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

*****DOB 6-17-96***

******DOB 9-2-01***

** REFERENCE STANDARD RS 10-1A MASONRY

Section 1 General

****1.1 SCOPE** -This standard provides minimum requirements for the design and construction of non enlargement alterations to unit masonry in buildings constructed on or before the effective date of this local law as an alternate to RS 10-1B, not including plain or reinforced unit concrete, reinforced gypsum, or reinforced unit masonry. All new construction and enlargement alterations in and of themselves of unit masonry on new or existing foundations, not including plain reinforced concrete, reinforced gypsum, or reinforced unit masonry shall comply with reference standard RS 10-1B.

***Local Law 17-995.*

1.2 DIMENSIONS.-Unless the word "actual" is used, the dimensional requirements for masonry and for masonry units given in this standards are nominal. The measured dimensions of masonry shall be not more than 1/2 in. less than the required nominal dimensions.

Section 2 Definitions

ARCHITECTURAL TERRA COTTA.-(See ceramic veneer).

ASHLAR MASONRY.-Masonry composed of rectangular units having sawed, dressed, or squared beds, properly bonded, and laid in mortar.

BACKUP.-That part of a masonry wall behind the facing.

BONDER.-A masonry unit that overlaps two or more adjacent wythes of masonry to bind or tie them together.

BRICK.-A masonry unit, not less than 75 percent solid, having a shape approximating a rectangular prism, made from burned clay or shale, or mixture thereof. Brick may be composed of other materials when so designated, as for example, "concrete brick" and "sand-lime brick".

BUTTRESS.-A bonded column of masonry built as an integral part of the wall and projecting from either or both surfaces decreasing in cross-sectional area from base to top.

CERAMIC VENEER.-Hard-burned, glazed or unglazed, non-loadbearing clay masonry units, solid or hollow, plain or ornamental.

CHASE.-A continuous recess in a wall to receive pipes, ducts, conduits, etc.

COLLAR JOINT.-The vertical longitudinal joint between wythes of masonry.

COLUMN.-A vertical compression member whose width does not exceed three times its thickness.

COPING.-The materials or masonry units used to form a cap or finish on top of a wall, column, chimney, or pilaster to protect the masonry below from penetration of water.

CORBELLING.-The projecting of successive courses of masonry out from the face of the wall to increase the wall thickness or to form a shell or ledge.

COURSE.-One of the continuous horizontal layers of masonry units bonded together with mortar.

CROSS-SECTIONAL AREA.-Net cross-sectional area of a masonry unit shall be taken as the gross cross-sectional area minus the area of the cores or cellular spaces. Gross cross-sectional area of scored units shall be determined to the outside of the scoring but the cross-sectional area of the grooves shall not be deducted from the gross cross-sectional area to obtain the net cross- sectional area.

EFFECTIVE HEIGHT.-The height of a wall or column which is assumed for purposes of calculating the slenderness ratio (see section 4.4.2.)

EFFECTIVE THICKNESS.-The thickness of a wall or column that is assumed for purposes of calculating the slenderness ratio (see section 4.4.3.)

FILLED CELL MASONRY.-Masonry construction made with vertical cell hollow units in which all cells and voids are filled by pouring grout therein.

GROUTED MASONRY.-Masonry construction made with solid masonry units in which the collar joints are filled by pouring grout therein.

HEADER.-A brick or other masonry unit laid with the end surface exposed.

HOLLOW MASONRY UNIT.-A masonry unit whose net cross- sectional area in any plane parallel to the bearing surface is less than 75 percent of its gross cross sectional area measured in the same plane (see cross-sectional area).

MASONRY.-A built-up construction or combination of masonry units set in mortar.
PARGING.-The process of applying a coat of mortar to masonry construction.
PARTITION.-An interior non-loadbearing wall supporting no vertical load other than its own weight.
PILASTER.-A bonded or keyed column of masonry having uniform cross section throughout its height; built as part of a wall and projecting from either or both surfaces. A pilaster may serve as either a vertical beam, or a column, or both.
RUBBLE.-
(1) Coursed rubble-Masonry composed of roughly shaped stones fitting approximately on level beds, well bonded, and brought at vertical intervals to continuous level beds or courses.
(2) Random rubble-Masonry composed of roughly shaped stones, well bonded and brought at irregular vertical intervals to discontinuous but approximately level beds or courses.
(3) Rough or ordinary rubble-Masonry composed of nonshaped or field stones laid without regularity of coursing, but well bonded.
SOLID MASONRY UNIT.-A masonry unit whose net cross-sectional area in every plane parallel to the bearing surface is 75 percent or more of its gross cross-sectional area measured in the same plane (see cross-sectional area).
VENEER.-A single facing wythe of masonry units or similar materials securely attached to a wall for the purpose of providing ornamentation, protection, insulation, etc., but not so bonded or attached as to be considered as exerting common reaction under load.
WALL.-A vertical compression member having a horizontal dimension measured at right angles to the thickness, of more than three times the thickness.
(1) Cavity wall.-A wall built of masonry units so arranged as to provide a continuous air space within the wall between the inner and outer wythes (with or without insulating material), and in which the wythes are tied together with metal ties.
(2) Composite wall.-A multiple-wythe wall in which at least one of the wythes is dissimilar to the other wythe or wythes with respect to type of masonry unit, mortar, or construction.
(3) Curtain wall.-An exterior non-loadbearing wall.
(4) Faced walls.-A composite wall in which the masonry facing and the backing are so bonded as to exert a common reaction under load.
(5) Hollow-masonry wall.-A wall built of hollow masonry units.
(6) Loadbearing wall.-A wall that supports any vertical load in addition to its own weight.
(7) Masonry bonded hollow wall.-A wall built of masonry so arranged as to provide an air space within the wall between the inner and outer wythes and in which the wythes are bonded together with solid masonry units.
(8) Non-loadbearing wall.-A wall that supports no vertical load other that its own weight.
(9) Panel wall.-An exterior non-load bearing wall in skeleton frame construction, wholly supported at each story.
(10) Solid masonry wall.-A wall built of solid masonry units laid contiguously, with joints between units filled with mortar or grout.
(11) Veneered wall.-A composite wall having a facing of masonry units or other weather-resisting noncombustible materials securely attached to the backing, but not so bonded as to intentionally exert common action under load (see section 11).
WYTHE.-Each continuous vertical longitudinal section of a wall. For walls of unit masonry, each wythe is one masonry unit in thickness.

Section 3 Materials
3.1 QUALITY.-Masonry materials shall conform to the standards and requirements set forth herein. Where no standards are established, the quality of materials shall be based on generally accepted good practice.
3.2 MASONRY UNITS.-Except as noted in sections 3.2.1 to 3.2.3, the quality of all masonry units used in buildings shall conform to the standard and grade shown in table RS 10-1.1. Manufacturer's certification as to the suitability of the material for the proposed use shall be submitted for all masonry units used in structural applications.
3.2.1 Ceramic veneer - All ceramic veneer shall have a strong homogeneous body conforming to the following physical requirements:
(a) The average compressive strength of at least five 1 in. square specimens shall be not less than 5,000 psi with no individual specimen testing less than 4,500 psi. Compression tests shall be made on five specimens, 1 in. by 1 in. face size and the full thickness of the ceramic veneer. Loads shall be applied to the test specimens in a direction parallel to the exposed face. Specimens shall be capped and tested in accordance with Reference Standard RS 10-30.
(b) The average absorption of not less than five specimens by 5 hr. boiling shall not exceed 16 per cent with no individual specimen exceeding 18 per cent. Absorption tests shall be made on five specimens, 6 in. by 6 in. in face size and the full thickness of the ceramic veneer. Absorption tests shall be made in accordance with Reference Standard RS 10-30.
3.2.2 Glass Block-Block may be solid or hollow; mortar bearing surfaces of the blocks shall be provided with surface or a coating material to afford adhesion between mortar and block.
3.2.3 Natural stone-Stone used in masonry shall be sound, free from friable inclusions and have characteristics of strength, durability and resistance to impact and abrasion commensurate with the proposed use.
3.3 METAL ANCHORS AND TIES.-Where corrosion-resistant anchors or ties are called for, they shall be copper coated or zinc coated, or of metal having corrosion-resistant qualities equivalent to zinc-coated mild steel.

(a) Zinc coatings on iron or steel shall conform to Reference Standard RS 10-23, class B-1, B-2, or B-3.
(b) Zinc coatings on wire shall conform to Reference Standard RS 10-41, class 1.
(c) Copper coated wire shall conform to Reference Standard RS 10-42, grade 30 HS.

TABLES RS 10-1.1 MATERIAL STANDARDS

Units	Reference Standard	Severe Exposure	Minimum Grade Moderate Exposure	No Exposure
Brick—				
Clay or shale……...……	RS 10-31	SW	MW	NW
Sandlime……..……	RS 10-32	SW	MW	NW
Concrete……..……	RS 10-33	U	P[c]	G
Structural Clay Tile—				
Loadbearing……	RS 10-34	LBX	LBX	LB
Non-Loadbearing…...……	RS 10-35	not permitted	not permitted	NB
Concrete Masonry Units-				
Solid loadbearing……	RS 10-36	U	p[c]	G
Hollow loadbearing……	RS 10-37	U	p[c]	G
Hollow non-loadbearing….	RS 10-38	not permitted	permitted	permitted
Gypsum[a]—				
Partition tile or block..……	RS 10-39	not permitted	not permitted	permitted[a]
Cast Stone	RS 10-43	permitted	permitted	permitted
Ceramic Glazed Clay Masonry Units[b]—				
Solid Units……..……	RS 10-40	permitted	permitted	permitted
Hollow Units……..……	RS 10-40	permitted	permitted	permitted
Prefaced Concrete Masonry Units—	RS 10-33	permitted	permitted	permitted
	RS 10-36	permitted	permitted	permitted
	RS 10-37	permitted	permitted	permitted

Notes:
[a]Gypsum partition tile or block shall not be used in bearing walls, or where subject to continuous dampness. Gypsum partition tile or block shall not be used for partitions to receive Portland cement plaster, ceramic tile, marble or structural glass wainscots unless self-furring metal lath is placed over the gypsum tile.
[b]Requirements for finish do not apply.
[c]Grade P may be used for "severe exposure" if protective coatings to prevent water penetration are applied on exterior face.

3.3.1 Prefabricated joint reinforcement- Prefabricated wire reinforcement for embedment in horizontal mortar joints shall consist of two or more longitudinal wires welded to cross wires. The distance between welded contacts of cross wires with each longitudinal wire shall not exceed 6 in. and 16 in. for smooth and deformed longitudinal wires, respectively. Longitudinal wires and cross wires shall be not less than no. 9 steel wire gage where used in 3/8 in. or thicker mortar joints and not less than no. 12 steel wire gage where used in thinner mortar joints. Cross wires of joint reinforcement that are used to bond the facing sand backing of masonry, including cavity walls, shall be corrosion resistant and not less than no. 9 gage. The out-to-out spacing of longitudinal wires shall be such that the wires will be thoroughly embedded in the mortar joints as required in section 10.12.

3.3.2 Unit ties, anchors, or steel bar reinforcement- Unit metal ties, anchors, or steel bar reinforcements for embedment in horizontal mortar joints shall conform to the applicable requirements of Sections 7, 9, 10 and 11 or shall be equivalent in strength and stiffness to the size specified. Any such materials shall have a minimum 30,000 psi yield strength.

* **3.4 MASONRY MORTAR AND GROUT**.-Mortar, except gypsum, and type H, shall conform to Reference Standard RS 10-46. Grout shall conform to the applicable requirements of Reference Standard RS 10-47. Gypsum mortar shall be composed of one part gypsum, meeting the requirements of Reference Standard 10-48, to not more than three parts sand by weight. Water shall be clean and potable. Type H mortar shall be subject to controlled inspection and shall have a compressive

strength of at least 6,000 psi when tested after 28 days at a cure of 75°F. and 50% Relative Humidity, in accordance to ASTM C-109 and shall consist of:

1 bag (94 lbs.) Type I or III Portland cement
50 lbs. ground limestone
3 1/4 cu. ft. mortar sand conforming to ASTM C-144
4 gallons polyvinylidene chloride latex having a solids content of at least 46%

Prior to commencement of construction the supplier of the mortar shall submit an affidavit certifying that all the required ingredients specified have been supplied and included in the mix.

3.4.1 Types of mortar permitted-Unit masonry shall be laid in mortar of the type specified in Table RS 10-1.2.
264-73 BCR

Section 4 Design

4.1 GENERAL.-The design of masonry may be predicated upon analysis of stress or upon the empirical provisions indicated in this Reference Standard. The provisions of this section shall apply only where the design is predicted on analysis of stress. Except as specifically indicated, stresses shall be calculated on the basis of actual rather than nominal dimensions. For provisions relating to infrequent stress conditions the structural design provisions of the building code on combination of loads shall apply.

4.2 ALLOWABLE COMPRESSIVE STRESSES-.

***4.2.1 General**-The allowable compressive stress in any type of masonry construction due to axial loads shall not exceed 0.25 f'_m for walls or 0.2 f'_m for columns. The allowable compressive stress in type H mortar construction due to flexural loads shall be 0.33 f'_m. The value of f'_m shall be based on the cross-sectional area (A_g) as defined in Sections 4.4.4 (a) and (b). Where Method No.1 (Section 4.2.2(a) is used, the value of f'_m shall be the specified minimum 28-day compressive strength of the masonry or the specified minimum compressive strength at any earlier age at which the masonry may be expected to receive its full load. Plans shall show the compressive strength of masonry (f'_m) at a specified age for which the several parts of the structure were designed. Where Method No.2 (Section 4.2.2 (b)) is used, the tabulated values of f'_m shall be multiplied by the ratio of the strength of the mortar at a given age to the specified strength of the mortar at the age of 28 days, except that said ratio shall not be taken as greater than 1.0.
264-73 BCR

*** TABLES RS 10-1.2 TYPES OF MORTAR PERMITTED**

Type of Masonry:	Type of Mortar Permitted[a]
Masonry in contact with earth	H, M, or S[b]
Grouted and filled cell masonry	H, M, or S
Masonry above grade or interior masonry:	
Columns of solid units	H, M, S, N, or O
Columns of hollow units	H, M, or S
Walls of solid units	H, M, S, N, or O
Walls of hollow units	H, M, S, or N
**Cavity walls and masonry bonded hollow walls	H, M, S, or N
Glass Block Masonry	S or N
Non-loadbearing partitions and fireproofing	H, M, S, O, or Gypsum
Gypsum partition tile or block	Gypsum
Linings of existing masonry, either above or below grade	H, M, or S

Notes:

[a] M,S, N and O as defined by reference standard RS 10-46.

