SUBCHAPTER 11
FOUNDATIONS

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***"C26" omitted from section numbers in this column.*
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ARTICLE 1 GENERAL

§[C26-1100.1] 27-652 Scope.- The provisions of this subchapter shall establish minimum requirements for the design and construction of the foundations of buildings. In addition, within special flood hazard areas, and below the regulatory flood datum, as described in article ten of subchapter four of this chapter, foundations shall conform with the applicable provisions of reference standard RS 4-5.

§[C26-1100.2] 27-653 Standards.- The provisions of reference standard RS-11 shall be part of this subchapter.

§[C26-1100.3] 27-654 Definitions.- For definitions to be used in the interpretation of this subchapter, see subchapter two of this chapter.

§[C26-1100.4] 27-655 Plans. -For the requirements governing the filing of plans and the work to be shown on the plans, see subchapter one of this chapter**.**

§[C26-1100.5] 27-656 Permits. -For the requirements governing equipment work permits and for equipment use permits, see subchapter one of this chapter.

§[C26-1100.6] 27-657 General requirements. -
Except as otherwise specifically provided herein, the foundations of buildings including retaining walls and other structures shall bear on, or be carried down to, satisfactory bearing materials in such manner that the entire transmitted load will be distributed over the supporting soils at any depth beneath the foundation at unit intensities within the allowable bearing values established in this subchapter. In addition, foundations shall be proportioned to limit settlements to a magnitude that will not cause damage to the proposed construction or to existing adjacent or nearby buildings during or after construction.

§[C26-1100.7] 27-658 Depth of foundations. -
(a) Footings and Pile Caps.- The bottom surface of any footing, pier, pile cap, or other foundation construction, other than grade beams, shall be carried down at least four feet below the lowest level of the adjoining ground or pavement surface that is exposed to frost, except as follows:
(1) In refrigerator, cold storage, or similar areas, the depth shall be increased as required to find [*sic*] the construction below the potential level of freezing in the soil, or loss of heat from the soil shall be prevented by insulation, warm air ducts, circulating systems, or equivalent means.
(2) For foundation elements resting on rock, the footings may rest on the rock surface at shallower depths than those indicated above, provided that visual inspection of the rock surface directly underlying the bearing area shows it to be free of seams, cracks, or disintegrated materials that could serve as reservoirs for water and thus be subject to freezing.
(3) For foundation elements in the interior of closed and heated buildings, or in cases where the soil underlying the foundation is not subject to frost action, there shall be no mandatory minimum requirement for embedment.
(4) Mobile or portable buildings not more than one story high may be supported on foundation elements bearing at grade, subject to the following conditions:
a. The building shall be supported on jacks, wedges, or other devices that will permit readjustment of level in the event of displacement.
b. The bearing capacity of the underlying soil shall be adequate to support the building loads without rupture. Where the building is to be supported on nominally unsatisfactory bearing materials, the provisions of sections 27-677 and 27-679 of article four of this subchapter shall apply except that, where the bearing material is confined under pavement and the bearing pressure on the surface of the soil material does not exceed five hundred psf, special investigation of the foundation will not be required.
c. The bearing area shall be well drained and not subject to inundation.
d. The levels of the foundations shall be checked and adjusted to compensate for displacements at least once

every year, and the owner shall maintain a record of such work, available for inspection by the commissioner.
(5) Where piles project above grade and displacement of the pile cap is prevented by interposing a space between the underside of the cap and the ground, the requirement for embedment of the cap below the level of frost penetration, shall not apply.
(b) Grade beams. -The bottom surface of any grade beam shall be carried down at least eighteen inches below the lowest level of the adjoining ground or pavement surface that is exposed to frost.

§[C26-1100.8] 27-659 Foundations at different levels. -Where footings are supported at different levels, or at different levels from the footings of adjacent structures, the influence of the pressures under the higher footings on the stability of the lower footings shall be considered. Consideration shall be given to the requirements for lateral support of the material supporting the higher footings, the additional load imposed on the lower footings, and assessment of the effects of dragdown on adjacent pile-supported buildings.

§[C26-1100.9] 27-660 Slabs on grade. -Slabs on grade within or adjacent to a building shall be so designed to limit settlement of such slabs to a magnitude that will not impair their usability or cause damage to the building or its foundations.

§[C26-1100.10] 27-661 Construction. –
The provisions of subchapter nineteen of this chapter relating to safety and of subchapter ten of this chapter relating to concrete, timber, masonry, and steel construction shall apply. For inspection requirements, see article thirteen of this subchapter.
(a) Cold weather. -No foundation shall be placed on frozen soil. No foundation shall be placed in freezing weather unless provision is made to maintain the underlying soil free of frost.
(b) Seepage. -In an excavation where soil and ground water conditions are such that an inward or upward seepage might be produced in soil material intended to provide vertical or lateral support for foundation elements or for adjacent foundations, excavating methods that will control or prevent the inflow of ground water shall be employed to prevent disturbance of the soil material in the excavation or beneath existing buildings. No foundation shall be laid on soil that has been disturbed by seepage unless remedial measures, as directed by an architect or engineer, are taken.

ARTICLE 2 SOIL INVESTIGATIONS

§[C26-1101.1] 27-662 General. -Borings in earth or rock, recovery of samples, tests of soil samples, load tests, or other investigations or exploratory procedures shall be performed as necessary for the design and construction of a safe foundation subject to inspection in accordance with the requirements of article thirteen of this subchapter.

§[C26-1101.2] 27-663 Borings. -(a) Number. -At least one boring shall be made for every twenty-five hundred square feet of building area or fraction thereof and, for buildings supported on piling of such type or capacity that load tests are required, one boring shall be made for every sixteen hundred square feet of building area or fraction thereof except as indicated in paragraphs one through three of this subdivision.
(1) For one- and two-family dwellings (appurtenant structures such as garages, sheds, and porches shall be considered as part of the dwelling):
a. Buildings supported on footings founded on soil of class 8-65 or better. -For contiguous groups of four or more dwellings at least one boring shall be made for every four buildings. For isolated dwellings and for contiguous groups of two or three dwellings, the overall site shall be explored by at least one boring or auger probing or, alternately, the site of each building shall be explored by one test pit carried to a depth of at least eight feet below the level of the bottom of the proposed footings.
b. Buildings supported on piles or on footings founded in soil strata of class 9-65, or poorer. -The site shall be explored by at least one boring for every four buildings in contiguous groups or one boring for each building in the case of isolated dwellings.
(2) For buildings having a plan area in excess of ten thousand square feet and where subsurface conditions as determined from preliminary borings or from borings on neighboring sites consist of uniform deposits of materials of class 1-65, 2-65, 3-65, 6-65, 7-65, or 8-65, subject to the approval of the commissioner, the required borings may be reduced to one for every five thousand square feet of building area or fraction thereof except where the foundation is to be supported on piles.
(3) Where foundations are to rest on rock of class 1-65, 2-65, or 3-65 and such rock is exposed prior to construction over a part or all of the area of the buildings, borings will not be required in those areas where rock is exposed, and the area (within the limits of the building) of the exposed rock surface shall not be included in the area used to compute the required number of borings, provided the following requirements are met:
a. The presence of defects or the inclination of bedding planes in the rock are of such size and location as to not affect the stability of the foundation.
b. The foundation is designed for bearing pressures not exceeding those permitted in table 11-2 without increase for embedment.

(b) Location. -At least two-thirds of the required number of borings shall be located within the area under the building. Those outside the area shall not be more than twenty-five feet from the limits of the building. Borings shall be uniformly distributed or distributed in accordance with the loading pattern imposed by the building.

(c) Depth. -

(1) Unless soil material of class 1-65 through 3-65 is encountered at shallower depth, borings shall extend below the deepest part of the excavation as necessary to satisfy the more restrictive of the following requirements:

a. Borings shall extend deep enough into nominally satisfactory bearing material to establish its character and thickness, but not less than the following:

1. Where the soil material is class 5-65-ten feet.

2. For one- and two-family residences, two stories or less in height-fifteen feet.

3. For other cases-twenty-five feet.

b. Borings shall extend to the depth at which the vertical stress caused by the proposed construction is reduced to ten percent or less of the original vertical stress at this depth due to the weight of the overburden, except that where strata of soil materials of class 9-65 or poorer are encountered within this depth, the borings shall penetrate such strata and be carried to a depth that shows penetration continuous of material of class 8-65 or better as required in paragraph a of this subdivision.

c. In addition to the requirements of paragraphs a and b of this subdivision, at least one boring in every ten thousand square feet of building area, but not less than one boring per building, shall be carried to a depth of one hundred feet below the curb for buildings having an average area load exceeding one thousand psf. The average load shall be computed as the sum of all dead loads and live loads of the building, divided by the area of the building at ground level.

(2) Where rock is encountered in borings within the depths noted in paragraph one the borings shall be cored a minimum of five feet into rock, or farther where necessary or required, to obtain at least a recovery of thirty-five percent core from five feet of penetration but not to exceed the depth in paragraph one of this subdivision. However, for foundations supported on piles or drilled-in caissons bearing on the rock and having a capacity in excess of eighty tons per unit, the capacity of the rock to support the applied load shall be demonstrated by increasing the length of coring to ten feet.

(d) Types. -

(1) SOIL BORINGS. -Soil samples shall be recovered at intervals not to exceed five feet and at every change of soil strata. Such samples shall be recovered using a two inch O.D. split spoon sampler having an inside diameter of one and three-eighths inches and a constant internal cross section. The sampler shall be at least twenty-four inches long and shall be tipped with a heat treated, sharp cutting shoe. It shall be straight and sound, with an undistorted cross section. The rods to which the sampler is attached shall be one inch extra heavy pipe or one and five-eighths O.D. drill rods. The sampling tools shall be driven with a one hundred forty pound hammer having a fall of thirty inches. The blows per foot so recorded shall be designated hereinafter, by the symbol, N. The fall of the hammer shall be a free fall and the energy of impact shall not be mitigated by friction of the hoisting line on the drum, friction of the hammer against its guide, or other similar effects. All samples, except those of rock, shall be preserved in air tight bottles having a capacity of at least eight ounces.

(2) ROCK BORINGS. -Where borings are required to penetrate rock they shall be advanced by core drilling, and core samples shall be recovered using a double tube core barrel and diamond bits that provide cores at least one and three-eighths inches in diameter.

(e) Data to be reported. -Records of all borings required by the provisions of subdivision (a) of this section shall accompany the application for approval of the foundation plans. Such records shall show, as a minimum, the size of casing and the number of blows per foot required to advance the casing (to the depth that casing is used); the weight of hammer and the distance of fall; a description of the sampler; a description of the drill tools and equipment including, where used, the size of diamond bits and type of core barrels; the number of blows required to drive the sampling spoon for each six inches increment of penetration; the elevation of the ground surface referenced to an established datum; the location and depth of the boring and its relation to the proposed construction; the elevations at which samples were taken; the elevations at which core drilling was started and stopped for each "run;" the elevations of the boundaries of soil strata; percent recovery for each "run" of core drilling; description of the soil strata encountered and geological classification of rock drilled (based on visual examination of cores); any particular, unusual, or special conditions such as loss of water in the earth and rock strata, boulders, cavities, and obstructions, use of special type of samplers, traps, etc.; and the level of ground water together with a description of how and when the ground water level was observed. All abandoned or unsuccessful attempts at borings or rock drilling shall be reported.

(f) Disposition of Samples and Cores. -Soil samples and rock cores shall be retained in an accessible location by the owner, or by the party making application for approval of the foundation plans for a period of one year after the date of issuance of a certificate of occupancy, and shall be available upon reasonable notice for inspection by the commissioner.

§[C26-1101.3] 27-664 Test pits. -

(a) Tests pits may be substituted for boring on a one-for-one basis. All applicable requirements as to depth, numbers of samples, data to be reported, and disposition of samples shall be observed, except that the use of sample spoon, recording of driving resistance, and recovery of rock cores is not required in test pit investigations, and except as provided in subdivision (b) of this section.
(b) Test pits for buildings not more than one story in height or for one or two-family residences not more than two stories in height need only extend four feet below the deepest part of the excavation for the construction of footings, or a minimum of four feet when foundation elements rest on grade pursuant to paragraph four of subdivision (a) of section 27-658 of article one of this subchapter, provided that such structures are supported by footings bearing on nominally satisfactory bearing materials of class 9-65 (except soft clay) soil or better.

§[C26-1101.4] 27-665 Boring methods. -
Borings shall be made by continuous driving and cleaning out of a pipe casing (including telescoping of smaller sizes inside of larger casing) except as permitted in subdivisions (a), (b) and (c) of this section. Where casing is used, it shall be cleaned out to undisturbed soil prior to sampling and the sample spoon driven into soil that has not been affected by chopping, washing, or hydrostatic imbalance.
(a) Uncased borings. -Uncased borings, including borings where the casing is omitted for part of the depth, may be used if the mud slurry method is followed. The requirements for soil sampling and rock coring shall be the same for uncased borings as for borings made using casing, except that prior to each soil sampling operation the boring shall be substantially cleaned of disturbed material and the sample spoon shall be advanced through any settled solids before counting the blows required to drive the spoon. Longer sample spoons, having a sludge chamber, shall be used where settled solids exceed six inches. In determining ground water levels, methods shall be used to reduce and replace the mud slurry so that the hydrostatic head may be measured. The procedures shall be described in detail in the records.
(b) Augur borings. -Borings may be made with augers except that short flight augers shall not be used in granular soils below the water level. Sampling procedures in auger borings for both soil and rock shall be the same as for cased borings. Full hydrostatic head shall be maintained in granular soils below the ground water level during the boring operation.
(c) Maximum diameter. -Where the bore hole, as drilled by any method, is in excess of four inches in diameter, sampling operations shall be performed through a temporary casing having a four inch inside diameter or less.

§[C26-1101.5] 27-666 Probings and geophysical explorations. -
(a) Footings, pier or wall designs.- Where the foundations for a proposed building consist of footings or foundation piers or walls bearing on rock of class 1-65, 2-65 or 3-65, the use of probings, auger borings or geophysical methods, made without the recovery of soil samples or rock cores, may (except as hereafter specified) be substituted for up to one-half of the number of borings required by the provisions of subdivision (a) of section 27-663 of this article, provided that such probings, borings, etc. are carried to adequate depth and are of a nature that will reasonably define the surface contours of the rock. The accuracy of such surface contour definition shall be confirmed by recovering rock cores at the locations of at least one-fifth of the probings or auger borings or, in the case where geophysical methods are used, those borings which are made shall be so distributed as to permit confirmation of the accuracy of the geophysical investigations. The provisions of paragraph two of subdivision (a) of section 27-663 of this article, shall not apply where the provisions of this section are invoked.
(b) Pile support.- Where the foundation for the proposed building consists of piling bearing on rock of class 1-65, 2-65 or 3-65, the provisions of subdivision (a) of this section shall apply, provided that the borings consistently show that the soil overlying the rock consists solely of deposits of class 6-65 through 11-65 and is free of boulders or other obstructions.
(c) Geophysical methods.- Geophysical investigations shall be conducted by experienced and qualified personnel acceptable to the commissioner who may reject the results and require additional exploration by borings if the results of the geophysical explorations cannot be satisfactorily correlated to the logs of the borings.

§[C26-1101.6] 27-667 Existing borings.- Existing boring data may be utilized subject to the following:
(1) Borings, test pits, probings, etc., that have been made in accordance with all requirements of this section, but not necessarily for the investigation of the specific project for which application is being made, may be utilized in fulfillment of these provisions.
(2) The logs of borings, test pits, probings, etc., that have been made in accordance with all requirements of this section, but wherein the soil samples and/or rock cores are not available for examination, may be utilized in fulfillment of these provisions to an extent not to exceed one-half of the required number of borings.
(3) Borings, test pits, probings, etc., or the logs thereof, that do not meet the specific requirements of this subchapter, but which are of suitable type and adequate penetration to provide the data required for the safe design and construction of the proposed foundation,

may be utilized in fulfillment of the provisions of this section, subject to the approval of the commissioner.

ARTICLE 3 FOUNDATION LOADS

§[C26-1102.1] 27-668 Soil bearing pressures. -The loads to be used in computing the bearing pressures on materials directly underlying footings shall be the total column, pier, or wall reactions determined in accordance with the provisions of subchapter nine of this chapter, on the basis of reduced live load; plus the weight of the foundations; plus the weight of any soil, fill, and slabs on grade that is included within vertical planes projected upward from the extreme limits of the footing to the final ground surface. Live load on grade, or on slabs on grade, within these limits shall also be included. Impact loads shall be considered in accordance with the provisions of section 27-673 of this article.

§[C26-1102.2] 27-669 Pile reactions. -The loads to be used in computing pile reactions shall be determined as provided in section 27-668 of this article except that where piles penetrate fill, clay, silt, peat, or similar compressible strata, the pile loads shall be increased by the amount of drag exerted by such material, and by any overlaying strata, during consolidation. Computation of the amount of drag shall consider the amount of added fill, the amount of shear strain between pile (or group) and the soil, the ratio of vertical to horizontal pressure in the soil, and the arrangement of the piles. The soil surrounding or underlying the pile cap shall not be considered as providing any vertical support for the cap.

§[C26-1102.3] 27-670 Lateral loads. -

****(a) Earth and ground water pressure**. -Every foundation wall or other wall serving as a retaining structure shall be designed to resist, in addition to the vertical loads acting thereon, the incident lateral earth pressures and surcharges, plus hydrostatic pressures corresponding to the maximum probable ground water level. Retaining walls shall be designed to resist at least the superimposed effects of the total static lateral soil pressure, excluding the pressure caused by any temporary surcharge, plus an earthquake force of $0.045\ w_s h^2$ (horizontal backfill surface), where w_S equals unit weight of soil and h equals wall height. Surcharges which are applied over extended periods of time shall be included in the total static lateral soil pressure and their earthquake lateral force shall be computed and added to the force of $0.045\ w_s h^2$. The earthquake force from backfill shall be distributed as an inverse triangle over the height of the wall. The point of application of the earthquake force from an extended duration surcharge shall be determined on an individual case basis. If the backfill consists of loose saturated granular soil, consideration shall be given to the potential liquefication of the backfill during the seismic loading using reference standard RS 9-6.

(b) Wind and other superstructure loads. -Provision shall be made to resist lateral loads imposed on the superstructure due to wind or other causes.

(c) Soil movements.- Buildings shall not be constructed in areas where the soil is subject to lateral movements unless positive provision is made to prevent such movements.

****Local Law 17-1995.***

§[C26-1102.4] 27-671 Eccentricities. -Eccentricity of loading in foundations, including eccentricity of loading on the bases of retaining walls, shall be investigated and the maximum soil pressure or pile load (considering eccentricity) shall be kept within the safe capacity thereof as established in articles four and eight of this subchapter. Soil pressure and pile load due to eccentricity shall be computed on the basis of straight line distribution of foundation reaction. However, other modes of distribution of the foundation reaction may be assumed, subject to the approval of the commissioner, if it can be demonstrated that the pile and/or soil is capable of sufficient plastic deformation to develop such mode of distribution without failure.

§[C26-1102.5] 27-672 Uplift forces.- Uplift and overturning forces due to wind and hydrostatic pressure shall be considered.

§[C26-1102.6] 27-673 Impact. -Impact forces may be neglected in the design of foundations, except for foundations bearing on loose granular soils, or, regardless of the type of soil material, for foundations supporting cranes, heavy machinery, and* moving equipment, or where the ratio of the live load causing impact to the total of the reactions from live load applied without impact plus dead load exceeds one-third.

****As enacted but "or" probably intended.***

§[C26-1102.7] 27-674 Stability. -The provisions of article twelve of this subchapter shall apply.

ARTICLE 4 ALLOWABLE SOIL BEARING PRESSURES

§[C26-1103.1] 27-675 Classification of soil materials. - For purposes of this subchapter, soil materials shall be classified and identified in accordance with table 11-1. In addition, the following supplementary definitions shall apply.

(a) Rock. -

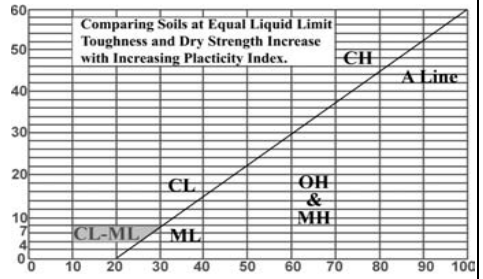
(1) HARD SOUND ROCK. -Includes crystalline rocks such as Fordham geniss**, Ravenswood geniss**, Palisades diabase, Manhattan schist. Characteristics [*sic*] are: the rock rings when struck with pick or bar; does not

disintegrate after exposure to air or water; breaks with sharp fresh fracture; cracks are unweathered and less than one-eighth inch wide, generally no closer than three feet apart; core recovery with a double tube, diamond core barrel is generally eighty-five percent or greater for each five foot run.

*****As enacted but "gneiss" probably intended.***

TABLE 11-1 UNIFIED SOIL CLASSIFICATION
(Including Identification and Description)

Major Divisions		Group Symbols	Typical Names	Field Identification Procedures (Excluding particles larger than 3 in. and basing fractions on estimated weights)			Information Required for Describing Soils	Laboratory Classification Criteria
1	2	3	4	5			6	7
Coarse-grained Soils More than half of material is *larger* than No. 200 sieve size. The No. 200 sieve size is about the smallest visible to the naked eye.	Gravels More than half of coarse fraction is larger than No. 4 sieve size. (For visual classification, the ¼-in. size may be used as equivalent to the No. 4 sieve size.) Clean Gravels (Little or no fines)	GW	Well-graded gravels, gravel-sand mixture, little or no fines.	Wide range in grain size and substantial amounts of all intermediate particle sizes.			For undisturbed soils add information on stratification, degree of compactness, cementation, moisture condition, and drainage characteristics. Give typical name; indicate approximate percentages of sand and gravel, maximum size; angularity, surface condition, and hardness of the coarse grains; local or geologic name and other pertinent descriptive information; and symbol in parentheses. Example: Silty sand, gravelly; about 20% hard, angular gravel particles ½-in. maximum size; rounded and subangular sand grains, coarse to fine; about 15% nonplastic fines with low dry strength; well compacted and moist in place; alluvial sand; (SM).	Use grain-size curve in identifying the fractions as given under field identification. Determine percentage of gravel and sand from grain-size curve. Depending on percentage of fine (fraction smaller than No. 200 sieve size) coarse-grained soils are classified as follows: Less than 5% GW, GP, SW, SP, More than 12% GM, GC, SM, SC. 5% to 12% Borderline cases requiring use of dual symbols.
		GP	Poorly graded gravels or gravel-sand mixture, little or no fines.	Predominantly one size or a range of sizes with some intermediate sizes missing.				$C_u = \frac{D_{60}}{D_{10}}$ Greater than 4 $C_e = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ Between 1 and 3 Not meeting all gradation requirements for GW
	Gravels with Fines (Appreciable amount of fines)	GM	Silty gravels, gravel-and-silt mixtures.	Nonplastic fines or fines with low plasticity (for identification procedures see ML below).				Atterberg limits below "A" line or P1 less than 4 Atterberg limits above "A" line with P1 greater than 7 Above "A" line with P1 between 4 and 7 are borderline cases requiring use of dual symbols.
		GC	Clayey gravels, gravel-and-clay mixtures.	Plastic fines (for identification procedures see CL below).				
	Sands More than half of coarse fraction is smaller than No.4 sieve size. Clean Sands (Little or no fines)	SW	Well-graded sands, gravelly sands, little or no fines.	Wide range in grain size and substantial amounts of all intermediate particle sizes.				$C_u = \frac{D_{60}}{D_{10}}$ Greater than 6 $C_e = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ Between 1 and 3 Not meeting all gradation requirements for SW
		SP	Poorly graded sands or gravelly sands, little or no fines.	Predominantly one size or a range of sizes with some intermediate sizes missing.				Atterberg limits above "A" line or P1 less than 4 Atterberg limits above "A" line with Pl greater than 7 Limits plotting in hatched zone with P1 between 4 and 7 are borderline cases requiring use of dual symbols.
	Sands with Fines (Appreciable amount of fines)	SM	Silty sands, sand-silt mixtures.	Nonplastic fines or fines with low plasticity (for identification procedures see ML below).				
		SC	Clayey sands, sand-clay mixtures.	Plastic fines (for identification procedures see CL below).				
Fine-grained Soils More than half of material is *smaller* than No. 200 sieve size.				Identification Procedure on Fraction Smaller than No. 40 Sieve Size.				
				Dry Strength (Crushing Characteristics)	Dilatancy (Reaction to shaking)	Toughness (Consistency near PL)		
	Silts and Clays Liquid limit is less than 50	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity	None to slight	Quick to slow	None	For undisturbed soils add information on structure, stratification, consistency in undisturbed and remolded states, moisture and drainage conditions Give typical name; indicate degree and character of plasticity; amount and maximum size of coarse grains; color in wet condition; odor, if any; local or geologic name and other pertinent descriptive information; and symbol in parentheses. Example: Clayey silt, brown; slightly plastic; small percentage of fine sand; numerous vertical root holes; firm and dry in place; loess; (ML)	
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.	Medium to high	None to very slow	Medium		
	Silts and Clays Liquid limit is greater than 50	OL	Organic silts and organic silty clays of low plasticity.	Slight to medium	Slow	Slight		
		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.	Slight to medium	Slow to none	Slight to medium		
		CH	Inorganic clays of high plasticity, fat clays.	High to very high	None	High		
		OH	Organic clays of medium to high plasticity, organic silts.	Medium to high	None to very slow	Slight to medium		
Highly Organic Soils		Pt	Peat and other highly organic soils.	Readily identified by color, odor, spongy feel and frequently by fibrous texture				



LIQUID LIMIT
PLACTICITY CHART
For Laboratory classification of fine-grained soils

(1) Boundary classifications: Soils possessing characteristics of two groups are designed by combinations of group symbols. For example GM-GC, well-graded gravel-sand mixture with clay binder.
(2) All sieve sizes on this chart are U.S. standard.
(3) Adopted by Corps of Engineers and Bureau of Reclamation, January 1952

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FIELD IDENTIFICATION PROCEDURES FOR FINE-GRAINED SOILS OR FRACTIONS (Notes for Table 11-1)

These procedures are to be performed on the minus No. 40 sieve size particles, approximately 1/64 in. For field classification purposes, screening is not intended, simply remove by hand the coarse particles that interfere with the tests.

Dilatancy (reaction to shaking)

After removing particles larger than No. 40 sieve size, prepare a pat of moist soil with a volume of about one-half cubic inch. Add enough water if necessary to make the soil soft but not sticky.

Place the pat in the open palm of one hand and shake horizontally, striking vigorously against the other hand several times. A positive reaction consists of the appearance of water on the surface of the pat which changes to a livery consistency and becomes glossy. When the sample is squeezed between the fingers, the water and gloss disappear from the surface, the pat stiffens, and finally it cracks or crumbles. The rapidity of appearance of water during shaking and of its disappearance during squeezing assist in identifying the character of the fines in a soil.

Very fine clean sands give the quickest and most distinct reaction whereas a plastic clay has no reaction. Inorganic silts, such as a typical rock flour, show a moderately quick reaction.

Dry Strength (crushing characteristics)

After removing particles larger than No. 40 sieve size, mold a pat of soil to the consistency of putty, adding water if necessary. Allow the pat to dry completely by oven, sun or air-drying, and then test its strength by breaking and crumbling between the fingers. This strength is a measure of the character and quantity of the colloidal fraction contained in the soil. The dry strength increases with increasing plasticity.

High dry strength is characteristic for clays of the CH group. A typical inorganic silt possesses only very slight dry strength. Silty fine sands and silts have about the same slight dry strength, but can be distinguished by the feel when powdering the dried specimen. Fine sand feels gritty whereas a typical silt has the smooth feel of flour.

Toughness (consistency near plastic limit)

After particles larger than the No. 40 sieve size are removed, a specimen of soil about one-half inch cube in size, is molded to the consistency of putty. If too dry, water must be added and if sticky, the specimen should be spread out in a thin layer and allowed to lose some moisture by evaporation. Then the specimen is rolled out by hand on a smooth surface or between the palms into a thread about one-eighth inch in diameter. The thread is then folded and rerolled repeatedly. During this manipulation, the moisture content is gradually reduced and the specimen stiffens, finally loses its plasticity, and crumbles when the plastic limit is reached.

After the thread crumbles, the pieces should be lumped together and a slight kneading action continued until the lump crumbles.

The tougher the thread near the plastic limit and the stiffer the lump when it finally crumbles, the more potent is the colloidal clay fraction in the soil.

Weakness of the thread at the plastic limit and quick loss of coherence of the lump below the plastic limit indicate either inorganic clay of low plasticity, or materials such as kaolin-type clays and organic clays which occur below the A-line.

Highly organic clays have a very weak and spongy feel at the plastic limit.

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(2) MEDIUM HARD ROCK. -Includes crystalline rocks of paragraph one of this subdivision, plus Inwood marble and serpentine. Characteristics are: all those listed in paragraph one of this subdivision, except that cracks may be one-quarter inch wide and slightly weathered, generally spaced no closer than two feet apart; core recovery with a double tube, diamond core barrel is generally fifty percent or greater for each five foot run.

(3) INTERMEDIATE ROCK. -Includes rocks of paragraphs one and two of this subdivision, plus cemented shales and sandstone of the Newark formation. Characteristics are: the rock gives dull sound when struck with pick or bar; does not disintegrate after exposure to air or water; broken pieces may show weathered surfaces; may contain fracture and weathered zones up to one inch wide spaced as close as one foot; core recovery with a double tube, diamond core barrel is generally thirty-five percent or greater for each five foot run.

(4) SOFT ROCK.- Includes rocks of paragraphs one, two and three of this subdivision in partially weathered condition, plus uncemented shales and sandstones. Characteristics are: rock may soften on exposure to air or water; may contain thoroughly weathered zones up to three inches wide but filled with stiff soil; core recovery with a double tube, diamond core barrel is less than thirty-five percent for each five foot run, but standard penetration resistance in soil sampling is more than fifty blows per foot. Where core recoveries are less than twenty percent and the material is to be used for bearing, a minimum three inches diameter core shall be recovered and the material recovered shall be classified in accordance with table 11-1.

(b) Special soil types. -

(1) FINE SAND.- Soils of group SM, containing more than fifty percent (by weight) of particles passing a number sixty mesh sieve.

(2) HARDPAN.- Soils of groups GM, GC, and SW, generally directly overlying rock, and which are sufficiently cemented to be difficult to remove by picking.

(3) CLAY SOILS.- Soils of each group SC, CL and CH shall be classified according to consistency as hard, medium, or soft in accordance with the following:

a. Hard clay.- A clay requiring picking for removal, a fresh sample of which cannot be molded by pressure of the fingers.

b. Medium clay.- A clay that can be removed by spading, a fresh sample of which can be molded by a substantial pressure of the fingers.

c. Soft clay. -A clay, a fresh sample of which can be molded with slight pressure of the fingers.

(4) SILT SOILS.- Soils of each group ML and MH shall be classified as dense, medium, or loose depending on relative difficulties of removal as described for hard, medium, and soft clays in paragraph three of this subdivision.

(5) VARVED SILT. -A natural soil deposit consisting of alternating thin layers of silt, clay, and sand in which the silt or silt plus sand layers predominate.

§[C26-1103.2] 27-676 Satisfactory bearing material.- The following materials, or any combination of them

shall be considered as generally satisfactory bearing materials; hard sound, medium hard, intermediate, and soft rock; hardpan; granular soils of G and S groups; dense or medium silt soils of groups ML and MH; and hard or medium clay soils of groups CL and CH.

§[C26-1103.3] 27-677 Nominally unsatisfactory bearing material. -Fill material, peat (group Pt), organic silts and clays (grouping OL and OH), soft or loose soils of groups ML, CL, HM and CH, varved silt, or satisfactory bearing materials that contain lenses of, or are underlain by, these materials shall be considered as nominally unsatisfactory bearing materials.

§[C26-1103.4] 27-678 Allowable soil bearing pressures.- The allowable bearing pressures on satisfactory bearing materials shall be those established in table 11-2. The allowable bearing pressures on nominally unsatisfactory bearing materials shall be those established in accordance with section 27-679 of this article. Allowable bearing pressure shall be considered to be the allowable pressure at a point in the soil mass in excess of the stabilized overburden pressure existing at the same point prior to construction operations. The stabilized overburden pressure existing at a point shall be defined as that portion of the weight of the overlying soil material that is supported by granular interaction rather than pore pressure. In general, the magnitude of the stabilized overburden pressure may be approximated as follows:

(a) The overlying soil material shall have been in place for an adequate length of time to produce a stable condition of pore pressure in, or below, the foundation level. Where the bearing stratum consists of soils of classes 5-65 through 8-65, the bearing stratum shall be considered to be fully consolidated except with regard to the weight of that portion of the overlying soil material that consists of added fill material.
(b) Where all or a portion of the overlying soil consists of fill material, the weight of the fill material shall not be included in the stabilized overburden pressure unless the magnitude of stabilized pressure is verified by an architect or engineer on the basis of laboratory or field tests on undisturbed material.
(c) Where the bearing stratum consists of soils of classes 9-65 through 11-65, the stabilized overburden pressure shall be considered as zero unless the magnitude of the stabilized pressure is established by an architect or engineer on the basis of laboratory or field tests on undisturbed material.

TABLE 11-2 ALLOWABLE SOIL BEARING PRESSURES

Class of Material	Description See Notes* (1)	Basic Allowable Bearing Values (Tons per sq. ft.) See Notes (10), (11), and (12)	
1-65	Hard Sound Rock…….	60	See Notes (2) and (8).
2-65	Medium Hard Rock……..	40	See Notes (2) and (8).
3-65	Intermediate Rock……	20	See Notes (2) and (8).
4-65	Soft Rock…….	8	
5-65	Hardpan…… …	—	See Notes (3) and (8).
6-65	Gravel and Gravel Soils (Soil Groups GW, GP, GM, & GC and soils of Soil Groups SW, SP, and SM containing more than 10% of material retained on a No. 4 sieve)……..	—	See Notes (4) and (8) and (9).
7-65	Sands (other than Fine Sands) (Soil Groups SW, SP, & SM but containing not more than 10% of material retained on a No. 4 sieve)……	—	See Notes (5) and (8) and (9).
8-65	Fine Sand…….	—	See Notes (6) and (8) and (9).
9-65	Clays and Clay Soils (Soil Groups SC, CL, & CH)		
	Hard…..……...	5	See Note (7).
	Medium.……. .	2	See Note (7).
	Soft.…… .	See Sec. 27-679.	

10-65	Silts and Silt Soils (Soil Groups ML & MH)	
	Dense……..	3
	Medium……..	1.5
	.	
	Loose……..	See Sec. 27-679.
	.	
11-65	Nominally Unsatisfactory Bearing Materials	See Sec. 27-679.

As enacted but "Note" probably intended.

Notes:

(1) Classification. The soil classifications indicated in this table are those described in section 27-675 of this article. Where there is doubt as to the applicable classification of a soil stratum, the allowable bearing pressure applicable to the lower class of material to which the given stratum might conform shall apply unless the conformance to the higher class of material can be proven by laboratory or field test procedures.

(2) Allowable bearing pressure on rock. The tabulated values of basic allowable bearing pressures apply only for massive rocks or, for sedimentary or foliated rocks, where the strata are level or nearly so, and, then only if the area has ample lateral support. Tilted strata and their relation to nearby slopes or excavations shall receive special consideration.

(3) Allowable bearing pressure on hardpan. For hardpan consisting of well cemented material composed of a predominantly granular matrix and free of lenses of fine grained material and inclusions of soft rock, the basic allowable bearing pressure shall be twelve tons per square foot. For hardpan consisting of poorly cemented material or containing lenses of fine grained material, inclusions of soft rock, or a fine grained matrix, the basic allowable bearing pressure shall be eight tons per square foot.

(4) Allowable bearing pressure on gravel and gravel soils. Values of basic allowable bearing pressure shall be as follows:

(a) For soils of Soils Groups GW,GP, GM, and GC:
Compact, well graded material—ten tons per square foot.
Loose, poorly graded material—six tons per square foot.
Intermediate conditions—Estimate by interpolation between indicated extremes.

(b) For soils of Soil Groups SW, SP, and SM, containing more than ten percent of material retained on a No. 4 sieve :
Compact, well graded material—eight tons per square foot.
Loose, poorly graded material—four tons per square foot.
Intermediate conditions—Estimate by interpolation between indicated extremes.

(5) Allowable bearing pressure on sands. The basic allowable bearing pressure shall be determined from the resistance to penetration of the standard sampling spoon. The basic allowable bearing pressure in tons per square foot shall equal 0.10 times N but not greater than six tons per square foot, nor less than three tons per square foot. The appropriate value for the penetration resistance at various areas of the site shall be made by averaging the measured resistance within a depth of soil below the proposed footing level equal to the width of the footing. Where the average values so obtained do not vary by more than twenty-five percent of the minimum of the average values over the site of the proposed building, the lowest average value shall be used for the design of the entire building. Where the variation exceeds twenty-five percent, the allowable bearing pressure shall be predicated on the lowest average value unless appropriate measures are taken to avoid detrimental amounts of differential settlements of the footings. Where the design bearing pressure on soils of class 7-65 exceeds three tons per square foot, the embedment of the loaded area below the adjacent grade shall not be less than four feet and the width of the loaded area not less than three feet, unless analysis shall demonstrate the proposed construction to have a minimum factor of safety of 2.0 against shear failure of the soil.

(6) Allowable bearing pressure on fine sand. The basic allowable bearing pressure shall be determined from the resistance to penetration of the standard sampling spoon. The basic allowable bearing pressure in tons per square foot shall equal 0.10 times N but not greater than four tons per square foot nor less than two tons per square foot, except that, for loose materials (resistance to penetration of the standard sampling spoon ten blows per foot or less), where the foundation is subjected to vibratory loads from machinery or similar cause, the indicated basic values shall not apply. The allowable bearing pressure shall be established by analysis applying accepted principles of soil mechanics and a report of such analysis satisfactory to the commissioner shall be submitted as a part of the application for the acceptance of the plans.

(7) Allowable bearing pressure on clays and clay soils. The bearing capacity of medium and hard clays and clay soils shall be established on the basis of the strength of such soils as determined by field or laboratory tests and shall provide a factor of safety against failure of the soul of not less than 2.0 computed on the basis of a recognized procedure of soils analysis, shall consider probable settlements of the building, and shall not exceed the tabulated maximum values.

(8) Increases in allowable bearing pressure due to embedment of the foundation. (a) The basic allowable bearing values for rock of classes 1-65, 2-65, and 3-65 shall apply where the loaded area is on the surface of sound rock. Where the loaded area is below the adjacent rock surface and is fully confined by the adjacent rock mass and provided that the rock mass has not been shattered by blasting or otherwise is or has been rendered unsound, these values may be increased ten percent of the base value for each foot of embedment below the surface of the adjacent rock surface in excess of one foot, but shall not exceed twice the basic values. (b) The basic allowable bearing values for soils of classes 5-65 through 8-65 determined in accordance with notes three, four, and five above, shall apply where the loaded area is embedded four feet or less in the bearing stratum. Where the loaded area is embedded more than four feet below the adjacent soil, these values may be increased five percent of the base value of each foot of additional embedment, but shall not exceed twice the basic values. Increases in allowable bearing pressure due to embedment shall not apply to soils of classes 4-65, 9-65, 10-65, or 11-65.

(9) Increase in allowable bearing pressure for limited depth of bearing stratum: The allowable bearing values for soils of classes 6-65, 7-65, and 8-65 determined in accordance with this table and the notes thereto (including note eight), may be increased up to one third where the density of the bearing stratum below the bottom of the footings or the tips of the piles increases with depth provided that: (a) The bearing stratum is not underlain by materials of a lower class. (b) The allowable bearing value of the soil material underlying the bottom of the footings or the tips of the piles increases at least fifty percent within a depth below the footing or the tips of the piles which is not greater than the width of the footing or the width of the polygon circumscribing the pile group. (c) It shall be demonstrated by a recognized means of analysis that the probable settlement of the foundation due to compression, and/or consolidation do not exceed acceptable limits for the proposed building.

(10) Combination of loads. The provisions of section 27-594 of article two of subchapter ten of this chapter shall apply.

(11) Correction for foundations bearing on materials of varying bearing capacities. Where it is shown by borings or otherwise that materials of varying bearing value will be used for support of a building: (1) Where the weakest material does not rank below class

5-65, no modifications shall be required. (2) Where the weakest materials rank as classes 6-65 through 8-65, if the difference in basic allowable bearing values for the several materials does not exceed thirty percent of the allowable value for the poorest material which is to support the foundation, the foundations may be proportioned in direct conformance with the allowable bearing pressures. Where the difference in basic allowable bearing values exceed thirty percent, appropriate measures shall be taken to limit the differential settlements of the different portions of the structure to tolerable values. (3) For materials of classes 9-65 and 10-65, in all cases, appropriate measures shall be taken to equalize the settlements of the different portions of the structure.

(12) Inundated footings. The provisions of this section relating to materials of classes 1-65 through 7-65, shall be deemed equally applicable both to the dry and to the inundated condition of the soil provided: (a) That the subgrade is undisturbed by the construction operations, (b) The bearing area is in a confined condition. For such cases, no reduction in allowable bearing value will be required where the soil supporting the foundation is subject to a rising level of inundation. However, the effects on settlement of a failing level of inundation occurring after construction of the foundation shall be considered in the design.

(d) The stabilized overburden pressure shall not include the weight of any soil removed by excavation and not replaced. For footings, the total stabilized overburden pressure shall not exceed the weight of a one square foot column of soil (considering submerged weight where the soil column is partly submerged) measured from the bottom of the footing to the lowest level of the final grade above the footing. For a box foundation, where the strength of the slab is adequate to stabilize the underlying soil, the stabilized overburden pressure shall not exceed the weight of a one square foot column of soil measured from the bottom of the box to the lowest level of the adjacent grade.

(e) Where the bearing stratum consists of soils of classes 9-65 through 11-65, the allowable bearing pressure shall be adjusted for the effects of rebound due to excavation as determined from consolidation test data.

(f) Where the bearing stratum consists of rock of classes 1-65 through 3-65, the stabilized overburden pressure shall be neglected.

§[C26-1103.5] 27-679 Bearing capacity of nominally unsatisfactory bearing materials.- Whenever soils exploration shows that the proposed foundation would rest on, or be underlain by, nominally unsatisfactory bearing materials, a report based on soil tests and foundation analysis (including analysis of undisturbed samples) shall be submitted by an architect or engineer, demonstrating, subject to the approval of the commissioner, that the proposed construction, under a condition of one hundred percent overload, is safe against failure of the soil materials. The report shall also show that the probable total magnitude and distribution of settlement to be expected under design conditions will not result in instability of the building or stresses in the structure in excess of the allowable values established in subchapter ten of this chapter. In addition, the following provisions shall apply:

(a) Fill materials. -

(1) CONTROLLED FILLS. -Fills shall be considered as satisfactory bearing materials of class 6-65 or 7-65 when placed in accordance with the following procedures, under the provisions for controlled inspection.

(a) Before placement of fill, the existing ground surface shall be stripped of all organic growth, timber, rubbish, and debris. After stripping, the ground surface shall be compacted to the density [described]* in subparagraph d of this paragraph.

Copy in brackets not enacted but probably intended.

(b) Materials for fill shall consist of sand, gravel, crushed stone, crushed gravel, or a mixture of these, and shall contain no organic matter. The fill materials shall contain no particles exceeding four inches in the largest dimension. No more than thirty per cent of the material shall be retained on a three-quarter inch sieve. The material passing the three-quarter inch sieve shall contain, by weight, no more than forty percent passing the one hundred sieve, or twelve percent passing the two hundred sieve.

(c) The grading of the fill shall be determined in accordance with the applicable procedures of reference standards RS 11-1 and RS 11-2.

(d) Fill shall be placed and compacted at its optimum moisture content, in uniform layers not more than twelve inches thick (after compaction) and each layer shall be thoroughly compacted to a density not less than ninety-five percent of the density prescribed in reference standard RS 11-3. The field density shall be verified by in-place density tests made on each lift of the embankment. Fill shall not be placed when frozen or placed on a frozen or wet sub-grade.

(2) UNCONTROLLED FILLS. -Fill material, other than controlled fill, may be used for the support of buildings, other than one-and two-family dwellings, and may be considered as satisfactory bearing material of applicable class, subject to the following:

a. The soil within the building area shall be explored using test pits. At least one test pit, penetrating at least eight feet below the level of the bottom of the proposed footings, shall be provided for every twenty-five hundred square feet of building area. Where such test pits consistently indicate that the fill is composed of material that is free of voids and free of extensive inclusions of mud, organic materials such as paper, garbage, cans, or metallic objects, and debris, the provisions of subparagraphs b and c of this paragraph shall apply. Where the test pits show such voids or inclusions, the additional provisions of subparagraph d of this paragraph shall apply. Borings may be used in lieu of test pits, provided that continuous samples at least four inches in diameter are recovered.

b. The building area shall be additionally explored using one standard boring under each column. These borings shall be carried to a depth sufficient to penetrate into natural ground, but not less than twenty feet below grade, and a sufficient number shall penetrate deeper than twenty feet as required to

meet the provisions of section 27-663 of article two of this subchapter. Where such borings show voids or inclusions, the provisions of subparagraph d of this paragraph shall apply.

c. The allowable soil bearing pressure on the fill material shall not exceed two tons per square foot.

d. Wherever the fill shows voids or inclusions as described in subparagraphs a and b of this paragraph, either the fill shall be treated as having no presumptive bearing capacity, or the building shall incorporate adequate strength and stiffness to bridge such voids or inclusions or shall be articulated to prevent damage due to differential or localized settlement of the fill.

(b) Organic silts, organic clays, soft inorganic clay, loose inorganic silt, and varved silt. -

(1) The allowable bearing pressure shall be determined independently of table 11-2 subject to the following:

a. For varved silts, the soil bearing pressure produced by the proposed building shall not exceed two tons per square foot, except that for desiccated or preconsolidated soils, higher bearing pressures will be allowed.

b. For organic silts or clays (groups OL and OH) or for soft or loose soils of groups ML, CL, MH, and CH, the soil bearing pressure produced by the proposed building shall not exceed one ton per square foot except that a value of two tons per square foot will be permitted on soils that are adequately preconsolidated or artificially treated.

(2) The report required in this section shall contain, as a minimum, the following information:

a. Geological profiles through the area defining the stratigraphy.

b. Sufficient laboratory test data on the compressible material to indicate the coefficient of consolidation, coefficient of compressibility, permeability, secondary compression characteristics, and Atterberg limits.

c. Where the design contemplates improvement of the natural bearing capacity and/or reduction in settlements by virtue of preloading, cross sections showing the amount of fill and surcharge to be placed on* design details showing the required time for surcharging shall be indicated, and computations showing the amount of settlement to be expected during surcharging. Records of settlement plate elevations and pore pressure readings, before, during, and after surcharging, shall be filed with the commissioner.

As enacted but "and" probably intended.

d. The estimated amount and rate of settlement expected to occur after the structure has been completed, including the influence of dead and live loads of the structure.

e. A detailed analysis showing that the anticipated future settlement will not adversely affect the performance of the structure.

f. Where sand drains are to be used, computations showing the diameter, spacing, and method of installation of such drains, shall be provided.

(c) Artificially treated soils. -

Nominally unsatisfactory soil materials that are artificially compacted, cemented, or preconsolidated (including soils compacted by vibration, cemented by chemical injection, or preconsolidated by use of electric current, but not including cases where preconsolidation consists solely of the use of surcharge with or without sand drains) may be used for the support of buildings, and nominally satisfactory soil materials that are similarly treated may be used to resist soil bearing pressures in excess of those indicated in table 11-2 for the soil in its natural state, subject to the following:

(1) The vertical and lateral extent of the soil that is compacted, cemented, or preconsolidated shall conform to the full extent of the distribution of loading that is assumed for purposes of computing the intensities of the soil bearing pressure. The actual soil bearing pressure shall not exceed the limitations of subdivisions (a) and (b) of this section for nominally unsatisfactory bearing materials or, for satisfactory bearing materials, shall not exceed the limitations of table 11-2.

(2) After the treatment procedure, a minimum of one boring shall be made for every sixteen hundred square feet of that portion of the building area that is supported on treated soil, and a sufficient number of samples shall be recovered from the treated soil to demonstrate the efficacy of the treatment.

§[C26-1103.6] 27-680 Utility services. -Where utility service lines are to be laid in soil materials of class 11-65, provision shall be made to prevent damage to such services lines, as follows:

(a) Where the lines enter a structure, including a building, a manhole, or a junction chamber, that is rigidly supported on piles or in firm bearing material, the services shall be supported on piles or bearing materials of adequate firmness to prevent differential settlement of the service lines with respect to the structure; otherwise, provisions, such as oversized sleeves, flexible connections, utility tunnels, or other approved device, shall be made to permit the anticipated differential movement to occur without damage to the service lines.

(b) Where the lines enter a structure that is supported on soil materials of class 11-65 or on soft clay or loose silt deposits, an engineering analysis shall be made of the probable differential settlement of the utility service line with respect to the structure, and provision shall be made to accommodate such displacement, as described in subdivision (a) of this section.

ARTICLE 5 SOIL LOAD BEARING TESTS

§[C26-1104.1] 27-681 Applicability. -Soil load bearing tests made at the option and expense of the owner of the proposed structure and inspected in accordance with the provisions of section 27-132 of article seven of subchapter one of this chapter, controlled inspection, may be accepted by the commissioner as evidence of allowable bearing capacity of a given soil stratum, subject to the following limitations:

(a) The applicability of soil load bearing tests shall be limited to soil materials of classes 5-65 through 10-65.

(b) Soil load bearing tests shall not be used to justify allowable bearing pressures in excess of the maximum allowable bearing values established in table 11-2 for the applicable class of material.

(c) Soil load bearing tests shall not be applicable where the proposed bearing stratum is underlain by a stratum of lower class, unless analysis indicates that the presence of such lower stratum will not create excessive settlements of the building.

§[C26-1104.2] 27-682 Procedure. -

(a) Preparations. -

(1) A sketch showing the layout, levels, number of tests, details of test apparatus, and test procedures shall be filed with the commissioner before conducting such tests. The sketch shall also include the locations and levels of the proposed tests in relation to the contemplated foundation levels as well as the logs of borings that have been made for the building or buildings involved.

(2) The tests shall be made at the levels contemplated for the proposed building footings, and in at least two locations within the limits of the building area. The surfaces at the locations of the proposed tests shall be leveled at the elevations of the proposed test for a clear distance of at least five feet all around the test plate.

(3) The loaded area shall be square and at least twenty-four inches by twenty-four inches.

(4) When load tests are performed on materials affected by drying, suitable methods shall be used to prevent evaporation from the material.

(5) In the event ground water is present immediately [*sic*] below, at, or above the level required to be tested, dewatering facilities shall be installed to maintain ground water a minimum of four feet below the level of the test plate during the preparation and duration of the test or tests.

(6) Trenches and other provisions at the ground surface shall be made to prevent inflow of surface water and to remove water that may drain into the test area. The entire test area shall be protected against weather and rainfall for the entire duration of the test.

(7) The load platform providing the support for the test load shall be supported on adequate timber cribbing, which shall not be closer than five feet from the edge of the test plate.

(8) The plate on which the loads are applied shall be of steel having a minimum thickness of two inches and shall be set and centered in a depression in the bottom of the pit or loading area about thirty inches square for a twenty-four inch by twenty-four inch plate and eight inches deep. The area on which the plate is placed shall be scraped to remove any disturbed soil. The area to be tested shall be covered with a thin layer of fine clean sand that shall be smoothed and leveled until a completely level surface for placing the test plate is obtained.

(9) Settlement observations shall be made at four corners of test plate by means of dial extensometers. The extensometers shall provide readings to the nearest 0.001 in. In addition, settlement observations shall be taken using an engineer's level reading to 0.001 ft., properly referenced to a well-established benchmark.

(10) All tests shall be made under the surveillance of the commissioner, who shall be duly notified in order that he or she may be represented.

(b) Loading of the soil. -

(1) Loads shall be applied to the test plate by direct weight or by means of a hydraulic jack. The loading platform or box shall be constructed to provide a concentric load on the plate. If direct weight is employed, the loading increments shall be applied without impact or jar.

The weight of the blocking placed on the plate and the loading platform or box shall be obtained prior to the test and this weight shall be considered as the first increment of load. If a hydraulic jack is employed, facilities for maintaining each increment of desired load constant under increasing settlement shall be provided.

The gauge [*sic*] for the jack and the jack shall be calibrated as a unit not more than two weeks prior to the test.

(2) The unit intensity of the test load shall be one and one-half times the unit intensity of the loading proposed to be imposed on the soil by the design loads. The test load shall be applied in a minimum of six increments at twenty-five percent, fifty percent, seventy-five percent, one hundred percent, one hundred twenty-five percent, and one hundred fifty percent of the proposed working load. Each load increment shall be maintained for a length of time as follows:

a. At the proposed loading and at one hundred fifty percent of load until the settlement is less than 0.005 in. over a period of twenty-four hours.

b. At other loadings until the settlement is 0.001 in. or less, over a period of five minutes.

(3) Under each load increment, settlement observations shall be made and recorded at intervals of one-half minute, one minute, four minutes, and each four minutes thereafter after application of load

increment except in the instance of the working load and one hundred fifty percent of working load where, after the four minute reading, the time interval shall be doubled successively until the final settlement limitation is reached and the load is increased or removed.

(4) After the test load and limiting rate of settlement under the test load is reached, loads shall be removed in not less than three equal increments and rebound observations made in the same manner as for the loading increments. The final rebound shall be recorded twenty-four hours after the entire test load has been removed.

(c) Determination of results. -

(1) Subject to the limitations designated in section 27-681 of this article, the soil load test for soils of classes 5-65 through 8-65 shall be considered as tentatively substantiating the ability of the soil to support the proposed unit intensity of loading if the gross settlement of the test plate under the proposed unit intensity of loading does not exceed one-half inch and the total gross settlement after the fifty percent overload is applied does not exceed one inch. This tentative substantiation shall be supported by a report by the architect or engineer on the correlation of the behavior of the load test to the probable behavior of the full size building. The proposed design load shall be considered as acceptable only upon written acceptance by the commissioner.

(2) For soils of classes 9-65 and 10-65, the soil load test alone shall not be considered as evidence of allowable bearing capacity of the soil, but the data so obtained may be utilized to establish an allowable bearing capacity subject to the provisions of section 27-677 and 27-678 of article four of this subchapter.

(3) In the event that it is desired to conduct load tests on square areas larger than the minimum stipulated above, permission may be granted provided notice of such increase in area is properly filed with the test information required to be submitted to the commissioner. The limiting gross settlements stipulated in paragraph one of this subdivision shall be increased in relation to the increase in width of test plate in accordance with the following formula:

$$S = (9S_1 / 16)(2B/ B + 1)^2$$

where:

S = settlement of the larger loaded area (in.)

S_1 = permissible settlement of twenty-four inch by twenty-four inch loaded area, as specified in paragraph one of this subdivision (in.)

B = side dimension of square plate used for test (ft.)

ARTICLE 6 FOOTINGS, FOUNDATION PIERS, AND FOUNDATION WALLS

§[C26-1105.1] 27-683 Materials.- All structural elements of foundations as defined in section 27-585 of article one of subchapter ten shall meet the requirements as to type and minimum quality of materials prescribed in such subchapter. Inspection of materials and construction shall comply with the provisions of section 27-586 of such subchapter.

§[C26-1105.2] 27-684 Footings. - Inspections of subgrade of footings, piers and walls shall comply with the requirements of section 27-723 of article thirteen of this subchapter.

(a) Wood footings. -Wood footings may be used only for wood frame structures. Wood footings shall be given a preservative treatment in accordance with reference standard RS 11-4.

(**b) Pole buildings**. -Buildings not more than one story high may be supported on poles embedded in the ground. Wood poles shall conform to the requirements of reference standard RS 11-5 and shall be given a preservative treatment in accordance with reference standard RS 11-4. Steel poles embedded in the soil shall be protected as required by the provisions of paragraph one of subdivision (c) of section 27-685 of this article.

(c) Grillages. -Grillage beams shall be provided with proper spacers, stiffeners, [*sic*] and diaphragms, or the space between the beams shall be filled with concrete or grout. In addition, all steel grillages shall be fully protected against corrosion by encasement, coating with metal protection of a type satisfactory to the commissioner or by other approved device.

(d) Design. -

(1) CONCRETE FOOTINGS. -Concrete footings shall be proportioned in accordance with the provisions of reference standard RS 10-3. Reinforcement shall extend to within four inches of the edges of the footing.

(2) MASONRY FOOTINGS.- Masonry used for the construction of footings shall be of solid units.

a. Reinforced masonry footings shall meet the requirements of reference standard RS 10-2 and shall be proportioned similarly to the proportioning of reinforced concrete footings.

b. Unreinforced masonry footings shall be of such dimension that a sloping plane extending downward from the top of the footing where it intersects the pier of * wall, to the bottom of the footing, and measured at the angle with the horizontal that is indicated below, will be contained entirely within the footing:

As enacted but "or" probably intended.

Soil bearing capacity of three tons per square foot or less-sixty degrees.

Soil bearing capacity between three tons per square foot and six tons per square foot-seventy degrees.

Soil bearing capacity greater than six tons per square foot shall be investigated.

The compressive stress in the footing, based on the assumption that the vertical load is uniformly distributed over horizontal sections bounded by said

planes, shall not exceed the values given in reference standard RS 10-1.

§[C26-1105.3] 27-685 Foundation piers.-
Foundation piers shall be designed as columns. Reinforced concrete piers shall be designed in accordance with the provisions of reference standard RS 10-3. Reinforced and unreinforced masonry piers shall be designed in accordance with the provisions of reference standards RS 10-2 and RS 10-1. Unreinforced concrete piers shall be designed in accordance with subdivision (b) of this section.
(a) Lateral support. -The equivalent unbraced length of a pier supported by lateral soil pressure may be determined by a recognized method of elastic analysis. Alternatively, such a pier may be assumed to be hinged, but laterally braced at intervals equal to the full height of the pier or eight times the least lateral dimension of the pier, whichever is the lesser value. The provisions of subdivision (e) of this section shall apply.
(b) Unreinforced concrete piers. -Where unreinforced concrete piers are used, the allowable compressive stress shall not exceed 0.25f 'c and the center of cross section of the pier at any level shall not deviate from the line of action of the resultant of all forces (which line of action shall consider the eccentricities due to all loads and moments acting on the pier) by an amount more than one-sixtieth of its height or one-tenth of its least lateral dimension and the ratio of the height to the least lateral dimension shall not exceed eight. For larger values of the ratio of the height to the least lateral dimensions, or for greater eccentricities, piers shall be reinforced.
(c) Metal shells. -Where piers are encased by a metal shell, the shell may be considered as contributing to the structural strength of the pier provided that the thickness is one-eighth inch or greater, and subject to the following requirements:
(1) Where boring records or site conditions indicate possible deleterious action on the shell, where any portion of the shell is embedded in ash, cinder fill or garbage fill, where the encased piers are used for support of chemical plants, piles of coal, or under other conditions conducive to chemical seepage or corrosive action, or where the encased piers are used for support of electrical generating plants, the metal shells shall be protected against deterioration by encasement, coating, or other device acceptable to the commissioner.
(2) The area of the metal section of the shell multiplied by the efficiency of the horizontal joints shall be considered as equivalent vertical reinforcement of the pier. The area of the metal section of the shell, multiplied by the efficiency of the vertical joints, shall be considered as equivalent spiral reinforcement of the pier.
(d) Minimum dimensions.- The provisions of subdivision (e) of this section shall apply. In addition, the plan dimensions of the pier shall not be less than those of the column above. If the column above is a steel section resting on a base plate, the base plate and pier shall be proportioned for allowable bearing pressures as prescribed in reference standards RS 10-1, RS 10-2, and RS 10-3.
(e) Filling. -The provisions of subdivisions (a) and (d) of this section shall apply only where the fill (or backfill) is placed around the pier as controlled fill, and wherein the level of the fill is raised uniformly around the entire perimeter of the pier. Where the fill operation is not controlled the least lateral dimension of a foundation pier shall be twenty-four inches and the pier shall be proportioned for lateral pressure equal to the pressure of a differential height of fill equal to five feet, applied simultaneously with the other loads on the pier specified in article three of this subchapter.

§[C26-1105.4] 27-686 Foundation walls. -
(a) Concrete.- Concrete foundation walls shall be designed in accordance with the provisions of reference standard RS 10-3 relating to bearing or retaining walls. The equivalent unbraced height of a wall supported by lateral soil pressure may be determined by a recognized method of elastic analysis. Alternatively, such a wall may be assumed to be laterally braced at intervals as follows:
(1) Where fill is placed against both faces of the walls: the full height of the wall or eight times the thickness, whichever is the lesser value.
(2) Where both faces of the wall are not in contact with soil: the height of the unbraced section of the wall or eight times the thickness of the wall, whichever is greater, but not more than the full height of the wall.
(b) Masonry. -Masonry foundation walls shall conform to the provisions of reference standards RS 10-1 and RS 10-2, and the following:
(1) TYPES. -Masonry foundation walls may be of plain or reinforced masonry and shall be of solid units, except that load bearing hollow units will be permitted for support of one- and two-story buildings.
(2) WALL THICKNESS. -Foundation walls of masonry shall be designed and constructed in accordance with the provisions of reference standards RS 10-1 and RS 10-2, supplemented by the provisions of subdivision (a) of this section, relating to unbraced height. The thickness shall be at least six inches.

§[C26-1105.5] 27-687 Construction of footings, foundation piers, and foundation walls. -The provisions of sections 27-661 and 27-723 of this subchapter shall apply. In addition, methods of installation and construction shall satisfy the following conditions:
(a) Footings, piers, or walls shall be founded on undisturbed soil or on satisfactorily compacted or prepared materials.
(b) Accurate preparation and inspection of the bearing materials directly underlying the foundation

shall be possible; and the bearing area shall be substantially level or suitably benched.
(c) Excavation shall be kept substantially free of water during construction of the foundation except that the use of tremie or similar underwater construction will be permitted in the case of foundations bearing directly on rock, provided that the construction procedure will permit thorough cleaning and preparation of the rock surface, and that the surface of the rock is maintained in a clean condition, unfouled by the inflow of soil or settlement of the fluid suspension, until the concrete is in place.

ARTICLE 7 PILE FOUNDATIONS-GENERAL REQUIREMENTS

§[C26-1106.1] 27-688 Administrative requirements. -
(a) Identification of piles. -A plan showing clearly the designation of all piles by an identifying system shall be filed with the commissioner prior to installation of such piles. All detailed records for individual piles shall bear an identification corresponding to that shown on the plan. A copy of such plan shall be available at the site for inspection at all times.
(b) Record of pile driving. -A record of the penetration and behavior of each pile during installation shall be kept by the architect or engineer designated in section 27-721 of article thirteen of this subchapter. Such records shall be prepared on forms furnished by, or satisfactory to, the commissioner and, upon the completion of pile installation, shall be filed with the commissioner together with the records of any additional borings or subsurface information obtained during installation of the piles, and plans showing any deviations of the pile or related constructions (including any corrective measures) from the details and locations shown on the approved plans. Inspection of piling and pile load tests shall conform to the requirements of section 27-721 of article thirteen of this subchapter.

§[C26-1106.2] 27-689 Minimum pile penetrations. -
(a) Required by soil bearing capacity. -The provisions of paragraph one of subdivision (b) of section 27-700 of article eight of this subchapter shall apply.
(b) Required for lateral restraint. -The provisions of section 27-694 of this article shall apply.
(c) Piles located near a lot line. -Piles located near a lot line shall be designed on the assumption that the adjacent lot will be excavated to a depth of ten feet below the nearest legally established curb level. Where such excavation would reduce the embedded length of the pile, the portion of the pile exposed shall be considered as providing no lateral or vertical support, and the load-carrying determination in accordance with the provisions of article eight of this subchapter shall be made after the resistance offered by the soil that is subject to potential excavation has been discounted.

§[C26-1106.3] 27-690 Use of existing piles at demolished structures.- Piles left in place where a structure has been demolished shall not be used for the support of new construction unless satisfactory evidence, including load or hammer testing of representative piles, can be produced indicating the capacity, length, and driving conditions of the piles. The load bearing value for such existing piles shall be the least of the values indicated by: (1) the load or hammer test, (2) the capacity of the pile as a structural member, and (3) the allowable bearing pressure on the soil underlying the pile tips, all in accordance with the provisions of article eight of this subchapter.

§[C26-1106.4] 27-691 Tolerance and modification of design due to field conditions. -
(a) Tolerance in alignment of the pile axis. -If the axis of any pile is installed out of plumb or deviates from the specified batter by more than four percent of the pile length, the design of the foundation shall be modified as may be necessary to resist the resulting vertical and lateral forces. In types of piles for which subsurface inspection is not possible, this determination shall be made on the exposed section of the pile, which section, at the time of checking axial alignment, shall not be less than two feet. In piles which can be checked for axial alignment below the ground surface, the sweep of the pile axis shall not exceed four percent of the embedded length.
(b) Tolerance in location of the head of the pile. -A tolerance of three inches from the designed location shall be permitted in the installation of each pile, without reduction in load capacity of the pile group. Where piles are installed out of position in excess of this amount, the true loading on such piles shall be analytically determined from a survey which defines the actual location of the piles as driven, and using the actual eccentricity in the pile group with respect to the line of action of the applied load. If the total load on any pile, so determined, is in excess of one hundred ten percent of the allowable load bearing capacity, correction shall be made by installing additional piles or by other methods of load distribution as required to reduce the maximum pile load to one hundred ten percent of the capacity.
(c) Bent piles. -Where piles have been bent during installation, and the amount of the bend exceeds the allowable tolerance for alignment of the pile axis in subdivision (a) of this section, the condition shall be investigated and, where required, correction made by the installation of additional piles, by strengthening the bent piles, by reduction in capacity or other means acceptable to the commissioner.

§[C26-1106.5] 27-692 Minimum spacing of piles.-
Piles shall be spaced to meet the following requirements:

(1) Spacing of piles shall provide for adequate distribution of the load on the pile group to the supporting soil, in accordance with the provisions of subdivision (b) of section 27-700 of article eight of this subchapter.
(2) In no case shall the minimum center-to-center spacing of piles be less than twenty-four inches, nor less than the values for specific types of piling as indicated in article ten of this subchapter. Unless special measures are taken to assure that piles will penetrate sufficiently to meet the requirements of section 27-689 of this article without interfering with or intersecting each other, the minimum center-to-center spacing of piles shall be twice the average diameter of the butt for round piles; one and three-quarters times the diagonal for rectangular piles; or, for taper piles, twice the diameter at a level two-thirds of the pile length measured up from the tip. In cases of practical difficulty, the spacing of new piles from existing piles under an adjacent building may be less than the above values provided that the requirements relating to minimum embedment and pile interference are satisfied and that the soil under the proposed and existing buildings is not overloaded by the closer pile grouping.

§[C26-1106.6] 27-693 Minimum section. -Except as provided in article ten of this subchapter for timber piles, no tapered pile shall be less than six inches in diameter at any section, nor have less than an eight inch diameter at cutoff. The taper of any tapered section may be uniform or may occur in steps. No pile of uniform section shall have a diameter of less than eight inches, or, if not circular, a dimension of less than seven and one-half inches. Tapered shoes or points of lesser dimensions may be attached to the tips of piles.

§[C26-1106.7] 27-694 Capping and bracing of piles.
(a) Capping of piles. -
(1) EMBEDMENT. -Tops of all piles shall be embedded at least three inches in concrete caps. Such concrete shall conform to the provisions of article five of subchapter ten of this chapter and shall extend at least four inches beyond the edge of all piles. Alternatively, and only where the piles project above the future grade and will be readily accessible for visual inspection at all times, the tops of the piles may be capped with timber or steel caps, which shall be connected to the piles. Cap plates will not be required for steel H piles embedded in a reinforced concrete cap. Inspection of pile caps shall be as required in section 27-722 of article thirteen of this subchapter.
(2) UPLIFT. -Where piles are subject to uplift, they shall be anchored into the cap to resist at least one and one-half times the amount of such uplift without exceeding the basic allowable stresses as established in subchapter ten.
(3) REINFORCEMENT. -Reinforcement shall be placed to provide at least three inches of clear cover, measured to the surface of the pile cap that is in contact with the ground. All reinforcement adjacent to timber or concrete piling shall have a minimum of one inch of concrete protection. Reinforcement shall extend to within four inches of the edges of the pile cap.
(4) DESIGN. -Except as modified above, concrete pile caps shall be designed in accordance with the provisions of reference standard RS 10-3.
(b) Bracing of piles. -Except for short piles as described in subdivision (c) of this section, every pile shall be laterally braced to conform with one or more of the following provisions:
(1) RIGID CAP. -Three or more piles connected by a rigid cap shall be considered as being braced provided that the piles are located in radial directions from the centroid of the group not less than sixty degrees apart (within a tolerance of three inches in location of the pile). A two-pile group, in a rigid cap, shall be considered to be braced along the axis connecting the two piles.
(2) BRACE BEAMS. -Piles may be braced by the use of brace beams or ties rigidly connecting to at least two other piles in radial directions not less than sixty degrees nor more than one hundred twenty degrees apart. Concrete brace beams shall have minimum dimensions of one-twentieth of the clear distance between pile caps, but not less than eight inches. All brace beams shall be proportioned to resist a minimum axial load equal to three percent of the total axial load capacity of the piles that are to be braced by that beam, plus the moment due to any eccentricity between the centroid of the pile group and the line of action of the applied load. Where underlain by soil of class 9-65, 10-65 or 11-65, brace beams shall be proportioned to support the weight of soil, slab-on-ground, and live load on the slab-on-ground that is contained within vertical planes projected upward from the lateral limits of the brace beam. The design of brace beams to resist these loads shall conform to the provision of subchapter ten of this chapter.
(3) CONCRETE SLAB-ON-GRADE. -A continuous concrete slab or mat on grade, that is five inches or more in thickness and reinforced, and that extends at least forty feet in each direction and is anchored to the pile caps (or in which the piles are embedded at least three inches), may be used in lieu of brace beams for bracing of pile caps, providing that the slab is supported on material having an allowable bearing pressure of one and one-half tons per square foot or better and such material is not underlain by nominally unsatisfactory bearing materials.
(4) OTHER MEANS.- Piles may be braced by anchors, anchor wall, or other means acceptable to the commissioner.
(5) FLOOR SYSTEM.- Single-pile or two-pile groups or a single line of piles may be considered to be adequately braced if connected to, and braced by, a self supporting floor system provided: (1) that the details and dimensions of the floor and the wall or pier are of adequate strength to resist lateral displacement

of the pile cap under conditions of maximum eccentricity of the applied load; and (2) that the wall or pier is braced until connection of the floor framing is made and the flooring (or slab) is in place.
(6) SPECIAL REQUIREMENTS FOR BRACING BATTER PILES.- The provisions of paragraphs one through five of this subdivision above shall apply. In addition, provisions shall be made to oppose the lateral thrust resulting from the pile inclination.
(c) Bracing of short piles. -
(1) All pile caps supported by piles that penetrate less than ten feet below cutoff level or less than ten feet below ground level shall be braced against lateral movement. Such bracing may consist of connection to other pile caps that encompass piles embedded more than ten feet below those levels; the use of suitable anchors, connection to a slab-on-grade or the floor system as described in paragraphs three and five of subdivision (b) of this section, or by other equivalent means. The heads of the piles shall be fixed in the cap. In no event shall more than fifty percent of the piles in the foundation of any building penetrate less than ten feet below cut-off-level or less than ten feet below ground level.
(2) Where the embedded length of piles located near a lot line would be reduced to less than ten feet by excavation of the adjacent site to a depth of ten feet below the nearest established curb level, the provisions of paragraph one of this subdivision shall apply.

§[C26-1106.8] 27-695 Splicing of piles.- Splices shall be constructed so as to provide and maintain true alignment and position of the component parts of the pile during installation and subsequent thereto, and shall be of adequate strength to transmit the vertical and lateral loads (including tensions) and the moments occurring in the pile section at the location of the splice without exceeding the allowable stresses for such materials as established in subdivision (a) of section 27-700 of article eight of this subchapter. Except for piles which can be visually inspected after driving, splices shall develop at least fifty percent of the capacity of the pile in bending. In addition, all pile splices in the upper ten feet of the pile section shall be capable of resisting (at allowable working stresses) the moment and shear that would result from an assumed eccentricity of the pile load of three inches, or the pile shall be braced in accordance with the provisions of section 27-694 of article seven of this subchapter to other piles that do not have splices in the upper ten feet of embedment. For piles located near a lot line, the embedded length of such piles shall be determined on the basis that the adjacent site will be excavated to a depth of ten feet below the nearest established curb level.

§[C26-1106.9] 27-696 General requirements for installation of piles. -
(a) Protection of adjacent property. -Piles shall be installed with adequate provision for the protection of adjacent buildings and property.
(b) Protection of the pile during installation. -Piling shall be handled and installed to the required penetration and resistance by methods that leave their strength unimpaired and that develop and retain the required load-bearing resistance. Any damaged pile shall be satisfactorily repaired or the pile shall be rejected. Subject to the approval of the commissioner, damaged piles may be used at a fraction of the design load as determined by the architect or engineer in lieu of repair or rejection.
(c) Protection of pile materials after installation. -Where boring records or site conditions indicate possible deleterious action on pile materials due to soil constituents, changing water levels, or other causes, such materials shall be adequately protected by preservatives or encasements that will not be rendered ineffective by driving and that will prevent such deleterious action. The following specific provisions shall apply:
(1) Untreated timber piles shall not be used unless the top level of the pile is below the permanent water table. The permanent water table level shall not be assumed higher than the invert level of any sewer, drain, or subsurface structure in the adjacent streets, nor higher than the water level at the site resulting from the lowest drawdown of wells or sumps, but in no case shall untreated timber piles be used where the cut-off level is less than ten feet below the adjacent legal grade. Where treated piles are required, preservative treatment shall consist of impregnation with creosote or a creosote solution or, for piles entirely embedded below grade, a pentachlorophenal solution may be used. Treatment shall be in accordance with all requirements of reference standard RS 11-6.
(2) Piles installed in ash or garbage fills, cinder fills, or which are free-standing in or near a seawater environment, or which are used for the support of chemical plants, coal piles or under similar conditions of chemical seepage or aggressive action, or which are used for support of electrical generating plants, shall be investigated regarding the need for special protective treatment and, where protective treatment is indicated, shall be protected against deterioration by encasement, coating, or other device acceptable to the commissioner.
(d) Equipment. -Equipment and methods for installing piles shall be such that piles are installed in their proper position and alignment, without damage. Equipment shall be maintained in good repair.

§[C26-1106.10] 27-697 Use of uncased concrete pile shafts.-
The use of uncased shafts (i.e., where the concrete of the pile shaft is in direct contact with the surrounding

soil) will be permitted under the following conditions:
(a) For bored piles. -Where the bored hole is maintained free of water before and during placement of the concrete and the sides and bottom can be inspected prior to such placement, and provided that no displacement pile shall be installed within fifteen feet of any bored pile.
(b) For driven piles (including all piles wherein installation utilizes a temporary casing).- The maximum length of the uncased shaft shall be limited to ten feet unless otherwise permitted by the commissioner. Uncased shafts will be permitted to be formed in soil below the water table but shall not be formed in any soil of class 9-65 that is of medium or soft consistency; in any soil of class 10-65 that is of medium or loose density; or in any soil of class 11-65.

§[C26-1106.11] 27-698 Where more than one pile type, pile capacity, or method of pile installation is used.- Wherever it is proposed to: (1) construct a foundation for a building utilizing piles of more than one type or capacity; (2) modify an existing foundation by the addition of piles of a type or capacity other than those of the existing piling; (3) construct or modify a foundation utilizing different methods or more than one method of installation, or using different types or capacities of equipment (such as different types of hammers having markedly different striking energies or speeds); or (4) support part of a building on piles and part on footings, the several parts of the building supported on the different types, capacities, or modes of piling shall be separated by suitable joints providing for differential movement, or a report shall be submitted by the architect or engineer establishing to the satisfaction of the commissioner that the proposed construction is adequate and safe, and showing that the probable settlements and differential settlements to be expected will not result in instability of the building or stresses in the structure in excess of the allowable values established in subchapter ten of this chapter. The provisions of subdivision (d) of section 27-700 of article eight of this subchapter relating to required load tests shall apply separately and distinctly to each different type or capacity of piling, method of installation, or type or capacity of equipment used, except where analysis of the probable, comparative behavior of the different types or capacities of the piles or the methods of installation indicates that data on one type or capacity of pile permits a reliable extrapolation of the probable behavior of the piles of other types and capacities.

§[C26-1106.12] 27-699 Pile materials. -
The provisions of sections 27-580 and 27-588 of article one of subchapter ten of this chapter relating to "classification of materials, assemblies and methods of construction" and to the use of "used and unidentified materials" shall apply.

ARTICLE 8 PILE FOUNDATIONS-LOADS

§[C26-1107.1] 27-700 Allowable axial load. -The allowable axial load on a pile shall be the least value permitted by consideration of the following factors (for battered piles, the axial load shall be computed from the resultant of all vertical loads and lateral forces occurring simultaneously):
1. The capacity of the pile as a structural member.
2. The allowable bearing pressure on soil strata underlying the pile tips.
3. The resistance to penetration of the piles, including resistance to driving, resistance to jacking, the rate of penetration, or other, equivalent criteria as established in this section.
4. The capacity as indicated by load test, where load tests are required.
5. The maximum loads prescribed in subdivision (e) of this section.
(a) The capacity of the pile as a structural member.-
(1) EMBEDDED PORTION OF THE PILE. -
The compressive stress on any cross section of a pile produced by that portion of the design load that is considered to be transmitted to that section shall not exceed the allowable values for the construction materials as established in table 11-3. The tensile stress shall not exceed the values established in subchapter ten of this chapter for like material.
(2) PORTION OF THE PILE THAT IS NOT EMBEDDED.-
That portion of any pile that is free standing in air or water shall be designed as a column in accordance with the provisions of subchapter ten of this chapter, fixed at a point five feet below the soil contact level in class 8-65 material or better and ten feet below in any other material. The conditions of lateral and rotational restraint offered by the pile cap shall be considered in determining the equivalent unbraced length.
(3) LOAD DISTRIBUTION ALONG EMBEDDED PORTION OF THE PILE. -The portion of the design load acting on any cross-section of a pile may be determined by analysis, considering time dependent changes in distribution of the load. As an alternative method for the purposes of this section, it may be assumed that:
a. For piles embedded forty feet or more in materials of class 10-65 or better, or in controlled fills, and bearing on or in materials of classes 1-65 to 5-65: seventy-five percent of the load shall be assumed to be carried by the tip. For shorter piles, with similar conditions of embedment and bearing, one hundred percent of the load shall be assumed carried by the tip.
b. For piles embedded in materials of class 10-65 or better, or in controlled fills, and bearing on or in materials of classes 6-65 to 10-65 (or controlled fills): the full load shall be assumed to act at a cross section located at two-thirds of the embedded length of the pile measured up from the tip. Where tapered piles are used, the stress at all sections of the pile shall be determined on the basis that the full load acts at a location as described above and that one-third of

the full load acts at the tip. The stresses so computed shall not exceed the allowable values in table 11-3.

c. For conditions not covered in subparagraphs a and b of this paragraph three the provisions relating to analysis shall apply.

(b) Allowable bearing pressure on soil strata underlying the pile tips. -

(1) BEARING CAPACITY. -The allowable pile load shall be limited by the provision that the pressures in materials at and below the pile tips, produced by the loads on individual piles and by the aggregate of all piles in a group or foundation, shall not exceed the allowable bearing values established in article four of this subchapter. The provisions of section[s]* 27-678 and 27-679 of article four of this subchapter shall apply. The transfer of load from piles to soil shall be determined by a recognized method of analysis. As an alternative, for purposes of this section, piles or pile groups may be assumed to transfer their loads to the underlying materials by spreading the load uniformly at an angle of sixty degrees with the horizontal, starting at a polygon circumscribing the piles, located as follows:

***Copy in brackets not enacted but probably intended.**

TABLE 11-3 ALLOWABLE COMPRESSIVE STRESS FOR PILE MATERIALS

Pile Material	Allowable Compressive Stress
Concrete	Concrete—The provisions of Reference Standard RS 10-3 relating to short compression members shall apply. For working stress design use $0.25f'_c$. For ultimate strength design use minimum eccentricity of 5 per cent, phi = 0.70 (phi = 0.75 where a permanent metal shell having a minimum wall thickness of 1/8 inch is used), and load factors as specified in Reference Standard RS 10-3. The above provisions shall be deemed applicable to reinforced and unreinforced sections. For unreinforced sections use Ds = D and d = t (symbols refer to those used in Reference Standard RS 10-3).
	Reinforcing steel—$0.40f_y$ but not greater than 30,000 psi. (The provisions of article five of subchapter ten of this chapter relating to ties, spirals, and percentages of reinforcing steel for reinforced concrete compression members shall apply.)
Timber	See timber piles (section 27-707 of article eight of this subchapter).
Steel	H piles-$0.35f_y$, with f_y not to be taken as greater than 36,000 psi. Minimum thickness of metal shall be 0.40.
	Pipe piles, shells for cast–in place concrete piles and shells of pipe sections used in caisson piles: 0.35 f_y, (f_y not to be taken as greater than 36,000 psi.) for thickness of 1/8 in. or more. Metal thinner less* than 1/8 in. shall not be considered as contributing to the structural strength of the pile section.
	Core sections for caisson piles: $0.50f_y$ with f_y not to be taken as greater than 36,000 psi.

Notes for Table 11-3:
f'_c = 28 day compressive strength of concrete.
f_y = Minimum specified yield strength of steel.
* "less" not enacted but probably intended.

a. For piles embedded entirely in materials of classes 4-65 to 8-65, or in controlled fill materials, the polygon shall be circumscribed at a level located two-thirds of the embedded length of the pile, measured up from the tip.

b. For piles penetrating through soils of classes 9-65, 10-65, or 11-65 into bearing in soils of class 8-65 or better, the polygon shall be circumscribed at the bottom of the strata of class 9-65, 10-65 or 11-65 materials.

c. In the case of piles having enlarged bases, the lateral distribution of the load to the soil may be assumed to begin at the junction of the shaft and the enlarged base and to extend as follows:

1. In the case where the enlarged base is formed in loose or medium compact (N value less than thirty) soils of class 6-65 or 7-65 that extend twenty feet or more below the junction of the base and shaft, or that are of lesser extent but are directly underlain by soil of class 5-65 or better, the bearing area may be taken at a plane six feet below said junction but not lower than the bottom of the soil strata of class 6-65 or 7-65.

2. Where the enlarged base is formed in compact (N value thirty to sixty) soils of class 6-65 or 7-65, or in any soil of these classes that extends less than twenty feet below the junction of the base and the shaft and that is underlain by soil of class 8-65 or poorer, the bearing area shall be taken at planes less than six feet below said junction, with a lower limit of three feet where the material is very compact (N value sixty, or greater) and the extent of the class 6-65 or 7-65 material is ten feet below the junction of shaft and base. (The provisions of subdivision (e) of section 27-710 of article ten of this subchapter relating to minimum depth of bearing stratum below the junction of base and shaft shall apply.) For conditions intermediate between that described in clause one of this subparagraph and the lower limit conditions described here, the location of the bearing area may be determined by linear interpolation between the indicated limits of N value and extent of bearing material below the junction of shaft and base, giving equal weight to both variables.

3. Where the enlarged base is formed in or on soils of class 4-65 or 5-65, the bearing area shall be taken at a depth below the junction of the shaft and base consonant with the size and depth of the base formed, and as evaluated from the required test piles.

d. For all piles bearing on soils of classes 1-65 to 3-65, analysis of load distribution will not be required if the requirements relating to capacity of the pile as a structural member, to resistance to penetration, to load test where required, and to maximum tabulated loads are satisfied.

e. For piles bearing in soils of classes 9-65 and 10-65, for cases not described above, or for any case where the method of installing the pile utilizes a temporary casing, the provision relating to analysis shall apply.

f. In no case shall the area considered as supporting the load extend beyond the intersection of the sixty degree planes of adjacent piles or pile groups.

(2) BEARING STRATUM.- The plans for the proposed work shall establish, in accordance with the requirements relating to allowable bearing pressure, the bearing strata to which the piles in the various sections of the building are to be penetrated and the approximate elevations of the top of such bearing strata. Where penetration of a given distance into the bearing strata is required for adequate distribution of the loads, such penetration shall be shown on the plans. The indicated elevations of the top of the bearing strata shall be modified by such additional data as may be obtained during construction. All piles shall penetrate to or into the designated bearing strata.

(c) Capacity as indicated by resistance to penetration.- Where subsurface investigation, as described in article two of this subchapter, or general experience in the area, indicates that the soil that must be penetrated by the pile consists of glacial deposits containing boulders, or fills containing riprap, excavated detritus, masonry, concrete, or other obstructions in sufficient numbers to present a hazard to the installation of the piles, the selection of type of pile and penetration criteria shall be subject to the approval of the commissioner but in no case shall the minimum penetration resistance be less than that stipulated in tables 11-4 and 11-5.

(1) PILES INSTALLED BY USE OF STEAM-POWERED, AIR-POWERED, DIESEL-POWERED OR HYDRAULIC IMPACT HAMMERS. -

a. The minimum required driving resistance and the requirements for hammer energies for various types and capacities of piles are given in tables 11-4 and 11-5. To obtain the required total driving resistance, the indicated driving resistances shall be added to any driving resistance experienced by the pile during installation, but which will be dissipated with time (resistance exerted by non-bearing materials or by materials which are to be excavated). For purposes of this section, the resistance exerted by non-bearing materials may be approximated as the resistance to penetration of the pile recorded when the pile has penetrated to the bottom of the lowest stratum of nominally unsatisfactory bearing material (class 11-65, but not controlled fill) or to the bottom of the lowest stratum of soft or loose deposits of class 9-65 or 10-65 but only where such strata are completely penetrated by the pile. The provisions of articles nine and ten of this subchapter shall also apply.

b. Alternate for similitude method. -The requirement for installation of piling to the penetration resistances given in tables 11-4 and 11-5 will be waived where the following five conditions prevail:

1. The piles bear on, or in, soil of class 5-65 through class 10-65.

2. The stratigraphy, as defined by not less than one boring for every sixteen hundred square feet of building area, shall be reasonably uniform or divisible into areas of uniform conditions.

3. Regardless of pile type or capacity, one load test, as described in subdivision (d) of this section, shall be conducted in each area of uniform conditions, but not less than two typical piles for the entire foundation installation of the building or group of buildings on the site, nor less than one pile for every fifteen thousand square feet of pile foundation area shall be load tested.

4. Except as permitted by the provisions of clause six of this subparagraph, all building piles within the area of influence of a given load-tested pile of satisfactory performance shall be installed to the same or greater driving resistance as the successful load-tested pile. The same or heavier equipment of the same type that was used to install the load-tested pile shall be used to install all other building piles, and the equipment shall be operated identically. Also, all other piles shall be of the same type, shape, external dimension, and equal or greater cross-section as the load-tested pile. All building piles within the area of influence represented by a given satisfactory load-tested pile shall bear in, or on the same bearing stratum as the load test pile.

5. A report by an architect or engineer shall be submitted establishing to the satisfaction of the commissioner, that the soil bearing pressures do not exceed the values permitted by the provisions of article four of this subchapter and that the probable differential settlements will not cause stress conditions in the building in excess of those permitted by the provisions of subchapter ten of this chapter.

6. Where the structure of the building or the spacing and length of the piling is such as to cause the building and its foundation to act as an essentially rigid body, the building piles may be driven to length and/or penetration into the bearing stratum without regard to penetration resistance, subject to the requirement of clause five of this subparagraph, relating to submission of report.

(2) PILES INSTALLED BY JACKING OR OTHER STATIC FORCES.- The carrying capacity of a pile installed by jacking or other static forces shall be not more than fifty percent of the load or force used to install the pile to the required penetration, except for piles jacked into position for underpinning. The working load of a temporary underpinning pile shall not exceed the total jacking force at final penetration. The working load of each permanent underpinning pile shall not exceed the larger of the following values: two-thirds of the total jacking force used to obtain the required penetration if the load is held constant for seven hours without measurable settlement; or one-half of the total jacking force at final penetration if the load is held for a period of one hour without measurable settlement. The jacking resistance used to determine the working load shall not include the resistance offered by non-bearing materials which will be dissipated with time.

(3) PILES INSTALLED BY USE OF VIBRATORY HAMMER. -The capacity of piles installed by vibratory hammer shall not exceed the value established on the principle of similitude, as follows:
a. Comparison piles, as required by the provisions of subdivision (d), of this section, shall be installed using an impact hammer and driving resistances corresponding to the proposed pile capacities as determined in paragraph one of subdivision (c) of this section or to tip elevations and driving resistances as determined by the architect or engineer.

TABLE 11-4 MINIMUM DRIVING RESISTANCE AND MINIMUM HAMMER ENERGY FOR STEEL H-PILES, PIPE PILES, PRECAST AND CAST-IN-PLACE CONCRETE PILES AND COMPOSITE PILES (other that timber)

		Minimum Driving Resistance [a,c,[d]*,e]				
Pile Capacity (tons)	Hammer[b] Energy (ft. lbs.)	Friction Piles (blows/ft.)	Piles Bearing on Hardpan (Soil Class 5-65) (blows/ft.)	Non- Displacement Piles Bearing on Decomposed Rock (Soil Class 4-65) (blows/ft.)	Displacement Piles Bearing on Decomposed Rock (Soil Class 4-65) (blows/ft.)	Piles Bearing on Rock (Soil Classes 1-65, 2-65, & 3-65)
Up to 20	15,000	19	19	48	48	
	19,000	15	15	27	27	
	24,000	11	11	16	16	
30	15,000	30	30	72	72	
	19,000	23	23	40	40	
	24,000	18	18	26	26	
40	15,000	44	50	96	96	
	19,000	32	36	53	53	
	24,000	24	30	34	34	
50	15,000	72	96	120	120	5 Blows per ¼ inch (Minimum hammer energy of 15,000 ft. lbs.)
	19,000	49	54	80	80	
	24,000	35	37	60	60	
	32,000	24	25	40	40	
60	15,000	96		240	240	
	19,000	63		150	150	
	24,000	44		100	100	
	32,000	30		50	50	
70 & 80	19,000 24,000 32,000		5 Blows per ¼ inch (Minimum hammer energy of 15,000 ft. lbs.)	5 Blows per ¼ inch (Minimum hammer energy of 19,000 ft. lbs.)		
100 Over 100**						

Copy in brackets not enacted but probably intended.

****Appears with no corresponding hammer energy on original text.***

Notes for Table 11-4:

a. Final driving resistance shall be the sum of tabulated values plus resistance exerted by non-bearing materials. The driving resistance of non-bearing materials shall be taken as the resistance experienced by the pile during driving, but which will be dissipated with time and may be approximated as described in subparagraph a of paragraph one of subdivision (c) of this section.

b. The hammer energy indicated is the rated energy.

c. Sustained driving resistance—where piles are to bear in soil classes 4-65 and 5-65, the minimum driving resistance shall be maintained for the last six inches, unless a higher sustained driving resistance requirement is established by load test. Where piles are to bear in soil classes 6-65

through 10-65, the minimum driving resistance shall be maintained for the last twelve inches unless load testing demonstrates a requirement for higher sustained driving resistance. No pile need be driven to a resistance to penetration (in blows per inch) more than twice the resistance indicated in this table, nor beyond the point at which there is not measurable net penetration under the hammer blow.

d. The tabulated values assume that the ratio of total weight of pile to weight of striking part of the hammer does not exceed 3.5. If a larger ratio is to be used, or for other conditions for which no values are tabulated, the driving resistance shall be as approved by the commissioner.

e. For intermediate values of pile capacity, minimum requirements for driving resistance may be determined by straight line interpolation.

TABLE 11-5 MINIMUM DRIVING RESISTANCE AND HAMMER ENERGY FOR TIMBER PILES

Pile Capacity (tons)	Minimum Driving Resistance (blows-in.) to be added to driving resistance exerted by non-bearing materials [1,3,4]	Hammer Energy (ft.-lbs.) [2]
Up to 20	Formula in Note[4] shall apply	7,500-12,000
Over 20 to 25		9,000-12,000 14,000-16,000
Over 25 to 30		12,000-16,000 (single-acting hammers)
Greater than 30		15,000-20,000 (double-acting hammers)

Notes for Table 11-5:

1 The driving resistance exerted by non-bearing materials is the resistance experienced by the pile during driving, but which will be dissipated with time and may be approximated as described in subparagraph a of paragraph one of subdivision (c) of this section.

2 The hammer energy indicated is the rated energy.

3 Sustained driving resistance. Where piles are to bear in soil classes 4-65 and 5-65, the minimum driving resistance shall be maintained for the last six inches, unless a higher sustained driving resistance requirement is established by load test. Where piles are to bear in soil classes 6-65 thru 10-65, the minimum driving resistance measured in blows per inch shall be maintained for the last twelve inches, unless load testing demonstrates a requirement for higher sustained driving resistance. No pile need to be driven to a resistance to penetration (in blows per inch) more than twice the resistance indicated in this table nor beyond the point at which there is no measurable net penetration under the hammer blow.

4 The minimum driving resistance shall be determined by the following formula:

$$P=\frac{2W_hH}{s+0.1} \quad \text{or} \quad P=\frac{2E}{s+0.1}$$

Where: P = Allowable pile load in pounds.
W_p = Weight driven in pounds.
W_h = Weight of striking part of hammer in pounds
H = Actual height of fall of striking part of hammer in feet.
E = Rated energy delivered by the hammer per blow in foot lbs.
s = Penetration of pile per blow, in inches, after the pile has been driven to a depth where successive blows produce approximately equal net penetration.

The value $\frac{W_p}{W_h}$ shall not exceed three.

b. For each comparison pile, install an identical index pile by use of the vibratory hammer at a location at least four feet, but not more than six feet, from each comparison pile. The index piles shall be installed to the same tip elevation as the comparison pile, except that where the comparison piles bear on soils of classes 1-65 to 5-65, the index piles shall bear in, or on, similar material. All driving data for the index pile shall be recorded.

c. The index piles shall be load tested in accordance with the provisions of subdivision (d) of this section. Should the specified load test criteria indicate inadequate capacity of the index piles, steps a, b, and c shall be repeated using longer, larger, or other types of piles.

d. All building piles within the area of influence of a given, satisfactorily tested index pile shall be installed to the same or lesser rate of penetration (in. per min.) as of the successful index pile. The same equipment that was used to install the index pile, identically operated as to rpm, manifold pressure, etc., shall be used to install the building piles. Also, all building piles shall be of the same type, size, and shape as the index pile. All building piles within the area of influence as represented by a given satisfactorily tested index pile shall bear in, or on, the same bearing stratum as the index pile.

(d) Capacity as indicated by load test. -Load test of piling shall be required as follows:

(1) PILES INSTALLED BY STATIC FORCES. -The load bearing capacity of all types and capacities of piles installed by static forces, other than caisson piles and underpinning piles, shall be demonstrated by load test.

(2) PILES DRIVEN BY IMPACT HAMMERS. -The load bearing capacity of piles installed by impact hammers shall be demonstrated by load test when the proposed pile capacity exceeds the following values:

a. Caisson piles-no load test required.

b. Piles installed open end to rock of class 1-65, 2-65 or 3-65-one hundred tons, except as provided in subparagraph d of this paragraph, and except that no load tests will be required for piles up to two hundred tons capacity wherein the pile load does not exceed eighty percent of the load determined on the basis of limiting stresses in the pile materials and provided that the pipe or shell be driven to the resistance indicated in table 11-4.

c. Piles bearing on rock or hardpan (soil classes 1-65 to 5-65) other than as described in subparagraph b of this paragraph, and except as provided in subparagraph d of this paragraph-forty tons.

d. Piles bearing on materials of class eight or better, wherein, on the assumption that one hundred percent of the load reaches the pile tip, (or, in case of piles having an enlarged base or other enlargement of the bearing area, the top of the enlargement), the bearing pressure on the soil underlying the tips or bases can be demonstrated to be equal to or less than the values of basic allowable pressure indicated in table 11-2-provided that the class and density of the bearing material supporting the piles be confirmed by not less than one boring at each column location, then the commissioner may reduce the required number of load tests.

e. All other types of piles-thirty tons.

(3) PILES INSTALLED BY USE OF VIBRATORY HAMMERS. -The load bearing capacity of all types and capacities of piles (other than caisson piles) shall be demonstrated by load test.

(4) LOAD TEST PROCEDURES. -Before any load test is made, the proposed apparatus and structure to be used in making the load test shall be satisfactory to the commissioner and when required by him or her, all load tests shall be made under the commissioner's surveillance or that of his or her representative. A complete record of such tests shall be filed with the commissioner.

a. Areas of the foundation site within which the subsurface soil conditions are substantially similar in character shall be established. In addition, for friction piles bearing on*, or on, soil materials of class 6-65, or poorer, the uniformity of each such area shall be verified by installing at least three penetration-test piles, distributed over the area. Continuous records of penetration resistance shall be made for such piles. If the records of penetration resistance are not similar or are not in reasonable agreement with the information obtained from the borings, the assumed areas of similar subsurface conditions shall be modified in accordance with the information derived from the penetration-test piles and additional penetration-test piles shall be installed as required to verify the uniformity of such areas.

***As enacted but "in" probably intended.**

b. For piles installed by jacking or other static forces or by impact hammer, one load test shall be conducted in each area of uniform conditions, but not less than two typical piles for the entire foundation installation of the building or group of buildings on the site, and not less than one pile for each fifteen thousand square feet of the area of the building wherein said piles are to be used shall be load tested. For piles installed by use of vibratory hammers, one comparison pile shall be installed and one index pile shall be load tested in each area of uniform conditions, but not less than two index piles shall be tested for the entire foundation installation of the building or group of buildings on the site, nor less than one index pile be tested for every seventy-five hundred square feet of pile foundation area. For piles whose capacity is determined on the basis of similitude, the provisions of subparagraph b of paragraph one of subdivision (c) of this section shall apply.

c. The load test shall be conducted by a method that will maintain constant load under increasing settlement. Settlement observations shall be made by means of dial extensometers. The extensometers shall provide readings to the nearest one one-thousandth of an inch. In addition, settlement observations shall be taken using an engineer's level reading to one one-thousandth of a foot, properly referenced to a well-established benchmark.

1. Test loads shall be applied by direct weight or by means of a hydraulic jack. The loading platform or box shall be carefully constructed to provide a concentric load on the pile. If direct weight is employed, the loading increments shall be applied without impact or jar. The weight of the loading platform or box shall be obtained prior to the test and this weight shall be considered as the first increment of load. If a hydraulic jack is employed, facilities for maintaining each increment of desired load constant under increasing settlement shall be provided. The gauge and the jack shall be calibrated as a unit for each project.

2. The test load shall be twice the proposed working load of the pile. The test load shall be applied in seven increments at a load of fifty percent, seventy-five percent, one hundred percent, one hundred twenty-five percent, one hundred fifty percent, one hundred seventy-five percent, and two hundred percent of the proposed working load. After the proposed working load has been applied and for each increment thereafter, the test load shall remain in place until there is no measurable settlement in a two hour period. The total test load shall remain in place until settlement does not exceed one one-thousandth of a foot in forty-eight hours. The total load shall be removed in decrements not exceeding twenty-five percent of the total load at one hour intervals or longer. The rebound shall be recorded after each decrement is removed, and the final rebound shall be recorded twenty-four hours after the entire test load has been removed.

3. Under each load increment, settlement observations shall be made and recorded at one-half minute, one minute, two minutes, four minutes, and each four minutes thereafter after application of load increment, except in the instance of the total load where, after the four minute

reading, the time interval shall be successively doubled until the final settlement limitation is reached and the load is removed.
4. The allowable pile load shall be the lesser of the two values computed as follows:
(a) Fifty (50) percent of the applied load causing a net settlement of the pile of not more than one one-hundredth of an inch per ton of applied load. Net settlement in this paragraph means gross settlement due to the total test load minus the rebound after removing one hundred percent of the test load.
(b) Fifty (50) percent of the applied load causing a net settlement of the pile of three-quarters of an inch. Net settlement in this paragraph means the gross settlement as defined in subclause (a) of clause 4 of this subparagraph, less the amount of elastic shortening in the pile section due to total test load.
(5) FOUNDATION PILES. -Except as provided in clause six of subparagraph b of paragraph one of subdivision (c) of this section, all building piles within the area of influence of a given load-tested pile of satisfactory performance, shall be installed to the same or greater penetration resistance (or static load) as the successful load-tested pile. The same equipment (or heavier equipment of the same type) that was used to install the load-tested pile shall be used to install all other building piles, and the equipment shall be operated identically. Also all other piles shall be of the same type, shape, external dimension, and equal or greater cross section as the load-tested pile. All building piles within the area of influence represented by a given satisfactory load-tested pile shall bear in, or on the same bearing stratum as the load-tested pile. For friction piles where the actual pile lengths vary more than fifty percent from that of the test pile, the commissioner may require investigation to determine the adequacy of the piles.
(6) PILE GROUPS.- When the commissioner has reasons to doubt the safe load sustaining capacity of pile groups, he or she may require at the expense of the owner, group load tests up to one hundred fifty percent of the proposed group load.
(7) "CASING-OFF".- Any temporary supporting capacity that the soil might provide to the pile during a load test, but which would be dissipated with time, shall be obviated by "casing-off" or by other suitable means. For purposes of this section, temporary supporting capacity shall include the resistances offered by any strata of nominally unsatisfactory bearing materials (class 11-65, other than controlled fill) or of soft or loose deposits of class 9-65 or 10-65 that are completely penetrated by the pile, or any resistance offered by granular soils that will be dissipated by reason of vibration.
(e) Maximum loads. -
(1) BASIC MAXIMUM LOADS. -Except as permitted by the provisions of paragraph two of this subdivision, the maximum allowable pile load, determined in accordance with the provisions of subdivisions (a) through (d) of this section, shall not exceed the values specified in table 11-6.
(2) SUBSTANTIATION OF HIGHER ALLOWABLE LOADS. -The pile capacities tabulated in table 11-6 may be exceeded where a higher value can be substantiated on the basis of test and analysis, as follows:
a. Load tests. -The provisions of subdivision (d) of this section shall be supplemented, as follows:
1. Not less than one single-pile load test shall be conducted for each ten thousand square feet of pile foundation area.
2. Final load increment shall remain in place for a total of not less than ninety-six hours.
3. Single test piles shall be subjected to cyclical loading or suitably instrumented so that the movements of the pile tip and butt may be independently determined. Other alternate methods or devices, acceptable to the commissioner which will permit evaluation of the transfer of load from piles to soil may be used.
4. Where the commissioner deems necessary, the provisions of paragraph six of subdivision (d) of this section relating to group load tests shall apply. If required, group load tests shall be performed in groups of numerically average size. Except where the proposed foundation is limited to single and/or two pile groups, each test group shall contain not less than three piles.
5. Individual pile loadings shall not exceed those determined from the single pile load tests.
6. The provisions of paragraph two of subdivision (d) of this section shall apply.
b. Analysis and report.- A report shall be submitted by the architect or engineer establishing to the satisfaction of the commissioner (on the basis of soil and load tests and foundation analysis, including analysis of the group action of the piles) that the proposed construction under a one hundred percent overload of the foundation is safe against failure of the pile and soil materials, and showing that the probable total magnitude and distribution of settlement to be expected under design conditions will not result in instability of the building or stresses in the structure in excess of the allowable values established in subchapter ten of this chapter.
c. Penetration resistance.- The penetration resistance shall not be less than that required by the provisions of subdivision (c) of this section or, where applicable values are not indicated therein, shall be determined from the required load tests. The pile material shall be capable of withstanding the driving stresses without being damaged.
(f) Combination of loads.- The provisions of section 27-594 of subchapter ten of this chapter shall apply.

§[C26-1107.2] 27-701 Allowable lateral load.- For plumb piles fully embedded in the ground, the lateral load applied at the top of the pile shall not exceed one ton per pile unless it has been demonstrated by tests that the pile will resist a lateral load of two hundred percent of the proposed working lateral load without lateral movement of more than one inch at the ground level and will resist the proposed working lateral load without a movement of more than three-eighths of an inch at the ground level. For piles projecting above the ground level the shear and bending stresses computed on the basis of cantilever action to a level of five feet below grade in soils of class 8-65 or better and to ten feet below grade in poorer soils shall not exceed the allowable values for like materials established in subchapter ten of this chapter. The provisions of

subdivision (f) of section 27-700 of this article relating to combination of loads shall apply.

TABLE 11-6 BASIC MAXIMUM PILE LOADS

Type of pile	Basic maximum pile load (tons)
Caisson piles……...	No upper limit
Open-end pipe (or tube) piles bearing on rock of classes 1-65, 2-65, and 3-65…….	18 in. O.D. and greater — 250; less than 18 in. O.D. — 200
Closed-end pipe (or tube) piles, H piles, cast-in-place concrete and compacted concrete piles bearing on rock of classes 1-65, 2-65, and 3-65……..	150
Piles (other than timber piles) bearing on soft rock (classes 4-65)	
1) Displacement piles such as pipe, cast-in-place concrete, and compacted concrete piles……...	60
2) Non-displacement piles such as open-end pipe and H piles……...	80
Piles (other than timber piles) bearing on hardpan (class 5-65) overlying rock…….	100
Piles (other than timber piles) that receive their principal support other than by direct bearing on soils of classes 1-65 to 5-65……	60
Timber piles	
Bearing in soils of classes 1-65 to 5-65……...	25
Bearing in soils of classes 6-65 to 10-65…….	30

§[C26-1107.3] 27-702 Uplift capacity. -A minimum factor of safety against withdrawal of two shall be provided, except that the factor of safety against withdrawal shall be greater than two when the piles are subjected to dynamic uplift loads. The uplift capacity shall be demonstrated by pull-out tests, except where a factor of safety of three or more based on analysis is used, pull-out tests need not be conducted.

ARTICLE 9 PILE DRIVING OPERATIONS

§[C26-1108.0] 27-703 Exceptions.- The provisions of sections 27-704 and 27-705 of this article shall not apply to piles driven with a vibratory hammer or other equipment wherein the energy of impact cannot be evaluated.

§[C26-1108.1] 27-704 Equipment. -
(a) General.- The hammer shall travel freely in the leads. The cushion or cap block shall be replaced, if crushed. The hammer shall deliver its rated energy, and measurements shall be made of the fall of the ram or other suitable data shall be observed at intervals as required to verify the actual energy delivered at the termination of driving.
(b) Cushion or cap block.- The cushion or cap block shall be a solid block of hardwood with its grains parallel to the axis of the pile and enclosed in a tight-fitting steel housing, or shall be an equivalent assemblage. If laminated materials are used, the type and construction of these materials shall be such that their strength is equal to, or greater than, hardwood. Wood chips, pieces of rope, hose, shavings, or automobile tires and similar materials shall not be used. Cap blocks shall be replaced if burned, crushed, or otherwise damaged.
(c) Followers.- Followers shall not be used unless permitted in writing by the architect or engineer, and only when necessary to accomplish such installation. They shall be of steel or hardwood of such size, shape, length, and weight as to permit driving the pile in the desired location and to the required depth and resistance. The required driving resistance tabulated in tables 11-4 and 11-5 shall be increased to compensate for the loss of energy in the hammer blow. The follower shall be a single length section, shall be provided with a socket or hood carefully fitted to the top of the pile to minimize loss of energy and to prevent damage to the pile, and shall have sufficient rigidity to prevent "whip" during driving.

§[C26-1108.2] 27-705 Procedures. -
(a) Continuous driving.- Driving of piles preliminary to final seating shall be continuous for an interval adequate to break or prevent the development of freeze. The hammer shall be operated at its rated speed during this interval.
(b) Jetting.- Jetting, augering and other methods of pre-excavation shall not be used unless permitted in writing by the architect or engineer. When permitted, such procedures shall be carried out in a manner which will not

impair the carrying capacity of the piles already in place or the safety of existing adjacent structures. Jetting or augering shall be stopped at least three feet above the final expected pile-tip elevation and at least three feet above the tip elevation of any pile previously driven within six feet of the jet or auger, except that where piles are to be end bearing on rock or hardpan, jetting or augering may be carried to the surface of the rock or hardpan. Piles shall be carried down beyond the depth of jetting, augering or other pre-excavation until the required resistance is obtained. If there is evidence that jetting or other procedures have disturbed the load-bearing capacities of previously installed piles, those piles that have been disturbed shall be restored to conditions meeting the requirements of this article by redriving or by other methods acceptable to the architect or engineer. Redriving or other remedial measures shall be instituted after the jetting or other operations in the area have been completed.

(c) Sequence of installation. -Individual piles and pile groups shall be installed in such sequence that: (1) the carrying capacity of previously installed piles is not reduced; (2) the soil surrounding the piles is not compacted to the extent that other piles in the group cannot be installed properly; and (3) ground movement that would damage adjacent buildings or utilities is prevented. In general, in any group, driving shall start from one side and proceed progressively toward the other side of the group or shall start from the middle and proceed toward the edges of the group.

(d) Heaved piles. -In soils in which the installation of piles causes previously installed piles to heave, accurate level marks shall be put on all piles immediately after installation, and all piles that have been heaved by an amount in excess of one-quarter of an inch shall be redriven to the required resistance.

(e) Penetration measurements.- Penetration measurements made for the purpose of determining resistance to driving shall not be made when pile heads are damaged to an extent that may affect measured penetration, nor shall they be made immediately after fresh cushion blocks have been inserted under the striking part of the hammer.

ARTICLE 10 PILE TYPES-SPECIFIC REQUIREMENTS

§[C26-1109.1] 27-706 Scope. - Types of pile construction and installation that are not described in this section will be permitted for use only where acceptable to the commissioner.

§[C26-1109.2] 27-707 Timber piles. -

(a) Materials. -Timber piles shall conform in quality to class A or B of reference standard RS 11-7.

(1) SIZE OF PILES. -Piles shall be of adequate size to resist the applied loads without creating stresses in the pile materials in excess of twelve hundred psi for piles of southern pine, Douglas fir, oak, or other wood of comparable strength; or eight hundred fifty psi for piles of cedar, Norway pine, spruce or other wood of comparable strength. Except as provided in paragraph two of this subdivision, for piles forty feet or more in length and of thirty tons capacity or less, the following sizes or classes of piles shall be deemed to be adequate for considerations of stress in the pile material:

a. Piles of twenty-five to thirty tons capacity-Class A or minimum eight inch tip with uniform taper.

b. Piles of less than twenty-five tons capacity-Class A or B or minimum six inch tip with uniform taper.

(2) PILES DRIVEN TO END BEARING. -All timber piles, regardless of capacity, driven to end bearing on soils of classes 1-65 through 5-65 shall be class A or shall have a minimum eight inch tip and a uniform taper.

(3) SPECIES OF WOOD. -Any species of wood may be used that conforms to the provisions of reference standard RS 11-7 and that will stand the driving stresses.

(4) PEELING. -Unless treated, piles need not be peeled.

(b) Limitations on use. -Where timber piles are to be driven to end bearing on soils of classes 1-65 through 5-65 by use of an impact hammer, the installation of each such pile shall be under the personal supervision of an architect or engineer, and the operations of driving such piles, the observations of penetration resistance, and the operation of the equipment shall be so conducted as to terminate driving directly when the pile reaches bearing on the hard material. A report, prepared by the architect or engineer, describing the procedures, equipment, and precautions followed to prevent injury to the piling shall be submitted to the commissioner.

(c) Lagged and inverted piles. -The use of lagged or inverted piles will be permitted. Double lagging shall be adequately connected to the basic pile material to transfer the full pile load from the basic pile material to the lagging without exceeding values of allowable stress as established in subchapter ten of this chapter. The connection for single lagging shall be proportioned for half the pile load. The diameter of any inverted timber pile at any section shall be adequate to resist the applied load without exceeding the stresses indicated in paragraph one of subdivision (a) of this section, but in no case shall it be less than eight inches.

(d) Installation. -

(1) All broomed, crushed, or otherwise damaged materials at the head of the pile shall be removed before capping.

(2) Any sudden decrease in driving resistance shall be investigated with regard to the possibility of breakage of the pile, and if such sudden decrease in driving resistance cannot be correlated to boring data or some incident in the driving, and if the pile cannot be removed

for inspection, it shall be considered as adequate cause for rejection of the pile.

§[C26-1109.3] 27-708 Precast concrete piles (including prestressed sections). -

(a) Materials. -Materials for precast concrete piles shall conform to the requirements of article five of subchapter ten of this chapter.

(b) Construction. -

(1) HANDLING. -Precast concrete piles shall be proportioned, cast, cured, handled, and driven so as to resist the stresses induced by handling and driving as well as by loads. Handling stresses shall be computed on the basis of fifty percent of the weight of the pile as an allowance for impact. Handling equipment shall be constructed so as to equalize the reactions on the several lines of the pile pickups. Loading conditions induced by handling and driving shall be considered as of infrequent occurrence.

(2) DIMENSIONS. -The minimum lateral dimension of the pile shall be ten inches, except for the taper at the tip.

(3) STRUCTURAL DESIGN. -Piles shall be proportioned in accordance with the provisions of article eight of this subchapter, subject to the following additional requirements:

a. For a length equal to at least three times the minimum lateral dimension at each end of the pile, lateral tie reinforcement consisting of 0.225 in. diameter rods or larger shall be spaced not more than three inches center-to center, or an equivalent spiral shall be provided. Elsewhere, the spacing of the ties or the pitch of the spiral may be increased to twelve inches. The minimum amount of longitudinal reinforcement shall be two percent of the concrete section placed in a symmetrical pattern of at least four bars. If prestressed piles are used, the minimum residual compression in the pile section shall be seven hundred psi. For piles designed with voids, the three inch spacing of the ties or spiral at each end of the pile shall be extended for a distance of twelve feet or one-third the length of the pile, whichever is smaller.

b. For piles designed with voids, the minimum wall thickness of the concrete in any section of the piles shall be four inches. Voids may extend through either or both ends of the pile. If the void extends through the lower end of the pile, the pile head shall be vented to prevent buildup of internal hydraulic pressure during driving.

c. Reinforcing steel shall be covered with at least one and one-half inches of concrete on the surface against the ground.

(c) Tolerances. -Voids, when used, shall be located within three-eighths of an inch of the position shown in the plans. The maximum departure of the pile axis from a straight line, measured while the pile is not subject to bending forces, shall not exceed one-eighth of an inch in ten feet or three-eighths of an inch in forty feet or, 0.1 percent of the pile length.

(d) Installation. -Precast concrete piles shall not be handled or driven until they have cured sufficiently to develop the necessary strength.

§[C26-1109.4] 27-709 Cast-in-place concrete piles. -

(a) Description. -Cast-in-place concrete piles shall be cast in shells previously installed in the ground or, with the limitations indicated in section 27-697 of article seven of this subchapter, may be cast in an uncased hole. Cast-in-place piles may be tapered or cylindrical, or a combination of tapered and cylindrical shapes.

(b) Materials. -Concrete for cast-in-place concrete piles shall conform to the requirements of article five of subchapter ten of this chapter. Slump shall be five inches plus or minus one inch. Where the pile shell is assumed to contribute to the capacity of the pile as a structural member, the shell shall be of metal and shall conform to the provisions of article six of subchapter ten of this chapter or section 27-712 of this article. Where the pile shell is not assumed to contribute to the capacity of the pile as a structural member, the shell may be of any material that will adequately resist the driving stresses and maintain an open well to receive the concrete. End closures for shells shall not project more than one-half inch beyond the outer limits of the pile when bearing in soils of class 6-65 or lower.

(c) Installation. -

(1) After installation to final depth and immediately before filling with concrete, the inside of the tube, shell, or bore shall be thoroughly cleaned to the bottom and inspected by lowering a drop light or by means of a light beam. To be accepted: (a) the pile shall be free of collapsed sections of shell and the pile shell shall not show any tears; (b) the pile shall be free of water except that a minor amount of water may be allowed to occur in the pile if it be absorbed by placing a suitable amount of dry cement-sand mixture in the tip end of the pile; and (c) the alignment of the pile shall conform to the provisions of section 27-691 of article seven of this subchapter. If the bottom of the casing is out of sight, the shape and alignment of the casing shall be surveyed with a suitable instrument, or the pile rejected.

(2) Concrete shall be placed by such methods that the entire volume of the tube, shell, or bore is filled and in a manner that will preclude separation of the ingredients.

(3) No concrete shall be placed in a cast-in-place pile until all piles within a radius of fifteen feet, or within the heave range, have been driven.

(4) Rejected pile shells shall be filled with concrete or sand.

(5) The concrete cap shall not be placed until at least one hour after all piles within the cap group are completely filled.

§[C26-1109.5] 27-710 Compacted concrete piles. -
(a) Description.- A "compacted concrete pile" shall denote a concrete pile formed with an enlarged base in which the concrete in the base is placed in small batches that are compacted prior to attaining an initial set. The concrete in the shaft of the pile shall be placed as specified in section 27-709 of this article for cast-in-place concrete piles if a permanent casting is provided, or in small batches that are compacted.
(b) Materials. -Concrete for compacted concrete piles shall conform to the requirements of article five of subchapter ten of this chapter. Concrete to be compacted shall have a minimum compressive strength at the age of twenty-eight days of four thousand psi and shall be mixed with sufficient water to permit hydration of the cement, but the slump shall be zero. The concrete shall be placed and compacted before initial set can occur. Non-compacted concrete, if used for the pile shafts, shall conform to the requirements for cast-in-place concrete piles.
(c) Spacing.- Minimum spacing between compacted concrete piles shall be four feet six inches, center to center, except that where the shafts of such piles are cased for their full length, this spacing may be reduced to three feet six inches. Where a question exists as to possible damage to adjacent previously driven piles, these minimums shall be increased.
(d) Installation. -
(1) The base shall be formed by ramming concrete, in batches of approximately five cubic feet or less, from a drive casing and into the soil. Unless specifically otherwise permitted by the commissioner, a minimum of twenty blows of at least one hundred forty thousand foot-pounds per blow shall be required for extrusion of the last five cubic feet of concrete. The total quantity of concrete extruded from the drive casing to form the base shall be equal to or greater than the quantity so extruded in the case of the nearest successful applicable test pile, except that a compactive effort in excess of thirty blows, each of one hundred forty thousand foot-pounds, will not be required for extrusion of the last five cubic feet.
(2) After the expanded base has been formed, the shaft shall be constructed. Where a cased shaft is to be used, a steel shell shall be inserted into the drive casing and anchored to the expanded base by placing a fresh charge of concrete in the shell and driving it into the base. The shell may then be filled with concrete to cut-off elevation after the removal of the drive casing, in accordance with the provisions relating to cast-in-place concrete piles. Any annular space remaining between the shell and surrounding soil shall be suitably filled to assure proper lateral support of the shaft, unless there is sufficient recovery of the ground to provide the necessary support. Where an uncased shaft is to be used, the provisions of section 27-697 of article seven of this subchapter shall apply, and the concrete for the shaft shall be placed by ramming or by the use of approved pressure devices as the drive casing is withdrawn. Where ramming is used, the concrete batches being rammed shall not exceed five cubic feet in volume, not less than two blows of thirty thousand foot-pounds each shall be applied to compact each batch of concrete, and the bottom of the drive casing shall be kept below the level of the concrete at all times.
(3) The outside diameter of the permanent shaft shall not be more than four inches less than the inside diameter of the drive casing.
(4) Except where uncased shafts are used, as described in section 27-697 of article seven of this subchapter, no concrete shall be placed in the pile shafts until all piles within a radius of fifteen feet, or within the heave range, have been driven.
(e) Bearing material. -The enlarged base of the pile shall be formed in, or on the same type of bearing material as is used to support the nearest applicable load test pile and at a similar depth therein. In addition, the enlarged base shall be underlain by a minimum depth of ten feet (measured from the junction of the shaft and base) of soil materials of classes 1-65 to 7-65, except that, where installation of the base is permitted to be performed with blows of less energy than the one hundred forty thousand foot-pounds indicated in paragraph one of subdivision (d) of this section, the requirement for a ten foot depth of class 1-65 to 7-65 material may be reduced, subject to the approval of the architect or engineer and the approval [*sic*] of the commissioner.

§[C26-1109.6] 27-711 Steel H sections. -
(a) Materials.- Steel H sections may be of any type of steel permitted by the provisions of reference standard RS 10-5. The use of built-up sections or sections of other than "H" form will be permitted if the several components of the section are adequately connected to develop the strength of the adjacent components and if the ratio of width to thickness of the component parts does not exceed the values for conventional "H" sections.
(b) Limitations on use. -The tips of all steel H piles having a thickness of metal less than one-half inch, which are driven to end bearing on rock of class 1-65 through 3-65 by an impact hammer, shall be reinforced. The installation of all steel H piles by impact hammer to end bearing on rock of classes 1-65 through 3-65 shall be under the personal inspection of an architect or engineer, and the operations of driving such piles, the observations of penetration resistance, and the operation of the equipment shall be conducted so as to terminate driving directly when the pile reaches refusal on the rock surface.

§[C26-1109.7] 27-712 Concrete-filled pipe piles. -
(a) Materials.- The pipe shall conform to the provisions of reference standard RS 11-8. Concrete shall conform

to the requirements of article five of subchapter ten of this chapter.

(b) Minimum dimensions. -

(1) Pipe installed open-end and having a nominal outside diameter of less than fourteen inches shall be at least one-quarter inch thick. For diameters from fourteen inches to eighteen inches, the minimum thickness shall be 0.310 in. For diameters over eighteen inches, the minimum thickness shall be 0.375 in.

(2) Steel pipe piles installed with ends closed shall have a minimum nominal wall thickness of at least 0.125 in.

(3) For piles which receive their principal support by friction, closure or splice plates shall not project more than three-eighths of an inch beyond the outer limit of the pipe section.

(c) Installation. -

(1) Pipe shells driven open-end shall be cleaned to the bottom of the shell after driving.

(2) After driving and cleaning the pipe, open-end piles driven to end bearing on rock or hardpan shall be reseated to full bearing by redriving, to the resistance indicated in Table 11-4. If the pipe shell shows two inches or more of penetration on redriving, the pipe shall be recleaned and redriven in successive cycles until the penetration on redriving is less than two inches.

(3) Pipe shells shall be inspected before filling with concrete, shall be clean, and shall meet the requirements for alignment and condition of the shell as specified with regard to the shells of cast-in-place piles. If leakage of water into the pipe occurs, the provisions of paragraph five of subdivision (e) of section 27-713 of this article shall apply.

(4) Placing of concrete fill in pipe shells shall conform to the requirements for placing concrete fill in cast-in-place piles.

§[C26-1109.8] 27-713 Caisson piles. -

(a) Description.- Caisson piles shall denote concrete filled pipe piles that are socketed into bedrocks of class 1-65, 2-65 or 3-65 and constructed with steel cores.

(b) Materials.- Pipe or shell and concrete shall conform to the requirements for concrete filled pipe piles, except that the minimum compressive strength of the concrete at the age of twenty-eight days shall be thirty-five hundred psi. Steel cores shall conform to the requirements for steel H piles. Reinforcing steel cages shall be covered with at least one and one-half inches of concrete.

(c) Design of rock socket. -The design of the rock socket shall be predicated on the sum of the allowable bearing pressure on the bottom of the socket plus bond along the sides of the socket. The allowable bearing pressure on the surface of the rock at the bottom of the socket shall be as established in section 27-678 of article four of this subchapter increased for embedment in accordance with note eight of table 11-2, provided that the strength of the concrete fill in the socket, computed as 0.45 f 'c is of comparable magnitude. The allowable bond stress between the concrete and the sides of the socket shall be taken as two hundred psi. The provisions of subdivision (c) of section 27-700 of article eight of this subchapter relative to penetration resistance shall not apply.

(d) Spacing and minimum dimensions. -

(1) Minimum diameter of a caisson shall be eighteen inches with a minimum shell thickness of three-eighths of an inch. Minimum depth of the rock socket shall be equal to the diameter of the pipe.

(2) The center-to-center spacing of caissons shall be at least two and one-half times the outside diameter of the shell.

(e) Installation. -

(1) The steel shell shall be installed through overburden, the material within the shell shall be removed, and the shell seated in the rock sufficiently to stop the inflow of soil. Where required to extend the shells, splices are to be welded. A suitable steel driving shoe shall be welded to the bottom of each caisson.

(2) A socket shall then be drilled in the rock to the required depth and shall be approximately of the same diameter as the inside diameter of the shell. Before placement of concrete, the socket and shell shall be thoroughly cleaned and the rock inspected to verify that the rock is of the class on which the design has been predicated, or of a better class. In case visual inspection cannot be made because of inability to unwater the caissons by standard pumping methods, drilling logs and screenings from the rock drilling operation may be utilized to determine the class of rock in the socket.

(3) Where more than one section of steel core is required, the mating ends of the sections shall be spliced so as to safely withstand the handling stresses to which they may be subjected. The ends shall be milled or field ground to insure contact. The steel core shall be centrally installed in the caisson before grouting and concreting, shall not be more than one inch above the rock at the bottom of the socket, and shall be full length of the caisson or extend a sufficient distance up into the shaft to transmit the load in the steel core into the concrete of the caisson. A minimum-weight thirty-six pounds stub core beam shall be installed in the socket for caissons not requiring steel cores in order to lock the caissons into the rock. In these cases, the length of the steel cores shall be twice the socket depth.

(4) Concrete and grout shall be placed so that it completely fills the shell, the socket, and the space between the steel core and shell, and in a manner that will preclude separation of the ingredients.

(5) If the leakage of water into the caisson is minor, the caisson shall be pumped out and one cubic yard of grout shall be placed in the caissons and then the balance of the concrete installed. If the leakage of water makes it inadvisable to attempt to place concrete in the dry, the shell shall be filled to its top with clean water, and the concrete placed by the tremie method to the top of the caisson in one continuous operation or by using a

seal of grout of the same strength as the specified concrete. The grout seal, if used, shall be deposited by means of a grout pipe to an elevation of at least three feet above the cutting edge, and after a sufficient time has elapsed to allow the grout to set, the caisson shall be pumped dry and the remaining space filled with concrete.

§[C26-1109.9] 27-714 Composite piles. -Composite piles include those consisting of two types of pile joined together. The maximum allowable load shall be that allowed for the component of lesser strength used to make up the full pile length. The connection or joint between the two components shall be constructed so as to prevent the separation of the upper and lower components during construction and thereafter. The details and methods of making joints shall be designed.

ARTICLE 11 UNDERPINNING

§[C26-1110.1] 27-715 General requirements. -
Where support of adjacent structures or properties is required, such support may be provided by underpinning, sheeting, and bracing, or by other means acceptable to the commissioner. Except as specifically permitted otherwise, underpinning piers, walls, piles, and footings shall be designed and installed in accordance with the applicable provisions of this subchapter relating to piers, walls, piles, and footings used in new construction and shall be inspected as provided in section 27-724 of article thirteen of this subchapter**.**

§[C26-1110.2] 27-716 Use of rock support in lieu of underpinning.- Existing structures founded at a level above the level of adjacent new construction may be supported on hard rock in lieu of underpinning, the use of sheeting and bracing, or the construction of retaining walls, provided that a report by the architect or engineer is submitted substantiating the safety of the proposed construction and verifying that an "in-place" inspection has been made of the rock exposed and of the jointing therein in the excavation.

ARTICLE 12 STABILITY

§[C26-1111.1] 27-717 General.- The possibility of overturning and sliding of the building shall be considered.

§[C26-1111.2] 27-718 Factor of safety. -
(a) Overturning.- The minimum factor of safety against overturning of the structure as a whole shall be one and one-half. Stability against overturning shall be provided by the dead load of the building, by the allowable uplift capacity of piling, by anchors, by the weight of soil directly overlying footings provided that such soil cannot be excavated without recourse to major modification of the building, or by any combination of these factors.
(b) Sliding. -The minimum factor of safety against sliding of the structure under lateral load shall be one and one-half. Resistance to lateral loads shall be provided by friction between the foundation and the underlying soil, by passive earth pressure, by batter piles, or by plum piles, subject to the following:
(1) The resistance to lateral loads due to passive earth pressure shall be discounted where the abutting soil could be removed, inadvertently, by excavation.
(2) In the case of pile supported structures, frictional resistance between the foundation and the underlying soil shall be discounted.
(3) The available resistance to friction between the foundation and the underlying soil shall be predicated on an assumed friction factor of one-half for soils of classes 1-65 through 8-65. A greater value of coefficient of friction may be used subject to verification by analysis and test. For soils of poorer classes, the stability shall be analyzed by accepted procedures of soil mechanics.

ARTICLE 13 INSPECTION

§[C26-1112.1] 27-719 General. -The applicable provisions of article seven of subchapter one of this chapter shall apply.

§[C26-1112.2] 27-720 Boring and test pit operations.-
Boring and test pit operations shall be subject to controlled inspection, except that fifty percent or less of the required number of borings and/or test pits may be inspected by an architect or engineer other than the architect or engineer designated for controlled inspection. The records of borings and/or test pits shall be attested to as follows:
(a) The architect or engineer shall file a report stating which borings and/or test pits were performed under his or her inspection and whether such inspection was performed personally or otherwise. If the inspection was not made personally by the architect or engineer, the name and address of the inspector shall be noted. It shall be stated: that the borings and/or test pits so inspected were made and were carried to the depths indicated; that, to the best of the architect's or engineer's knowledge and belief, the description and classification of the soils are a true description of the samples recovered from the respective borings and/or test pits; that such samples were recovered at the levels indicated; and that the boring and/or test pit work progressed in such manner that the samples recovered are reasonably representative of the subsurface conditions.
(b) The accuracy of the other data indicated on the boring records shall be attested to by the drilling contractor or by the driller making the borings.

§[C26-1112.3] 27-721 Piling.- The installation of all piling shall be subject to controlled inspection. Such inspection shall be performed only by an architect or engineer resident at the site, except that where more than one pile rig is working at a site, inspection of the work may be performed by nonlicensed or nonregistered personnel working under the resident architect or engineer, who need act only in a supervisory capacity. This exception shall not apply, however, in the cases of timber or steel piles driven to end bearing as described in article ten of this subchapter. Materials for piling shall be subject to inspection requirements as prescribed in subchapter ten of this chapter for those or like materials. In all cases, an inspector shall be assigned to observe the operations of each rig.

§[C26-1112.4] 27-722 Footings, foundation piers, foundation walls and pile caps. -The provisions of section 27-683 of article six of this subchapter shall apply.

§[C26-1112.5] 27-723 Subgrade for footings, foundation piers, and foundation walls. -The soil material directly underlying footings, foundation piers, and foundation walls shall be inspected by an architect or engineer after excavation and immediately prior to construction of the footings. If such inspection indicates that the soil conditions do not conform to those assumed for purposes of design and described on the plans, or are unsatisfactory due to disturbance, then additional excavation, reduction in allowable bearing pressure, or other remedial measures shall be adopted, as required. A copy of a report or reports on such inspection or inspections describing the conditions found and any necessary modification of the design, and bearing the signature of the architect or engineer making the inspections, shall be filed with the commissioner. In addition, notification shall be received by the department at least two working days prior to construction of the footing, pier, or foundation walls, that the subgrade is ready for inspection unless the requirements of section 27-209 of article twenty-one of subchapter one of this chapter have been met.

§[C26-1112.6] 27-724 Construction required for or affecting the support of adjacent properties or buildings.- Except in cases where a proposed excavation will extend less than ten feet below the legally established grade, all underpinning operations and the construction and excavation of temporary or permanent cofferdams, caissons, braced excavated surfaces, or other constructions or excavations required for or affecting the support of adjacent properties or buildings shall be subject to controlled inspection. The details of underpinning, cofferdams, caissons, bracing, or other constructions required for the support of adjacent properties or buildings shall be shown on the plans or prepared in the form of shop or detail drawings and shall be approved by the architect or engineer who prepared the plans.

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SUBCHAPTER 12
LIGHT, HEAT, VENTILATION, AND NOISE CONTROL

TABLE OF CONTENTS

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ARTICLE 1 GENERAL

§[C26-1200.1] 27-725 Scope. -The provisions of this subchapter shall establish and control the minimum requirements for light, heat, ventilation, and noise control except as otherwise provided in subchapters six, seven, and eight.

§[C26-1200.2] 27-726 Standards. -The provisions of reference standard RS-12 shall be a part of this subchapter.

§[C26-1200.3] 27-727 Definitions. -For definitions to be used in the interpretation of this subchapter, see subchapter two of this chapter.

§[C26-1200.4] 27-728 Plans. -For the requirements governing the filing of plans and the work to be shown on plans, see subchapter one of this chapter.

§[C26-1200.5] 27-729 Permits. -For the requirements governing equipment work permits and equipment use permits, see subchapter one of this chapter.

§[C26-1200.6] 27-730 Tests and inspections. -Where required in this subchapter, all equipment and systems shall be subject to tests and/or inspections that would disclose defects or operating conditions dangerous to life or health. Such equipment or systems shall not be operated until these defects or conditions are corrected.

ARTICLE 2 EXISTING BUILDINGS

§[C26-1201.1] 27-731 Alterations. -No building, or part thereof, shall hereafter be altered or rearranged so as to reduce any of the following to less than the required standards prescribed in this subchapter for buildings hereafter erected:

(a) The amount of available natural or artificial light.
(b) The output of devices providing heat to a room.
(c) The outdoor air supply.

No additional room shall be created unless made to conform to the requirements of this subchapter except that in basements of one-family dwellings existing on January first, nineteen hundred eighty-two, and in basements of all other dwellings existing on January first, nineteen hundred forty-eight, the minimum clear ceiling height may be seven feet for the minimum area. In multi-family dwellings, the installation of all new mechanical equipment shall conform to the requirements of article nine of this subchapter except that existing mechanical equipment may be replaced with new equipment of the same kind as previously installed.

ARTICLE 3 STANDARDS OF NATURAL LIGHT

§[C26-1202.1] 27-732 Natural light requirements. - Every habitable room shall be provided with natural light complying with the provisions of this subchapter.

§[C26-1202.2] 27-733 Natural light sources and location[s]*. -

(a) Natural light, when required, shall be provided by windows, skylights, monitors, glazed doors, transoms, fixed lights, jalousies or other natural light transmitting media. Such sources shall not be located in recesses having a width of less than six feet and such sources shall not be located so as to create a habitable room whose depth exceeds thirty feet except in dwelling units of group one construction containing more than three habitable rooms. Such sources, except as provided in subdivision (b) of this section, shall face or open upon the sky or upon a public street, space, alley, park, highway, or right of way, or upon a yard, court, plaza, or space above a setback, when such yard, court, plaza, or space above a setback is located upon the same lot and is of the dimensions required by the applicable provisions of the zoning resolution. Where dwelling units in buildings or spaces classified in occupancy group J-1 or J-2 are located in a cellar or a basement such dwelling unit or units shall have at least one-half of their height and all of their window surfaces above every part of an "adequate adjacent space". Such "adequate adjacent space" shall be open to the sky and shall be a continuous surface area outside the dwelling unit or units not less than thirty feet in its least dimension and abutting at same level or directly below every part of the exterior walls of such dwelling unit or units. Such "adequate adjacent space" shall include only spaces which are located on the same lot or plot as the building or on a public street, space, alley, park, highway or right of way and the level of such areas which abut or adjoin the habitable room at least shall be six inches below the window sills of any windows.

(b) Natural light sources may face or open upon an enclosed or partially enclosed balcony or space above a setback when such balcony or space faces upon a public street, space, alley, park, highway or right of way or upon a yard, court, plaza, or space above a setback, when such yard, court, plaza, or space above a setback is located upon the same lot and is of the same dimensions required by the applicable provisions of the zoning resolution, the maximum depth of any habitable room is at most thirty feet measured from the outer face of the wall forming the partial or full enclosure of the balcony or space, the enclosure of the balcony or space is not more than one story in height, and the balcony or space complies with either of the following:

(1) The front of the balcony or space above a setback has an opening to the outer air whose area is equal to at least seventy-five percent of the floor surface area of such balcony or space.

(2) The front of the balcony or space above a setback may be completely enclosed when the building is of group one construction provided the outer enclosing walls are glazed with clear plate glass or with plastic equivalent complying with subdivision (e) of section 27-

331 of article four of subchapter five of this chapter and such glazed wall area is equal to at least fifty percent of the interior walls enclosing such balcony or space and at least fifty percent of the required glazed area is openable and no window from any bathroom, water closet [*sic*] compartment, or kitchen whose area is fifty-nine square feet or less opens on such balcony or space.

***Copy in brackets not enacted but probably intended.**

§[C26-1202.3] 27-734 Area of natural light sources. - Required sources of natural light shall have an aggregate transmitting area of at least ten percent of the floor area of the room or space served and where an enclosed or partially enclosed balcony or space above a setback complying with section 27-733 of this article intervenes, the required sources of natural light shall have an aggregate transmitting area of at least ten percent of the combined floor area of such room and the portion of the balcony or space directly adjoining and in front of such room. Each required source shall have a minimum transmitting area of twelve square feet and only that area of the light source above thirty inches from the finished floor may be considered as providing the natural light required in any space.

ARTICLE 4 STANDARDS OF ARTIFICIAL LIGHT

§[C26-1203.1] 27-735 Artificial light requirements.- Adequate means for producing artificial light by electricity shall be provided in every room or floor space in every building hereafter erected and in the portions of existing buildings where alterations are performed except as follows:

(a) Artificial light need not be provided in rooms or spaces occupied exclusively during the daylight hours between one hour after sunrise and one hour before sunset, and which are provided with natural light meeting the requirements of sections 27-733 and 27-734 of article three of this subchapter.

(b) Artificial light need not be provided in rooms or spaces with less than forty square feet of floor area if they are used exclusively for storage purposes or for mechanical facilities containing no rotating or moving parts, no combustion equipment, or no other hazardous equipment.

§[C26-1203.2] 27-736 Means of egress. -All means of egress shall be provided with the levels of artificial illumination as required in article six of subchapter six of this chapter.

§[C26-1203.3] 27-737 Places of assembly.- All places of assembly shall be provided with the levels of artificial illumination as required in subchapter eight of this chapter.

§[C26-1203.4] 27-738 Bathrooms and toilet rooms.- In all bathrooms and toilet rooms, the required means for producing artificial illumination shall be capable of producing an average intensity of not less than ten foot candles, when measured at thirty inches above the floor.

§[C26-1203.5] 27-739 Yards and courts. -Where a building is classified in occupancy group J-1 or J-2, or where a building contains a space or spaces classified in occupancy group J-1 or J-2, all yards and courts shall be provided with adequate means of providing artificial light by electricity having a minimum intensity of not less than one foot candle measured at the lower level or levels of all yards or courts.

ARTICLE 5 STANDARDS OF HEATING

§[C26-1204.1] 27-740 Heating requirements.-

All habitable or occupiable rooms or spaces, and all other rooms or spaces listed in table 12-1, shall be provided with means of heating in accordance with the requirements of this subchapter and reference standard RS 12-1. Heating systems shall be capable of producing the required temperatures listed in table 12-1 when the outdoor temperature is five degrees Fahrenheit and the wind velocity is fifteen mph. In highly exposed locations, provision shall be made for higher wind velocities. Heating equipment shall not be required when either of the following conditions exist:

(a) Where the occupancy is seasonal and the rooms or buildings will not be occupied between November first and May first of the following year.

(b) Where the processes or activities normally conducted within the space will generate sufficient heat to produce the prescribed indoor temperature during the time of occupancy.

§[C26-1204.2] 27-741 Minimum temperature requirements.- Heating systems shall be capable of producing the required minimum space temperatures as set forth in table 12-1. Where the occupancy of a space does not conform exactly with any of the spaces listed, the temperature shall be determined by the requirements of the listed space to which it most nearly conforms.

§[C26-1204.3] 27-742 Devices producing incidental heat.- Where a room or space contains equipment that produces heat, such as motors, generators, resistors, lights, compressors, steam heated vessels, etc., and where such equipment is in constant use during the period of occupancy, the equipment may be considered as a supplementary heating device. Its heating capacity may be deducted from the required capacity of the heating devices in the room.

§[C26-1204.4] 27-743 Capacity of central heat sources.- Where central heat sources are used, they shall have a gross output capacity sufficient to provide for the required heating load, including appropriate

allowance for distribution losses, pick-up, and the heating of domestic hot water if the central heat source is used for that purpose.

TABLE 12-1 MINIMUM SPACE TEMPERATURE REQUIREMENTS[a]

Rooms or Spaces	Minimum Temperature (degree F)
Habitable rooms in all buildings…….	70
Building equipment and machinery rooms…….	50
Patients' rooms, bathrooms and toilet rooms, stairs and corridors in hospitals and nursing homes……..	75
Bathrooms and toilet rooms, except patients' bathrooms and toilet rooms in hospitals and nursing homes.	70
Offices, waiting rooms, art galleries, museums, libraries, meeting rooms, churches, classrooms, auditoriums, lecture halls, night clubs, restaurants, theatres, locker rooms, dressing rooms, and spaces where persons are engaged in sedentary activities……..	70
Laboratories, light machine work, product inspections, loft buildings, shops, stores, display rooms, show rooms, sales rooms, and spaces where persons are engaged in moderate physical activities…..……	70
*Laboratories, light machine work, product inspections, loft buildings, shops, stores, display rooms, show rooms, sales rooms, and spaces where persons are engaged in moderate physical activities……...	65
Gymnasia, dance halls, skating rinks, bowling alleys, heavy assembly workrooms or shops, and spaces where persons are engaged in vigorous physical activities…….	60
Automotive repair shops…….	50
Storage areas, garages, space where work or process requires a low temperature……	None
Hospital operating rooms, and recovery, labor, delivery, and nursery rooms……..…..	80
Swimming pools, bath houses, and shower rooms…….	75

Note for Table 12-1:

[a]Where the listed temperatures differ from those that are required to be maintained under the provisions of section 131.03 of the New York City health code, the higher temperature shall apply.

Duplicate designation enacted on line above, this designation is probably intended.

§[C26-1204.5] 27-744 System design. -Where central heat sources are used, the heating system including all wiring, piping and/or ductwork, the heat sources and the various space heating devices shall be designed and installed so as to be capable of producing the minimum temperatures set forth in table 12-1. Also, the installation of the entire system shall be in accordance with the applicable requirements of this subchapter and subchapters thirteen through sixteen of this chapter, and the electrical code of the city of New York.

ARTICLE 6 STANDARDS OF NATURAL VENTILATION

§[C26-1205.1] 27-745 Occupiable rooms.- All occupiable rooms shall be ventilated by natural or mechanical means, or by a combination of both. Natural ventilation may be provided except where mechanical ventilation is required by article seven or eight of this subchapter.

§[C26-1205.2] 27-746 Habitable rooms.- All habitable rooms shall be provided with natural ventilation complying with the provisions of this subchapter except as provided in section 27-750 of this article.

§[C26-1205.3] 27-747 Alcoves.- An alcove or room opening off another room or space shall be considered as a separate room in determining its requirements for ventilation. However, for dwellings classified in occupancy group J-3, where the opening between the alcove and the room or space is at least eighty percent of the area of the common wall and the floor area of the alcove does not exceed twice the area of the opening, the alcove and the room opening into the alcove may be considered as a single space.

§[C26-1205.4] 27-748 Balconies.- Where an interior balcony or mezzanine opens to form part of another room or space, its area shall be added to the area of the room or space in which it is located to compute the ventilation required for both spaces.

§[C26-1205.5] 27-749 Natural ventilation sources.- Natural ventilation, when required, shall be provided by windows, skylights, monitors, doors, louvers, jalousies, or other similar ventilating openings. Such ventilating openings shall open to the sky or a public street, space, alley, park, highway, or right of way, or upon a yard, court, plaza, or space above a setback, where such yard, court, plaza, or space above a setback is located on the same lot and is of the dimensions required by the applicable provisions of the zoning resolution.

§[C26-1205.6] 27-750 Area of ventilating openings.- Ventilating openings in all habitable rooms or spaces shall have a free openable area of at least five percent of the floor area of the room or space ventilated and where there is an enclosed or partially enclosed balcony or space above a setback complying with section 27-733 of article three of this subchapter the ventilating openings shall have a free openable area of at least five percent of the combined floor area of such room and portion of the balcony or space directly adjoining and in front of such room. Each required ventilating opening shall have a minimum openable area of six square feet. Where fresh air is furnished in any habitable room or space by mechanical means supplying a minimum of forty cfm the free openable area of the openings may be reduced to one-half of the above requirements but not less than five and one-half square feet in aggregate. In all occupiable rooms or spaces, the free openable area shall be used to calculate the index for ventilation (section 27-753 of article seven of this subchapter), which shall determine the minimum requirements for supplementary mechanical ventilation.

****§[C26-1205.7] 27-751 Minimum dimensions of habitable rooms.-** Habitable rooms shall have a minimum clear width of eight feet in any part; a minimum clear area of eighty square feet and a minimum clear ceiling height of eight feet for the minimum area, except:

(a) A room which complies with the requirements for natural light and ventilation and in addition has an opening of not less than sixty square feet into an immediately adjoining room may have a minimum floor area of seventy square feet and a least horizontal dimension of seven feet;

(b) A dining space which has legally required ventilation, and in which the window has an area of at least one-eighth the floor area of such dining space;

(c) One-half the number of bedrooms in a dwelling unit containing three or more bedrooms may have at* least minimum dimension of seven feet;

(d) A room in a class B multiple dwelling as defined in section four of the multiple dwelling law which may have a minimum floor area of sixty square feet and a least horizontal dimension of six feet.

***Chapter 559 Laws of 1995*.

**As enacted but "a" probably intended.*

ARTICLE 7 STANDARDS OF MECHANICAL VENTILATION

§[C26-1206.1] 27-752 Areas requiring mechanical ventilation.- Mechanical ventilation shall be provided in all occupiable rooms or spaces where the requirements for natural ventilation are not met; in all rooms or spaces, which because of the nature of their use or occupancy, involve the presence of dust, fumes, gases, vapors, or other noxious or injurious impurities, or substances which create a fire hazard; or where required by the provisions of article eight of this subchapter or subchapters six through eight of this chapter.

§[C26-1206.2] 27-753 Index for ventilation.- The index for ventilation for any room or space shall be computed by adding the following:

(a) The contents per occupant, in cubic feet.

(b) The floor area per occupant, times ten, in square feet.

(c) The clear, unobstructed openable area of windows, skylights, and other sources of natural ventilation per occupant, times two hundred, in square feet. In all cases, the number of occupants used in computing the index for ventilation shall be the maximum number who will occupy the room or space simultaneously during any two-hour period.

§[C26-1206.3] 27-754 Minimum quantity of outside air for mechanical ventilation. - The minimum quantity of outside air required for mechanical ventilation in any occupiable room, where not otherwise prescribed, shall be determined according to table 12-2.

(a) Window requirements.- To be credited as ventilating openings under the provisions of this subchapter, windows or other openings shall meet the requirements

of section 27-749 of article six of this subchapter, and where mechanical supply ventilation is not provided, shall have a free openable area of at least one square foot per one hundred square foot of floor area.

TABLE 12-2 REQUIRED MINIMUM OUTDOOR AIR SUPPLY AND EXHAUST (cfm per sq. ft.)