[b] Type N mortar may be used where masonry in contact with the earth will not be exposed to frost.

264-73 BCR; 747-72 BCR

4.2.2 Determination of compressive strength of masonry. The determination of the compressive strength of masonry (f'_m) shall be made by one of the following methods: Interpolate to obtain intermediate values.

(a) Method no. 1- Prism tests- When the compressive strength of the masonry is to be established by preliminary tests, the tests shall be made in advance of the operations, using prisms built of similar materials under the same conditions and, insofar as possible, with the same bonding arrangements as for the structure. In building the prisms, the moisture content of the units at the time of laying, the consistency of the mortar, the thickness of the mortar joints, and the workmanship shall be the same as will be used in the structure. Assembled specimens shall be at least 16 in, high and shall have a height to thickness ration (h/t) of at least 2 but not of the prisms tested is less than 5, the compressive strength values indicated by the tests shall be corrected by multiplying by the factor indicated in the table RS 10-1.3.

Prisms shall be tested after aging for 28 days in accordance with the applicable provisions of Reference Standard RS 10-17. Seven-day tests may be used, provided the relation between the 7-and 28-day strengths of the masonry is established by tests of the materials used. Not less than five specimens shall be tested.

(b) Method no.2-Unit tests-In lieu of prism tests, an assumed value of f'_m may be interpolated from the values in table 10-1.4. Compressive strength of the masonry units shall be determined from tests conducted in accordance with applicable ASTM specifications.

TABLE RS 10-1.3 CORRECTION FACTORS FOR H/T RATIO

Ratio of height to thickness (h/t)……	2.0	2.5	3.0	3.5	4.0	5.0
Correction Factor[a]……	0.73	0.80	0.86	0.91	0.95	1.00

Note:
[a]Interpolate to obtain intermediate values.

TABLE RS 10-1.4 ASSUMED COMPRESSIVE STRENGTH OF MASONRY [a b]

Compressive Strength of Units (psi)	Assumed Compressive Strength of Masonry f'm (psi)				
	Type H Mortar	Type M Mortar	Type S Mortar	Type N Mortar	Type O Mortar
			Solid Clay or Shale Units		
14,000 or more……..	5,000	4,600	3,900	3,200	—
10,000……...	5,000	3,400	2,900	2,400	—
6,000…….	5,000	2,200	1,900	1,600	—
2,000…….	1,000	1,000	900	800	—
			Solid Concrete or Sand-Lime Units		
6,000…….	2,000	2,000	1,700	1,400	—
4,000…….	1,500	1,500	1,300	1,100	—
2,500…….	1,100	1,100	1,000	900	—
1,800…….	950	950	860	770	—
1,200……	800	800	740	680	—
			Hollow Units (Clay, Shale, or Concrete)[c]		
6,000…….	5,000	2,000	1,700	1,400	—
4,000…….	1,500	1,500	1,300	1,100	—
2,000…….	1,000	1,000	900	800	—
1,000…….	750	750	700	650	—
			Stone Ashlar Masonry		
Granite……..	4,300	4,300	3,850	3,400	2,700
Limestone or marble…….	2,700	2,700	2,400	2,150	1,750
Sandstone or caststone…….	2,150	2,150	1,900	1,700	1,350
Rubble stone, coursed, rough, or random……..	750	750	650	550	450

Notes:
[a]Where masonry cement mortar is used, if the amounts of Portland cement and lime are established and conform to the requirements for the mortar type indicated in the table, the values in this table apply. Masonry cement mortar in which the proportions are not identified shall not be used for masonry construction proportioned on the basis of the analysis of stress.
[b]For grounted masonry and filled cell masonry, f '$_m$ shall be based on the values given for solid units and hollow units respectively. See Section 8.
[c]The ratio of the bedded area to gross area shall not be less than 0.25. For units having a lesser ratio of mortar bedded area than 0.25, the f '$_m$ values shall be determined by Method No.1 (prism tests).

4.3 ALLOWABLE FLEXURAL, TENSION, AND SHEAR STRESSES.-The allowable stresses in flexural tension and in shear shall not exceed the values set forth in Table RS 10-1.5, except as permitted in other sections of this Reference Standard. The resistance in flexural tension and shear where the wall section is penetrated by flashing shall be investigated on the basis that the resistance is limited to the fractional resistance.

***4.3.1** The allowable flexural tension stress for masonry constructed with Type H mortar shall be the same as with Type M or S mortar (Table RS 10-1.5) except that when clay or shale masonry units are used the allowable flexural tension shall be 0.30 f '$_t$ but not greater than 112 psi and the allowable shear shall be 100 psi provided:

(a) The brick is ASTM C26-69 grade SW or MW.
(b) The brick has no silicone treatment.
(c) The initial rate of absorption of the brick does not exceed 35 grams/minute 730 square inches when tested in accordance with ASTM C67-62.
(d) The brick are extruded side cut units.
(e) The average compressive strength of the brick units is 6,000 psi when tested in accordance with ASTM C67-69.
(f) F'$_t$ is determined by building 5 stack bond single wythe prisms one brick wide and seven brick tall. The prisms shall be cured for 28 days at about 75°F and 50% relative humidity. Specimens shall then be tested as a simple beam with third point loading as described in ASTM C78-64.

(g) Test reports indicating the determination of f '$_t$ shall be submitted by either the applicant or the Architect or Engineer designated for controlled inspection prior to commencement of construction of masonry.

***4.3.2** The allowable flexural tension stress for masonry constructed with Type H mortar and clay or shale masonry units which do not meet the requirements of section 4.3.1(c) through (d) shall be 0.30 f '$_t$ provided f'$_t$ is determined by ASTM E 72-61, uniform transverse load strength method B after 28 day cure at 75°F and 50% R.H. The test panels shall be single wythe, 8 feet tall and 4 feet wide. In addition, units producing wall strength less than 360 psi when tested as outlined above must be tested by building additional single wythe panels constructed and tested for uniform transverse load strengths immediately after being subjected to the National Bureau of Standard Water Permeability Test for a period of five days following the normal 28 day cure.

*__4.3.3__ Wetting of brick in construction of masonry using Type H mortar shall not be permitted.

*__4.3.4__ Allowable flexural tension stresses for masonry constructed by Type H mortar may be increased 33 1/3% when considering wind load.

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*** TABLE RS 10-1.5 ALLOWABLE STRESSES IN FLEXURAL TENSION AND IN SHEAR ALLOWABLE STRESSES (PSI) ON CROSS-SECTIONAL AREA (EXCEPT AS NOTED)**

	Mortar Type[c] Flexural Tension						Shear		
	Normal to bed joints[a]			Parallel to bed joints[b]					
Construction Type[d]	H	M or S	N	H	M or S	N	H	M or S	N
Clay or Shale Masonry Units:									
Solid……	112[f]	36	28	112[f]	72	56	100	50	40
Hollow[e]……..	112[f]	15	10	112[f]	30	20	100	30	20
Concrete Masonry Units:									
Solid……	25	25	18	50	50	36	30	30	20
Hollow[e]……..	15	15	10	50	30	20	30	30	20
Sand-Lime Masonry Units:									
Solid……	30	30	20	60	60	40	40	40	35
Hollow[e]……..	15	15	10	30	30	20	30	30	20
Stone Masonry Units:									
Natural Stone..……..	25	25	18	50	50	36	30	30	20
Cast Stone……..	25	25	18	50	50	36	30	30	20

Notes:

[a]Direction of stress is normal to bed joints construction.

[b]Direction of stress is parallel to bed joints. If masonry is laid in stack bond, tensile stress values for tension parallel to bed joints shall not be used.

[c]Where masonry cement mortars are used, if the amount of Portland cement and lime is established and conforms to the requirements for Type M, S, or N mortar, the provisions of this table shall apply. Masonry cement mortar in which the proportions are not identified shall not be used for masonry construction proportioned on the basis of the analysis of stress.

[d]For computing flexural resistance, the moment of inertia of a cavity wall shall be based on the assumption that the two wythes act independently. The moment of inertia of a masonry bonded hollow wall may be based on the assumption that there is adequate shear resistance between the wythes to assure that they act together.

[e]Net area in contact with mortar.

[f] The allowable flexural tensile stress may be increased by 33 1/3% (or to 150 psi) when considering wind load.

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4.4 DESIGN OF MASONRY WALLS AND COLUMNS.-

4.4.1 Slenderness ratio-

(a) The slenderness ratio (ratio of effective height, h', or length of the wall panel to the effective thickness, t) shall not exceed 30 for walls of solid units, 20 for walls of hollow units, and 25 for walls of filled cell or grouted masonry.

(b) The slenderness ratio (ratio of the effective height, h', to the least effective thickness, t) shall not exceed 25 for columns of solid units, 15 for columns of hollow units and 20 for columns of filled cell or grouted masonry.

* (c)The slenderness ratio shall exceed 40 for walls and columns of masonry constructed with type H mortar.

4.4.2 Effective height-the effective height, h', of columns and walls shall be determined by the architect or engineer who prepares the plans, who shall consider the conditions of end restraint provided in the particular case.

4.4.3 Effective thickness-

(a) For solid masonry, grouted masonry, filled cell masonry, hollow masonry, and masonry bonded hollow walls, the effective thickness, 6, shall be taken as the actual thickness.

(b) For cavity walls loaded on both wythes, the effective thickness, t, shall be taken as 2/3 the sum of

the actual thickness of both wythes.

(c) For cavity walls loaded on one wythe only, the effective thickness, t, shall be taken as the actual thickness of the loaded wythe or 2/3 the sum of the actual thicknesses of both wythes, whichever is the lesser value.

(d) For columns, the effective thickness shall be taken as the least actual thickness.

4.4.4 Allowable vertical loads-

(a) AXIAL LOADS ON WALLS.-Allowable axial loads on masonry walls P, shall be computed by the following formula:

$$P = c\,(0.25f'_m)\,A_g$$

Where:

c = stress reduction factor given in Table RS 10-1.6, corresponding to the slenderness ratio.

A_g = cross-sectional area of the wall.

For solid masonry, grouted masonry, stone masonry and filled cell masonry, A_g shall be computed on the basis of actual thickness without deduction for cells or cores.

For hollow masonry walls, A_g shall be taken as the net cross-sectional area of the units. Where the ratio of mortar bedded area to gross area is less than 0.25, A_g shall then be multiplied by a factor equal to mortar bedded area divided by 0.25 times the gross area.

Where both wythes of a cavity wall support vertical load, A_g shall be taken as cross-sectional area of wall computed as above minus the actual area of the cavity between wythes. Where only one wythe supports vertical load, A_g shall be taken as the cross-sectional area of the loaded wythe computed as above.

(b) AXIAL LOADS ON COLUMNS.-Allowable axial loads on masonry columns shall be computed by the following formula:

$$P=c(0.20\,f'_m)A_g$$

Where:

c = stress reduction factor given in Table 10-1.6 corresponding to the slenderness ratio.

A_g = cross-sectional area of the column.

For solid masonry, grouted masonry, stone masonry and filled cell masonry, A_g shall be computed on the basis of actual thickness without deduction for cells or cores.

For hollow masonry columns, A_g shall be taken as the net cross-sectional area of the units. Where the ratio of mortar bedded area to gross area is less than 0.25, A_g shall then be multiplied by a factor equal to mortar bedded area divided by 0.25 times the gross area.

(c) ECCENTRIC LOAD.-

(1) Where the eccentricity of the loads on the member does not exceed 1/3 the thickness, the allowable vertical load on walls and columns, shall be computed in accordance with section 4.4.4(a) and section 4.4.4(b), respectively, using the stress reduction factors given in Table RS 10-1.6.

TABLE RS 10-1.6 STRESS REDUCTION FACTORS (C)[a]

	Eccentricity as a Proportion of the Thickness of the Member		
Slenderness Ratio	0 to 1/20	1/6	1/3
5	1.00	0.66	0.32
10	0.92	0.63	0.27
15	0.79	0.56	0.22
20	0.64	0.42	0.16
25	0.49	0.36	0.12
30	0.38	0.27	0.08
35	0.27		
40	0.21		

Note:

[a] Linear interpolation between values for stress factors is permissible.

(2) Where the eccentricity exceeds 1/3 the thickness, the maximum tensile stress in the masonry, assuming linear stress distribution (P/A + M/S), shall not exceed the values given in Table RS 10-1.5 or the member shall be reinforced in accordance with the requirements of Reference Standard RS 10-2.

(3) In computing the eccentricity of loads on walls and columns, consideration shall be given to the effects of lateral load, eccentricity of vertical load, and the deflection, thermal and other movements of members. For solid masonry, grouted masonry, filled cell masonry, hollow masonry, masonry bonded hollow walls and cavity walls loaded on both wythes, the eccentricity shall be considered with respect to the centroidal axis of the member. For composite members, the eccentricity shall be considered with respect to the centroidal axis of the transformed area of the member. For cavity walls loaded on one wythe, the eccentricity shall be considered with respect to the centroidal axis of the loaded wythe.

4.5 COMPOSITE WALLS OR FACED WALLS.-In composite walls, faced walls, or other structural members composed of different kinds or grades of units or mortars, the maximum stresses shall not exceed the allowable stresses for the weakest of the combinations of units and mortars of which the member is composed. In cavity walls, where only one wythe supports vertical load, the stresses shall not exceed the allowable stresses for the units and mortars comprising that wythe.