Index for Ventilation	Ventilated Rooms with Natural Ventilation Openings		Ventilated Rooms without Natural Ventilation Openings		Air Conditioned Rooms	
	Supply	Exhaust	Supply	Exhaust	Supply	Exhaust
0-300	2.5	2.0	2.5	2.0	1.5	1.5
301-520	2.0	1.5	2.0	1.5	1.2	1.2
521-850	1.5	1.25	1.5	1.25	0.9	0.9
851-1250	…	1.0	1.0	1.0	0.6	0.6
1251-1650	…	0.67	0.67	0.67	0.5	0.5
Over 1650	…	…	0.33	0.33	0.4	0.4

(b) Air conditioning. -
(1) In air conditioned rooms, the windows and other openings shall not be credited as such in computing the index for ventilation. Air conditioned rooms shall be considered as interior rooms.
(2) Air that has been exhausted from an air conditioned space may be reconditioned by air conditioning apparatus and recirculated as equivalent outdoor air, provided that the total of supply air is not less than required for air conditioned rooms by table 12-2 and that the amount of actual outdoor air is at least thirty-three and one-third percent of the required total. The actual outdoor air supply shall not, under any circumstances, be reduced to less than five cfm per occupant, except that these minimum requirements may be reduced by fifty percent as provided in section 27-755 of this article.
(c) Required exhaust. -Required exhaust may be accomplished by raising the pressure within the space with consequent leakage through doors and windows, or by drawing the vitiated air from air conditioned spaces into the return air duct of air conditioning apparatus or into an exhaust duct discharging directly to the outdoor air.
(d) Make-up air. -A sufficient quantity of air to make the exhaust system effective shall be provided to the space being exhausted by one or by any combination of the following methods:
(1) By supplying air to the space by means of a blower system.
(2) By infiltration through louvers, registers, or other permanent openings in walls, doors, or partitions, adjoining spaces where air is supplied by one of these methods.
(3) By infiltration through cracks around window sash and doors.
(4) By other methods acceptable to the commissioner.
(e) Prohibited use of recirculated air.- Air drawn from any of the following spaces may not be recirculated;* mortuary rooms; bathrooms or toilet rooms; or any space where an objectionable quantity of flammable vapors, dust, odors, or noxious gases is present. Air drawn from rooms that must be isolated to prevent the spread of infection shall not be recirculated, except that air drawn from hospital operating rooms may be recirculated, if in compliance with the following requirements:
Semicolon enacted but colon probably intended.
(1) There shall be a minimum of twenty-five total air changes per hour, of which five air changes per hour shall be outdoor air.
(2) All fans serving exhaust systems shall be located at the discharge end of the system.
(3) Outdoor air intakes shall be located at least twenty-five feet from exhaust outlets of ventilation systems, combustion equipment stacks, medical surgical vacuum systems, plumbing vent stacks or from areas which may collect vehicular exhaust and other noxious fumes. The bottom of outdoor air intakes serving central systems shall be located at least six feet above ground level, or if installed above a roof, at least three feet above roof level.
(4) Positive air pressure shall be maintained at all times in relation to adjacent areas.
(5) All ventilation or air conditioning systems serving such rooms shall be equipped with a filter bed of twenty-five percent efficiency upstream of the air conditioning equipment and a filter bed of ninety percent efficiency downstream of the supply fan, any recirculating spray water systems and water reservoir type humidifiers. All filter efficiencies shall be average atmospheric dust spot efficiencies tested in accordance with ASHRAE Standard 52-68.
(6) A manometer shall be installed across each filter bed.
(7) Duct linings shall not be used in ventilation and air conditioning systems serving such rooms unless terminal filters of at least ninety percent efficiency are installed downstream of linings.
(8) Air supplied shall be delivered at or near the ceilings and all exhaust air shall be removed near floor level, with at least two exhaust outlets not less than three inches above the floor.

§[C26-1206.4] 27-755 Use of adsorption devices.- In all cases where the use of recirculated air is permitted, the required outdoor air supply may be reduced up to fifty percent, provided that the recirculated air is passed through adsorption devices. The adsorption devices shall be approved and rated. Means shall be provided for maintaining the effectiveness of the adsorption devices.

(a) Improper maintenance.- Should the adsorption devices be improperly maintained so that their effectiveness is impaired, the commissioner may order their removal. If the adsorption devices are removed, the air conditioning or ventilating system shall not be operated without supplying one hundred percent of the outdoor air required by this article or article eight of this subchapter.

(b) Test records.- The building owner shall, at all times, maintain a maintenance record showing the manufacturer's recommendation of the frequency of tests, the method of making tests, and the results of all tests of the adsorption devices. Such tests shall be made and certified by the manufacturer or by a laboratory acceptable to the commissioner at least twice every six months. The records of such tests shall be maintained for a period of at least two years, and shall be available for inspection by the commissioner.

(c) Ventilation of water closet compartments. -The use of any device that returns exhaust air from water closet compartments or from toilet rooms after passing through adsorption devices is not permitted as a means of providing ventilation for a water closet compartment for which a mechanical system of ventilation is required.

§[C26-1206.5] 27-756 Installation and operation of ventilating and air conditioning systems. -Where mechanical ventilation is accepted as an alternate for, or a supplement to, natural means of ventilation, or is required under the conditions herein prescribed, or where ventilation is provided by means of air conditioning system, the system, equipment, and distributing ducts shall be installed in accordance with the applicable provisions of subchapters thirteen through fifteen of this chapter. Such required ventilating and/or air conditioning systems shall be kept in operation at all times when the building or space is being used in a normal manner in accordance with the purpose for which it was intended.

ARTICLE 8 VENTILATION OF SPECIAL SPACES

§[C26-1207.1] 27-757 Rooms in institutional H-1 occupancy.- In occupancy group H-1, rooms or spaces in which persons are detained under restraint may be naturally ventilated by means meeting the intent of this subchapter.

§[C26-1207.2] 27-758 Kitchens. -

Kitchens shall be ventilated as follows:

(a) Kitchens located within dwelling units and having a floor area of greater than fifty-nine square feet shall have natural ventilation as prescribed in article six of this subchapter. When the floor area is fifty-nine square feet or less, the kitchen shall be ventilated by either of the following:

(1) Natural means complying with article six of this subchapter and further that the windows shall have a minimum width of twelve inches, a minimum area of thee* square feet or ten percent of the floor area of the space whichever is greater and so constructed that at least one-half of their required area may be opened. When the space is located at the top story the window or windows may be replaced with a skylight whose minimum width shall be twelve inches, whose minimum area shall be four square feet or one-eighth the floor area of the space whichever is greater and shall have ventilating openings of at least one-half of the required area of the skylight.

***As enacted but "three" probably intended.**

(2) Mechanical means exhausting at least two cfm of air per square feet of floor area. Where doors are used to separate the space, the lower portion of each door shall have a metal grille containing at least forty-eight square inches of clean openings or in lieu of such grille two clear open spaces may be provided, each of at least twenty-four square inches, one between the bottom of each door and the floor and the other between the top of each door and the head jamb.

(b) Kitchens, except those located within dwelling units, and side spaces, where cooking of any kind is done, shall be ventilated by either of the following; provided that in no instance may there be any violation of the nuisance provisions of the health code.

(1) Natural means complying with article six of this subchapter and supplemented with auxiliary mechanical supply and exhaust ventilation adequate to remove the fumes and smoke from the cooking equipment when operating.

(2) Mechanical means exhausting at least three cfm of air per square foot of floor area, but in no case less than one hundred fifty cfm. Such air shall be exhausted through duct or chimney constructed in accordance with the provisions of subchapters thirteen and fifteen of this chapter.

(c) Kitchens, snack bars, or pantries, where the operation consists of heating or warming previously prepared food that was cooked elsewhere, or preparation of food in vending machines may be ventilated by either of the following:

(1) Natural ventilation complying with article six of this subchapter.

(2) Mechanical ventilation complying with article seven of this subchapter.

§[C26-1207.3] 27-759 Bathrooms and toilet rooms.- Bathrooms and toilet rooms shall be ventilated as follows:

(a) When ventilated by natural means, the natural ventilation sources shall comply with section 27-749 of

article six of this subchapter and shall have an unobstructed free area of at least five percent of the floor area. In no case shall the net free area of the ventilation sources be less than one and one-half square feet except that in occupancy groups H-1 and H-2, provided the ventilation opening conforming with section 27-749 of article six of this subchapter may be in a vent shaft provided that the net free area of the opening is not less than three square feet. The vent shaft cross-sectional area shall be increased by one-fifth of a square foot for every foot of height, but shall not be less than nine square feet in area and open to the outer air at the top; or, the vent shaft may be open at the sides above the roof with louvres providing an equivalent net free area at the top, equal to the area of the shaft.

(b) By individual vent shafts or ducts constructed of noncombustible materials with a minimum cross-sectional area of one square foot and one-third additional square foot for each additional water closet or urinal above two in number. The upper termination of such ducts shall be equipped with a wind-blown ventilator cap.

(c) When a bathroom or toilet room is not ventilated by natural ventilation as required by this section, it shall be mechanically ventilated as follows:

(1) Rooms containing only one water closet or urinal shall be mechanically ventilated by an exhaust system capable of exhausting at least fifty cubic feet of air per minute. Means shall be provided for air ingress by louvres in the door, by undercutting the door, or by transfer ducts, grilles, or other openings.

(2) Rooms containing more than one water closet or urinal, and any auxiliary spaces such as those used in hand basins, slop sinks, and locker rooms, shall be mechanically ventilated by an independent exhaust system capable of exhausting at least forty cubic feet of air per minute per water closet or urinal. The outdoor air supply shall conform to the requirements of article seven of this subchapter.

(3) Toilet exhaust systems shall be arranged to expel air directly to the outdoors.

§[C26-1207.4] 27-760 Inside locker rooms. -Inside locker rooms and dressing rooms for more than one person shall be provided with exhaust ventilation giving at least four changes of air per hour.

§[C26-1207.5] 27-761 Corridors. -Unless natural sources complying with section 27-749 of article six of this subchapter provide ventilating openings equivalent to at least two and one-half percent of the floor area, corridors in buildings of occupancy groups H-1, J-1 and J-2 more than three stories in height, shall be mechanically ventilated by a system supplying at least one-half cubic foot of outdoor air per minute per square foot of floor area. [, or a system exhausting 1/2 cu. ft. of air per minute per sq. ft. of floor area.]* When air conditioned, a part of the required supply may be recirculated as equivalent outdoor air, but at least thirty-three and one-third percent of the required air supply shall be actual outdoor air.

Copy in brackets not enacted but probably intended.

§[C26-1207.6] 27-762 Crawl spaces. -

(a) Buildings and structures without basements. -In buildings and structures constructed without basements, and in which the first floor construction does not bear directly on the ground, a space at least eighteen inches high shall be provided directly under the floor beams, girders or sill of the first floor construction. Where the floor above such a space is constructed of wood or metal, the space shall be ventilated by one of the following means:

(1) At least four widely-distributed ventilating openings, providing a total net free area of at least one eight-hundredth of the area of the crawl space, shall be provided in the foundation walls, and the ground within the crawl space shall be covered with a vapor barrier in durability equivalent to at least fifty-five pounds, roofing felt with unsealed laps and with a transmission rate of one perm or less. At least two ventilating openings, providing a total net free area of at least one fifteen-hundredth the area of the crawl space shall be provided in foundation walls, provided that a vapor barrier with a transmission rate of one perm or less is installed over the entire underside of the first floor construction and overlaps the walls.

(2) Other means acceptable to the commissioner.

(b) Buildings and structures with basements.- No foundation wall vents shall be required where one side of a crawl space is completely open except for structural members, to a basement that has an area at least equivalent to that of the crawl space, provided that the basement is naturally ventilated by openings complying with section 27-749 of article six of this subchapter and having a free openable area of at least five percent of the floor area of the basement.

§[C26-1207.7] 27-763 Ventilation of refrigeration plants.- Rooms containing refrigeration plants shall be ventilated in accordance with the provisions of subchapter thirteen of this chapter.

§[C26-1207.8] 27-764 Ventilation of boiler rooms. - Boiler rooms shall be ventilated in a manner that will provide air for combustion in accordance with the provisions of subchapter fourteen of this chapter and also prevent the accumulation of hot air over or near the equipment within the room.

§[C26-1207.9] 27-765 Ventilation for schools.- School buildings shall be ventilated in accordance with the following requirements:

(a) Rooms of instruction and administration.- Classrooms, other rooms of instruction, and administrative rooms, where the index for ventilation is less than one thousand six hundred fifty, shall have a supply of outdoor air of at least fifteen cfm per occupant and mechanical exhaust. Where windows are used as the source of supply air, mechanical air exhaust shall be fifteen cfm per occupant. When outdoor air is supplied by mechanical means, the exhaust shall be at least eighty percent of the supply. In air-conditioned rooms, the conditioned air supply may be reduced to a minimum of ten cfm per occupant, of which at least five cfm shall be outdoor air.

(b) Lockers and wardrobes. -Lockers, wardrobes, or wardrobe rooms shall be ventilated in accordance with the provisions of section 27-760 of this article, and where these spaces are located within or adjacent to classroom[s]*, the exhaust air from the classroom may be used for such ventilation.

(c) Auditoria and assembly rooms. -Rooms where there are more than seventy-five occupants shall have a supply of outdoor air of at least fifteen cfm per occupant and mechanical exhaust. Where windows are used as the source of supply air, mechanical air exhaust shall be at least fifteen cfm per occupant. When outdoor air is supplied by mechanical means, the mechanical exhaust shall be at least eighty percent of the supply. In air-conditioning spaces, the conditioned air supply may be reduced to a minimum of ten cfm per occupant, of which at least five cfm shall be outdoor air.

Copy in brackets not enacted but probably intended.

§[C26-1207.10] 27-766 Ventilation of rooms or spaces with excessive temperatures, strong odors, toxic substances, or airborne irritants.- In these rooms or spaces, prevention of all of the following conditions shall be considered in the design and installation of a ventilating system:

(a) Excessive temperatures that may be detrimental to the occupants.

(b) The danger of large concentrations of toxic substances in the air.

(c) The danger of large concentrations of airborne irritants an** impurities, such as steam, gases, vapor, and dust, that may be injurious to health.

Where the exhausted air may contain toxic substances or strong objectional*** odors, the exhaust system shall be independent of exhaust systems serving other parts of the building.

As enacted but "and" probably intended.

****As enacted but "objectionable" probably intended.***

§[C26-1207.11] 27-767 Ventilation for special uses and occupancies. -Special uses and occupancies, not provided for in this subchapter, shall be ventilated in accordance with the requirements of subchapter seven of this chapter. Ventilation of stage areas shall be in accordance with the requirements of subchapter eight of this chapter.

ARTICLE 9 NOISE CONTROL IN MULTIPLE DWELLINGS

§[C26-1208.1] 27-768 Requirements. -Interior walls, partitions, floor-ceiling constructions, and mechanical equipment in spaces or buildings of occupancy group J-2 shall be designed and constructed in accordance with the requirements of this subchapter, to provide minimum protection for each dwelling unit from extraneous noises emanating from other dwelling units and from mechanical equipment. In addition, airborne sound from exterior mechanical equipment of buildings in any occupancy group shall conform to the requirements of this subchapter**.**

(a) Field testing. -Where conditions indicate that the installed construction or equipment does not meet the noise control prescribed in this subchapter, measurements shall be taken to determine conformance or non-conformance. For conformance with this subchapter, the results of such measurements shall not fail by more than two db to meet the requirements in any octave band, or by more than two points to meet any STC or INR requirements.

(b) Materials or assemblies of materials utilized to meet noise control requirements shall comply with load bearing, fire protection or other applicable requirements of this code for walls, partitions and floor-ceiling constructions.

§[C26-1208.2] 27-769 Acoustical isolation of dwelling units.-

(a) Airborne noise. -

(1) Walls, partitions, and floor-ceiling constructions separating dwelling units from each other or from public halls, corridors, or stairs shall have a minimum sound transmission class (STC) rating of forty-five for airborne noise. This requirement shall not apply to dwelling unit entrance doors. However, such doors shall fit closely and not be undercut. For permits issued after January first, nineteen hundred seventy-two, the STC required shall be fifty for airborne noise. For permits issued after April thirtieth, nineteen hundred seventy-three, dwelling unit entrance doors shall have a minimum STC of 35.

(2) STC ratings shall be obtained by tests conducted in accordance with the procedures of reference standard RS 12-2 except as provided in paragraph three of this subdivision.

(3) The STC ratings of construction assemblies as listed in reference standard RS 12-2 may be used to determine conformance with the requirements of paragraph one of this subdivision and with any other section that requires a specific STC rating.

(4) Penetrations or openings in walls, partitions, or floors for pipe sleeves, medicine cabinets, hampers, electric devices, or similar items shall be packed, sealed, lined, back-plastered, or otherwise isolated by sufficient mass to maintain the required STC ratings.
(5) Where grilles, registers, or diffusers in one dwelling unit are connected by ductwork with grilles, registers, or diffusers in another dwelling unit, and where such connecting duct is less than seven feet long, it shall be lined with duct lining; otherwise, an approved sound attenuating device shall be installed therein. Duct lining shall conform to the requirements of subchapter thirteen of this chapter.
(b) Structure-borne noise. -
(1) Floor-ceiling constructions separating dwelling units from each other or from public halls or corridors shall have a minimum impact noise rating (INR) of zero.
(2) Such INR shall be obtained by tests conducted in accordance with the procedure of reference standard RS 12-3 except as provided in paragraph three of this subdivision.
(3) The INR of a floor-ceiling construction listed in reference standard RS 12-3 shall be used to determine conformance with the requirements of paragraph one of this subdivision above and with any other paragraph that requires a specific INR. Constructions shall be designed and installed to avoid short circuiting the isolation devices that are incorporated into the constructions.
(4) This subdivision shall apply only to construction pursuant to permits issued after the thirty-first day of December, nineteen hundred seventy-six.

§[C26-1208.3] 27-770 Noise control of mechanical equipment. -
(a) **Minimum airborne noise insulation requirements**.
(1) BOILER ROOMS.- Boiler rooms adjoining dwelling spaces, either vertically or horizontally, shall be separated therefrom by floor-ceiling or partition constructions having a minimum STC rating of fifty.
(2) MECHANICAL EQUIPMENT SPACES. -Spaces or shafts containing air conditioning, refrigeration, or ventilating equipment, elevator machinery, or other mechanical equipment shall be separated both vertically and horizontally from dwelling units by constructions that will provide a minimum STC rating of fifty. [Spaces or shafts containing equipment shall be separated both vertically and horizontally from dwelling units by constructions that will provide a minimum STC rating of fifty.]* Spaces or shafts containing equipment totaling more than seventy-five rated h.p. shall not be located vertically or horizontally adjacent to dwelling units unless the total sound power level output of all the equipment in the space or shaft is certified not to exceed the maximum sound power levels of table 12-3 in any octave band. Such sound power level ratings shall be obtained by tests conducted in accordance with the procedures of reference standard RS 12-5.
a. Ventilating openings into mechanical equipment spaces. -Ventilating openings into boiler rooms and other mechanical equipment spaces shall not be located in yards or courts where there are windows opening from living quarters, unless such ventilating openings are provided with sound attenuating devices if needed to limit noise transmission to NC-40 (noise criterion) levels in the exposed dwelling units. For permits issued after January first, nineteen hundred seventy-two, the permissible noise levels shall not exceed NC-35.
b. Noise criteria requirements.- Noise criteria requirements prescribed in this subchapter shall be in accordance with reference standard RS 12-4.
Copy in brackets not enacted but probably intended.

TABLE 12-3 MAXIMUM SOUND POWER LEVELS PERMITTED IN MECHANICAL SPACES OR SHAFTS ADJOINING DWELLING SPACES [[b]]*

Octave Bands, c.p.s. Mid-Frequency	Max. Sound Power Level db[a]	
	db re 10^{-13} Watts	db re 10^{-12} Watts
63	101	91
125	101	91
250	103	93
500	105	95
1000	102	92
2000	101	91
4000	98	88
8000	96	86

Copy in brackets not enacted but probably intended.

Notes for Table 12-3:
[a]The maximum sound power levels shall be reduced five db in any octave band where the equipment data indicate pure tone generation. The presence of pure tones may be determined by means of one-third octave band analysis. The criterion for a significant prue-tone component shall be an audible pure-tone sound together with an increase of the sound pressure level in the corresponding one-third octave band above the mean of the two adjacent one-third of at least:

Center frequency of one-third octave band……..	40/125	160/250	215/500	630/1,000	1,000/10,000
Increase in sound pressure level (db)	6	4	3	2	1 ½

[b] For permits issued after January first, nineteen hundred seventy-two, the maximum sound power levels shall be changed as follows:

Octave Bands, c.p.s. Mid-Frequency	db re 10^{-13} Watts	db re 10^{-12} Watts
63	98	88
125	97	87
250	100	90
1000	97	87
2000	96	86
4000	93	83
8000	91	81

TABLE 12-4 MAXIMUM SOUND POWER LEVELS PERMITTED FOR EXTERIOR MECHANICAL EQUIPMENT ADJOINING BUILDINGS[b]

Maximum distance from equipment to exterior window (ft.)[a]	Maximum Sound Power Levels in Octave Bands—db re 10^{-13} Watts[a]							
	Octave Bands c.p.s Mid Frequency							
	63	125	250	500	1000	2000	4000	8000
12	99	92	88	84	82	82	82	82
25	103	96	92	88	86	86	86	86
50	107	100	96	92	90	90	90	90
100	110	103	99	95	93	93	93	93
	Octave Bands—db re 10^{-12} Watts							
12	89	82	78	74	72	72	72	72
25	93	86	82	78	76	76	76	76
50	97	90	86	82	80	80	80	80
100	100	93	89	85	83	83	83	83

Notes for Table 12-4:

[a]The minimum distance shall be measured in a straight line regardless of obstructions. Interpolated levels may be used for distances between those given in this table. See note a at end of table 12-3.

1. In the event sound power level data for the exterior mechanical equipment is not available, the sound pressure levels in octave bands, of the exterior mechanical equipment shall be measured.
2. The measurements shall be obtained with the microphone of the measuring equipment located at the interior of the dwelling unit affected in a line with the window nearest the exterior mechanical equipment. The window shall be fully open and the microphone shall be located three ft. away from the open portion of the window.
3. Measurements shall be obtained during times when the ambient sound pressure levels, in octave bands, are at least six db lower at all octave bands than the sound pressure levels measured with the exterior equipment operating. By ambient sound pressure levels is meant the measured sound pressure levels, at the above described measuring location, with the exterior equipment not in operation.

For permits issued after January first, nineteen hundred seventy-two, the permitted maximum sound power levels for exterior mechanical equipment adjoining buildings shall be changed as follows:

Feet	Maximum Sound Power Levels in Octave Bands—db re 10^{-13} Watts[a]							
	63	125	250	500	1000	2000	4000	8000
12	97	90	83	78	75	73	72	71
25	104	96	89	84	81	79	78	77
50	110	102	95	90	87	85	84	83
100	116	108	101	96	93	91	90	89
	[in]* Octave Bands—db re 10^{-12} Watts							
12	87	80	73	68	65	63	62	61
25	94	86	79	74	71	69	68	67
50	100	92	85	80	77	75	74	73
100	106	98	91	86	83	81	80	79

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TABLE 12-5 NOISE OUTPUT LIMITATIONS FOR EXTERIOR MECHANICAL EQUIPMENT MAXIMUM SOUND PRESSURE LEVEL[a,b] (NOT TO BE EXCEEDED IN ANY OCTAVE BANDS)

Octave Bands Center Frequency (cps)	Decibels re .0002 Microbar
63	64
125	57
250	51
500	45
1000	41
2000	39
4000	38
8000	37

Notes for Table 12-5:

[a]Measurements shall be obtained with a sound level meter and octave band analyzer, calibrated both electronically and acoustically before and after the measurements are made. The equipment used shall meet the requirements of reference standards RS 12-6.

[b]For permits issued after January first, nineteen hundred seventy-two, the maximum sound pressure levels shall be changed as follows:

Octave Bands Center Frequencies (cps)	Decibels re .0002 microbar
63	61
125	53
250	46
500	40
1000	36
2000	34
4000	33
8000	32

(3) DUCTWORK. -Ducts serving dwelling units shall be lined with duct lining for at least twenty feet from the fan discharge or intake; otherwise, an approved sound attenuating device shall be installed therein. All toilet exhaust ducts shall be lined with duct lining for at least twenty feet upstream of the exhaust fan intake, otherwise, an approved sound attenuating device shall be installed therein. Duct lining shall conform to the requirements of subchapter thirteen of this chapter.

(4) EXTERIOR MECHANICAL EQUIPMENT. -Mechanical equipment in a building in any occupancy group, when located outside of the building in a yard or court or on a roof, or where the equipment opens to the exterior of the building, shall be subject to the noise output limitations given in table 12-4 where one or more windows of a dwelling unit in any building in occupancy groups J-1, J-2, or J-3 is located within a sphere of one hundred foot radius whose center is any part of the equipment or its housing, unless it can be shown that the sound pressure levels, in octave bands, of the exterior mechanical equipment as measured within the dwelling unit do not exceed the levels given in table 12-5.

(b) Minimum structure-borne noise and vibration isolation requirements. -All isolators used in accordance with the following requirements shall be approved.

(1) BOILER ROOMS. -

a. Boilers.- All boilers supported on floors above a story having dwelling units shall be supported on resilient isolators having a minimum static deflection of one inch. The isolators shall be installed directly under the structural frame of the boiler.

b. Boiler breeching and piping.- When boilers are equipped with mechanical draft fans, the boiler breeching and piping that is supported from or on slabs, floors or walls that are contiguous to the dwelling unit shall be supported for a distance of fifty pipe diameters on or from resilient isolators. Each isolator shall have a minimum static deflection of one inch.

(2) INCINERATOR CHARGING CHUTES. -

a. Metal chutes. -Metal chutes, metal chute supports, and/or metal chute bracing, shall be free of direct contact with the shaft enclosure and the openings provided in the floor construction. Metal chutes shall be resiliently supported at each structural support location. Isolators shall provide a minimum static deflection of 0.30 in. All chutes shall be plumb.

b. Masonry chutes. -The interior chute wall shall be plumb and without obstructions for the full height of the shaft and shall have a smooth interior finish.

(3) PIPING. -

a. Metal piping connected to power driven equipment shall be resiliently supported from or on the building structure for a distance of fifty pipe diameters from the power driven equipment. The resilient isolators shall have a minimum static deflection of one inch for all piping with a four inch or larger actual outside diameter and one-half inch for piping with less than four inches in actual outside diameter. Piping connected to fluid pressure-reducing valves shall be resiliently isolated for a distance of fifty pipe diameters from pressure reducing valves and isolators shall provide a minimum static deflection of one-half inch.

b. Equipment such as heat exchangers, absorption refrigeration machines, etc., that is located on any floor or roof other than a floor on grade, and that is not power driven but is connected by metal piping to power driven equipment, shall be resiliently supported from or on the building structure, for a distance of fifty pipe diameters from the power driven equipment. The resilient supports shall be vibration isolators having a minimum static deflection of one inch and shall incorporate approved resilient pads having a minimum thickness of one-quarter inch.

(4) FANS. -Except for fans installed in compliance with section 27-353 of article five of subchapter five of this chapter all fan equipment located on any roof or floor other than a floor on grade shall be mounted on or from vibration isolators. Fan equipment with motor drives separated from the fan equipment shall be supported on an isolated integral rigid structural base supporting both the fan and motor. Fan equipment with motor drives supported from the fan equipment shall be mounted directly on vibration isolators. Each isolator shall have provision for leveling. Isolators shall incorporate resilient pads having a minimum thickness of one-quarter inch. The vibration isolators shall provide a minimum isolator efficiency of ninety percent at fan rotor rpm with a maximum deflection of two inches. Fans and compressors of three h.p. or less assembled in unitary containers may meet this requirement with isolators internal to the container providing the isolators meet the above minimum isolator efficiencies.

(5) PUMPS. -All pumps of three h.p. or more located on any floor other than a floor on grade shall be supported on vibration isolators having a minimum isolation efficiency or eighty-five percent at the lowest disturbing frequency. Each isolator shall incorporate a leveling device and a resilient pad having a minimum thickness of one-quarter inch.

(6) COMPRESSORS. -Compressors and drives located on a floor other than a floor on grade shall be mounted on vibration isolators having a minimum isolation efficiency of eighty-five percent at the lowest disturbing frequency. Each isolator shall incorporate a leveling device and a resilient pad having a minimum thickness of one-quarter inch.

(7) COOLING TOWERS. -All moving parts of cooling towers located on a roof or floor other than a floor on grade shall be installed on vibration isolators providing a minimum isolation efficiency of eighty-five percent at fan rotor rpm with a maximum static deflection of four inches. Each isolator shall

incorporate a leveling device and a resilient pad having a minimum thickness of one-quarter inch.

(8) EVAPORATIVE CONDENSERS.- Evaporative and air cooled condensers located on a roof or floor other than a floor on grade shall be mounted on vibration isolators providing a minimum isolation efficiency of eighty-five percent at fan rotor rpm with a maximum static deflection of four inches. Each isolator shall incorporate a leveling device and a resilient pad having a minimum thickness of one-quarter inch.

(9) DUCT CONNECTIONS TO FAN EQUIPMENT. - Flexible connections shall be installed between fan equipment and connecting ductwork.

(10) ELEVATOR MACHINERY.- Gear-driven machinery, gearless machinery, motor generators, and controllers located in an elevator machinery room or shaft on a roof, or on a floor other than a floor on grade, shall be supported on vibration isolator pads having a minimum thickness of one-half inch.

(c) Maximum permissible air velocities in ducts. -

(1) DUCTS LOCATED OVER CEILINGS OF DWELLING PLACES. -The maximum permissible air velocity in ductwork located over the ceilings of dwelling spaces or in masonry shafts adjoining dwelling spaces shall not exceed the velocities prescribed in table 12-6.

TABLE 12-6 MAXIMUM PERMISSIBLE AIR VELOCITIES IN DUCTS

Type of System	Branch Ducts	Sub-Main Ducts	Main Ducts
Low Velocity	750 fpm	1000 fpm	1500 fpm
High Velocity	1000	2000	3000

In the application of table 12-6 the following shall apply:

a. Any duct that connects directly to any terminal device (grille, diffuser, etc.) shall be classified as a branch duct for a distance of at least four feet from the terminal device.

b. Any duct that connects a branch duct to a main duct or to the fan shall be classified as a sub-main duct. No duct may be classified as a sub-main duct if it connects to a terminal device by means of a connection less than four feet in length.

c. When a duct is connected to the fan and to two or more sub-main ducts it shall be classified as a main duct.

d. The maximum velocities shown in table 12-6 for low velocity ductwork shall apply in all cases except where a system of round ductwork is used and an acoustic air control device with self-contained attenuation components is located in the ductwork prior to each air terminal device. Branch ducts, if any connecting the acoustic air control devices to the terminals shall not have air velocities exceeding seven hundred fifty fpm. Maximum power level ratings for the acoustic air control devices shall be three db less than the values shown in table 12-7.

(d) Maximum permissible sound power levels of fan coil units, grilles, registers, diffusers and induction units. -Sound power level data, in octave bands, shall be certified in accordance with the provisions of section 27-131 of article seven of subchapter one of this chapter, for grilles, registers, diffusers and induction units at design operating conditions and for coil units when operating at specified cfm. The sound power levels shall not exceed the levels listed in table 12-7 when measured in accordance with the provisions of reference standard RS 12-5

TABLE 12-7 MAXIMUM PERMISSIBLE SOUND POWER LEVELS FOR TERMINAL UNITS[1]

Octave Bands, c.p.s. Mid-Frequency	Sound Power Levels, db: db re 10^{-13} Watts	Sound Power Levels, db: db re 10^{-12} Watts
63	79	69
125	73	63
250	67	57
500	62	52
1000	59	49
2000	57	47
4000	54	44
8000	53	43

Notes for Table 12-7:

[1] For permits issued after January first, nineteen hundred seventy-two, the Maximum Permissible Sound Power Level for terminal units shall be changed as follows:

Octave Bands, c.p.s. Mid-Frequencies	Sound Power Levels, [db]*: db re 10^{-13} Watts	Sound Power Levels, [db]*: db re 10^{-12} Watts
63	76	66
125	69	59
250	62	52
500	57	47
1000	54	44
2000	52	42
4000	49	39
8000	48	38

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SUBCHAPTER 13
MECHANICAL VENTILATION, AIR CONDITIONING, AND REFRIGERATION SYSTEMS

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ARTICLE 1 GENERAL

§[C26-1300.1] 27-771 Scope. -This subchapter shall establish the minimum safety requirements for, and control the design, construction, installation, alteration, and use of, systems for providing mechanical ventilation, air conditioning, air cooling, air heating, and refrigeration. In addition, within special flood hazard areas, and below the regulatory flood datum, as described in article ten of subchapter four of this chapter, mechanical ventilation, air conditioning, and refrigeration systems, and related equipment shall meet the requirements of the applicable provisions of reference standard RS 4-5.

§[C26-1300.2] 27-772 Standards. -The provisions of reference standard RS-13 shall be a part of this subchapter.

§[C26-1300.3] 27-773 Definitions. -For definitions to be used in the interpretation of this subchapter, see subchapter two of this chapter.

§[C26-1300.4] 27-774 Plans. -For the requirements governing the filing of plans and the work to be shown on plans, see subchapter one of this chapter.

§[C26-1300.5] 27-775 Permits. -For the requirements governing equipment work permits and equipment use permits, see subchapter one of this chapter.

§[C26-1300.6] 27-776 General requirements. -

(a) Ventilation. -The minimum quantities of air and other requirements for the ventilation of habitable and occupiable rooms shall be as required by subchapter twelve of this chapter, and for the ventilation of special uses and occupancies by subchapters seven and eight of this chapter.

(b) Noise control. -Noise control requirements for mechanical equipment shall be as required by subchapter twelve of this chapter.

(c) Safety. -All systems, equipment, and materials including any devices, apparatus, piping work, sheet metal work, insulation work, and supports therefor, used as part of or in connection with installations governed by this subchapter, shall be designed, installed, located, and operated so that they will not create an immediate or potential danger to life or impair public health or welfare. No piping of any kind, with the exception of piping required or, permitted under subchapter seventeen of this chapter, shall be permitted within a stair enclosure. Ducts protected in accordance with the requirements of this subchapter, which do not reduce the required clearances of a stair enclosure, are permissible.

(d) Openings. -No openings for outdoor exhaust air discharges, air intakes, or reliefs from equipment shall be located and constructed so as to:

(1) Interfere with the proper functioning of other openings in the same building or in adjoining buildings.

(2) Interfere unreasonably with the occupants of the same building or adjoining buildings or with the general public.

(3) Create a fire or health hazard.

§[C26-1300.7] 27-777 Construction.-

The construction, installation, and alteration of systems for providing mechanical ventilation, air conditioning, air

cooling, air heating, and refrigeration, shall be in accordance with the following:
(a) Air conditioning and ventilating systems for all occupancies shall be constructed in accordance with the provisions of reference standard RS 13-1. In addition, equipment used for air conditioning systems shall be constructed, installed and altered in accordance with the provisions of reference standards RS 13-7 through 13-15. Where any conflicts arise between the electrical provisions of the foregoing reference standards and the New York City electrical code, the provisions of the latter shall govern.
(b) Air conditioning systems for one- and two-family dwellings, for one story buildings four thousand square feet or less in gross floor area provided ducts do not penetrate fire divisions, and for buildings classified in mercantile occupancy group C, twenty-five hundred square feet or less in gross floor area shall be constructed and installed in accordance with the provisions of reference standard RS 13-4. Also see article eleven of subchapter fourteen of this chapter.
(c) Exhaust systems for cooking spaces requiring mechanical ventilation in accordance with the provisions of subchapter twelve of this chapter, except kitchens located within dwelling units, shall be installed as provided in reference standard RS 13-2.
(d) Restaurant cooking equipment shall be provided with a means of ventilating such equipment constructed in accordance with the provisions of reference standard RS 13-3, provided however that restaurant cooking equipment installed for periodic cooking use other than commercial [*sic*] only, in community rooms of multiple dwellings, firehouses and other low hazard occupancies as determined by the commissioner may be provided with a means of ventilation constructed in accordance with the provisions of reference standard RS 13-1.
(e) Air blower and exhaust systems, where required for the removal or conveying of dust, vapor, or other impurities, shall be installed in accordance with the provisions of reference standard RS 13-5.
(f) Refrigeration systems shall be constructed, installed, and altered in accordance with the provisions of reference standard RS 13-6.
(g) The utilization of city water in air conditioning and refrigeration systems shall be subject to the requirements of reference standard RS-16.

§[C26-1300.8] 27-777.1 Smoke control requirements.
(a) In all buildings classified in occupancy group C, D, E, F, G, H, J-1 or J-2:
(1) Ventilation systems supplying different occupancy groups shall not be interconnected, provided however that a ventilation system may serve two occupancy groups located on the same floor when the accessory use occupies less than twenty per cent of the floor area occupied by the principal use.
(2) Ventilation systems supplying corridors shall not be interconnected with systems serving other spaces, except that this requirement shall not apply to floors used exclusively as office space in buildings classified in occupancy group E which are fully sprinklered.
(3) A ventilation system supplying any part of a means of egress shall not be interconnected with any other ventilation system.
(4) A ventilation system supplying public areas and assembly spaces shall have smoke detecting devices that will shut down the system upon detecting smoke.
(5) In buildings classified in occupancy group J-2, ventilation systems supplying individual apartments shall not be directly connected with any other ventilation system.
(6) Except in buildings classified in occupancy group J-2, and as otherwise provided in section 27-343 of article five of subchapter five of this chapter, either a combined heat and smoke damper or independent heat and smoke dampers shall be installed at any penetration of construction required to have a fire-resistance rating.
(b) In all buildings classified in occupancy group C, D, E, F, G, H or J-1, there shall be provided a system of mechanical means of sufficient capacity to exhaust six air changes per hour or one cfm/sq. ft., whichever is greater, from the largest floor in the building, using either dedicated fan equipment or the building ventilation system arranged to shut down automatically with manual override capability to exhaust one floor at a time through a roof or an approved location on an exterior wall other than a lot line wall.

§[C26-1300.9] 27-777.2 Ventilation in existing J-1 buildings. -In any existing building classified in occupancy group J-1, either seventy-five feet or more in height or containing thirty or more sleeping rooms:
(a) Where a corridor or space above a ceiling in a corridor is being used on or after February first, nineteen hundred eighty-four to furnish direct ventilation to a sleeping room or suite, such use shall, unless continued use is permitted by the commissioner, be discontinued by closing all openings between the corridor and sleeping room with construction having a fire-resistance rating equal to the construction in which the opening occurs. When continued use of corridor spaces as a plenum is permitted, smoke detecting devices shall be installed in accordance with the requirements of section 27-981 of article six of subchapter seventeen of this chapter and activation of any two detectors on a floor shall cause closure of all openings to that floor and shut-off of ventilation service to the floor.
(b) All corridors and other public areas not provided with natural ventilation meeting the requirements of section 27-761 of article eight of subchapter twelve of this chapter shall be provided with manual smoke purging by means of existing ventilation systems.

(c) The requirements of this section shall be complied with on or before April first, nineteen eighty-seven.

ARTICLE 2 INSPECTIONS AND TESTS FOR EQUIPMENT USE PERMITS

§[C26-1301.1] 27-778 General requirements.-
No required ventilating system, no voluntary air duct system containing smoke detection or fire protection devices that are required by this subchapter, and no refrigeration system shall be placed in operation, until it has been tested and inspected in accordance with the requirements of this subchapter and until an equipment use permit has been issued by the commissioner, except as hereinafter provided.

§[C26-1301.2] 27-779 Required ventilating systems.-
The following tests and inspection requirements shall be complied with in order to obtain an equipment use permit for a required ventilating system.
(a) Procedure.- A required ventilating system shall be subject to the requirements for controlled inspection as provided in article eight of subchapter one of this chapter except that it shall not be required that the architect or engineer be in the employ of the owner. An inspection shall be made of the completed system to verify that the installation complies with the requirements of this subchapter. Tests shall be conducted to ascertain that the amount of air being supplied to and exhausted from each space conforms with the requirements of this code, and that all required smoke detection and fire protection devices are functioning properly. When a required ventilating system handles five thousand cfm or less, it shall be subject to controlled inspection except that the person making the inspection may be an architect, engineer or a person with at least five years of experience installing ventilating systems. However, if such a system exhausts any of the following:
(1) fumes, dusts, vapors or other noxious or injurious substances;
(2) substances that create a fire hazard, then the person making the inspection shall be an architect or engineer. It shall not be required that the architect or engineer be in the employ of the owner. The test reports required under the provisions of article eight of subchapter one of this chapter shall be filed in the form prescribed by the commissioner. The form shall include the quantity of air supplied or exhausted by each outlet.
(b) Fire extinguishing systems.- No equipment use permit for a required ventilating system containing a required fire extinguishing system shall be issued until a signed statement has been obtained from a representative of the fire commissioner who has witnessed the test of the extinguishing system and its control devices, certifying the fire commissioner's acceptance of such a system.
(c) Owner's statement. -A statement shall be filed with the commissioner by the owner or lessee of the building that the required ventilating system will be kept in continuous operation at all times during the occupancy of the building and, if any smoke or fire detection devices or fire extinguishing systems have been installed, that he or she will have such devices and the fan shut-offs actuated by them tested and inspected by a competent person or agency at one year intervals or less. The owner or lessee shall also state that he or she will promptly make any necessary adjustments and repairs to keep the ventilating system and its safety devices in proper operating condition. A record of each inspection and test shall be maintained on the premises by the owner or lessee, and records for at least the last two years shall be made available for inspection by the commissioner and the fire commissioner.

§[C26-1301.3] 27-780 Voluntary ventilating systems or other voluntary air duct systems. -The following test and inspection requirements shall be complied with in order to obtain an equipment use permit for a voluntary ventilating system or other air duct system when smoke detectors or fire protection devices are required.
(a) Procedure.- A voluntary ventilating system or other voluntary air duct system shall be subject to test and inspection to ascertain that all smoke detection and fire protection devices are functioning properly, and that the installation conforms with the requirements of this subchapter.
(b) Fire extinguishing systems.- No equipment use permit for a voluntary ventilating system containing a required fire extinguishing system shall be issued until a signed statement has been obtained from a representative of the fire commissioner who has witnessed the test of the extinguishing system and its control devices, certifying the fire commissioner's acceptance of such a system.
(c) Owner's statement. -A statement shall be filed with the commissioner by the owner or lessee of the building that he or she will have such devices and the fan shut-offs actuated by them tested and inspected by a competent person or agency at one year intervals or less. The owner or lessee shall also state that he or she will promptly make any necessary adjustments and repairs to keep these devices in operation. A record of each inspection and test shall be maintained on the premises by the owner or lessee, and the records for at least the last two years of operation shall be made available for inspection by the commissioner and the fire commissioner.

§[C26-1301.4] 27-781 Refrigerating systems. -The following test and inspection requirements shall be complied with in order to obtain an equipment use

permit for a refrigerating system, except as hereinafter provided.

(a) Procedure.- A refrigeration system shall be designated for test and inspection under the requirements for controlled inspection as provided in article eight of subchapter one of this chapter, except that it shall not be required that the architect or engineer be in the employ of the owner. Test information and all other information required by reference standard RS 13-6 shall be posted, and the inspection shall be made of the completed system to verify that the installation complies with the requirements of this subchapter.

(b) Temporary permit. -A temporary equipment use permit shall be required for a nonoperating system in which a charge is maintained. See subchapter one of this chapter for provisions governing temporary permits.

(c) Exception. -No equipment use permit or temporary equipment use permit shall be required for any refrigeration system exempted under the provisions of section 27-189 of article eighteen of subchapter one of this chapter; for any system using a group two refrigerant and having a prime mover of one h.p. or less; or for any system using water or air as a refrigerant.

ARTICLE 3 OPERATION AND MAINTENANCE

§[C26-1302.1] 27-782 General requirements.- All systems shall be maintained in a clean and orderly condition, free from accumulations of dust, oily waste, or debris. All machinery and all operating devices on piping and ductwork shall be kept readily accessible for inspections and repair. Plenum chambers, air ducts, and cooling and heating coils shall be kept clean. Filters shall be cleaned or renewed at proper intervals to insure safe operation and adequate air flow and shall comply with the applicable requirements of the fire prevention code.

ARTICLE 4 POSTING

§[C26-1303.1] 27-783 General requirements. – Information to be posted shall be as required in reference standard RS-13. Method of posting shall be as required in subchapter one of this chapter.

ARTICLE 5 CODE REQUIREMENTS OF OTHER CITY DEPARTMENTS

§[C26-1304.1] 27-784 Electrical. -All electrical work shall be installed in accordance with the requirements of the electrical code of the city of New York.

§[C26-1304.2] 27-785 Air pollution. -The discharge of odors, smoke, or other emissions into the open air shall be subject to the requirements of the New York City air pollution control code.

§[C26-1304.3] 27-786 Refrigeration. -For operating permits and qualification of operators for refrigeration systems, see the requirements of the fire department.

SUBCHAPTER 14
HEATING AND COMBUSTION EQUIPMENT

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LIST OF TABLES

ARTICLE 1 GENERAL

§[C26-1400.1] 27-787 Scope. -This subchapter shall establish the minimum safety requirements for, and control the design, construction, installation, alteration, and use of heating, combustion, fuel storage, and related equipment. In addition, within special flood hazard areas, and below the regulatory flood datum, as described in article ten of subchapter four of this chapter, heating, combustion, fuel storage and related equipment shall meet the requirements of the applicable provisions of reference standard RS 4-5.

§[C26-1400.2] 27-788 Standards. -The provisions of reference standard RS-14 shall be a part of this subchapter.

§[C26-1400.3] 27-789 Definitions. -For definitions to be used in the interpretation of this subchapter, see subchapter two of this chapter.

§[C26-1400.4] 27-790 Plans. -For the requirements governing the filing of plans and the work to be shown on plans, see subchapter one of this chapter.

§[C26-1400.5] 27-791 Permits. -For the requirements governing equipment work permits and equipment use permits, see subchapter one of this chapter.

§[C26-1400.6] 27-792 General requirements.-
All heating, combustion, and cooking equipment shall be installed with adequate clearances from combustible construction [*sic*] in accordance with the provisions of this subchapter. Either the equipment shall be provided with insulation or the building construction shall be fire protected, so that during continued or intermittent operation the surface of combustible construction materials will not be raised to a temperature higher than one hundred seventy degrees Fahrenheit. Such equipment shall be located, arranged, and protected so that the means of access to them for ordinary operation and maintenance will not be hazardous. They shall not be located in exits, hoistways, nor in the same space with other equipment or materials when the proximity to the other equipment or materials would create a hazardous condition. All piping shall be installed so as to provide for adequate expansion and contraction.

ARTICLE 2 INSPECTIONS AND TESTS FOR EQUIPMENT USE PERMITS

*****§[C26-1401.1] 27-793 Boilers**. -
(a) Acceptance tests. -Boilers shall not be placed in operation upon completion of construction until they have been inspected and tested and an equipment use permit has been issued by the commissioner. All final inspections and tests for boilers shall be subject to the provisions for controlled inspection as provided in subchapter one of this chapter, except that such inspections and tests shall be made by a qualified boiler inspector in the employ of the department or a duly authorized insurance company as provided in section two hundred four of the labor law. Equipment having a Btu input of not more than three hundred fifty thousand Btu per hour shall be exempt from this requirement.
(a) **Periodic boiler inspections**.-
(1) Except as provided in paragraph two of this subdivision, all boilers, as defined in section two hundred four of the labor law, excepting those boilers listed in subdivision five of such section of the labor law, shall be inspected at least once a year by duly authorized insurance companies or other qualified inspectors in the manner set forth in rules and regulations promulgated by the commissioner. Such inspections shall also include the chimney connectors described in article three of subchapter fifteen of this chapter. All boiler inspectors who perform periodic inspections pursuant to this subdivision shall be qualified under section two hundred four of the labor law and rules and regulations promulgated by the commissioner of labor.
(2) Each owner of a high-pressure boiler, as defined in sections 26-160 and 27-795 of this code, may choose to have the annual boiler inspection conducted by the department or by a duly authorized insurance company.
(**c) Owner's annual statement**. -
(1) The owner of each boiler that is subject to periodic inspection shall file an annual written statement with the commissioner, specifying:
a. The location of each boiler.
b. Whether or not the owner, agent, or lessee has had the boiler inspected by a duly authorized insurance company or other qualified inspector in accordance

with the requirements of subdivision (b) of this section, setting forth the name and address of the insurance company or other qualified inspector, the date of inspection, and the policy number covering the boiler.
(2) If the periodic boiler inspection has been performed by a duly authorized insurance company or other qualified inspector pursuant to subdivision (b) of this section, the annual statement shall be accompanied by a signed copy of the report of each boiler inspection, on such forms and in such manner as required by the commissioner.
(3) The statement shall be filed within thirty days after installation of a boiler. Thereafter, it shall be filed on or before the last day of December of the year of each annual inspection.
(d) Removal or discontinuance notice. -The owner of a boiler that is removed or discontinued from use shall file a written notice of such removal or discontinuance with the commissioner within thirty days of the date of removal or discontinuance.
(e) Failure to file statements and notices. -If an owner of a boiler shall fail to file any statement or notice required under this section, such owner shall be liable for a civil penalty pursuant to section 26-125 of this code.
(f) Additional inspections.- In addition to the inspections required by subdivisions (a) and (b) of this section, the commissioner may make such additional inspections as required to enforce the provisions of this code. No fee shall be charged for such additional inspections.
(g) Fees. -Every owner of a boiler in use and inspected by a duly authorized insurance company shall pay to the department an annual fee for each boiler in the amount prescribed by section 26-213 of title twenty-six of the administrative code to cover the city's administrative and supervisory costs involved. The fee shall be payable at the time of the filing of the statement required by this subdivision.
******Local Law 62-1991.***

§[C26-1401.2] 27-794 Fuel burning and fuel storage installations. -
(a) Field tests. -
(1) All liquid fuel piping and fuel oil storage tanks shall be hydrostatically tested for tightness by the contractor who made the installation before the work is closed in and before the system is operated. The piping shall be tested at one and one-half times the maximum working pressure applicable to that part of the piping system but at a pressure less than the test pressure required for the storage tank. The minimum pressure for testing tanks shall be one and one-half times the maximum working pressure applicable to the tank but in no case less than twenty-five psi. The hydrostatic pressure shall be maintained until all joints and connections have been visually inspected for leaks, but in no case for less than one-half hour. The tank shall not show any permanent deformation as a result of the test. A record shall be kept of the pressure tests showing the name of the contractor and the pressures at which the piping and the tank were tested.
(2) Gas distribution piping shall be tested for tightness by the contractor who made the installation before the work is closed in and before the system is operated, in accordance with the requirements of section 27-922 of article seven of subchapter sixteen of this chapter. For gas storage tanks see chapter four of this title.
(b) Inspections. -Fuel burning equipment shall be inspected in accordance with the requirements for controlled inspections in subchapter one, except that the inspections may be made by an architect or engineer who need not be in the employ of the owner or by a representative of the commissioner.
(c) Temporary use permit. -A temporary equipment use permit, as provided in subchapter one, may be issued by the commissioner upon receipt of a statement signed by the contractor who made the installation, certifying that:
(1) The portions of the work completed conform with all provisions of the code listing at the same any items still to be completed.
(2) All required pressure tests have been successfully completed on the portion of the work installed and giving the pressure at which the tests were made.
(d) Instruction cards. -For oil burning systems, cards giving complete instructions for the care and operation of the system shall be furnished and shall be permanently located in an easily visible and accessible location near the equipment.
(e) Exceptions. -An equipment use permit shall not be required for any installation for which a work permit is not required as provided in section 27-189 of article eighteen of subchapter one of this chapter.

ARTICLE 3 LICENSES AND CERTIFICATES

§[C26-1402.1] 27-795 High pressure boiler operating engineer license. -If a boiler produces steam or vapor or has a safety valve setting of more than fifteen psi and rated in excess of ten hp or if such boiler produces hot water at a pressure of more than one hundred sixty psi or at a temperature over two hundred fifty degrees Fahrenheit, such boiler shall be operated by a high-pressure boiler operator licensed in accordance with the requirements of subchapter two of title twenty-six of the administrative code.

§[C26-1402.2] 27-796 Oil burning equipment installer license.- All oil burning installations, including storage equipment, shall be made by, or under, the direct supervision of a licensed oil burning equipment installer, in accordance with requirements of subchapter two of title twenty-six of the administrative code.

§[C26-1402.3] 27-797 Certificates. -No oil burning equipment hereafter installed shall be operated until an equipment use permit has been issued by the commissioner, the requirements of the air pollution control code have been met as provided in section 27-799 of article four of this chapter, and until approval for the storage of fuel oil has been given by the fire commissioner, except that temporary operation may be permitted as provided in section 27-188 of article eighteen of subchapter one of this chapter.
(a) Every oil burning installation that is not fully automatic or requires preheating shall be operated by, or under, the direct supervision of a person holding a certificate of fitness issued by the fire commissioner. Such person shall be in the building at all times while the burners are in operation, and shall be present in the boiler room during the starting of the operation of a boiler.

§[C26-1402.4] 27-798 Operator's inspection after repairs.-
After any repairs are made to a boiler or fuel burning equipment for which licensed or qualified operators are required, such operators shall check the repairs, together with the functioning of all control [*sic*] devices and the positioning of all valves. These licensed or qualified operators also shall be present during the starting of the operation of the equipment and shall be responsible for the proper and safe operation of such equipment.

ARTICLE 4 ABATEMENT OF AIR CONTAMINANTS

§[C26-1403.1] 27-799 General requirements.-
All heating and combustion equipment that is fired with solid, liquid, or gas fuels and that is subject to the provisions of this code, including all rubbish burners and incinerators, shall comply with the requirements of the air pollution control code.

ARTICLE 5 EQUIPMENT STANDARDS

§[C26-1404.1] 27-800 Standards for gas and oil burning equipment. -Gas burning and fuel oil burning equipment and accessory equipment or devices shall be accepted for use in accordance with the provisions of this subchapter when they comply with the test and installation standards of reference standard RS-14 as applicable, or have been approved by the board. Both methods shall be subject to the requirements of section 27-135 of article eight of subchapter one of this chapter.

ARTICLE 6 EQUIPMENT CLASSIFICATION

§[C26-1405.1] 27-801 Low temperature equipment. -Equipment whose products of combustion at the point of leaving the equipment have a temperature of six hundred degrees Fahrenheit or less under normal operating conditions shall be classified as low temperature equipment.

§[C26-1405.2] 27-802 Medium temperature equipment.-
Equipment whose products of combustion at the point of leaving the equipment have a temperature of between six hundred degrees and one thousand degrees Fahrenheit under normal operating conditions shall be classified as medium temperature equipment.

§[C26-1405.3] 27-803 High temperature equipment.-
Equipment whose products of combustion at the point of leaving the equipment have a temperature of one thousand degrees Fahrenheit or greater under normal operating conditions shall be classified as high temperature equipment.

ARTICLE 7 EQUIPMENT FOUNDATION MOUNTINGS

§[C26-1406.1] 27-804 General requirements. -All floor mounted combustion or heating equipment shall be mounted on noncombustible construction as provided in reference standard RS 14-17 or on combustible construction if such construction is protected as required in reference standard RS 14-17, provided the following conditions are met:
(a) All clearances shall comply with the requirements specified in section 27-792 of article one of this subchapter.
(b) Heating and combustion equipment which has been tested in accordance with applicable standards listed in reference standard RS-14, shall be installed with the clearances determined by such tests.
(c) Equipment which has been approved, as provided in section 27-135 of article eight of subchapter one of this chapter, shall be installed in accordance with the conditions of such approval.
(d) When mounted above combustible construction, the equipment is arranged so that flame or gaseous products of combustion do not impinge upon the base of the equipment.

ARTICLE 8 EQUIPMENT CLEARANCES

§[C26-1407.1] 27-805 General requirements.-
Clearances from combustible construction in walls, partitions and ceilings adjacent to combustion or heating equipment shall not be less than that tabulated in reference standard RS 14-15, provided the following conditions are met:
(a) All clearances shall comply with the requirements specified in section 27-792 of article one of this subchapter.
(b) Heating and combustion equipment which has been tested in accordance with the applicable standards listed

in reference standard RS-14, shall be installed with the clearances determined by such tests.
(c) Equipment which has been approved, as provided in section 27-135 of article eight of subchapter one of this chapter, shall be installed in accordance with the conditions of such approval.

§[C26-1407.2] 27-806 Reduction of clearances. -The clearances required in section 27-805 of this article may be reduced when the exposed combustible construction is protected with noncombustible material in accordance with the forms of protection listed in reference standard RS 14-16.

ARTICLE 9 COMBUSTION AIR

§[C26-1408.1] 27-807 Air supply. -
(a) Oil fuels. -The air supply for equipment burning fuel oil shall comply with the requirements in applicable standards in reference standard RS-14. Ventilation shall be capable of providing at least thirty-six cfm of air for each gallon of oil per hour required to fire the equipment to gross output.
(b) Gas fuels. -The air supply for equipment burning gas shall comply with the requirements of article sixteen of this subchapter.
(c) Solid Fuels. -The air supply for equipment burning solid fuels shall comply with those required for burning fuel oil based on Btu equivalent of the solid fuel.
(d) Mechanical ventilation. -If the ventilation for the purpose of combustion is supplied mechanically, the ventilating system shall be electrically interlocked with the burner so that when the burner is in operation the ventilating system shall maintain the room in which the equipment is located at a pressure not less than the outdoor atmospheric pressure.

§[C26-1408.2] 27-808 Flue dampers. -Dampers in flues shall be constructed so that they cannot completely cut off the passage of flue gases at any time. Tight-closing dampers may be installed with approved automatic draft and combustion controls.

ARTICLE 10 PIPING CONTAINING STEAM, HOT WATER OR OTHER FLUIDS

§[C26-1409.1] 27-809 Insulation and clearances. - All accessible piping in habitable and occupiable rooms carrying steam, water, or other fluids at temperatures exceeding one hundred sixty-five degrees Fahrenheit shall be insulated to prevent the temperature at the outer surface of the insulation from exceeding sixty degrees Fahrenheit above the ambient temperature. The openings for insulated piping through combustible floors, walls, partitions, ceilings and other combustible construction shall include clearance and insulation adequate to satisfy the requirements of section 27-792 of article one of this subchapter. Where accessible piping carries a fluid not exceeding two hundred fifty degrees Fahrenheit and insulation would interfere with the functioning of the system, such piping may be uninsulated provided sufficient clearance is maintained from the combustible construction so that the temperature limitation of section 27-792 of article one of this subchapter is not exceeded, and all uninsulated piping shall be provided with at least one-half inch clearance from combustible materials.

§[C26-1409.2] 27-810 Firestopping. -
For requirements governing firestopping around piping passing through floors, roofs, or fire separations, see subchapter five of this chapter.

§[C26-1409.3] 27-811 Insulation materials.-
All insulations shall be of noncombustible materials. All coverings, vapor barriers and adhesives shall have a flame spread rating no higher than twenty-five and a smoke developed rating no higher than fifty. Adhesives and mastic finishes shall be tested in sufficient bulk to produce maximum burning, and shall be tested in accordance with reference standard RS 14-11.

ARTICLE 11 RESIDENCE-TYPE WARM AIR HEATING SYSTEMS

§[C26-1410.1] 27-812 General requirements. -
Residence-type warm air heating systems shall be designed and installed in accordance with the applicable requirements of reference standard RS-14.

ARTICLE 12 UNIT HEATERS

§[C26-1411.1] 27-813 General requirements.-
All gas or oil burning unit heaters shall conform to the requirements of article five of this subchapter.

§[C26-1411.2] 27-814 Supports.- All suspended type direct-fired unit heaters shall be adequately supported by metal hangers, brackets, or other noncombustible supports with the clearances required in reference standard RS 14-15.

§[C26-1411.3] 27-815 Recessed heaters.- Recessed heaters shall be of an approved type, and shall be installed only in accordance with the conditions of approval.

§[C26-1411.4] 27-816 Fireplace heaters.- Gas-fired heaters, approved for use in fireplace recesses only, shall not be used elsewhere.

ARTICLE 13 FLOOR FURNACES

§[C26-1412.1] 27-817 Location. -Floor furnaces shall be located so as to be accessible and shall not be installed in the floor of any corridor or passageway, nor in any exit in a place of assembly.

§[C26-1412.2] 27-818 Enclosures. -Enclosures of floor furnaces shall be constructed entirely of noncombustible materials with a fire resistance rating of at least one hour and the enclosure shall be provided with adequate outdoor air in accordance with the requirements of article nine of this subchapter to ensure proper combustion. The enclosure shall be provided with adequate means of access for servicing the furnace.

§[C26-1412.3] 27-819 Furnace supports. –
Floor furnaces shall be installed only in floors of noncombustible construction having at least a two hour fire resistance rating, except as provided for one- and two-family dwellings in section 27-823 of this article. Floor furnaces shall have the following clearances:
(a) Pit clearances. -Floor furnaces, when other than gas-fired, shall be mounted independently of the floor grille with a six inch clearance at the bottom and a twelve inch clearance at the sides except that the clearance on the control side shall be at least eighteen inches.
(b) Pit waterproofing. -When there is likelihood of water rising above the bottom clearance of the unit, the pit shall be constructed with a watertight enclosure with the sides extending at least four inches above the ground level.

§[C26-1412.4] 27-820 Pit access openings. -The access foundation wall opening or floor trap door shall be at least eighteen inches by twenty-four inches and the under floor passage to the furnace shall be at least twenty-four inches by twenty-four inches in cross-section.

§[C26-1412.5] 27-821 Duct temperature. -The outlet duct temperature of warm air heating furnaces shall not be greater than two hundred fifty degrees Fahrenheit.

§[C26-1412.6] 27-822 Pressure regulator. -
In gas-fired furnaces, a gas pressure regulator shall be provided so that the gas input does not exceed the manufacturer's rating. Pressure regulators shall comply with the requirements of article five of this subchapter.

§[C26-1412.7] 27-823 One-and two-family dwellings.-
Floor furnace enclosures shall be constructed of noncombustible materials with a fire resistance rating of at least one hour. Means shall be provided for supporting the furnace when the floor grille is removed. Clearances shall be as provided in reference standards RS 14-15 and 14-16.

ARTICLE 14 BOILERS

§[C26-1413.1] 27-824 General requirements. -The construction, installation, maintenance, and operation of boilers shall comply with the applicable requirements of reference standard RS 14-5.

ARTICLE 15 UNFIRED PRESSURE VESSELS

§[C26-1414.1] 27-825 General requirements. -The minimum clearance and fire protection requirements for unfired pressure vessels shall be the same as required for boilers designed for the same operating temperatures. The construction, maintenance, installation, and operation of unfired pressure vessels shall comply with the applicable requirements of reference standard RS 14-4.

ARTICLE 16 GAS FIRED EQUIPMENT

§[C26-1415.1] 27-826 General requirements. -The construction and installation of gas burning equipment shall comply with the applicable requirements of article five of this subchapter and reference standard RS 14-2 and RS 14-6. The installation of gas piping shall be in accordance with the provisions of subchapter sixteen of this chapter, and for the installation of chimneys and gas vents, the provisions of subchapter fifteen of this chapter.

***§27-826.01 Barbecue grilles**.- Only accepted natural gas-fired barbecues or grilles that employ an open flame for roasting or broiling and that are located in the interior of buildings, or on the exterior of buildings when against any part of an exterior wall, shall be installed. All provisions for the construction and installation of fireplaces set forth in article 19 of this subchapter shall be complied with in the construction and installation of barbecue grilles.
Local Law 80-1989.

ARTICLE 17 FUEL OIL EQUIPMENT

§[C26-1416.1] 27-827 General requirements. -For the purpose of this subchapter, fuel oil shall mean hydrocarbon oils as classified in reference standard RS 14-3 and RS 14-12 and shall have a flashpoint not lower than one hundred degrees Fahrenheit when tested in accordance with reference standards RS 14-13 and marketed under the following commercial grades: range oil or no.1 fuel oil; diesel oil or no. 2 fuel oil; no. 4 fuel oil; no. 5 fuel oil; no. 6 fuel oil. Except as provided in section 27-4056 of this title the use of crankcase refuse oil as fuel oil is prohibited. These requirements shall not apply to (1) the use and installation of portable burners not requiring a connection to a flue where such burners are of the type commonly used for household purposes such as oil stoves, oil heaters and oil lamps

equipped with a woven wick; (2) portable apparatus such as blow torches, soldering pots, tar heaters, snow melters, etc.; (3) storage tanks for oils used in industrial process such as cracking, distilling, manufacture of gas, or other similar processes. For the requirements governing the storage of such oils see chapter four of this title.

§[C26-1416.2] 27-828 Fuel oil storage equipment. -

(a) General requirements for fuel oil tanks. -All tanks shall be designed and installed in accordance with the provisions for steel work in subchapter ten of this chapter or in accordance with the provisions of this subchapter.

(1) All fuel oil storage tanks shall be built of steel plates or sheets, made by the open hearth or basic oxygen process. Such steel shall be free from physical imperfections, and shall be new, in good condition, and free from rust.

(2) Tanks shall be welded, riveted and caulked, or riveted and welded. Flanges or other pipe connections may be welded. All caulking shall be placed with round nose tools and without damages to the plates. Filler of any kind between plates shall be prohibited.

(3) Tanks to be buried shall be cleaned and then coated on the outside with two coats of red lead, or equivalent. They shall be further protected by a coating of hot tar, asphalt, or equivalent rust resistive material, applied at the work site. Tanks installed inside buildings above ground shall be coated with one coat of red lead, or equivalent.

(4) All buried storage tanks shall be constructed of at least one-quarter inch thick metal and shall be designed to withstand any external loads to which the tank may be subjected.

(5) At the time of installation all storage tanks shall bear a permanently-fixed plate, spot welded or equivalent, bearing the name of the tank manufacturer, the gage [*sic*] of the material, and capacity of the tank. Shop fabricated storage tanks shall be installed without structural alteration.

(6) All openings shall be through the top of the storage tank, except that storage tanks of two hundred seventy five gallon capacity or less, located above ground but below the lowest story, may be provided with a three-quarter inch opening for gravity discharge and a one inch opening in the bottom for cleaning and protection against corrosion.

(7) Tanks for no. 1, no. 2, no. 3 and no. 4 commercial [*sic*] grade oils need not have manholes. However, if manholes are used for such oils, the manhole covers shall be bolted and made gastight. Tanks for no. 5 and no. 6 commercial grade oils shall have manhole covers bolted or otherwise secured to the tanks and kept hydrostatically tight at all times.

(8) Tanks outside of buildings shall be electrically grounded in accordance with the requirements for equipment grounding of the electrical code of the city of New York.

(9) Tanks shall be located at least seven feet measured in the most direct manner, from any source of exposed flame unless protected as provided in paragraph two or three of subdivision (a) of section 27-829 of this article and at least two feet from any surface where the temperature exceeds one hundred sixty-five degrees Fahrenheit.

(b) Construction requirements, cylindrical tanks, except vertical tanks above ground outside of buildings, more than two hundred seventy-five gallon capacity. -

(1) The thickness of cylindrical tanks, including oval, elongated oval, or round [*sic*] tanks of more than two hundred seventy-five gallon capacity shall be subject to the following requirements:

a. Tanks thirty-six inches in diameter and less-at least 1/4 in. shell and 1/4 in. heads.

b. Tanks thirty-seven to seventy-two inches in diameter-at least 1/4 in. shell and 5/16 in. heads.

c. Tanks seventy-three to one hundred twenty inches in diameter-at least 5/16 in. shell and 3/8 in. heads.

d. Tanks over one hundred twenty inches in diameter-shall be of at least 3/8 in. steel and shall be stiffened by angle rings or equi3valent members so as to retain their cylindrical form.

(2) Dished heads for such tanks shall have a curvature the radius of which is not greater than the diameter of the tank. Dished heads shall be formed with an adequate cylindrical extension rim to provide a welding or riveting surface. If flat heads are used, they shall be braced in the same manner as described for the bracing of flat sides of rectangular tanks.

(3) Riveting in single lap seams shall not exceed a pitch as follows:

a. Shell 1/4 in. thick-5/8 in. diameter rivets, 2 1/4 in. pitch.

b. Shell 5/16 in. thick-5/8 in. diameter rivets, 2 3/8 in. pitch.

c. Shell 3/8 in. thick-3/4 in. in diameter rivets, 2 1/2 in. pitch.

(c) Rectangular tanks, of more than two hundred seventy-five gallon capacity. -

(1) Plates for rectangular tanks of more than two hundred seventy-five gallon capacity shall be at least 5/16 in. thick.

(2) Corners may be made up by bending the plates or by using angles.

(3) Minimum rivet diameter in seams shall be 5/8 in., and rivets shall be spaced not more than 2 1/4 in. center-to-center.

(4) All flat surfaces of rectangular tanks shall be braced by structural members or rods.

(5) When structural members are used, the rivet pitch shall not exceed six inches.

(6) All structural members shall be designed in accordance with the requirements of subchapter ten of this chapter.
(7) Connections between bracing members and the sides of the tank shall be designed so that the connection will not fail before the member will fail.
(d) All tanks except vertical tanks above ground, two hundred seventy-five gallon or less capacity. -
(1) All oil storage tanks of two hundred seventy-five gallon capacity or less that are not buried shall have a minimum thickness of shell and head plates of no. 10 manufacturer's standard gage [*sic*] steel plate. Storage tanks of sixty gallon capacity or less shall be similarly constructed but need not be thicker than No. 14 manufacturer's standard gage [*sic*].
(e) Vertical storage tanks over one thousand gallon capacity located outside of building above ground.-
(1) Vertical storage tanks located outside of buildings above ground shall be built of steel plates of the quality required for cylindrical tanks.
(2) The minimum thickness of shell or bottom plates shall be one-quarter of an inch, and the minimum thickness of roof plates one-eighth of an inch. The thickness of shell plates shall be determined in accordance with the following formula:

$$t = \frac{P \times R \times F}{T \times E}$$

where: t = thickness of shell plate in inches.
P = head pressure at bottom of ring under consideration in psi.
R = radius of shell, in inches.
F = factor of safety (taken as five).
T = tensile strength of plate, in psi as verified by mill test certificate.
E = efficiency of vertical joint in ring under consideration. E shall in no case be taken greater than one.

(3) Roof plates shall have single lap-riveted or welded watertight seams, and the roof shall be built to shed water. Bottom plates shall have single lap riveted or welded seams. Shell plate seams shall be designed to develop the full strength of the plate.
(f) Storage containers of six gallons or less. -
(1) Oil storage containers used with burners or oil burning heaters and having a capacity of six gallons or less used in connection with burners or oil-burning heaters shall be designed so as to withstand a hydrostatic pressure test of at least five psi without permanent deformation, rupture, or leakage, and shall be approved.
(2) All storage containers used with burners or oil burning heaters shall be installed with rigid metal fasteners for wall, floor, or stand type installations, and shall be protected against mechanical damage.
(3) Portable containers may be filled by a pump mounted on a storage tank, provided that the pump is approved.

§[C26-1416.3] 27-829 Location of tanks. -
(a) Inside of buildings, above ground on the lowest floor.-
(1) TANK CAPACITY OF FIVE HUNDRED FIFTY GALLONS OR LESS.- Storage tanks having a capacity of five hundred fifty gallons or less may be installed above ground on the lowest floor of a building, provided that such tanks are mounted on adequate noncombustible supports, with the tank anchored thereto. No more than five hundred fifty gallons of total storage capacity may be connected to one burner or may be installed without the protection provided in paragraph two or three of this subdivision.
(2) TANK CAPACITY MORE THAN FIVE HUNDRED FIFTY GALLONS BUT LESS THAN ELEVEN HUNDRED GALLONS.- Storage tanks having a capacity of more than five hundred fifty gallons but less than eleven hundred gallons may be installed above ground on the lowest floor of a building, provided that all portions of such tanks above the floor are completely enclosed with noncombustible construction having at least a two hour fire resistance rating. Weep holes one inch in diameter shall be provided at least every three feet along the bottom of the enclosure unless at least fifteen inches of clearance, together with access door, is provided between the tank and the enclosure.
(3) TANK CAPACITY ELEVEN HUNDRED GALLONS OR MORE.- Storage tanks having a capacity of eleven hundred gallons or more may be installed above ground on the lowest floor of a building, provided that all portions of such tanks above the floor are completely enclosed with noncombustible construction having at least a three hour resistance rating. At least fifteen inches clearance shall be provided over the tanks and on all sides between the tanks and the enclosure. A noncombustible access door, constructed so as to preserve the integrity of the fire resistive enclosure, shall be installed in the enclosure above the point where the capacity of the enclosure below the door sill would be equal to the capacity of the largest tank installed. When the longest inside dimension of the enclosure exceeds thirty-five feet, access doors shall be installed at intervals not exceeding twelve feet. Columns, pipes, or similar obstructions may project into the required fifteen inches of space within the enclosure, provided that access door or doors are so arranged that all portions of the enclosure are accessible for servicing.
(4) MAXIMUM TANK SIZE.- The capacity of individual storage tanks in no case shall exceed twenty thousand gallons.
(b) Inside of building above the lowest floor. -

(1) Fuel oil storage tanks having a capacity of two hundred seventy-five gallons or less may be installed inside of buildings above the lowest story when provided with a four inch thick concrete or masonry curb, or with a metal pan of gage [*sic*] equal to the gage [*sic*] of the tank, completely surrounding the tank and of sufficient height to contain two times the capacity of the tank. The number of such oil storage tanks shall be limited to one per story.
(2) Storage tanks having a capacity of two hundred seventy-five gallons or less, installed above the lowest floor inside a building shall be filled by means of a transfer pump supplied from a primary storage tank located and installed as otherwise required by this subchapter. A separate transfer pump and piping circuit shall be provided for each storage tank installed above the lowest floor. No intermediate pumping stations shall be provided between the storage tank and the transfer pump. Appropriate devices shall be provided for the automatic and manual starting and stopping of the transfer pumps so as to prevent the overflow of oil from these storage tanks.
(3) A float switch shall be provided with the curb or pan around the storage tank and shall be arranged so as to sound an alarm and stop the transfer pump in case of failure of the tank or the control in the tank. The operation of the float switch shall be tested at least once each week. An alarm bell shall be located in the same room with the tank and a visual and audible alarm shall be located in a maintenance office. The enclosing and sealing of switches and wiring shall conform to the requirements of the electrical code of the city of New York for devices located in an atmosphere of flammable vapors.

(c) Inside of buildings, below ground. -

(1) Storage tanks having a capacity greater than two hundred seventy-five gallons may be buried inside a building provided that the top of the tank is at least two feet below floor level. In lieu of two feet of earth over the tank, the tank may be covered by concrete flooring having the same thickness as the basement floor, but not less than four inch concrete meeting the requirement of subchapter ten of this chapter and reinforced with two inch by two inch mesh of at least no. 20 U.S. standard gage [*sic*] steel wire. Tanks shall be placed in firm soil and shall be surrounded by clean sand or well-tamped earth, free from stones that will not pass through a one inch mesh. When necessary to prevent floating, tanks shall be securely anchored.
(2) No tank shall be buried within three feet of any foundation wall or footing.

(d) Outside of building, below ground. -

(1) Storage tanks located outside of buildings and below ground shall be buried with the top of the tank at least two feet below ground. Tanks shall be placed in firm soil and shall be surrounded by clean sand or well-tamped earth, free from ashes or other corrosive substance, and free from stones that will not pass a one inch mesh. When necessary to prevent floating, tanks shall be securely anchored.
(2) No tank shall be buried within three feet of any foundation wall or footing.

(e) Outside of buildings, above ground. -

(1) Storage tanks of a capacity greater than two hundred seventy-five gallons located outside of buildings above ground shall be not less than one and one-quarter (1 1/4) tank diameters and in no case less than ten feet from the line of adjoining property, the nearest building or adjacent tank. The minimum clearance between individual tanks located outside of buildings above ground and the line of adjoining property which may be built upon shall be fixed by the following formula:

$$M.C. = 10 + 4 \left(\frac{G-275}{5000} \right)$$

where:

M.C. = minimum clearance from nearest surface of tank to adjoining property, in feet.
G = capacity of tank, in gallons.

The maximum allowable capacity of fuel oil storage tanks located outside of buildings above ground shall be one hundred thousand gallons.
(2) Tanks shall be located so as not to obstruct or interfere with any means of egress.
(3) Each storage tank shall be protected by an embankment or dike. Such protection shall have a capacity at least one and one-half times the capacity of the tank so surrounded and shall be at least four feet high, but in no case shall the protection be higher than one-quarter the height of the tank when the height of the tank exceeds sixteen feet. Embankments or dikes shall be made of earthwork with clay core, of masonry, of reinforced concrete or of steel. Earth work embankments shall be firmly and compactly built of good earth free from stones, vegetable matter, etc., and shall have a flat section of at least three feet at the top and a slope of at least one and one-half to two on all sides. Concrete, masonry or steel dikes shall be designed so as to conform safely all of the oil in the tank so surrounded. Embankments or dikes shall be continuous and unpierced, and the outside toe shall be located at least five feet inside of the property line, and no less than five feet from a driveway or parking area.

(f) Tanks located along line of subways.-

(1) No buried tank shall be placed within twenty feet of the outside line of a subway wall. Where an above ground tank within a building is located within the outer lines of the subway, or within twenty feet of the outside line of the subway wall, such tank shall be placed within a welded steel oiltight pan of not less than no. 18

manufacturer's standard gage [*sic*] metal suitably reinforced and of capacity to contain the contents of the tank.
(2) For the purpose of the foregoing requirement, a subway shall be deemed to include any subsurface railroad or rapid transit roadbed.

§[C26-1416.4] 27-830 Piping.-
(a) Installation of piping and tubing.-
(1) Exposed piping shall be protected against mechanical damage and shall be adequately supported with rigid metal fasteners or hangers. All pipes connected to buried tanks, except test well piping, shall be provided with double swing joints at the tank.
(2) Only new wrought iron, steel or bass pipe, or type K or heavier copper tubing, or aluminum alloy tubing, properly identified, may be used. Metal tubing when used for conveying oil shall be adequately protected. Such tubing may be installed at the burner without protection. Drawn tubing when used in domestic installations shall be of at least 3/8 in. inside diameter up to the shut-off valve at the burner. Soldered connections shall be prohibited.
(3) Overflow pipes, where installed, shall not be smaller in size than the supply pipe.
(b) Relief valves.-
(1) Where a shut-off valve is installed in the discharge line from an oil pump, a relief valve shall be installed in the discharge line between the pump and the first shut-off valve.
(2) A relief or pressure regulating valve shall be provided in the oil piping system on the heater side of the shut-off valves.
(3) Relief valves shall be set to discharge at not more than one and one-half times the maximum working pressure of the system. The discharge from relief valves shall be returned to the storage tank or to the supply line. There shall be no shut-off valve in the line of relief.
(c) Fuel oil heaters.-Fuel oil heaters shall not be installed within the steam or water space of a boiler. Fuel oil heaters and the connecting piping shall be arranged to prevent oil leakage from being transmitted to the boiler. This may be accomplished by any of the following methods:
(1) By discarding the condensate from the heaters.
(2) By using approved double tube or other approved heaters.
(3) By means of a secondary hot water or steam heating system where the water or steam from the boiler has no direct contact with the oil heater.
(4) By a sight tank arrangement for collecting and inspecting the condensate which is provided with a pump controlled by a hand switch for returning the condensate to the normal return system.
(5) By such other method as may be permitted by the commissioner.
(d) Vent pipe.-
(1) A vent pipe of iron or steel, without trap, draining to the tank, shall be provided for each storage tank. The lower end of the vent pipe shall not extend more than one inch through the top of the storage tank. Cross-connection between a vent pipe and fill pipe is prohibited.
(2) Where a battery of storage tanks designed to hold the same grade of oil is installed, vent pipes may be run into a main header.
(3) Vents shall be at least one and one-quarter inches in diameter for storage tanks not exceeding eleven hundred gallons capacity and at least two inches in diameter for storage tanks of eleven hundred gallons or more except that vents for storage tanks of sixty gallon capacity or less shall be at least one-half inch in diameter. Vents for tanks inside of buildings above the lowest floor shall be run into the primary storage tank vent.
(4) Vent pipes shall be provided with an approved weatherproof hood having a free area of at least the pipe size area. Vent pipes shall terminate outside the building in a nonhazardous location, at least two feet from any building opening and less than two feet nor more than twelve feet above the fill pipe terminal, unless otherwise permitted by the commissioner. If the vent pipe terminal is not visible from the fill pipe terminal location, a one inch tell-tale line shall be connected to the tank and shall parallel the fill pipe and terminate at the fill pipe terminal with an unthreaded end. Such tell-tale lines shall be provided with a check valve set to prevent flow of surface water to the storage tank.
(e) Fill pipes.-
(1) Fill pipes shall terminate outside the buildings, with the fill pipe terminal located at or above grade, at least two feet from any building opening and five feet from any subway grating at or below the level of the fill pipe terminal. No fill pipe shall be less than two inches in diameter, and no fill pipe for no. 6 oil shall be less than three inches [*sic*] in diameter. Where no. 6 oil is used, the fill pipe terminal shall be located within three feet of the curb, unless otherwise required by the department of transportation or the transit authority. Where there are facilities for the delivery tank truck to drive onto the premises, the fill terminal may be located elsewhere than at the curb, provided that the location complies with the other requirements of this subchapter.
(2) Each storage tank shall be provided with a separate fill pipe, except that where a battery of tanks is installed containing the same grade of oil, a common fill and header pipe may be installed.
(3) Where the top of the storage tank is above the fill pipe terminal, the fill pipe shall be connected to the top of the tank and provided with a shut-off valve and swing check valve both of which shall be located at the fill pipe terminal. However, the shut-off and check valves may be installed in an accessible location inside

the building at or below the level of the fill pipe terminal.
(4) All fill pipe terminals shall be of an approved type, and shall be provided with lugs for embedding in concrete. In lieu of lugs, a set screw or threads to fasten the terminal to the fill pipe may be used. The outer flange of the fill pipe terminal or the seal cap shall be permanently marked "fuel oil." The fill pipe terminal shall be threaded or provided with other equivalent means to receive the seal cap. The seal cap shall be suitably slotted for receiving an opening wrench, and an oilproof gasket inserted in a groove in the fill pipe terminal shall be provided so as to make the seal cap leakproof. A strainer shall not be required but, if used, shall be of at least one-eighth inch mesh. Where a storage system for volatile flammable oil and a storage system for fuel oil are to be used in the same premises, the terminal of the fuel oil pipe shall be provided with a left-handed thread and the fill pipe fitting shall be of a different size than that required for the fill pipes to the tanks containing the volatile flammable oil.

(f) Piping from transfer pump to storage tanks above the lowest floor. -

(1) The piping from a transfer pump to storage tanks at levels above the lowest floor in buildings, the return piping, and vent piping shall comply with the applicable provisions of subdivisions (a) and (d) of this section and shall be enclosed in a shaft constructed of four inch concrete or masonry having a four inch clearance from all pipe or pipe covering. Provision shall be made for expansion in piping without the use of expansion joints.
(2) Where it is necessary to make horizontal offsets in the supply piping and pipe shafts such piping shall be enclosed in a sleeve of other piping of at least no. 10 manufacturer's standard gage [*sic*] steel, two sizes larger and arranged to drain into the shaft. Horizontal piping offsets shall be further enclosed in construction having a two hour fire resistance rating.
(3) A drain pipe shall be installed at the base of shafts enclosing the supply and overflow piping. The pipe shall lead to an open sight drain or to an open sump.
(4) Oil lines for tanks above the level of the lowest floor shall be seamless steel pipe of a weight not less than ASA schedule 40 with welded connections.
(5) Pipe shafts shall not be penetrated by or contain other piping or ducts.

(g) Heating coils in storage tanks. -The heating of oil in storage tanks shall be by means of coils using low pressure hot water or steam, or by means of electric heaters approved for use in oil storage tanks.

(h) Valves and devices to control the flow of oil. -

(1) Where more than one storage tank is connected to a common supply line, a shut-off valve shall be provided in the supply line at each tank. Where more than one burner is connected to a supply line a shut-off valve shall be provided at each burner. Where a single tank and a single burner are installed, a shut-off valve shall be required in the supply line at the tank and another at the burner. Valves shall be brass or equivalent in corrosion and fire resistance, shall provide tight shut-off, and shall be rated at one hundred twenty-five psi or greater as required by the pressure in the system.
(2) Where a storage tank is located so that the top of the tank is above the oil inlet to the burner or to the fuel pump, and the storage tank capacity is greater than two hundred seventy-five gallons, the supply line to the burner shall be provided with an approved anti-syphon device. The device shall be located at the highest point in the supply line. Where an approved foot valve is used in the tank and the tank is constructed with a manhole, an anti-syphon device shall not be required. No anti-syphon device shall be required where no. 6 fuel oil is used.
(3) The pressure in oil lines to burners located above the lowest floor of a building shall not be more than is required to circulate oil to and from the burners, and all parts of the oil system shall be capable of withstanding the maximum working pressure in that part of the system.
(4) A remote control shall be provided to stop the flow of oil to any burner. Such control shall be located outside the entrance to the room in which the burner is located and as close to such entrance as practicable, except that when an outside location is impracticable, such control may be located immediately inside the room in which the burner is located, provided such location is accessible at all times. All such controls shall be permanently labeled "remote control for oil burner." On storage tanks of sixty gallon or less capacity used with manually operated burners, such remote control may be installed in the supply lines between tank and burner.
(5) Pressure in a storage tank for the purpose of discharging oil shall be prohibited.
(6) In systems where either steam or air is used for atomizing the oil, the oil and the atomizing supply shall be interlocked so that where the supply of either is interrupted, the supply of the other will be immediately cut off.

(i) Oil level indicating devices and test wells. -

(1) All tanks located inside buildings shall be provided with an oil level indicating device. Test wells shall be prohibited in tanks located inside of buildings. Unused tank openings shall be permanently sealed to prevent the removal of plugs or cover.
(2) Oil level indicating devices shall be designed and constructed of substantial materials so that can be no leakage of oil or oil vapor.
(3) Test wells in storage tanks located outside of buildings shall be capped oil tight and kept closed when not in use.

§[C26-1416.5] 27-831 Controls.- With each automatic burner a set of safety controls of the electric, pneumatic, hydraulic, or mechanical type shall be installed and maintained in good working order. The proper controls for each burner shall be those that have

been tested and accepted in accordance with the requirements of article five of this subchapter. The controls shall provide the following functions:
(a) Oil temperature control (no. 5 and no. 6 oil).
(b) Ignition.
(c) Stack or combustion control.
(d) High temperature or pressure control.

§[C26-1416.6] 27-832 Chimneys.- No oil burner shall be installed in any boiler, heater, range, or stove unless each boiler, heater, range, or stove is connected to a chimney complying with subchapter ten of this chapter, except for portable burners as prescribed in section 27-827 of this article.

ARTICLE 18 REFUSE DISPOSAL SYSTEMS

§[C26-1417.1] 27-833 General. -All incinerators and other refuse disposal systems in buildings shall be constructed, installed and altered in accordance with the requirements of this subchapter**.**

§[C26-1417.2] 27-834 Compliance.- All new and existing refuse disposal systems shall be installed, altered and maintained in buildings in conformity with the applicable provisions of the administrative code, the air pollution control code and as follows:
(a) Charging chutes for refuse disposal system shall comply with applicable provisions of subchapter fifteen of this chapter.
§[C26-1417.3] 27-835 Permitted types of incinerators.- When permitted by sections 24-118 and 24-119 of title twenty-four of the administrative code, incinerators shall conform to the following:
(a) Semiautomatic incinerators.- Semiautomatic incinerators shall be limited to capacities not exceeding one million seven hundred thousand Btu/hr. in other buildings. Semiautomatic incinerators may have manually operated grates, but shall have automatically operated flue gates, gas or oil burners with temperature controls, overfire air fans and nozzle system[s]*, emission control devices, and clock controlled cycles.
(b) Automatic incinerators.-Automatic incinerators shall be required for capacities exceeding one million seven hundred thousand Btu/hr. They are optional for smaller capacities. Automatic incinerators shall have power operated grates, and automatically operated flue gates, gas or oil burners with temperature controls, overfire and underfire air fans and nozzle system, emission control devices and clock controlled cycles.
Copy in brackets not enacted but probably intended.

§[C26-1417.4] 27-836 Refuse collection rooms.-
A refuse collection room shall be provided for refuse reduction systems which utilize methods other than burning. Such rooms shall comply with the requirements of section 27-837 of this article.

a. Existing refuse rooms and incinerators rooms which have been approved for such use, may be retained as approved.
b. Existing incinerator combustion chambers may be used in whole or in part as refuse collection rooms provided the grates are removed and provided they comply with the provisions of section 27-837 of this article.
c. Floors of refuse collection rooms shall be constructed of concrete and shall be sloped to a floor drain within the room, connected to the house drain. A hose connection shall be provided within the room.
d. A hopper and cut-off door shall be provided at the bottom of the refuse chute. Where compacting equipment is used, it shall be located entirely within the enclosure of the refuse collection room except that motors, pumps, and controls may be installed in adjacent rooms.
e. Compacting equipment shall meet the criteria of the department of environmental protection and be approved. Where such equipment is installed so that the refuse flows directly into it, the compacting equipment may be used in place of the hopper and cut-off door. Compacting equipment shall be arranged to operate automatically when the level of refuse is not more than three feet below the lowest hopper door.

§[C26-1417.5] 27-837 Incinerator rooms.-
Incinerators and refuse collecting bins and spaces shall be located in rooms or compartments used for no other purpose. Such rooms or compartments shall be separated from all other occupancies by noncombustible construction having a fire resistance of at least two hours with self-closing opening protectives. Refuse collection bins and spaces shall be sprinklered in accordance with the construction provisions of subchapter seventeen of this chapter.

§[C26-1417.6] 27-838 Ventilation.-Fixed ventilation for combustion air to the incinerator room shall be provided by a louvered opening in a wall to outdoor air. When ducts are used, they shall be sized and installed so as to provide the amount of air required for combustion, taking into consideration head loss. Fans may be installed to deliver air to the incinerator room, provided they are in operation whenever the incinerator is in use. Louvers, ducts, and fans shall be sized to deliver at least two and one-half cfm of air for each pound per hour of refuse while burning is taking place. All duct work shall be installed in accordance with the requirements of subchapter thirteen of this chapter.

§[C26-1417.7] 27-839 Draft control.-If a manual damper or automatic draft controller, is provided in the incinerator flue, it shall be capable of closing off not more than ninety-five percent of the flue area, and the damper or controller shall be made of such materials and in such a manner so as to prevent warping, binding, cracking, corrosion, and distortion when exposed to

operating temperatures. If an automatic draft controller is used, means shall be provided for temporary manual operation.

§[C26-1417.8] 27-840 Charging chutes and exhaust flues.-
All incinerators shall be constructed with a flue within a chimney to exhaust the products of combustion and a refuse charging chute which shall be separate from the flue. Refuse charging chutes shall not discharge directly into incinerators, except in buildings classified in residential occupancy group J and in accordance with the requirements of this subchapter and subchapter fifteen of this chapter.
(a) Flues for existing incinerators and existing refuse chutes may be used as refuse charging chutes provided they are in good condition and comply with the requirements of subchapter fifteen of this chapter.
§[C26-1417.9] 27-841 Charging gates.-Charging gates, when provided, shall be power operated. Gates and guide rails shall be of such materials and construction so as to withstand a temperature of two thousand degrees Fahrenheit, without distortion, warping, binding, cracking, or corrosion, and also to withstand impact by heavy falling objects.

§[C26-1417.10] 27-842 Auxiliary heat. -Burners or other sources of heat shall be provided for all incinerators. Such heat sources shall be capable of maintaining a temperature of at least fifteen hundred degrees Fahrenheit [*sic*] at the discharge from the combustion chamber, and shall be equipped with safety devices to shut off the fuel in cases of ignition failure, flame failure, or insufficient draft.

§[C26-1417.11] 27-843 Construction of incinerators.-
Incinerators shall be constructed so as to be gas tight and shall be lined or protected with heat resistive materials suitable for the services required, as follows:
(a) Masonry incinerators.- When the combined hearth and grate area is twenty square feet or less, or the number of habitable rooms served is one hundred or less, combustion chambers, separation chambers, and connecting gas passages shall be constructed of eight inch common brick thick and lined with four and one-half inch of refractory material with an intervening air space of one inch. When the combined hearth and grate area is more than twenty square feet, or the number of habitable rooms served is more than one hundred, combustion chambers, separation chambers, and connecting gas passages shall be constructed of common brick eight inches thick and lined with nine inches of refractory material with an intervening air space of one inch.
(1) TIES. -Noncorroding metal ties shall be used at least every fifth course of common-brick. Structural steel angles, straps, and tiebacks shall be installed on all masonry incinerators having more than one hundred twenty-five cubic feet of combustion chamber volume.
(2) INTERIOR CONSTRUCTION. -Interior walls, curtain walls, bridge walls, or baffles shall, in every case, be of refractory brick, at least nine inches thick.
(3) ARCHES. -Sprung arches may be used if the span is less than four feet. [*sic*] Flat suspended type arches shall have a minimum of five inches of refractory material between the furnace heat and the hangers. Flat suspended arches shall have an insulated block roof of at least two and one-half inches thick.
(4) ISOLATION. -No structural supports for the vertical building flues or other parts of the building shall rest upon the incinerator; nor shall any metal guides, hangers, or structural steel parts of the incinerator be exposed to direct heat of combustion.
(5) THERMAL BLOCK INSULATION.- High temperature block insulation shall be at least equal to type 3 specified in reference standard RS 14-10.
(6) REFRACTORY.- Refractory material shall be firebrick or hydraulic setting castable refractory.
a. Firebrick.- Firebrick shall be high duty, spall resistant and conform to type A reference standard RS 14-7.
b. Castable refractories.- Castable refractories shall conform to reference standard RS 14-8 (Class F).
c. Mortar.- Mortar for firebrick shall be air setting high temperature cement conforming to reference standard RS 14-14.
(b) Steel-cased incinerators. -In lieu of the eight inch common brick outer wall and one inch air space required in subdivision (a) of this section, the outside enclosure of incinerators may be of no. 12 manufacturer's standard gage [*sic*] steel casing that is welded, riveted, or bolted to be gastight, with at least two thicknesses of two and one-half inches high high-temperature block insulation applied with staggered joints.
(c) Other constructions. -Other forms of incinerator construction, equivalent in terms of structural strength, insulating value, and temperature and erosion resistance, may be used, subject to approval by the commissioner.

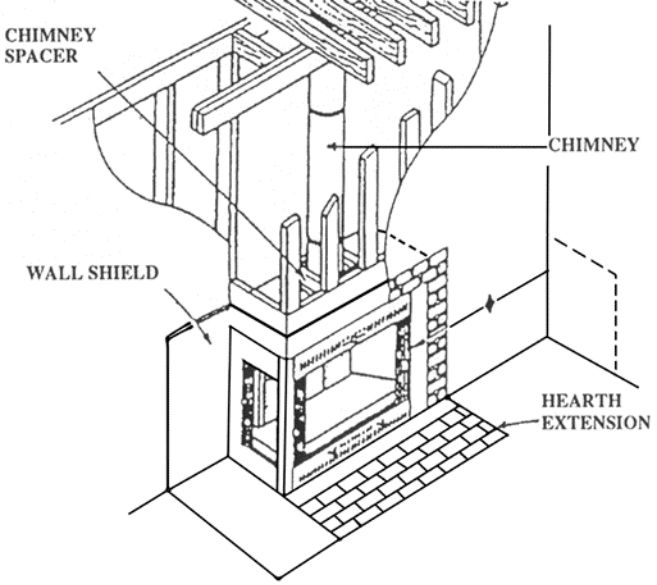
§[C26-1417.12] 27-844 Construction of chimneys and charging chutes.- For requirements governing the construction of chimneys and charging chutes, see article four of subchapter fifteen of this chapter.

§[C26-1417.14] 27-845 Cleanouts.- Openings shall be provided so that all parts of the incinerator can be cleaned, including the ash pit, the combustion chamber, the passes of separation chambers, and the incinerator flue. Cleanouts shall be closed by tight fitting doors or covers, securely latched or otherwise held in a closed position. Ash pit and combustion chamber closures and frames shall be of cast iron or equivalent, with the frames securely attached to the incinerator.

§[C26-1417.15] 27-846 Accessibility. -Sufficient space shall be provided around the incinerator and its appurtenances to facilitate cleaning, repair, and servicing. Clearance shall be provided to allow the cleanout doors to be completely opened so that all parts of the combustion chamber, ash pit, separation chambers, etc., may be reached and so implements used for this purpose can be freely manipulated. All dampers, gates, burners, valves, levers, etc., shall be accessible for repair and adjustment or replacement. No construction shall be located closer than sixteen inches to any part of an incinerator, except that noncombustible structural members two feet wide or less parallel to the incinerator, may be located as close as six inches to the incinerator, provided such members do not reduce accessibility to any moving parts of the incinerator.

§[C26-1417.16] 27-847 Cabinets and control wiring.- All control equipment shall be installed in dustproof, noncombustible cabinets. Such cabinets shall not be mounted on the incinerator. Conduits carrying control wiring for the incinerator shall not be fastened to the incinerator. All electrical work shall comply with the electrical code of the city of New York.

§[C26-1417.17] 27-848 Posting. -
(a) Operating and maintenance instructions shall be permanently and conspicuously mounted under transparent protective covers in the incinerator room, together with the equipment use permit. The instructions shall include complete procedures for operating and maintaining fuel burners, dampers, and other devices, and shall state quantities and kinds of materials that may be burned.
(b) On every door that opens into a space in which a service opening into a refuse chute is located, or on the wall directly over the service opening into the chute, the following sign shall be permanently and conspicuously posted:
"THROWING LIGHTED MATCHES, CIGARS OR CIGARETTES CARPET SWEEPINGS, NAPHTHALENE, CAMPHOR BALLS OR FLAKES, FLOOR SCRAPINGS, OIL SOAKED RAGS, EMPTY PAINT CANS, AEROSOL CONTAINERS, OR ANY OTHER FLAMMABLE OR HIGHLY COMBUSTIBLE OR EXPLOSIVE SUBSTANCE INTO THIS CHUTE IS UNLAWFUL AND SUBJECTS THE OFFENDER TO A PENALTY."
Such signs shall be designed as follows:
(1) Signs on doors leading to the service openings and on walls over service openings shall be at least eight inches wide and three inches high, with lettering at least one-quarter inch high. The signs shall be located on the hall side approximately five feet above the floor.
(2) The lettering of the signs shall be of bold type, and shall be properly spaced to provide good legibility. The lettering and the background shall be of contrasting colors.



Factory-Built Fireplace
Figure 14-1

(3) Signs shall be durable and shall be securely attached to the door or wall.
(4) Sufficient lighting shall be provided so that the signs are easily readable at all times.

*ARTICLE 19 SOLID FUEL FIREPLACES, FIREPLACE STOVES AND ROOM HEATERS

Local Law 80-1989.

§27-848.01 General.- The construction, installation, alteration and operation of all fireplaces, fireplace stoves and room heaters used for space heating shall be subject to the provisions of this article. This article shall not be construed to apply to a central heater with hot air distribution, a central boiler with either hot water or steam heat distribution or a water tank, water heaters, furnaces or cooking stoves.
§27-848.02 Reference standards.- The applicable reference standards shall be as follows:
(a) Fireplaces and wood burning appliances. Reference standard RS 14-18.
(b) Factory-built fireplaces. Reference standard RS 14-19.
(c) Fireplace stoves. Reference standard RS 14-20.
(d) Room heaters. Reference standard RS 14-21.

§27-848.03 Definitions. -As used in this article, the following terms shall have the following meaning:

Accessories, factory-built. Such devices as fireplace heater inserts, heat exchangers circulating air or water or other devices which may alter the combustion or heating characteristics of the fireplace.

Appliance. A device which utilizes fuel or other forms of energy to produce light, heat, power, refrigeration or air conditioning. This definition shall also include wood burning appliances and vented decorative appliances.

Fireplace, factory-built. A fireplace composed of factory-built components assembled in accordance with the terms of the listing and acceptance to form the completed fireplace and provided with a chimney complying with subchapter fifteen of this chapter (see figure 14-1).

Fireplace, masonry. A hearth and fire chamber made of solid masonry units such as bricks, stones, or reinforced concrete and provided with a chimney complying with subchapter fifteen of this chapter.

Fireplace heat exchangers. Metal heat circulators designed for installation wholly within a masonry fireplace built in accordance with this code. Fireplace heat exchangers extract heat from the firebox of masonry fireplaces and return it to the area to be heated (see figure 14-2).

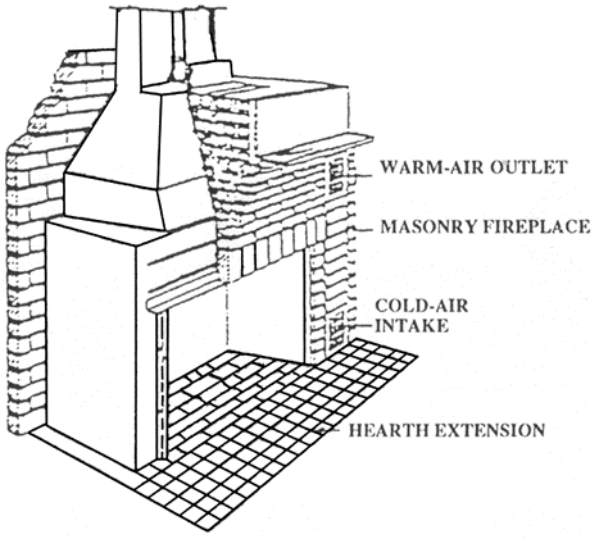


Figure 14-2

Fireplace inserts. Solid-fuel burning appliances located partially within a complying masonry fireplace. Stove and room heaters may be used as inserts for installation in masonry fireplaces (see figure 14-3).

Fireplace stoves. Freestanding assemblies having firechambers intended to be operated open to the room or if equipped with doors to be operated with doors either open or closed and provided with a chimney complying with subchapter fifteen of this chapter (see figure 14-4).

Room heater. A solid fuel burning freestanding firechamber assembly designed to be operated with the firechamber closed except for fueling and provided with a chimney complying with subchapter fifteen of this chapter (see figure 14-5).

Hearth extension. The noncombustible surfacing applied to the floor area beneath, and extending beyond the front, back and sides of a heating appliance.

Listed and listings. Terms referring to equipment which is shown in a list published by an accepted nationally recognized testing laboratory qualified and equipped for experimental testing and maintaining an adequate periodic inspection of current production and whose listing shows that the equipment complies with nationally recognized safety standards.

Manufacturer's installation instructions. Printed instructions included with equipment as part of the conditions of the listing.

Solid fuel. A material such as natural wood which will ignite and burn when subjected to fire.

§27-848.04 Installations.-

(a) Application.

(1) An application for the installation of a fireplace or stove equipment shall be filed by a registered architect or licensed professional engineer at the borough office of the department. The application shall describe the equipment in question and its installation.

(2) The applicant, prior to the filing of the application, shall make an inspection to determine the adequacy of the air supply for combustion and ventilation and the ability of the equipment to be installed to comply with code requirements.

(b) Qualifications of installer.-

(1) Installation shall be made only by persons authorized by the manufacturer to install the specific equipment in question.

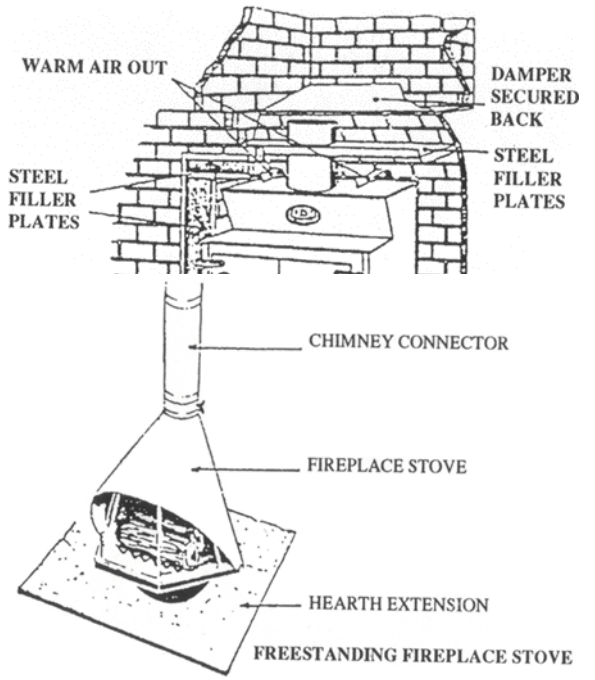
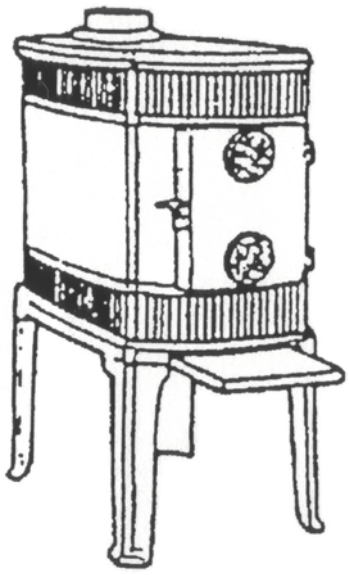


Figure 14-4



AIRTIGHT ROOM HEATER

Figure 14-5

(2) The installer shall certify to the registered architect or licensed professional engineer who has filed the application that the installation is in full compliance with the terms of the listing, acceptance and the manufacturer's instructions.
(3) For retrofit installations in occupied residential dwellings, the installer shall have a home improvement contractor's license from the department of consumer affairs.
(c) Controlled inspection. -Installation shall be subject to controlled inspection to ensure that the installation is in accordance with:
(1) the structural elements shown on the approved plans,
(2) the fire protection requirements, and
(3) the listing, acceptance and the manufacturer's installation recommendations.
(d) Environmental requirements.- All solid fuel burning appliances shall comply with the requirements of the air pollution control law, chapter one of title twenty-four of this code.
(a) **State energy conservation code**. - The requirements of the New York State energy conservation construction code concerning the combustion air supply shall be complied with.

§27-848.05 Structural adequacy.- The registered architect or licensed professional engineer filing the application for the installation shall certify on the application as to the adequacy of the structural supports and chimney bracing to sustain the loadings when in operation**.**

§27-848.06 Chimneys.- Fireplace, fireplace stove and room heater chimneys shall meet the requirements of subchapter fifteen of this chapter. Separate flues shall be provided for every fireplace, fireplace stove and room heater.

§27-848.07 Masonry fireplaces. –
(a) Construction.
(1) Masonry fireplaces shall be constructed of solid masonry units of reinforced portland or refractory cement concrete. Masonry fireplaces shall be supported on foundations of masonry or reinforced portland or refractory cement concrete, or on other noncombustible construction having a fire resistance rating of not less than three hours. Such supports shall be designed to support the loadings.
(2) Where a lining of low-duty fire clay refractory brick at least two inches thick laid in medium-duty fireclay refractory mortar, or the equivalent two inches thick soapstone, three-sixteenths inch thick steel or cast iron, or equivalent material capable of withstanding a temperature of 2000 degrees Fahrenheit without cracking or spalling or other accepted lining is provided, the total thickness of back and sides, including the lining, shall be not less than eight inches.
(3) Where such lining is not provided, the thickness of the back and sides shall be not less than twelve inches.
(4) Where the masonry supporting a fireplace is designed to support vertical loads from the building and corbels are used to support beams or girders, corbeling shall be as described in reference standard RS 14-18 as recommended for masonry chimneys. The lintel spanning the fireplace shall be designed and constructed to support the additional load transferred by the member.
(5) Masonry fireplaces shall be provided with chimneys designed and constructed in accordance with the requirements of subchapter fifteen of this chapter for construction of masonry chimneys or, where permitted by the individual listing, shall be provided with accepted factory-built chimneys having accepted adapters in accordance with the requirements for factory-built chimneys of subchapter fifteen of this chapter.
(b) Steel fireplace units.
(1) Steel fireplace units incorporating a firebox liner of not less than one quarter inch thick steel and an air chamber shall be installed with masonry to provide a total thickness at the back and sides of not less than eight inches, of which not less than four inches shall be solid masonry. Listed firebox liners shall be installed in accordance with the terms of the listing.
(2) Warm air ducts employed with steel fireplace units of the circulating air type shall be constructed of metal in accordance with reference standard RS 14-22, or of masonry.
(c) Clearance.
(1) All wood beams, joists, studs and other combustible material shall have a clearance of not less than two inches from the front faces and sides of masonry fireplaces, and not less than four inches from the back faces of masonry fireplaces. Headers of combustible material supporting masonry trimmer arches or concrete hearth extensions shall be located not less than twenty inches from the face of the chimney breast.
(2) Spaces between headers or trimmers of combustible material and masonry fireplaces shall be firestopped [*sic*] with noncombustible material. The material used for firestopping shall be galvanized sheet metal of at least no. 14 U.S. standard gage [*sic*] thickness, mineral board at least one quarter inch thick or equivalent rigid noncombustible sheet material not less than one half inch thick or other accepted noncombustible material.
(3) Woodwork, such as wood trim and mantels, or other combustible material shall not be placed within six inches of a fireplace opening. Combustible material above and projecting more than one and one-half inches from a fireplace opening shall not be placed less than twelve inches from the top of the fireplace opening.
(4) Clearances specified in reference standard RS 14-18 shall apply if greater than those specified in this subdivision.

(d) Hearth extensions.
(1) Masonry fireplaces shall have hearth extensions of brick, concrete, stone, tile or other accepted noncombustible materials. Such hearths shall be supported on trimmer arches of brick, stone, tile or concrete at least four inches thick, or of other equivalent materials and with noncombustible material against the underside thereof. Wooden forms or centers used during the construction of the hearth and hearth extension shall be removed when the construction is completed.
(2) Where the fireplace opening is less than six square feet, the hearth extension shall extend at least sixteen inches in front of the facing material and at least eight inches beyond each side of the fireplace opening.
(3) Where the fireplace opening is six square feet or larger, the hearth extension shall extend at least twenty inches in front of the facing material, and at least twelve inches beyond each side of the fireplace opening.
(4) Where a fireplace is elevated above or overhangs a floor, the hearth extension shall also extend over the area under the fireplace.
(e) Fireplace dampers. Every fireplace shall be equipped with a damper able to withstand distortion, binding, cracking or corrosion when exposed to the fireplace operating temperature.
(f) Accessories. Factory-built accessories shall be listed and accepted and shall be installed in accordance with the terms of their listing and acceptance.

§27-848.08 Wood burning appliances: Installation. -
(a) Scope. Wood burning appliances include factory-built fireplaces, fireplace stoves, room heaters, and fireplace inserts.
(b) Listing. Wood burning appliances shall be listed and accepted and shall be installed in accordance with the terms of their listing and acceptance.
(c) Location of appliances.
(1) Every appliance shall be located with respect to building construction and other equipment so as to permit access to the appliance. Sufficient clearance shall be maintained to permit cleaning of surfaces, the replacement of air filters, blowers, motors, controls and chimney connectors, and the lubrication and servicing of moving parts.
(2) Wood burning appliances shall not be installed in confined spaces or alcoves. The minimum size of the space or room in which the appliance is located shall be three hundred cubic feet. There shall be at least one openable window serving such space or room.
(3) Wood burning appliances shall not be installed in any location where gasoline or any other flammable liquids, vapors or gases are present or likely to be present.
(4) Wood burning appliances shall not be installed in any garage.
(d) Air for combustion and ventilation. Wood burning appliances shall be installed in a location in which the facilities for ventilation permit proper chimney draft and maintenance of safe temperature under conditions of use and provide sufficient air to prevent carbon monoxide from entering the dwelling space. Appliances shall be located so as not to interfere with proper circulation of air within the heated space. Where buildings are so tightly sealed that normal infiltration does not provide the necessary air, outside air shall be introduced.
(e) Mounting for residential type appliances.
(1) Residential type wood burning appliances that are tested and listed by an accepted national testing laboratory for installation on floors constructed of combustible materials shall be placed on such floors in accordance with the requirements of the listing and the conditions of acceptance. Such appliances which are not listed for installation on combustible floors by an accepted national testing laboratory shall be provided with floor protection in accordance with the provisions of subdivision (g) of this section. Residential type wood burning appliances are permitted to be placed without floor protection in any of the following manners:
a. on concrete bases adequately supported on compacted soil, crushed rock or gravel;
b. on concrete slabs or masonry arches that do not have combustible materials attached to the underside; or
c. on accepted assemblies constructed entirely of non-combustible materials, and having a fire resistance rating of not less than two hours, with floors constructed of noncombustible materials.
(2) Any floor assembly, slab or arch shall extend not less than eighteen inches beyond the appliance on all sides.
(3) In lieu of the requirements for floor protection specified herein, a floor protector listed by a recognized testing laboratory and installed in accordance with the installation instructions may be used.
(4) Appliances shall be supported by concrete bases, concrete slabs, masonry arches and floor ceiling assemblies and their supports which are designed and constructed to support the appliance.
(f) Mounting for fireplace stoves and room heaters.
(1) Fireplace stoves and room heaters which are set on legs or pedestals that provide not less than six inches of ventilated open space beneath the fire chamber or base of the appliance may be placed on floors of combustible construction, provided the floor under the appliance is protected with closely spaced solid masonry units not less than two inches in thickness. The top surface of the masonry shall be covered with sheet metal not less than 24 gage [*sic*] (0.024 inches). The floor protection shall extend not less than eighteen inches beyond the appliance on all sides.
(2) Fireplace stoves and room heaters [*sic*] which are set on legs or pedestals providing two to six inches of ventilated open space beneath the fire chamber or base of the appliance may be placed on floors of

combustible construction, provided the floor under the appliance is protected with one course of hollow masonry units not less than four inches in thickness. The masonry units shall be laid with ends unsealed and joints matched in such a way as to provide a free circulation of air through the core spaces of the masonry. The top surface of the masonry shall be covered with sheet metal not less than 24 gage [*sic*] (0.024 inches). The floor protection shall extend not less than eighteen inches beyond the appliance on all sides.

(3) Fireplace stoves and room heaters with legs or pedestals that provide less than two inches of ventilated open space beneath the fire chamber or base of the appliance shall not be placed on floors of combustible construction.

(g) Clearances. Woodburning appliances shall be installed with the following minimum clearances to combustible construction: Above the top of appliance-thirty-six inches; from front-thirty-six inches; from back-thirty-six inches; from sides-thirty-six inches. The minimum clearance to noncombustible construction shall be six inches when table 14-1 herein is used except that forty-eight inches shall be maintained where the fuel is inserted. Accepted stoves shall be exempt from the above-mentioned clearances and shall be installed in accordance with the appropriate reference standard and clearances determined therefrom through tests specified in the reference standard.

TABLE 14-1 REDUCTION OF APPLIANCE CLEARANCE WITH SPECIFIED FORMS OF PROTECTION [1,2,3,4,5,6,7,8,9,10]

Clearance reduction system applied to and covering all combustible surfaces within the distance specified as required clearance with no protection	Maximum allowable reduction in clearance (percent)		When the required clearance with no protection is 36 in., the clearances below are the minimum allowable clearance. For other required clearances with no protection, calculate minimum allowable clearance from maximum allowable reduction. [9,10]	
	As Wall Protector	As Ceiling Protector	As Wall Protector (in.)	As Ceiling Protector (in.)
(a) 3 ½ in. thick masonry wall without ventilated air space	33%	—	24	—
(b) ½ in. thick noncombustible insulation board over 1 in. glass fiber or mineral wool batts without ventilated air space.	50%	33%	18	24
(c) 0.024 in. (24 gage) sheet metal over 1 in. glass fiber or mineral wool batts reinforced with wire, or equivalent, on rear face with ventilated air space.	66%	50%	12	18
(d) 3 ½ in. thick masonry wall with ventilated air space.	66%	—	12	—
(e) 0.024 in (24 gage) sheet metal with ventilated air space.	66%	50%	12	18
(f) ½ in. noncombustible insulation board with ventilated air space.	66%	50%	12	18
(g) 0.024 in (24 gage) sheet metal with ventilated air space over 0.024 in (24 gage) sheet metal with ventilated air space.	66%	50%	12	18
(h) 1 in. glass fiber or mineral wool batts sandwiched between two sheets 0.024 in. (24 gage) sheet metal with ventilated air space.	66%	50%	12	18

Notes for Table 14-1:

[1] Spacers and ties shall be of noncombustible material. No spacers or ties shall be used directly behind appliance or conductor.

[2] With all clearance reduction systems using a ventilated air space, adequate air circulation shall be provided. There shall be at least 2 in. between the clearance reduction system and combustible walls and ceilings for clearance reduction systems using a ventilated air space.

[3] Mineral wool batts (blanket or board) shall have a minimum density of 8 lb. per ft^3 and have a minimum melting point of 1500°F.

[4] Insulation material used as part of clearance reduction system shall have a thermal conductivity of 1.0(BTU-In.)/(Sq ft-Hr -°F) or less. Insulation board shall be formed of noncombustible material.

[5] If a single wall connector passes through a masonry wall used as a wall shield, there shall be at least 1/2 in. of open, ventilated air space between the connector and the masonry.

[6] There shall be at least 2 in. between the appliance and the protector. In no case shall the clearance between the appliance and the wall surface be reduced below that allowed in the table.

[7] Clearances in front of the loading door and/or ash removal door of the appliance shall not be reduced from those in Section 8-6.

[8] All clearances and thicknesses are minimums: larger clearances and thicknesses are acceptable. Clearances are not to be less than 12 in. from appliances.

[9] To calculate the minimum allowable clearance, the following formula may be used: $Cx_{pr} = C_{un} \times (1-R/100)$. C_{pr} is the minimum allowable clearance. C_{un} is the required clearance with no protection, and R is the maximum allowable reduction in clearance.

[10] Refer to Figures 14-11 and 14-12 for other reduced clearances using materials (a) through (h).

(h) Reduction of clearances from wood burning appliances.

(1) Clearances from listed and unlisted wood burning appliances to combustible material may be reduced if the combustible material is protected as described in table 14-1 herein and as shown in figures 14-6 to 14-10 herein.

(2) Clearances from wood burning appliances to combustible material may be reduced by the use of materials or products listed for the purpose of reducing such clearances. Materials and products listed for such purpose shall be installed in accordance with the conditions of the listing and the manufacturer's instructions.

(3) For clearance reduction systems using an air space between a combustible wall and wall protector, adequate air circulation shall be provided by one of the following methods as shown in figure 14-10 herein:

a. Adequate air circulation may be provided by leaving all edges of the wall open with an air gap of at least two inches.

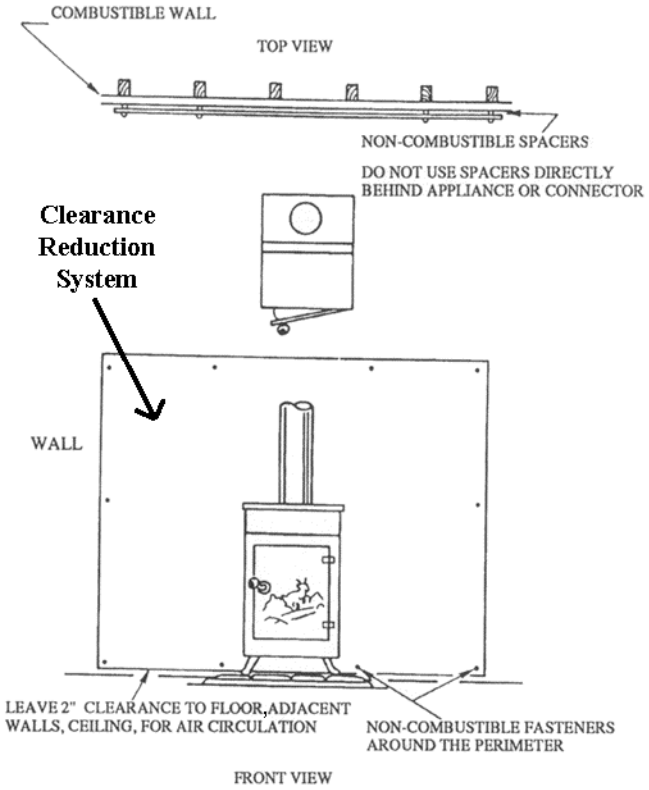


Figure 14-6

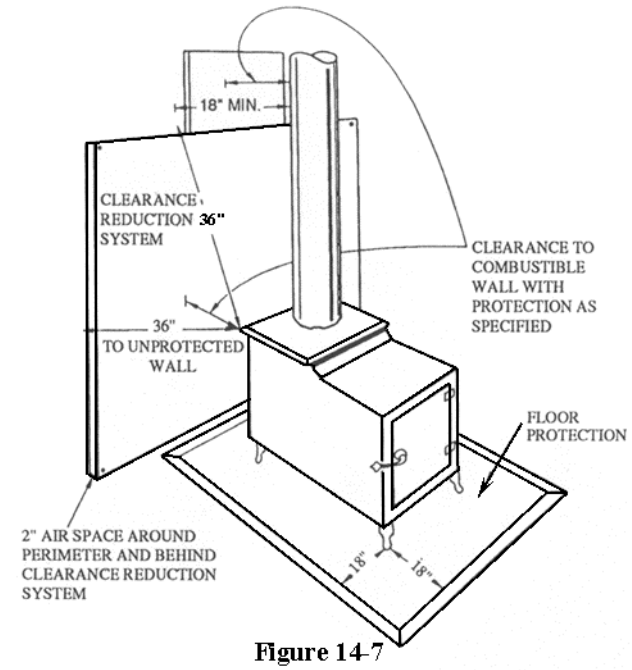


Figure 14-7

b. If the wall protector is mounted on a single flat wall away from corners, adequate air circulation may be provided by leaving only the bottom and top edges or only the side and top edges open with an air gap of at least two inches.

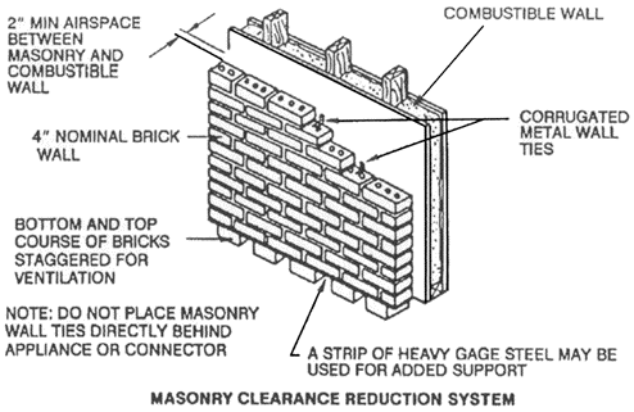


Figure 14-8

c. Wall protectors that cover two walls in a corner shall be open at the bottom and top edges with an air gap of at least two inches.

(4) All clearances shall be measured from the outer surface of the combustible materials to the nearest point on the surface of the wood burning appliance, disregarding any intervening protection applied to the combustible materials.

(5) All clearances provided between wood burning appliances and combustible materials shall be large enough so as to maintain sufficient clearance between chimney connectors and combustible materials as required in subchapter fifteen of this chapter.

(i) Accessories. Factory-built accessories for wood burning appliances such as heat exchangers, stove mats,

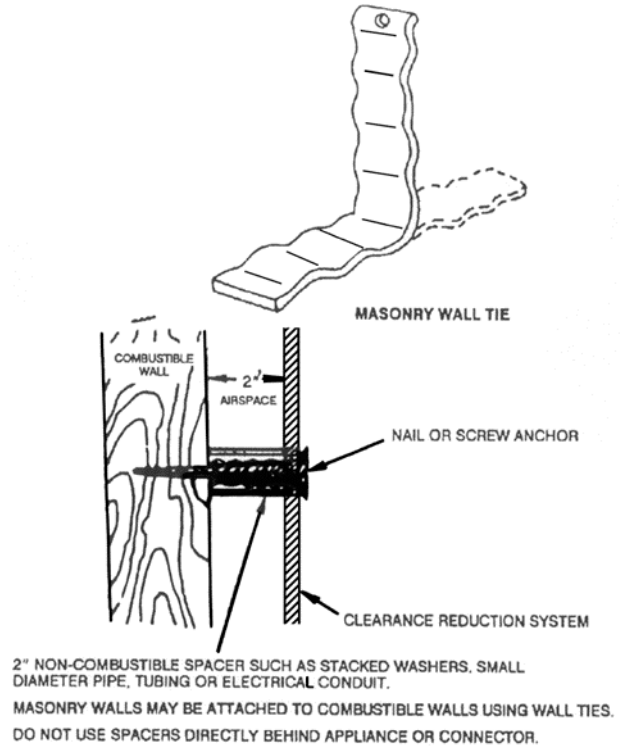


Figure 14-9

floor pads and protection shields shall be listed and

accepted, and shall be installed in accordance with the terms of their listing and acceptance.

§27-848.09 Factory-built fireplaces, fireplace stoves and room heaters. -

(a) Acceptance. Factory-built fireplaces, fireplace stoves and room heaters shall be listed and accepted for use as wood burning appliances.

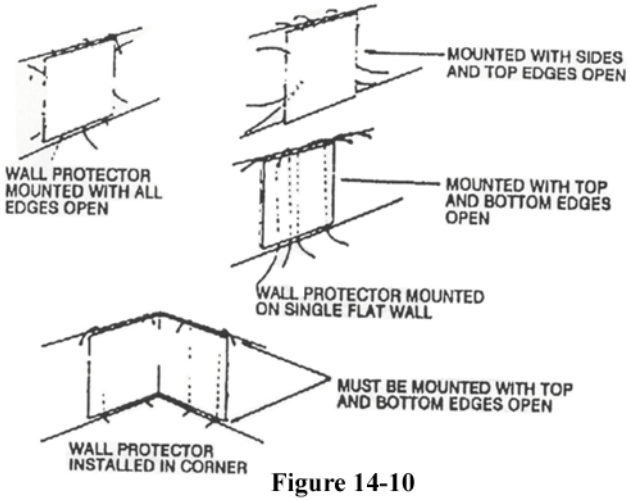


Figure 14-10

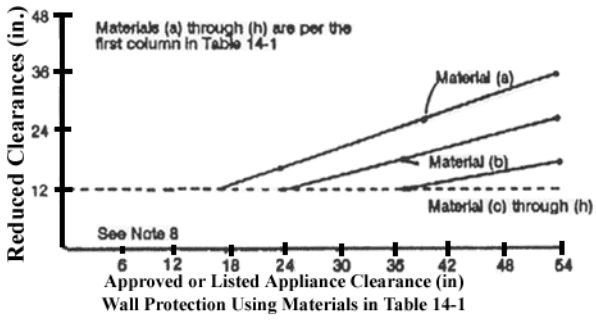


Figure 14-11

(b) Occupancy group limitations. Factory-built fireplaces, fireplace stoves and room heaters shall not be permitted in buildings other than those in residential occupancy group classifications J-2 and J-3, except that installations within other occupancy groups may be authorized by the commissioner pursuant to rules and regulations promulgated by the department.

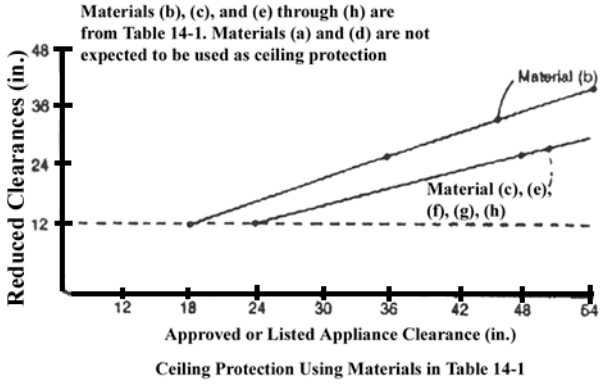


Figure 14-12

(c) Chimney requirements.

(1) The chimney systems of factory-built fireplaces, fireplace stoves and room heaters shall be constructed in accordance with section 27-869.01.

(2) No chimney shall serve more than one factory-built fireplace, fireplace stove or room heater or be pierced to serve any other appliance.

(d) Additional limitations. Factory-built fireplaces, fireplace stoves or room heaters shall be:

(1) located only in exterior rooms, and

(2) limited to space heating of the room within which they are located.

(e) Chimney connectors.

(1) Stovepipe.

a. The stovepipe (or chimney connector) connecting a factory-built fireplace, fireplace stove or room heater to a chimney may contain no more than two elbows. The total length of the connecting pipe should be kept as short as possible while maintaining the required minimum spacing between the factory-built fireplace, fireplace stove or room heater and combustible materials. See subdivision (h) of section 27-848.08 of this code.

b. The connector pipe shall be as large as the flue collars (where the connector pipe joins the factory-built fireplace, fireplace stove or room heater), and shall be fabricated from steel coated with a high temperature rust inhibitor.

c. The pipe's horizontal section shall rise one-quarter inch for each foot of pipe, with the highest point being at the chimney inlet, and shall not be longer than three quarters of the chimney height.

d. When joining sections of pipe, the joints shall overlap at least two inches, with the crimped (male) end pointing down to prevent creosote drip or leak. Each joint shall be secured with three sheet metal screws. All fits shall be snug.

e. The thimble shall be cemented with high temperature cement at the flue inlet. The pipe shall not project into the flue itself.

f. Connector pipe clearance to combustible materials shall be at least three times the pipe diameter (e.g. eighteen inches for six inch pipe), but not less than eighteen inches.

g. Stovepipes shall not pass through floors, ceilings or closets. Stovepipes shall not pass through exterior walls unless directly connected with a thimble to the chimney as noted in subparagraph h of this paragraph.

h. Alternately, a listed and accepted noncombustible thimble larger in diameter than the connector pipe, or a burned fireclay or metal thimble surrounded by not less than twelve inches of brickwork may be used for protection.

i. Connectors and chimneys for factory-built fireplaces, fireplace stoves and room heaters shall be designed, located and installed to permit ready access for internal inspection and cleaning, in compliance with the requirements of subchapter fifteen of this chapter.

(2) Connection to masonry fireplace flue. A factory-built fireplace stove or room heater or insert may use a masonry fireplace flue when the following conditions are met:
a. There is a connector which extends from the fireplace stove or room heater to the flue liner.
b. The cross-sectional area of the flue is no more than three times the cross-sectional area of the flue collar of the factory-built fireplace, fireplace stove or room heater.
c. There is a noncombustible seal below the entry point of the connector if the appliance vents directly through the chimney wall above the smoke chamber.
d. The chimney system can be inspected and cleaned.
e. Air from the habitable space is not used to dilute combustion products in the chimney flue.
f. Hearth extensions are provided in accordance with the manufacturer's instructions or are of masonry of noncombustible construction in accordance with subdivision (d) of section 27-848.07.

§27-848.10 Fireplace heat exchangers and fireplace inserts.- Fireplace heat exchangers and fireplace inserts shall not be inserted into or connected to factory-built fireplaces unless listed by a nationally recognized testing laboratory and accepted for use in the specific fireplace.

§27-848.11 Imitation fireplaces.- Only natural gas-fired fireplace heaters accepted in accordance with the provisions of article twelve of subchapter thirteen of this chapter shall be used with imitation fireplaces and shall be installed in accordance with the conditions of the acceptance.

§27-848.12 Precautionary requirements. -
(a) Smoke detecting devices. Smoke detecting devices, complying with article six of subchapter seventeen of this chapter, are required where fireplaces, fireplace stoves or room heaters are installed. At least one device shall be in the same room as the installation or in an adjacent room.
(b) Fire extinguisher. A fire extinguisher rated for class "A" fires shall be available in the vicinity of a fireplace, fireplace stove or room heater.
(c) Latching. The fireplace stove fuel door shall be latched to prevent burning wood from falling out or an overfired fire from occurring due to an oversupply of air.
(d) Fireplace screens. Fireplace stoves shall be equipped with fireplace screens to minimize spark emission.
(e) Warnings. Warnings on fireplace stoves shall be as required by the United States Consumer Product Safety Commission [*sic*] and reference standard RS 14-20.
(f) Floor protection. Floor protection for fireplace stoves required by section 27-848.08(f) shall extend a minimum of twenty-six inches beyond the stove at the front or side where the ashes are removed and at least eight inches on the other sides.

SUBCHAPTER 15
CHIMNEYS AND GAS VENTS

TABLE OF CONTENTS

"C26" omitted from section numbers in this column.

****"27" omitted from section numbers in this column.***

LIST OF TABLES

15-11 Reduced Clearances for Vent Connectors with Specified Forms of Protection

ARTICLE 1 GENERAL

§[1500.1] 27-849 Scope. -This subchapter shall establish the minimum safety requirements for, and control the design, construction, installation, alteration, and use of chimneys and gas vents.

§[1500.2] 27-850 Standards.- The provisions of reference standard RS-15 shall be a part of this subchapter.

§[1500.3] 27-851 Definitions. -For definitions to be used in the interpretation of this subchapter, see subchapter two of this chapter.

§[1500.4] 27-852 Plans. -For the requirements governing the filing of plans and the work to be shown on plans, see subchapter one of this chapter.

§[1500.5] 27-853 Permits. -For the requirements governing equipment work permits and equipment use permits, see subchapter one of this chapter.

§[1500.6] 27-854 General requirements.— Chimneys or gas vents shall be designed and constructed so as to provide the necessary draft and capacity to completely exhaust the products of combustion to the outside air, and to satisfy the following conditions:
(a) Temperature. -The temperature on adjacent combustible surfaces shall not be raised above one hundred sixty degrees Fahrenheit.
(b) Condensation. -The condensation shall not be developed to an extent that can cause rapid deterioration of chimney or vent.

***§[1500.7] 27-855 Factory-built chimneys and gas vents**.-
(a) Factory-built chimneys. -Factory-built chimneys and chimney units shall be listed and accepted in accordance with the applicable reference standard and shall be installed in accordance with the temperature conditions and height limitations of the listing and acceptance, the manufacturer's instructions or this article, whichever is the most restrictive. Flue gas temperatures in the chimney shall not exceed the limits and durations employed during listing tests and as required by this code.
(b) Gas vents. -Type B and Type BW gas vents shall be listed and accepted in accordance with the conditions of the acceptance and applicable provisions of this code.
Local Law 80-1989.

ARTICLE 2 CHIMNEYS

§[1501.1] 27-856 General requirements. -
(a) Equipment requiring chimneys.- All gas-burning equipment that produces flue gas temperatures in excess of five hundred fifty degrees Fahrenheit or four hundred eighty degrees Fahrenheit above room temperature, and all solid and liquid fuel-burning equipment, shall be connected to chimneys that conform to the requirements of this subchapter.
***(b) Chimney construction**. -Unlisted chimneys shall be constructed of steel, brick, masonry units, concrete, concrete units, or equivalent materials. Chimneys shall be of adequate structural strength, with resistance suitable for the temperatures to which they may be subjected and resistive to the corrosive action of gases. For structural requirements, see subchapters ten and eleven of this chapter.
(c) Separation of flues. -Whenever more than one flue is installed within a chimney, the lining of each flue shall be separated, one from the other, as follows:
(1) In low temperature chimneys with fire clay flue linings: by a wythe of cement grout at least one inch thick or other equivalent method.
(2) In medium temperature and high temperature chimneys: by a division wall of brick or concrete at least three and three-quarters inches thick or other equivalent method.
The separation between flue linings thus established shall in all cases be adequate to give stability for the chimney construction as required by subchapter ten of this article.
(d) Test run. -All new chimneys shall be test run by the applicant under operating conditions to demonstrate fire safety and the complete exhausting of smoke and the products of combustion to the outer air. The results of such test run shall be certified as correct by the applicant and shall be submitted in writing to the department.
(e) Requirement of a smoke test. -Whenever required by the commissioner after an inspection has been made of the chimney, a smoke test shall be made as outlined in section 27-868 of this article. Any faults or leaks found shall be corrected. Such smoke test shall be witnessed by a representative of the commissioner. In lieu thereof, the commissioner may accept the test report of an architect or engineer in which case the test shall be subject to the provisions for controlled [*sic*] inspection except that the architect or engineer may be retained by the contractor.
Local Law 80-1989.

§[1501.2] 27-857 Classification of chimneys.-
Chimneys shall be classified as follows:
(a) Low temperature chimneys. -Chimneys designed and constructed to exhaust the products of combustion from low temperature equipment as defined in subchapter fourteen of this chapter.
(b) Medium temperature chimneys.- Chimneys designed and constructed to exhaust the products of

combustion from medium temperature equipment as defined in subchapter fourteen of this chapter.

(c) High temperature chimneys. -Chimneys designed and constructed to exhaust the products of combustion from high temperature equipment as defined in subchapter fourteen of this chapter.

§[1501.3] 27-858 Cleanouts and maintenance.-

Whenever a new chimney is completed or an existing chimney is altered, it shall be cleaned and left smooth on the inside. Cleanouts with a gas tight door shall be provided at the base of all chimneys.

§[1501.4] 27-859 Chimney heights and locations. -

(a) Low temperature chimneys. -Low temperature chimneys shall extend at least three feet above the highest construction, such as a roof ridge, parapet wall, or penthouse, within ten feet of the chimney outlet, whether the construction is on the same building as the chimney or on another building. However, such constructions do not include other chimneys, vents, or open structural framing. Any chimney located beyond ten feet from such construction, but not more than the distance determined in subdivision (d) of this section, shall be at least as high as the construction.

(b) Medium temperature chimneys. -Medium temperature chimneys shall extend at least ten feet above the highest construction, such as a roof ridge, or parapet wall or penthouse within twenty feet of the chimney outlet, whether the construction is on the same building as the chimney or on another building. However, such constructions do not include other chimneys, and vents. Any chimney located beyond twenty feet from such constructions but not more than the distance determined in subdivision (d) of this section, shall be at least as high as the construction.

(c) High temperature chimneys. -High temperature chimneys shall extend at least twenty feet above the highest construction, such as roof ridge, parapet wall, penthouse, or other obstruction within fifty feet of the chimney outlet, whether the construction is on the same building as the chimney or in another building. However, such constructions do not include other chimneys, vents, or open structural framing. Any chimney located beyond fifty feet from such construction but not more than the distance determined in subdivision (d) of this section, shall be at least as high as the construction.

(d) Formula. -The following formula shall be used for determining the distances referred to in subdivisions (a), (b) and (c) of this section:

$$D = F\sqrt{A}$$

where:

D = Distance, in ft., measured from the center of the chimney outlet to the nearest edge of the construction.

F = Value determined from table 15-1.

A = Free area, in sq. in., of chimney flue space.

TABLE 15-1 "F" FACTOR FOR DETERMINING CHIMNEY DISTANCES

Type of Fuel	"F" Factor		
	Low Temp. Chimney	Medium Temp. Chimney	High Temp. Chimney
Gas…….……	2	2	3
No. 2 Fuel Oils……	2.5	2.5	3
No. 3, No. 6 Fuel Oils, Solid Fuels and Incinerators……	3	3	3

§[1501.5] 27-860 Adjoining Chimneys. -

(a) Responsibility of owner of taller building. -Whenever a building is erected, enlarged, or increased in height so that any portion of such building, except chimneys or vents, extends higher than the top of any previously constructed chimneys within one hundred feet, the owner of such new or altered building shall have the responsibility of altering such chimneys to make them conform with the requirements of section 27-859 of this article. A chimney that is no longer connected with a fireplace or combustion or other equipment for which a chimney was required, shall be exempt from this requirement. Such alterations shall be accomplished by one of the following means or a combination thereof:

(1) Carry up the previously constructed chimneys to the height required in section 27-859 of this article.

(2) Offset such chimneys to a distance beyond that required in section 27-859 of this article from the new or altered building, provided that the new location of the outlet of the offset chimney shall otherwise comply with the requirements of this subchapter.

(b) Protection of draft. -After the alteration of a chimney as required by subdivision (a) of this section, it shall be the responsibility of the owner of the new or altered building to provide any mechanical equipment or devices necessary to maintain the proper draft in the equipment.

(c) Written notification. -The owner of the new or altered building shall notify the owner of the building affected in writing at least forty-five days before starting the work required and request written consent to do such work. Such notice shall be accompanied by plans indicating the manner in which the proposed alterations are to be made.

(d) Approval. -The plans and method of alteration shall be subject to the approval of the commissioner.

(e) Refusal of consent. -If consent is not granted by the owner of the previously constructed building to do the alteration work required by subdivisions (a) and (b) of this section, such owner shall signify his or her refusal in writing to the owner of the new or altered building and to the commissioner; and the owner of the new or altered building has submitted plans that conform to the requirements of this section, he or she shall thereupon be released from any responsibility for

the proper operation of the equipment due to loss of draft and for any health hazard or nuisance that may occur as a result of the new or altered building. Such responsibilities shall then be assumed by the owner of the previously constructed building. Likewise, should such owner neglect to grant consent within forty-five days from the date of written request or fail to signify his or her refusal, he or she shall then assume all responsibilities as prescribed above.

(f) Procedure. -It shall be the obligation of the owner of the new or altered building to:

(1) Schedule this work so as to create a minimum of disturbance to the occupants of the affected building.

(2) Provide such essential services as are normally supplied by the equipment while it is out of service.

(3) Where necessary, support such extended chimneys and equipment from this building or to carry up such chimneys within his or her building.

(4) Provide for the maintenance, repair, and/or replacement of such extensions and added equipment.

(5) Make such alterations of the same material as the original chimney so as to maintain the same quality and appearance, except where the owner of the chimney affected shall give his or her consent to do otherwise. All work shall be done in such fashion as to maintain the architectural esthetics of the existing building.

(g) Existing violations. -Any existing violations on the previously constructed equipment shall be corrected by the owner of the equipment before any equipment is added or alterations made at the expense of the owner of the new or altered building.

(h) The commissioner may grant a variance in accordance with the provisions of section 27-107 of article one of subchapter one of this chapter.

§[1501.6] 27-861 Metal chimneys. -

(a) Exterior metal chimneys.- Exterior metal chimneys constructed of steel shall be of adequate thickness to resist all applied loads specified in subchapter nine of this chapter, but shall not be less than the thickness required in table 15-4.

(b) Clearances for exterior metal chimneys. -Metal chimneys erected on the exterior of a building shall have sufficient clearance from a wall or frame of combustible construction to satisfy the requirements of table 15-2 and to permit inspection and maintenance operations on the chimney, and shall comply with the following minimum requirements:

(1) Exterior metal chimneys over eighteen inches in diameter, for equipment of any operating temperature, shall have a clearance of at least four inches, and those eighteen inches or less in diameter shall have a clearance of at least two inches from a building wall of any combustible construction.

(2) No portion of an exterior metal chimney shall be nearer than twenty-four inches to any door or window or to any exit, or located where it would be readily accessible to the public, unless it is insulated or shielded to avoid injury to any person in contact with the chimney.

TABLE 15-2 MINIMUM CLEARANCES REQUIRED FROM ANY COMBUSTIBLE MATERIALS

Classification of Equipment		
Low Temperature	Medium Temperature	High Temperature*
6”	24”	24”

Bracket not enacted but probably intended.

(c) Enclosure of interior metal chimneys. -

(1) Every interior metal chimney or part thereof erected within buildings shall be enclosed with non-combustible construction having a fire resistance rating of not less than that prescribed in table 15-3 in all stories above the one in which the equipment served thereby is located. Where the metal chimney passes through a combustible roof, it shall be guarded by a non-combustible ventilating thimble of galvanized metal or equivalent non-combustible material that extends at least nine inches below and above the roof construction. The thimbles shall be of a size to provide clearances on all sides of the metal chimney of at least six inches for low temperature equipment and at least eighteen inches for medium and high temperature equipment as defined in subchapter fourteen of this chapter. However, if the metal chimney is insulated and protected to prevent a temperature of more than two hundred fifty degrees Fahrenheit on its exterior surface the thimble clearance may be reduced by fifty percent.

(2) The enclosure around a metal chimney shall provide a space on all sides of the chimney to permit inspection and repair for the entire chimney height. When metal chimneys have a minimum dimension of twenty-four inches in diameter and are completely jacketed with noncombustible insulating material within the required enclosure, access to permit inspection and repair shall not be required.

(3) The enclosing construction shall be of non-combustible materials and shall have a fire resistance rating as required in table 15-3 and shall be without openings, except access openings equipped with opening protectives constructed in accordance with the requirements of subchapter five of this chapter, at floor levels where necessary for complete inspection purposes.

(4) The required fire resistance ratings of table 15-3 for the enclosure of a medium or high temperature metal chimney may be reduced by one hour if the chimney is insulated with an insulation adequate for the temperature of the chimney and having at least a one hour fire resistance rating at all sections of the insulation.

**** TABLE 15-3 REQUIRED FIRE RESISTANCE RATINGS OF ENCLOSURES FOR METAL CHIMNEYS**

Chimney Classification	Required Fire Resistance Rating of Enclosure
Low Temperature	1 Hr. for buildings under 5 stories 2 Hr. for buildings 5

	stories or more
Medium Temperature	2 Hr.
High Temperature	3 Hr.

Note for Table 15-3:
Table 3-4 of section 27-271 shall also be complied with in the construction of enclosures for metal chimneys.

** ***Local Law 80-1989.***

(d) Prohibited location. -No interior metal chimney shall be carried up inside a ventilating duct unless such duct is constructed as required by this subchapter for metal chimneys, and only when such duct is used solely for exhaust venting the room or space in which the equipment served by the metal chimney is located. Metal chimneys shall not be installed in air supply ducts.

**(e) Unlisted metal chimneys serving residential type or low heat appliances and producing flue gas having a temperature below 350ºF at the entrance to the chimney at full load or partial load shall be lined with acid and condensate resistant refractory material, or constructed of suitable stainless steel, or otherwise protected so as to minimize or prevent condensation or corrosion damage as required in reference standard RS 15-14.

**Steel chimneys for exterior use shall be insulated and weather sheathed to maintain flue surface temperatures above the acid dew point in all parts of the system in accordance with subdivision (b) of section 27-854.

**(g) Steel chimneys for interior use shall be insulated to ensure enclosure temperatures not in excess of 160ºF on combustible materials in accordance with subdivision (a) of section 27-854.

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§[1501.7] 27-862 Materials other than metal for construction of chimneys. -Materials other than metal for the construction of chimneys shall include the following:

(a) Clay, concrete, or shale bricks, laid in a full bed of mortar.

(b) One hundred percent solid masonry units, or hollow masonry units having the cores filled with mortar or grout, laid in spread mortar covering the entire cross-sectional area of the unit.

(c)Concrete cast in place and adequately reinforced where required. (d) Natural stones that have been sawed, dressed, or have a tooled finish, laid in spread mortar.e) Perforated radial brick. Such brick shall be laid in spread mortar equal to type M, of reference standard RS 15-3, and shall be shaped to the circular and radial lines of the various sections so as to form even joints.

(f) Other equivalent materials or combination of materials.

TABLE 15-4 LOW TEMPERATURE CHIMNEY CONSTRUCTIONS

Material	Thickness	Lining Required	Type of Lining	Thickness	Air Space
Steel[a] (for exterior chimneys)[b]	1/8 in. for areas up to 7 sq. ft., 3/16 in. for areas up to 12.5 sq. ft., 1/4 in. for larger.	Not required	….	….	….
Steel[a] (for interior chimneys)	No. 16 U.S. gage for areas up to 155 sq. in., No. 14 U.S. gage up to 200 sq. in., No. 12 U.S. gage up to 255 sq. in., No. 10 U.S. gage for greater areas.	Not required	….	….	….
Brick, masonry units, or stone	8 inches[c]	Full height from chimney base to 4 in. above chimney walls.	Clay flue lining meeting requirements of Reference Standard RS 15-4, with fire clay mortar or cement mortar equal to that of Type M of Ref. Std. RS 15-3, or a heat-proof and acid-proof flue lining joint cement.	Not less than 5/8 in.	Not less than 1/4 in. nor more than 3/4 in. between chimney walls and flue lining.
Concrete	6 inches[c]	ditto	ditto	ditto	ditto
Radial brick	7 ½ inches	Full height from chimney base to 4 in. above chimney wall.	Firebrick Type G, RS 15-6, laid in medium refractory mortar, RS 15-7, or acid resistant brick Type H or L, Ref. Std. RS 15-8.	4 1/2 inches	….
Brick type H or L, RS 15-7	8 inches	Not required	….	….	….

Notes for Table 15-4:

[a]Metal chimneys shall be of riveted, bolted or welded construction and made gas tight.

[b]Exterior metal chimneys shall be galvanized, or painted on the exterior surface with a heat resisting paint or be constructed of equal corrosion resistive alloys.

[c]In buildings in residential occupancy group J3, of four stories or less, and in other buildings not over two stories high and not in high hazard occupancy group A, providing the flue areas are not more than 200 sq. in. the walls of masonry or concrete chimneys may be reduced to 4 in. with fire clay flue lining. Flue linings shall be set ahead of chimney walls, and carefully bedded in fire clay mortar or in cement mortar. Chimney walls shall be provided with mortar spacer ties every 10 ft, of height. Mortar ties shall not be continuous around the flue linings.

***TABLE 15-5 MEDIUM TEMPERATURE CHIMNEY CONSTRUCTIONS**

Material	Thickness	Lining Required	Type of Lining	Thickness	Air Space
Steel	Same as for low temp. chimney	Lining is required for full height of chimney.	Incinerators only-Castable refractory Cl. A, RS 15-5	2 in.	None required
			Medium-duty fireclay refractory brick (ASTM C64) or the equivalent laid in medium-duty refractory mortar (ASTM C105) or the equivalent, RS 15-6.	The lining shall be at least 2 ½ in. thick for chimneys having a diameter or greatest cross-section dimension of 18 in. or less. The lining shall have a thickness of not less than 4 ½ in. laid on a full bed for chimneys having a diameter or greatest cross-section dimension greater than 18 in.	
Brick or masonry units	8 inches	Full height from chimney base to 4 in. above chimney wall.	Firebrick Type G, RS 15-6 laid in medium refractory mortar, RS 15-7, or acid resistant brick Type H or L, Ref. Std. RS 15-8.	4 ½ inches	None required
Concrete	6 inches	ditto	ditto	ditto	ditto
Stone	12 inches	ditto	ditto	ditto	ditto
Radial brick	7 ½ inches	Full height from chimney base to 4 in. above chimney wall.	ditto	ditto	ditto
Brick masonry units, stone, or concrete	Double wall construction, each wall 8 inches thick	From 2 feet below to a height of 25 feet above the point of entry if connector, the inner wall shall be lined.	Fire clay flue lining, as required for low temperature masonry chimneys.	5/8 inch	2 in. air space between each 8 in wall, fire-stopped at each floor with non-combustible material.

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***§[1501.8] 27-863 Chimney construction for low, medium, and high temperature equipment.-**

(a) Unlisted chimneys for low temperature equipment shall be constructed in accordance with table 15-4.