4.6 DISTRIBUTION OF CONCENTRATED LOADS.-The length of the wall to be considered as effective in resisting a concentrated load shall not exceed the center-to-center distance between loads, nor shall it exceed the width of bearing plus four times the wall thickness. Concentrated loads shall not be considered as distributed by metal ties, or distributed across continuous vertical joints.

4.7 BEARING STRESSES.-Allowable bearing stresses may be taken as 1.5 times the corresponding allowable compressive stress, provided that the area of the bearing plate does not exceed 1/3 of the area of the member supporting the bearing plate and the least distance between the edges of the loaded and unloaded areas is a

minimum of 1/4 of the parallel side dimension of the loaded area. For bearing on the full area, the allowable bearing stress shall be taken as equal to the allowable compressive stress. For reasonably concentric bearing areas greater than 1/3, but less than the full area, the allowable bearing stress shall be interpolated between 1.0 and 1.5 times the allowable compressive stress.

Section 5 Lateral Support

5.1 METHOD OF SUPPORT.-Lateral support for masonry walls may be obtained by cross walls, columns, pilasters, or butresses, where the limiting distance is measured horizontally; or by floors, roofs, spandrel beams, or girts, where the limiting distance is measured vertically, sufficient bonding or anchorage shall be provided between the walls and the supports to resist the assumed wind or other horizontal forces, acting either inward or outward, and shall meet the requirements of section 9.5. All members relied upon for lateral support shall be designed on the basis of allowable stress and shall have sufficient strength to transfer the horizontal force, acting in either direction, to adjacent structural members or to the ground. Where walls are dependent upon floors or roofs for their lateral support, provision shall be made in the building to transfer the lateral forces to the ground.

5.2 HEIGHT AND THICKNESS LIMITATIONS.-

5.2.1 General-Masonry walls, whether loadbearing or non- loadbearing shall be provided with lateral support by means of horizontal or vertical members or constructions at intervals not to exceed those specified in section 4.4.1 or, for non- loadbearing walls or for loadbearing walls where it is desired to obviate the need for structural analysis, at intervals not to exceed those specified in this section.

Where masonry wall containing no openings is supported in both horizontal and vertical spans, the allowable distance between lateral supports as indicated in this section may be increased; but if both horizontal and vertical distances exceed the allowable distance, the sum of the horizontal and vertical spans between supports may be no more than three times the allowable distance permitted for support in only one direction.

5.2.2 Load bearing exterior masonry walls-Except as provided in section 6.4 load bearing exterior masonry walls shall be proportioned on the basis of structural analysis.

5.2.3 Non-loadbearing exterior masonry walls-In lieu of structural analysis, non-loadbearing exterior masonry walls may be proportioned so that the maximum slenderness ratio does not exceed 20. In the case of a gable, the height of the wall shall be based on the average height. Where the wall panel contains openings having a dimension in excess of 50 percent of the corresponding dimension of the panel, the wall shall be proportioned by structural analysis.

5.2.4 Interior loadbearing walls-In lieu of analysis of stresses, interior loadbearing masonry walls may be proportioned so that the maximum slenderness ratio does not exceed 20.

5.2.5 Partitions-The distance between lateral supports of partitions 3 in. or greater in thickness shall not exceed 48 times the nominal thickness of the partition, excluding plaster, and for partitions less than 3 in. thick, 48 times the actual thickness, including plaster.

5.2.6 Faced or composite walls-The slenderness ratio for faced or composite walls shall not exceed the value allowed for the weakest of the combination of masonry units or mortars of which the wall is composed.

5.2.7 Rubble stone masonry-In lieu of structural analysis, rubble stone masonry walls may be proportioned so that the slenderness ratio does not exceed 14 for exterior walls and 16 for interior walls.

***5.3 MINIMUM THICKNESS**.-Whether proportioned on the basis of analysis of stresses or empirical rules, in no case shall the thickness of masonry construction be less than the dimensions shown in Table RS 10-1.7 except when type H mortar is used and the construction is proportioned on the basis of analysis of stresses. When type H mortar is used the minimum nominal thickness of masonry shall be 4 inches. The minimum thickness of a wythe shall be 2 inches.

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5.4 DECREASE IN THICKNESS.-Whether proportioned on the basis of empirical provisions or the analysis of stresses, where walls of hollow units or masonry bonded hollow walls are decreased in thickness, a course or courses of solid masonry shall be interposed between the wall below and the thinner wall above, or special units of construction shall be used that will adequately transmit the loads from the shells of the units above to the shells of those below.

***TABLE RS 10-1.7 MINIMUM THICKNESS OF MASONRY**

Type of Masonry	Nominal Thickness (in.)
Loadbearing walls (exterior or interior).-	
Solid masonry……	5
Grouted or filled cell masonry……	6
Hollow masonry……..	6
Cavity or masonry bonded hollow walls	8[a]
Stone ashlar masonry……..	12
Stone rubble masonry……	16[c]
Non-loadbearing walls.-	
Exterior walls……..	4
Partitions……..	2
Columns.-	
Solid unit masonry……..	6
Hollow unit masonry……..	8
Facing of faced walls……...	2[b]

Notes:-

[a] Overall wall thickness including cavity.

[b] In no case less than 1/8 the height of the facing unit.

[c] 12 in. for one story buildings.

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Section 6 Thickness and Height of Masonry Empirical Provisions

6.1 GENERAL.-Compliance with the provisions of this section shall not be required where the design is proportioned on the basis of analysis of stresses.

6.2 MINIMUM THICKNESS.-The provisions of section 5.3 shall apply.

6.3 CHANGE IN THICKNESS.-

6.3.1 Variation in thickness- Except for window-paneled backs, and permissible chases and recesses (section 10.1) walls shall not vary in thickness between their lateral supports. When a change in thickness, due to minimum thickness requirements, occurs between floor levels, the greater thickness shall be carried up to the higher floor level.

6.3.2 Decrease in thickness-The provisions of section 5.4 shall apply.

6.4 LOADBEARING WALLS.-Where the height of exterior or interior loadbearing masonry walls does not exceed the following requirements, such walls, if they meet the provisions of section 5.3 with regard to compressive stress and of section 5.3 with regard to minimum thickness, may be considered to be adequate to resist the applied wind loads and other shearing forces.

6.4.1 Multi-story buildings-For limitations on 8 in. walls see (f) below.

(a) Exterior solid walls-The thickness of solid exterior masonry bearing walls shall be at least 8 in. for the top floor and 12 in. for a maximum of 55 ft. measured downward from the top floor level. Any additional height shall be provided by 16 in. lower walls up to a maximum building height of 104 ft. Buildings taller than 104 ft. shall be structurally analyzed and designed. The slenderness ratio shall not exceed 20.

(b) Interior solid walls-Interior solid walls shall be at least 8 in. thick for the uppermost 55 ft. of wall height and 12 in. for the lower walls for a maximum building height of 104 ft. Taller walls shall be designed by structural analysis.

(c) Cavity walls-Cavity walls or masonry bonded hollow walls shall be at least 8 in. thick for the top floor and 12 in. thick for the lower walls up to a maximum total height of 40 ft except that 10 in. cavity walls may be used for a maximum total height of 25 ft. Taller walls shall be designed by structural analysis.

(d) Walls of hollow units-Loadbearing walls of hollow units shall be at least 12 in. thick for the top floor and at least 12 in. for the lower walls for a maximum building height of 40 ft. Hollow unit walls 40 ft. high may be supported by solid masonry walls whose height is no more than 35 ft. above the first tier of beams.

(e) Stiffened walls-Where solid masonry bearing walls are stiffened by, and tied to, reinforced concrete floors or masonry cross walls at distances not greater than 20 ft. apart, they may be 12 in. thick for the uppermost 70 ft., measured downward from the top of the wall.

(f) Eight inch walls-Notwithstanding other provisions in this section, the thickness of masonry bearing walls may be 8 in. where:(1) the total height of the wall above its support does not exceed 35 ft. except for cavity walls for which (c) above shall apply, and (2) the distance from floor-to-floor or floor-to-roof does not exceed 12 ft. and (3) the floor live load does not exceed 60 psf; and (4) the roof is designed so that the dead load imparts no lateral thrust to the wall.

6.4.2 One-story buildings-The bearing walls of one-story buildings shall be at least 6 in. thick provided the vertical loads on the roof impart no lateral thrust to the wall

6.4.3 Walls of residence buildings-In residence buildings not more than three stories high, bearing walls other than coursed or rough or random rubble stone, may be 8 in. thick when not over 35 ft. high and the roof is designed so that the dead load imparts no lateral thrust to the wall. Such walls in one- story residence buildings, and in one-story private garages, may be 5 1/2 in. thick.

6.4.4 Walls above roof level-Masonry walls above roof level, 12 ft. or less in height, enclosing stairways, machinery rooms, shafts, or penthouses, may be 8 in. thick and may be considered as neither increasing the height nor requiring any increase in the thickness of the wall below. Parapet walls shall conform to the provisions of section 10.4.

6.4.5 Faced or composite walls-Neither the thickness or height of faced or composite walls, not the distance between lateral supports, shall exceed that prescribed for masonry of either of the types forming the facing or the backing.

6.4.6 Cavity or masonry bonded hollow walls-Where both the facing and backing wythes are constructed of solid masonry units, the wythes may be 3 in. thick. Otherwise, the wythes of cavity walls shall each have a thickness of at least 4 in. and the cavity shall be at least 2 in. but not more than 4 in. wide. Wythes less than 4 in. thick shall not have raked joints and the backing wythe of cavity or masonry bonded hollow walls shall be at least as thick as the facing wythe. A cavity or masonry bonded hollow wall may be constructed to its maximum permissible height on top of a solid masonry wall whose maximum height is 35 ft. above the first tier of beams. Roof construction shall be designed so that the dead load imparts no lateral thrust to the wall.

6.4.7 **Rubble stone walls**-Rough, random or coursed rubble stone walls shall be 4 in. thicker than is required for other types of masonry, but in no case less than 12 in. thick.

6.4.8 Wall thickness increase due to span length-When the clear span between bearing walls or between a bearing wall and an intermediate support is more than 26 ft., the effects of temperature, of rotation of end supports, and of eccentricity shall be investigated. In lieu of such investigation, the thickness of such walls shall be increased 4 in. for each 12 1/2 ft., or fraction thereof, that such span is in excess of 26 ft.

6.5 NON-LOADBEARING WALLS.-Provided that they conform to the provisions of Section 5, non-loadbearing masonry walls, including curtain walls and

panel walls, may be 4 in. less in thickness than required in Section 6.4 for loadbearing walls, except as provided below.

6.5.1 Partitions-The minimum thickness for partitions shall be as follows:

TABLE RS 10-1.8

Height of Walls	Thickness
8 ft. and under …….	2 in.
Over 8 ft. to 12 ft……..	3 in.
Over 12 ft. to 16 ft……	4 in.
Over 16 ft. to 20 ft……	6 in.
Over 20 ft. to 24 ft……	8 in.

6.6 OPENINGS IN BEARING WALLS.-The area of openings in any transverse horizontal plane of a bearing wall shall not exceed 50 percent of the gross sectional area unless the wall panel can be demonstrated by analysis to be structurally adequate with the increased area of openings.

Section 7 Bonding

7.1 GENERAL.-All multiple wythe masonry loadbearing and non- loadbearing walls shall be bonded in accordance with one of the methods indicated in sections 7.2 through 7.4. For grouted masonry see section 8.

7.2 BONDING WITH MASONRY HEADERS.-Where the facing and backing of solid masonry construction are bonded by means of masonry headers, at least 14 percent of the wall surface of each face shall be composed of headers extending at least 3 in. into the backing. The distance between adjacent full length headers shall not exceed 24 in. either vertically or horizontally. In walls in which a single header does not extend through the wall, headers from the opposite sides shall overlap at least 3 in., or headers from opposite sides shall be covered with another header course overlapping the header below at least 3 in.

7.3 BONDING WITH METAL TIES.-The facing and backing (adjacent wythes) of masonry walls shall be bonded with corrosion-resistant 3/16 in. diameter (1/8 in. diameter for veneer), steel ties or metal wire of equivalent stiffness embedded in the horizontal mortar joints. There shall be at least one metal tie for each 2 sq.ft. of wall area. Ties in alternate courses shall be staggered, the maximum vertical distance between ties shall not exceed 24 in., and the maximum horizontal distance shall not exceed 36 in., except that for cavity walls having less than a 4 in. wythe , the maximum vertical distance between ties shall not exceed 16 in. Rods or ties bent to rectangular shape shall be used with hollow masonry units laid with the cells vertical. In other walls the ends of ties shall be bent to 90 degree angles to provide hooks at least 2 in. long. Additional bonding ties shall be provided at all openings and shall be spaced not more than 3 ft. apart around the perimeter and within 12 in. of the opening.

***7.3.1 BONDING OF WALLS**.-Walls bonded in accordance with this section or section 7.4 shall conform to the allowable stress, lateral support, thickness, height, and mortar requirements for cavity walls unless the collar joints in such walls are filled with mortar.

**Caption supplied by editor.*

7.4 BONDING WITH PREFABRICATED JOINT REINFORCEMENT.-

The facing and backing (adjacent wythes) of masonry walls may be bonded with prefabricated joint reinforcement. There shall be at least one cross wire serving as a tie for each 2 sq. ft. of wall area. The vertical spacing of the reinforcement shall not exceed 16 in.

7.5 BONDING FACED OR COMPOSITE WALLS.-Faced or composite walls may be bonded as provided for in sections 7.2, 7.3, and 7.4. Where the facing and backing are bonded by means of masonry headers, such headers shall extend at least 3 in. into a hollow masonry back-up unit specifically designed to receive and provide mortar bedding for the header.

7.6 BONDING CAVITY AND MASONRY BONDED HOLLOW WALLS.-

7.6.1 Cavity walls-Wythes of cavity walls shall be bonded as required in section 7.3 or 7.4.

7.6.2 Masonry bonded hollow walls-Wythes of masonry bonded hollow walls shall be bonded as required in section 7.2.

7.7 MASONRY LAID IN STACK BOND.-Where unit masonry is laid in stack bond, continuous prefabricated joint reinforcement or other steel bar or wire reinforcement shall be embedded in the horizontal mortar beds at vertical intervals not to exceed 16 in. The longitudinal reinforcement shall be not less than no. 9 steel wire gage. At least one longitudinal bar or wire shall be provided in the prefabricated unit for each 6 in. of wall thickness or fraction thereof.