(b) Unlisted chimneys for medium temperature equipment shall be constructed in accordance with table 15-5.

(c) Unlisted chimneys for high temperature equipment shall be constructed in accordance with table 15-6.

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***§27-863.01 Chimney limitations and tests.-**

No solid fuel fireplace, fireplace stove or room heater shall be installed or altered unless connected to a chimney which complies with the limitations and testing requirements set forth in table 15-6.1.

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§[1501.9] 27-864 Chimney supports.-

(a) Chimneys shall not be supported by the equipment they serve unless such equipment has been specifically designed for such loads.

(b) An exterior metal chimney shall be supported on an independent substantial masonry or concrete foundation designed in accordance with the provisions of subchapters ten and eleven of this chapter. Interior

metal chimneys may be supported on noncombustible construction at intermediate levels.

(c) Masonry and concrete chimneys may be designed and constructed as free standing , or as constituting an integral part of a wall, or may be enclosed within a structure without constituting a component part thereof.

***TABLE 15-6 HIGH TEMPERATURE CHIMNEY CONSTRUCTIONS**

Material	Thickness	Lining Required	Type of Lining	Thickness	Air Space
Steel	Same as for low temp. chimney	For full height of chimney	High-duty fireclay refractory brick (ASTM C64) or the equivalent not less than 4 ½ in. thick laid on a full width bed in high- duty refractory mortar (ASTM C105) or the equivalent, RS 15-6.	4 ½ inches	None required
Brick masonry or concrete	Double wall construction with each wall 8 inches thick and an intervening air space	Inner course of inner wall shall be a firebrick, form 2 feet below connector to full height of chimney	Firebrick same as above for steel chimneys, except no castable refractory permitted.	4 ½ inches	2 in. air space required between the two 8 in. walls, fire-stopped as for medium temperature chimneys.
Steel and masonry, or concrete single wall. (Steel on inside of chimney)	Steel as above, with a single 8 in. masonry or 6 in. concrete wall and an intervening air space.	For full height of chimney	Firebrick and castable refractory, same as above for steel chimneys.	4 ½ inches 2 inches	2 in. air space required between the steel and the masonry or concrete wall, fire-stopped as per medium temperature chimneys.
Radial Brick	7 ½ inches	For full height from chimney base to 4 in. above chimney wall.	Firebrick as above for steel chimneys except no castable refractory permitted	4 ½ inches	None required

***TABLE 15-6.1 CHIMNEY LIMITATIONS AND THESTS FOR SOLID FUEL FIREPLACES, FIREPLACE STOVES AND ROOM HEATERS**

Occupancy	Reference Standard	Test Standard	Temperature	Number of Tests
J-2 & J-3 limited to 40 feet and three stories	RS 15-15	UL 127, as Modified	1700°F	1 test
J-2 & J-3 limited to 75 feet	RS 15-9	UL 103HT	2100 °F —10 min.	3 tests
	RS 15-12	ULC 629M	2100 °F —30 min.	3 tests
All other occupancies and all buildings	RS 15-10	UL 959	2100 °F to Equilibrium and 2300—30 min.	1 test 3 tests
greater than 75 feet in height	Table 15-6 of subdivision (c) of section 27-863 and Section 27-861	No Standard	Unlisted High Temp. Chimney with Required Thickness listed in Table 15-6	No test

Notes for Table 15-6.1:

Chimneys accepted pursuant to reference standard RS 14-10 or Table 15-6 may be used in lieu of chimneys accepted pursuant to reference standards RS 15-9, RS 15-12, and RS 15-15.

Chimneys accepted pursuant to reference standards RS 15-9 or RS 15-12 may be used in lieu of chimneys accepted pursuant to reference standard RS 15-15.

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(d) Masonry and concrete chimneys shall be wholly supported on noncombustible construction that shall conform to the requirements of subchapters ten and eleven of this chapter, and shall not be required to support any direct load other than the weight of the chimney. No supports shall project into the chimney flue or flue lining.

*(e) Supports for listed chimneys shall be listed and installed in accordance with the listing and acceptance.

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§[1501.10] 27-865 Chimney caps.- All masonry chimneys shall be capped with concrete, cement wash, terra cotta tile, or other equivalent material.

§[1501.11] 27-866 Corbelling of chimneys. -Walls less than twelve inches thick shall not be corbelled. The maximum horizontal projection in any corbel shall be one inch for each two inches of vertical projection and in all cases the total projection shall not be greater than one-third of the minimum thickness of the wall to be corbelled. In no case shall the total projection be more than six inches. No masonry chimney shall be corbelled from hollow or cavity wall masonry units.

***§[1501.12] 27-867 Clearances from masonry and concrete chimneys**. -

(a) All wood beams, joists, and studs shall be framed away from chimneys. Headers, beams, joists, and studs shall be at least two inches from the outside face of a chimney or from masonry enclosing a flue. Trimmers shall be not less than five inches from the inside face of the concrete or masonry chimney wall. Finished flooring shall have at least one-half inch clearance from chimney walls.

(b) A clearance of at least four inches shall be provided between the exterior surfaces of masonry or concrete chimneys for commercial and industrial type incinerators and combustible material.

(c) A clearance of at least two inches shall be provided between the exterior surfaces of interior masonry or concrete chimneys for all wood burning appliances.

(d) No combustible lathing, furring, or plaster grounds shall be placed against a chimney at any point more than one and one-half inches from the corner of the chimney; but this shall not prevent plastering directly on masonry or on metal lath and metal furring nor shall it prevent placing chimneys for low temperature equipment entirely on the exterior of a building against the sheathing.

(e) All spaces between chimneys and wood joists, beams, or headers shall be firestopped in accordance with the provisions of subchapter five of this chapter.

(f) No change in the size or shape of a chimney shall be made within six inches of the roof framing through which it passes.

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§[1501.13] 27-868 Smoke test. -

(a) General. -When required by the commissioner to determine the tightness of chimney constructions, a smoke test shall be made in accordance with the following conditions and requirements:

(1) The equipment, materials, power and labor necessary for such test shall be furnished by, and at the expense of, the owner or holder of the work permit.

(2) If the test shows any evidence of leakage or other defects, such defects shall be corrected in accordance with the requirement of this subchapter and the test shall be repeated until the results are satisfactory.

(b) Method of test. -The chimney shall be filled with a thick penetrating smoke produced by one or more smoke machines, or smoke bombs, or other equivalent method. As the smoke appears at the stack opening on the roof, such opening shall be tightly closed and a pressure equivalent to a one-half inch column of water measured at the base of the stack, shall be applied. The test shall be applied for a length of time sufficient to permit the inspection of the chimney.

§[1501.14] 27-869 Exhaust gases from internal combustion engines. -

(a) Exhaust pipe construction. -The exhaust pipe from internal combustion engines shall be constructed in accordance with the requirements for metal chimneys based on the temperature of the gases entering the exhaust pipe, and in accordance with the following:

(1) The requirements for at least a medium temperature chimney shall apply.

(2) The exhaust pipe shall be constructed of at least three-sixteenths inch steel, or of other equivalent metal of similar strength and resistance to the temperature and corrosive action of the exhaust gases.

(3) No lining shall be required.

(4) Where the exhaust pipe runs inside a building, it shall be insulated with an insulation adequate for the temperature of the pipe, so that the surface temperature shall be not more than two hundred degrees Fahrenheit.

(5) All joints shall be constructed so as to be gastight under all operating conditions. No threaded joints shall be permitted in pipe sizes over four inches or in pipe of a thickness less than that of schedule 40 steel pipe.

(b) Location of discharge opening. -The location of the discharge opening of the exhaust pipe shall comply with the requirements of subdivision (d) of section 27-776 of article one of subchapter thirteen of this chapter, and, in addition, the opening shall be located or arranged so that it cannot cause condensate leaving the outlet to come in contact with people. The exhaust pipe may be connected to a chimney used for other equipment, provided that the operation of the engine does not adversely affect the operation of the other

equipment so as to cause a fire or health hazard, or to cause the emissions from the chimney to be in violation of the air pollution control code.

*§27-869.01 Factory-built chimneys. -

(a) Residential occupancy. In residential occupancy groups J-2 and J-3:

(1) Factory-built chimneys servicing liquid or gas fueled appliances shall be listed and accepted in accordance with reference standard RS 15-8[A].**

***Copy in brackets not enacted but probably intended*.

(2) Factory-built chimneys servicing wood burning fireplaces or stoves and inserts shall be listed and accepted in accordance with reference standards RS 15-9, RS 15-10, RS 15-12 or RS 15-15.

(3) Factory-built chimneys servicing factory-built fireplaces shall be listed and accepted in accordance with reference standard RS 15-15.

(b) Other occupancies. In all other occupancy groups:

(1) Factory-built chimneys servicing liquid or gas fueled appliances shall be listed and accepted in accordance with reference standard RS 15-10 or RS 15-11.

(2) Factory-built chimneys servicing wood burning appliances of any type shall be listed and accepted in accordance with reference standard RS 15-10.

(c) Enclosures. All factory-built chimneys shall be enclosed in accordance with the requirements of table 15-3.

(d) Height limitation: Every chimney servicing a factory-built fireplace or wood burning stove in a building of more than seventy-five feet in height shall be listed and accepted in accordance with reference standard RS 15-10, unless such chimney is an unlisted high temperature chimney constructed in accordance with the requirements of section 27-861 and of table 15-6 of subdivision (c) of section 27-863, and is installed to serve the appliance.

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***§27-869.02 Changes in appliance fuels**. -

(a) Conversion from gas to fuel oil or wood for heating appliances shall be made only if:

(1) the chimney design meets the requirements of this subchapter for the conversion fuel; and

(2) the chimney size is adequate to vent the combustion products from the new fuel.

(b) Conversion from solid or liquid fuels to natural gas fuels for heating appliances shall be made only if:

(1) the chimney design meets the requirements of this subchapter for the conversion fuel;

(2) the chimney is thoroughly cleaned prior to the conversion to remove collected flue deposits, which can spall off when gas is used as a fuel;

(3) the chimney size is recalculated for the new fuel;

(4) drains are installed to remove condensed water; and

(5) gas vents are installed within the chimney for venting purposes if required by the appliance listing.

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* **§27-869.03 Reduction in flue size**. -Conversion from one fuel to another or the use of an existing chimney to service a fireplace or wood burning appliance may require a flue size change for proper operation. This may be done if the redesigned flue meets the criteria for the fuel and chimney type to be used as set forth in this subchapter.

(a) Individual fireclay flue linings, in conformance with reference standard RS 15-14 or the equivalent not less than five-eighths inch thick, may be used but shall be carefully bedded one on the other in medium-duty fireclay refractory mortar in conformance with reference standard RS 15-6 or the equivalent as determined by the commissioner, with close fitting joints left smooth on the inside. Linings shall be separate from the chimney wall and the space between the liner and masonry shall not be filled; only enough mortar shall be used to make a good joint and hold the liners in position.

(b) Cast in place chimney linings. -

(1) Cast in place linings shall be installed in accordance with reference standard RS 15-16 and with their listing and acceptance.

(2) The applicant prior to the installation of the lining shall verify that the chimney meets the requirements of reference standard RS 15-4 and is in a sound and uncracked condition, that spalling has been removed and that there are no carbon or creosote deposits.

Local Law 80-1989.

ARTICLE 3 CHIMNEY CONNECTORS

§[1502.1] 27-870 Chimney connector construction.- Chimney connectors except those serving incinerators shall be constructed of galvanized steel of thickness conforming to the requirements listed in subdivision (a) of this section or of equivalent materials. Cleanout doors of the same material as the connector or other equivalent means shall be provided for the cleaning of connectors. Tile pipe shall not be used as a chimney connector.

(a) Thickness of metal. -The thickness of galvanized steel for chimney connectors shall be not less than that given in table 15-7.

TABLE 15-7 REQUIRED THICKNESS OF GALVANIZED STEEL FOR CONNECTORS

Galvanized Sheet Gage [*sic*] No.	Area of Connector Sq. In.
24	less than 79
22	80 to 154
20	155 to 200
16	Over 200

(b) General. -All chimney connectors shall be as short and as straight as possible consistent with their use and

the required draft conditions. No chimney connector shall pass through a floor or ceiling construction.

§[1502.2] 27-871 Chimney connection. -In entering a flue in a masonry or metal chimney, the chimney connector shall be installed above the extreme bottom to avoid stoppage and in such manner or by such means as to prevent the chimney connector from entering so far as to restrict the space between its end and the opposite wall of the chimney. The chimney connector shall be firmly attached or inserted into a thimble or slip joint to prevent it from falling out of place. All connectors shall fit tightly. Chimney connections to any flue shall be limited to one floor. Two or more chimney connectors may be joined to a single connection provided that the chimney connectors are on one floor level and the flue is of sufficient size to serve all of the equipment thus connected. Chimney connectors shall be inspected at the time of the initial installation by the commissioner or by a duly authorized insurance company as provided in section two hundred four of the labor law.

§[1502.3] 27-872 Chimney connector clearances. -
(a) From combustible construction. -The minimum distance between the chimney connector and any combustible material or construction shall be:
(1) eighteen inches for chimney connectors from low temperature equipment.
(2) thirty-six inches for chimney connectors from medium temperature and high temperature equipment.
(b) Reduced clearances. -The above clearances may be reduced as outlined in table 15-8 in accordance with the type of protection applied to the combustible material or construction.

***TABLE 15-8 REDUCED CLEARANCES FOR CHIMNEY CONNECTORS WITH SPECIFIED FORM OF PROTECTION**[1, 2, 3, 4]

Type of protection Applied to the combustible material and covering all surfaces within the distance specified as the required clearance with no protection. Thicknesses are minimum	Where the required clearance with no protection is: 36 in.	18 in.	9 in.	6 in.
(a) 0.027 in. (23 gage) [*sic*] sheet metal spaced out 1in.	36 in.	18 in.	9 in.	6 in.
(b) 3 ½ in. thick masonry wall spaced out 1 in. and adequately tied to the wall being protected. (see Note 4.)	18 in.	9 in.	4 in.	2 in.
(c) 0.027 in. (23 gage) [*sic*] sheet metal on 1 in. mineral wool batts reinforced with wire or equivalent spaced out in 1 in.	12 in.	3 in.	2 in.	2 in.

Notes for Table 15-8:
[1] Spacers and ties shall be of noncombustible material.
[2] All methods of protection require adequate ventilation between protective material and adjacent combustible walls and ceilings.
[3] Mineral wool batts (blanket or board) shall have a minimum density of 8 lb. per cu. ft. and a minimum melting point of 1500ºF.
[4] If a single wall connector passes through the masonry wall there shall be at least 1/2 in. open ventilated airspace between the connector and the masonry.
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§[1502.4] 27-873 Underground chimney connectors.- Underground chimney connectors shall be covered with at least twelve inches of solid masonry or an equivalent insulation. Each cleanout opening shall be provided with double iron doors or covers, and the doors or covers shall be twelve inches apart with the intervening space filled with insulating material. The doors or covers shall be not less than 10 manufacturer's standard gage [*sic*]. No combustible flooring shall be permitted over such connectors.

§[1502.5] 27-874 Annual inspection of chimney connectors.- Chimney connectors for boilers subject to section two hundred four of the labor law shall be inspected at least once a year by the commissioner or by a duly authorized insurance company, as provided in subdivision (b) of section 27-793 of article two of subchapter fourteen of this chapter and shall be subject to procedures listed therein.

ARTICLE 4 INCINERATOR CHIMNEYS AND REFUSE CHARGING CHUTES

§[1503.1] 27-875 Charging chutes for refuse reduction.- Charging chutes shall be constructed in accordance with the following requirements:
(a) Directly connected. -When directly connected to the combustion chamber of an incinerator, the chutes shall be gas tight with smooth linings and shall conform to the following:
(1) They shall be constructed in accordance with the requirements for medium temperature chimneys.

(2) They shall extend through the building roof and be open to the outer air. The opening shall be equal to the required chute size at the top floor.
(3) If a roof damper is used it shall be constructed to open automatically under conditions of excessive pressure or temperature. The roof damper shall be electrically interlocked with the auxiliary burners.
(4) Each charging chute shall be provided with a spark arrester of corrosion resistive, noncombustible construction in which the maximum size of mesh opening shall not exceed three-quarters of an inch. The cross-sectional free area of such arrester shall be not less than that of the inside of the chute to which it is attached. The height of the spark arrester shall be such that there will be a mimimum of twenty-four square feet of total free area provided for a chute height to sixty feet; thirty-six square feet for a chute height from sixty-one feet to one hundred twenty feet; and forty-four square feet for chute heights over one hundred twenty feet. In no case, however, shall the height of the spark arrester be less than one foot.
(5) Provisions shall be made for sterilizing the charging chute by heating or purging at a temperature of at least four hundred degrees Fahrenheit but not higher than one thousand degrees Fahrenheit.

(b) Not directly connected. -When not directly connected to a building service incinerator, the chutes shall be gas tight with smooth linings and shall conform to the following:
(1) They shall be constructed in accordance with the applicable requirements for shafts in table 3-5** and subchapter five of this chapter.
As enacted but "3-4" probably intended.
(2) They shall extend through the building roof and be open to the air. The opening shall be equal to at least one square foot.
(3) If a roof damper is used it shall be constructed to open automatically under conditions of excessive pressure or temperature.
(4) Provisions shall be made for sterilizing the chute by spraying, washing, or other equivalent means.
(5) Bins, containers, or rooms for receiving rubbish shall be constructed as required by section 27-837 of article eighteen of subchapter fourteen of this chapter and sprinklers shall be provided as required by the construction provisions of subchapter seventeen of this chapter.

(c) Sizes. -
(1) The sizes of chutes directly connected to the incinerators in buildings shall conform to table 15-9.
(2) Charging chutes not directly connected to the incinerator shall have a cross-sectional free area adequate for the service intended.

(d) Charging doors. -Charging doors, service openings, or hopper doors for chutes may be located in separate rooms or compartments enclosed in non-combustible walls or partitions, floors, and ceilings having a fire resistance rating of at least one hour and a self-closing fire door with a three-quarter-hour fire-protection rating. Service openings shall, in no case, have a free area of more than one-third of the cross-sectional free area of the chute to which they give access. All such openings shall be substantially constructed of steel or the equivalent metal of sufficient thickness to prevent distortion or other damage in normal usage. The door shall be provided with counterweights, door checks, or other equivalent means for automatically closing after use and where the chute is connected directly to the combustion chamber of an incinerator, the door shall be so constructed that the chute is closed off while the hopper is being loaded. No part of the door shall project into the chute at any time. The minimum height of charging door openings shall be eleven inches, and the minimum width shall be thirteen inches.
(e) When charging chutes are located in multiple dwellings, in addition to the requirements of this subchapter, the chutes shall be constructed in accordance with the requirements for noise control of chutes in subchapter twelve of this chapter.

TABLE 15-9 MINIMUM SIZE OF CHARGING CHUTES

Building Height	Location	If Square		If Round
7 stories or less	All 7 stories	22 ½"	x 22 ½"	24" dia.
8 to 30 stories	Top 7 stories	22 ½"	x 22 ½"	24" dia.
	8th to 30th from the top	27"	x 27"	30" dia.
31 stories and over	Top 7 stories	22 ½"	x 22 ½"	24" dia.
	8th to 30th from the top	27"	x 27"	30" dia.
	Remaining lower	32"	x 32"	36" dia.

§[1503.2] 27-876 Chimneys for building service incinerators.- Chimneys for building service incinerators shall be constructed in accordance with the requirements of this subchapter for high or medium temperature chimneys, based upon the temperature of the flue gases leaving the equipment, except that no reduction of flue gas temperature shall be recognized if such reduction is the result of using water scrubbers or barometric dampers. In addition, such chimneys shall comply with the following:
(a) Chimneys shall extend through the roof and be open to the air.
(b) Chimneys shall be provided with a spark arrester as required in paragraph four of subdivision (a) of section 27-875 of this article.
(c) Incinerators may discharge into chimneys serving other equipment provided such combined chimney is of adequate size for both uses, conforms to construction required for the highest temperature, and adequate draft control equipment is provided for each device connected to the combined chimney.

§[1503.3] 27-877 Chimneys for industrial or municipal incinerator plants.- Chimneys for central incinerator plants shall be constructed in accordance with the requirements for:
(a) Medium temperature chimneys if the incinerator is provided with a heat recovery unit or other means to assure a flue gas temperature not in excess of one thousand degrees Fahrenheit at the base of the stack.
(b) High temperature chimneys if the incinerator has no heat recovery unit or other means to assure a flue gas temperature less than one thousand degrees Fahrenheit.

§[1503.4] 27-878 Incinerator chimney connectors. -
(a) The chimney connector from the combustion chamber of an auxiliary fuel-fired incinerator shall be constructed of metal at least as heavy as no. 16 manufacturers standard gage [*sic*] when twelve inches or less in diameter or greater dimension, and of metal at least as heavy as no. 12 manufacturers standard gage [*sic*] when they exceed twelve inches in diameter or greater dimension.
(b) Chimney connectors from auxiliary fuel-fired incinerators shall be lined with firebrick, laid in fire clay mortar, at least two and one-half inches thick when they are between twelve inches and eighteen inches in diameter or greater dimension and at least four and one-half inches thick when they are larger; where no flue gas temperature reduction is effected the chimney connectors shall be equipped with a guillotine or horizontal sliding damper or butterfly damper interlocked with the fuel firing controls so that operation of the incinerator occurs when the damper is open. If chimney connectors from auxiliary fuel-fired incinerators lead into and combine with chimney connectors from other equipment, the connectors from the other equipment shall also be lined as required for direct flue connections unless the cross-sectional area of the connector into which they lead is at least four times their required cross-sectional area.
(c) Chimney connectors for an auxiliary fuel-fired incinerator to a boiler stack or chimney for [*sic*] high temperature heating equipment shall be permitted when the cross-sectional area of such stack or chimney is at least four times that of the incinerator chimney connector.
(d) The clearance of incinerator chimney connectors from combustible material or construction shall be at least thirty-six inches. This clearance may be reduced as outlined in table 15-8 in accordance with the type of protection applied to the combustible material or construction.

ARTICLE 5 GAS VENT SYSTEMS

†§[1504.1] 27-879 General. -
(a) Vent systems of gas-fired equipment shall be so designed and constructed as to completely exhaust the products of combustion to the outdoor air.
(b) When required by the commissioner, gas vents shall be tested to determine fire safety and the adequate exhausting of the products of combustion.
(c) Vents shall be installed if required, in accordance with the applicable standards for gas-fired equipment. See reference standard RS 15-2 for a tabulation of these standards.
†***Local Law 80-1989.***

†§[1504.2] 27-880 Equipment not required to be vented.-
(a) Ranges for which a vent is not required by reference standard RS 15-2.
(b) Built-in domestic cooking units for which a vent is not required by reference standard RS 15-2.
(c) Hot plates and laundry stoves.
(d) Type 1 clothes dryers.
(*e) Water heaters with inputs not over five thousand Btu/hr. (See note below.)
(*f) Automatically controlled instantaneous water heaters that supply water to a single faucet which is attached to and made a part of the equipment.
(*g) A single booster type (automatic instantaneous) water heater when designed and used solely for the sanitizing rinse requirements of a national sanitation foundation class one, two or three dishwashing machine, provided that the input is limited to fifty thousand Btu/hr. The storage capacity is limited to twelve and one-half gallons and the heater is installed in a commercial kitchen having a mechanical exhaust system.
(*h) Refrigerators.
(*i) Counter equipment.
(*j) Room heaters for which a vent is not required by reference standard RS 15-0.
(*k) Other equipment for which a vent is not required and which are not provided with flue collars.
(*l) Specialized equipment of limited input such as laboratory burners or gas lights.
See notes at end of Section 27-880.
†***Local Law 80-1989.***

Notes:
When any, or all, of the equipment marked with an asterisk (*) is installed so that the aggregate input rating exceeds thirty Btu/hr. per cubic foot of room or space in which it is installed, one or more pieces of the equipment shall be provided with a venting system or other equivalent means for removing the vent gases to the outdoor air so that the aggregate input rating of the remaining unvented equipment does not exceed the thirty Btu/hr. per cubic foot figure. When the room or space in which such equipment is installed is directly connected to another room or space by a doorway, archway, or other opening of comparable size, which cannot be closed, the volume of such adjacent room or space may be included in the calculations.

†§[1504.3] 27-881 Draft hoods. -
(a) All vented equipment, except dual oven type combination ranges, equipment with sealed combustion chambers, and units designed for power burners or forced venting, shall be installed with a draft hood or with a barometric damper.
(b) The draft hood supplied with, or forming a part of, vented equipment shall be installed in accordance with the

requirements of the applicable standard in reference standard RS 15-2. The draft hood shall be located in the same room as the combustion air opening of the equipment.
†*Local Law 80-1989.*

§[1504.4] 27-882 Chimneys for venting gas-fired equipment.- When venting of gas-fired equipment is provided for by the use of chimneys, such chimneys shall be constructed in accordance with the requirements of this subchapter.

§[1504.5] 27-883 Gas equipment connected to chimneys.- Automatically controlled gas-fired equipment connected to a chimney that also serves equipment for the combustion of solid or liquid fuel shall be equipped with an automatic pilot. A gas-fired equipment vent connector and a chimney connector from equipment burning another fuel, located on the same floor, may be connected into the same chimney through separate openings, or may be connected through a single opening if joined by a suitable fitting located as close as practicable to the chimney. If two or more openings are provided into one chimney, they shall be at different levels.

§[1504.6] 27-884 Types of gas vents. -
†(a) Type B gas vents. -Type B gas vents conforming to the requirements of section 27-855 of article one of this subchapter may be used to vent gas-fired equipment. Type B gas vents may be used for single-story or multi-story installations when they conform to the requirements of section 27-855 of article one of this subchapter and the gas equipment used in multi-story installations shall be accepted for such use. Type B gas vents shall be used to vent only listed gas appliances with draft hoods and other gas appliances listed for use with Type B gas vents. However, Type B gas vents shall not be used for venting:
(1) vented wall furnaces listed for use with Type BW gas vents only;
(2) incinerators;
(3) appliances which may be converted readily to the use of solid or liquid fuels;
(4) combination gas-oil burning appliances;
(5) appliances listed for use with chimneys only.

†*Local Law 80-1989.*
†(b) Type B-W gas vents. -Type B-W gas vents conforming to the requirements of section 27-855 of article one of this subchapter shall be used to vent gas-fired vented recessed heaters. Type B-W gas vents may be used with single-story or multi-story installations when they conform to the requirements of section 27-855 of article one of this subchapter and the gas equipment used in multi-story installations shall be accepted for such use. Type BW vents shall be used with listed vented gas wall furnaces having a capacity not greater than that of the listed Type BW gas vent.

†*Local Law 80-1989.*
(c) Single-wall metal vents. -Single-wall metal vents may be used to vent gas-fired equipment and shall be constructed of not less than 16 oz. sheet copper, or No. 20 galvanized sheet gage [*sic*] steel, or of other equivalent noncombustible corrosion-resistive material. Single-wall metal gas vents may pass through the roof or exterior wall to the outdoor air, but shall not pass through any attic or other concealed space nor through any intermediate floor construction.
(d) Connection to a common vent. -Connection of gas-fired equipment on more than one floor level to a common vent, except as provided for in subdivisions (a) and (b) of this section, shall be prohibited.
(e) Ventilating hoods. -Ventilating hoods and exhaust systems may be used to vent kitchen, laboratory, and commercial [*sic*] equipment.

§[1504.7] 27-885 Labeling gas vents. -Gas vents for use with gas-fired equipment, and which are not designed for use with solid or liquid fuel-fired equipment, shall be plainly and permanently identified by a metal label etched or embossed to read: "This gas vent is for equipment which burns gas only. Do not connect to incinerator or solid or liquid fuel-burning equipment." This label shall be attached to the vent at a point near where the gas vent system enters the wall, ceiling, or chimney.

§[1504.8] 27-886 Special venting arrangements. -
(a) Equipment with sealed combustion chambers. -The vent requirements contained in this subchapter do not apply to equipment having sealed combustion chambers and which are so constructed and installed that all air for combustion is derived from outside the space being heated and all flue gases are discharged by integral vent to the outdoors. Such equipment, having integral venting, shall be installed in accordance with the conditions of the applicable standard governing their use.
(b) Gas-vent exhausters and chimney exhausters. -Gas-vent exhausters and chimney exhausters may be used with gas appliances in lieu of natural draft vents. Where an exhauster is used with gas-burning equipment requiring venting, provisions shall be made to prevent the flow of gas to the main burner in the event of failure of the exhaust system. A vent connector serving gas equipment vented by natural draft shall not be connected into the discharge side of a power exhauster.
(c) Ventilating hoods and exhaust systems. -
Ventilating hoods and exhaust systems may be used to vent gas equipment installed in commercial applications. When automatically operated equipment, such as water heaters, are vented through natural-draft ventilating hoods, dampers shall not be installed in the ventilating system. When the ventilating hood or exhaust system is

equipped with a power-driven exhaust fan, the equipment control system shall be so interlocked as to permit equipment operation only when the power exhaust is in operation. When used, ventilating hoods shall be built and installed in accordance with the provisions of subchapter thirteen of this chapter.

§[1504.9] 27-887 Installation requirements. -
(a) The gas vent connected to equipment with a single vent shall not be less than the size of the draft hood outlet, and in no case less than two inches in diameter.
(b) When more than one piece of equipment is connected to a gas vent, the area shall be not less than the area of the largest vent connector plus fifty percent of the areas of additional vent connectors or in accordance with the provisions of reference standard RS 15-1.
(c) Where two or more vent connectors enter a common vertical gas vent or chimney, the smaller connector shall enter at the highest level consistent with available headroom or clearance to combustible material. Two or more items of gas equipment may be vented through a common vent connector or manifold located at the highest level consistent with available headroom or clearance to combustible material. The manifold, all junction fittings, and the common vent connector shall be of a size adequate for the combined volume of the vent gases.
(d) Gas vents shall be enclosed as provided in subdivision (c) of section 27-861 of article two of this chapter.

§[1504.10] 27-888 Gas vent height and locations. - Gas vents shall extend at least two feet above the highest construction, such as a roof ridge, parapet wall, or penthouse, within ten feet of the vent outlet whether the construction is on the same building as the chimney or on another building. However, such constructions do not include chimneys or other vents, or open structural framing. The vent shall be as high as such construction which is located beyond ten feet from the vent and up to and including the distance determined by the following formula:

$$D = 2\sqrt{A}$$

where:

D = Distance in ft., measured from the center of the vent outlet to the nearest edge of the construction.

A = Free area, in sq. in., of vent flue space.

Vents shall be subject to the following additional requirements:
(a) No gas vent shall terminate less than five feet in vertical height above the highest connected equipment draft hood outlet or flue collar.
(b) No type B-W gas vent serving a vented recessed heater shall terminate less than twelve feet in vertical height above the bottom of the heater.
(c) All gas vents shall terminate in an approved vent or cowl, which shall prevent down drafts and prevent rain and debris from entering the vent.

§[1504.11] 27-889 Adjoining gas vents. -
(a) Responsibility of owner of taller building. - Whenever a building is erected, enlarged, or increased in height so that any portion of such building, except chimneys or vents, extends above the top of a previously constructed gas vent within fifty feet, the owner of the new or altered building shall have the responsibility of altering such gas vents that have their outlets within fifty feet measured horizontally, of any part of the newly erected building. Such alterations shall be at the expense of the owner of the new or altered building and shall be accomplished by one of the following means or a combination thereof:
(1) Carry up such previously constructed vents from gas-fired equipment to the eight required in section 27-888 of this article.
(2) Offset such gas vents to a distance of more than fifty feet from the new or altered building, provided that the new location of the outlet of the offset gas vent shall comply with the requirements of this subchapter.
(b) Protection of draft. -After the alteration of a gas vent as described in subdivision (a) of this section, it shall be the responsibility of the owner of the new or altered building to provide any mechanical devices or equipment necessary to maintain the proper draft in the equipment.
(c) Written notification. -The owner of the new or altered building shall notify the owner of the building affected in writing at least forty-five days before starting the work and request written consent to do such work. Such notice shall be accompanied by a written description or a plan showing how the proposed alterations are to be made.
(d) Approval. -The method of correction shall be subject to the approval of the commissioner.
(e) Refusal of consent. -If consent is not granted by the owner of the previously constructed or altered building to do the alteration work required by paragraph one of subdivision (a) of this section, such owner shall signify his or her refusal in writing to the owner of the new or altered building and to the commissioner, and the owner of the new or altered building has submitted plans that conform to the requirements of this section, he or she shall thereupon be released from any responsibility for the operation of his or her equipment and for any health hazard or nuisance that may occur as a result of the newly erected or modified building. Such responsibilities shall then be assumed by the owner of the previously constructed building. Likewise, should such owner neglect to grant consent within forty-five days from the date of written request or fail to signify his or her refusal, he or she shall then assume all responsibilities as prescribed above.

(f) Procedures. -It shall be the obligation of the owner of the new or altered building to:
(1) Schedule this work so as to create a minimum of disturbance to the occupants of the affected building.
(2) Provide such essential services as are normally supplied by the equipment while it is out of service.
(3) Where necessary, support such extended gas vents from his or her building or carry up such vents within his or her building.
(4) Provide for the maintenance, repair, and/or replacement of such alterations.
(5) Make such alterations of the same material as the original gas vent except where the owner of the vent affected shall give his or her consent to do otherwise. All work shall be done in such fashion as to maintain the architectural esthetics of the existing building.
(g) Existing violations. -Any existing violations on the previously constructed equipment shall be corrected by the owner of the equipment before any equipment is added or alterations made at the expense of the owner of the new or altered building.
(h) The commissioner may grant a variance in accordance with the provisions of section 27-107 of article one of subchapter one of this chapter.

§[1504.12] 27-890 Support of gas vents. -All portions of gas vents shall be adequately supported for the weight of the material used and for the applied loads on the vent.

§[1504.13] 27-891 Prohibited termination. -Gas vents extending through outside walls shall not terminate below eaves or parapets.

ARTICLE 6 GAS VENT CONNECTORS

§[1505.1] 27-892 Construction. -Vent connectors for conversion burners without draft hoods, or other gas-fired equipment without draft hoods, shall be constructed of materials having resistance to corrosion and temperature not less than that of no. 24 galvanized sheet gage [*sic*] steel.
(a) Vent connectors used for gas-fired equipment having draft hoods and for conversion burners having draft hoods, shall be constructed of Type B gas vent material or materials having resistance to corrosion and temperature not less than that of no. 26 galvanized sheet gage [*sic*] steel.
(b) The vent connector between the equipment and the vertical gas vent or chimney shall have the greatest possible initial rise consistent with the headroom available in the equipment area and with the required clearance to combustible material. The horizontal run of the vent connector shall be as short as possible and the equipment shall be located as near the gas vent or chimney as practicable. The maximum length of an uninsulated horizontal run of vent connector shall not exceed seventy-five percent of the height of the gas vent or chimney.
(c) No vent connector shall pass through floor or ceiling construction.

§[1505.2] 27-893 Clearances. -
(a) Minimum clearances. -Minimum clearances at vent connectors to combustible materials shall not be less than those listed in table 15-10.
(b) Reduced clearances. -These clearances may be reduced when the combustible construction is protected as provided in table 15-11.

§[1505.3] 27-894 Thimbles. -
(a) When passing through combustible constructions, vent connectors constructed of type B gas vent material shall be installed so that the clearances required by the standard are maintained.
(b) Vent connections made of single-wall metal pipe shall not pass through any combustible walls or partitions unless they are guarded at the point of passage by ventilated metal thimbles not smaller than the following:
(1) For equipment conforming to standards-four inches larger in diameter than the vent connector.
(2) For equipment having draft hoods-six inches larger in diameter than the vent connector.
(3) For equipment without draft hoods-twelve inches larger in diameter than the vent connector.

§[1505.4] 27-895 Size of connectors. -The vent connector shall not be smaller than the size of the flue collar or the draft hood outlet of the gas-fired equipment. Where a single item of equipment has more than one draft hood outlet, the vent connector shall equal the combined area of the draft hood outlets for which it acts as a common connector to the gas vent or chimney.

TABLE 15-10 VENT CONNECTOR CLEARANCE[S]* FOR GAS-FIRED EQUIPMENT

	Minimum Distances from Combustible Materials (in.)	
	Type B Gas Vent Material	Other Than Type B Materials
Boiler	As required by Std.	6
Warm air furnace	As required by Std.	6
Water heater	As required by Std.	6
Room Heater	As required by Std.	6
Floor furnace	As required by Std.	6
Conversion burner (with draft hood)	6	9
Equipment with draft hoods	6	9
Equipment without draft hoods	Not Permitted	18

Copy in brackets not enacted but probably intended.

TABLE 15-11 REDUCED CLEARANCES FOR VENT CONNECTORS WITH SPECIFIED FORMS OF PROTECTION[a]

Specified Form of Protection[b]	Reduced Clearances Where the Required Clearance with No Protection is:		
	18 in.	9 in.	6 in.
(a) 1/4 in. asbestos millboard spaced out 1 in.[c]	12	6	3
(b) 28 gage [*sic*] sheet metal on 1/4 in. asbestos mill board	12	4	2
(c) 28 gage [*sic*] sheet metal spaced out 1 in.[c]	9	4	2
(d) 28 gage [*sic*] sheet metal on 1/8 in. asbestos millboard spaced out 1 in.[c]	9	4	2
(e) 1 1/2 in. asbestos cement covering on heating appliance	18	9	6
(f) 1/4 in. asbestos millboard on 1 in. mineral fiber bats reinforced with wire mesh or equivalent	6	4	2
(g) 22 gage [*sic*] sheet metal on 1 in. mineral fiber bats reinforced with wire or equivalent	3	2	2
(h) 1/4 in. asbestos cement board or 1/4 in. asbestos millboard	18	9	4
(i) 1/4 in. cellular asbestos	18	9	3

Notes for Table 15-11:

[a]Except for the protection described in (e) above, all clearances should be measured from the outer surface of the appliance to the combustible material disregarding any intervening protection applied to the combustible material.

[b]Applied to the combustible material unless otherwise specified and covering all surfaces within the distance specified as the required clearance with no protection. Thicknesses are minimum.

[c]Spacers shall be on** noncombustible material.

As enacted but "of" probably intended.

SUBCHAPTER 16
PLUMBING AND GAS PIPING

TABLE OF CONTENTS

**"C26" omitted from section numbers in this column.*
***"27" omitted from section numbers in this column.*

ARTICLE 1 GENERAL

§[1600.1] 27-896 Scope.-The provisions of this subchapter shall establish and control the minimum requirements for the design, installation, alteration, repair, and maintenance of plumbing systems, including gas piping, sanitary and storm drainage, industrial and special wastes, sanitary facilities, water supplies and storm water and sewage disposal, except where specific exemptions are made in the code. All installation, alteration, repair, and maintenance work shall be performed by or under the direct supervision of a licensed master plumber, except as follows:

(a) Minor alterations and ordinary repairs as defined and delimited in article five of subchapter one of this chapter.

(b) Installation of gas service piping and gas meter piping may be performed by a utility corporation that is subject to the jurisdiction of the public service commission, provided that the corporation maintains and services such piping.

(c) Emergency repairs to alleviate hazardous conditions in gas distribution piping may be performed by a utility corporation which is subject to the jurisdiction of the Public Service Commission, subject to the requirements of section 27-176 of article fifteen of subchapter one of this chapter.

§[1600.2] 27-897 Standard.-The provisions of reference standard RS-16 shall be a part of this subchapter.

§[1600.3] 27-898 Definitions.- For definitions to be used in the interpretation of this subchapter, see subchapter two of this chapter.

§[1600.4] 27-899 Plans.- For the requirements governing the filing of plans and the work to be shown on plans, see subchapter one of this chapter.

§[1600.5] 27-900 Permits.-For the requirements governing application for building permits and plumbing permits, see subchapter one of this chapter.

§[1600.6] 27-901 General requirements.-Plumbing and gas piping shall be designed and installed so as to satisfy the following conditions and the requirements of reference standard RS-16:

(a) All occupied premises shall have potable water.- Every building intended for human habitation, occupancy, or use shall be provided with a supply of potable water.

(b) Sufficient water required.-Plumbing fixtures, devices, and appurtenances shall be supplied with water in sufficient volume and at pressures adequate to enable them to function properly. The pipes conveying the water shall be of sufficient size to provide the water required without undue pressure reduction and without undue noise under all normal conditions of use.

(c) Water conservation.-Plumbing shall be designed and adjusted to use the minimum quantity of water

consistent with proper performance and cleansing of the fixture or plumbing appurtenance.

(d) Safeguarding against explosion.-Devices for heating and storing water shall be designed, installed, and maintained to guard against rupture of the containing vessel through overheating.

* **(e) Connection to public water supply systems and to sanitary or combined sewer systems.**

* ***Local Law 65-1996; For Excerpts from Local Law 7 of 1974, see end of Subchapter 1.***

(1) GENERAL.-

a. The water distribution system and system for conveying sewage from any building in which plumbing fixtures are installed shall be connected, respectively, to a public water main and a sanitary or combined sewer if either or both are available and, regarding the sewer, if the department determines that connection thereto is feasible. The department shall determine that connection is feasible if :

1. the sewer is of adequate capacity to receive all sewage flowing from the building;

2. the sewer is in adequate physical condition to receive such sewage;

3. no physical obstacles exist between the boundaries of the lot or tract of land on which the building is located and the sewer, which would make connection to the sewer impracticable;

4. the elevation of the sewer in relation to the lot or tract of land on which the building is located is such that conveyance of the sewage from the building to the sewer is not impracticable;

5. the sewer is located in the same drainage area as all or most of the lot or tract of land on which the building is located; and

6. no other factor reasonably related to the conveyance of sewage from the building to the sewer would make such connection impracticable or undesirable as a proper means of sewage disposal.

b. Where a public water main is not available, an individual potable water supply shall be provided, and where neither a sanitary nor a combined sewer is available to which the department determines that connection is feasible, a private sewer or private sewage disposal system shall be provided. All such private systems shall be provided subject to the approval of the commissioner and of any other agency or agencies having jurisdiction, and constructed in accordance with the requirements of reference standard RS-16 and, with respect to the construction of individual on site private sewage disposal systems, in accordance with the specifications and standards prescribed by the commissioner, in consultation with the commissioner of environmental protection, pursuant to section six hundred forty three of the charter.

c. Extensions of public sewers and water mains shall be made in accordance with the regulations of the department of environmental protection.

(2) SYSTEMS AVAILABLE.-

a. A public water main, and a sanitary or combined sewer for the purpose of conveying sewage, shall be deemed available to a building in which plumbing fixtures are installed, except to a one- or two-family dwelling, if a property line of such building is within five hundred feet (measured along a street, alley, or right-of-way) of the public water supply system or the sewer. The connection shall be made in accordance with the applicable standards of the department of environmental protection.

b. A public water supply system, and a sanitary or combined sewer for the purpose of conveying sewage, shall be deemed available to a one- and two-family dwelling if a property line of such dwelling is within one hundred feet (measured along a street, alley, or right-of-way) of the public water supply system or the sewer. The connection shall be made in accordance with the applicable standards of the department of environmental protection.

c. Where two or more one- or two-family dwellings are to be constructed on a tract of land, or where a substantial improvement of any other type of building or buildings is contemplated on a tract of land, the public water supply system and/or the sanitary or combined sewer may be declared available thereto by the agencies having jurisdiction thereon even though the distances specified in subparagraphs (a) and (b) of this paragraph are exceeded.

(f) Well water systems.-No well or individual water supply may be installed for any purpose without the approval of the commissioner and of the department of health and the department of environmental protection.

(g) Design and maintenance of system for conveying sewage from building.-The system for conveying sewage from the building shall be designed, constructed and maintained to guard against fouling, deposit of solids, and clogging, and shall be provided with adequate cleanouts so arranged that the pipes may be readily cleaned.

(h) Exclusion of certain substances from the plumbing system.-

(1) DETRIMENTAL OR DANGEROUS MATERIAL.-No person shall deposit, by any means, any of the following into the building drainage system or sewer: ashes, cinders, rags, flammable, poisonous, or explosive liquids, gases, oils, grease, or any other material that could obstruct, damage, or overload such system, or that could interfere with the normal operation of the sewage treatment processes.

(2) INDUSTRIAL WASTES.-Wastes from hospitals, chemical plants, laundries, abattoirs, or any other industrial wastes that could be detrimental to the public sewer or public health, shall be treated before such

wastes are discharged into the public sewer. At the time of the filing of plumbing plans for any hospital, chemical plant, laundry, abattoir, or any other industrial structure, a statement shall be filed with the commissioner indicating the substances, ingredients, or matter, that will be discharged into the sewer, together with written approval of the department of environmental protection for the method of treatment of said substance, ingredient or matter, before it is discharged into the public sewer.

(i) Prevention of Contamination.-Plumbing fixtures, devices, and appliances shall be provided with adequate protection to prevent contamination of food, water, sterile goods, and similar materials by backflow of sewage. The fixture, device, or appliance shall be connected indirectly with the building drainage system when necessary.

(j) Drainage below street level.-The drainage of all sanitary and storm water below the crown level of the street sewer, or below a level where backflow from the street sewer is possible, shall be conveyed to a sewage ejector and/or sump through a system of sub-house drains, and lifted into the street sewer or disposal system.

****(k) Disposal of storm water**.-Storm water falling or coming to rest on property on which new buildings or substantial horizontal enlargements are to be constructed, and on all streets and other paved areas constructed or altered in connection with the construction of such new buildings or substantial horizontal enlargements, shall be disposed of in accordance with the requirements of reference standard RS-16 and the rules and regulations of the department of environmental protection. No person providing a system for disposing of storm water, as required by this subdivision, shall in any way alter, relocate or affect any existing drainage system on the property, except in accordance with the provisions of section 19-146 of title nineteen of the administrative code. Except as otherwise permitted by this code, no person shall perform land contour work, as defined in section 19-146 of this code, which work causes storm water to flow across sidewalks or onto an adjacent property. For purposes of this subdivision, the term "substantial horizontal enlargement" shall have the meaning given such term in subdivision (a) of section P110.2 of reference standard RS-16.

** *Local Law 103-1989.*

(l) Required plumbing fixtures.-Every dwelling unit in buildings classified in occupancy groups J-2 and J-3 shall have at least one water closet, one lavatory, one kitchen-type sink, and one bathtub or shower. All other buildings shall be equipped with the number and types of plumbing fixtures required by reference standard RS-16.

(m) Smooth surfaces required.-Plumbing fixtures shall be made of smooth, nonabsorbent material and shall be free from fouling surfaces.

(n) Location of fixtures.-

(1) LIGHT AND VENTILATION.-For light and ventilation requirements of rooms or spaces containing plumbing fixtures, see subchapter twelve of this chapter.

(2) LOCATION.-Piping, fixtures, or equipment shall be located so as not to interfere with the normal operation of windows, or doors and other exit openings.

(3) ACCESSIBILITY.-Plumbing fixtures shall be located so that they are readily accessible to the users.

(o) Liquid-seal traps required.-Each fixture directly connected to the drainage system shall be equipped with a liquid-seal trap, except as otherwise provided in this subchapter. The drainage system shall be designed to provide adequate air circulation in all pipes with no danger of siphonage, aspiration, or forcing of trap seals under conditions of ordinary use.

(p) Exhausting of foul air to outside.-Each vent terminal shall extend to the outdoor air and be located and installed so as to minimize the possibility of clogging and the return of foul air to the building.

(q) Materials and workmanship.-All materials and equipment used in the plumbing and gas systems shall be free from defects, and shall be designed, constructed, and installed so as to give satisfactory service for their expected life.

(r) Condemned equipment.-Any plumbing materials or equipment condemned by the commissioner because of wear, damage, defects, or sanitary hazards shall not be used or re-used for plumbing purposes.

(s) Prevention of sewer flooding.-Where a plumbing drainage system is subject to backflow of sewage from the public sewer, suitable provision shall be made to prevent its overflow in the building.

(t) Test of plumbing system.-The plumbing system shall be subjected to such tests as will readily disclose all leaks and defects in the work or in the material used.

(u) Proper maintenance.-Plumbing systems shall be maintained in a safe and serviceable condition from the standpoint of both operation and health.

(v) Protection of ground and surface water.-Sewage or other waste shall not be discharged into surface or subsurface water unless it has been discharged by a method subject to the approval of the commissioner and of the department of health and the department of environmental protection.

(w) Weather protection.-Water service piping shall be installed at least four feet below exterior grade, and building house sewers shall be installed at least three feet below exterior grade. Plumbing piping in exterior building walls shall be adequately protected against freezing by insulation or heat, or by both.

(x) Structural safety.-The structural safety of a

building shall not be affected or impaired in any way as a result of the installation, alteration, renovation, or replacement of a plumbing system or any part thereof. See subchapters nine, ten, eleven and nineteen of this chapter.

(y) Strains and stresses in pipes.-Piping shall be installed so as to prevent strains and stresses that would exceed the structural limitations of the pipe and so as to prevent deflection or deformation that would cause the system to malfunction. Provision shall be made for expansion and contraction and for structural settlement that might affect the piping.

(z) Installation limitations.-

(1) ELEVATOR SHAFTS.-No piping shall be installed in any elevator or counterweight hoistway.

(2) FIRE RATED CONSTRUCTION.-No plumbing or gas piping shall be installed in any construction required to have a fire resistance rating except in accordance with the provisions of subchapter five of this chapter.

(3) STAIR ENCLOSURES.-No piping of any kind, with the exception of piping required or permitted under subchapter seventeen of this chapter, shall be permitted within a stair enclosure.

(aa) Special flood hazard restrictions.-Within special flood areas and below the regulatory flood datum as described in article ten of subchapter four of this chapter, plumbing installations shall comply with the applicable provisions of reference standard RS 4-5.

***§[1600.7] 27-902 Use of nonconforming material or equipment**.-

(a) No person shall use or install any new or used plumbing material or equipment, unless it complies with the requirements set forth in this subchapter and reference standard RS-16.

(b) No person shall use any portable equipment that utilizes mercury to test the pressure of gas piping, drainage or vent systems.

Local Law 17-2001.

§[1600.8] 27-903 Fire protection.-Where pipes pass through construction required to have a fire-resistance rating, they shall comply with the requirement of section 27-343 of article five of subchapter five of this chapter.

§[1600.9] 27-904 Establishing gas supply.-It shall be unlawful for any utility company to supply gas to a building, place or premises in which new meters other than replacement are required until a certificate of approval of gas installation from the department of buildings is filed with such utility company. When new gas service piping has been installed it shall be locked-off by the utility either by locking the gas service line valve or by installing a locking device on the outside gas service line valve. The lock shall not be removed until the gas meter piping (other than utility owned) and gas distribution piping has been inspected and certified as required by the department of buildings as being ready for service.

§[1600.10] 27-905 Alterations to gas piping systems.-When alterations, extensions or repairs to existing gas meter piping or gas distribution piping requires the shut-off of gas flow to a building, the utility shall be notified by the owner or his or her authorized representative.

ARTICLE 2 WATER SUPPLY SYSTEMS

§[1601.1] 27-906 Public water supply.-

(a) Required capacity.-Where the required capacity of potable water supply is available from street water mains at the site, every building shall be supplied from such mains.

(b) Power pumps.-When power pumps are required in the water supply system of a building, they shall take their supply from the street water mains in the manner prescribed in reference standard RS-16.

§[1601.2] 27-907 Private water supply.-Every private source of potable water supply, other than a water supply company franchised by the city of New York, shall be subject to the approval of the commissioner; and every private source of non potable water supply shall be submitted to the commissioner for approval and recording.

§[1601.3] 27-908 Cross-connection of supplies and identification.-

(a) Cross-connection.-No person shall connect water piping supplied directly from street water mains to other sources; and no cross-connection shall be made between the potable water distribution system and any portion of waste or soil systems, or between the potable water distribution system and fixtures or devices that may contaminate, pollute, or otherwise render the water nonpotable.

(b) Identification.-Water supply systems not approved as potable shall be identified at each outlet with a warning sign stating that the water is unfit, and its use prohibited, for drinking purposes. Piping carrying potable water shall be identified and distinguished from water piping carrying nonpotable water by distinctive painting or markings as prescribed in reference standard RS-16.

(c) Construction.-The construction of water supply systems shall be in accordance with the requirements of reference standard RS-16.

ARTICLE 3 DRAINAGE SYSTEMS

***§[1602.1] 27-909 Permits**.-In addition to the permits required under provisions of subchapter one of this chapter, the following permits shall also be required.

(a) Permits for the installation of the building house sewer from the street line to, and including, the spur connection at the street sewer shall be obtained from the department of environmental protection, except that, in conjunction with the issuance of a permit for the construction or alteration of a structure within the curbline, the commissioner may issue a permit for connection with a sewer or drain.

(b) Permits for sidewalk and street openings shall be obtained from the department of transportation.

Local Law 65-1996.

***§[1602.2] 27-910 Individual sewage systems**. -[*sic*] (a) Where public sewers are deemed not available according to subdivision (e) of section 27-901 of article one of this subchapter, an individual on site private sewage disposal system shall be installed in accordance with the requirements of this subchapter. When public sewers are made available, the individual on site private sewage disposal system shall be abandoned in a manner prescribed by the commissioner, and the building house sewer shall be connected to the available public sewer within six months of the date of notification that the sewer has been accepted to receive flow by the agency or agencies having jurisdiction**.**

Local Law 65-1996.

§[1602.3] 27-911 Construction.-The construction of drainage systems shall be in accordance with the requirements of reference standard RS-16.

ARTICLE 4 HOSPITAL AND INSTITUTIONAL PLUMBING

§[1603.1] 27-912 Requirements.- Hospital and institutional plumbing shall be installed in accordance with all of the applicable requirements for plumbing and gas piping of this subchapter and in accordance with the specific modifications of reference standard RS-16.

ARTICLE 5 SWIMMING POOLS

§[1604.1] 27-913 Requirements.-All plumbing for swimming pools, including display pools and fountains, shall be installed in accordance with the requirements of this subchapter, the requirements of reference standard RS-16, and the requirements of the New York City health code.

§[1604.2] 27-914 Construction.-For requirements covering the general construction of swimming pools, the provisions of article sixteen* of subchapter seven of this chapter shall apply.

*** *As enacted; "fifteen" probably intended.***

§[1604.3] 27-915 Operation.-
No swimming pool regulated by the provisions of this code shall be operated without a permit from the department of health.

ARTICLE 6 EXISTING BUILDINGS AND INSTALLATIONS

§[1605.1] 27-916 General.-When alterations are made requiring the addition of two or more plumbing fixtures in an existing building, or when a building is remodeled for an extension in size or change in use in which plumbing, drainage, or gas piping work is involved, all the new work shall be made to conform to all the applicable sanitary requirements of this code and the affected portions of the system made adequate for the added load.

§[1605.2] 27-917 Existing soil and vent stacks.-

(a) When a new building is erected higher than an existing building, no operable windows or other wall openings shall be located closer than ten feet to an existing stack vent or vent stack on the lower building. Wherever necessary, the owner of the new building shall at his or her own expense and with the approval of the adjoining owner, offset the stack vent or vent stack to a distance ten feet or more from such windows or wall opening, or shall extend such stack vents or vent stacks to a height of at least three feet above the topmost opening.

(b) When the existing adjoining building is higher than the new building, all new soil, waste, or vent stacks of the new building shall be located at least ten feet from the common lot line, or shall be carried to a level above the higher existing roof, adequately supported and with the consent of the owners of both the new and existing structures.

§[1605.3] 27-918 Existing gas meter rooms.-Existing gas meter rooms shall comply with the provisions of section P 115.5(c) of the reference standard RS-16 no later than December first, nineteen hundred seventy-two.

ARTICLE 7 INSPECTION AND TESTS

***§[1606.1] 27-919 Inspection**.-Every new plumbing and gas piping system and every part of an existing system that has been altered, except for ordinary repairs, shall be inspected and tested to determine compliance with code requirements except that the

commissioner may promulgate rules authorizing a certification from a master plumber for minor work that was performed in accordance with applicable codes in lieu of the two day inspection notification requirement of section 27-920 of this article and the inspection reporting requirements of subdivision a of section 27-922 of this article. In no event shall such certification be allowed for any new installation, or any alteration to an existing gas piping system.

* ***Local Law 51-2001.***

§[1606.2] 27-920 Notification.-The holder of the plumbing permit shall give at least two days prior written notice to the commissioner that the plumbing work covered by the permit is ready for inspections and test.

§[1606.3] 27-921 Testing of plumbing and gas piping systems.-

(a) New, altered, extended, or repaired systems.-Every new plumbing and gas piping system and every part of an existing system that has been altered or repaired except for minor alterations and ordinary repairs, shall be tested as hereinafter prescribed to disclose leaks and defects. However, testing may be waived in the following cases:

(1) In any case that does not involve replacement, alteration, or relocation of any water supply, drainage, or vent piping.

(2) In any case where plumbing equipment may be set up temporarily for exhibition purposes.

(b) Representation at test.-

(1) Tests required by section 27-922 of this article shall be conducted in the presence of the commissioner or an authorized plumbing inspector of the department.

(2) The commissioner may also authorize such test to be witnessed by architects, engineers, master plumbers or representatives of utility companies, each of whom must be acceptable to the commissioner. Persons performing this function shall have had at least five (5) years experience in inspection and testing of gas piping systems, or hold a current master plumber's license. Such tests may be conducted without any verifying inspection or tests by members of the department, provided that verified statements and supporting inspectional and test reports are filed with the department within one working day of such tests.

(c) Exposure of work.-If any plumbing system or part thereof is enclosed before it has been inspected, tested, and accepted as prescribed in this subchapter, such system or part thereof shall be uncovered upon the direction of the commissioner.

(d) Retesting.-If, upon inspection and tests, any of the work fails to meet the test requirements, the necessary corrections shall be made before any reinspections or retests are conducted.

§[1606.4] 27-922 Requirements.-

(a) Drainage and vent systems.-

(1) ROUGH PLUMBING.-Except for outside leaders and perforated or open jointed drain tile (subsoil drains), the piping of plumbing drainage and venting systems shall be verified as to materials and shall be tested upon completion of the rough piping installation and proven to be watertight. The commissioner may require the removal of any cleanout plugs to ascertain that the prescribed pressure has been reached in all parts of the system.

a. Water Test.-A water test shall be applied to the drainage system either in its entirety or in sections after rough piping has been installed. If applied to the entire system, all openings in the piping, except the highest opening, shall be tightly closed and the system filled with water to the point of overflow. If the system is tested in sections, each opening, except the highest opening of the section under test, shall be tightly plugged and each section filled with water. No section shall be tested with less than a ten foot head of water. In testing successive sections, at least the upper ten feet of the following section shall be tested, so that no joint or pipe in the building (except the uppermost ten feet of the system) shall have been submitted to a test of less than ten foot head of water. The water shall be kept in the system or in the portion under test for a least fifteen minutes before inspection starts; the system shall then be tight at all points.

b. Air test.-An air test may be used only when permission for this type of test is obtained from the commissioner. The air test shall be made by attaching an air compressor testing apparatus to any suitable opening and, after closing all other inlets and outlets of the system, forcing air into the system until there is a uniform gauge pressure of * five psi. This pressure shall be held, without introducing additional air, for a period of at least fifteen minutes.

* ***Corrected by Local Law 17-2001.***

(2) FINISHED PLUMBING.-After the plumbing fixtures have been set and their traps filled with water, the entire drainage system shall be verified as to materials and shall be tested and proven gastight by either a smoke test or a peppermint test.

a. Smoke test.-The smoke test shall be made by filling all traps with water and then introducing into the entire system a pungent, thick smoke produced by one or more smoke machines. When the smoke appears at stack openings on the roof, these openings shall be closed and a pressure equivalent to a one inch water column shall be maintained for the period of the inspection.

b. Peppermint test.-The peppermint test shall be made by introducing two ounces of oil of peppermint into the roof vent terminal of every line or stack to be

tested. The oil of peppermint shall be followed at once by ten quarts of hot water (one hundred sixty degrees Fahrenheit or higher), whereupon all roof vent terminals shall be sealed. The detection of the odor of peppermint at any trap or other point in the system shall determine the location of any leaks. Persons who have come in contact with oil of peppermint shall be excluded from the test area.

(b) Building house sewer.-The building house sewer shall be tested by inserting a test plug at the point of connection with the street sewer before such connection is made. The building house sewer shall then be filled with water under a head of at least ten feet. The water level at the top of the test head of water shall not drop for at least fifteen minutes.

(c) Water systems.-Upon completion of a section of a water system or of the entire water system, the completed section or system shall be verified as to materials, and shall be tested and proven tight under a water pressure of at least twenty-five percent greater than the working pressure under which it is to be used. The water used for tests shall be obtained from a potable source of supply.

* **(d) Gas piping systems**.-Upon completion of the installation of a section of a gas system or of the entire gas system, and before appliances are connected thereto, the completed section or system shall be verified as to materials, and tested and proven tight as follows:

(1) Gas distribution piping:-

**a. Distribution pressures up to one-half psig. The completed piping is to be tested with a non-mercury gauge at a pressure of three pounds per square inch gauge (psig) for a minimum of thirty minutes.

b. Distribution pressures over one-half psig through three psig. The completed piping is to be tested at fifty psig for a minimum of thirty minutes.

c. Distribution pressures over three psig through fifteen psig. The completed piping is to be tested at one hundred psig for a minimum of one hour.

d. Distribution pressures above fifteen psig. The completed piping is to be tested to twice the maximum allowable operating pressure, but not less than one hundred psig, for a minimum of one hour.

(2) Meter piping shall be pressure tested in accordance with the requirements of the serving utility. These requirements shall be either the same as those for testing distribution piping in paragraph one of this subdivision, or if different, the piping shall be certified by the local utility as being tested in compliance with their requirements.

(3) Notwithstanding the above, all coated or wrapped pipe shall be pressure tested at a minimum of ninety psig.

For testing, the piping shall be filled with air or an inert gas, and the source of pressure shall be isolated before the pressure readings are made. All test duration time periods are to be measured after stabilization of testing medium. Fresh water may be used as the test medium only where the required test pressure exceeds one hundred psig.

**(4) The commissioner shall publish a list of non-mercury gauges certified by a nationally recognized testing lab or promulgate rules with standards for non-mercury gauges within one hundred and twenty days of the effective date of this paragraph.

Local Law 18-1992.

****Local Law 17-2001 .***

(e) Other piping systems.-All other piping systems shall be tested in accordance with the requirements prescribed in reference standard RS-16.

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SUBCHAPTER 17
FIRE ALARM, DETECTION AND EXTINGUISHING EQUIPMENT

TABLE OF CONTENTS

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****"27" omitted from section numbers in this column.***

LIST OF TABLES

ARTICLE 1 GENERAL

§[1700.1] 27-923 Scope.-The provisions of this subchapter shall establish and control the minimum requirements for the design and installation of standpipe, sprinkler, fire alarm, and fire detection systems except for fire alarm systems in factory and mercantile buildings and where specific exemption is made in this code. Alterations or additions to existing systems shall comply with the requirements of this subchapter regardless of magnitude or cost.

§[1700.2] 27-924 Standards.-The provisions of reference standard RS-17 shall be part of this subchapter.

§[1700.3] 27-925 Definitions.-For definitions to be used in the interpretation of this subchapter, see subchapter two of this chapter.

§[1700.4] 27-926 Plans.-For the requirements governing the filing of plans and the work to be shown on plans, see subchapter one of this chapter.

§[1700.5] 27-927 Permits.-For the requirements governing equipment work permits, equipment use permits, see subchapter one of this chapter.

§[1700.6] 27-928 General requirements.-All systems of standpipes, sprinklers, fire alarms, and fire detectors and all component devices thereof, as required by this subchapter specifically and by subchapters four, five, seven and eight of this chapter shall be installed in accordance with the provisions of this subchapter.

§[1700.7] *27-929 Retroactive requirements.-The provisions of this subchapter shall apply retroactively for the specific occupancies indicated in subdivisions (j) and (s) of section 27-954 and paragraph ten of subdivision (a) of section 27-968 of this subchapter. An application noting compliance shall be required to be filed on or before April thirteenth, nineteen hundred seventy-nine; and installation shall be required on or before January thirteenth, nineteen hundred eighty, except as otherwise provided in this code.

* ***Local Law 16-1987***

(a) The provisions of this article shall apply retroactively for the specific occupancies and spaces indicated in subdivisions (v), (w), and (y) of section 27-954 and subdivision (j) of section 27-972. Installation of all systems required by these sections shall be completed on or before April first, nineteen hundred eighty-seven.

*(b) Notwithstanding the provisions in subdivision a of this section, an application for a permit and approval of plans for the installation of fire alarm and signal systems as required under the provisions of article five of this subchapter in buildings classified in occupancy group J-1 shall be filed with the department on or before June thirtieth, nineteen hundred eighty-seven and such installation shall be completed on or before December thirty-first, nineteen hundred eighty-seven.

*(c) Notwithstanding any other provision of this subchapter, the requirement to install a system of automatic sprinklers shall apply retroactively to any space in a basement, cellar or other location below grade subject to the provisions of subdivision aa of section 27-954 of this code. Installation of such system of automatic spriklers shall be completed on or before April thirtienth, two thousand four.

Local Law 16-1987.

ARTICLE 2 EXISTING BUILDINGS-FIRE EXTINGUISHING EQUIPMENT

§[1701.1] 27-930 Existing standpipes.-Standpipe systems existing on December sixth, nineteen hundred sixty-eight, shall not be required to be altered to conform to the provisions of this subchapter, except as follows:

(a) The existing installation shall meet the following minimum requirements:

(1) WATER SUPPLIES.-There shall be a reserve of at least two thousand five hundred gallons of water in a gravity or pressure tank for exclusive use of the standpipe; or there shall be a direct connection to a city main meeting the requirements of section 27-945 of article three of this subchapter.

(2) GRAVITY TANKS.-The gravity tank or tanks shall be filled by direct city water connection or by an automatic fill pump at a rate of at least forty-five gpm; and the bottom of the tank shall be located at least eleven feet six inches above the highest hose outlet under the main roof.

(3) HOSE AND HOSE VALVES.-Hose and hose valves shall be in good serviceable condition. Hose valve wheel handles shall be within six feet six inches of the floors or stair landings or the wheel handle may be within two feet horizontally from a stair tread and no more than six feet six inches vertically above the tread. Such hose may be omitted from hose racks in existing buildings in occupancy group J-2 provided that the provisions of paragraph five of subdivision (c) of section 27-942 of article three of this subchapter are complied with.

(4) FIRE DEPARTMENT CONNECTIONS.-
There shall be a three inch by three inch siamese hose connection with approved caps, painted red. The word "Standpipe" shall be cast in the body of the siamese connection or on metal plates that are secured to the riser or to the face of the building behind the siamese connection.

(5) NOZZLES.-A five-eighths inch smooth bore nozzle with two and one-half inch hose shall be provided where the hydrostatic pressure at the hose valve is less than ten psig.

(6) PROTECTION FROM FREEZING.-All parts

of the standpipe system that are exposed to freezing shall be protected in accordance with the requirements of subdivision (a) of section 27-949 of article three of this subchapter.

(7) PRESSURE REDUCING VALVES.-Pressure reducing valves shall be provided as required by section 27-944 of article three of this subchapter.

(8) DRIP VALVES.-Drip valves shall be provided between the siamese connection and the check valve.

(b) When the building requires additional standpipe protection because of extension in height or in area, or the occupancy is changed to a use requiring additional protection, the new or altered part of the system shall comply with this subchapter.

§[1701.2] 27-931 Existing Sprinklers.-

(a) Required sprinklers.-Sprinkler systems and devices existing on December sixth, nineteen hundred sixty-eight shall not be required to be altered to conform to the provisions of this subchapter, except that when additional protection is required for a change in occupancy or for a building addition, the new or altered part of the system shall comply with this subchapter. Sprinklers in any extension or alteration shall be connected to, or extended from, the existing system or a separate water supply as provided in section 27-962 of article four of this subchapter. Additional heads shall not be connected to existing undersized piping.

(b) Voluntary sprinklers.-Sprinkler systems and devices existing on December sixth, nineteen hundred sixty-eight, but which are not required by this code, need not conform to the provisions of this subchapter, except that when a siamese hose connection is installed in the system, the siamese connection shall be installed and the entire system pressure tested as required by this subchapter.

ARTICLE 3 STANDPIPE REQUIREMENTS

§[1702.1] 27-932 When required.-

(a) Wet standpipe systems shall be installed:

(1) In all buildings or portions thereof exceeding six stories or seventy-five feet in height, except that open parking structures shall not require installation of a wet standpipe system unless they exceed ten parking levels or seventy-five feet in height.

(2) In all portions of buildings two or more stories in height that have a floor area of ten thousand square feet or more on any floor.

(b) Where standpipes are required by the height and area limitations of (a) of this section, a non-automatic or automatic dry standpipe system may be installed in lieu of the wet standpipe in all buildings classified in occupancy group G not over six stories or seventy-five feet in height. A dry standpipe system shall be installed in all open parking structures which exceed three parking levels and contain not more than ten parking levels.

(c) A standpipe system shall be installed in all buildings exceeding three stories in height that have an area exceeding seven thousand five hundred square feet on any floor and where a standpipe system is not otherwise required by the provisions of this subchapter. A non-automatic or automatic dry system may be used in lieu of the wet standpipe.

(d) The following buildings shall be exempt from the provisions of subdivisions (a), (b) and (c) of this section:

(1) Buildings classified in occupancy groups F, G, H, and J that do not exceed two stories or thirty feet in height and an area of twenty thousand square feet on any floor and are provided with hand or portable fire extinguishers as required by the fire department.

(2) Buildings classified in occupancy groups E, F, G, H, and J that require a wet standpipe as provided in paragraph two of subdivision (a) and subdivision (c) of this section but not exceeding six stories or seventy-five feet in height and that are equipped throughout with an automatic wet or dry sprinkler system connected to a central supervisory station, and such system complies with the provision of this subchapter.

§[1702.2] 27-933 Yard hydrant systems required.-Outdoor amusement and exhibition places, oil storage plants, lumber yards, trailer camps, industrial parks, and similar occupancies shall have yard hydrants installed so that the entire area may be reached by two hundred fifty feet of hose from a yard hydrant or a street hydrant. Single hydrant connection shall be at least in six inch I.P.S. Such hydrants shall be directly connected with city water main or private water main, or supplied from gravity tanks or pressure tanks, as provided in this subchapter.

(a) Where the area of such enclosure is more than forty thousand square feet and where the available city water service is less than that specified in paragraph one of subdivision (b) of section 27-945 of this article, the yard hydrant system shall be supplied as follows:

(1) A gravity tank of at least fifty thousand gallon capacity shall be provided and elevated so that the bottom of the tank is at least seventy-five feet above the highest grade elevation and at least twenty-five feet above the highest building in the area supplied by this tank.

(2) In lieu of paragraph one of this subdivision, there shall be provided a manual fire pump with a capacity of at least one thousand gpm, and a suction tank of at least fifty thousand gallon capacity. The suction tank shall be supplied through a six inch connection to the city water main controlled by an automatic ball float valve in the suction tank. A bypass shall be provided so that the pump may be fed directly from the city water main.

(3) The pump shall be located in a pump house at the street main side of the area or enclosure.

(4) Suction from a river or well may be permitted by the commissioner if the required quantity of reasonably clean fresh water may be obtained thereby, subject to the approvals of such other authorities as may have jurisdiction over the primary source of supply.

(b) The maximum distance between hydrants shall be two hundred fifty feet. At each yard hydrant, two hundred fifty feet of rubber lined hose, with a smooth bore of one and one-eighth inch approved play-pipe, shall be placed in a hose house painted red, and the words "Fire Hose" in six inch white letters shall be painted on the door.

(c) The approval of the fire department shall be obtained for location of any monitor nozzles that may be required in addition to yard hydrants. Not more than one monitor nozzle with remote control will be required for each forty thousand square feet of area or fraction thereof unless, in the fire department's opinion, an unusual hazard exists.

(d) Standpipes and sprinkler systems may be connected to a yard hydrant system in accordance with the requirements of this subchapter.

(e) Yard hydrant systems connected to city water mains shall be provided with post indicator valves located in an accessible position. Post indicator valves shall be locked open and be painted red.

(f) Fire extinguishing equipment, in addition to that prescribed by this section, shall be provided in accordance with requirements of chapter four of this title for oil storage plants, oil refineries, and other plants deemed by the fire commissioner to present unusual fire hazards, and also in rooms or spaces housing electrical equipment when such fire extinguishing equipment is deemed necessary.

§[1702.3] 27-934 Standpipe systems in structures being erected or demolished.-

(a) During construction or demolition of any structure for which a standpipe system is required, provision shall be made for the use of such standpipe by the fire department in accordance with the provisions of section 27-1014 of article one of subchapter nineteen and this subchapter.

(b) Temporary risers shall be at least four inches in diameter for structures less than four hundred fifty feet high and at least six inches in diameter for structures four hundred fifty feet high or more. There shall be as many risers as will be, or were, required for the permanent system. Each such riser shall be connected to a cross connection that is supplied through siamese hose connections at the street level, and shall be equipped on each floor with a two and one-half inch hose outlet valve. The installations shall be made so that each riser, cross-connection, and branch line can be plugged or capped when work is not being done on the system. The location of the siamese hose connection shall be placarded, kept free from obstruction, and identified by a red light.

§[1702.4] 27-935 Number of standpipe risers required.- The number of standpipe risers shall be such that every point of every floor can be reached by a twenty foot stream from a nozzle attached to not more than one hundred twenty-five feet of hose connected to a riser outlet valve.

§[1702.5] 27-936 Location of standpipe risers.-

(a) Standpipe risers and two and one-half inch angle hose valves shall be located within stairway enclosures. For additional requirements see section 27-343 of article five of subchapter five and subdivision (j) of section 27-375 of article five of subchapter six of this chapter. When stairway enclosures are not available within the distance limitations of section 27-935 of this article, the standpipe risers and two and one-half inch angle hose valves shall be located as near to the enclosure as practicable, subject to the approval of the commissioner. A metal sign with one inch lettering indicating the location of the outlet shall be provided in the stair enclosure on each floor where the riser is not located in the enclosure.

(b) No standpipe riser shall be placed in any shaft containing a gas or fuel pipeline.

§[1702.6] 27-937 Omission of standpipe service.-

(a) Standpipe outlets may be omitted in portions of first floors or basements that are completely separated from the entrance hall or enclosed stairways leading to the upper floors, provided portable fire extinguishers are installed, subject to the approval of the commissioner.

(b) Standpipe protection shall be omitted from transformer vaults, high-tension switchboard rooms, and other locations where the use of hose streams would be hazardous. Any space or room that houses equipment of such nature that the use of water would be ineffective in fighting the fire, or would be hazardous, shall have a conspicuous metal sign on each door opening on such space or room stating the nature of the use and the warning: "Use Npo Water."

§[1702.7] 27-938 Size of standpipe risers.-The size of standpipe risers shall be in accordance with Table 17-1.

TABLE 17-1 SIZE OF STANDPIPE RISERS

Height[1]	Minimum Riser Size Required (I.P.S.)
150 ft. or less……..	4 in.
Greater than 150 ft……..	6 in.

Note for Table 17-1:

[1] The height shall be that of the individual riser to the highest hose outlet (not including manifold outlets) from the level of the entrance floor at street level at which the riser begins.

§[1702.8] 27-939 Devices used in system.-No device, valve, pipe, or fitting may be used in a standpipe system unless such device, valve, pipe, or fitting has been accepted or approved in accordance with the provisions of section 27-135 of article eight of subchapter one of this chapter.

§[1702.9] 27-940 Siamese connections required.-Siamese connections shall be provided as follows:

(a) One siamese connection shall be provided for each three hundred feet of exterior building wall or fraction thereof facing upon each street or public space.

(b) Where buildings face upon two parallel streets or public spaces without an intersecting street or public space, one siamese shall be provided for each three hundred feet of exterior building wall or fraction thereof facing upon each such parallel street or public space.

(c) Where a building faces upon two intersecting streets or public spaces and the total length of the exterior building walls facing upon such streets or public spaces does not exceed three hundred feet only one siamese connection need be installed provided the siamese connection is located within fifteen feet of the corner and on the longer street.

(d) Where a building faces on three streets or public spaces, one siamese connection shall be provided for each three hundred feet of building wall or fraction thereof facing upon such streets or public spaces provided that at least one siamese connection is installed on each of the parallel streets or public spaces, and further provided that the siamese connections shall be located so that the distance between them does not exceed three hundred feet.

(e) Where a building faces upon four streets or public spaces, at least one siamese connection shall be provided on each street front or public space; however, only one siamese connection need be provided at the corner of two intersecting streets or public spaces if the siamese connection is located within fifteen feet of the corner and on the longer street or public space, and if the distances between siamese connections, in all cases, does not exceed three hundred feet.

(f) In any case where the exterior building walls of a building facing a street or public space is obstructed in part by another building, one siamese connection shall be provided for each clear three hundred feet of exterior building wall or fraction thereof facing upon such street or public space.

§[1702.10] 27-941 Cross connections.-

(a) Standpipe systems that include more than one riser shall have all risers cross-connected at, or below, the street entrance floor level, except as otherwise provided in this section.

(b) Standpipe systems in buildings required by the provisions of section 27-943 of this article to have one or more zones shall be so designed and installed that the risers supplied from each zone will be cross-connected below, or in, the story of the lowest hose outlets from the water source in each zone. Horizontal intermediate check valves shall be installed in the run of each riser continuing into a higher zone in such manner as to permit all upper zones of the system to be fed through one riser from the zone below and to prevent any lower zone of the system from being supplied from a zone above.

(c) Risers supplied by an upper level cross connection shall be provided with manual control valves or remote control valves, so arranged that risers supplied by the upper level cross connections may independently be shut off from the tank supplies.

(d) Cross connections shall be at least as large as the largest riser supplied by the cross connection. However, when supplying two, but not more than four four inch risers, the cross connection shall not be less than five inches. The cross connection shall not be less than six inches for all other riser combinations.

(e) Where there is no cellar, cross connections may be hung from the ceiling of the lowest story.

(f) Each siamese connection shall be connected to a riser or to a cross connection connecting other siamese hose connections or risers. The pipe from the siamese connection to the riser or cross connection shall be five inch I.P.S., except that a four inch pipe shall be sufficient when such pipe supplies a single four inch riser system. The pipe from the siamese connection shall be run as directly as practicable to the riser or cross connection.

§[1702.11] 27-942 Hose stations.-

(a) Hose outlet valves.-

(1) At the riser on each floor served by the riser and on the entrance floor above the riser control valve, a two and one-half inch hose outlet valve shall be provided for fire department use. Such hose outlet valve shall be readily accessible from a stairway landing or from a floor, and shall be located between five feet and six feet above the landing or floor.

(2) At the top of the highest riser, there shall be provided above the main roof level, a three-way manifold equipped with three two and one-half inch hose valves with hose valve caps. Where the manifold is located other than within a heated stair enclosure or bulkhead, the control valve shall be located in a horizontal run of piping below the roof.

(b) Location.-Hose stations shall be located at the standpipe risers located either within a stair enclosure or adjacent to the entrance to such enclosure as provided in section 27-936 of this article. When the

hose station is located outside the stair enclosure and the riser is within the stair enclosure, it shall be known as and referred to as "Auxiliary Hose Station."

(1) Hose stations shall be located so that every point in the floor area served by the hose station is within twenty feet of the end of the hose nozzle with the hose in its extended position. The maximum length of hose that shall be permitted at any hose station is one hundred twenty-five feet.

(c) Size, type and quality of hose.-Hose shall be provided on hose racks at each hose station as follows:

(1) Hose shall be one and one-half inch "flax-line" unlined linen hose or equivalent, factory coupled, in occupancy groups C, E, F, G, H, and J.

(2) Hose shall be two and one-half inch cotton rubber-line, or rubber hose or equivalent, factory coupled, in occupancy group A.

(3) Hose shall be two and one-half inch "flax-line" unlined linen hose or equivalent, factory coupled, for occupancy groups other than those in paragraphs one and two of this subdivision.

(4) Hose for auxiliary hose stations shall be one and one-half inch "flax-line" unlined hose or equivalent.

(5) Hose lines shall be made up of fifty foot factory coupled hose except that required hose lengths of less than fifty feet shall be in one section of the required length. Only one length less than fifty feet will be permitted where hose length is not of equal fifty foot increments, and no length shall be less than twenty-five feet.

(6) Hose may be omitted from hose racks in occupancy groups J-1 and J-2 whenever at least three open nozzles, two one and one-half inch, and two two and one-half inch spanner wrenches, two two and one-half by one and one-half inch non-swivel reducing couplings and three hundred seventy-five feet of one and one-half inch hose are stored and maintained in a locked cabinet located on the main entrance floor in a location near the standpipe riser enclosure subject to the approval of the commissioner, and hose valves are capped with a hose valve cap fastened to the valve with a chain. The person responsible for the maintenance of the standpipe system shall maintain on the premises a key for unlocking the storage cabinet. The key shall be kept in a location where it is readily available to authorized persons, but not available to the general public. A sign shall be placed on the storage cabinet indicating the location of the key. An additional labelled key shall be kept in a locked receptacle near the storage cabinet openable by a fire department standard key. Such receptacle shall be marked "For Fire Department Use Only." A metal sign shall be placed in each stair enclosure on the main entrance floor stating clearly where the storage cabinet is located.

(7) Hose may be omitted from hose racks for non-automatic dry standpipe systems provided that the hose outlet valves are capped with hose valve caps which are chained to the valves.

(d) Auxiliary hose stations.-

(1) Auxiliary hose stations may be installed in those occupancies where one and one-half inch hose is permitted as specified in subdivision (c) of this section.

(2) When auxiliary hose stations are installed, the required two and one-half inch hose valve at the riser shall be installed and the valve shall be equipped with a cap fastened to the valve with a chain.

§[1702.12] 27-943 Maximum pressures.-The standpipe system shall be zoned by the use of gravity tanks, automatic fire pumps, pressure tanks, and street pressure so that the maximum pressure at the inlet of any hose valve in the zone does not exceed one hundred sixty psig.

§[1702.13] 27-944 Pressure reducing valves.-

(a) When the normal hydrostatic pressure at a two and one-half inch hose outlet valve exceeds fifty-five psig, each valve shall be equipped with an adjustable type pressure reducer so that the pressure on the down-stream side will not exceed fifty psig when the discharge is at the rate of two hundred gpm from a one inch orifice nozzle attached to one hundred feet of two and one-half inch unlined hose.

(b) At one and one-half inch hose stations, an adjustable type of pressure reducer shall be provided on each hose outlet valve where the hydrostatic pressure exceeds eighty-five psig and shall be so adjusted that the pressure on the downstream side will not exceed eighty psig when seventy gpm is discharged from a one-half inch orifice nozzle attached to the length of hose to be provided at the hose station.

(c) The pressure reducing valve shall be permanently marked with the address of the premises in which it is installed and with the floor location and the setting for the location at which it is to be used.

§[1702.14] 27-945 Water supply for standpipe systems.-

(a) Primary water supply for standpipe systems.-Every standpipe system except nonautomatic dry standpipe systems shall have a primary water supply available at all times at every hose outlet, or made available automatically when the hose valve at any outlet is opened. Such primary water supply may be from one or more gravity tanks, from a pressure tank or tanks, from a direct connection to a city water main, from a connection to a private water main, or from an automatic fire pump.

(b) Method of providing water supply for standpipe systems.-Combinations of two or more of the following methods shall be used; in using such

combinations, the siamese connections shall be considered as a source of supply.

(1) Direct connections of standpipes to the city water system provided one of the following conditions is met:

a. A statement furnished by the bureau of water supply of the department of environmental protection indicates a pressure in the street main that is capable of maintaining a static pressure of at least fifteen psig. at the highest hose outlet between the hours of eight a.m. and five p.m. on a normal working day when a street level fire hydrant within two hundred fifty feet of the building is supplied from the same street main and is discharging at least five hundred gpm through a two and one-half inch hydrant butt.

b. For buildings forty feet or less in height with an area of not more than twenty thousand square feet per floor, there is a four inch direct connection to the street main that is fed two ways or there is a four inch direct connection to each of two street mains on two street fronts so installed that shutting off one service will not interfere with the supply of the other, and there is sufficient pressure in the street main to maintain a minimum static pressure of twenty-five psig. at the highest required hose outlet and the department of environmental protection states that the required street pressure is available.

(2) A private yard main when meeting the conditions of a direct water connection to the city water system.

(3) Gravity tanks provided:

a. The minimum quantity of water reserved for standpipe service is thirty-five hundred gallons in each standpipe zone.

b. The bottom of the tank shall be at least twenty-five feet above the highest hose outlet that such tank supplies, (except the roof manifold) and those hose outlets in a penthouse enclosing mechanical equipment, except as otherwise provided in subparagraph e of this paragraph.

c. Each zone of the standpipe system having three risers or more shall have a total fire reserve capacity of five thousand gallons or more from one or more gravity tanks for each zone.

d. Where a group of two or more buildings, connected or separated, is operated under a single control, a single gravity tank having a fire reserve capacity of at least five thousand gallons may be accepted as the primary water supply for the several standpipe systems of such group, provided a dead riser is carried from the bottom of the tank to an underground header or cross connection system and provided each building unit has a post indicator type control valve outside or an o.s. and y. control valve inside the building at a readily accessible location. The underground cross connection may not cross any public street without the approval of the city departments having jurisdiction.

e. Usable [*sic*] storage or office space on penthouse floors shall be provided with a riser outlet valve within the distances stated in section 27-935 of this article. In lieu of elevating the bottom of the gravity tank twenty-five feet above these outlets, an automatic fire pump with local supervisory alarms may be installed. The pump shall be capable of delivering two hundred fifty gpm. at a pressure of twenty-five psig. above the normal static pressure at the highest outlet supplied by the pump. The pump shall take suction from the gravity tank and be so arranged as to permit the siamese connection and any required manual fire pump to supply these outlets. No more than three stories of any penthouse or of penthouse and building stories combined, may be supplied by this method.

(4) Pressure tanks shall be acceptable as the primary supply to the system provided all of the following conditions are met:

a. A pressure tank, or tanks, so proportioned and located that a pressure of at least fifteen psig will be available at the nozzle of the highest required hose station, exclusive of roof outlets, when all the water has been discharged from the pressure tank.

b. The storage quantities stated for gravity tanks in subparagraphs a, c, and d of paragraph three of this subdivision are met and an additional volume equivalent to one-half of the required water storage space is provided for the required air.

c. An air compressor is provided with suitable automatic control and of sufficient capacity to build up air pressure of at least seventy-five psig. in the tank within three hours and to maintain thereafter an air pressure between seventy and eighty psig. The automatic control shall also maintain the proper air-to-water ratio in the pressure tank.

d. Pressure tanks shall be supplied with water through a fixed pipe, independent of the standpipe riser and at least two inches in size. The water supply and connection shall be capable of supplying the tank at a rate of at least sixty-five gpm without reducing the pressure in the tank. The tank shall have a fixed water level plate on the end opposite the gauge glass, or other equivalent indicating device.

(5) An automatic fire pump shall be acceptable as the primary supply to the system provided:

. a. The building is three hundred feet high or less, or if the building is higher than three hundred feet, the automatic fire pump is used only for the lower three hundred feet. The zones above three hundred feet shall be supplied by either a gravity tank conforming to paragraph three of subdivision (b) of this section or a pressure tank conforming to paragraph four of

subdivision (b) of this section and in addition shall be supplied by the manual fire pump required by section 27-946 of this article.

b. The automatic fire pump supplying the system or section has a capacity of at least five hundred gpm with a discharge pressure of at least twenty-five but not exceeding seventy psig (above the normal) static pressure at the highest hose outlet within the zone supplied by the pump plus the frictional resistance from the pump to the outlet at a flow of five hundred gpm.

c. The electrical power to the pump is connected to the street side of the building service switch.

(c) High and low risers and cross connections in standpipe systems.-When tanks are used for the primary water supply, the standpipe systems may use separate riser systems serving, respectively, low and high parts of the building. Separate gravity tanks or pressure tanks may supply each zone, but in every case the standpipe system shall be so designed that every hose outlet of the entire system can be supplied through the required cross connections from every siamese connection and from every manually operated fire pump located at or below the street level.

(d) Use of standpipe riser for sprinkler system water supply.-Standpipe risers may be used to supply water to sprinklers in buildings classified in occupancy group E, one hundred feet or more in height, and in existing office buildings, one hundred feet or more in height, in accordance with applicable provisions of this subchapter and reference standards RS 17-1 and RS 17-2.

§[1702.15] 27-946 Fire pumps.-

(a) Additional water supply.-Additional water supply shall be provided for standpipes in buildings over three hundred feet high. The primary water supply to the standpipe system shall be supplemented by one or more manually operated fire pumps as follows:

(1) Standpipe systems in buildings more than three hundred feet high shall have at least one seven hundred fifty gpm pump or two five hundred gpm pumps. Pumps shall be capable of delivering their rated capacity at a pressure of fifty psig above the normal static pressure determined from the highest hose outlet (except the roof manifold) in the building plus the frictional resistance through the pipe from the pump to the outlet.

(2) Where a group of two or more buildings, whether connected or separated, are operated under a single ownership and one or more buildings exceed three hundred feet in height, one fire pump shall be accepted as the supplemental supply for the group. The pump shall be installed in the building where the maintenance personnel are located, and a metal sign with one inch lettering shall be installed in each building at all of the hose outlets on the entrance floor indicating the location of the fire pump.

(b) Standpipe pump rooms and location.-

(1) Fire pumps shall be installed at the entrance floor level or below, in rooms enclosed by noncombustible construction having a two hour fire-resistance rating and that are adequately heated, ventilated, lighted, and drained. The pump room shall have access to the street level by a direct opening to a street or a court, or by a passageway or stairway having a fire-resistance rating of at least two hours.

(2) No person shall install other machinery or mechanical equipment in a fire pump room, unless the building is of construction class IA, IB, or IC.

(3) No person shall place or install any equipment containing a refrigerant classified in groups I, II, and III in subchapter thirteen of this chapter, or place or install gas piping or gas consuming devices or any other equipment within any space housing a fire pump that would create a hazardous condition.

(c) Power supply for standpipe fire pumps.-The type of fire pump and prime mover used in a standpipe system shall be suitable for the required service in a standpipe system provided for fire department use. If the prime mover employs any form of power other than an electric current supplied by a public utility, the use thereof shall be subject to the approval of the commissioner. Electrical power to the motor shall be taken from the street side of the house service switch.

(d) Combined use of fire pumps for standpipe and automatic sprinkler systems.-A fire pump that furnishes the required auxiliary water supply either to a standpipe system or to an automatic sprinkler system shall be accepted as furnishing the corresponding water supply to the other system if such pump is in the same premises, provided that in every such case of combined use, suitable relief and shutoff valves shall be installed so as to prevent the water pressure on the automatic sprinkler system resulting from any required operation of the pump for the standpipe system from becoming greater than one hundred seventy-five psig.

§[1702.16] *27-947 Direct connections of standpipes to the public water system.-

(a) Control valve.-Each service directly supplying a standpipe system or a fire pump shall be equipped with a control valve located under the sidewalk in a flush sidewalk box located within two feet of the street line, or in such other locations as may be approved by the department of environmental protection. The purpose of each such control valve shall be clearly indicated by the words "Standpipe Supply Control," cast in the cover of such flush sidewalk box or, in lieu thereof, a metal sign with one inch lettering shall be located on the exterior building wall indicating the use and location of the valve.

(b) Water supply to standpipe fire pumps.-

(1) Any required manual or automatic fire pump shall draw from two independent street water mains in different streets, except that: (i) any manual or automatic fire pump serving a building classified in occupancy group J-2 that is fully protected by a system of automatic sprinklers may draw from a single water main; and (ii) an automatic fire pump may draw from a single water main if augmented by a suction tank or tanks, and if the valves at the meter and pump are provided with tamper switches that are wired to an approved central station of an operating fire alarm company. Where two services are installed, one service from the street water main shall be run directly to the pump, and the other service may be used for domestic water supply. The connection from water to the mains to the pumps shall be at least six inch pipe size and shall be flushed before connection is made to the system. Connections shall be in accordance with subchapter sixteen of this chapter.

(2) In the event that two separate and distinct water mains are not available as a supply or the street mains cannot produce the required supply, there shall be provided a suction tank, or tanks, suitably located and of sufficient capacity to furnish the fire pump with at least a one-half hour supply at the rated capacity of such pump. Suction tanks shall be filled by a six inch connection to the water main, controlled by an automatic ball float valve in the suction tank. A six inch bypass shall be provided so that pumps may be fed directly from the street water main.

(3) When a water service supplies both the domestic service and the manual fire pump, a remote control valve shall be placed on the domestic service connection at the point where such connection is taken from the city supply or service main. Such remote control valve shall be controlled from a point near the pump control panel. In lieu of a remote control valve, a manually operated valve may be installed to shut off the entire domestic water supply to the building, provided such valve is located in the fire pump room and is properly tagged for identification.

* ***Local Law 10-1999.***

§[1702.17] 27-948 Installation of private fire hydrants.-

(a) When buildings are not required to be provided with a standpipe system, at least one entrance to the building shall be located within two hundred fifty feet of a street hydrant; or, a private hydrant of the same type as the city hydrant connected to the street water main shall be provided within two hundred fifty feet of entrance. The private hydrant shall be supplied by at least an eight inch pipe, and the domestic water supply may be connected to this private supply provided a shut-off valve is installed in a curb box in the domestic supply within six feet of the hydrant shutoff valve.

§[1702.18] 27-949 Protection of standpipe system.-

(a) All parts of the standpipe systems that may be exposed to frost shall be protected from freezing by any one of the following methods:

(1) The piping shall be frostproofed with insulation having a thermal conductance of 0.1 Btu/hr. per square foot of surface per degree F at a mean temperature of seventy to seventy-five degrees F. Insulation shall be protected to prevent water infiltration, and when exposed to the weather the insulation shall be covered with a forty-five pound roofing felt jacket or equivalent.

(2) Steam or electric tracers may be used in conjunction with the insulation.

(b) Tanks subject to freezing temperatures shall be protected.

§[1702.19] 27-950 Standards for installation.- Details for installation, components, sizing valves, fittings, protection against freezing, etc., for standpipe systems and related equipment shall be in accordance with reference standard RS 17-1.

§[1702.20] 27-951 Inspections and tests.-

(a) Inspections.-Every new system and every part of an existing system that is altered, extended, renovated, or repaired, except for ordinary repairs, shall comply with the applicable requirements of this subchapter.

(b) Notification.-Advance notification of tests and inspections required by this section shall be given to the commissioner.

(c) Representation at test.-Tests required by this section shall be conducted in the presence of the commissioner or his or her authorized representative, or in lieu thereof, the commissioner may accept a signed statement of an architect or engineer, whose name is submitted with the notification in subdivision (b) of this section, declaring that he or she has witnessed the tests and that the standpipe system meets the requirements of this code. If a representative of the commissioner does not appear within two days after receipt of such report by the commissioner, the report shall be deemed to be accepted by the commissioner.

(d) Testing equipment required.-All equipment, material, and labor required for testing a system or part thereof shall be furnished by, and at the expense of, the person responsible for installing the work.

(e) Testing of system.-Systems may be tested in sections, or parts, in accordance with the requirements of this subchapter.

(f) Acceptance.-Before the acceptance of such system, each system shall be subjected to the tests required by this section.

(g) Standpipe system tests.-

(1) PRESSURE TESTS.-

a. The test shall demonstrate that the system will sustain a hydrostatic pressure of at least one hundred psig, and at least three hundred psig at the siamese connection, for a period of at least one hour at the topmost hose outlet and at the lowest fire pump supply connection to the system. In buildings not exceeding three stories or forty feet in height, the test pressures need not be more than fifty psig. in excess of the normal hydrostatic pressures at the topmost hose outlet, and this pressure must be maintained for a period of at least one hour.

b. Pressure tanks shall be tested to demonstrate that they will sustain a hydrostatic pressure of at least one hundred fifty percent of the normal maximum required operating pressure for a period of at least one hour.

(2) FLOW TEST.-The system shall be flow tested to determine that water is available at the top outlet of each riser, the lowest outlet in each riser, and through each siamese connection. The system shall be flushed to remove all foreign matter from the system. Flow shall be through at least a two and one-half inch hose without nozzle at each one of the above mentioned locations at separate times.

(3) ALTERATION TESTS.-When alterations, additions, or repairs are made to a standpipe system, the entire system shall be subjected to a hydrostatic test pressure of at least fifty psig at the highest hose outlet, and in addition, a flow test shall be made as stated in paragraph two of this subdivision through the new or altered portion of the system.

(h) Pump tests.-

(1) Fire pumps shall be tested at the factory, and a certified test curve shall be furnished with each pump.

(2) Pumps shall be tested after installation to ascertain that the pump is supplying its rated capacity at the highest required hose outlet or through the roof manifold. The test shall be performed as follows:

a. At least fifty feet of approved two and one-half inch rubber lined hose equipped with a one and one-eighth inch nozzle shall be connected to the highest two and one-half inch hose outlet valve. One of these assemblies shall be connected in parallel for each two hundred fifty gpm of rated pump capacity.

b. The nozzle or nozzles of the hose assembly shall discharge at, or above, the highest required hose outlet or through a manifold.

c. Pitot tube gauge readings shall be taken at each nozzle to determine that the required pump capacity is being discharged.

d. For manually operated fire pumps, the suction and discharge pressures shall be recorded for each step or pump speed. The pump rpm electrical current, and voltage readings shall be recorded with the specific discharge pressure for each supply condition.

e. Automatic fire pumps shall be tested to ascertain that all of the automatic controls are in good working order.

f. All of the above readings shall be noted on the required standpipe diagram or a framed chart, which shall be mounted in a visible location near the pump control panel.

g. When pumps are supplied by two independent services, the test shall be conducted from each service independent of the other and, in addition, with both services supplying the pump.

(i) Test equipment for fire pumps.-

(1) For every fire pump installation, there shall be provided for test purposes at least three fifty foot lengths of approved two and one-half inch rubber lined fire hose. Hose shall be hung in the pump room or other convenient location.

(2) Three two and one-half inch by one and one-eighth inch nozzles, three spanner wrenches, and twelve washers shall be stored with the required hose.

§[1702.21] 27-952 Standpipe signal systems.-
Standpipe signal systems shall be provided in accordance with section 27-974 of article five of this subchapter.

§[1702.22] 27-953 Elevators for fire department use.-
Elevators for fire department use shall be provided as required by section 27-989 of article one of subchapter eighteen.

ARTICLE 4 AUTOMATIC SPRINKLER REQUIREMENTS

§[1703.1] * 27-954 Required sprinklers.-A system of automatic sprinklers shall be provided in the areas listed in this section and as required in subchapters four through eight of this chapter. A summary of sprinkler requirements is given in Table 17-2.

(a) Buildings classified in high hazard occupancy group A.

(b) Spaces classified in high hazard occupancy group A.

(c) Buildings classified in storage occupancy group B-1 exceeding one thousand square feet in floor area or seventy-five feet or more in height, except as modified under subdivisions a, b, and c of section 27-455 of article ten of subchapter seven of this code.

(d) Spaces classified in storage occupancy group B-1 exceeding five hundred square feet in floor area, except as modified under subdivisions a, b, and c of section 27-455 of article ten of subchapter seven of this code.

(1) Such storage spaces less than five hundred square feet in area shall install a system of automatic sprinklers, when required by the commissioner or the fire commissioner.

(e) Buildings and spaces classified in storage occupancy group B-2 exceeding five thousand square feet in floor area, or seventy-five feet or more in height, except as modified under subdivisions a, b, and c of section 27-455 of article ten of subchapter seven of this code.

(f) Spaces in high rise buildings classified in mercantile occupancy group C, spaces classified in mercantile occupancy group C exceeding seventy-five hundred square feet in floor area or with an unenclosed stair or escalator between any two or more floors.

(g) Buildings classified in industrial occupancy group D when required by section two hundred eighty of the labor law or when seventy-five feet or more in height.

(h) Spaces classified in industrial occupancy group D-1 exceeding seventy-five hundred square feet, in floor area excluding heliports.

(i) Buildings classified in occupancy group E, one hundred feet or more in height having air-conditioning and/or mechanical ventilation systems that serve more than the floor in which the equipment is located, and on or before January eighteenth, nineteen hundred seventy-six, in existing office buildings one hundred feet or more in height having such systems, showroom spaces exceeding seventy-five hundred square feet in area located more than forty feet above curb level. The sprinkler system may be connected to the domestic water supply and/or the standpipe risers. Where connected to a standpipe riser, provision shall be made to prevent excessive pressure on the sprinkler heads. If such work is not completed within on or before July eighteenth, nineteen hundred seventy-four, the owner shall submit a statement to the commissioner, with a copy to the fire commissioner, setting forth a plan and time schedule for the performance of the work and completion within the prescribed time. Such plan and schedule shall be subject to the approval of the commissioner. Failure to comply with the provisions of this subdivision, or to perform the work in accordance with the time schedule, as approved by the commissioner, shall constitute a violation.

(j) Dressing rooms and property rooms used in conjunction with all places of assembly, except for F-1B places of assembly not providing live entertainment.

(k) Corridors and exit passageways of buildings classified in institutional occupancy group H where the building or building section is not otherwise required to be fully sprinklered as provided in subchapter four. Patient rooms in H-2 occupancies shall be protected with smoke detectors complying with provisions of section 27-955 of this article when not required to be sprinklered by the provisions of subchapters four through seven.

(l) Regardless of occupancy group classification, any story above grade that cannot be ventilated by at least twenty square feet of free openable area and the first story below grade when it cannot be ventilated by at least thirty-five square feet of openable area per ten thousand cubic feet of volume. Such ventilation shall be provided by operable* windows or other natural ventilation sources complying with section 27-749 of article six of subchapter twelve of this chapter. All other stories below grade shall be sprinklered. Sprinklers may be omitted in toilets, shower rooms, stairs, and mechanical and electrical equipment rooms.

As enacted but "openable" probably intended.

For purposes of this subdivision fixed windows may be considered as "openable" (may be broken inward) if they are not more than one hundred feet above grade, or fifteen feet below grade; or if they are located within six feet of an accessible roof or setback; or if they are located within six feet of an operable window having at least three foot by three foot openings.

(1) Buildings classified in occupancy group J-2 with not more than three dwelling units and buildings classified in occupancy group J-3 shall be exempt from this provision provided all spaces classified in storage occupancy group B-2 exceeding one thousand square feet have been sprinklered in accordance with the requirements of this subchapter.

*(m) Rubbish chutes, laundry chutes, and chutes for similar uses. Sprinklers, protected from damage, shall be provided in accordance with reference standard RS 17-2, RS 17-2A, or RS 17-2B, as applicable.

Local Law 10-1999.

(n) Soiled linen collection and sorting areas.

(o) Workshops exceeding one hundred square feet except in one-and two-family dwellings.

(p) Refuse collection and disposal areas.

(q) Drying area of laundries or similar spaces in which two or more clothes drying machines are installed. Sprinklers to be spaced to cover area five feet in front, rear, and sides of machines.

(r) Sprinklers for cooling towers, where required by subchapter five of this chapter, shall be either a dry pipe or deluge system designed in accordance with the provisions of reference standard RS 17-4.

(s) (1) F-4 places of assembly used as cabarets.

(2) Stages within F-1a, F-1b, F-3 or F-4 occupancies providing live entertainment at anytime as set forth in subchapter eight of this chapter.

*(t) Buildings classified in occupancy group J-1, buildings classified in occupancy group J-2 with four or more dwelling units, spaces classified in occupancy group J-1, and spaces classified in occupancy group J-2 with four or more dwelling units.

(u) Places of assembly located within a building classified in occupancy group J-1.

*TABLE 17-2 SUMMARY OF SPRINKLER REQUIREMENTS

	Automatic Sources Required	Partial System Permit-ted	Connection to Domestic Permitted	Alternate Permitted (§27-955)	Siamese Required (§27-959)	Central[a] Station Required (§27-955) (§27-967)	Water[b] Flow Alarm Required (§27-957)	Automatic Dry Sprinkler Permitted (§5212 of RS-17)	Dry Non-automatic Sprinkler Permitted[c]
High Hazard Bldg. — Group A (§27-954(a))	2	No	No §27-961(c)	No	Yes	None[a]	Yes	Yes	No
High Hazard Spaces — Group A (§27-954(b))[b]	1	Yes	No §27-961(c)	No	§27-959 (a)(3) If over 36 heads in a fire section	None[a]	Yes If over 36 heads in a fire section	Yes	No
Storage Occupancy Bldg. — Group B1 (§27-954(c))	1	No	No §27-961(c)	No	Yes	None[a]	Yes	Yes	No
**Storage Occupancy Spaces — Group B1 (§27-954(d)) And Permitted Below Grade Flammable/Combustible Storage Spaces in Mercantile Establishments (§27-954(aa)	1	Yes	Yes [§27-961(c)] §27-962(c)	No	§27-959 (a)(3) If over 36 heads in a fire section	None[a]	Yes[b] If over 36 heads in a fire section	Yes	No
Storage Occupancy Spaces — Group B2 (§27-954(e))	1	Yes	No	No	§27-959 (a)(3) If over 36 heads in a fire section	None[a]	Yes[b], If over 36 heads in a fire section	Yes	No
Mercantile Occupancy Spaces — Groups C Exceeding 7,500 sq. ft. (§27-954(f))	2 sources if exceeding 20,000 sq. ft. 1 source if not more than 20,000 sq. ft.	No	No	No	Yes	None[a]	Yes	Yes	No
Industrial Occupancy Bldg.— Group D-1, When required by Labor Law (§27-954(g))	1 source if not hazardous occupancy	No	No	No	Yes	None[a]	Yes	Yes	No
Industrial Occupancy Spaces—Group D-1, exceeding 7,500 sq. ft. (§27-954(h))	1	No	No	No	Yes	None[a]	Yes	Yes	No
Business Occupancy Spaces— Group E Showrooms when Required by (§27-954(i))	1	Yes	Yes and/ or Stand-pipe Riser	No	Yes	None[a]	Yes	Yes	No
Assembly Occupancy Spaces— Group F-1[a] (§27-954(j))	1	Yes	Yes	No	§27-959 (a)(3) If over 36 heads in a fire section	None[a]	Yes[b]	No	No

Table 17-2 SUMMARY OF SPRINKLER REQUIREMENTS (continued)

Institutional Occupancy Group H — Corridors and Exit Passageway (§27-954(k))	1	Yes	Yes	No	§27-959 (a)(3) If over 36 heads in a fire section	None[a]	Yes	No	No
Unventilated Areas Above or Below Grade (§27-954(l))[d]	1	Yes	Yes	No	§27-959 (a)(3) If over 36 heads in a fire section	None[a]	§27-962(e)(8)	Yes	No
Rubbish—Laundry and Similar Chutes (§27-954(m))[d,e]	1	Yes	Yes	No	No	Yes[a]	None	Yes	No
Soiled Linen—Collection and Sorting Area (§27-954(n))	1	Yes	Yes	No	§27-959 (a)(3) If over 36 heads in a fire section	None[a]	Yes §27-962(e)(8)	Yes	No
Workshops (§27-954(o))[d]	1	Yes	Yes	Yes	§27-959 (a)(3) If over 36 heads in a fire section	Yes If smoke detector [*sic*] is used in lieu of sprinkler	Yes §27-962(e)(8)	Yes	No
Refuse Collection and Disposal Areas (§27-954(p))	1	Yes	Yes in Occupancy Groups E, G, J	No	§27-959 (a)(3) If over 36 heads in a fire section	None[a]	Yes §27-962(e)(8)	Yes	No
Drying Areas—Laundries or Similar Spaces (§27-954(q))[d]	1	Yes	Yes in Occupancy Groups E,G, J	Yes	§27-959 (a)(3) If over 36 heads in a fire section	Yes If smoke detector [*sic*] is used in lieu of sprinkler	Yes §27-962(e)(8)	No	No
Cooling Towers (§27-954(r))	1	No	Yes	No	No	None[a]	Yes	Yes	No
Building and Spaces in Residential Occupancy Group J-1 (§27-954(t))	1	No	No[f]	No	Yes, exept as provided in §27-959(a)(3)	No	Yes	No	No
Buildings and Spaces in Residential Occupancy Group J-2 with 4 or more Dwelling Units and not exceeding Six Stories or 75 Feet in Height (§27-954(t))	1	No	Yes[g]	No	Yes, exept as provided in §27-959(a)(1) and §27-959(a)(5)	No	Yes	No	No
Buildings and Spaces in Residential Occupancy Group J-2 with 4 or more Dwelling Units and Exceeding Six Stories or 75 Feet in Height (§27-954(t))	1	No	No[h]	No	Yes, exept as provided in §27-959(a)(3)	No	Yes if over 36 heads	No	No

Notes for Table 17-2:

a. Central Station Supervision required only when booster pump is provided under §27-964 or when non automatic sprinkler [*sic*] is permitted by the commissioner.

b. Water flow alarms required when more than 36 heads are installed in a fire section or fire area.

c. Only when permitted by the commissioner (§27-967(c)).

d. See §27-954(w) for requirements pertaining to these spaces located in a building classified in occupancy group J-1.

e. See section 4-4.8 of reference standard RS 17-2.

f. Except as provided in reference standard RS 17-2A.

g. Notwithstanding section 27-962(i) of this chapter.

h. Except as provided in section 27-962(i) of this chapter.

Amended by Local Law 10-1999.

****Amended by Local Law 26-2002***

(v) Catering establishments and banquet halls with an occupant load of three hundred or more persons.

*(w) In all existing buildings classified in occupancy group J-1 (except for "residential hotels," as such term is defined by the commissioner pursuant to rules,) all spaces listed in subdivisions (c), (d), (l), (m), (n), (o), (p) and (q) of this section, except that an approved smoke detection alarm system may be installed in those locations described under subdivisions (o) and (q) in lieu of sprinklers other than in those locations where sprinklers are required pursuant to section 27-123.2 of this chapter. Such smoke detection system shall be of the supervisory type connected to an approved central station.

(x) High rise buildings classified in occupancy group F-1, F-3, F-4, or G, or any spaces classified in such occupancy groups located within a high rise building or building section more than seventy-five feet above curb level.

(y) Spaces in existing high rise buildings classified in occupancy group C and any space in an existing building classified in occupancy group C with an unenclosed stair or escalator between any two or more floors.

(z) Notwithstanding the provisions of subdivision i of this section, high rise buildings classified in occupancy group E and low rise buildings classified in occupancy group E with a total gross floor area of one hundred thousand square feet or more.

**(aa) Regardless of occupancy group classification, in each basement, cellar or other location below grade, regardless of the floor area of such space, in a ny mercantile establishment in which the fire commissioner permits the storage of flammable or combustible mixtures pursuant to sections 27-4066, 27-4070 or 27-4094 of this code, except that, where such flammable or combustible mixtures are stored in such basement, cellar or other location below grade, in a room or other area that is segregated, vertically and horizontally, from surrounding spaces by a fire separation of not less than a two-hour fire-resistance rating, such system of automatic sprinklers shall be required only within such room or other area. Such system of automatic sprinklers shall conform only within such room or other area. Such system of automatic sprinklers shall conform to the requirements for automatic sprinklers for spaces classified in storage occupancy group B-1 pursuant to subdivision d of this section.

Local Law 10-1999.

****Local Law 16-1987*

§[1703.2] *27-955 Smoke detector alternate.-An approved smoke detection alarm system may be used in lieu of sprinklers in those locations described under in subdivisions (o) and (q) of section 27-954 of this article, except in buildings or spaces classified in occupancy group J-1 or J-2. Such smoke detection system shall be of the supervisory type connected to an approved central station.

Local Law 10-1999.

§[1703.3] *27-956 Standard for installation of sprinklers. (a) Except as herein provided in subdivision (b) of this section, the installation, components, sizing, spacing, location, clearances, position, and type of systems shall be in accordance with reference standard RS 17-2, except that sprinkler systems in one and two family dwellings may in the alternative be in accordance with reference standard RS 17-2B, and sprinkler systems in other residential buildings not exceeding six stories or seventy-five feet in height and in other residential spaces in buildings not exceeding six stories or seventy-five feet in height may in the alternative be in accordance with reference standard RS 17-2A.

(b) Notwithstanding any provision to the contrary contained in reference standards RS 17-2, RS 17-2A or RS 17-2B sprinklers may be omitted from clothes closets, linen closets, pantries, water closets, water closet compartments, bathrooms, general toilet rooms and shower rooms in buildings and spaces classified in occupancy group J-2 and J-3.

Local Law 10-1999.

§[1703. 4] 27-957 Sprinkler alarm system.-

*(a) A sprinkler alarm system shall be provided in accordance with the applicable provisions of reference standards RS 17-2, RS 17-2A, RS 17-2B and RS 17-3. Where the building is provided with a class E or modified class E fire alarm signal system, compliance with the applicable provisions of reference standard RS 17-3A or

RS 17-3B shall be acceptable in lieu of compliance with the provisions of reference standard RS 17-3.

(b) A sprinkler alarm system shall be required when more than thirty-six heads are installed in any fire area or section. See table 17-2 for general requirements. ***Local Law 10-1999.***

§[1703.5] 27-958 Approved devices.-
No device, valve, pipe, or fitting may be used in a sprinkler system unless such device, valve, pipe, or fitting is of a type approved for such use.

§[1703.6] 27-959 Siamese connections required.-

(a) Where required.-

(1) Siamese connections shall be provided in accordance with section 27-940 of article three of this subchapter, except as modified hereinafter.

(2) In below grade sprinkler systems for garage occupancies involving the storage or repair of motor vehicles, a siamese connection shall be provided within fifty feet of every exit or entrance used by motor vehicles.

(3) Where partial sprinkler protection is required for storage spaces, one siamese connection shall be provided when more than thirty-six heads are installed in one fire section. Areas subdivided, when the subdivisions are totally enclosed by noncombustible construction having at least a two hour fire-resistance rating, shall be considered separate fire sections and the number of heads in the largest section shall determine the necessity for siamese connections.

When partial sprinkler systems are installed to protect entire floor areas, siamese connections shall be provided in accordance with section 27-940 of article three of this subchapter.

In all cases where partial sprinkler protection is provided and siamese connections installed, metal signs shall be securely fastened to, or above, the siamese connection indicating the area protected. Where the building has two or more frontages, additional metal signs shall be installed indicating the location of the siamese connection.

(4) When a sprinkler system supplies a group of buildings, siamese connections shall be provided for each building as required by paragraphs one, two and three of this subdivision.

(5) A single three-inch (seventy-six millimeter) inlet fire department connection acceptable to the fire commissioner may be provided for the sprinkler system in lieu of each required siamese connection in buildings classified in occupancy group J-2 not exceeding six stories or seventy-five feet in height and in spaces classified in occupancy group J-2 in buildings not exceeding six stories or seventy-five feet in height.

(b) Installation and construction.-The installation and construction of siamese connections shall be the same as required for fire standpipe systems, except that the caps of each automatic sprinkler siamese connection shall be painted green and the entire siamese connection of a nonautomatic sprinkler system shall be painted with aluminum paint, and except that caps of each siamese connection used for combination standpipe and sprinkler systems shall be painted yellow and signs provided as required in subdivision (b) of section two of reference standard RS 17-1.

(c)** A siamese connection need not be provided for a sprinkler system in one and two family dwellings. ***Local Law 10-1999.

§[1703.7] 27-960 Piping from siamese connection.-
Piping from the siamese connection shall be the same size as the riser or trunk main to which it is connected, except that it need not be more than five inches in diameter when supplying larger riser or feed mains. When more than one siamese connection is required, the piping from each siamese connection need not exceed four inches in diameter.

§[1703.8] 27-961 Classification of water supplies.-

(a) Automatic sources of water supply for sprinkler systems.-Automatic sources of water supply for sprinkler systems shall include a gravity tank, pressure tank, automatic fire pump, or direct connection to the public water systems. Automatic fire pumps where used for sprinkler supply shall comply with the applicable provisions of sections 27-946 and 27-947 except that no enclosures shall be required, and provided that when an emergency power system is provided, the electric power to the motor shall be connected to the emergency power source.

(b) Auxiliary sources of water supply for sprinkler systems.-Auxiliary sources of water supply for sprinkler systems shall include a manually actuated fire pump or siamese connection.

(c) Combination sprinkler and standpipe tank sources of water supply.-Tanks used to provide the required primary water supply to a standpipe system may also be used as a supply for an automatic sprinkler system.

(d) Nonautomatic sources of water supply for sprinkler systems.-Nonautomatic sources of supply for sprinkler systems shall include siamese connections.

§[1703.9] 27-962 Sources of water supply for sprinkler systems.-Sprinkler systems shall be provided with water from the following sources:

(a) Two automatic sources of water supply shall be provided for sprinklers in:

(1) Buildings classified in occupancy group A.

(2) Buildings classified in occupancy group C when the area on one floor exceeds twenty thousand square feet.

(3) Buildings classified in occupancy group F-1a when open heads are required for stages of unlimited size.

(b) At least one automatic source of water supply shall be provided for sprinklers installed in all occupancy groups, except those listed in subdivision (a) and except as provided in subdivision (c) of this section.

**(c) The domestic water supply may be used to supply any sprinklers required under section 27-954 of this article when installed in buildings classified in occupancy groups E, G, H and J, or to supply any

sprinklers required under subdivision (aa) of said section, regardless of occupancy group classification, provided that all the requirements stated in subdivision e of section 27-962 of this article are met.

(d) The domestic water supply may be used to supply water to sprinklers in cooling towers if provision is made to automatically stop the use of water through the domestic supply lines and provided that all of the requirements stated in subdivision (e) of this section are met.

(e) When the domestic water is used to supply sprinklers as permitted in subdivisions (c) and (d) of this section, all of the following conditions shall be met:

(1) The domestic water supply line from the tank or street supply is at least the size of the sprinkler line and that the capacity available is at least equal to the capacity required for the sprinklers.

(2) The domestic water supply line from the tank or street has the required pressure as provided in section 27-963 of this article.

(3) The domestic water supply line is of nonferrous material except when the domestic water supply is four inches or over.

*(4) An o.s. and y. valve or an approved valve having visual indication, sealed open, is installed in the sprinkler supply branch, or such other valve arrangement as may be provided for in reference standard RS 17-2A or RS 17-2B, as applicable.

(5) The pipe connecting the domestic water supply and the sprinkler control valve is of nonferrous material and not less than twelve inches long.

*(6) The number of heads in each fire section does not exceed twenty, except that the number of heads in each fire section may exceed twenty in buildings classified in occupancy group J-2 or J-3 not exceeding six stories or seventy-five feet in height and in spaces classified in occupancy group J-2 or J-3 in buildings not exceeding six stories or seventy-five feet in height, and no more than ten heads are supplied from any one domestic water riser.

(7) The connection is made at the supply or riser side of any domestic branch control valves.

*(8) In connection with the above conditions, the number of fire sections having twenty or less heads may be unlimited; and the installation of alarms in branches supplying fire sections shall be at the option of the owner, except that such alarms shall be provided where required by reference standard RS 17-2A or RS 17-2B.

*(9) A check valve is installed on the sprinkler supply branch.

(f) Nonautomatic sprinkler systems shall be provided with:

(1) Siamese connections in accordance with section 27-940 of article three of this subchapter.

(2) Malleable iron fittings approved for sprinkler installations.

(3) An approved automatic fire alarm with direct connection to a central station of an approved operating fire alarm company shall be installed in the area protected by the sprinkler system.

*(g) There shall be no more than ten sprinkler heads connected to a plumbing riser supplying anything other than sprinkler heads, and no more than twenty sprinkler heads connected to a riser supplying only sprinkler heads in any fire section separated by two hour enclosures from adjoining fire sections.The number of sprinkler heads connected to a riser supplying only sprinkler heads may exceed twenty in buildings classified in occupancy group J-2 or J-3 that do not exceed six stories or seventy-five feet in height and in residential spaces classified in occupancy group J-2 or J-3 in buildings not exceeding six stories or seventy-five feet in height.

(h) Standpipe risers may be used to supply water to sprinklers in high rise buildings classified in occupancy groups E, G, H and J and in existing office buildings one hundred feet or more in height, in accordance with applicable provisions of this subchapter and reference standards RS 17-1 and RS 17-2.

(i) The domestic water supply in buildings classified in occupancy group J-1 or J-2 may be used for sprinklers in corridors, in refuse chutes and in other similar areas, as approved by the commissioner. The domestic water may be supplied by direct public water connection or equipment and pumps approved for water supply in accordance with reference standard RS-16.

*_Local Law 10-1999._

**_Local Law 26-2002_

§[1703.10] * 27-963 Direct connection of sprinklers to the public water system.-Direct connection of sprinklers to a city water main shall be acceptable as an automatic water supply, provided the main is capable of maintaining a pressure of at least fifteen psig at the top of the highest sprinkler riser, with five hundred gpm of water flowing from a two and one-half inch hydrant outlet located at the street level within two hundred fifty feet of the building. The hydrant test shall be made between the hours of eight a.m. and five p.m. on a working day. If the pressure found in this test is insufficient to comply with the above requirement, a minimum of twelve psig at the top of the highest sprinkler riser shall be acceptable, provided that all piping in the affected area and supply piping thereto that is four inches and under is increased one pipe size above those sizes required by reference standard RS 17-2, RS 17-2A or RS 17-2B, as applicable. In addition to the fifteen psig or twelve psig requirements, the following requirements shall be met:

(a) The size of each connection shall be as large as that of the main riser and, except in sprinkler systems in multiple dwellings, shall be at least three inches and shall be controlled by an accessible shutoff valve.

(b) The service pipe shall be flushed out thoroughly before connecting to the sprinkler system. A flow sufficient to produce a water velocity of at least five fps shall be used.

(c) Each service shall be equipped, under the sidewalk, with a control valve in a flush sidewalk box located within two feet of the front wall of the building

or street line as required by the department of environmental protection. The location of the control valve shall be indicated by a sign placed on the structure directly opposite the sidewalk flush box, and such sign shall have a white background with one inch red letters reading: "Automatic Sprinkler Shutoff Valve ...Feet Opposite this Sign." Alternatively, brass, bronze, or other metal sign with one inch letters, raised or countersunk one-eighth of an inch may be used.

(d) The plans submitted in connection with the permit application shall be accompanied by a statement from the bureau of water supply of the department of environmental protection, stating the size of street main or mains, distance to and size of mains from which it or they are fed, the location of control valves, the static pressure on the hydrant nearest the premises, and the residual pressure in the street main taken on a hydrant near the premises when the flow from the nearest hydrant is equal to the flow required to meet the requirements of this section. A letter from the bureau of water supply of the department of environmental protection estimating available flow and residual pressure shall be acceptable to the borough superintendent when a hydrant test cannot be conducted.
Local Law 10-1999.

§[1703.11] 27-964 Sprinkler booster pumps.-Where the pressure from the city water main is insufficient to comply with the requirements of section 27-963 of this article but is sufficient to give at least five psig at the highest line of sprinklers as determined by test, an automatic, electrically driven pump installed for the purpose of boosting or increasing the city water pressure in the sprinkler system may be accepted subject to the following requirements:

(a) Pumps shall be of approved centrifugal type, capable of delivering at least two hundred gpm, and shall be capable of supplying twenty-five percent of the heads, in the largest area supplied, at twenty gpm, at a pressure of at least twenty-five psig at the top of the highest sprinkler riser.

(b) Pumps shall be maintained under approved automatic control with closed circuit supervisory attachment. The supervisory attachments shall be directly connected to an office where maintenance personnel are in attendance twenty-four hours a day; or, in lieu thereof, the supervisory attachment may be directly connected to the central station of an approved operating fire alarm company. The supervisory alarm services shall be arranged so as to provide positive indication at an approved central office or sprinkler alarm panel board that the pump has operated or that the source of electrical supply has failed.

(c) Such pumps shall also comply with the applicable provisions of sections 27-946 and 27-947 of article three of this subchapter, except that only one supply shall be required and no enclosure shall be required.

§[1703.12] *27-965 Gravity and pressure tanks.-When the requirements of sections 27-963 and 27-964 of this article are not met, a pressure or gravity tank or other device shall be used, complying with the provisions of subchapter sixteen of this chapter and reference standard RS 17-2, RS 17-2A or RS 17-2B.
Local Law 10-1999.

§[1703.13] 27-966 Protection of sprinkler system.-

(a) All parts of an automatic sprinkler system exposed to freezing temperatures shall be protected from freezing in accordance with the provisions of section 27-949 of article three of this subchapter, or in lieu thereof, an automatic drypipe system or a system filled with a nonfreezing, noncombustible solution shall be used, and when a system filled with nonfreezing solution is used and the system is connected to a potable water supply, it shall be subject to the requirements of the health department and the bureau of water supply of the department of environmental protection.

*(b) Sprinkler heads subject to damage shall be protected in accordance with the applicable provisions of reference standard RS 17-2, RS 17-2A or RS 17-2B.
Local Law 10-1999.

§[1703.14] 27-967 Inspection and tests.-

All inspections and tests of sprinkler systems shall be conducted in accordance with the provisions of subdivisions a through f of section 27-951 of article three of this subchapter and the requirements of this article.

(a) Automatic wet and dry systems.-Automatic wet and dry sprinkler systems shall be subjected to a hydrostatic pressure test for a period of one hour at a pressure of at least one hundred psig at the topmost sprinkler head and at least two hundred psig at the lowest cross connection to the siamese connections.

(b) Automatic dry pipe systems.-In addition to the hydrostatic test in subdivision (a) of this section, the automatic dry pipe systems shall also be tested to forty psig air pressure for a twenty-four hour period with the pressure loss not to exceed one and one-half psig.

(c) Nonautomatic sprinkler systems.-Nonautomatic sprinkler systems shall be subjected to a hydrostatic pressure test of fifty psig at the topmost sprinkler head, with the test pressure maintained for a period of at least one hour.

(d) Pressure tanks.-Pressure tanks shall be hydrostatically tested to a pressure of at least one and one-half times the working pressure for a period of one hour.

(e) Sprinkler branches and heads supplied from domestic water.-Sprinkler branches and heads shall be tested at the pressure required by this section or at the pressure of the domestic water supply as required by subchapter sixteen of this chapter, whichever is greater.

(f) System performance.-A performance or operation test shall be made on each completed system to determine that all alarms, valves, indicators, pumps, deluge valves, dry pipe valves, and other appurtenances are in good working order.

(g) Supervisory service.-All components connected to a central station of an approved operating fire alarm company shall be tested to determine that they are in good working order. The test report shall be accompanied by a statement from the central supervisory agency stating that the agency has been retained to provide the required supervision; and when the services of the agency have been terminated it shall notify the commissioner in writing.

(h) Altered systems.-When additions, alterations, or repairs are made to a sprinkler system, the entire system shall be tested as stated in subdivisions (a), (b), (c), (e), and (g) of this section, except that the pressure at the top of the system need not exceed one hundred psig. In addition, a flow test of at least twenty gpm shall be made from a test connection at the end of the sprinkler header or the section altered or repaired.

(i) Pump test.-Pumps shall be tested in accordance with the applicable provisions of subdivisions (h) and (i) of section 27-951 of article three of this subchapter.

ARTICLE 5 INTERIOR FIRE ALARM AND SIGNAL SYSTEM

§[1704.1] 27-968 Where required.-

(a) A closed circuit electrically supervised fire alarm signal system shall be installed in the following types of buildings:

(1) Hotels, motels, lodging houses, dormitories, and single room occupancies having more than fifteen sleeping rooms or accommodating more than fifteen lodgers above the first or ground story.

(2) Buildings classified in occupancy group H-1 or H-2. Systems installed in buildings where persons are restrained under the jurisdiction of an agency of the city or the state of New York may be modified to comply with the regulations of such agency, when such modification is approved by the commissioner.

(3) Day care agencies having a board of health permit for the accommodation of more than thirty children. If such day care agency is located at the grade level of the building, the fire alarm system is required only in the premises of the day care agency. If the day care agency is located at other than grade level of the building, an approved fire alarm system shall be provided throughout the building.

(4) Health clubs and turkish or other special treatment bath houses where there are sleeping accommodations for more than fifteen persons on the premises.

(5) Department stores or retail sales establishments having one or more floors above the street floor to which the public is admitted or with a total floor area of twenty thousand or more gross square feet.

(6) All public schools; also all private schools and university teaching buildings more than one story in height. If a school premise is located at other than a grade level of a building, an approved fire alarm system shall be provided throughout the building.

(7) Single and multi-tenant factory buildings more than two stories in height in which more than twenty-five persons are employed above the ground floor, as provided by section two hundred seventy-nine of the labor law. In buildings where more than ten percent of the building occupancy is engaged in manufacturing, the building shall have an approved fire alarm system throughout.

(8) Buildings housing a motion picture studio.

(9) Buildings classified in occupancy group E, seventy-feet feet or more in height and buildings classified in such occupancy group occupied or arranged to be occupied by an occupant load of more than one hundred persons above or below the street level or more than a total of five hundred persons in the building.

(10) a. Stages, dressing rooms and property rooms used in conjunction with all places of assembly used as cabarets.

b. Places of assembly used as a cabaret.

(b) Areas containing gas distribution piping operating at levels above fifteen psig shall have a combustible gas detection-alarm system, and a suitable fire protection system as approved by the commissioner with the concurrence of the fire commissioner.

§[1704.2] 27-969 Approvals.-

(a) Equipment and systems shall be made of approved materials, and shall be free from defective workmanship. The requirements of reference standard RS 17-5 shall apply except as specifically qualified herein.

(b) Before any fire alarm system is installed or extended, approval shall be obtained from the commissioner.

(c) All devices and equipment that have been approved shall have securely fastened thereon a manufacturer's label indicating compliance with the requirements of section 27-135 of article eight of subchapter one of this chapter.

§[1704.3] 27-970 Existing installations.-Except as provided in subdivisions (g) and (j) of section 27-972 of this article, fire alarm systems heretofore installed in buildings in accordance with rules then in force shall be accepted for use as long as they are maintained in good working order.

§[1704.4] 27-971 Classification and general requirements of fire alarm systems.-Fire alarms shall be classified as follows and shall meet the following general requirements:

(a) Uncoded closed circuit fire alarm system.-Consisting of manually operated [pull-lever type]* sending stations and audible signaling devices, so arranged that the operation of any station will automatically sound continuously the signaling devices throughout all portions of the building.

Copy in brackets not enacted but probably intended.

(b) Master coded closed circuit fire alarm systems.-Consisting of manually operated pull-lever type sending stations and audible signaling devices, so

arranged that the operation of any station will automatically sound the signaling devices giving a common code of signals throughout all portions of the building. The code shall consist of four rounds of a series of single strokes of the signaling devices, each round consisting of "3-3-3-3".

(c) Individually coded closed circuit general fire alarm systems.-Consisting of manually operated pull-level type sending stations and audible signaling devices, so arranged that the operation of any station will automatically sound the signaling devices, throughout all portions of the building, for a minimum of four rounds of a distinctive code of signals particular to the station at which the signal has been initiated. The code numbers that are used shall be subject to the approval of the fire commissioner.

(d) Individually coded closed circuit presignal fire alarm systems.-Consisting of manually operated pull-lever type sending stations and signal devices so arranged that the operation of any station will cause the sound of only the signal devices located in the engine room and basement and other places in the building where the members of a fire brigade work or assemble. The signaling device shall give four rounds of the particular code signal of the station at which the signal has been initiated. Approved equipment shall be provided at each station so that the operation of any station performed with the aid of a key or plug will sound all of the signal devices located in the building with four rounds of the particular coded signal of the station initiated. The code numbers used shall be subject to the approval of the fire commissioner. The presignal key or plug shall be so designed that it can be readily identified. Presignal type systems will not generally be approved; however, approval may be obtained from the fire commissioner where special type occupancies may warrant such a system.

(e) Combination unit or zone, and general alarm coded closed circuit fire alarm systems.-Consisting of manually operated pull-lever type sending stations and signal devices so arranged that the operation of any station will cause all of the signaling devices in that unit or zone to sound four rounds of the particular coded signal of the station initiated, and simultaneously will cause all of the signaling devices on the general alarm circuit to sound four rounds of the coded signal designating the unit or zone in which the station is located. An approved register and time stamp may be used in connection with this system when approved by the fire commissioner. The register, if of the closed circuit type, shall be operated from a separate closed circuit control board or panel isolated by a barrier from the main control panel in the main fire alarm control cabinet. An approved closed circuit unit annunciator with trouble alarm circuit shall be installed as part of this system when required by the fire commissioner.

(f) Special systems.-Consisting of the above systems as required, supplemented by special circuits for the operation of other fire alarm or detection devices in the systems, or electric control systems for stopping machinery, closing doors or ventilators, or shutting down fans as may be required by the commissioner or the code, or to call the central station of a private operating company of the fire department. Automatic fire detecting systems may be connected to operate an interior fire alarm system when connected thereto by an approved coded transmitter. In no case shall the transmitter be considered to replace the standard approved interior fire alarm station, except where a transmitter has been approved for both purposes. The special control circuits and devices shall be separate and distinct from the fire alarm system but shall be brought into action whenever the fire alarm system is set in operation.

***(g) Class E system**.-Consisting of a class E fire alarm signal system as described in subdivision (f) of section 27-972 of article five of this subchapter and reference standard RS 17-3A. Such systems shall be exempt from the provisions of section 27-973 of article five of this subchapter, except that compliance with paragraph two of subdivision (a) and subdivision (e) of such section shall be required.

***(h) Modified class E system.-**Consisting of a modified class E fire alarm signal system as described in subdivision (g) of section 27-972 of article five of this subchapter and reference standard RS 17-3B. Such systems shall be exempt from the provisions of section 27-973 of article five of this subchapter, except that compliance with paragraph two of subdivision (a) and subdivision (e) of such section shall be required.

***(i) Class C system.-**Consisting of a class C fire alarm signal system as described in subdivision (k) of section 27-972 and reference standard RS 17-3A. Such systems shall be exempt from the provisions of section 27-973 of article five of this subchapter, except that compliance with paragraph two of subdivision (a) and subdivision (e) of such section shall be required**.**

***(j) Class J system**.-Consisting of a class J fire alarm signal system as described in subdivision (l) of section 27-972 of article five of this subchapter and reference standard RS 17-3A. Such systems shall be exempt from the provisions of section 27-973 of article five of this subchapter, except that compliance with paragraph two of subdivision (a) and subdivision (e) of such section shall be required.

***(k) Modified class J system**.-Consisting of a modified class J fire alarm signal system as described in subdivision (m) of section 27-972 of article five of this subchapter and reference standard RS 17-3B. Such systems shall be exempt from the provisions of section 27-973 of article five of this subchapter, except that compliance with paragraph two of subdivision (a) and subdivision (e) of such section shall be required.

***(l) Modified class J-1 system**.- Consisting of a modified class J-1 fire alarm signal system as described in paragraph two of subdivision (j) of section 27-972 of

article five of this subchapter.
Local Law 16-1987.

§[1704.5] 27-972 Systems required for specific occupancies.-

(a) In any type of one-story building where a fire alarm system is required and where the floor area is not more than twenty-five hundred square feet, an uncoded closed circuit fire alarm system may be used.

(b) Private and public schools.-Master coded systems shall be used in all schools, except that schools having more than fifteen hundred students shall have an individually coded system.

(c) Single and multi-tenant factory buildings.-

(1) In factory buildings, an individually coded closed circuit fire alarm system shall be installed except as hereinafter provided. An uncoded circuit fire alarm system may be used in buildings not exceeding two stories in height, having not more than twenty-five hundred square feet in area in any one story, and having not more than one hundred persons in a single factory nor more than fifty persons in a multiple tenant factory above the first or ground floor.

(2) Special fire alarm signal systems may be designed for use in buildings subject to the approval of the commissioner.

(d) **A common coded closed circuit system may be used in a motion picture studio**, and in addition, an approved rate-of-rise or other approved thermostatic fire alarm system, with direct connections to a central office of an approved operating fire alarm company or the fire alarm telegraph central station, shall be provided for protecting the open studio door. Also there shall be one or more manual fire alarm boxes, which shall be located so as to be readily accessible from the open studio door.

(e) Hospitals, asylums, and nursing homes.-Buildings classified in occupancy group H-2 shall meet the following requirements:

(1) An individually coded closed circuit fire alarm system shall be provided in accordance with subdivision (c) of section 27-971 except where the fire commissioner shall have approved an individually coded closed circuit presignal fire alarm system as described in subdivision (d) of section 27-971. All fire alarm systems shall be activated by sprinkler waterflow and by all other fire detection devices installed in the building.

(2) Alarm systems shall be installed in zones of a maximum size of twenty thousand square feet.

(3) Manual fire alarm sending stations shall be at staff locations only.

(4) Where two or more buildings are served by one fire brigade, a combination unit or zone and a general alarm coded closed circuit fire alarm system shall be provided and an approved indicating annunciator installed in each building. Upon initiation of a station signal, general alarm signaling devices shall sound in engine rooms and subgrade areas of each building, and unit or zoned alarm signaling devices shall sound throughout all areas in only the building wherein the station signal was initiated. In the building where the station signal has been initiated, an approved annunciator shall indicate the station at which the signal is initiated.

(f) Buildings classified in occupancy group E- One hundred feet or more in height, and existing office buildings one hundred feet or more in height except as provided in subdivision (g) of this section shall be provided with a class E fire alarm signal system as follows:

(1) It shall be special electrically supervised approved direct wire, radio or combination thereof fire alarm signal system consisting of an interior fire alarm and voice communicating system so arranged that the operation of any station will identify its location at the fire command station as required by section 27-975 of this article, at the mechanical control center and at the regularly assigned location of the fire safety director. This identification signal shall be accomplished by means of an information display system which shall be manually resettable from the fire command station only.

(2) The nomenclature used for the location identification system shall be subject to the approval of the fire commissioner.

(3) In addition to the visual devices required above, audible signal devices indicating operation of the fire alarm signal system shall be provided at the fire command station, mechanical control center and the regularly assigned location of the fire safety director. Provisions shall be made for silencing the audible signal and transferring this signal to lamp indication.

(4) Operation of a manual station shall automatically transmit a fire alarm signal to the fire department via a central office of an operating company franchised by the board of estimate, and cause the fire alarm signal system to sound continuously throughout the floor where activated and the floor above.

(5) The fire alarm signal may be sounded over loudspeakers [*sic*]as provided in reference standard RS 17-3A so located that their operation will be heard clearly above any ambient noise, and shall be controlled from the fire command station in such a manner that the fire alarm signal can be sounded on the individual floors or throughout the building.

(6) Provision shall be made whereby the fire command station may permit the floor station to make announcements over the loudspeaker [*sic*] system.

(7) The loudspeaker [*sic*] amplifier system shall be so designed and installed that approximately fifty (50) percent of the system shall remain operable for the transmission and audibility of signals and intelligibility of voice communication over the loudspeaker [*sic*] system throughout the building, in the event the other fifty (50) percent become inoperable. The electrical supply for this fire alarm system, including the amplifiers, shall be in accordance with applicable laws, rules and regulations.

(8) An approved product of combustion ionization detecting device or a combination of an approved smoke detecting device and an approved fixed temperature thermostatic device shall be installed at each elevator landing. The device shall be located in the ceiling immediately above a call button. The activation of this device shall have the same effect as specified in subparagraphs a through e of paragraph nine of this subdivision and in addition cause the overriding of the programming for car stops of all automatic elevators serving the floor where activated and bring them non-stop to the floor levels designated by section 210.13C of reference standard RS 18-1.

(9) In buildings which are approved with air-conditioning and/or mechanical ventilation systems that serve more than the floor on which the equipment is located, the activation of any of the detectors installed in such air-conditioning and/or mechanical ventilation systems in accordance with the provisions of RS 13-1 of the reference standards shall:

a. cause the fire alarm signal system to sound continuously throughout the floor where activated and the floor above.

b. cause a fire alarm signal to be transmitted to the fire department via a central station of a franchised operating company.

c. cause the fire alarm signal system to sound at the fire command station required by section 27-975 of this article and to sound an alarm in the mechanical control center and at the regularly assigned location of the fire safety director, and to operate an information display system as provided in paragraph one of this subdivision.

d. stop the air supply into and the air return from the floor where activated by actuation of approved remote control reversible fire shutters or by automatically shutting down the air supply fans and the air return fans of the floor where activated, notwithstanding the provisions of sections 1001 through 1005 of RS 13-1 of the reference standards relating to air supply and air return controls in case of fire.

e. cause the activation of the air exhaust fans and dampers in smoke shafts and/or the pressurizing fans in stair enclosures.

(10) A building equipped throughout with an automatic sprinkler system including a water flow alarm shall be exempt from the installation of any detectors pursuant to paragraph eight of this subdivision and section 1006 of reference standard RS 13-1 provided the activation of the sprinkler water flow alarm shall have the same effect as specified in subparagraphs a through e of paragraph nine of this subdivision and in addition cause the overriding of the programming for car stops of all automatic elevators serving the floor where activated and bring them non-stop to the floor levels designated by section 210.13C of reference standard RS 18-1.

(11) In existing office buildings one hundred feet or more in height where compliance would cause practical difficulty or undue hardship, the commissioner may waive or modify the requirements of paragraphs one through nine of this subdivision (f) and accept alternatives fulfilling the intent of these requirements.

(12) Existing office buildings one hundred feet or more in height shall comply with the requirements of this subdivision on or before September thirteenth, nineteen hundred eighty-one. Complete plans of the installation shall be filed with the commissioner on or before June thirteenth, nineteen hundred eighty. A permit shall be secured from the commissioner on or before September thirteenth, nineteen hundred eighty. Where compliance with the time requirements of this paragraph would cause undue hardship, the commissioner, with the approval of the fire commissioner, may extend the time for compliance, in accordance with rules and regulations to be promulgated. Before such application for a time extension shall be considered all required applications and plans must be filed and approved permits obtained and a good faith effort towards completion of the work shall have been made.

(g) Fire alarm or communication systems installed prior to December thirteenth, nineteen hundred eighty in existing office buildings one hundred feet or more in height, may be incorporated or installed in a modified class E fire alarm signal system provided they comply with the following:

(1) It shall be a special electrically supervised approved direct wire, radio or combination thereof fire alarm signal system consisting of an interior fire alarm and voice communicating system so arranged that the operation of any station will identify its location at the fire command station as required by section 27-975 of this article, at the mechanical control center and at the regularly assigned location of the fire safety director. This identification signal shall be accomplished by means of an information display system which shall be manually resettable from the fire command station only.

(2) The nomenclature used for the location identification system shall be subject to the approval of the fire commissioner.

(3) In addition to the visual devices required above, audible signal devices indicating operation of the fire alarm signal system shall be provided in the fire command station, mechanical control center and the regularly assigned location of the fire safety director. Provisions shall be made for silencing the audible signal and transferring this signal to lamp indication.

(4) Operation of a manual station shall automatically transmit a fire alarm signal to the fire department via a central office of an operating company franchised by the board of estimate, and cause the fire alarm signal system to sound continuously throughout the floor where activated and the floor above.

(5) The fire alarm signal may be sounded over loudspeakers [*sic*]as provided in reference standard RS 17-3B so located that their operation will be heard clearly above any ambient noise, and shall be controlled

from the fire command station in such a manner that the fire alarm signal can be sounded on the individual floors or throughout the building.

(6) The electrical supply for this modified fire alarm system, including the amplifiers, shall be in accordance with applicable laws, rules and regulations.

(7) An approved product of combustion ionization detecting device or a combination of an approved smoke detecting device and an approved fixed temperature thermostatic device shall be installed at each elevator landing. The device shall be located in the ceiling immediately above a call button. The activation of this device shall have the same effect as specified in subparagraphs a through e of paragraph eight of this subdivision and in addition cause the overriding of the programming for car stops of all automatic elevators serving the floor where activated and bring them non-stop to the floor levels designated by section 210.13C of reference standard RS 18-1.

(8) In buildings which are provided with air-conditioning and/or mechanical ventilation systems that serve more than the floor on which the equipment is located, the activation of any of the detectors installed in such air-conditioning and/or mechanical ventilation systems in accordance with the provisions of RS 13-1 of the reference standards shall:

a. cause the fire alarm signal system to sound continuously throughout the floor where activated and the floor above.

b. cause a fire alarm signal to be transmitted to the fire department via a central station of a franchised operating company.

c. cause the fire alarm signal system to sound at the fire command station required by section 27-975 of this article and to sound an alarm in the mechanical control center and at the regularly assigned location of the fire safety director, and to operate an information display system as provided in paragraph one of this subdivision.

d. stop the air supply into and the air return from the floor where activated by actuation of approved remote control reversible fire shutters or by automatically shutting down the air supply fans and the air return fans of the floor where activated, notwithstanding the provisions of sections 1001 through 1005 of RS 13-1 of the reference standards relating to air supply and air return controls in case of fire.

e. cause the activation of the air exhaust fans and dampers in smoke shafts and/or the pressurizing fans in stair enclosures.

(9) A building equipped throughout with an automatic sprinkler system including a water flow alarm shall be exempt from the installation of any detectors pursuant to paragraph seven of this subdivision and section 1006 of reference standard RS 13-1 provided the activation of the sprinkler water flow alarm shall have the same effect as specified in subparagraphs a through e of paragraph eight of this subdivision and in addition cause the overriding of the programming for car stops of all automatic elevators serving the floor where activated and bring them non-stop to the floor levels designated by section 210.13C of reference standard RS 18-1.

(10) Existing office buildings one hundred feet or more in height shall comply with the requirements of this subdivision on or before September thirteenth, nineteen hundred eighty-one. Complete plans of the installation shall be filed with the commissioner on or before June thirteenth, nineteen hundred eighty. A permit shall be secured from the commissioner on or before September thirteenth, nineteen hundred eighty. Where compliance with the time requirements of this paragraph would cause undue hardship, the commissioner, with the approval of the fire commissioner may extend the time for compliance, in accordance with rules and regulations to be promulgated. Before such application for a time extension shall be considered all required applications and plans must be filed and approved, permits obtained and a good faith effort towards completion of the work shall have been made.

(11) In existing office buildings one hundred feet or more in height where compliance would cause practical difficulty or undue hardship, the commissioner may waive or modify the requirements of paragraphs one through nine of this subdivision (g) and accept alternatives fulfilling the intent of these requirements.

(h) Buildings classified in occupancy group E, less than one hundred feet in height occupied or arranged to be occupied for an occupant load of more than one hundred persons above or below the street level or more than a total of five hundred persons in the entire building, and on or before January eighteenth, nineteen hundred seventy-five, existing office buildings less than one hundred feet in height, occupied or arranged to be occupied, as hereinabove specified, shall be provided with a system acceptable to the commissioner, which shall:

(1) consist of equipment which shall have the capability of two-way voice communication from a fire command station to the warden on each floor of the building and the mechanical control center, to be used for fire emergencies and fire drills.

(2) have the capability of transmitting a fire alarm signal from the fire command station to the fire department via a central station of a franchised operating company.

***(i) (1) High rise buildings classified in occupancy group C** shall be provided with a fire alarm and communication system meeting the requirements of subdivision (k) of this section and reference standard RS 17-3A.

2. Buildings classifed in occupancy group J-1, either seventy-five feet or more in height or containing thirty or more sleeping rooms (except "residential hotels" as such term is defined by the commissioner pursuant to rules and regulations) shall be provided

with a fire alarm and communication system meeting the requirements of subdivision (l) of this section and reference standard RS 17-3A. In lieu of fire warden stations, either of the following are acceptable as a two-way voice communications system:

Local Law 16-1987.

1. A closed circuit supervised fire department telephone system meeting the following conditions in complying with requirements of RS 17-3 as applicable to standpipe fireline telephone and signaling system:

a. Means on every floor to communicate by telephone with the fire command station. A permanent telephone shall be located at the fire command station. All other floors near the main riser shall be provided with telephones or telephone jacks. Telephones or jacks shall be installed in locked cabinets capable of being opened with a fire department standard key.

b. At least six portable telephones with jack connections shall be provided unless permanent telephones are installed at every required location. The portable telephones shall be kept in a cabinet located near the fire command station and shall be provided with a lock capable of being opened with a fire department standard key. Such cabinet shall be locked at all times and marked portable telephones for fire department use.

c. A pilot light shall be provided at the fire command station to indicate that the telephone is in use or that its receiver is off the hook; or

2. A fire communication slotted coaxial cable radio system installed to provide adequate communication capability throughout the building. Adequate communication is defined as the capability for clear two-way communication between a fire department portable radio at the lobby command post and another fire department portable radio at any other point in the building.

Such system shall be acceptable to the fire department.