7.8 ASHLAR, NATURAL OR CAST STONE.-In ashlar masonry, bond stones uniformly distributed shall be provided to the extent of at least 10 percent of the wall area. Such bond stones shall extend at least 4 in. into the backing wall. Rubble stone masonry, 24 in. thick or less, shall have bond stones with a maximum spacing of 3 ft. vertically or horizontally and, if the masonry is thicker than 24 in. shall have one bond stone for each 6 sq. ft. of wall surface on both sides.

7.9 LONGITUDINAL BOND.-In each wythe of masonry loadbearing and non-loadbearing walls, at least 60 percent of the stretchers in any transverse vertical plane shall lap the units above and below at least 2 in. or 1/3 the height of the unit, whichever is greater, or the masonry walls or partitions shall be reinforced longitudinally as required in section 7.7.

7.10 BONDING OF INTERSECTING WALLS AND PARTITIONS.-Bonding of intersecting walls shall be as required in section 9.2.

Section 8 Grounted and Filled Cell Masonry

8.1 MATERIALS.- Only solid masonry units shall be used in grouted masonry construction and only vertical cell hollow masonry units shall be used in filled cell

construction. In grouted masonry, fine grout (Reference Standard RS 10-47) shall be used in grout spaces with a least clear dimension less than 2 in. and coarse grout (Reference Standard RS 10-47) shall be used in grout spaces with a least clear dimension of 2 in. or more. In filled cell masonry, either fine or coarse grout may be used where the least clear dimension of the core is less than 4 in., and coarse grout shall be used where the least clear dimension of the core is 4 in or more.

8.2 CONSTRUCTION.-

8.2.1 Grouted masonry-The masonry units in either the inner or outer wythes, but not necessarily both, shall have a 24-hr. cold water absorption of not less than 5 percent. All masonry units in the inner and outer wythes shall be laid plumb in full head and bed joints and mortar "fins" shall not protrude into spaces designed to be filled with grout. Only type M or S mortar shall be used. All interior joints shall be solidly filled with grout, except that masonry units in the core may be placed or floated in grout poured between the two outer wythes. The grouted longitudinal joints shall be not less than 3/4 in. wide. Where the least clear dimension of the longitudinal vertical joint or core is less than 2 in., the maximum height of pour shall be 12 in. Where the least clear dimension of the longitudinal vertical joint or core is 2 in. or more, the maximum height of grout pour shall not exceed 48 times the least dimension of the longitudinal vertical joint for coarse grout nor 64 times for fine grout, but in no case shall the maximum height of grout pour shall not exceed 12 ft. When grouting is stopped for 1 hr. or longer, the grout poured shall be stopped 1 1/2 in. below the top of a masonry unit and properly rodded or puddled. Masonry bonders shall not be used, but metal wall ties may be used to prevent spreading of the wythes and to maintain vertical alignment of the wall. Where such metal ties are used, they shall be protected as required in section 10.12.

8.2.2 Filled cell masonry-All units shall be laid plumb with full face shell mortar beds. All head (or end) joints shall be filled solidly with mortar for a distance in from the face of the unit or wall not less than the thickness of the longitudinal face shells. Cross webs adjacent to vertical cores shall be fully bedded in mortar to prevent leakage of grout and mortar "fins" shall not protrude into spaces designed to be filled with grout. Only type M or S mortar shall be used. Bond of masonry units in a single wythe shall be provided by lapping units in alternate vertical courses. Where masonry units are laid in stack bond, continuous joint reinforcement shall be used in the bed joints as required by section 7.7. All filled cell masonry shall be built to preserve the unobstructed vertical continuity of the cores. The minimum continuous clear dimensions of vertical cores shall be 2 in. x 3 in. In filling vertical cores, the grout shall not exceed 4 ft. in height. Grout shall be rodded or puddled during placement to insure complete filling of the core. When grouting is stopped for 1 hr. or longer, the grout pour shall be stopped 1 1/2 in. below the top of a masonry unit.

Section 9 Anchorage

9.1 GENERAL.-All elements depending upon one another for continuity or support shall be securely anchored in such a manner as to resist all forces that tend to separate them.

9.2 INTERSECTING WALLS AND PARTITIONS.-Masonry walls and partitions shall be securely anchored or bonded at points where they meet or intersect by one of the following methods:

9.2.1 Bonding-Walls may be bonded by laying at least 50 percent of the units at the intersection in a true masonry bond with alternate units having a bearing of at least 3 in. upon the unit below, by metal ties, joint reinforcement, anchors as specified in section 9.2.3., or by other equivalent method.

9.2.2 Interior non-loadbearing walls – Interior non-loading walls shall be anchored at their intersection, at vertical intervals of not more than 2 ft. on centers, with at least 22 gage corrosion-resistant, corrugated metal ties at least 7/8 in. wide extending at least 4 in. into the masonry or with other ties which provide equivalent anchorage.

9.2.3 Walls carried up separately-Where the courses of meeting or intersecting walls are carried up separately, corner intersections shall be made by regularly toothing or blocking with 8 in. maximum offsets and providing metal anchors having a minimum section of 1/4 in. by 1 1/2 in. with ends bent up at least 2 in., or cross pins at the joints. Such anchors shall be at least 2 ft. long with a maximum vertical spacing of 4 ft. Other types of metal ties, joint reinforcement, or anchors shall be spaced to provide equivalent anchorage at the intersection.

9.3 WALLS ADJOINING OR INTERSECTING STRUCTURAL FRAMING.-Where walls are dependent upon the structural frame for lateral support, they shall be anchored with flexible metal anchors or keyed to the structural members.

9.4 ANCHORAGE OF FURRING.-Masonry furring shall be anchored to the backing with hardware cloth ties consisting of 1/2 in. mesh no. 20 steel wire gage galvanized iron fabric at least 4 in. long and extending at least 1¼ in. into the facing and backing or by an equivalent means of anchorage. Ties shall be spaced no more than 24 in. apart vertically and 36 in. apart horizontally. Such masonry furring shall be excluded in calculating the required wall thickness and shall not be considered as having any structural value.

9.5 ANCHORAGE OF FLOOR JOISTS.-Wood floor joists 5 ft. or more above grade bearing in masonry walls shall be anchored to the wall at intervals not to exceed 6 ft. by metal anchors having a minimum cross section of 0.25 sq. in. and at least 16 in. long. The anchors shall be securely fastened to the joists and built at least 3 1/2 in. into the masonry. Joists 5 ft. or more above grade and parallel to the wall shall be tied to the

wall with metal straps that are spaced not more than 8 ft. on centers and that engage at least three joists. Anchors shall be in line with the bridging or blocking.
Steel floor joists bearing on masonry shall be anchored to the masonry in a manner at least equivalent to that required for wood joists. Concrete slabs bearing on masonry walls require no additional anchorage. The ends of joists, rafters, beams, or girders required to be anchored into walls or bearing partitions shall be continuous and the opposite end shall be similarly anchored into a wall or bearing partition. However, if discontinuous, the discontinuous ends shall lap each other at least 6 in. and shall be well bolted or spiked together, shall be butted and fastened by metal straps or ties, or other means shall be provided for the transfer of thrust between the discontinuous ends.

9.6 ROOF ANCHORAGE.-Roof construction, other than cast-in- place concrete slabs, shall be securely anchored to loadbearing masonry walls with minimum 1/2 in. bolts spaced 8 ft. on center, or their equivalent. The bolts shall extend and be embedded a minimum of 15 in. vertically into the masonry, or where a continuous bond beam is provided, shall be hooked tightly around or welded to at least 0.2 sq.in. of continuous longitudinal bond beam reinforcement placed at least 6 in. from the top of the wall.

Section 10 Miscellaneous Requirements

10.1 CHASES AND RECESSES.-

10.1.1 Limitations-Chases in masonry walls shall not be deeper than 1/8 the wall thickness. Vertical chases adjacent to bearings of beams or lintels, vertical chases wider than 12 in., and all horizontal chases shall be proportioned on the basis of the analysis of stress. No chase shall allowed within the required area of a column or pilaster. The clear spacing between chases shall not be less than three times the width of the larger adjacent chase.

10.1.2 Exceptions for 8 in. walls-In buildings of residential occupancy not over 2 stories in height, vertical chases not more than 4 in. deep and not more than 4 sq. ft. of wall area may be built in 8 in. walls, except that recesses below windows may extend from floor to sill and be the width of the opening above. Masonry directly above chases or recesses wider than 12 in. shall be supported on lintels.

10.2 CORBELLING.-The maximum horizontal projection of corbelling from the face of the wall shall not exceed 1/2 the wall thickness. The maximum projection of one unit shall not exceed ½ the height of the unit or 1/3 its bed depth. The top corbel course shall be a full course of headers at least 6 in. long. Corbelling of hollow walls or walls of hollow units shall be supported on at least one full course of solid masonry. Unless structural support and anchorage is provided to resist the overturning moment, the center of gravity of all projecting masonry or molded cornices shall lie within the middle third of the supporting wall.

10.3 ARCHES AND LINTELS.-The masonry above openings shall be supported by well buttressed arches or by lintels that bear on the wall at each end for at least 4 in.

10.4 PARAPET WALLS.-All cells in the hollow masonry units and all joints in solid, cavity, or masonry bonded hollow wall construction shall be filled solid with mortar. All corners of masonry parapet walls shall be reinforced with joint reinforcement or its equivalent at vertical intervals not greater than 12 in. Such reinforcement shall extend around the corner for at least 4 ft. in both directions and splices shall be lapped at least 6 in. Parapet walls shall be properly coped and flashed with noncombustible, weather-proof material of a width not less than the width of the parapet wall plus sufficient overage for overlaps. Nonreinforced masonry parapet walls shall be not less than 8 in. in thickness and their height shall not exceed three times their thickness. Reinforced parapet walls shall be designed in accordance with the provisions of Reference Standard RS 10-2

10.5 GLASS BLOCK.-Masonry of glass block may be used in nonloadbearing exterior or interior walls and in openings that might otherwise be filled with windows, either isolated or in continuous bands, provided the glass block panels have a thickness of at least 3 1/2 in., at the mortar joint and the mortared surfaces of the blocks are satisfactorily treated for mortar bonding. Glass block shall be laid in type S or N mortar. Both vertical and horizontal mortar joints shall be at least 1/4 in. and not more than 3/8 in. thick and shall be completely filled.
Glass block panels for exterior walls shall not exceed 144 sq. ft. of unsupported wall surface nor 25 ft. in length or 20 ft. in height between supports. For interior walls, glass block panels shall not exceed 250 sq.ft. of unsupported area nor 25 ft. in one direction between supports.
Exterior glass block panels shall be held in place in the wall openings to resist both external and internal pressures due to wind. Panels shall be set in recesses at the jambs, and panels exceeding 10 ft. in horizontal dimension between supports shall be set in recesses at the head so as to provide a bearing surface at least 1in. wide along the panel edges. However, for panels exceeding neither 100 sq.ft. in area nor 10 ft. in either horizontal or vertical dimension, and situated four stories or less and less than 50 ft. above grade level, anchorage may be provided by means of noncorrodible perforated metal strips or equivalent.
Glass block panels shall have reinforcement in the horizontal mortar joints, extending from end to end of mortar joints but not across expansion joints with any unavoidable joints spliced by lapping the reinforcement not less than 6 in. The reinforcement shall be spaced at not more than 2 ft. vertically. In addition, reinforcement shall be placed in the joint immediately above and below all openings within a panel. The reinforcement shall conform to the requirements of section 3.3.1, or shall be equivalent in strength.
Every exterior glass block panel shall be provided with

expansion joints at the sides and top. Expansion joints shall be entirely free of mortar, and shall be filled with resilient material.

10.6 BEARING DETAILS.-Concentrated loads shall be supported upon a solid construction of solid masonry, concrete, or masonry of hollow units with cells filled with mortar, grout, or concrete and of sufficient height to distribute safely the loads to the wall, plaster, or column, or other adequate provisions shall be made to distribute the loads.

10.6.1 Joists-Solid construction for support under joists shall be at least 2 1/4 in. in height, and joists supported on such construction shall extend into the masonry at least 3 in.

10.6.2 Beams-Solid construction for support under beams, girders, or other concentrated loads shall be at least 4 in. in height and the bearing of beams shall extend into the masonry at least 3 in.

10.7 USE OF EXISTING WALLS.-An existing masonry wall may be used in the alteration or extension of a building provided that under the new conditions it meets the requirements of this standard and is structurally sound or is made so.

10.7.1 Walls of insufficient thickness-Existing walls of masonry units that are structurally sound, but that are of insufficient thickness when increased in height, may by strengthened by an addition of similar masonry units laid in type M or S mortar. The foundations and lateral support shall be equivalent to those required for newly constructed walls under similar conditions. All such linings shall be thoroughly bonded into existing masonry by toothings to assure combined action of wall and lining. Toothings shall be distributed uniformly throughout the wall, and shall aggregate in vertical cross- sectional area at least 15 percent of the total surface area of the lining. Stresses in the masonry under the new conditions shall not exceed the allowable stresses of Sections 4.2 and 4.3.

10.8 PRECAUTIONS DURING ERECTION.-
Temporary bracing shall be used whenever necessary to take care of any loads to which the walls may be subjected during erection. Such bracing shall remain in place as long as may be required for safety.

10.9 MIXING MORTAR AND GROUT.-All cementitious materials, aggregates, and water shall be mixed for a minimum of 5 minutes in a mechanical batch mixer. If the mortar begins to stiffen, the mortar may be retempered by adding water and remixing. The consistency of grout shall be such that, at the time of placement, it has a slump of 10 1/2 to 11 in. as determined by Reference Standard RS 10-49. All mortar and grout shall be used within 2 1/2 hr. of initial mixing and no mortar or grout shall be used after if has begun to set.

10.10 FILLING JOINTS.-In unit masonry construction, all vertical and horizontal joints designed to receive mortar or grout shall be completely filled. The thickness of mortar joints in loadbearing masonry shall not exceed 1/2 in. Solid masonry units shall be laid with full head and bed joints. Hollow masonry units shall be laid with full mortar coverage on vertical and horizontal face shells.

10.11 MINIMUM JOINT THICKNESS FOR REINFORCEMENT.-The thickness of grout or mortar between masonry units and reinforcement shall be at least 1/4 in. except that 1/4 in. bars may be laid in 1/2 in. horizontal mortar joints, and no. 6 steel wire gage or smaller wires may be laid in 3/8 in. horizontal joints.

10.12 PROTECTION FOR REINFORCEMENT.-Reinforcement consisting of bars or wire ¼ in. or less in diameter embedded in the horizontal mortar joints shall have at least 5/8 in. horizontal cover.

10.13 WETTING OF MASONRY UNITS.-

***10.13.1 Clay or shale bricks**-All brick having an absorption rate in excess or 0.025 oz. per sq. in. per minute shall be wetted before laying except no wetting shall be permitted for brick used with type H mortar. The method of wetting shall be such as to insure that each unit is nearly saturated, surface dry when laid. During freezing weather, units that require wetting shall be sprinkled with warm water immediately before laying and shall be protected against formation of films of ice. No units with ice on the surface shall be laid.

****264-73 BCR***

10.13.2 STRUCTURAL CLAY TILE.-Structural clay tile having a 1 hr. boiling water absorption of 12 percent or more shall be wetted before laying.

10.13.3 Concrete masonry units-Concrete masonry units shall not be wetted before laying.

10.14 PROTECTION AGAINST FREEZING.-
Adequate equipment shall be used for heating the masonry materials and protecting the masonry during freezing or near-freezing weather. No frozen material or materials containing ice shall be used.

Sand shall be heated in such a manner as to remove frost or ice. Water or sand shall not be heated to temperature above 160 degrees F. When necessary to remove frost, the masonry units shall be heated.

When the outside temperature is below 32°F, an air temperature of at least 32°F shall be maintained on both sides of the masonry for a period of at least 48 hours if type M or S mortar is used, and 72 hours if type N or O mortar is used. These periods may be reduced to 24 and 48 hours, respectively, if high early-strength cement is used. When type H mortar is used and the outside temperature is below 40°F, an air temperature of at least 50°F shall be maintained on both sides of the masonry for a period of 72 hours. This time may be reduced to 24 hours if high early strength cement is used. All methods and materials for the protection of the fresh masonry work against freezing shall be subject to the approval of the commissioner. In general, methods and materials commonly accepted as suitable for the protection of reinforced concrete construction in freezing weather shall be used. Salt or other chemicals for lowering the freezing temperature of the mortar shall not be used.

10.15 STORAGE AT THE SITE.-All materials for masonry construction shall be stored in such a manner

that they are kept free of excessive dirt and wetness.

****10.16 HORIZONTAL COMPRESSION JOINTS**.-All concrete framed high-rise buildings to be constructed over 150 ft.-0 in. in height (as measured from adjoining grade to the main roof level), whose exterior walls are of cavity wall construction with steel lintels, shall have horizontal compression joints in the exterior walls to prevent masonry distress induced by vertical shortening of the structural frame.

(a) Horizontal compression joints shall be 1/4 in. thick in thickness (minimum), with 1/4 inch neoprene polyethylene, or urethane gasket or equivalent joint filler filling the entire joint, except for a recess from the toe of the lintel angle to the exterior of the facing brick, to provide space for caulking. These joints shall be spaced at 40 foot intervals (maximum), and the details shown on the plans.

(b) The applicant of record shall submit a statement (or engineering analysis) that the minimum code requirements as stated in (a) are sufficient to provide for the effects of vertical shortening of the structural frame or specify additional horizontal compression joints of at least 1/4 inch thickness.

*****181-72 BCR***

Section 11 Veneer

11.1 GENERAL.-Veneer as used in this section refers to an exposed facing wythe of brick, tile, ceramic veneer, terra cotta, concrete masonry units, cast stone, natural stone, or similar weather-resistant noncombustible masonry units laid in mortar and securely attached to a surface for the purpose of providing ornamentation, protection or insulation, but not intentionally so bonded as to exert common action under load.

11.1.1 Limitations-Veneer shall not be assumed to add to the strength of any wall, nor shall it be assumed to support any load other than its own weight. No veneer shall be less than the thickness specified in Table RS 10-1.9. The height and length of veneer areas shall be unlimited, except as required to control expansion and contraction and except as provided in subdivision 11.2.

TABLE RS 10-1.9 MINIMUM THICKNESS OF MASONRY VENEER

Type of Veneer	Minimum Thickness Actual (in).
Anchored Type:	
Solid masonry units…..	1 5/8
Hollow masonry units...	1 5/8
Ceramic veneer……..	1
Adhesion Type:	
Solid masonry units…..	3/8
Ceramic veneer……..	3/8

11.1.2 Design-All anchor attachments shall be designed to resist a positive or negative horizontal force of 30 psf, and adhesion type veneer shall be designed to have a bond sufficient to withstand a shearing stress of 50 psi. In lieu of design, veneer may be installed in accordance with the requirements of Section 11.2.1 and 11.3.1.

11.1.3 Support of Veneer-The weight of all anchored type veneer shall be supported upon footings, foundation walls, or other supports. Veneer above openings shall be supported upon lintels.

****11.2 VENEER ON WOOD**.-Anchored masonry veneer attached to wood frame structures shall be supported on footings or foundation walls. The height of the veneer shall not exceed 35 feet measured from the top of the supporting footings or foundation walls. Where anchored veneer exceeding 20 feet in height is applied, it shall be supported in a manner that will provide for movement between the veneer and its backing.

*****Local Law 54-1970***

11.2.1 Attachment-Veneer of unit masonry shall be attached directly to wood studs, by one of the following means:

(a) With at least 22 gage corrosion-resistance corrugated steel ties at least 7/8 in. wide at vertical intervals of not more than 24 in. and horizontal intervals of not more than 32 in., but in no case less than one tie for each 3 1/2 sq. ft. of wall area.

(b) Directly to a 1 in. reinforced cement mortar base.

11.3 VENEER ON MASONRY.-Veneer attached to masonry or concrete backing shall not be limited in height other than by compressive stresses.

11.3.1 **Attachment** -Veneer shall be securely attached to the masonry or concrete backing by one of the following means or by a means that is equivalent in strength:

(a) Metal ties conforming to section 7.3 except that ties shall be spaced not more than 24 in. apart either horizontally or vertically.

(b) Corrosion-resistant dovetail slot anchors where the backing and the veneer has been designed for this type of attachment. Such anchors shall be formed from at least 16 gage steel at least 1 in. wide.

(c) Adhesion type masonry veneer shall be installed in accordance with the manufacturers' recommendations and setting plans.

(d) Where anchored veneer is not grouted to the backing, it shall be supported in a manner that will provide for movement between the veneer and its backing.

Section 12 Miscellaneous Structures and Systems

12.1 FLAT OR SEGMENTAL MASONRY FLOOR OR ROOF ARCHES.-The provisions of this section do not apply when masonry floor or roof arches are proportioned on the basis of structural analysis.

12.1.1 Span.-The maximum clear span between supporting beams shall be 8 ft.

12.1.2 Tie Rods.-All masonry flat arches or segmental arches shall be provided with tie rods in both the exterior and interior spans. The minimum size and spacing of tie rods shall be:

For exterior spans-1 1/4 in. round rods spaced 4 ft.-6 in. apart.
For interior spans-7/8 in. round rods spaced 4 ft.-6 in. apart.
Washers shall be used with all tie rods. All tie rods shall have a minimum specified yield point of 33,000 psi.

12.1.3 Flat Arches.-The depth of flat arches of burnt clay or shale hollow blocks shall be at least 1 1/2 in. for each foot of span, inclusive of the portion of the block extending below the under side of the beam, and such arches shall be at least 6 in. thick. Brick shall not be used for flat arches.
12.1.4 Segmental Arches.-Segmental arches shall have a rise of at least 1 in. per ft. of span, and the minimum thickness shall be 6 in. for hollow tile arches and 4 in. for brick arches with a span of 5 ft. or less and 8 in. for brick arches with a span exceeding 5 ft.
12.1.5 Structural Clay Tile Arches.-The blocks shall be at least two cells deep, shall be laid in type M or S mortar, and shall be properly keyed.
12.1.6 Brick Arches.-Brick arches shall be laid in a full bed of type M or S mortar and shall be solidly bonded.
12.1.7 Openings In Floors And Roofs.-Suitable metal framing or reinforcement shall be provided in masonry arch and roof construction around any opening more than 1 ft.-6 in. on a side.
12.2 CHIMNEYS.-The design of chimneys shall be predicted on the following requirements:
12.2.1 Chimney Walls.-Chimney walls constructed of perforated radial brick with perforations not exceeding 33 per cent of the gross area may be designed using the values shown in Tables RS 10-1-4 and 10-1-5 applicable to solid units.
12.2.2 Chimney Linings.-The lining in chimneys shall not be considered as taking either compression or tension stresses.
12.2.3 Chimney Expansion and Contraction.-Expansion and contraction in chimney walls due to temperature variations shall be accommodated solely by the use of steel reinforcing rings.
12.2.4 Reinforcing Rings.-Reinforcing rings shall be provided at all changes in wall thickness, at the top of the chimney, and above and below all flue openings, but may be omitted at changes in wall thickness for chimneys constructed of perforated radial brick with type M mortar.

** **REFERENCE STANDARD RS 10-1B MASONRY**
ACI 530-92/ASCE 5-92 Building Code Requirements for Masonry Structures, as modified.
ACI 530.1-92/ASCE 6-92 Specifications for Masonry Structures, as modified.
MODIFICATIONS - The provisions of ACI 530-92/ASCE 5-92 shall be subject to the following modifications. The chapter and section numbers are from that standard.
Chapter 1 - General Requirements
Section 1.3 - Approval of special systems of design or construction
Delete this section.
Section 1.4 - Standards cited in this code
Section 1.4.1 - Delete the words "ANSI A 58.1-82 - Minimum Design Loads for Buildings and other structures".
Chapter 5 - General Analysis and Design Requirements
Section 5.2.2. - Delete this section substitute the following:
"5.2.2. - Service loads shall be in accordance with the building code of the city of New York of which this standard forms a part, with such live load reductions as are permitted in the building code of the city of New York. The load provisions of the reference standard RS 9 shall be used."
Chapter 6 - Design Allowing Tensile Stresses in Masonry
Section 6.1.1 - Delete this section and substitute the following:
"6.1.1 - The provisions of this chapter are to be applied in conjunction with the provisions of Chapter 5-General Analysis and Design Requirements and Appendix A."
Section 6.4 - Axial tension
Add the following sentence at the end of section 6.4:
"Axial tension stress shall be resisted entirely by steel reinforcement in accordance with Chapter 7."
Chapter 7 - Design Neglecting Tensile Strength of Masonry Section 7.1.2 - Delete this section and substitute the following:
"7.1.2. - The provisions of this chapter are to be applied in conjunction with the provisions of Chapter 5-General Analysis and Design Requirements and Appendix A."
Chapter 9 - Empirical Design of Masonry
Section 9.1.1.1 - Seismic - Delete this section and substitute the following:
"9.1.1.1 - Seismic - Empirical requirements may apply to the design or construction of masonry for buildings, parts of buildings, or other structures located in New York City."
Section 9.1.1.2 - Wind
Delete this section and substitute the following**:**
"9.1.1.2 - Wind - Empirical requirements shall not apply to the design or construction of masonry for buildings, parts of buildings, or other structures to be located in areas where the basic wind speed will result in wind pressure that exceeds 20 psf."
Section 9.2 - Height
Add the following sentence at the end of section 9.2:
"However, members which are not part of the lateral forces resisting system of the building are permitted to be designed in accordance with the provisions of Chapter 9 of reference standard RS 10-1B in buildings greater than 35 feet in height."
Section 9.9 - Miscellaneous requirements
Delete this section and add the following new Chapter 10:
"Chapter 10 - Miscellaneous Requirements
10.1 - Chases and Recesses - Masonry directly above chases or recesses wider than 12 inches shall be supported on lintels.
10.1.1 - Where permitted - Chases and recesses shall be prohibited in any wall less than 12 inches thick and in the required area of piers and buttresses; except that where permitted in 8-inch walls, in residential buildings and in the apron under window openings, the maximum depth of chases shall be 4 inches.
10.1.2 - Maximum size - The maximum permitted depth of a chase in any wall shall not be more than one-third of the wall thickness, and the maximum length of a

horizontal chase or the maximum horizontal projection of a diagonal chase shall not exceed 4 feet except as provided for in Section 10.1.6; and except further that the maximum length of the apron below window sills in all walls shall not exceed the width of the window opening. Waterproofed chases in such aprons in 8-inch walls shall not exceed 4 inches in depth. The aggregate area of recesses and chases shall be not more than one-fourth of the area of the face of the wall in any one story.

10.1.3 - Waterproofing chases - The backs and sides of all chases in exterior walls with less than 8 inches of masonry to the exterior surface shall be insulated and waterproofed.

10.1.4 - Fire resistive limitations - Chases or recesses shall not reduce the thickness of masonry material below the minimum equivalent thickness required for firewalls, fire separation assemblies or required fire resistive coverings of structural members.

10.1.5 - Hollow walls - Where chases and recesses are permitted in hollow walls and walls constructed of hollow blocks or tile, the chases and recesses shall be built in with the wall. Chases shall not be cut in hollow walls after erection.

10.1.6 - Continuous chases - Where horizontal chases for the bearing of reinforced concrete floors and roof slabs are continuous, anchors shall be installed above and below the floor construction to resist bending and uplift in the wall due to flexure of the slab.

10.2 - Lintels - The design for lintels shall be in accordance with the provisions of Sections 5.6 and 7.3.3. Minimum end bearing shall be 4 inches.