***(j) (1) Existing buildings** seventy-five feet or more in height, classified in occupancy group J-1 (except "residential hotels" as such term is defined by the commissioner pursuant to rules and regulations) shall be provided with a fire alarm and communication system meeting all the applicable requirements of subdivision (m) of this section and reference standard RS 17-3B. In lieu of fire warden stations, either of the following is acceptable as a two-way voice communication system:

1. A closed circuit supervised fire department telephone system meeting the following conditions in complying with requirements of RS 17-3 as applicable to standpipe fireline telephone and signaling system:

a. Means on every floor to communicate by telephone with the fire command station. A permanent telephone shall be located at the fire command station. All other floors near the main riser shall be provided with telephones or telephone jacks. Telephones or jacks shall be installed in locked cabinets capable of being opened with a fire department standard key.

b. At least six portable telephones with jack connections shall be provided unless permanent telephones are installed at every required location. The portable telephones shall be kept in a cabinet located near the fire command station and shall be provided with a lock capable of being opened with a fire department standard key. Such cabinet shall be locked at all times and marked portable telephones for fire department use.

c. A pilot light shall be provided at the fire command station to indicate that the telephone is in use or that its receiver is off the hook; or

2. A fire communication slotted coaxial cable radio system installed to provide adequate communication capability throughout the building. Adequate communication is defined as the capability for clear two-way communication between a fire department portable radio at the lobby command post and another fire department portable radio at any other point in the building.

Such system shall be acceptable to the fire department.

(2) Existing buildings less than seventy-five feet in height and containing thirty or more sleeping rooms, classified in occupancy group J-1, shall be provided with a modified Class J-1 fire alarm and communications system as follows:

(a) A fire command station shall be provided at the entry floor level in accordance with the requirements of the fire commissioner.

(b) A public address system shall be provided acceptable to the fire commissioner capable of being easily heard (80 dbs at sixty feet) in all existing corridors, hallways, passageways and stairs.

(c) The approved existing interior fire alarm system shall be acceptable provided that it shall automatically transmit a fire alarm signal (when activated) to the fire department via a central station connection of an operating company which is franchised where applicable and which is acceptable to the fire department.

***(k) Buildings classified in occupancy group C**, seventy-five feet or more in height, shall be provided with a class C fire alarm and communications system which shall meet the criteria contained in paragraphs one through ten of subdivision (f) of this section and the criteria contained in subdivisions (a) and (b) of section 27-975 of this article.

***(l) Buildings classified in occupancy group J-1**, seventy-five feet or more in height or containing thirty or more sleeping rooms, shall be provided with a class J fire alarm and communication system which shall meet the criteria contained in paragraphs one through ten of subdivision (f) of this section and the criteria contained in subdivisions (a) and (b) of section 27-975 of this article**.**

***(m) Existing buildings classified in occupancy group J-1**, seventy-five feet or more in height, shall be provided with a modified class J fire alarm and communication system which shall meet the criteria contained in paragraphs one through nine of subdivision (g) of this section and the criteria contained in subdivisions

(a) and (b) of section 27-975 of this article.

***(n) All other occupancies** shall be provided with an individually coded closed circuit general fire alarm system when a fire alarm system is required.

Local Law 16-1987.

§[1704.6] 27-973 Location and identification of sending stations and sounding devices.-

(a) Location of sending stations.-

(1) There shall be at least one fire alarm sending station in each story of any building at all natural paths of egress to the street. The station shall be installed at a readily accessible location meeting the approval of the fire commissioner. The sending station shall be kept unobstructed at all times. Additional sending stations shall be installed so that no point on any floor is more than one hundred fifty feet from the nearest sending station in buildings of Group I construction and one hundred feet in buildings of Group II construction.

(2) All fire alarm stations installed or relocated after April first, nineteen hundred eighty-four, shall be installed so that the handle is approximately four feet from the floor.

(b) Location of sounding devices.-

(1) Sounding devices shall be of sufficient number so that the alarm shall be clearly audible to all the occupants of the building.

(2) The centerline of all gongs and signaling devices shall be located at least eight feet above the floor except that in locations where ceilings prevent the installation at this height, the centerline of the device shall be located six inches below the ceiling.

(3) Approved gongs shall be provided as the sounding devices. Where gongs are not audible, approved horns, chimes, or whistles may be installed subject to the approval of the fire commissioner.

(c) Location of instructions.-An approved instruction card, properly marked and framed under glass, shall be installed at each fire alarm station. Instruction cards for individually coded systems shall indicate the code designation and location of each sending station in the building.

(d) Fastening for devices.-All materials and devices used in fire alarm signal systems shall be securely fastened in position. The locations shall be selected by an architect or engineer, subject to the approval of the commissioner.

(e) Identification of equipment.-Fire alarm sending stations for all systems shall be painted red. A diagonal white stripe one inch wide from the upper left hand corner to lower right hand corner shall be painted or applied to sending stations which transmit a fire alarm signal to the fire department via a central station of a franchised operating company. The stripe shall not render any lettering illegible or obliterate the station number.

(f) Mixed occupancy buildings.-Where a building is subdivided by fire divisions, each building section may be treated as a separate building for the purpose of fire alarm signal system installations. One control board may be used, if so arranged as to operate the signaling devices in each building section independently.

(g) Subdivided occupancy.-In buildings requiring fire alarm signal systems, and in which parts are occupied by other than factory tenants and in which the fire department has approved the use of a local fire brigade, the commissioner may accept dual operation systems.

§[1704.7] 27-974 Standpipe fireline telephone and signaling systems.-

(a) In every building more than three hundred feet high, a telephone and signaling system shall be provided for fire department use in operating the standpipe system.

(b) Such system shall permit communication by permanent telephones in the pump rooms, on the entrance floor, and in gravity tank rooms communicating with floors, and by means of permanent or portable telephones on each floor near the main standpipe riser. The system shall be a selective ringing, common talking system supplied by a twenty-four volt direct current power source.

(c) Permanent wall telephones shall be provided with six inch gongs at each instrument. The telephones in the pump room shall be equipped with a loudspeaking receiver so that a voice can be distinctly heard at a distance of at least fifteen feet from the receiver. All other floors shall be provided with jacks protected by break-glass boxes, or with permanent telephones.

(d) At least three portable telephones with jack connections shall be provided for each standpipe installation, unless permanent telephones are installed at every required location. The portable telephones shall be kept in a cabinet located in the main hall of the entrance floor and shall be provided with a lock capable of being opened with a fire department standard key. Such cabinet shall be locked at all times. The panel of the cabinet door shall be conspicuously marked "portable telephone for fire department use."

(e) A pilot light shall be provided over the standpipe telephone cabinet in the entrance floor to indicate if the telephone is in use or a receiver is off the hook.

(f) Standpipe signaling devices.-

(1) Manual type individually coded sending stations shall be located in the main corridor of the building or other location meeting the approval of the commissioner. This system shall be so arranged that a coded signal will be transmitted to the alarm sounding devices. An eight inch gong shall be provided in the pump rooms, in elevator shafts at intervals not exceeding ten floors, and at such other locations selected by the architect or engineer, subject to the approval of the commissioner. All apparatus used in connection with the signaling system shall be of an approved type and installed as required by the provisions of reference standard RS 17-3 governing the installation of interior fire alarm

systems.

(2) Adjacent to each telephone station and near the main standpipe riser, there shall be provided an approved closed circuit strap key enclosed in a sheet metal box equipped with a paracentric fire department lock and approved hinges. The strap key shall be connected in series with the box circuit of the signal sending station.

(3) A card of instructions shall be placed in the pump room giving code numbers of signaling stations, the pressure obtainable at various speeds of the fire pumping motor, and such other information as the commissioner may direct.

(g) Where the building is subject to the provisions of subdivision (f) or (g) of section 27-972 of this article with respect to the requirement for a modified class E fire alarm signal system, the standpipe fireline telephone and signaling system may be combined with such fire alarm system provided:

(1) the alarms and two-way voice communication with the fire command station include the pump room and gravity tank or pressure tank room, and

(2) a designated floor station of the modified class E fire alarm signal system is located at or near the main standpipe riser on every floor.

§[1704.8] 27-975 Communication system and fire command station.-Buildings classified in occupancy group E, seventy-five feet or more in height, or, if less than seventy-five feet in height, with a total gross area of two hundred thousand square feet or more and existing office buildings one hundred feet or more in height, shall be provided with the following:

(a) a communication system acceptable to the commissioner consisting of:

(1) loud speakers on each floor of the building, in each elevator and each stair enclosure, which shall be capable of being operated from the fire command station.

(2) a two-way voice communication capability between the fire command station and the following locations:

a. a designated floor warden station on each floor
b. mechanical control center
c. elevators
d. air-handling control rooms
e. elevator machine rooms

(b) The fire command station shall be located in the lobby of the building on the entrance floor as part of the elevator control panel or immediately adjacent thereto. Such command station shall be adequately illuminated and shall contain the following:

(1) the loud speaker and communication capability described in subdivision (a) of this section.

(2) the audible alarm signal required in subdivision (f) and (g) of section 27-972 of this article.

(3) manually reset information display system to indicate the floor where the alarm was activated.

(4) means to control the sounding devices on any floor or throughout the building.

(5) means to manually transmit a fire alarm signal to the fire department via a central station of a franchised operating company.

(6) means for silencing the audible alarm signals when the loud speakers are in use and for activating the audible alarm systems automatically when use of the loud speakers are terminated. Switches used for this purpose shall be of the self-restoring type.

(7) display lamps to include on/off condition of air-handling systems unless such lamps are provided in the mechanical control center.

(8) means for testing the display lamps, local alarms and the connection to the central station of franchised operating company.

(c) Existing office buildings one hundred feet or more in height shall comply with the requirements of this section on or before September thirteenth, nineteen hundred eighty-one. Complete plans of the installation shall be filed with the commissioner on or before June thirteenth, nineteen hundred eighty. A permit shall be secured from the commissioner on or before September thirteenth, nineteen hundred eighty. Where compliance with the time requirements of this subdivision would cause undue hardship, the commissioner, with the approval of the fire commissioner, may extend the time for compliance, in accordance with rules and regulations to be promulgated. Before such application for a time extension shall be considered all required applications and plans must be filed and approved, permits obtained and a good faith effort towards completion of the work shall have been made.

§[1704.9] 27-976 Installation.-Installation, source of energy, wiring, and other requirements shall comply with reference standard RS 17-3, RS 17-3A or RS 17-3B as applicable.

§[1704.10] 27-977 Fire systems electrical tests.-Upon completion of a fire alarm system, and other electrical systems, the installation shall be subject to a test to demonstrate the efficiency of operation of all the components in the system and to an acceptance test by the fire department.

ARTICLE 6
SMOKE DETECTING DEVICES

***§[1705.1] 27-978 Definitions.-For the purposes of this article:**

a. an existing building is one which is within occupancy group J-1, occupancy group J-2 or occupancy group J-3 and for which plans have been approved by the department on or prior to December thirty-first, nineteen hundred eighty-one.

b. an improvement or alteration is a physical change in an existing structure other than painting, repairs and normal replacement of maintenance items.

c. a building shall be deemed to have been substantially improved or altered if:

1. the cost of improvement or alteration exceeds the sum of one hundred fifty thousand dollars, or

2. in either occupancy group J-1 or occupancy group J-2, fifty percent or more of the dwelling units or square feet of the structure are improved or altered and the cost of such improvement or alteration exceeds the sum of fifteen thousand dollars per dwelling unit, or

3. there has been a change in the occupancy or use of the structure.

Local Law 81-1989.

***§[1705.2] 27-979 Smoke detecting devices; where required.-**

(a) On and after January first, nineteen hundred eighty-two, all dwelling units within occupancy group J-1 and occupancy group J-2, except such units which contain operational automatic wet sprinkler systems pursuant to article four of this subchapter, and dwelling units in buildings within occupancy group J-3 shall be equipped with approved and operational smoke detecting devices as hereinafter provided. Buildings within occupancy group J-1 may, in the alternative, be equipped with a line-operated zoned smoke detecting system with central annunciation and central office tie-in for all public corridors and public spaces, pursuant to rules and regulations promulgated by the commissioner. The commissioner may, upon good cause shown, extend the period of compliance for occupancy groups J-1 and J-2 to June thirtieth, nineteen hundred eighty-two.

(b) Approved and operational smoke detecting devices shall be installed in mechanical rooms, electrical switch gear rooms and electric and telephone closets over seventy-five square feet in gross floor area in all buildings in all occupancy groups.

Local Law 81-1989.

§[1705.3] 27-980 Power sources of smoke detecting devices.-Dwelling units shall be equipped with smoke detecting devices receiving their primary power from the building wiring and there shall be no switches in the circuit other than the over-current device protecting the branch circuit; provided, however, that dwelling units in existing buildings may, in the alternative, be equipped with battery-operated smoke detecting devices except where such buildings are substantially improved or altered on or after January first, nineteen hundred eighty-two.

****§[1705.4] 27-981 General requirements for smoke detecting devices.-**

a. All smoke detecting devices required to be provided and installed pursuant to this article shall either be accepted pursuant to rules and regulations promulgated by the commissioner or be listed by a nationally recognized independent laboratory that maintains periodic inspections of production of listed equipment and whose listing states that the equipment meets nationally recognized standards. To meet the requirements of this article, such laboratory shall be one which maintains a periodic follow-up service of the devices to ensure compliance with the original listing.

b. No device shall be deemed to be in compliance with the provisions of this article unless it is of either the ionization chamber or photo-electric type. Such devices shall be in compliance with the requirements of reference standard RS 17-11 and shall be installed in a manner consistent with the requirements of reference standard RS 17-12 except that device within occupancy group J-1 shall be installed pursuant to rules and regulations promulgated by the commissioner.

****Local Law 49-1991.***

SUBCHAPTER 18
ELEVATORS AND CONVEYORS

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* *"C26" omitted from section numbers in this column.*

** *"27" omitted from section numbers in this column.*

ARTICLE 1 GENERAL

§[C26-1800.1] 27-982 Scope.-This subchapter shall establish the minimum safety requirements for, and control the design, construction, installation, alteration, maintenance, inspection, test and operation of, all elevators, dumbwaiters, escalators, moving walks, industrial lifts and loading ramps, automotive lifts, mechanical parking garage equipment, console or stage lifts, power operated scaffolds, amusement devices, and special hoisting and conveying equipment.

§[C26-1800.2] 27-983 Standards.-The provisions of reference standard RS-18 shall be a part of this subchapter.

§[C26-1800.3] 27-984 Definitions.-For definitions to be used in the interpretation of this subchapter, see subchapter two of this chapter.

§[C26-1800.4] 27-985 Plans.-For the requirements governing the filing of plans and the work to be shown on plans, see subchapter one of this chapter**.**

§[C26-1800.5] 27-986 Permits.-For the requirements governing equipment work permits and equipment use permits, see subchapter one of this chapter.

§[C26-1800.6] 27-987 General requirements.-All of the equipment listed in section 27-982 of this article shall be designed, constructed, altered and maintained as required by the provisions of this subchapter and reference standard RS-18.No piping or ductwork of any kind shall be permitted within hoistway or elevator enclosures except (i) as may be required for the elevator installation and (ii) low voltage wiring required or permitted by subchapter seventeen of this chapter provided that such wiring shall be protected within the hoistway or elevator enclosures in accordance therewith.

(a) Construction equipment.-Except for workers' hoists the provisions of this subchapter shall not apply to materials hoisting equipment for temporary construction use. For such equipment, the requirements of subchapter nineteen of this chapter shall apply.

(b) Portable equipment.-The provisions of this subchapter shall not apply to portable elevating devices used to handle materials only except as specifically provided in reference standard RS 18-5.

(c) Fire protection.-The fire resistance rating of hoistway enclosures shall be two hours and for hoistway doors and door assemblies the fire protection shall be one and one-half hours subject to the test procedures of subchapter five of this chapter.

(1) Vertical conveyors passing through floors shall be fire protected as required for shafts in subchapter five of this chapter.

(2) Inclined conveyors passing through floors shall be fire protected as required in reference standard 18-1 for escalators which are not a required means of egress.

(3) Horizontal conveyors passing through vertical fire divisions shall be fire protected as required in subchapter five of this chapter.

(d) Elevators required.-For provisions designating buildings in which elevators are required, see subdivision (c) of section 27-372 of article five of subchapter six of this chapter.

(e) Elevator mirrors.-In all multiple dwellings in which there are one or more self-service passenger elevators, there shall, pursuant to such regulations as the commissioner shall prescribe, be affixed and maintained in each such elevator a mirror which will enable persons prior to entering into such elevator to view the inside thereof to determine whether any person is in such elevator.

(f) Emergency signal equipment.-Elevators, other than private residence elevators, that are operated at any time without a designated operator in the car, shall be provided with emergency signal equipment in accordance with the requirements of reference standard RS 18-1.

(g) Elevators and escalators as exits.-Elevators shall not be accepted as a required means of egress. Elevators shall not be installed in a common enclosure with a stairway. Escalators shall be accepted as equivalent to stairs when they comply with the requirements of section 27-378 of article five of subchapter six of this chapter.

(h) Car switch operation.-Elevators with car switch operation shall be provided with a signal system by means of which signals can be given from any landing whenever the elevator is desired at that landing.

(i) Electrical requirements.-All electric work shall conform to the electrical code of the city of New York.

§[C26-1800.7] 27-988 Manlifts.-The installation of manlifts is governed by the requirements of reference standard RS 18-9, and such additional safety regulations as may be promulgated by the commissioner.

§[C26-1800.8] 27-989 Elevator in readiness.-

(a) Except as provided in subdivision (b) of this section, in every building seventy-five feet or more in height, all floors shall be served by at least one elevator which shall be kept available for immediate use by the fire department during all hours of the night and day, including holidays, Saturdays and Sundays. There shall be available at all times a person competent to operate the elevator, except that no attendant shall be required for buildings between seventy-five feet and one hundred fifty feet in height having elevators with automatic or continuous pressure operation with keyed switches meeting the requirements of reference standard RS 18-1 so as to permit sole use of the elevators by the fire department.

(b) In high rise buildings classified in occupancy group A, B, C, D, E, F, G or H, in buildings classified in occupancy group E with a gross area of two hundred thousand square feet or more, in buildings classified in occupancy group J-1 or J-2, in existing high rise buildings classified in occupancy groups C, F, G and H, in existing buildings classified in occupancy group J-1 (except "residential hotels," as such term is defined by the commissioner pursuant to rules and regulations) and in existing office buildings one hundred feet or more in height the number of elevators that shall be kept available for immediate use by the fire department as provided for in subdivision (a) of this section, shall be as follows:

(1) Where a floor is serviced by three or less elevator cars, every car shall be kept available.

(2) Where a floor is serviced by more than three elevator cars, at least three elevator cars with a total rated load capacity of not less than six thousand pounds shall be kept available for every floor. Such cars shall include not more than two cars which service all floors and at least one other car in another bank servicing that floor. If the total load capacity of all cars servicing the floor is less than six thousand pounds, all such cars shall be kept available.

(3) Such elevators which have automatic or continuous pressure operation shall be controlled by keyed switches meeting the requirements of reference standard RS 18-1.

(4) In high rise buildings classified in occupancy group A, B, C, D, E, F, G or H, in low rise buildings classified in occupancy group E with a gross area of two hundred thousand square feet or more and in buildings classified in occupancy group J-1 or J-2, all other automatically operated cars shall have manual operation capability.

(c) Notwithstanding the retroactive provisions of section 27-994 of article two of this subchapter:

(1) Existing office buildings one hundred feet or more in height shall comply with the requirements of this section by September thirteenth, nineteen hundred eighty-one. Complete plans of the installation shall be filed with the commissioner by June thirteenth, nineteen hundred eighty. A permit shall be secured from the commissioner by September thirteenth, nineteen hundred eighty.

(2) Existing high-rise buildings classified in occupancy group C, F, G or H and existing buildings classified in occupancy group J-1 subject to the requirements of this section shall comply with the requirements of this section on or before April first, nineteen hundred eighty-seven.

§[C26-1800.9] 27-990 Acceptance of equipment.-All equipment and devices regulated by the provisions of this subchapter shall be accepted or approved for use in accordance with the requirements of article eight of subchapter one of this chapter.

§[C26-1800.10] 27-991 Construction.-The construction, installation and alteration of all elevator and conveyor equipment and devices, shall be subject to the provisions of this subchapter and applicable reference standards as follows:

(a) Elevators, dumbwaiters, escalators and moving walks.-reference standard RS 18-1.

(b) Mechanized parking garage equipment.-reference standard RS 18-2.

(c) Automotive lifts.-reference standard RS 18-3.

(d) Industrial lifts and hinged loading ramps.-reference standard RS 18-4.

(e) Conveyors.-reference standard RS 18-5.

(f) Console or stage lifts.-reference standard RS 18-6.

(g) Workers' hoists.-reference standard RS 18-7.

(h) Power operated scaffolds.-reference standard RS 18-8.

§[C26-1800.11] 27-992 Alterations.-Alterations to elevators, escalators, dumbwaiters and other equipment provided for in this subchapter shall comply with the requirements of article four of subchapter one of this chapter. Minor alterations and ordinary repairs shall comply with the requirements of article five of subchapter one of this chapter except that elevator work shall not constitute a minor alteration or an ordinary repair when it is classified as alteration by the provisions of reference standard RS 18-1.

§[C26-1800.12] 27-993 Prohibited devices.-The installation of sidewalk elevators located outside the street line is prohibited.

ARTICLE 2 EXISTING INSTALLATIONS

§[C26-1801.1] 27-994 Retroactive provisions.-The provisions of this subchapter are not retroactive except that the provisions of this section are retroactive. Existing elevators moved to new hoistways shall conform with all the requirements for new installations. All alteration work on existing installations required by this section must be completed no later than December sixth, nineteen hundred seventy.

(a) Emergency interlock release switch.-Emergency interlock release switches in elevator cars, where provided, shall be of the key-operated, continuous-pressure type and all other types now in use shall be removed or replaced with approved key-operated, continuous-pressure type switches.

(b) Machines-belt and chain-driven.-Single-belted and chain-driven machines shall be permitted only on freight elevators and only when equipped with electrically released, spring applied brakes and with terminal stopping devices and electrical safety devices as required in reference standard RS 18-1.

(c) Machines-drum winding.-Drum winding machines shall be equipped with electrical machine limits as set forth in reference standard RS 18-1.

(d) Car gate switches-additions, replacement, or relocation of.-Car gate electric contacts where such devices are not provided or are found to be tied or blocked so as to render them inoperative shall be added, replaced or relocated as required by the commissioner. Installation or replacement of car gate electric contacts shall conform to the requirements of reference standard RS 18-1.

(e) Elevator hoistway-door interlocks.-All existing elevators not presently equipped with hoistway doors having door interlocks shall be provided with hoistway landing doors equipped with approved type hoistway-door interlocks conforming to the requirements of reference standard RS 18-1. Approved-type interlock switches may be installed in connection with existing hoistway door closers, provided the combination door closers and interlocks conform to all the requirements for approved hoistway-door interlocks. The use of elevator parking devices and hoistway door unlocking devices for opening hoistway doors from the landing side shall conform to the requirements of reference standard RS 18-1.Exceptions:

Interlocks or electric contacts shall not be used on hydraulic elevator landing doors or gates except where such elevators are provided with electric control and operating devices.

(f) Emergency signal or telephone.-Automatic operation elevators or any elevator operated at any time without a designated operator shall be provided with an audible emergency signal, and except in buildings classified in occupancy groups J-1, and J-2, the cars shall be provided with a telephone, in accordance with the requirements of reference standard RS 18-1.

(1) Elevators with car switch operation shall be provided with a signal system by means of which signals can be given from any landing whenever the elevator is desired at the landing.

§[C26-1801.2] 27-995 Existing sidewalk elevators.-Existing sidewalk elevators shall not be subject to the provisions of this section.

§[C26-1801.3] 27-996 Existing hand powered freight elevators.-Existing hand powered freight elevators shall not be subject to the provisions of this article. However, adequate protection of landing openings shall be provided by hinged or sliding doors which shall remain locked at all times except when the freight elevator is in use. Auxiliary gates not less than thirty-six inches in height, substantially constructed and secured in place, of wood or metal, or equivalent metal chains shall be installed. Such gates or chains may be arranged to lift vertically, to slide horizontally, or to swing. No part of any gate or chain may project into the freight elevator shaft. Gates may be operated automatically or manually.

§[C26-1801.4] 27-996.1 Locks on elevators and elevator hoistway doors.-Notwithstanding the retroactive provisions of section 27-994 of this article, in high rise buildings and existing high rise buildings, no switch, lock or device of any kind shall be installed on any floor on or above the street floor on any elevator car or elevator hoistway door, except elevators used exclusively for freight, that shall prevent opening of such doors by anyone not having a key, unless fire department access to cars and hoistways is provided for by a city-wide standard key as described in reference standard RS 18-1.

Existing high rise buildings shall comply with the requirements of this section on or before April first, nineteen hundred eighty-seven.

§[C26-1801.5] 27-996.2 Firemen service operation in existing elevators.-

(a) Notwithstanding the retroactive provisions of section 27-994 of this article, where required by reference standard RS 18-1, firemen service operation shall be installed in all existing elevators serving any of the following:

(1) High rise buildings or building sections classified in occupancy group C.

(2) All buildings or building sections classified in occupancy group F, G, H or J-1 (except for "residential hotels," as such term is defined by the commissioner pursuant to rules and regulations).

(b) All work necessary to meet the requirements of this section shall be completed on or before April first, nineteen hundred eighty-seven.

ARTICLE 3 TESTS AND TEST INTERVAL

§[C26-1802.1] 27-997 Acceptance tests.-No new, relocated or altered equipment shall be placed in operation until it has been tested and an equipment use permit has been issued by the commissioner. Such tests shall be made as required in section 27-999 of this article and shall be conducted by the person or firm installing, relocating or altering the equipment and shall be witnessed by a representative of the commissioner.

***§[C26-1802.2] 27-998 Periodic inspection and test intervals**.-Every new and existing device listed in article one of this subchapter except elevators located, (i) in owner occupied one-family or two-family dwellings provided that the elevator services only the owner occupied dwelling unit and that such dwelling unit is not occupied by boarders, roomers or lodgers, or (ii)within convents or rectories which are not accessible to non-occupants on a regular basis, or (iii) within an owner occupied dwelling unit which is not occupied by boarders, roomers or lodgers shall be inspected and tested at least at the following intervals:

(a) Elevators-five times every two years, or as otherwise provided by the commissioner and except:

(1) Car safeties and counterweight safeties, where provided, shall be inspected at intervals not exceeding one year and shall be tested at intervals not exceeding two years.

(2) Oil buffers and governors shall be periodically inspected and shall be tested at intervals not exceeding one year.

(3) Hydraulic elevator pressure tanks and the piston rods of roped hydraulic elevators every three years.

(b) Escalators-five times every two years.

(c) Amusement devices-every six months except that the commissioner may extend the periodic inspection and test for an additional two months for amusement devices located in premises which are seasonally operated.

(d) Workers' hoists-every three months and immediately following each increase in travel.

(e) All other devices-at such intervals as the commissioner may require.

(f) Additional inspections- in addition to the inspections required by subdivisions (a) through (e) of this section, the commissioner may make such additional inspections as required to enforce the provisions of this code. No fee shall be charged for such additional inspections.

(g) Fees-every owner of elevators and other devices shall pay to the department an inspection fee for each elevator or device in the amount prescribed by subdivision c of section 26-213 of title twenty-six of the administrative code.

Local Law 48-1991; Local Law 96-1985, language juxtaposed per Ch. 907-1985.

§[C26-1802.3] 27-999 Inspection and test requirements.-Every new and existing device listed in article one of this subchapter shall be subjected to inspections and test requirements as follows:

(a) Elevators, dumbwaiters and escalators to the requirements specified in the reference standard RS 18-1 except that:

(1) Governor operated elevator car safeties shall be tested with no load in the car at the lowest operating speed.

(2) Instantaneous type car safeties, without governors, operated only as a result of the breaking or slackening of the hoist ropes shall be tested with no load in the car.

(b) Moving walks to the requirements specified in the reference standard RS 18-1.

(c) Lifts, conveyors, and amusement devices shall be inspected and subjected to the test requirements of the applicable reference standards and shall be tested to confirm the load capacity and safety of operation of the equipment, including tests of all operating protective safety devices,

adequacy of the structural supports, and anchorage to floors, walls, ceilings and foundations.

(**d) All other devices** shall be subject to such inspections and tests as the commission[er]* may require.

Copy in brackets not enacted but probably intended.

§[C26-1802.4] 27-1000 Inspection agencies and elevator repair service.-

**(a) The required periodic inspections shall be made by the department except that two of the five inspections required every two years for elevators and escalators shall be made on behalf of the owner by an insurance company, elevator maintenance company, elevator manufacturer, elevator inspection company, or other person, each of which must be acceptable to the commissioner. The department shall promulgate rules and regulations establishing criteria as to the qualifications of such companies or persons. Such owner shall cause such inspections to be performed between January first and September fifteenth of each year. Reports by private inspection agencies shall be on such forms and in such manner as required by the commissioner. Such reports shall be delivered to the owner of each elevator or escalator inspected listing all violations of any of the provisions of this subchapter within five days of the inspection, and a signed copy of the report of each inspection shall be filed with the commissioner. The failure to have such inspection performed within the prescribed period and to file a copy of the report with the department on or before September thirtieth of each year shall be a violation of this section, which shall be punishable pursuant to the provisions of section 26-125 of title twenty-six of the administrative code. After such violation is placed the owner may file such report and the department shall enter a notation in its records of the date on which such report was received by the department. After the date of receipt by the department, the per diem penalty provided by subdivision c of section 26-125 of title twenty-six of the administrative code shall be stayed. The department shall maintain the violation on its records, with a notation of the date on which such report was received by the department. On or before October fifteenth of each year all defects as found upon such inspection shall be corrected.

(b) In addition to the requirements of subdivision (a) of this section, all reports filed on or after April first, nineteen hundred eighty-seven for existing buildings required to install stair and elevator signs pursuant to section 27-390, elevator in readiness systems pursuant to paragraph two of subdivision (c) of section 27-989 of article one of this subchapter or firemen service operation pursuant to section 27-996.02 of article two of this subchapter, shall contain a certification that the required installation has been made. The reports shall be on such forms and in such manner as the commissioner may require. Failure to file such report by such a date shall be a violation of this section, and shall be punishable pursuant to section 26-125 of title twenty-six of the administrative code.

(c) In multiple dwellings (either J1 or J2 occupancy groups), the owner shall be required to have a contract with an elevator repair person or company authorizing the performance of emergency elevator repair work. Such repair person or company shall be one of the elevator inspection agencies or inspectors employed thereby currently acceptable to the commissioner. The name, address and telephone number of such elevator repair person or company shall be maintained on each premises, in a location readily accessible to employees of this department, and maintenance or custodial staff at the premises.

Local Law 48-1991.

ARTICLE 4 EQUIPMENT PERMITS

§[C26-1803.1] 27-1001 Permit required.-No construction, alteration or removal shall be commenced until a written work permit therefor shall have been issued by the commissioner in accordance with the provisions of article seventeen of subchapter one of this chapter. No equipment shall be placed in operation until an equipment use permit has been obtained in accordance with provisions of article eighteen of subchapter one of this chapter and section 27-997 of article three of this subchapter.

§[C26-1803.2] 27-1002 Temporary use permits.-Temporary use permits may be issued by the commissioner upon request in accordance with the provisions of section 27-188 of article eighteen of subchapter one of this chapter for any equipment or device regulated herein, except power operated scaffolds. Temporary use permits for elevators shall be conditioned further upon compliance with the following:

(a) The class of service to be permitted is designated on the temporary permit.

(b) The hoistway has been enclosed throughout in an enclosure complying with subdivision (b) of section 27-987 of article one of this subchapter or with a temporary enclosure in accordance with the requirements for workers' elevators (temporary elevators) of the industrial code of the state of New York, rule no. 23.

§[C26-1803.3] 27-1003 Posting of temporary use certificate-The temporary operating certificate shall be posted in a conspicuous location on, or adjacent to, the device covered by the certificate and shall state that the device has not been finally approved by the commissioner.

***§[C26-1803.4] 27-1004 Posting of inspection certificate**.-a. At the time the equipment use permit is issued, an inspection certificate issued by the commissioner shall be posted. No such certificate shall be issued for elevators which are not

subject to periodic inspections pursuant to section 27-998. The certificate shall be in such form as determined by the commissioner and shall be posted in the car of every passenger and freight elevator and on or near every escalator and power operated scaffold and in a frame with a transparent cover.

b. In place of posting inspection certificates in those locations specified in subdivision a of this section, certificates may be kept in the on site building manager's office. In a building where this option is elected, there must be a building manager's office open during normal business hours, and there must be posted in each location specified in subdivision a of this section a notice in a frame with a transparent cover, or a plaque with an indelible inscription, stating that the inspection certificate is located in the building manager's office and identifying the location of such office.

******Local Law 39-1993; Local Law 96-1985, language juxtaposed per Ch. 907-1985.***

ARTICLE 5 EQUIPMENT OPERATION

§[C26-1804.1] 27-1005 Operators.-Every power driven passenger elevator and freight elevator with a rise of more than one story, except automatic operation and continuous pressure elevators and sidewalk elevators, shall be in charge of a designated competent operator, who shall be at least eighteen years old, free from serious physical or mental defects, and selected with consideration of his or her abilities to perform his or her duties in a careful and competent manner, and who has been instructed in accordance with the requirements of the commissioner, except as otherwise specifically provided by law. Operators of amusement devices that require the services of a regular operator shall be at least eighteen years of age and shall have secured a certificate of competence from the commissioner. If the commissioner finds that any person engaged in running an elevator or amusement device is not competent to operate the elevator or device, the owner, agent or lessee of such elevator or amusement device shall, upon notice from the commissioner, discontinue the operation of such elevator or amusement device by such operator. Other devices listed in article one of this subchapter shall, when deemed necessary by the commissioner, be in charge of a designated competent operator conforming to such qualifications as the commissioner may prescribe except that operators for workers' hoists shall be assigned as required by the applicable provisions of reference standard RS 18-7.

§[C26-1804.2] 27-1006 Accidents.-The owner or person in charge of the equipment or devices listed in article one of this subchapter shall promptly notify the commissioner of every accident involving injury to any person requiring the services of a physician or damage to property or to apparatus exceeding one hundred dollars on, about, or in connection with such equipment, and shall afford the commissioner every facility for investigating such accident or damage. The commissioner shall make an investigation immediately thereafter, and shall prepare a full and complete report of such investigation. Such report shall give in detail all material facts and information available and the cause or causes as far as they can be determined. Such report shall be open to public inspection at all reasonable hours. When an accident involves the failure or destruction of any part of the construction or operating mechanism of such equipment, no such equipment shall be used until it has been made safe, and re-inspected by the commissioner; and the commissioner may order the discontinuance of such equipment until a new use permit has been issued by him or her for its use. No part shall be removed from the premises of the damaged construction or operating mechanism until permission to do so has been granted by the commissioner.

SUBCHAPTER 19
SAFETY OF PUBLIC AND PROPERTY DURING CONSTRUCTION OPERATIONS

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ARTICLE 1 GENERAL

§[C26-1900.1] 27-1007 Scope.-The provisions of this subchapter shall govern the conduct of all construction operations with regard to the safety of the public and property. For the purposes of this subchapter, construction operations shall include excavation, erection, alteration, repair, removal and demolition as related to buildings. For regulations relating to the safety of persons employed in such construction operations, the provisions of subchapter ten of the labor law as implemented by the industrial code of the state of New York, rule no. 23, shall apply.

§[C26-1900.2] 27-1008 Definitions.-For definitions to be used in the interpretation of this subchapter, see subchapter two of this chapter.

§[C26-1900.3] 27-1009 General requirements.-
(a) A contractor engaged in building work shall institute and maintain safety measures and provide all equipment or temporary construction necessary to safeguard all persons and property affected by such contractor's operations.
(b) No structure, device, or construction equipment, whether permanent or temporary, including all partly or fully completed elements or sections of the building, shall be loaded in excess of its design capacity.
(c) At a height of no more than twelve feet above ground and on each perimeter of a construction site fronting on a public thoroughfare, a sign shall be erected no more than twenty-five square feet in size which shall bear in letters no less than six inches high, the name, address and telephone number of the owner of the property, and the name, address and telephone number of the general contractor.
(d) A construction site safety coordinator must be designated and present on a construction site in accordance with department rules and regulations.

§[C26-1900.4] 27-1010 Inspection.- Except for the installation of underpinning and the construction of temporary retaining structures (see section 27-724 of article thirteen of subchapter eleven of this chapter) and for other operations specifically required by the provisions of this subchapter to be inspected by an engineer or an architect, inspection of operations for compliance with the provisions of this subchapter may be performed by, or under, the authority of the person superintending the work. Unless required by the provisions of this subchapter, inspection and test reports relating to operations within the scope of this subchapter need not be filed.

§[C26-1900.5] 27-1011 Sizes and stresses of materials.-
(a) Sizes.-All sizes and dimensions prescribed in this subchapter are minimum requirements. Lumber sizes are nominal or commercial except where stated otherwise.
(b) Stresses.-Except where sizes are specifically prescribed in this subchapter, temporary equipment and constructions shall be designed so that the allowable stress values prescribed in subchapter ten of this subchapter are not exceeded.

§[C26-1900.6] 27-1012 Inspection.- Any construction equipment or device, except hand tools, that would affect the public safety when operated shall be inspected by the person superintending the work or by his or her designated representative before using the equipment or device on a specific job. Such inspection shall be carefully made, and every defect or unsafe condition shall be corrected before use is permitted. Any unsafe equipment or device shall be made safe immediately or removed from the site. Periodic inspection procedures

shall be instituted during construction operations, and a record of inspections shall be kept at the site for the duration of the work.

§[C26-1900.7] 27-1013 Utilities.-
(a) Existing services.-The location of all existing utilities and service lines shall be determined and adequate measures taken, or devices provided, to safeguard the public and property before such utilities are disturbed. If any utility is to be removed, relocated, or have its service interrupted, the utility company or city agency affected shall be notified at least seventy-two hours in advance.
(b) Maintaining essential services.-Fire preventive, sanitary, or other facilities that have been provided for the protection of life, health, and property shall be continuously maintained and protected unless authorization is obtained from the agency having jurisdiction to temporarily or permanently disconnect such facility.
(c) Electrical work.-All temporary electrical equipment and wiring shall meet the requirements of the electrical code of the city of New York, and shall be maintained to meet such requirements. Portions of permanent electrical installations may be used for temporary operations provided the requirements of the electrical code are met. At least seventy-two hours before work is begun that may affect a power line, above or below ground, the person superintending the work shall notify the utility company affected.

§[C26-1900.8] 27-1014 Fire protection.- Fire fighting equipment at the construction site and the conduct of all construction operations affecting fire prevention and fire fighting shall meet the requirements of the fire department.
(a) Temporary elevator.-Whenever in the course of building construction the work is at a height greater than seventy-five feet, at least one elevator meeting the requirements of subchapter eighteen of this chapter shall be kept in readiness at all times for fire department use.
(b) Standpipe systems.-Standpipe systems during construction operations shall comply with the following:
(1) If in the course of erection or alteration for which a standpipe system will be required the work reaches a height greater than seventy-five feet a permanent or temporary standpipe meeting the requirements of subchapter seventeen of this chapter shall be kept in readiness at all times for fire department use. The system shall be a dry system when freezing conditions may be encountered.
(2) In structures undergoing demolition which have existing standpipe systems, such systems shall be maintained as dry standpipes. When demolition is started, the standpipe risers shall be capped above the outlet on the floor immediately below the floor being demolished so as to maintain the standpipe system on all lower floors for fire department use. Standpipe hose, nozzles and spanners are not required to be maintained and may be removed at any time. Siamese hose connections shall be kept free from obstruction and shall be marked by a metal sign reading, "Standpipe Siamese Connection" and by a red light at night.
(3) The standpipe system may be used for water supply necessary to demolition operations. In freezing weather such standpipe system shall be completely drained after use to prevent freezing. Existing standpipe systems shall not be utilized to convey compressed air unless the standpipe consists of two or more risers in which event one of the risers may be used to convey compressed air to any floor or portion of the premises upon application to and permission from the fire department.
(4) In structures undergoing demolition which have existing sprinkler systems with siamese hose connections, such system shall be maintained as a non-automatic sprinkler system. When demolition starts, the sprinkler risers shall be capped immediately below the floor being demolished so as to maintain the sprinkler system on all lower floors for fire department use. Siamese hose connections shall be kept free from obstruction and shall be marked by a metal sign reading "Sprinkler Siamese Connection" and by a red light at night.

§[C26-1900.9] 27-1015 Design.-Whenever design is required by the provisions of this subchapter, such design shall be executed by, or under, the supervision of an engineer or an architect who shall cause his or her seal and signature to be affixed to any drawings or specifications that may be required for the work. All such documents shall be kept at the site for inspection by the commissioner for the duration of the job.

§[C26-1900.10] 27-1016 Alternate details and procedures.-Whenever "alternate" or "equivalent" details, materials or procedures are specified in this subchapter, they shall be permitted as provided in section 27-133 of article seven of subchapter one of this chapter. In the absence of specific criteria, the degree of structural safety shall be deemed to require a factor of safety against structural failure consistent with the requirements of subchapter ten of this chapter.

ARTICLE 2 MAINTENANCE OF SITE AND ADJACENT AREAS

§[C26-1901.1] 27-1017 Construction equipment.-
(a) Machinery.-All exposed, electrically charged, moving or otherwise dangerous parts of machines and construction equipment shall be located, guarded, shielded, or barricaded so as to prevent contact by the public.
(b) Services* lines and conduits.-Hose lines, wires, ropes, pipes, chains, etc., shall be located so that they

will not constitute a tripping hazard. Where it is necessary to carry such lines across sidewalks, or any public way, either they shall be suspended at least eight feet above the walks or suitable chamfered planks or a pedestrian bridge shall be provided.

(c) Contractors sheds.-Contractors sheds and offices located within thirty-feet of new construction or existing buildings shall be made of metal or other noncombustible material. Fire retardant treated wood may be used when protected from the weather.

* *As enacted but "Service" probably intended.*

**** §[C26-1901.2] 27-1018 Housekeeping**.-

(a) All areas used by the public shall be maintained free from ice, snow, grease, debris, equipment, materials, projections, tools, or other item, substance, or condition that may constitute a slipping, tripping, or other hazard.

****Local Law 61-1987.***

(b) When not being used, materials, equipment, and tools that might fall from levels above areas used by the public shall be kept away from edges or openings. When exterior walls are not in place, material piles shall be kept at least ten feet back from the perimeter of the building.

(c) Material may be stored within two feet of the edge of a building provided however that such material is stored not more than two stories below the stripping operation on concrete structures or the uppermost concrete floor on steel frame structures. Such material shall be secured against accidental movement. Storage of material on all other floors shall conform to paragraph (b) of this section and shall be secured when not being used.

(d) Waste dumpsters, debris boxes and skip boxes shall be secured and those containing material or debris shall be covered at the end of each work day. Such waste dumpsters, debris,*** boxes and skip boxes shall not be placed at the edge of the building at any time except when being moved from the floor or building.

(e) Sufficient containers of metal or other material acceptable to the commissioner shall be available for the storage of all garbage and debris. The containers shall be of three-quarter cubic yard minimum capacity.

*** *As enacted but comma probably intended to be omitted.*

§[C26-1901.3] 27-1019 Removal and storage of material.-

(a) Removal of waste material.-Combustible waste material or combustible debris shall not be permitted to accumulate, and shall be removed from the site at reasonable intervals, in accordance with the requirements of the fire department. No material shall be dropped or thrown outside the exterior walls of a building. Precautions shall be taken to prevent concrete or mortar washings, sand, grit, or any other material that would cause clogging from entering a sewer or drain. Provisions of the air pollution control code concerning precautions to prevent particulate matter from becoming airborne shall apply.

(b) Chutes.-When chutes are used for removal of material, they shall meet the following requirements:

(1) ENCLOSURE.-

a. Material chutes that are at an angle of more than forty-five degrees with the horizontal shall be entirely enclosed on all sides, except for openings at the floor levels for the receiving of materials. Such openings shall not exceed forty-eight inches in height, measured along the wall of the chute, and all openings, except the top opening, shall be closed and secured when not in use.

b. Chutes at an angle of less than forty-five degrees with the horizontal may be open on the upper side.

(2) CONSTRUCTION.-

a. Every chute used to convey waste material from a building shall be rigidly supported and braced throughout its height. Chutes less than twenty-four inches in maximum dimension shall be constructed of not less than one inch (nominal) wood or one-eighth inch thick steel. Chutes more than twenty-four inches in maximum dimensions shall be constructed of not less than two inch (nominal) wood or three-sixteenths inch thick steel.

b. Chutes shall be provided with a metal impact plate where material is forced to change direction while falling.

c. A gate shall be provided at the lower end of every chute to control the loading of material into trucks and to close the chute at all other times. Splashboards or baffles shall be erected to prevent materials from rebounding into the street or under the sidewalk shed.

d. A bumper or curb at least four inches by four inches in section shall be provided at each chute opening where such opening is level with, or below, the floor or platform. Every space between the chute and the edge of the opening in the floor or platform shall be solidly planked.

(3) FIRE RETARDANT CONSTRUCTION.-All chutes, constructed of combustible material shall be covered on the exterior with corrugated steel sheeting having a minimum thickness of 24 gage [*sic*] through their entire height or shall be constructed of non-combustible material when used in the following applications:

a. Chutes exceeding seventy-five feet in height.

b. Alteration, repair or partial demolition of buildings classified in occupancy groups H1 and H2.

(4) SUPPORTS.-All structural supports of material chutes shall be of noncombustible material.

(c) Storage of combustible material and equipment.-Storage of combustible material and other material and equipment that present a fire hazard shall meet the requirements of the fire department.

§[C26-1901.4] 27-1020 Obstruction of sidewalks and streets.-The requirements of the department of transportation shall apply with regard to the closing of streets or to the obstruction of any part thereof, except as hereinafter provided. Building department personnel are authorized to consider failure to display a current department of transportation permit for any street or sidewalk closing or obstruction not authorized by this code as a violation of this section; and to direct removal thereof**.**

§[C26-1901.5] 27-1021 Protection of sidewalks.- Unless the street is officially closed to the public during construction operations, the following minimum safeguards shall be provided for the protection of the public:

(a) Types of safeguards and when required.-

* (1) a. A sidewalk shed shall be erected when a structure higher than forty feet is to be constructed or a structure higher than twenty-five feet is to be demolished and the horizontal distance from the structure being built or demolished to the inside edge of the permanent or temporary walkway is equal to one-half or less of the height of the structure. No sidewalk shed shall be erected unless and until a special permit therefor has been issued by the department. Each applicant for a sidewalk shed permit shall state the reason the sidewalk shed is needed. The term of the sidewalk shed permit shall be one year, or upon the expiration of the contractor's insurance, if such time period is less than one year. No renewals of shed permits, except for new buildings under construction, will be given unless an architect or engineer conducts a thorough examination of that part of the premises on which work is being conducted and submits a report acceptable to the commissioner, which clearly documents the condition of the applicable part of the premises and the scope of work that has been performed thereon, and estimates the time needed to complete the work. To renew a shed permit for a new building under construction, each applicant shall file an application with the commissioner. All renewal applications shall include the name and address of the owner of the premises.

*_Local Law 93-1996;Local Law 33-1991._

b. Following the receipt of a permit to erect a sidewalk shed, the permit holder shall post a sign on the sidewalk shed. Such sign shall include the name, address, telephone number, and permit number of the permit holder. The sign shall also include the date that the permit expires. The sign shall measure twenty-five square feet.

(2) A sidewalk shed shall be erected regardless of the height of the structure or the horizontal distance between the structure and the sidewalk when material or debris is to be moved by a hoist, crane, derrick, or chute over a sidewalk or temporary sidewalk that is not closed to the public.

(3) A fence, in lieu of a sidewalk shed, may be constructed along the inside edge of the walkway or temporary walkway when a structure higher than forty feet is to be constructed or a structure higher than twenty-five feet is to be demolished and the horizontal distance from the structure being built or demolished to the inside edge of the permanent or temporary walkway is between one-half and three-quarters of the height of the structure. If permission to close the sidewalk has been obtained from the department of transportation, such fence may be erected along the curb or outside of the curb to such extent as may be approved by the department of transportation. The fence shall be returned at its ends to the extent necessary to effectively close off the site.

(4) For cases that do not fall within the circumstances described in paragraphs one through three of this subdivision, a standard guard rail (section 27-1050 of article eight of subchapter nineteen of this chapter), in lieu of a sidewalk shed or fence, may be constructed along the inside edge of such walkway or temporary walkway. If permission to close the sidewalk has been obtained from the department of transportation, the railing may be constructed along the curb or outside of the curb to such extent as may be approved by the department [*sic*] of transportation. The railing shall be returned at its ends to the extent necessary to effectively close off the site.

*(5) A sidewalk shed shall be erected when a portion of a facade over forty feet above curb level is being altered or repaired and the horizontal distance from the portion of the structure being altered or repaired to the inside edge of the temporary or permanent walkway is less than one-half the height of the structure being altered or repaired. Applications for sidewalk shed permits shall meet the requirements listed in paragraph one of this subdivision. Where a sidewalk shed is erected in conjunction with the repair of an unsafe condition of a facade, or for the repair of any other violation issued by the department, and such repairs have not been made, and the sidewalk shed has not been removed within two years from the date of issuance of the original sidewalk shed permit, in addition to any of the penalties provided for in section 27-129 of this code, the owner of the building shall be liable for a civil penalty in the amount of two hundred fifty dollars per month for every month or part thereof during which such sidewalk shed is not removed, unless such owner has submitted a report in compliance with section 26-252 of this code and the commissioner determines that the unsafe condition could not be repaired within such two-year period. Provided, however, that nothing in this paragraph shall be construed to prevent the commissioner, prior to the end of such two-year period, from taking action against the owner of a building for failure to repair an unsafe

condition pursuant to section 27-129 of this code or any rules and regulations promulgated thereunder.

*Local Law 33-1991.

**(6) Horizontal safety netting shall be provided on the sides of a structure more than six stories or seventy-five feet in height above the adjoining ground or adjoining roof level, whichever is applicable, when, while under construction, the facade of such structure is not enclosed and there is exposure to the public or adjacent property as determined in rules and regulations promulgated by the Commissioner. Vertical safety netting or screening shall be provided at the sides of a structure more than six stories or seventy-five feet in height above the adjoining ground or adjoining roof level, whichever is applicable, when, while under construction, the facade of such structure is not enclosed and is exposed to the public or adjacent property as determined by rules and regulations promulgated by the commissioner. In addition, safety netting shall be provided as required by section 27-1022.

**Local Law 61-1987.

(b) Sidewalk sheds.-

(1) Every sidewalk shed deck shall be designed and constructed to carry a live load of at least three hundred psf. However, a live load of one hundred fifty psf may be permitted for buildings less than one hundred feet in height provided there is no storage thereon. The members of the sidewalk shed shall be adequately braced and connected to prevent displacement or distortion of the framework. Where posts supporting the shed deck are placed beyond the curb, such posts shall be protected against displacement by vehicles.

(2) The deck of the sidewalk shed shall consist of planking closely laid, and made tight.

(3) Steel, or other materials having equivalent strength and suitability may be used in lieu of wood to construct sidewalk sheds.

(4) Where deemed necessary by the commissioner, the deck shall cover the entire width of the sidewalk, except for reasonably small clearances at the building line and the curb.

(5) Except as authorized by paragraph seven, sidewalk sheds shall extend at least the entire length of the property line of the structure unless constructed solely to comply with paragraph two of subdivision (a) of this section, and may extend beyond the curb to such extent as may be approved by the department of transportation.

(6) The outer side and ends of the deck of the shed shall be provided with a substantial enclosure at least three feet six inches high. Such enclosure may be vertical or inclined outward at approximately forty-five degrees, and shall consist of boards laid close together and secured to braced uprights, of galvanized wire screen not less than no. 16 steel wire gage with a one-half inch mesh, of corrugated metal, or of solid plywood. Temporary removal of portions of the enclosure shall be permitted for handling material.

(7) a. For all buildings one hundred feet or more in height, the deck and protective guards of the sidewalk shed shall be extended parallel with the curb at least twenty feet beyond the ends of all faces of the structure [regardless of whether such extensions are in front of the property being developed or in front of adjacent]*** property. Extensions of sidewalk sheds complying with the foregoing shall be constructed so as not to unreasonably obstruct, either visually or physically, entrances, egress, driveways and show windows of adjacent properties.

***Copy in brackets not enacted but probably intended.

b. All sidewalk sheds shall provide a protection for the full width of the shed extending upward at an angle of forty-five degrees from the ends of the deck and outward a horizontal distance of at least five feet beyond the ends of the shed. Such sloping end protection shall be constructed to meet the requirements of paragraph one of this subdivision with substantial outriggers bearing on and securely attached to, the deck.

(8) The passageway shall be wide enough to accommodate pedestrian traffic normal for that location without causing congestion; but in no case shall the width be less than four feet. The passageway shall have a minimum clear ceiling height of eight feet.

(9) Unless the top deck of the sidewalk shed is built solidly against the face of the structure in such a manner that no material can fall onto the sidewalk, the side of the shed toward the structure shall be solidly sealed with wood or other suitable material for the full height of the shed. Solid sliding or in swinging [*sic*] gates may be provided as necessary for the proper prosecution of the work.

*(10) The underside of the sidewalk sheds shall be lighted at all times either by natural or artificial light. The level of illumination shall be the equivalent of that produced by two hundred watt, thirty-four hundred lumen minimum, standard incandescent lamps enclosed in vandal-proof fixtures and spaced fifteen feet apart and eight feet above the floor level. Artificial lighting units shall be inspected nightly; and burned out or inoperative units shall be replaced or repaired immediately.

*Local Law 33-1991.

(11) When a sidewalk shed is required for the erection of a structure, construction of the structure shall stop at a height of forty feet unless, and until, the sidewalk shed has been completed. Such shed shall remain in place until the structure is enclosed, all exterior work completed and the sash is glazed above the second story, exterior of the facade is cleaned down, and all outside handling of material, equipment and machinery, and all dismantling of a material hoist, or climber or tower crane or the use of a derrick in their removal,

above the second story is completed.
(12) When a sidewalk shed is required for the demolition of a structure, the sidewalk shed shall be completed before any demolition work is performed. Such shed shall remain in place until the structure has been razed to the height of the shed and as long as necessary to meet the requirements of paragraph two of subdivision (a) of this section .
(c) Fences.-Fences shall be at least eight feet high, and constructed of wood or other suitable material. They shall be built solid for their entire length, except for openings with solid sliding or in swinging *sic*] gates as are required for the proper prosecution of the work, and for viewing panels, which shall be blocked with plexiglass or equivalent nonfrangible material.
(d) Openings in sidewalk sheds, fences, and railings.-Openings in sidewalk sheds, fences, and railings for loading purposes shall be kept closed at all times except during actual loading operations.
(e) Temporary walkways.-Where permission has been granted by the department of transportation to locate a temporary walkway beyond the curb line, such temporary walkway shall be provided with a standard guard rail (section 27-1050 of article eight of subchapter nineteen of this chapter) on the traffic side. All temporary walkways shall be illuminated at all times as required in paragraph ten of subdivision (b) of this section.
(f) Foot bridges.-
(1) When a temporary foot bridge is used as a sidewalk in front of a structure during construction work, the bridge shall be wide enough to accommodate normal traffic without congestion; but in no case shall it be less than four feet. The bridge, and steps or ramps, shall be designed and constructed to carry a live load of one hundred fifty psf. The walkway on such bridge shall be provided with standard guard rails for its entire length and shall be provided with steps at both ends or with inclined ramps at a maximum slope of one in four. Ramps shall have cleats to prevent slipping.
(2) Where planks are used to pave the walkway, they shall be laid close and securely fastened to prevent displacement. Planks shall be of uniform thickness, and all exposed ends on ramps shall be provided with beveled fillers to eliminate tripping hazards.
(3) Foot bridges shall be illuminated at all times as required in paragraph ten of subdivision (b) of this section.
****(g) Safety netting.-**
(1) When required to be installed horizontally, safety netting shall include a structural mesh lined with a fine mesh of a size and strength sufficient to catch falling tools and materials.
(2) When required to be installed vertically, safety netting or its equivalent shall include a fine mesh of a size and strength sufficient to contain falling tools and materials. Such netting shall be secured and kept closed at all times except during actual loading operations or perimeter construction operations.
(3) In addition to the requirements set forth in paragraphs one and two of this subdivision, required safety netting and its supports shall comply with reference standard RS 19-4 and all applicable rules and regulations promulgated by the commissioner. Scaffolding, screening or its equivalent shall comply with rules and regulations promulgated by the commissioner.
**
Local Law 61-1987.

****§[C26-1901.6] 27-1022 Safety netting and scaffolding.-**
(a) When required.-
(1) When demolishing the exterior walls or the roof of a structure more than six stories or seventy-five feet above the adjoining ground or adjoining roof level, whichever is applicable, horizontal safety netting shall be provided on the sides of a structure where there is exposure to the public or adjacent property as determined by rules and regulations promulgated by the Commissioner unless an exterior built-up scaffold providing equivalent protection has been erected. The horizontal safety netting or scaffolding shall be required in addition to the sidewalk sheds, fences, or railing required under section 27-1021 of this article, and shall be constructed and maintained not more than two stories or thirty feet below the story from which the exterior walls and roof are being removed until such demolition has progressed to within six stories or seventy-five feet of the ground level.
(2) When exterior walls are being constructed more than six stories or seventy-five feet above the adjoining ground or adjoining roof level, whichever is applicable horizontal safety netting shall be provided on the sides of the structure where the facade of such structure is not enclosed and is exposed to the public or adjacent property as determined by rules and regulations promulgated by the commissioner. Such safety netting shall be maintained at a level not more than two stories or thirty feet below the stripping operation on concrete structures or the uppermost concrete floor on steel frame structures and in addition, on such lower stories as required pursuant to rules and regulations promulgated by the commissioner.
(b) Debris shall be removed at least daily from safety netting provided in accordance with the requirements of this section.
(c) Storage of material.- Safety netting shall not be used for storing materials.
**
Local Law 61-1987.

§[C26-1901.7] 27-1023 Warning signs and lights.-
(a) Obstructions and openings.-Where a material pile or other obstruction, or an excavation, opening, or other hazard is located in, or adjacent to, a way open for use by persons other than workmen, such hazard shall be indicated by red flags or signs during daylight hours, and by red lanterns, red lights, oil flares, flashing beacons, lighted signs, or equivalent devices from sunset to sunrise. Such warning devices shall be located no more than thirty feet apart.
(b) Dangerous areas.-In areas where special danger to the public exists, such as at vehicle entrances and exits, hoisting areas, points of storage of explosives or highly flammable material, or discharge ends of chutes, descriptive warning signs shall be provided. Such warning signs shall contain the word "danger" in prominent letters and, where in, or adjacent to, a public way, shall be illuminated from sunset to sunrise. Barricades and/or designated personnel shall be provided to the extent necessary to keep the public away from such areas or to guide them around the areas.
(c) Vehicular traffic.-Whenever any work is being performed over, on, or in close proximity to a highway, street, or similar public way, control and protection of traffic shall be provided by barricades, signals, signs, flagmen, or other devices, equipment, and personnel in accordance with the requirements and standards of the department of transportation.

*§[C26-1901.8] 27-1024 Watchmen and flagmen.-
(a) Watchmen.-Where a building being constructed or demolished occupies a ground area of more than five thousand square feet, and up to forty thousand square feet, a competent watchman shall be on duty at the site during all hours when operations are not in progress. Where the construction or demolition area occupies a ground area of more than forty thousand square feet at least one additional watchman shall be on duty for each additional forty thousand square feet of construction or demolition area, or fraction thereof. Watchmen shall be familiar with the location of street fire alarm boxes and the location and use of fire fighting equipment required to be on the job site.
(b) Flagmen.-A flagman shall be provided whenever intermittent operations are conducted on, or across, areas open to use by persons other than workmen, or when dangerous operations, such as blasting, may affect such areas.
* *As enacted but nonsexist terms probably intended.*

§[C26-1901.9] 27-1025 Escape hatches required.-
(a) Where salamanders or other heating equipment are used to provide temporary heating during the placing of concrete for a floor, an escape hatch shall be provided from the floor where the concrete is being placed, which shall extend through at least one story immediately below such floor. The escape hatch shall be located as near to the center of the building as shall be practical.
(b) The escape hatch shall be constructed with at least two ladders enclosed in a metal shield. The ladders shall extend from a distance of three feet above the floor under construction to at least two stories below unless such floor is less than two stories above the lowest floor. The metal shield shall enclose the ladders on all sides from the top of the floor where the concrete is being placed to at least the top of the floor next below.
(c) The inside dimensions between faces of the shield shall be not less than three feet eight inches.
(d) The space between the shield and the perimeter of the opening in the floor under construction and also between the shield and the perimeter of the opening in the floor next below, shall be decked over with two inch or heavier planking covered with plywood or sheet metal so as to make the decking smoke tight. At the termination of the ladders the opening in the floor shall be covered completely with two inch planking or other material of equivalent strength.

ARTICLE 3 PROTECTION OF ADJOINING PROPERTY

§[C26-1902.1] 27-1026 General.-
(a) License to enter adjoining premises.-The provisions of chapter one of title twenty-six of the administrative code, as amended, shall apply.
(b) Physical examination.-
(1) When permission to enter upon adjoining property has been obtained, a physical examination of such property shall be conducted by the person initiating the construction or demolition operations prior to the commencement of the operations and at reasonable periods during the progress of the work.
(2) During demolition operations, the provisions of section 27-1037 of article six of this subchapter shall also apply.
(c) Adjoining walls.-When any construction operation exposes or breaches an adjoining wall, the contractor shall maintain the structural integrity of such wall and maintain all required fire exits and passageways or provide substitutions meeting the requirements of this code. Portions of the wall exposed by construction operations shall be protected against the elements, and shall be restored or left permanently protected after completion of operations.
(d) Weatherproof integrity of adjoining buildings.-Where the weatherproof integrity of an adjoining building is impaired by construction operations, the flashing shall be restored, copings replaced, or other necessary measures taken to restore the weatherproof integrity of such adjoining buildings. See paragraph three of subdivision (a) of section 27-1037 of article six of this subchapter.

§[C26-1902.2] 27-1027 Abandoned and discontinued operations.-

(a) Fencing.-If any construction operation is abandoned, discontinued or interrupted, a solid fence at least eight feet high shall be provided to protect the public from potential hazards on the site.

(b) Filing and grading**.-If an excavation has been completed or partly completed and discontinued or interrupted, and the required permit has expired under the provisions of section 27-196 of article nineteen of subchapter one of this chapter and a permit for a proposed building has not been issued within six months after the completion of such operations, the lot shall be filled and graded to eliminate all steep slopes, holes, obstructions, or similar sources of hazard. Fill shall consist of clean, noncombustible material. The final surface shall be graded in such a manner as to drain the lot, eliminate pockets in the fill, and prevent the accumulation of water, without damaging any foundations on the premises or on adjoining property.

** *As enacted but "filling" probably intended.*

§[C26-1902.3] 27-1028 Excavation or filling operations affecting adjoining property.-Whenever an excavation or fill is to be made that will affect safety, stability, or usability of adjoining properties or buildings, the adjoining properties or buildings shall be protected as required by the provisions of article four of this subchapter.

§[C26-1902.4] 27-1029 Foundation operations affecting adjacent properties.-Whenever subsurface operations are conducted that may impose loads or movements on adjoining property, such as driving of piles, compaction of soils, or soil solidification, the effects of such operations on adjoining property and structures shall be considered. The owner of the property that may be affected shall be given forty-eight hours written notice of the intention to perform such operations. Where construction operations will cause changes in the ground water level under adjacent buildings, the effects of such changes on the stability and settlement of the adjacent foundations shall be investigated and provision made to prevent damage to such buildings. When in the opinion of the commissioner a potential hazard exists, elevations of the adjacent buildings shall be recorded by an architect or engineer at intervals of twenty-four hours or less as determined by the commissioner to ascertain if movement has occurred.

§[C26-1902.5] 27-1030 Protection of trees.-No trees outside the street line shall be disturbed or removed without the permission of the commissioner of parks and recreation. Protection meeting the requirements of the department of parks and recreation shall be provided around the trunks of all such trees, and written notification shall also be made to the department of parks and recreation at least forty-eight hours prior to commencement of such work. No deleterious, caustic, or acid materials shall be dumped or mixed within ten feet of any such tree, nor shall salt for the removal of ice or snow be applied when runoff will drain to a tree.

ARTICLE 4 EXCAVATION OPERATIONS

§[C26-1903.1] 27-1031 General requirements.-The provisions of this section shall apply to all excavations, including those made for the purposes of taking earth, sand, gravel, or other material as well as for purposes of construction. The provisions of article three of this subchapter as applicable shall apply. The provisions of subchapter seven of chapter one of title twenty-six of the administrative code, as amended, shall also apply.

(a) Support of adjoining ground.-

(1) RETAINING STRUCTURE REQUIRED.-When the regulation of a lot requires the ground on such lot to be raised or lowered and kept higher than the ground of an adjoining lot, provided the ground of such adjoining lot is not maintained at a grade lower than in conformity with the street or streets on which it is situated, or where an excavation has been made or a fill placed on any lot meeting the curb level requirements, and the adjoining land is maintained at a grade in conformity with or lower than the street or streets on which it is situated, and is without permanent structures other than frame sheds or similar structures, a retaining structure shall be constructed as required for the safe support of the adjoining ground and unless the bank between the adjoining properties is maintained at a safe angle of repose. Any necessary retaining wall shall be built and maintained jointly by the owners on each side, unless otherwise agreed to by both owners.

(2) SURPLUS RETAINING STRUCTURE.-Where any owner shall insist on maintaining his or her ground either higher or lower than the legal regulation prescribed in the administrative code, the surplus retaining structure that may be necessary to support such height or provide for such excavation shall be made and maintained at the sole expense of such owner, and any additional thickness that may be required shall be built on the land of such owner.

(3) REMOVAL OF RETAINING STRUCTURES-Any retaining structure erected as provided under paragraphs one and two of this subdivision, standing partly on the land of each owner, may be removed by either owner when the original reason for the erection of such retaining structure ceases to exist.

(b) Support of adjoining structures.-

(1) EXCAVATION DEPTH MORE THAN TEN FEET.-When an excavation is carried to a depth more than ten feet below the legally established curb level the person who causes such excavation to be made shall, at all times and at his or her own expense, preserve and

protect from injury any adjoining structures, the safety of which may be affected by such part of the excavation as exceeds ten feet below the legally established curb level provided such person in afforded a license to enter and inspect the adjoining buildings and property.

a. Such person shall support the vertical load of the adjoining structure by proper foundations, underpinning, or other equivalent means where the level of the foundations of the adjoining structure is at or above the level of the bottom of the new excavation.

b. Where the existing adjoining structure is below the level of the new construction, provision shall be made to support any increased vertical or lateral load on the existing adjoining structure caused by the new construction.

c. Where the new construction will result in a decrease in the frost protection for an existing foundation below the minimums established in subchapter eleven of this chapter, the existing foundation shall be modified as necessary to restore the required frost protection.

(2) EXCAVATION DEPTH TEN FEET OR LESS.-Where an excavation is carried to a depth of ten feet or less below the legally established curb level, the owner of the adjoining structure shall preserve and protect the safety of his or her structure provided such owner is afforded a license to enter and inspect the property where the excavation is to be made.

(c) Support of party walls.-Where a party wall will be affected by excavation, regardless of the depth, the person who causes the excavation to be made shall preserve such party wall at his or her own expense so that it shall be, and shall remain, in a safe condition.

(d) Drainage.-All excavations shall be drained and the drainage maintained as long as the excavation continues or remains. Where necessary, pumping shall be used. No condition shall be created as a result of construction operations that will interfere with natural surface drainage. Water courses, drainage ditches, etc., shall not be obstructed by refuse, waste building materials, earth, stones, tree stumps, branches, or other debris that may interfere with surface drainage or cause the impoundment of surface waters.

(e) Access.-Every excavation shall be provided with safe means of ingress and egress kept available at all times.

§[C26-1903.2] 27-1032 Protection of sides of excavations.-

(a) Shoring and bracing and sheeting.-With the exception of rock cuts, the sides of all excavations, including related or resulting embankments, five feet or greater in depth or height measured from the level of the adjacent ground surface to the deepest point of the excavation, shall be protected and maintained by shoring, bracing and sheeting, sheet piling, or by other retaining structures. Alternatively, excavated slopes may be inclined not steeper than forty-five degrees or stepped so that the average slope is not steeper than forty-five degrees with no step more than five feet high, provided such slope does not endanger any structure, including subsurface structures. All sides or slopes of excavations or embankments shall be inspected after rainstorms, or any other hazard-increasing event, and safe conditions shall be restored. Sheet piling and bracing used in trench excavations shall be at least equivalent in strength to that specified in tables 19-1 and 19-2.

(b) Guard rail.-In addition to the requirements of section 27-1021 of article two of this subchapter, a standard guard rail or a solid enclosure at least three feet six inches high shall be provided along the open sides of excavations, except that such guard rail or solid enclosure may be omitted from a side or sides when access to the adjoining area is precluded, or where side slopes are one vertical to three horizontal or flatter.

(c) Placing of construction material.-Excavated material and superimposed loads such as equipment, trucks, etc., shall not be placed closer to the edge of the excavation than a distance equal to one and one-half times the depth of such excavation, unless the excavation is in rock or unless the sides of the excavation have been sloped or sheet piled (or sheeted) and shored to withstand the lateral force imposed by such superimposed loads. When sheet piling is used, it shall extend at least six inches above the natural level of the ground. In the case of open excavations with side slopes, the edge of excavation shall be taken as the toe of the slope.

(d) Mechanical diggers.-Where trenching more than five feet in depth is done by a mechanical digger, the required protection shall follow the boom as closely as practical.

TABLE 19-1 MINIMUM SIZES OF TIMBER BRACING AND TIMBER SHEET PILING FOR TRENCHES FOUR FEET WIDE OR LESS[a]

Depth of Trench, (ft.)	Sheet Piling Size (in.)	Sheet Piling Horizontal Spacing (ft.)	Stringers Size (in.)	Stringers Vertical Spacing (ft.)	Cross Bracing Size (in.)	Cross Bracing Horizontal Spacing (ft.)
			Hard and solid soil			
5-10……	2 x 6	6	2 x 6	6	2 x 6	6
10-15……...	2 x 6	4	2 x 6	6	2 x 6	4
More than 15...	2 x 6	tight	4 x 8	4	4 x 8	6
			Soil likely to crack or crumble			
5-10……	2 x 6	3	2 x 6	5	2 x 6	5
10-15……...	2 x 6	2	2 x 6	4	2 x 6	4
More than 15...	2 x 6	tight	4 x 10	4	4 x 10	6
			Soft, sandy filled-in loose soil			
5-10……	2 x 6	tight	4 x 6	6	4 x 6	6
10-15……...	2 x 6	tight	4 x 6	5	4 x 6	6
More than 15...	2 x 6	tight	4 x 12	4	4 x 12	6
			Where hydrostatic pressure exists			
To 10……...	2 x 6	tight	6 x 8	4	6 x 8	6
More than 10...	3 x 6	tight	6 x 10	4	6 x 10	6

Note for Table 19-1:

[a]Steel sheet piling and bracing of equivalent strength may be substituted for wood sheet piling and timber bracing.

TABLE 19-2 MINIMUM SIZES OF TIMBER BRACING AND TIMBER SHEET PILING FOR TRENCHES FOUR TO EIGHT FEET WIDE[a]

Depth of trench, (ft.)	Sheet Piling Size (in.)	Sheet Piling Horizontal Spacing (ft.)	Stringers Size (in.)	Stringers Vertical Spacing (ft.)	Cross Bracing Size (in.)	Cross Bracing Horizontal Spacing (ft.)
			Hard and solid soil			
5-10……	2 X 6	6	4 X 6	4	4 X 6	6
10-20……...	2 X 6	tight	6 X 6	4	6 X 6	6
More than 20...	2 X 6	tight	6 X 8	4	6 X 8	6
			Soil likely to crack or crumble			
5-10……	2 X 6	3	4 X 6	4	4 X 6	6
10-20……...	2 X 6	tight	6 X 6	4	6 X 6	6
More than 20...	2 X 6	tight	6 X 8	4	6 X 8	6
			Soft, sandy filled-in loose soil			
5-10……	2 X 6	tight	4 X 6	4	4 X 6	6
10-20……...	2 X 6	tight	6 X 6	4	6 X 6	6
More than 20...	2 X 6	tight	6 X 8	4	6 X 8	6
			Where hydrostatic pressure exists			
To 10……...	2 X 6	tight	6 X 8	4	6 X 8	6
More than 10...	3 X 6	tight	6 X 10	4	6 X 10	6

Note for Table 19-2:

[a]Steel sheet piling and bracing of equivalent strength may be substituted for wood sheet piling and timber bracing.

ARTICLE 5 ERECTION OPERATIONS

§[C26-1904.1] 27-1033 Protection of sidewalks.-The provisions of section 27-1021 of article two of this subchapter as applicable shall apply.

§[C26-1904.2] 27-1034 Structural steel assembly.-

(a) Placing of structural members.-

(1) During the placing of a structural member, the load shall not be released from the hoisting rope until the member is securely supported.

(2) Open web steel joists that are hoisted singly shall be

transferred from their place of storage directly to their permanent location and safely secured. No load shall be placed on open web steel joists until they are permanently fastened in place.

(b) Tag lines.-While structural members or assemblies are being hoisted, tag lines shall be used to prevent uncontrolled movement.

(c) Erection of trusses.-All trusses shall be laterally braced or guyed as necessary for the safety of the structure.

(d) Erection of frames.-All structural frames shall be properly braced with shores or guyed cables and turnbuckles as necessary for the safety of the structure.

§[C26-1904.3] 27-1035 Concrete formwork.-

(a) General requirements.-

(1) Formwork, including all related braces, shoring, framing, and auxiliary construction shall be proportioned, erected, supported, braced, and maintained so that it will safely support all vertical and lateral loads that might be applied until such loads can be supported by the permanent construction.

(2) Vertical and lateral loads shall be carried to the ground by the formwork system, by the new construction after it has attained adequate strength for that purpose, or by existing structures.

(3) Forms shall be properly braced or tied together so as to maintain position and shape, and shall conform to the sizes and shapes of members as shown on the design drawings.

(4) Ramps and runways shall meet the requirements of article nine of this subchapter.

(b) Inspection.-

(1) Formwork, including shores, reshores, braces, and other supports, shall be inspected by an engineer or architect to verify the sizes of the concrete members being formed, as provided in article five of subchapter ten of this chapter. In addition, such forms shall be inspected for conformance with the form design drawings, when such drawings are required by the provisions of subdivision (c) of this section; and/or conformance with the provisions of this section. Such inspections may be made by the person superintending the work. Both such inspections shall be made prior to placement of reinforcing steel. Subsequently, inspections shall be made by the person superintending the work periodically during the placement of concrete to detect incipient problems.

(2) During and after concreting, the elevations, camber, and vertical alignment of formwork systems shall be checked using tell-tale devices.