10.3 - Support on wood - No masonry shall be supported on wood girders or other forms of wood construction.

10.4 - Corbelling

10.4.1 - Solid masonry units shall be used for corbelling. The maximum corbelled projection beyond the face of the wall shall be not more than one half of the wall thickness or one half the wythe thickness for hollow walls; the maximum projection of one unit shall neither exceed one half the height of the unit nor one third its thickness at right angles to the face which is offset. Corbelling of hollow walls or walls built of hollow units shall be supported on at least one full course of solid masonry.

10.4.2 - Molded cornices - Unless structural support and anchorage are provided to resist the overturning moment, the center of gravity of all projecting masonry or molded cornices shall lie within the middle one-third of the supporting wall. Terra cotta and metal cornices shall be provided with a structural frame of non-combustible anchored material.

10.5 - Arches and lintels - The masonry above openings shall be supported by properly buttressed
arches or by lintels that bear on the wall at each end for at least 4 inches.

10.6 - Parapet walls - All cells in the hollow masonry units and all joints in solid, cavity, or masonry bonded hollow wall construction shall be filled solid with mortar. All corners of masonry parapet walls shall be reinforced with joint reinforcement or its equivalent at vertical intervals not greater than 12 inches. Such reinforcement shall extend around the corner for at least 4 feet in both directions and splices shall be lapped at least 6 inches. Parapet walls shall be properly coped and flashed with noncombustible, weatherproof material of a width not less than the width of the parapet wall plus sufficient overage for overlaps. Masonry parapet walls shall be not less than 8 inches in thickness and their height shall not exceed three times their thickness. Parapet walls shall be designed in accordance with the provisions of Appendix A.

10.7 - Isolated piers - Isolated masonry piers shall be bonded as required for solid walls of the same thickness and shall be provided with adequate means for distributing the load at the top of the pier.

10.8 - Bearing details - Concentrated loads shall be supported upon construction of solid masonry, concrete, or masonry of hollow units with cells filled with mortar, grout, or concrete and of sufficient height to distribute safely the loads to the wall or column, or other adequate provisions shall be made to distribute the loads.

10.8.1 - Joists - Solid construction for support under joists shall be at least 2 1/4 inches in height, and joists supported on such construction shall extend into the masonry at least 3 inches.

10.8.2 - Beams - Solid construction for support under beams, girders, or other concentrated loads shall be at least 4 inches in height and the bearing of beams shall extend into the masonry at least 4 inches.

10.9 - Use of existing walls - An existing masonry wall may be used in the alteration or extension of a building provided that it meets the requirements of this standard.

10.9.1 - Walls of insufficient thickness - Existing walls of masonry units that are structurally sound, but that are of insufficient thickness when increased in height, may be strengthened by an addition of similar masonry units laid in type M or S mortar. The foundations and lateral support shall be equivalent to those required for newly constructed walls under similar conditions. All such linings shall be thoroughly bonded into existing masonry by toothings to assure combined action of wall and lining. Toothings shall be distributed uniformly throughout the wall, and shall aggregate in vertical cross-sectional area at least 15 percent of the total surface area of the lining. Stresses in the masonry under the new conditions shall not exceed the allowable stresses.

10.10 - Precautions during erection - Temporary bracing shall be used wherever necessary to take care of any loads to which the walls may be subjected during erection. Such bracing shall remain in place as long as may be required for safety.

10.11 - Horizontal compression joints - All concrete framed buildings to be constructed over 35 feet in height (as measured from adjoining grade to the main

roof level), whose exterior wythe are of cavity wall construction with steel lintels, shall have horizontal compression joints in the exterior wythe to prevent masonry distress induced by vertical shortening of the structural frame.

(a) Unless substantiated as indicated by (b) below, horizontal compression joints shall be 1/4 inch minimum thickness, with neoprene, polyethylene, or urethane gasket or equivalent joint filler filling the entire joint, except for a recess from the toe of the lintel angle to the exterior of the facing brick, to provide space for caulking. These joints shall be spaced at each floor.

(b) The applicant of record shall submit an engineering analysis establishing that proposed building compression joints spaced further apart than in (a) above are sufficient to provide for the effects of vertical shortening of the structural frame.

10.12 - Dry-Stacked, surface-bonded masonry walls

10.12.1 - General - Dry-Stacked, surface-bonded masonry walls may be used for only one and two family dwellings and shall comply with requirements of this code for masonry wall construction.

10.12.2 - Materials - Surface-bonding mortar shall comply with ASTM C476. Concrete masonry units shall comply with ASTM C55, C90 or C145.

10.12.3 - Design - Dry-stacked, surface-bonded masonry walls shall be of adequate strength and proportions to support all superimposed loads without exceeding the allowable stresses listed in Table 10.12.3. Allowable stresses not specified in Table 10.12.3. shall comply with the requirements in this standard.

Table 10.12.3
ALLOWABLE STRESS GROSS CROSS-SECTIONAL AREA

Description	Maximum allowable stress (psi)
Compression	
Standard block…….	45
Shear……	10
Flexural tension	
Vertical span……	18
Horizontal span……	30

10.12.4 - Construction - Construction of dry-stacked, surface-bonded masonry walls, including stacking and leveling of units, mixing and application of mortar, curing and protection, shall comply with ASTM C946.

10.13 - Glass-block walls

10.13.1 - Exterior wall panels - The maximum dimensions of glass-block wall panels in exterior walls, where used singly or in multiples to form continuous bands of glass blocks between structural supports, shall be 25 feet in length and 20 feet in height between structural supports and expansion joints; and the area of each individual panel shall not be more than 250 square feet. Intermediate structural supports shall be provided to support the dead load of the wall and all other superimposed loads. Where individual panels are more than 144 square feet in area, a supplementary stiffener shall be provided to anchor the panels to the structural supports

10.13.2 - Joint materials - Glass blocks shall be laid up in Type S or N mortar with approved galvanized metal panel anchors in the horizontal mortar joints of exterior panels The sills of glass-block panels shall be coated with approved water-based asphaltic emulsion, or other elastic waterproofing material, prior to laying the first mortar course, and the perimeter of the panels shall caulked to a depth of not less than ½ inch with nonhardening caulking compound on both faces, or expansion joints shall be provided. Where placed in joint materialsother than mortars herein defined, a single panel shall not be more than 100 square feet in area, nor more than 10 feet in either length or height.

10.13.3 - Wind and seismic loads - Exterior wall panels held in place in the wall openings shall be designed to resist both the internal and external loads due to wind and seismic loads.

10.13.4 - Interior wall panels - Solid or hollow glass blocks shall not be used in fire walls, party walls, fire separation assemblies or fire partitions, or for loadbearing construction. Such blocks shall be erected with mortar and reinforcement in metal frames, structural channels or embedded panel anchors as provided for exterior walls or other joint materials. All mortar-bearing surfaces of the glass block shall be precoated or prepared to insure adhesion between mortar and glass. Wood strip framing shall not be used in fire separation assemblies that are required to be fire resistance rated.

Exceptions: Glass-block assemblies with a material and equipment acceptance number or Board of Standards and Appeals number having a fire-resistance rating of not less than 3/4 hour shall be permitted in fire separations which have a required fire resistance rating of one hour or less and do not enclose exit stairways or exit passageways.

10.14 - Veneer

10.14.1 - General - Veneer, as used in this section, refers to an exposed facing wythe of brick, tile, ceramic veneer, terra cotta, concrete masonry units, cast stone, natural stone, or similar weather-resistant noncombustible masonry units laid in mortar and securely attached to a surface for the purpose of providing ornamentation, protection or insulation, but not intentionally so bonded as to exert common action under load. In lieu of the provisions of Section 10.14, veneers may be designed according to Chapters 5, 6 and 9 of reference standard RS 10-1B.

10.14.1.1 - Limitations - Veneer shall not be assumed to add to the strength of any wall, nor shall it be assumed to support any load other than its own weight. No veneer shall be less than the thickness specified in Table 10.14.1.1. The height and length of veneer areas shall be unlimited, except as required to control expansion and contraction, and except as provided in Section 10.14.2.

TABLE 10.14.1.1 Minimum Thickness of Masonry Veneer

Type of Veneer	Minimum Thickness Actual (in.)
Anchored Type:	
Solid masonry units	1 5/8
Hollow masonry units	1 5/8
Ceramic veneer	1
Adhesion Type:	
Solid masonry units	3/8
Ceramic veneer	3/8

10.14.1.2 - Design - All anchor attachments shall be designed to resist a minimum positive or negative horizontal force as required for wind or seismic effects, and adhesion type veneer shall be designed to have a bond sufficient to withstand a shearing stress of 50 psi. At a minimum, the veneer shall also meet the attachment requirements of Sections 10.14.2.1 and 10.14.3.1.

10.14.1.3 - Support of veneer - The weight of all anchored type veneer shall be supported upon footings, noncombustible foundation walls, or other approved supports. Veneer above openings shall be supported upon noncombustible, non-corrosive lintels.

10.14.2 - Veneer on wood - Anchored masonry veneer attached to wood frame structures shall be supported on noncombustible footings or foundation walls. The height of the veneer shall not exceed 35 feet measured from the top of the supporting footings or foundation walls. Where anchored veneer exceeding 20 feet in height is applied, it shall be supported in a manner that will provide for movement between the veneer and its backing.

10.14.2.1 - Attachment - At a minimum, veneer of unit masonry shall be attached directly to wood studs, by one of the following means:

(a) With at least 22 gage corrosion-resistance corrugated steel ties at least one inch wide, at vertical intervals of not more than 24 inches and horizontal intervals of not more than 32 inches, but in no case less than one tie for 3 1/2 square feet of wall area;

(b) Directly to a 1 inch reinforced cement mortar base.

10.14.3 - Veneer on masonry - Veneer attached to masonry or concrete backing shall not be limited in height other than by compressive stresses.

10.14.3.1 - Attachment - At a minimum, veneer shall be securely attached to the masonry or concrete backing by one of the following means or by a means that is equivalent in strength:

(a) Metal ties conforming to Section 5.8 except that ties shall be spaced not more than 24 inches apart either horizontally or vertically;

(b) Corrosion-resistant dovetail slot anchors where the backing and the veneer has been designed for this type of attachment. Such anchors shall be formed from at least 16 gage steel at least 1 inch wide;

(c) Adhesion type masonry veneer shall be installed in accordance with the manufacturer's recommendations and setting plans;

(d) Where anchored veneer is not grouted to the back, it shall be supported in a manner that will provide for movement between the veneer and its backing.

10.15 Miscellaneous structures and systems

10.15.1 - Flat or Segmental Masonry Floor or Roof Arches - The provisions of this section do not apply when masonry floor or roof arches are proportioned on the basis of structural analysis.

10.15.1.1 - Span - The maximum clear span between supporting beams shall be 8 feet.

10.15.1.2 - Tie Rods - All masonry flat arches or segmental arches shall be provided with tie rods in both exterior and interior spans. The minimum size and spacing of tie rods shall be:

For exterior spans- 1 1/4 inches round rods spaced 4 feet 6 inches apart.

For interior spans- 7/8 inches round rods spaced 4 feet 6 inches apart.

Washers shall be used with all tie rods. All tie rods shall have a minimum specified yield point of 36,000 psi.

10.15.1.3 - Flat arches - The depth of flat arches of burnt clay or shale hollow blocks shall be at least 1 1/2 inches for each foot of span, inclusive of the portion of the block extending below the under side of the beam, and such arches shall be at least 6 inches thick. Brick shall not be used for flat arches.

10.15.1.4 - Segmental arches - Segmental arches shall have a rise of at least 1 inch per foot of span, and the minimum thickness shall be 6 inches for hollow tile arches, 4 inches for brick arches with a span of 5 feet or less, and 8 inches for brick arches with a span exceeding 5 feet.

10.15.1.5 - Structural clay tile arches - The blocks shall be at least two cells deep, shall be laid in type M or S mortar, and shall be properly keyed.

10.15.1.6 - Brick arches - Brick arches shall be laid in a full bed of type M or S mortar and shall be solidly bonded.

10.15.1.7 - Openings in floors and roofs - Suitable metal framing or reinforcement shall be provided in masonry arch and roof construction around any opening more than 1 foot 6 inches on a side."

Appendix A - Special Provisions for Seismic Design.

Section A.1.1.1 - Delete this section and substitute the following:

"A.1.1.1 - Appendix A sets special requirements for masonry and construction of masonry building elements for seismic design as defined in reference standard RS 9-6."

Section A.2 - Delete this section.

Section A.3 - Delete the words "for Seismic Zone 2."

Section A.3.3 - Delete this section and substitute the following:

"A.3.3 - Distribution of seismic loads or forces shall be

in accordance with the provisions of reference standard RS 9-6."

Section A.3.6 - Delete the first two sentences and substitute the following:

"Masonry walls which require lateral forces shown in Table 23-P of reference standard RS 9-6 shall be anchored to all floors and roofs which provide lateral support for the walls. The anchorage of such walls or partitions shall provide direct connection capable of resisting the forces derived from Table No. 23-P or a minimum of 200 pounds per lineal foot of wall, whichever is greater."

Section A.3.8 - Delete this section and substitute the following:

"A.3.8 - Vertical reinforcement of at least 0.20 square inches in cross sectional area shall be provided continuously from support to support at each corner, at each side of each opening, at the ends of walls and at a maximum spacing of 10 feet apart throughout the wall. Horizontal reinforcement not less than 0.20 square inches in cross sectional area shall be provided: (1) at the bottom and top of wall openings and shall extend not less than 24 inches nor less than 40 bar diameters past the opening; (2) continuously at structurally connected roof and floor levels and at the top of walls; (3) at the bottom of the wall or in the top of the foundations when dowelled to the wall; (4) at maximum spacing of 10 feet unless uniformly distributed joint reinforcement is provided. Reinforcement at the top and bottom of openings when used in determining the maximum spacing specified in item (4) above shall be continuous in the wall."

Add the following sections:

"A.3.10 - Non-bearing back-up or infill walls and non-bearing partitions need not comply with the vertical and horizontal (2 way) reinforcing requirements of section A.3.8 if the requirements set forth in A.3.10.1 through A.3.10.4 are met.

A.3.10.1 - The cross sectional area of uniformly spaced steel reinforcement in either the horizontal or the vertical direction shall equal or exceed 0.0005 times the gross cross sectional area of the masonry.

A.3.10.2 - Reinforcement shall be continuous between supports.

A.3.10.3 - Spacing of prescribed horizontal reinforcement shall not exceed 16 inches for joint reinforcement and 4 feet for reinforcement bars in grouted bond beams. When vertical reinforcement is used, bars shall not exceed placement at 10 feet on center and at the ends of walls.

A.3.10.4 - Lateral support anchorage shall be provided between the non-loadbearing back-up, infill or partition wall and its structural support. Spacing of anchors shall conform to the provisions of Sections 4.2 and 5.11 and shall not exceed the spacing of prescribed reinforcement. Anchorage shall be designed to transfer lateral (out-of-plane) forces to the adjacent structural support."

Section A.4 - Delete this section.

MODIFICATIONS - The provisions of ACI 530.1-92/ASCE 6-92 shall be subject to the following modifications. The chapter and section numbers are from that standard.

2.3.1. - Inspection and testing.

Delete the opening sentence and substitute the following:

"Inspection shall conform to the requirements of Articles 1.5 and 1.6, the inspection and testing provisions of the building code of the city of New York, and the following:"

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

* REFERENCE STANDARD RS 10-2
REINFORCED MASONRY

ACI 530-92/ASCE 5-92 Building Code Requirements for Masonry Structures, as modified.

ACI 530.1-92/ASCE 6-92 Specifications of Masonry Structures, as modified.

MODIFICATIONS - The provisions of ACI 530-92 and ACI 530.1-92 shall be subject to the same modifications as set forth in reference standard RS 10-1B and shall apply to reinforced masonry.

EXCEPTION - For buildings designed utilizing reinforced masonry construction in existence on the effective date of this local law, repairs or alterations to the facade or interior of the structure shall be done in accord with ACI 530-92/ASCE 5-92 Building Code Requirements for Masonry Structures, as modified and ACI 530.1-92/ASCE 6-92 Specifications for Masonry Structures, as modified except for those provisions found in Appendix A Special Provisions for Seismic Design.

**** Local Law 17-1995; 264-73 BCR***

** REFERENCE STANDARD RS 10-3
ACI 318-1989 BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE

Comments - The commentary on Building Code Requirements for Reinforced Concrete (ACI 318-89) may be used as a guide for interpreting this standard.

MODIFICATIONS - The provisions of ACI 318-89 shall be subject to the following modifications. The section and subdivision numbers are from that standard.

-Delete this section and substitute the following:

"1.2.1 - The applicable provisions of the building code of the city of New York shall apply."

1.2.2 -Delete this section.

1.2.3 -Delete this section.

1.3.1 -Delete this section and substitute the following:

"1.3.1 - The applicable provisions of the building code shall apply."

1.3.2 -Delete this section.
1.3.4 -Delete this section.
1.4 -Delete this section and substitute the following:
"1.4 - The provisions of the building code for equivalent systems of design shall apply."
3.1.3 -Delete this section.
3.6.6 -Delete this section and substitute the following:
"3.6.6 - Fly Ash may be used in lieu of Chemical Admixtures (ASTM C494) RS 10-44."
-Delete "5.3.2" on the second line and insert the words "Section 5.6.1.6 as listed", and delete the last sentence.
5.1.2 -Delete "5.6.2" on the second line and insert the words " the New York City Building code".
5.2.1(c) -Delete "5.6" on the second line and insert the words " the New York City Building code".
5.2.3 -Delete this section.
5.3 -Delete the words "and/or trial mixtures".
-Delete the words "Standard deviation" and insert the words "Method II Proportioning on the basis of field experience".
5.3.1.1(c) -Delete the words "except as provided in 5.3.1.2".
5.3.1.2 -Delete in its entirety, including Table 5.3.1.2.
5.3.2.1 -Delete "or 5.3.1.2" at the end of the sentence.
5.3.2.2 -Delete in its entirety, including Table 5.3.2.2.
5.3.3 -Delete the words "several strength test records, or trial mixtures" at the end of the sentence.
-Delete the third sentence starting with words "For the purpose of" and ending with the words "less than 45 days".
-Add a period on the third line after the word "mixtures", delete the remainder of the section, and add the following sentence:
"The Trial mixtures shall conform to the provisions of Section 27-605(a)(3) of the New York City Building Code."
5.4.1 -Delete this section and substitute the following:
"Proportioning shall conform to New York City Building Code Section 27-605(a) Method I."
Table 5.4 -Delete in its entirety.
5.4.2 -Delete this section.
5.4.3 -Delete this section.
5.5 (b) -Delete this section.
5.6.1.1 -Delete this section and substitute the following:
"5.6.1.1 - Whenever strength tests of concrete specimens are required by the provisions of the building code of the city of New York, compression test samples shall be taken directly from the mixer in accordance with reference standard RS 10-51, cured in accordance with reference standard RS 10-52, and tested at the age of 28 days or as otherwise specified in accordance with reference standard RS 10-17."
5.6.1.2 -Delete this section and substitute the following:
"5.6.1.2 - Three test specimens shall be molded for each 50 cubic yards or fraction thereof for each class of concrete placed in any one day's concreting. In addition, concrete test specimens shall be made from concrete taken out of the bucket, hopper or forms as directed by the engineer designated for controlled inspection. These test specimens shall be separate and distinct from those made from the mixer and shall be made from the same batch and cured and tested in the same manner as described above for the samples taken from the mixer."
5.6.1.3 -Delete this section and substitute the following:
"5.6.1.3 - The number of test specimens made from the concrete taken out of the bucket, hopper or forms may be reduced to a minimum of one set of three (3) specimens for every 150 cubic yards, or fraction thereof, for each class of concrete placed in any one day's concreting. When the concrete is being placed directly from the mixer into the forms without any intermediate conveyance, the above additional specimens will not be required."
5.6.1.4 -Delete this section and substitute the following:
"5.6.1.4 - Additional specimens may be molded and tested where there is a question as to the required interval between placing of concrete and stripping forms or placing the structure into use."
Add the following section:
"5.6.1.5 - The test specimens shall be tested by licensed concrete testing laboratory. The testing of each batch of three specimens shall be considered one strength test. The strength of such test shall be the average of the breaking strengths of the three specimens comprising the test, except that if one of the specimens shall manifest evidence of improper sampling, molding, handling or testing, it shall be discarded and the remaining two averaged. If more than one specimen must be discarded, the entire strength test shall be voided."
Add the following section:
"5.6.1.6 - The average of all sets of three consecutive strength tests representing each class of concrete shall be equal or greater than the specified strength (f'_c) and not more than 10% of the strength tests shall have values less than the specified strength, but no test shall show an average strength less than 85% of the specified

strength."

5.6.2.1 -Delete this section.

5.6.2.2 -Delete this section.

-After the word "satisfactory" in the second line, delete the remainder of the section and add the words "if the provisions of Section 5.6.1.6 are met".

5.6.2.4 -Delete this section.

5.6.3.1 -Delete the words "Building Official" on the first line and insert the word "Commissioner".

-Delete the first three lines through the words "[Section 5.6.2.3(b)]", and substitute the following: "If tests of laboratory cured specimens fail to conform to the requirements of Section 5.6.1.6 refer to Section 5.6.3.4."

-Delete the words "strength test more than 500 psi below specified value of f'_c and insert the words "set of three specimen tests which fail to conform to the requirements of Section 5.6.1.6."

Add the following section:

"5.9.3 - Conveying by pumping methods shall be in accordance with the applicable provisions of the Building Code."

-Add a period on the second line after the word "used", delete the words "unless approved by the Engineer" and add the following sentence: "For additional requirements see applicable provisions of the Building Code Section 27-607(a)(2)."

Add the following sections:

"5.14 - SPECIAL REQUIREMENTS FOR HIGH STRENGTH CONCRETE

5.14.1 - All high strength concrete (6000 PSI and higher) shall be proportioned and manufactured only in accordance with the provisions of Building Code Section 27-605(b) Method II Proportioning on the basis of field experience.

5.14.2 - All high strength concrete specimens shall be made utilizing metal or plastic molds that comply with reference standard RS 10-52. Each test shall consist of eight specimens taken directly from the mixer. Two specimens shall be tested at seven days, three at 28 days and three at 56 days. These requirements are in addition to the hopper specimens as required by the Building Code.

5.14.3 - At the time of placement of high strength concrete, two concrete production facilities shall be available. Said facilities shall have been previously approved by the architect or engineer designated for controlled inspection.

5.14.4 - All high strength concrete for columns shall be of normal weight concrete.

5.14.5 - The requirements of Section 10.13.4 shall be adhered in all respects.

5.14.6 - Where lightweight concrete is to be used for the floor system, the columns and the beam or slab "sandwich" immediately above the columns shall be stone concrete, placed in accordance with the requirements of Section 10.13.

5.14.7 - The engineer will insure that there are no cold joints at the interface between the lightweight concrete and stone portions of the slabs or beams.

5.14.8 - All data shall be submitted periodically to the Department of Buildings for review."

Add the following section:

"6.1.7 - For additional form work requirements, see applicable provisions of Building Code Section 27-1035."

Add the following sections:

"6.3.13 - Concrete cover over electrical cables and snow melting pipes in sidewalks shall meet the requirements of the Bureau of Highways of the Department of Transportation.

6.3.14 - No conduits, pipes or other similar embedded items will be permitted in prestressed or post-tension concrete members other than as shown on the plans as filed with the Department of Buildings or on shop drawings reviewed by the engineer of record. Computations demonstrating the effects of such embedded items on the structural adequacy of prestressed or post-tensioned concrete shall be submitted."

Add the following section:

"10.13.4 - When the specified compressive strength of concrete in a column is greater than 1.4 times that specified for a floor system, the following additional requirements shall be adhered to:

(a) All of the design provisions of Section 10.13 (unmodified) are adhered to.

(b) Application is made to the Borough Superintendent in each individual case.

(c) The concrete construction is supervised and inspected continuously by a full-time Professional Engineer responsible for controlled inspection of concrete and not in the regular employ of the owner or contractor. Such engineer shall perform no other work during the construction of the particular building nor shall he delegate his responsibility to any subordinates.

(d) The Professional Engineer referred to in subdivision (c) above, without incurring any personal liability, shall be authorized to stop construction, reject any concrete, direct that the concrete testing laboratory being used be dismissed and a new laboratory be retained.

(e) Affidavits by the parties involved shall be filed with and be acceptable to the Borough Superintendent prior to approval of any plans."

Add the following section:

"12.1.3. - Development (Section 12.2) and splice lengths (Section 12.5) computed based on the minimum requirements of the ACI 318-83 code are deemed equally applicable for usage.

- Delete this section and substitute the following:

"16.4.2 - Lifting devices shall have a capacity sufficient to support four times the appropriate portion of the members dead weight. The inclination of the lifting force shall be considered."

16.4.2.1 - Delete this section.

16.4.2.2 - Delete this section.

16.4.2.3 - Delete this section.

- Add the following sentence to the beginning of this section: "New York City is to be considered in a region of moderate risk."

***Local Law 17-1995; 1077-86 BCR**

* REFERENCE STANDARD RS 10-4 PRECAST CONCRETE AND PRESTRESSED CONCRETE

ACI 318-1989 Building Code Requirement for Reinforced Concrete

MNL-120-1985 Prestressed Concrete Institute Design Handbook, Third Edition.

MODIFICATIONS - The applicable section of ACI 318-89 as modified by the applicable provisions of reference standard RS 10-3 shall apply for precast concrete and prestressed concrete.

***Local Law 17-1995; 455-89 BCR; 1077-86 BCR**

*** REFERENCE STANDARD RS 10-5A

AISC-1989 Specification for Structural Steel Buildings - Allowable Stress Design and Plastic Design, effective June 1, 1989, as modified.

MODIFICATIONS - The provisions of AISC-ASD 1989, Specification for Structural Steel Buildings - Allowable Stress Design and Plastic Design, shall be subject to the following modifications. The section and paragraph numbers are from that standard.

CHAPTER A GENERAL PROVISIONS

A3 MATERIAL - Add the following after the next to last paragraph of section A3.1a.

"Special Steels other than those listed above may be used in accordance with the provisions of this reference standard when approved by the NYCDOB for such use."

A4 LOADS AND FORCES - Delete this text and substitute the following:

"The provisions of the building code for loads shall apply".

A5 DESIGN BASIS - Delete the text of Subsection 2. Wind and Seismic Stresses and substitute the following:

"The applicable provisions of the Building Code for combinations of loads shall apply."

A6 REFERENCED CODES AND STANDARDS - Revise the list of publications of the following listed standards to read as follows:

American National Standards institute
ANSI/ASCE 7-93 (Formerly ANSI A58.1-82)

American Society for Testing and Materials

ASTM A6-94a	ASTM A27-93	ASTM A36-94
ASTM A53-93a	ASTM A148-93b	ASTM A193-94b
ASTM A194-94a	ASTM A242-93a	ASTM A307-94
ASTM A325-94	ASTM A354-94	ASTM A449-93
ASTM A490-93	ASTM A500-93	ASTM A501-93
ASTM A502-93	ASTM A514-94a	ASTM A529-94
ASTM A563-94	ASTM A570-92	ASTM A572-94b
ASTM A588-94	ASTM A606-91a	ASTM A607-92a
ASTM A618-93	ASTM A668-93	ASTM A687-93
ASTM A709-94A	ASTM A852-93a	ASTM C33-93
ASTM C330-89	ASTM F436-93	

American Welding Society

AWS D1.1-94	AWS A5.1-91	AWS A5.5-89
AWS A5.17-89	AWS A5.18-93	AWS A5.20-89
AWS A5.23-90	AWS A5.28-90	AWS A5.29.89

Research Council on Structural Connections

Specification for Structural Joints Using ASTM A325 or A490 Bolts, 1988

CHAPTER B DESIGN REQUIREMENTS B 11 PROPORTIONING OF CRANE GIRDERS

Add the following at the end of the section.