(3) A record of all such inspections shall be kept at the site available to the commissioner, and the names of the persons doing the inspecting and the name of the foreman in charge of formwork shall be posted in the field office.

(c) Design of concrete formwork.-Wherever the shore height exceeds fourteen feet or the total load on the forms exceeds one hundred fifty psf, or wherever power buggies or two-stage shores are used, the forms, including shoring foundation, shall be designed as provided in section 27-1015 of article one of this subchapter, and shall be constructed in conformance with such design. Formwork drawings shall be prepared. The allowable stresses for design shall meet the requirements of subchapter ten of this chapter. A copy of the design drawings and any construction drawings and specifications shall be kept on the job available to the commissioner.

(1) VERTICAL LOADS.-Vertical loads shall include the total dead and live loads. Dead load shall include the weight of formwork plus the weight of the reinforcement and fresh concrete. Live load shall allow for the weight of workers and equipment, with allowance for impact, but in no case shall less than twenty psf be allowed.

(2) LATERAL CONCRETE PRESSURE.-Design of forms, ties, and bracing shall assume that minimum lateral pressures of fresh concrete are as shown in table 19-3.

TABLE 19-3 MINIMUM LATERAL PRESSURES TO BE ASSUMED FOR FRESH CONCRETE WEIGHING 150 POUNDS PER CUBIC FOOT

Type of Work	Minimum Lateral Pressure Assumed (psf)	Limitations
Columns: Ordinary work with normal internal vibration	$p = 150 + \frac{9000R}{T}$	Maximum 3,000 psf or 150h, whichever is less
Walls: Rate of placement at 7 ft. per hr. or less	$p = 150 + \frac{9000R}{T}$	Maximum 2,000 psf or 150h, whichever is less
Walls: Rate of placement at greater than 7 feet per hr.	$p = 150 + \frac{43400}{T} + \frac{2800R}{T}$	Maximum 2,000 psf or 150h, whichever is less
Slabs	$p = 150h$	None

Where:

R = rate of placement, ft. per hr.

T = temperature of concrete in the forms, deg. F.

h = height of fresh concrete above point considered, ft.

Notes for Table 19-3:

[a] Allowances for change in lateral pressure shall be made for concrete weighing [*sic*] other than one hundred fifty pcf; for concrete containing pozzolanic additions or cements other than type I, for concrete having slumps greater than six in., or for concrete consolidated by revibration or external vibration of forms.

[b] Where retarding admixtures are employed under hot weather conditions an effective value of temperature less than that of the concrete in the forms shall be used in the above formulae.

[c] If retarding admixtures are used in cold weather, the lateral pressure may be assumed as that exerted by a fluid weighing [*sic*] one hundred fifty pcf.

(3) EXTERNAL LATERAL LOADS.-

a. Braces and shores shall be designed to resist all external lateral loads such as wind, cable tensions, inclined supports, dumping of concrete, and starting and stopping of equipment.

b. In no case shall the assumed value of lateral load due to wind, dumping of concrete, and equipment acting in any direction at each floorline be less than one hundred plf edge or two percent of total dead load of the floor, whichever is greater.

c. Except for foundation walls that are poured against a rigid backing, wall forms shall be designed for a minimum lateral load of ten psf, and bracing for wall forms shall be designed for a lateral load of at least one hundred plf of wall, applied at the top. The lateral load acting on walls greater than fourteen feet high shall be determined by analysis of conditions applicable to the site and building.

(4) SPECIAL LOADS.-The formwork shall be designed for any special conditions of construction likely to occur, such as unsymmetrical placement of concrete, impact of machine-delivered concrete, uplift, and concentrated loads.

(5) SHORING AND BRACING.-

a. When patented or commercial devices that are not susceptible to design are used for shoring, bracing, or splicing, they shall be approved.

b. Splices shall develop the full strength of the spliced members.

c. Where shore height exceeds ten feet, or when necessary to provide structural stability, diagonal bracing shall be provided. Struts, anchored into masonry or to panel joints of adjacent braced bays, may be used to prevent buckling of individual members not supported by the diagonal bracing; but, bracing an entire tier of shores with struts without diagonal bracing will not be permitted unless the system can be demonstrated to be braced by other rigid construction.

d. The unbraced length of shores shall not exceed the maximum length determined in accordance with the applicable reference standard in subchapter ten of this chapter for the structural material used.

(6) FOUNDATIONS.-Foundations for shores more than ten feet high and supported on the ground shall be designed.

(7) SETTLEMENT.-Falsework shall be so constructed that vertical adjustments can be made to compensate for take-up and settlements. Wedges, jacks, or other positive means shall be provided for this purpose.

(8) POWER BUGGIES.-For special requirements for runways, ramps, and platforms used by power buggies, see section 27-1053 of article nine of this subchapter.

(d) Construction.-

(1) Field constructed lap splices, other than approved devices, shall not be used more often than for every other shore under slabs or for every third shore under beams, and shall develop the full strength of the members. Such spliced shores shall be uniformly distributed throughout the work. Splices shall not be located near the midheight of the shores unless lateral support is provided, nor midway between points of lateral support.

(2) Vertical shores for multifloor forms shall be set plumb and in alignment with lower tiers so that loads from upper tiers are transferred directly to the lower tiers, or adequate transfer members shall be provided. Provision shall be made to transfer the lateral loads to the ground or to completed construction of adequate strength.

(3) Vertical shores shall be so erected that they cannot tilt, and shall have firm bearing. Inclined shores and the bearing ends of all shores shall be braced against slipping or sliding. The bearing surfaces shall be cut square and have a tight fit at splices.

(4) Runways for moving equipment shall be provided with struts or legs as required, and shall be supported directly on the formwork or structural member and not on the reinforcement.

(5) Any unsafe condition or necessary adjustment revealed by inspection shall be remedied immediately. If, during construction, any weakness develops and the falsework shows any undue settlement or distortion, the work shall be stopped, the affected construction removed if permanently damaged, and the falsework strengthened.

(e) Removal of forms and shoring.-
(1) Forms shall be removed in such a manner as to assure the complete safety of the structure.
(2) Where the structure as a whole is supported on shores, then beam and girder sides, columns, and similar vertical forms may be removed after twenty-four hours provided the concrete is sufficiently hard to withstand damage thereby. In no case shall the supporting forms or shoring be removed until the members have acquired sufficient strength to support safely their weight and the load thereon.
(3) The results of control tests, including concrete cylinder specimens prepared in accordance with reference standard RS 10-52, cast-in-place cores, or other device which will produce test specimens representative of the condition of the concrete in place, of suitable size and proportions, and approved by the architect or engineer shall be deemed evidence that the concrete has attained sufficient strength or such strength as may be specified on the drawings. The contractor may submit alternate methods of stripping, reshoring, and strength control for approval by the architect or engineer and subject to review by the commissioner.
(f) Reshoring.-Reshoring shall be provided to support the construction where forms and shores are stripped before the concrete has gained adequate strength to support the superimposed loads due to construction above.
*(1) INSTALLATION LIMITATIONS.-Reshores of wood or metal shall be screw adjusted or jacked and locked or wedged. Wedges shall not be used within ten feet of the facade or at such other locations as determined by rules and regulations promulgated by the commissioner. Reshores shall not be jacked or screwed so tight that they preload the floor below or remove the normal deflection of the slab above. In no case shall shores be so located as to significantly alter the pattern of stresses determined in the original structural analysis or to induce tensile stresses where reinforcing bars are not provided. Reshores within ten feet of the facade shall be secured.
*
Local Law 61-1987.
(2) BRACING. - Lateral bracing shall be provided during reshoring operations, and reshores shall be located as close as practical to the same position on each floor to provide continuous support from floor to floor.
(3) RESHORING BEAM AND GIRDER CONSTRUCTION.- Where reshoring of beam and girder construction is required, the forms shall not be removed from more than one girder at a time, and the girder shall be reshored before any other supports are removed. After the supporting girders are reshored, the form shall be removed from one beam with its adjacent slabs and the beam shall be reshored before any other supports are removed. Slabs spanning ten feet or more shall be reshored along the center line of the span.
(4) RESHORING FLAT SLABS.-Where reshoring of flat slab construction is required, the shores for the area within the intersection of the middle strips of each panel shall be left in place at all times until the concrete has attained sufficient strength to support the loading to which it will be subjected. After the other shores in each panel have been removed, reshores shall be placed on the column lines at [*sic*] the mid-points between columns, before the next panel is stripped.
(g) Slip form construction.-
(1) The applicable provisions of subdivision (c) of section 27-1035 of this article shall apply.
(2) All slip forms shall be designed, and the construction and sliding operations shall be carried out under the personal supervision of the person superintending the work or his or her designated representative.
(3) Lateral and diagonal bracing for forms shall be provided to insure that the shape of the structure will not be unduly distorted during the sliding operation.
(4) Jacks shall be spaced, anchored, and operated in such a manner that the vertical load on all jacks is approximately equal and does not exceed the capacity of any jack. Jacks shall be provided with automatic holding devices.
(5) Forms shall be leveled before and after they are filled, and shall be maintained level throughout the slide. Drifting of the forms from alignment or designed dimensions, and torsional movement shall be prevented. Horizontal and vertical alignment of structure shall be checked at least once during every twenty-four hours that the slide is in operation.
(h) Lift method construction.-
(1) The casting bed and supporting construction shall be designed to carry the dead load of the stacked slabs and any live load that may be imposed.
(2) Slabs shall not be lifted until the concrete has attained adequate strength to support its own weight and any superimposed loads without exceeding the stress values established in subchapter ten of this chapter.
(3) Lifting of all parts of the slab shall be approximately simultaneous and at a uniform rate. The lifting equipment shall be constantly engaged to prevent slippage or retrogression of the slab during lifting operations.
(4) Care shall be taken to insure that collar keyholes or other lifting attachment openings are in direct vertical alignment for all slabs. Wedges shall be inserted between the collar opening and column to maintain clearance on all sides of the column. Blockouts shall be provided to prevent concrete from entering space between collar and column as well as the lifting attachment openings.
(5) Temporary bracing for lateral support of columns shall be provided during lifting operations and shall remain in place until its function can be assumed by permanent connections of slabs to columns, permanent

bracing walls, or other means of lateral support, unless it can be shown that all columns, their base connections to footings, the footings, and soil are adequate as a cantilever system to resist all prescribed lateral forces.
(6) The assumed value of lateral forces in lift slab construction due to unsymmetrical loads, lifting reactions, or wind shall be at least fifty plf of floor edge or one percent of the total load lifted, whichever is greater.
(7) No person shall be allowed to enter the area immediately under slabs during the actual movement of lifting nor shall any construction operations be commenced in this area, other than fixing the connections of slabs to columns or providing other positive supports, until such connections or supports are completed and the load of all lifted slabs has been transferred from lifting equipment thereto.
(i) Prestressed construction.-Solid safety shields shall be provided at end anchorages of prestressing beds, or where necessary, for protection against breakage of prestressing strands, cables, or other assemblies during prestressing or casting operations.

ARTICLE 6 DEMOLITION OPERATIONS

§[C26-1905.1] 27-1036 Preparations.-
(a) Utilities and service lines.-The provisions of section 27-1013 of article one of this subchapter and article fourteen of subchapter one of this chapter shall apply.
(b) Condition of structure.-Where a structure to be demolished has been partially wrecked or weakened by fire, flood, explosion, age, or other causes, it shall be shored or braced to the extent necessary to permit orderly demolition without collapse. The necessary measures shall be determined by the contractor subject to approval by the commissioner.
(c) Hazards to be removed.-
(1) Before commencement of actual demolition, all glass in windows, doors, skylights, and fixtures shall be removed.
(2) In any structure more than twenty-five feet high, any window or other exterior wall opening that is within twenty-feet of a floor opening used for the passage of debris from floors above shall be solidly boarded up or otherwise substantially covered, unless such window or opening is so located as to preclude the possibility of any person being injured by material that may fall from such window or opening. See section 27-1022 of article two of this subchapter.
(3) Before demolition is started, the cellar and all floors shall be thoroughly cleaned of combustible materials and debris. All fixtures and equipment that would cause voids in the fill shall be removed. If the cellar is to be filled to grade, the first floor construction shall be removed and the existing cellar floor shall be broken up to the extent necessary to provide ground drainage and prevent accumulation of water. If the cellar is not to be filled, positive cellar drainage shall be provided.
(d) Examination and procedure.-Before any material is stored on any floor, the existing flooring adjacent to the bearing walls shall be removed and ends of floor beams in the bearing walls shall be carefully examined to ascertain their condition and the amount of bearing on the bearing wall. If they are found to be in poor condition or to have insufficient bearing, no material shall be deposited on the floor until these beams are shored from the cellar floor through each successive floor. No bearing partition shall be removed from any floor until the floor beams on the floor above have been removed and lowered. All header beams and headers at stair openings and chimneys shall be carefully examined, and where required shall be shored from the cellar floor through successive floors. All operations shall be continually inspected as the work progresses to detect any hazards that may develop.

§[C26-1905.2] 27-1037 Protection of adjacent structures.-The applicable provisions of article three of this subchapter shall apply.
(a) Adjoining walls.-
(1) All beams in party walls shall be cut off close to the walls, stub ends removed without weakening existing masonry, and beam pockets cleaned of loose mortar. The owner of the demolished structure shall, at his or her own expense, bend over all wall anchors at the beam ends in the standing wall and shall brick-up all open beam holes with sound brick and cement mortar.
(2) The stability and condition of the remaining walls shall be investigated and all necessary steps taken to protect same. Where the floor beams of the adjacent building bear on the party wall, the person causing the demolition to be made shall ascertain that such beams are anchored into the wall and, where such anchorage is lacking, shall provide anchorage or otherwise brace the standing wall.
(3) Roofing material of adjoining buildings shall be bent over and flashed. All door or other openings in party walls shall be sealed and weatherproofed. Cornices, where cut, shall be properly sealed. Parapets and any walls that have been disturbed shall be pointed up and made weathertight. All exposed furring, lath, and plaster on party walls shall be removed, and any loose wall material shall be firmly anchored or removed and replaced.
(4) All unnecessary chimney breasts, projections and any other debris exposed on party walls shall be removed by the person causing the demolition of the structure and all openings shall be bricked up flush on the exterior side of the party wall. All masonry which is in poor condition shall be pointed and patched.
(b) Party wall exits.-No party wall balcony or horizontal

fire exit shall be demolished, removed, or obstructed in any manner that would destroy the full effectiveness of such fire exit as means of egress, unless a substitute means of egress meeting the requirements of this code has been provided.

§[C26-1905.3] 27-1038 Protection of sidewalks.-The provisions of section 27-1021 of article two of this subchapter as applicable shall apply.

§[C26-1905.4] 27-1039 Demolition operations.-

(a) Walls.-

(1) Demolition of walls and partitions shall proceed in a systematic manner, and all work above each tier of floor beams shall be completed before any of the supporting structural members are disturbed.

(2) Sections of masonry walls shall not be loosened or permitted to fall in such masses as to affect the carrying capacity of floors or the stability of structural supports.

(3) No wall, chimney, or other structural part shall be left in such condition that it may collapse or be toppled by wind, vibration or any other cause.

(4) No section of wall with a height more than twenty-two times its thickness shall be permitted to stand without bracing.

(5) Where brick or masonry chimneys cannot be safely toppled or dropped, all materials shall be dropped down on the inside of such chimneys.

(6) All enclosed vertical shafts and stairs shall be maintained enclosed at all floors except the uppermost floor being demolished, and all work on the uppermost floor shall be completed before stair and shaft enclosures on the floor below are disturbed. All hand rails and banisters shall be left in place until actual demolition of such floor is in progress.

(b) Structural steel and heavy timbers.-

(1) Steel and heavy timber construction shall be demolished column length-by-column length and tier-by-tier. Any structural member that is being dismembered shall not be supporting any load other than its own weight, and such member shall be chained or lashed in place to prevent any uncontrolled swing or drop.

(2) Structural members shall not be thrown or dropped from the building, but shall be slowly and carefully lowered by hoists equipped with adequate brakes and non-reversing safety devices.

(c) Use of derricks.-Where a derrick is used for demolition, an investigation of the floor on which the derrick rests shall be made by an engineer or architect to determine its adequacy for the loading to be imposed; strengthening shall be designed and added as required to limit the imposed stresses to the values permitted by the provisions of subchapter ten of this chapter. A report summarizing such investigation and design shall be prepared and kept at the site available to the commissioner.

(d) Mechanical methods of demolition.-The mechanical method of demolition, whereby the wrecking of a building or part thereof is accomplished by smashing the walls or floors with a heavy weight suspended by a cable, or whereby the walls are collapsed by the use of a power shovel, tractor, or other mechanical contrivance, shall be permitted only upon issuance of a special permit by the department and in accordance with the following requirements:

(1) The building or structure, or remaining portion thereof, shall not be more than eighty feet in height.

(2) A safety zone, as determined by the commissioner, shall be provided around the demolition area. Fences constructed as required in section 27-1021 of article two of this subchapter shall be erected to prevent persons other than workers from entering such safety zone.

(3) Unless permitted by the commissioner, the mechanical method of demolition shall not be used where any building, or portion thereof, occupied by one or more persons is located within the safety zone.

(4) Where a swinging weight is used, two or more separate cable slings shall be used to attach the ball to a safety or moused hook and the supporting cable shall be of such length or so restrained that it is not possible for the weight to swing against any structure other than the structure being demolished.

(5) Where mechanical demolition operations may involve a street, the requirements of the department of transportation shall be met.

(e) Removal and storage of material.-

(1) PHYSICAL REMOVAL.-Debris, bricks, and similar material shall be removed by means of chutes, buckets, or hoists or through openings in the floors of the structure. Openings in any floor shall not aggregate more than twenty-five percent of the area of that floor unless it can be shown to the satisfaction of the commissioner that larger openings will not impair the stability of the structure.

a. Every opening used for the removal of debris in every floor except the top or working floor, shall be provided with a tight enclosure from floor to floor, equivalent to that afforded by planking not less than two inches in thickness. As an alternative in buildings when not more than six stories in height, such openings may be protected by a tight temporary covering equivalent to that afforded by planks not less than two inches in thickness and laid close. Wherever such covering has been temporarily removed to permit debris removal floor openings shall be protected by standard guard rails or railings. Such covering shall be promptly replaced in position upon the ceasing of such work at the end of each work day.

b. Every opening not used for the removal of debris in any floor shall be solidly planked over.

(2) STORAGE OF MATERIAL.-

a. Material shall not be stored on catch platforms, working platforms, floors, or stairways of any structure except that any one floor of a building to be demolished may be used for the temporary storage of material when such floor can be shown to be of adequate strength to support one and one-half times the load to be superimposed.
b. Storage spaces shall not interfere with access to any stairway or passageway, and suitable barricades shall be provided so as to prevent material from sliding or rebounding into any space accessible to the public. All material shall be safely piled in such storage locations in a manner that will not overload any part of the structure or create any hazard.
c. In buildings of noncombustible construction, floor slabs to an elevation of not more than twenty-five feet above the legally established curb level may be removed to provide temporary storage for debris, provided that: (1) the stored debris is piled with sufficient uniformity to prevent lateral displacement of interior walls or columns; (2) the height of the piled material will not burst the exterior walls due to accumulated pressure; and (3) the operation does not otherwise endanger the stability of the structure.
d. Debris stored in the cellar shall not be piled above the level of the adjacent exterior grade unless the contractor provides sheet-piling, shoring, bracing, or such other means necessary to insure the stability of the walls and to prevent any wall from collapsing due to the pressure of accumulated material.

(f) Dust.-Dust producing operations shall be wetted down to the extent necessary to lay the dust.

(g) Use of explosives.-The use of explosives in demolition operations shall conform to the requirements and limitations imposed by the fire department. The toppling of buildings by the use of explosives is prohibited except where such procedure is permitted by the commissioner.

(h) Temporary elevators.-Whenever, in the course of building demolition, the work is at a height greater than seventy-five feet, at least one elevator meeting the requirements of subchapter eighteen of this chapter shall be kept in readiness at all times for fire department use.

§[C26-1905.5] 27-1040 Completed demolitions.-At the completion of demolition operations, unless new construction is to follow within a period of thirty calendar days, the site shall be graded, drained, or otherwise protected as provided in section 27-1027 of article three of this subchapter.

ARTICLE 7 REPAIR AND ALTERATION OPERATIONS

§[C26-1906.1] 27-1041 General requirements.-Building repair or alteration operations shall be considered as construction operations and shall be governed by the regulations established in this subchapter. Where alterations are conducted in occupied buildings, barricades, signs, drop cloths, etc., shall be erected as required to provide reasonable protection for the occupants against hazard and nuisance.

ARTICLE 8 SCAFFOLDS

§[C26-1907.1] 27-1042 General provisions for all scaffolds.-All scaffolds shall be erected and maintained so that the safety of public and property will not be impaired by falling material, tools or debris or by collapse of the scaffold.

(a) Materials and construction.-
(1) All lumber used in scaffolds or their supports shall be at least equal in strength and quality to construction grade Douglas fir.

TABLE 19-4 SIZE AND NUMBER OF NAILS REQUIRED FOR SCAFFOLD CONSTRUCTION

Thickness of Smaller Member (in.)	Trade Size of Nail	Length of Nail (in.)
1	8d	2 ½
2	20d	4
3	60d	6
4	—	8

Width of Smaller Member (in.)	Minimum Number of Nails Required
4	2
6	3
8	4
10	5
12	5

(b) Loading and design.-
(1) DESIGN REQUIRED.-All exterior pole scaffolds over seventy-five feet high and all multiple-point suspension scaffolds, including all supports, fastenings, connections, and details, shall be designed. Design drawings shall be prepared and kept at the site available to the commissioner. The construction shall be executed in accordance with such design. All other scaffolding shall be constructed of sizes and numbers of members as hereinafter required or, in the absence of such requirements shall be demonstrated to be capable of supporting, without collapse, not less than four times the maximum weight required to be suspended therefrom or placed thereon when in use.
(2) LOADING.-No standard scaffold as defined herein, shall be loaded in excess of the maximum load for which it is designated in paragraph three of this subdivision. Loads shall not be concentrated so as to cause stresses in excess of the allowable values designated in subchapter ten of this chapter.

(3) STANDARD SCAFFOLD DESIGNATIONS.-
a. Light duty scaffold.-The light duty scaffold is to be used for loads up to twenty-five psf, and is intended for use by carpenters, painters, or others of similar trades. It shall not be used to support loads more severe than those imposed by such workers and a minimum amount of lightweight materials.
b. Medium duty scaffold.-The medium [duty]* scaffold is to be used for loads up to fifty psf, and is intended for use by bricklayers or plasterers. It shall not be used to support loads more severe than those imposed by such workers and a moderate amount of their materials.
Copy in brackets not enacted but probably intended.
c. Heavy duty scaffold.-The heavy duty scaffold is to be used for loads up to seventy-five psf, and is intended for use by stone masons. It shall not be used to support loads more severe than those imposed by such workers and a reasonable supply of their materials.
(4) FOOTINGS AND ANCHORAGE.-The footings and anchorage for every scaffold shall be sound and rigid, capable of carrying the maximum load without settlement or deformation, and secure against movement in any direction. Supports such as barrels, boxes, loose brick, loose stone, or other unstable constructions shall not be used.

(c) Planking.-
(1) The minimum width of every planked platform shall be eighteen inches, except as otherwise noted hereinafter. Unless otherwise indicated, the sizes in this subchapter for load-bearing planks shall denote undressed lumber, full thickness.
(2) Except as otherwise indicated in this section, planks shall overhang their end supports at least six inches, or they shall be securely fastened to prevent dislodgment. In no case shall the overhang exceed eighteen inches. Planks shall be laid tight, and inclined planking shall be fastened in place.
(3) The maximum permissible spans for two inch plank shall be as shown in table 19-5.
(4) The maximum permissible span for one and one-quarter inch plank of full thickness shall be six feet. The maximum permissible working load shall be fifty psf.
(d) Erection and removal.-Only workers with experience in erecting or removing scaffolds shall be employed. They shall work under the supervision of a designated superintendent or foreman who shall enforce such measures as necessary for the protection of public and property.

TABLE 19-5 MAXIMUM PERMISSIBLE SPANS FOR TWO-INCH PLANK USED ON SCAFFOLDS

Material	Full Thickness Undressed Lumber			Lumber of Nominal Thickness		
Working Load (psf)…..	25	50	75	25	50	75
Permissible Span (ft.)…	10	8	6	8	6	5

(e) Maintenance and repair.-All scaffolds shall be maintained in safe condition. No scaffold shall be altered, removed, or partially dismantled while it is in active use. Every damaged or weakened scaffold shall be immediately repaired and shall not be used until such repairs have been completed, and, in the case of suspended scaffolds, tested as required under subdivision (b) of section 27-1045 of this article.
(f) Fire retardant construction.-With the exception of the planking, all scaffolds shall be noncombustible material when used in the following applications:
(1) Exterior scaffolds exceeding seventy-five feet in height.
(2) Interior scaffolds exceeding twenty-one feet in height.
(3) All scaffolds used in the alteration, repair, or partial demolition of buildings in occupancy groups H-1 and H-2.
(g) Guard rails and toeboards.-
(1) Except for scaffold platforms ten feet or less above the ground or for scaffolds used on the interior of a building at a height ten feet or less above a floor, the open sides and ends of every scaffold platform shall be provided with a standard guard rail and toeboard as described in section 27-1050 of this article, unless otherwise specified for the particular type of scaffold.
(2) Where it is possible for the public to pass under, or next to a scaffold, the space between the top rail and toeboard shall be enclosed with a wire screen composed of not less than no. 18 steel wire gage with a maximum one-half inch mesh.
(3) Toeboards shall be installed so that no open space exists between the platform and the toeboard.

§[C26-1907.2] 27-1043 Pole scaffolds.-
(a) Poles.-Scaffold poles shall be plumb and the foot ends shall be secured against lateral movement. Where wood poles are spliced, the squared end of the upper section shall bear uniformly on the squared end of the lower section, and the two ends shall be rigidly fastened together with two or more wood splice plates, each at least four feet in length. The plates shall be placed at right angles to each other, shall overlap the abutting ends of the pole equally, and shall have a combined sectional area not less than fifty percent of the cross sectional area of the pole. Splicing of adjacent poles

shall be staggered. Splices shall be close to ledgers, but so located as not to interfere with the fastenings.

(b) Bracing.-Pole scaffolds shall be braced and stayed to prevent movement away from the building. Diagonal or equivalent bracing shall be provided to prevent the poles from moving in a direction parallel to the building face, and shall be so installed that every spliced section of every pole is braced to adjacent poles.

(c) Planking.-

(1) Where planks are butted end to end, parallel putlogs or bearers shall be provided not more than eight inches apart so that butted ends rest on separate putlogs or bearers. Ends shall be nailed or cleated.

(2) Where platform planks are used with overlapping ends, the ends of both the upper and lower planks shall overlap the putlog or bearer by a[t]* least six inches.

Copy in brackets not enacted but probably intended.

(3) Planks shall be laid close together and shall be of sufficient length to extend over three bearers.

(d) Connections.-

(1) Ledgers shall not be spliced between poles but shall overlap the poles at each end by at least four inches. Where ledgers lap each other, bearing-blocks attached to the pole shall be provided to support the ledger.

(2) The ends of all wooden braces shall overlap the nailed fastenings an amount sufficient to prevent the ends of the braces from splitting.

(e) Putlogs for single pole scaffolds.-All putlogs shall be set with the greater dimension vertical and shall be long enough to project beyond the outer edge of the poles by at least twelve inches. Putlogs shall be supported on the ledger and located against the side of the poles and fastened to either the pole or the ledger. The other end of the putlog shall rest in the wall of the building, with at least four inch bearing, and shall not be notched or cut down, except for light duty scaffolds, which may be notched or cut down to fit into a space made by the removal of a brick. In such cases, the notch shall be made on the top of the putlog just deep enough to permit it to be inserted in the hole in the wall.

(f) Bearers for independent pole scaffolds-.Bearers shall be set with their greater dimensions vertical, and shall be long enough to project over the ledgers beyond the outer row of poles by at least twelve inches and beyond the inner row of poles by at least two inches. Bearers shall be supported on the ledgers, and located against the sides of the poles and fastened to them.

(g) Free standing scaffolds.-Unless guyed, free standing scaffolds shall have a minimum base dimension of at least twenty-five percent of the height of the scaffold.

(h) Erection and removal.-When a new working level is desired, the existing planks shall be left undisturbed until the new working level is framed. As the platform level is abandoned with the progress of the work, all members other than the planking, railing, and toeboards shall be left intact. When removing a scaffold, the sequence of removing the members shall be the reverse of that used in erection.

(i) Standard designs.-All wood pole scaffolds seventy-five feet high or less shall be constructed in accordance with the minimum nominal sizes and maximum spacings shown in tables 19-6 through 19-11. For pole scaffolds more than seventy-five feet high, see paragraph one of subdivision (b) of section 27-1042 of this article.

TABLE 19-6 MINIMUM SIZE AND MAXIMUM SPACING OF MEMBERS OF SINGLE POLE LIGHT DUTY SCAFFOLDS

Uniformly Distributed Load					Not to Exceed 25 psf
Max. height of scaffold……	20'	40'	60'		75'
				Top 60'	Lower Sect.
Poles or uprights (min.)……..	2" x 4"	3" x 4"	4" x 4"	4" x 4"	4" x 6"
Pole foundation (min.)…….			2" x 9"		
Max. pole spacing (longitudinal).			10' – 0"		
Max. width of scaffold……			5' – 0"		
Bearers or putlogs (min.)…….			3" x 4" or 2" x 6" (on edge)		
Ledgers (minimum):					
With 6'-0" pole space……			1" x 6" (on edge)		
With 10'-0" pole space……			1 1/4" x 9" (on edge)		
Vertical spacing of ledgers (max.)			7'-0"		
Non-supporting stringers…….			1" x 4"		
Tie-ins……..			1" x 4"		
Bracing……			1" x 4"		
Planking:					
Not more than 6' span……..			1 1/4" x 9"		
Up to 10' span……...			2" x 9"		
Toeboards……			1" x 6"		
Guard rails……...			2" x 4"		

§[C26-1907.3] 27-1044 Outrigger scaffolds.-
Outrigger scaffolds shall not be used for loading in excess of fifty psf (medium duty).

(a) Outrigger beams.-Outrigger beams shall not extend more than six feet beyond the face of the building. The inboard end of outrigger beams, measured from the fulcrum point to the extreme point of support, shall be at least one and one-half times the outboard end in length. The fulcrum point of the beam shall rest on a secure bearing at least six inches in each horizontal dimension. The beam shall be secured against movement and shall be securely braced against tipping at both fulcrum point and inboard end. Outriggers shall not be less than three inches by ten inches set on edge, plumb, and spaced not to exceed six feet on centers for light and medium duty scaffolds.

(b) Inboard supports.-The inboard ends of outrigger beams shall be securely fixed to resist all vertical, horizontal, and torsional forces.

(c) Platform.-The platform shall be constructed of at least two inch by nine inch planks, securely fastened to the outriggers, and laid tight to within three inch[es]* of the face of the building.

(d) Guard rail and toeboard.-The railing posts for the required standard guard rail and toeboard shall be securely braced to the outriggers.

Copy in brackets not enacted but probably intended.

(e) Superstructures.-Supports for superstructures placed on outrigger scaffolds shall be set directly over the outrigger beams and shall be secured in place. Such structures shall not exceed six feet in height. Horses shall not be used as supports for such superstructures.

§[C26-1907.4] 27-1045 General provisions for suspended scaffolds.-

(a) Installation and use.-Suspended scaffolds shall be erected and operated in such a manner that suspension elements are vertical and in a plane parallel to the wall at all times. The installation or change of position of any suspended scaffold shall be performed under the supervision of a designated superintendent or foreman who shall enforce such measures as may be required for the safe execution of such operation.

TABLE 19-7 MINIMUM SIZE AND MAXIMUM SPACING OF MEMBERS OF SINGLE POLE MEDIUM DUTY SCAFFOLDS

Uniformly Distributed Load					Not to exceed 50 psf
Max. height of scaffold……..	20'	40'	60'	Top 60'	75' Lower Sect.
Poles or uprights (min.)……..	3" x 4" or 2" x 6"	4" x 4"	4" x 6"	4" x 6"	4" x 6"
Pole foundation (min.)……			2" x 9"		
Max. pole spacing (longitudinal)…			8' – 0"		
Max. width of scaffold……		5' – 0"		8' – 0'	
Bearers or putlogs (min.)……		3" x 4" or 2" x 8" (on edge)		3" x 5" or 2" x 9" (on edge)	
Max. spacing of bearers or putlogs.			8' – 0"		
Ledgers (minimum)…….			2" x 9" (on edge)		
Vertical spacing of ledgers (max.)..			7'— 0"		
Non-supporting stringers……			1" x 6" or 1 1/4" x 4"		
Tie-ins…….			1" x 6"		
Bracing……			1" x 6"		
Planking:					
Not more than 6' span…….			1 1/4" x 9"		
Up to 8' span…….			2" x 9"		
Toeboards……			2" x 9"		
Guard rails……...			2" x 4"		

***As enacted but 6" x 6" probably intended .*

TABLE 19-8 MINIMUM SIZE AND MAXIMUM SPACING OF MEMBERS OF SINGLE POLE HEAVY DUTY SCAFFOLDS

Uniformly Distributed Load					Not to exceed 75 psf
Max. height of scaffold……..	20'	40'	60'	Top 60'	75' Lower Sect.
Poles or uprights (min.)……..	3" x 4" or 2" x 6"	4" x 4"	4" x 6"	4" x 6"'	6" x 6"
Pole foundation (min.)……			2" x 9"		
Max. pole spacing (longitudinal)…			6' – 0"		
Max. width of scaffold……		5' – 0"		8' – 0"	
Bearers or putlogs (min.)……		3" x 5"		3" x 6" or 2" x 9"	
Max. spacing of bearers or putlogs.			6' – 0"		
Ledgers (minimum)…….			2" x 9" (on edge)		
Vertical spacing of ledgers (max.)..			7' —0"		
Non-supporting stringers……			2" x 4"		
Tie-ins…….			1" x 6"		
Bracing……			1" x 6"		
Planking……..			2" x 9"		
Toeboards……			2" x 9"		
Guard rails……...			2" x 4"		

(b) Tests and inspections required.-All suspended scaffolds shall be inspected daily by the user before use. A record of such inspections shall be kept and maintained at the field office of the user. Upon delivery of the scaffold equipment to the site, the supplier of such equipment shall furnish a certificate from an independent testing laboratory or a licensed professional engineer stating that physical tests of a prototype of the equipment were conducted and that such equipment is capable of withstanding at least four times the maximum allowable live loads. Such certificates shall be kept at the field office of the user and shall be available for inspection by a representative of the department of buildings. This section, however,

shall not be construed to reduce the factors of safety specified elsewhere in this code for various appurtenances to this equipment. In addition, tests prescribed in section 27-998 of article three of subchapter eighteen shall be performed with the full rated live load on the scaffold at the test intervals specified therein and at such other intervals as the commissioner may require.

(c) Tie-ins.-Scaffolds shall be tied into the building or structure, and means therefor shall be provided. Window cleaners anchors, window frames, millions*, or similar elements shall not be used as tie-in anchors or brace-back points.

(d) Wire rope.-Wire rope used for support of suspended scaffolds shall be capable of supporting six times the actual applied load without failure, but shall not be less than five-sixteenths of an inch in diameter for use with light duty platforms or one-half inch in diameter for use with medium or heavy duty platforms. Wire rope shall be rigged to blocks of proper size or to other approved devices. For other provisions concerning wire rope, see section 27-1055 of article ten of this subchapter.

****As enacted but "mullions" probably intended.***

TABLE 19-9 MINIMUM SIZE AND MAXIMUM SPACING OF MEMBERS OF INDEPENDENT POLE LIGHT DUTY SCAFFOLDS

Uniformly Distributed Load				Not to exceed 25 psf	
Max. height of scaffold…….	20'	40'	60'	Top 60'	75' Lower Sect.
Poles or uprights (min.)…….	2" x 4"	3" x 4" or 2" x 6"	4" x 4"	4" x 4"	4" x 6"
Pole foundation (min.)……...		2" x 9"			
Max. pole spacing (longitudinal):					
With 1 1/4" x 9" ledgers…….		6' – 0"			
With 2" x 9" ledgers……...		10' – 0"			
Max. pole spacing (transverse)…..		10' – 0"[a]			
Ledgers (minimum)……...		1 1/4" x 9" (on edge) or 2" x 9"			
Vertical spacing of ledgers (max.)		7'— 0"			
Bearers (minimum)……		1 1/4" x 9" (on edge)			
Non-supporting stringers……..		1" x 4"			
Bracing……..		1" x 4"			
Planking:					
Not more than 6' span……		1 1/4" x 9"			
Up to 10' span……		2" x 9"			
Toeboards……..		1" x 6"			
Guard rails…….		2" x 4"			

Note for Table 19-9:

[a] Total base dimension in both directions to be at least 25 per cent of height.

§[C26-1907.5] 27-1046 Two-point suspension scaffolds.-

(a) Width and support.-Two-point suspension platforms shall be at least twenty inches but not more than thirty inches in width. Each end of the platform shall be supported by an approved stirrup or hanger, and the platform shall be securely fastened thereto. Not more than two hangers or stirrups shall be used to support one scaffold.

(b) Hangers-Hangers or stirrups shall be of steel or wrought iron. Each such hanger shall be formed to properly fit the platform, and shall be provided with a loop or eye at the top for securing the supporting hook on the block, and with loops or equivalent means to support the top rail and midrail. The hanger or stirrup shall be placed at least six inches but not more than eighteen inches from the end of the platform.

(c) Roof irons.-Roof irons or hooks shall be of steel or wrought iron not less than seven-eighths of an inch in diameter or other size of equivalent strength and shall be securely anchored. Where the upper block hook does not directly engage the roof iron, the connection shall be made with wire rope of required strength but in no case shall the wire rope be less than one-half inch in diameter.

(d) Fibre rope.-

(1) The use of fibre rope shall be limited to light duty two-point suspension scaffolds. Fibre rope shall be at least equivalent in strength and suitability to three-quarter inch first quality unspliced manila rope.

(2) Fibre rope shall not be permitted for or near any

work involving the use of corrosive substances or where the upper block is more than one hundred feet above the platform.
(3) All blocks shall fit the size of rope they carry, and shall be so constructed as not to chafe the rope.
(e) Use.-
(1) Needle beam scaffolds shall not be used over areas used by the public.
(2) Two or more two-point suspension scaffolds shall not be combined into one by bridging the distance between them or by any form of connection.
(3) Not more than two workers shall be permitted to work on one scaffold at one time.
(4) Every two-point suspension scaffold shall be equipped with an approved device to raise, lower, and hold the scaffold in position.
(f) Platforms.-The platforms of every two-point suspension scaffold shall be one of the following types, or an approved equivalent.
(1) LADDER TYPE PLATFORM.-consisting of boards upon a horizontal ladder, the sides of which are parallel. The ladder shall be capable of sustaining, without failure in any part, at least four times the maximum load allowed to be placed thereon, and rungs shall be at least one and one-eighth inches in diameter with seven-eighths inch tenons mortised into the side stringers at least seven-eighths of an inch and spaced at not more than eighteen inches. Stringers shall be tied together with metal rods at least one-quarter inch in diameter located not more than five feet apart and which pass through the stringers and are riveted up tight against washers at both ends. The platform shall consist of at least one-half inch by three inch planks, shall fill the space between the sides of the hangers, and shall be securely fastened to the hangers by U-bolts passing around the hangers and bolted up tight on the inside face of the stringers.
(2) PLANK TYPE PLATFORM.-consisting of planks supported on stirrups or hangers. The planks shall have a uniform thickness of at least two inches and a width of at least nine inches. The planks shall extend at least six inches but not more than eighteen inches beyond the supporting hangers, and a bar shall be nailed across the platform on the underside at each end to prevent the platform from slipping off the hanger. Where two or more planks are used, they shall be fastened together by cleats not less than one inch by six inches nailed on the underside at intervals of four feet or less. Planks shall not be spliced.
(3) BEAM TYPE PLATFORM.-consisting of longitudinal side stringers with cross beams on which longitudinal platform planks are laid. Beam platforms shall have side stringers not less than two inches by eight inches. The stringers shall be supported on the hangers, located to fill the full width of the hangers, and the clear span between hangers shall not exceed twenty-four feet. The ends of the stringers shall extend at least six inches but not more than eighteen inches beyond the hangers, and shall be fastened to the hangers by U-bolts passing around the hangers and bolted up tight on the inside face of the stringers. The platform shall be supported on two inch by six inch cross beams, on edge, set between the side stringers, securely nailed thereto, and spaced not more than four feet on centers. The platform boards shall consist of material not less than one inch by six inches, nailed tight together, and extended to the outside face of the stringers. The ends of all platform boards shall rest on the cross beams and shall be nailed securely thereto.
(g) Guard rail and toeboard.-The outside edge of the platform, and the open ends (when stirrups do not afford adequate protection) shall be provided with a two-rail guard rail and a toeboard securely fastened at intervals not exceeding ten feet. Where there is a space between the scaffold and the structure greater than six inches, a similar guard rail shall be provided at the inside of the platform.

§[C26-1907.6] 27-1047 Multiple-point suspension scaffolds.-

(a) General.-
(1) All multiple-point suspension scaffolds shall be supported by wire ropes. The use of fibre ropes is not permitted.
(2) Provision shall be made to prevent supports from slipping off the ends of outrigger beams.
(3) Outrigger beams and platform bearers shall be of metal.
(b) Outrigger beams.-
(1) The overhang of outrigger beams shall not exceed that specified by the design, and the inboard length of beam shall be at least one and one-half times the outboard length.
(2) Outrigger beams shall be anchored and braced at both fulcrum point and inboard end to resist all vertical, horizontal, and torsional forces.
(3) Supporting points for outrigger beams shall be level, smooth, and of sufficient area (at least six inches by six inches) to provide a firm seat.
(4) The wire rope suspenders shall be securely fastened to the outrigger beams by steel shackles or equivalent means. The shackles and outrigger beams shall be so located that the ropes will hang vertically.
(5) Outrigger beams shall be of the sizes required for the design, but shall be at least equivalent in strength to a standard 7 I 15.3 [*sic*] steel I-beam, and shall be spaced not more than ten feet center-to-center.
(c) Hoisting machines.-
(1) Suspended scaffolds shall be provided with an approved hoisting machine of either the platform or overhead type.
(2) At least four turns of rope shall at all times remain on the hoisting drum, and the end of the rope shall be

properly secured to the drum.
(3) The hoisting rope shall be inspected regularly, maintained, and lubricated.
(d) Platform.-
(1) Platform widths shall be limited to eight feet.
(2) Platform planking shall be laid tight and securely fastened to the bearers, shall overlap the supporting bearers at each end of the scaffold at least six inches but not more than eighteen inches, and shall not be supported across more than two bearers.
(3) Platform bearers shall be at least the equivalent of a pair of two and one-half inch by two and one-half inch by one-quarter inch standard angles.

TABLE 19-10 MINIMUM SIZE AND MAXIMUM SPACING OF MEMBERS OF INDEPENDENT POLE MEDIUM DUTY SCAFFOLDS

Uniformly Distributed Load					Not to exceed 50 psf
Max. height of scaffold…….	20'	40'	60'		75'
				Top 60'	Lower Sect.
Poles or uprights (min.)…….	3" x 4" or 2" x 6"	4" x 4"	4" x 6"	4" x 6"	6" x 6"
Pole foundation (min.)……...			2" x 9"		
Max. pole spacing (longitudinal)...			8' – 0"		
Max. pole spacing (transverse)…..			10' –0"[a]		
Ledgers (minimum)……...			2" x 9" (on edge)		
Vertical spacing of ledgers (max.)			6'— 0"		
Bearers (minimum)……			2" x 9" (on edge)		
Non-supporting stringers……..			1 1/4" x 4" or 1" x 6"		
Bracing……..			1" x 6"		
Planking:					
Not more than 6' span……			1 1/4" x 9"		
More than 6' span……..			2" x 9"		
Toeboards……..			2" x 9"		
Guard rails……			2" x 4"		

Note for Table 19-10:
[a] Total base dimension in both directions to be at least 25 per cent of height.

TABLE 19-11 MINIMUM SIZE AND MAXIMUM SPACING OF MEMBERS OF INDEPENDENT POLE HEAVY DUTY SCAFFOLDS

Uniformly Distributed Load					Not to exceed 75 psf
Max. height of scaffold……..	20'	40'	60'		75'
				Top 60'	Lower Sect.
Poles or uprights (min.)…….	4" x 4"	4" x 4"	4" x 6"	4" x 6"	6" x 6"
Pole foundation (min.)………..			2" x 9"		
Max. pole spacing (longitudinal)...			6' – 0"[a]		
Max. pole spacing (transverse)…..			10' –0"[a]		
Ledgers (minimum)……...			2" x 9" (on edge)		
Vertical spacing of ledgers (max.)			5'-0"		
Bearers (minimum)……			2" x 9" (on edge)		
Non-supporting stringers……..			1 1/4" x 9"		
Bracing……..			1" x 6"		
Planking…….			2" x 9"		
Toeboards……..			2" x 9"		
Guard rails……			2" x 4"		

Note for Table 19-11:
[a] Total base dimension in both directions to be at least 25 per cent of height.

(e) Guard rail and toeboard.-The outside edge of the platform and open ends shall be provided with a standard guard rail and toeboard (section 27-1050 of this article) except that spacing of the vertical supports may be increased to not more than ten feet. Where there is a space between the scaffold and the structure in excess of six inches, a similar guard rail shall be provided at the inside edge of the platform.

(f) Erection and removal.-

(1) Multiple-point suspension scaffolds shall be installed, relocated, and raised or lowered under the supervision of a designated superintendent or foreman who shall enforce such measures as may be required for the safe execution of such operations.

(2) During raising or lowering, the levels of the various sections of the scaffolds shall be kept uniform and the differential height between sections minimized.

§[C26-1907.7] 27-1048 Manually-propelled free standing scaffolds. - All manually propelled free standing scaffolds shall meet the following requirements and shall be approved:

(1) Work platforms shall be tightly planked for the full width of the scaffold except for necessary entrance openings. Planks shall be secured in place.

(2) Platforms shall have a guard railing.

(3) Where a ladder is used to approach a platform, the ladder shall be secured to the scaffold.

(4) Handholds shall be provided for safe passage from the ladder to the platform.

(5) Unless temporarily braced to adjacent structure, the ratio of the platform height to the least base dimension shall be such as to assure stability, but in no case shall such height be more than four times the least base dimension.

(6) Provision shall be made to prevent the scaffold from falling during movement from one location to another.

(7) While the scaffold is in use by any person, it shall rest upon a stable footing and shall stand plumb. The casters or wheels shall be locked in position.

(8) While the scaffold is being moved, no person shall be suffered or permitted to ride, and all tools, equipment, and material shall be removed.

§[C26-1907.8] 27-1049 Power operated free standing scaffolds.-Records of the inspection, servicing, and maintenance of all power operated free standing scaffolds shall be kept by the user. These records are to be submitted on forms furnished by the commissioner and are to be made available whenever called for by the commissioner. All power operated scaffolds whether free standing or suspended shall meet the applicable requirements of subchapter eighteen of this chapter.

§[C26-1907.9] 27-1050 Standard guard rail and toeboard.-

(a) Standard guard rail.-

(1) GENERAL REQUIREMENTS.-A standard guard rail shall consist of a two inch by four inch wood top rail (S4S) not less than three feet nor more than three feet six inches above the platform and a one inch by four inch wood intermediate rail (S4S) midway between the top rail and the floor or toeboard, both supported by two inch by four inch wood posts (S4S) spaced not more than eight feet apart.

(2) ALTERNATE METAL RAILING.-In lieu of wood construction, posts and rails may be constructed of at least one and one-quarter inch diameter standard pipe or of at least two inch by two inch by one-quarter inch angles. Spacing of rails and posts shall be as required in paragraph one of this subdivision.

(3) REMOVABLE SECTIONS OF RAILING.-To provide necessary openings for intermittent operations, one or more sections of a required railing may be hinged or supported in sockets. When supported in sockets, rails shall be so constructed that they cannot be jolted out. A button or hook may be used to hold the rail in fixed position. Substantial chains or ropes may be used to guard such openings in standard railings. Where so used, the chains or ropes shall be taut at the same height as the rails of the standard railing.

(b) Standard toeboard.-A standard toeboard shall be at least five and one-half inches high and constructed of metal, wood, or other substantial material. It shall be installed, where required, along the edge of any floor, opening, platform, ramp, or runway. Such toeboard shall be securely fastened to the posts and so installed that no open space exists between the floor and the toeboard.

ARTICLE 9 STRUCTURAL RAMPS, RUNWAYS, AND PLATFORMS

§[C26-1908.1] 27-1051 Ramps and runways (including elevated walkways).-

(a) Construction.-All runways and ramps shall be constructed, braced and supported to resist lateral displacement and all vertical loads, including impact.

(b) For motor vehicle use.-Runways and ramps for the use of motor vehicles may consist of an earthfill or may be structurally supported. They shall have a clear width of not less than twelve feet with timber curbs at least eight inches by eight inches placed parallel to, and secured to, the sides of the runway or ramp. The flooring of structurally supported ramps shall consist of no smaller than three inch planking full size, undressed, or equivalent material, with spans designed for the loads to be imposed.

(c) For use of workers only.-Runways and ramps for

the use of workers shall be at least one foot six inches in clear width. Where used for wheelbarrows, hand-carts, or hand-trucks, runways and ramps shall be at least three feet in clear width. Flooring shall consist of at least two inch planking spanning as permitted by table 19-5, laid close, butt-joined, and securely fastened.

(d) Slope limitations.-Ramps shall have a slope not steeper than one in four. If the slope is steeper than one in eight, the ramp shall be provided with cleats spaced not more than fourteen inches apart and securely fastened to the planking to afford a foothold. Spaces in the cleats may be provided for the passage of the wheels of vehicles. The total rise of a continuous ramp used by workers carrying material or using wheelbarrows, hand-carts, or hand-trucks shall not exceed twelve feet unless broken by horizontal landings at least four feet in length.

(e) Guard rail required.-

(1) All runways and ramps located more than five feet above the ground or floor shall be provided with a standard guard rail and toeboard (section 27-1050 of article eight of this subchapter) on open sides.

(2) Where it is possible for the public to pass under, or next to, runways or ramps, the space between the top rail and the toeboard shall be enclosed with a wire screen composed of not less than no. 18 steel wire gage with a maximum one-half inch mesh.

§[C26-1908.2] 27-1052 Platforms.-

(a) Planking. -Platforms used as working areas, or for the unloading of wheelbarrows, hand-trucks, or carts shall have a floor consisting of at least two inch planking spanning as permitted by table 19-5. Platforms for the use of motor trucks shall have a floor of at least three inch planking, full size, undressed or equivalent materials with spans designed for the loads to be imposed. Planking shall be laid close and shall be butt-joined and securely fastened.

(b) Guard rail required.-

(1) Every platform more than five feet above the ground or above a floor shall be provided with a standard guard rail and toeboard (section 27-1050 of article eight of this subchapter), except that the side of the platform used for the loading or unloading of vehicles may be protected by a timber curb at least eight inches by eight inches for motor trucks or four inches by four inches for wheelbarrows and hand-trucks in lieu of the standard guard rail and toeboard.

(2) Where it is possible for the public to pass under, or next to, platforms, the space between the top rail and the toeboard shall be enclosed with a wire screen composed of not less than no. 18 steel wire gage with a maximum one-half inch mesh.

§[C26-1908.3] 27-1053 Special requirements where power buggies are used.-Runways, ramps, platforms, and other surfaces upon which power buggies are operated shall meet the following minimum requirements:

(1) They shall be designed.

(2) They shall be able to sustain, without failure, at least four times the maximum live load for which they are intended.

(3) The minimum width, inside of curbs, for any ramp, runway, or platform shall be two feet wider than the outside width of any power buggy operated thereon without passing, and three feet wider than twice such buggy width in the places where passing occurs.

(4) All runways shall be essentially level transversely.

(5) Curbs shall be furnished along all buggy traffic paths that are nearer than ten feet horizontally to any unenclosed area, shaft, or other open space into which or through which, a fall of more than twelve inches from such surface is possible, except as set forth in subdivision seven of this section.

(6) Where curbs are not required because the buggy is operated on a surface not over twelve inches above another surface, the lower surface shall be strong enough to sustain the loaded vehicle in the event of a fall thereon.

(7) Curbs may be omitted at actual dumping points more than twelve inches above other surfaces if the edge over which dumping occurs is provided with bumpers or other means that will effectively stop the buggy from running over the edge while dumping.

(8) Curbs must be at least seven inches high, securely fastened, and capable of resisting side impact, and shall be equivalent to at least two inch by eight inch plank set on edge against uprights securely fastened and braced at not more than four foot intervals.

ARTICLE 10 MATERIAL HANDLING AND HOISTING EQUIPMENT

§[C26-1909.1] 27-1054 General requirements.-Material handling and hoisting equipment shall be installed, operated, and maintained to eliminate hazard to the public or to property. It shall be unlawful to operate any such equipment which is not provided with a positive means for preventing the unauthorized operation of such machine. The means whereby such machines may be made inoperative shall be determined by the commissioner.

(a) Operation.-Only operators designated by the person causing such machinery to be used shall operate hoisting or material handling machinery. Operators and signalmen shall be experienced at the operation they perform. Riggers and hoisting machine operators shall be licensed as required under chapter one of title twenty-six of the administrative code. The operator shall be responsible for making the machine inoperative before he or she leaves the machine.

(b) Loading.-Material handling and hoisting equipment shall not be loaded in excess of the rated load specified by the manufacturer, except for power operated cranes and derricks where the provisions of section 27-1057 of this article are controlling. Except for power operated cranes and derricks if such data are not available, the safe loads and, where applicable, charts of reach vs. capacity, shall be established by an engineer or architect. All loads shall be properly trimmed to prevent the dislodgement of any part during raising, lowering, swinging or transit. Suspended loads shall be securely slung and properly balanced before they are set in motion. Rated load capacities and required charts shall be conspicuously posted on all material handling and hoisting machinery or on the job site and shall be available to the commissioner at all times.

(c) Refueling.-Open lights, flames, or spark-producing devices shall be kept at a safe distance while refueling an internal combustion engine, and no person shall smoke or carry lighted smoking material in the immediate vicinity of the refueling area. The engine shall be stopped during refueling. Fuel shall be kept in containers that meet the requirements of the fire department. "No smoking" signs shall be conspicuously posted in all fueling or fuel storage areas.

§[C26-1909.2] 27-1055 Rigging, rope, chains, and their appurtenances and fittings.-

(a) Hoisting line.-Only wire rope shall be used with power driven hoisting machinery, except that either wire or fibre rope may be used on winchheads or capstan hoists.

(b) Wire rope or cable.-

(1) All hoisting cable shall be at least one-half inch diameter plow steel grade.

(2) Wire cable shall not be used under the following conditions:

a. When it is knotted or kinked.

b. When more than ten percent of the total wires are broken in any lay, a lay being that distance measured along the cable in which one strand makes a complete revolution around the cable axis.

c. When the wires on the crown of the strands are worn down or rusted to less than sixty percent of their original cross-sectional area.

d. When any combination of broken wires, rust, or abrasion has reduced the strength of the cable to eighty percent or less of its original strength.

(3) At least four turns of the cable shall remain on the hoist drum at all times.

(4) Wire cable fastenings shall conform to the provisions of article eleven of subchapter ten of this chapter, and shall consist of zinc-filled sockets, wedge sockets with at least one cable clip above the socket, thimble and splice connections, or thimble and cable slips*.

(5) Where cable clips are used, the minimum number shall conform to the following:

***As enacted but "clips" probably intended.**

Diameter of wire rope	No. of clips
Up to and incl. 3/4 in…..……..	3
From 3/4 in. up to and incl. 1 in……..	4
From 1 in. up to and incl. 1 1/4 in……	5
From 1 1/4 in. up to and incl. 2 1/2 in..	6

(6) Clip spacing shall be at least six times the diameter of the cable, and the "U" part of the clip shall be placed over the short end of the cable. After the rope is in service and while it is under tension, the nuts on the clips shall be retightened.

(7) Cables and blocks used to change the direction of cables shall not be located in any area used by the public.

(c) Fibre rope.-

(1) Fibre rope shall be equal in strength, durability and quality to long fibered manila hemp rope, and shall be used and maintained in accordance with the recommendations of the manufacturer.

(2) Before rope is used it shall be carefully inspected for abrasions and severe wear. Rope that has been exposed to acid shall be destroyed and not used.

(3) Frozen rope shall be thawed out and inspected before being used.

(4) Rope shall not be made fast to sharp objects or surfaces, and sharp bends shall be avoided.

(5) Rope shall be stored in a dry place and protected.

(d) Sheaves.-

(1) Load-bearing sheaves shall be of diameter and grooving as recommended by the manufacturer to accommodate the particular rope under the proposed conditions of use.

(2) Sheaves and blocks that are worn, chipped, or otherwise damaged shall not be used.

(3) Sheaves and blocks intended for use with fibre rope shall not be used for wire rope.

(e) Fittings.-

(1) All wire rope fittings, including sockets, thimbles, clips, blocks, shackles, etc. shall be of the standard size, diameter, and grooving to fit the size of and to develop the breaking load capacity of the rope on which they are to be installed.

(2) Hooks, shackles, or other fittings deformed due to wear, over-stress, or other cause shall not be used.

(3) Safety hooks or open type hooks with wire mousings shall be used where loads may be accidentally unhooked.

(f) Chains.-

(1) Chains having deformed links or links that are stretched from their original length shall not be used. Defective links or portions of the chain shall be replaced only by links or sections furnished by the

manufacturer for the particular chain involved, unless a substitute link can be shown to be equivalent in strength and suitability. All repairs to chains shall be made by an experienced blacksmith or chainwright, except that alloy steel chains shall be repaired only by the manufacturer of such chains.
(2) When in constant use, steel chains should be normalized and wrought iron chains should be annealed at intervals not to exceed six months. The annealing or normalizing shall be done by the manufacturer or in strict accordance with such manufacturers specifications.
(3) Chains shall not be used as slings in hoisting operations. Chains shall not be knotted, nor shall they be shortened or spliced, by the use of nails or bolts.
(g) Slings.-
(1) Blocks or heavy padding shall be used at corners of the load to protect the sling from sharp bending.
(2) When lifting a load with multiple slings, the slings shall be so arranged as to equalize the load between the slings.
(3) The ends of slings made of wire or fibre shall be properly spliced to form the eyes. Eyes for wire rope shall be formed using thimbles.
(4) Wire rope slings shall be frequently inspected and lubricated.
*__(h) Accidents. -__ The owner or person directly in charge of any rigging equipment shall immediately notify the commissioner following any accident involving such equipment. When an accident involves the failure or destruction of any part of the rigging equipment, no person shall use or operate such equipment or any part thereof or remove such equipment or any part thereof from the immediate area of the job site without the permission of the commisioner.
* ***Local Law 15-1993.***

§[C26-1909.3] 27-1056 Material platform hoists and bucket hoists.-As used in this section, a material platform or bucket hoist means a power or manually operated suspended platform or bucket contained by guide rails and used for raising or lowering material exclusively, and controlled from a point outside the conveyance.
(a) Construction of material hoist towers.-
(1) Where the design of material hoist towers utilizes standard manufactured elements the loading shall not exceed the rated values established by the manufacturer. If specifically designed for the given installation, the design shall be prepared by an engineer or architect, and the construction shall conform to that design. For all material hoist towers more than six stories high, whether of manufactured units or specifically designed for the site, plans showing the design, including the guying, bracing, and foundations shall be submitted to the commissioner for approval prior to construction. Approval of such plans is subject to the provisions established in article nine of subchapter one of this chapter for approval of plans for new construction.
(2) Standard guard rails and toeboards shall be placed on the open sides of runways connecting the tower to the structure.
(3) The provisions of subdivision (f) of section 27-1042 of article eight of this subchapter relating to fire retardant construction of scaffolds shall apply to the construction of hoist towers.
(4) An enclosure shall be installed around the hoistway below the lowest landing to prevent unauthorized access to the space under any hoist.
(5) Exterior hoist towers may be used with or without an enclosure on all sides. When a hoist tower is enclosed, except for entrance and exit openings, it shall be enclosed on all sides for the entire height, with a screen enclosure with one-half inch mesh, No. 18 U.S. gage [*sic*] wires. When a hoist tower is not enclosed, the hoist platform or car shall be totally enclosed on all four sides for the full height between the floor and the overhead protective covering with one-half inch mesh of No. 14 U.S. gage [*sic*] wire or the equivalent. The hoist platform enclosure shall include the required gates for loading and unloading.
(b) Hoist cars.-Platforms for material hoist cars shall have sufficient strength to support five times the rated capacity, and the wire rope supporting material hoist cars or bucket hoists shall be capable of supporting eight times the rated capacity. The rated capacity shall be conspicuously posted and maintained on the cross head or side members. On the top of every material hoist cage there shall be an overhead protective cover of two inch planking, three-quarters inch plywood or other material of equivalent strength.
(c) Hoist machinery.-
(1) The car and counterweight, if provided, shall be equipped with safety devices capable of stopping and sustaining the counterweight and/or sustaining the car with its capacity load in the event of breakage of the hoisting or counterweight ropes.
(2) A sign or plate giving the maximum load capacity shall be posted in a conspicuous place near every hoist engine.

§[C26-1909.4] 27-1057 Testing inspection, approval and use of power operated cranes, derricks and cableways.-No owner or other person shall authorize or permit the operation of any power operated crane or derrick without a certificate of approval, a certificate of operation and a certificate of on-site inspection. No owner or other person shall authorize or permit the operation of any cableway without a certificate of on-site inspection.
(a) Exceptions.-

(1) The requirements of this section shall not apply to excavating or earth-moving equipment, except cranes used with clamshells.
(2) The requirements of this section shall not apply to cranes or derricks performing an emergency use pursuant to the lawful order of the head of any department.
(3) The requirements of this section shall not apply to truck cranes with telescopic, hydraulic or folding booms, including jibs and any other extensions to the boom, not exceeding one hundred thirty-five feet in length with a manufacturer's rated capacity of three tons or less, except that a certificate of operation, as provided for in this section and in reference standard RS 19-2 shall be required for such cranes with jibs and any other extensions to the boom exceeding fifty feet in length. The above requirement for a certificate of operation shall not apply to a crane used exclusively as a man basket.
(4) The requirements of this section shall not apply to a mobile crane with a boom, including jibs and any other extensions to the boom, not exceeding fifty feet in length with a rated capacity of three tons or less. The commissioner may, by rule and regulation, exempt other mobile cranes of limited size and capacity from any or all of the requirements of this section.
(5) The requirements of this section shall not apply to hoisting machines permanently mounted on the bed of material delivery trucks which are used exclusively for loading and unloading such trucks, provided that the length of boom does not exceed the length of the truck bed by more than five feet and that any material transported thereon shall not be raised more than two feet in the unloading process. Operators of such equipment shall be exempt from licensing requirements prescribed in section 26-166 of title twenty-six of the administrative code.

(b) Certificate of approval.-
(1) The owner of such crane or derrick shall file an application for a certificate of approval on a form prescribed by the department, together with such information as set forth in reference standard RS 19-2 and shall contain the various boom lengths and applicable load ratings for which approval is requested.
(2) Upon the approval by the department of information submitted pursuant to reference standard RS 19-2 and an inspection of the equipment, the department shall issue a certificate of approval for the equipment. Said equipment may be used with pile driving leads, mounted compressors, boilers, magnets, hammers, pile hammers, extractors, jetting equipment, augers, drills, vibrating hammers, mandrels, hoe rams and other similar attachments. A new certificate of approval shall be required when a crane is modified or altered to increase the boom length, jibs or any extensions to the boom beyond the maximum approval length or when the load ratings are increased.

(c) Certificate of operation.-
(1) Upon issuance of a certificate of approval, the department shall also issue the initial certificate of operation which shall expire one year from the date of issuance. The owner of such crane or derrick shall renew the certificate of operation each year.
(2) The commissioner shall approve the crane or derrick if he or she is satisfied after inspections and tests that said crane or derrick is in a safe operating condition.
(3) If the owner applies for renewal of a certificate of operation within not more than sixty or less than thirty days prior to the date of expiration of his or her certificate, such owner may continue to use his or her crane or derrick until the department grants or denies him or her a new certificate.
(4) No change in such crane or derrick not provided for in the certificate of operation may be made until the owner obtains a new certificate of operation.

(d) Certificate of on-site inspection.-
(1) The owner of the premises, building or structure, or his or her designated representative, shall obtain a certificate of on-site inspection for the use of any power operated crane, derrick or cableway used for construction purposes at each job site. Such owner or his or her designated representative shall file an application for a certificate of on-site inspection on a form prescribed by the department, and the fee for such application shall be as provided in section 26-215 of title twenty-six of the administrative code. The applicant shall specify the date when the equipment will be at the job site for use, which date shall be not less than three regular working days from the date of filing said application. Such application shall include the information as set forth in the applicable provisions of reference standards RS 19-2 and RS 19-3.
(2) Upon approval of the application, a copy of said approval shall be given to the applicant. It shall have noted thereon that the equipment shall not be operated prior to the date indicated, which date shall be not less than three regular working days from the filing of the application unless otherwise provided in the applicable provisions of reference standard RS 19-2. It shall be unlawful to operate the aforesaid equipment before the specified date, unless it has been inspected and found to be satisfactory by the department. If the equipment has not been inspected by the department on or before the said date, then the equipment may be operated, pending inspection, provided that the conditions and statements contained in the approved application are complied with. Upon inspection by the department and a finding of satisfactory compliance, the approval shall be deemed to be a certificate of on-site inspection.
(3) The certificate of on-site inspection is only valid if the conditions and statements contained in the approved

application are complied with and the hoisting machine is operated in conformance with the provisions of this section and the rules and regulations applicable thereto.
(4) No certificate of on-site inspection shall be required where any article is hoisted or lowered on the outside of any completed building, or for the installation of boilers and tanks, or for the erection, maintenance or removal of signs or sign structures, under the supervision of a master or special rigger or a master or special sign hanger in conformance with the provisions of chapter one of title twenty-six of the administrative code.
(e) The commissioner shall inquire into the cause of any accident involving hoisting machinery.-The owner or person directly in charge of any hoisting machinery shall immediately notify the administrator and the commissioner following any accident involving hoisting machinery. When an accident involves the failure or destruction of any part of a hoisting machine, no person shall do either of the following, without the permission of the commissioner:
(1) use such hoisting machine, or
(2) remove the hoisting machine or any part thereof from the area of the job site.
(f) Any person who wilfully violates any provision of this section shall be guilty of an offense and shall be subject to a fine not exceeding one thousand dollars.
(g) The commissioner may issue temporary certificates of approval, operation and on-site inspection for any power operated crane during the pendency of an application for certificates of approval and operation upon inspection and upon such analysis and testing as the commissioner may deem necessary. The commissioner may revoke such temporary certificates if the application is denied.
(h) Special requirements for cranes and derricks.-The construction, installation, inspection, maintenance and use of power operated cranes and derricks shall be in conformance with reference standard RS 19-2.
(i) Special requirements for cableways.-The construction, installation, inspection, maintenance and use of cableways shall be in conformance with reference standards RS 18-5 and RS 19-3.

§[C26-1909.5] 27-1058 Conveyors and cableways.-
(a) Walkways.-Walkways along belt conveyors or bucket conveyors shall be kept free of materials and, where five feet or more above the ground, shall be provided with a standard guard rail and toeboard along the outside of the walkway. The guard rail and toeboard may be omitted on the side toward the belt if the walkway is located adjacent to the conveyor.
(b) Trippers.-Where trippers are used to control discharge, a device for throwing the belt or bucket drive into neutral shall be installed at each end of the runway.
(c) Spillage.-Where conveyor belts cross any traveled way, trays shall be installed to catch spillage and overhead protection shall be provided for persons or traffic passing beneath.

§[C26-1909.6] 27-1059 Trucks.-
(a) Maintenance.-All parts and accessories of trucks shall be kept in repair. Brakes shall be so maintained that the vehicle with full load may be held on any grade that may be encountered on the job. Provision shall be made for the immediate application of wheel blocks to trucks traversing ramps steeper than one in ten.
(b) Loading.-Trucks shall not be loaded beyond the manufacturer's rated capacity, nor beyond the legal load limit, where applicable. The loads shall be trimmed before the truck is set in motion to prevent spillage. Loads that project beyond the sides of the truck, or that may be dislodged in transit, shall be removed or securely lashed in place.

§[C26-1909.7] 27-1060 Power buggies.-As used in this section, the term "power buggy" shall mean an automotive vehicle designed or used for the transportation of materials on or about construction sites. It shall not include automobiles, motor trucks, general purpose tractors, or excavating or material handling machinery.
(a) Responsibility of employers and workers.-
(1) Every person causing a power buggy to be used shall provide trained and competent operators and shall carry out or enforce all provisions of this section pertaining to the use, operation, and maintenance thereof.
(2) No person other than the operator assigned by the employer shall operate a power buggy. A power buggy shall be in charge and custody of the operator assigned, and no other person shall in any way interfere with or handle it, nor shall the operator cause or permit any other person to do so.
(3) No power buggy shall be operated unless it is in good operating condition and is so constructed that it is stable under conditions of normal use.
(b) Operation and Construction.-
(1) BRAKES.-Every power buggy shall be provided with brakes and tire surfaces capable of bringing it to a full stop within twenty-five feet on a level surface that is similar to the one on which it will be used and at full rated load and maximum design speed. Brakes shall be capable of being fixed in engagement to hold the full load stationary on a twenty-five percent grade.
(2) ACCIDENTAL STARTING.-All movement controls of every power buggy shall be so arranged or shielded that they cannot be inadvertently engaged or the buggy accidentally set in motion.
(3) PARKING ON GRADES.-No power buggy shall be left unattended on any grade sufficiently steep to cause it to coast if free of engine and brake resistance.
(4) USE ON RAMPS, RUNWAYS AND PLATFORMS.-Power buggies shall not be used on ramps, runways, or

platforms that do not meet the requirements of section 27-1053 of article nine of this subchapter.

§[C26-1909.8] 27-1061 Lift and fork trucks.-
(a) Load capacity.-A metal plate with readily legible etched or stamped figures giving the capacity rating in pounds shall be attached to every lift or fork truck.
(b) Maintenance.-All parts and accessories of lift or fork trucks shall be kept in repair and with brakes adequate to maintain the fully loaded vehicle on any grade that may be encountered on the job.
(c) Loading.-No lift or fork truck shall be loaded beyond its capacity rating. No hand-operated pallet truck loaded so that any point on the load is at a greater height than four feet six inches above the floor shall be moved by pushing unless handled by two persons.
(d) Prohibited use.-No lift or fork truck shall be in motion when the loaded forks are elevated higher than necessary to clear obstructions, except as may be required for positioning, picking up, or depositing the load.

§[C26-1909.9] 27-1062 Hand propelled vehicles.-Hand propelled vehicles shall be constructed and braked to withstand the loads to be carried and shall be maintained in repair. Vehicles with loose parts shall not be used.

§[C26-1909.10] 27-1063 Mixing machines.-Where the public may have access to the working area near charging skips, guard rails shall be erected to enclose the area under the raised skip and the mixing machine. Each time before raising or lowering the charging skip, the operator shall ascertain that no one is in the danger zone.

§[C26-1909.11] 27-1064 Jacks.-
(a) Marking.-The rated capacity of every jack shall be legibly marked in a prominent location on the jack by casting or stamping. The manufacturer shall designate the intended supporting point of the load and the maximum permissible length of lever and force applied.
(b) Overtravel to be limited.-Every jack shall, where practicable, be provided with a positive stop to prevent overtravel; otherwise an indicator to clearly show overtravel shall be provided on the jack.
(c) Maintenance.-Lubrication and operation of jacks shall be in accordance with the recommendations of the manufacturer.
(d) Foundations.-Jacks shall rest on a firm, level foundation adequate to support the load.
(e) Blocking required.-When the object has been lifted to the desired height, blocking or cribbing shall be immediately placed under it.

ARTICLE 11 EXPLOSIVE POWERED AND PROJECTILE TOOLS

§[C26-1910.1] 27-1065 General.-All explosive powered and projectile tools shall be approved.

§[C26-1910.2] 27-1066 Explosive powered tools.-
(a) The provisions of reference standard RS 19-1 shall apply.
(b) The care and storage of explosives shall meet the requirements of the fire department.

§[C26-1910.3] 27-1067 Projectile tools.-
(a) Basic requirements.-
(1) Unless in a particular case the board shall otherwise determine, design and construction must be such as to retain safely all internal pressures which may occur during operation, the discharge mechanism shall be such that the projectile cannot [*sic*] be discharged by dropping the tool, the discharge mechanism shall be such that the discharge of each projectile shall be dependent on a separate and distinct act by the operator, and all safety features shall be durable.
(2) A tool shall have such other characteristics as the board may find necessary or proper to provide safety, alternative or in addition to the foregoing. Such other characteristics may include devices and materials external to the tool itself but associated with its function, and may also include in respect to high velocity projectile tools the basic requirements set forth above for explosive powered tools which discharge projectiles with comparable velocities.
(b) Maintenance.-Every projectile tool shall be properly maintained. No such tool shall be used if any part thereof necessary to retain internal pressures or to prevent accidental discharge of a projectile is not in sound and operable condition.
(c) Operation.-
(1) A projectile [tool]* shall be operated only by an authorized operator who shall be the owner, lessee, or other person having proprietary custody of the tool or any other person whom he or she may authorize to operate it.
(2) While a projectile tool is in the care and custody of an authorized operator, no other person shall handle or in any way molest it.
(3) No authorized operator of a projectile tool shall leave it unattended while it is in a condition to discharge a projectile.
(4) No person shall use a projectile tool for any purpose other than that for which it was manufactured, nor shall such person point it at another person or hold it at an angle permitting the projectile to fly free.
(5) No person shall use a projectile tool in such a way as to endanger persons who may be in the vicinity.

Copy in brackets not enacted but probably intended.

ARTICLE 12 EXPLOSIVES AND BLASTING

§[C26-1911.1] 27-1068 General.-
All handling, transporting, and use of explosives shall meet the requirements of the fire department.

ARTICLE 13 FLAMMABLE AND COMBUSTIBLE MIXTURES, COMPRESSED GASES, AND OTHER HAZARDOUS MATERIALS

§[C26-1912.1] 27-1069 General.-The transportation, handling, storage, and use of all volatile flammable oils, flammable and combustible mixtures, compressed gases, and other hazardous materials shall meet the requirements of the fire department. Also, see subdivision (b) of section 27-1023 of article two of this subchapter, warning signs and lights.