"The applicable provisions of the Building Code for moving loads shall apply."

CHAPTER H COMBINED STRESSES

H1 AXIAL COMPRESSION AND BENDING - In the last sentence of the definition of F'_c, delete the reference to Section A5.2 and substitute the following:

"The provisions of the Building Code for wind load shall apply."

CHAPTER I COMPOSITE CONSTRUCTION

I1 DEFINITION - Add the following paragraph as the first paragraph:

"Composite construction used for members subjected to heavy vehicle loads, as defined in the Building Code for moving loads (except where applied vehicle is limited to passenger cars), shall be proportioned in accordance with the requirement of reference standard RS 9-3.

Add the following as item 4 of the new third paragraph:

"4. The minimum specified compressive strength of concrete (f'_c) for all encased composite beams shall be 3,000 lbs. per sq. in. and shall meet the applicable requirements of the Building Code."

I2 DESIGN ASSUMPTIONS - Add the following after the term, "$0.76F_y$" in the last sentence of section I2, paragraph 1:

"provided the encased beam is A36 steel, not more than 40 inches in depth and the concrete is made with ASTM C33 aggregate."

I4 SHEAR CONNECTORS - Add the following at the end of the third paragraph:

"For aggregate not complying with the above, the Department of Buildings Rules for Design of Composite Construction with Metal Decks or Lightweight Concrete dated Sept. 8, 1975 shall be used. Working values for use with construction for which design values have not been established in accordance with the foregoing and for connector types other than those shown in Table I4.1 shall be established by a prequalified load test as set forth in Section 27-599. The minimum specified compressive strength of concrete (f'_c) shall be 3,000 psi.

CHAPTER J CONNECTIONS, JOINTS AND FASTENERS

J1.GENERAL PROVISIONS

9. PLACEMENT OF WELDS, BOLTS AND RIVETS - At the end of the last sentence add the following:

"The foregoing provisions notwithstanding, the eccentricity perpendicular to the plane of the connection shall be considered in proportioning both the member and the connection."

J2.WELDS - Add the following paragraph before the first paragraph in Sec. J2.

"The provisions of the Building Code for welding operations, the Board of Standards and Appeals Rules for ARC and GAS Welding and Oxygen cutting of steel covering the Specifications for Design, Fabrication and Inspection of ARC and GAS Welding Steel Structures and the Qualification of Welders and Supervisors, and Board of Standards and Appeals Rules for Electroslag Welding Approvals shall apply."

Add the following paragraph after the first paragraph in Sec. J2.:

"Welding equipment used to perform submerged - arc, gas metal - arc and flux cored arc welding of high strength steel; and electro-slag or electro-gas welding of all steel shall be approved."

J3.BOLTS, THREADED PARTS AND RIVETS

2. Size and Use of Holes - Add the following after the title of paragraphs c., d., and e;

"subject to the approval of the engineer of record,"

6.Combined Tension and Shear in Slip-critical Joints - Delete the last sentence in Section 6. and substitute the following:

"Allowable stresses for A combination of loads for A325 and A490 bolts shall be used in slip-critical connections. The applicable provisions of the Building Code for wind load shall apply."

CHAPTER K SPECIAL DESIGN CONSIDERATION

K2.PONDING - Add the following paragraph:

In roof systems where secondary members are made up of materials other than steel, the depth of beams and girders supporting flat roofs shall not be less than $f_b/600$ times their span length whether designed as simple or continuous spans."

K4.FATIGUE - The provisions of this section shall not apply to the design of overhead beams for elevators and hoisting apparatus nor to their immediate supporting framing.

CHAPTER L SERVICEABILITY DESIGN CONSIDERATIONS

L2.EXPANSION AND CONTRACTION - Delete this text and substitute the following:

"The provisions of the building code for loads due to thermal forces shall apply."

L6. MINIMUM THICKNESS OF METAL - Add this additional section following Section L5 CORROSION:

"L6. MINIMUM THICKNESS OF METAL All exterior members of structural steel, except roofing and siding, that are exposed to the weather shall have a protective coating as required by the provisions of Section M3,1. and shall have a minimum thickness of metal of 0.23 in.

Exception: The minimum thickness of metal may conform to the requirements for stress under the following conditions:

1. Exterior members exposed to the weather - An approved type of atmospheric corrosion resistant steel is used or exposed surfaces are zinc coated with a minimum weight of coating of approximately 0.6 ounces per square foot of exposed surface and covered with a protective coating as required by section M3 or exposed surfaces are protected by other means.
2. Members not exposed to the weather - All members, except that members located where they would be subject to accidental impact, shall be stiffened to resist such impact.
3. Roofing and siding - All members, provided that surfaces which are exposed to the weather shall have a protective coating.
4. Temporary construction that will be in place for a period of one year or less, provided that all surfaces which are exposed to the weather shall have a protective coating.
5. Joists or purlins that are exposed to the weather but which do not support more than 200 sq. ft. of floor or roof area, and which have a protective coating as required by section M3,1.

CHAPTER M FABRICATION, ERECTION AND QUALITY CONTROL

M1. SHOP DRAWINGS - Add the following paragraph to Section M1.

"The shop drawings shall include the location of oversized, short-slotted or long-slotted holes."

M3. SHOP PAINTING

1. **GENERAL REQUIREMENTS** - Delete this section and substitute the following:

"1. PAINTING OF STRUCTURAL STEEL

(a) All structural steel, except as provided in subsection (b) of this section, shall receive one coat of paint, zinc, or bituminous coating, or equivalent metal protection before erection. The protection shall be applied thoroughly and evenly to dry surfaces which have been cleaned of loose mill scale, loose rust, weld slag flux deposit, dirt, and other foreign matter. Oil and grease deposits shall be removed. Surfaces inaccessible after assembly shall be treated as required above prior to assembly.

(b) Surfaces of structural steel shall not be required to receive metal protection when the structural steel is used under the conditions listed in paragraph (1) through (7) below. However, these surfaces shall be cleaned of oil and grease by solvent cleaners and be cleaned of dirt and other foreign material by thorough brushing with a fiber brush.

(1) Structural steel that is encased in concrete (other than cinder concrete) or surfaces that abut concrete (other than cinder concrete) at interior locations.

(2) Structural steel encased in non-corrosive fire resistive materials that are bonded or secured to the steel surfaces by approved means.

(3) Surfaces of structural steel that are to be riveted, bolted or welded together.

(4) Surfaces of structural steel within 2 in. of field welds shall be free of protective coatings that would prevent proper welding or produce objectionable fumes while welding is being done.

(5) Surfaces of structural steel that have been machine finished.

(6) Surfaces of types of structural steel that have been specifically approved for use without metal protection.

(7) Structural steel members that are completely concealed by interior finish such as lath and plaster, masonry, etc., need not be painted except that where such members are subject to condensation from piping, are in shower or steam rooms, are exposed to chemical fumes or are exposed to other conditions of potentially aggressive corrosion.

(c) Parts of structural members left unpainted because of welding, bolting or riveting operations are not exempted from painting by the provisions of subsection (b) above shall receive a field application of metal protection as prescribed in subsection (a) above.

(d) Structural steel that will remain exposed to the weather or to a corrosive atmosphere shall receive an additional coat of metal protection of another color after erection, except for types of structural steels that have been specifically intended for use under exposure to the weather without protection.

(e) All abrasions to, or deteriorations of, the protective coating shall be spot painted."

M4. ERECTION

6. Delete in its entirety.

7. FIELD CONNECTIONS - Add the following paragraph to Section 7:

"Field connections shall meet the requirements for corresponding types of shop connections described in section M2. No holes, copes or cuts of any type shall be made to facilitate erection unless specifically shown on the shop drawings or authorized in writing by the engineers or architect of record.

Add the following new Section 8:

"8. HANDLING AND STORING

MATERIALS

"All steel members shall be shipped and handled in a manner that will not cause injury to protective coatings or permanent deformations of the members. Steel members shall not be dropped, thrown, or dragged. Any bends, crimps or other evidence of permanent deformations shall be straightened by methods approved by the engineer or architect of record or the piece shall be rejected. Materials shall be stored out of contact with the ground, kept clean, and in general protected against damage and corrosion.

M5. QUALITY CONTROL - Add the following paragraph before paragraph one:

"The requirements of the building code for quality control shall apply."

Add this section following Section M5.5 IDENTIFICATION OF STEEL

"6. INSPECTION OF CONNECTIONS

All connections, both field and shop, shall be subject to Controlled Inspection pursuant to the requirements of Section 27-132, Section 27-585 and Table 10-2 of Section 27-586 of the Administrative Building Code."

******DOB 6-17-96; 617-87 BCR; 738-86 BCR; 799-79 BCR***

** **REFERENCE STANDARD 10-5B**

AISC-LRFD Load and Resistance Factor Design Specification for Structural Steel Buildings, effective December 1, 1993.

MODIFICATIONS - The provisions of AISC-LRFD Load and Resistance Factor Design Specifications for Structural Steel Buildings, December 1, 1993 shall be subject to the following modifications. The section and paragraph numbers are from that standard.

A3 MATERIAL - Revise the first line of Subsection 1. and add a new Subsection 7. to read as follows:

"Material conforming to the following standard specifications shall be used."

"7. Special Steels.

Steels other than those listed above may be used in accordance with the provisions of this reference standard when approved by the NYCDOB for such use."

A4 LOADS AND LOAD COMBINATIONS - Add the following as paragraph one.

"The provisions of the building code for loads shall apply. The load factors and load combinations contained in Subsections 1. , 2. and 3. of this section shall be used in conjunction with designs based on the use of this AISC-LRFD specification."

A6 REFERENCED CODES AND STANDARDS - Revise the list of publications of the following listed standards to read as follows:

American Society of Civil Engineers

ASCE 7 93

American Society for Testing and Materials

ASTM A6-94a	ASTM A27-93
ASTM A36-94	ASTM A53-93a
ASTM A148-93b	ASTM A193-94b
ASTM A194-94a	ASTM A242-93a
ASTM A307-94	ASTM A325-94
ASTM A354-94	ASTM A449-93
ASTM A490-93	ASTM A500-93
ASTM A501-93	ASTM A502-93
ASTM A514-94a	ASTM A529-94
ASTM A563-94	ASTM A570-92
ASTM A572-94b	ASTM A588-94
ASTM A606-91a	ASTM A607-92a
ASTM A618-93	ASTM A668-93
ASTM A687-93	ASTM A709-94A
ASTM A852-93a	ASTM C33-93
ASTM C330-89	ASTM F436-93

American Welding Society

AWS D1.1-94	AWS A5.1-91
AWS A5.5-89	AWS A5.17-89
AWS A5.18-93	AWS A5.20-89
AWS A5.23-90	AWS A5.28-90
AWS A5.29-89	

CHAPTER B DESIGN REQUIREMENTS

Add the following at the end of the section.

"The applicable provisions of the Building Code for moving loads shall apply."

CHAPTER I COMPOSITE MEMBERS

I1. DESIGN ASSUMPTIONS - Add the following paragraph at the beginning of the section.

"Concrete-Plain and Reinforced-All concrete materials and reinforcing shall meet the applicable requirements of the building code. Composite construction used for member subject to heavy vehicle loads, as defined in the building code for moving loads (except where the applied vehicle is limited to passenger cars), shall be proportioned in accordance with the requirements of Reference Standard RS 9-3."

I3. FLEXURAL MEMBERS - Add the following to the end of the second paragraph in subsection 3. Strength of Concrete-encased Beams.

"provided the encased beam is A36 structural steel not more than 40 in. in depth and the concrete has a minimum compressive strength of 3,000 lbs. per square inch and is made with ASTM C33 aggregate."

I5. SHEAR CONNECTORS - Add the following paragraphs after the first paragraph of subsection 1. Materials.

"For aggregate not complying with ASTM C33, the Department of Buildings' Rules for Design of Composite Construction with Metal Decks or Lightweight Concrete, dated September 8, 1975 or as subsequently revised, shall be adhered to. Working values for use with construction for which design values have not been established in accordance with the foregoing and for connector types other than those covered by Subsections 3. and 4. of Section I5 shall be established by a prequalified load test as set forth in Section 27-599. The minimum specified compressive strength of concrete (f'_c) shall be 3,000 psi.

I6. SPECIAL CASES - Add the following to the end of the paragraph.

"satisfactory to the commissioner."

CHAPTER J CONNECTIONS, JOINTS AND FASTENERS

JI GENERAL PROVISIONS

8. Placement of Welds and Bolts-At the end of the last sentence add the following:

"The foregoing provisions notwithstanding, the eccentricity perpendicular to the plane of the connection shall be considered in proportioning both the number and the connection."

12. WELDS - Add the following paragraph at the beginning of the section before the initial paragraph.

"The provisions of the building code for welding operations, the Board of Standards and Appeals' Rules for Arc and Gas Welding and Oxygen Cutting and Steel Covering the Specifications for Design, Fabrication and Inspection of Arc and Gas Welded Steel Structures and Qualification of Welders and Supervisors, and the Board of Standards and Appeals' rules for Electro-slag Welding Approvals shall apply."

Add the following paragraph after the first paragraph in Section J2.

"Welding equipment used to perform submerged - arc, gas metal-arc and flux cored arc welding of high strength steel and electro-slag or electro-gas welding of all steel shall be approved."

J3. BOLTS AND THREADED PARTS

2. Size and Use of Holes - Add the following after the title of paragraph c., d., and e.

"subject to the approval of the engineer of record,"

6. Combined Tension and Shear in Slip-critical Joints - Add the following:

"Allowable stresses for a combination of loads for A325 and A490 bolts shall be used in slip-critical connections. The applicable provisions of the Building Code for wind load shall apply."

K2. PONDING - Add the following paragraph at the end of the section.

"In roof systems where secondary members are made up of materials other than steel, the depth of the beams and girders supporting flat roofs shall not be less than $f_b/600$ times their span length whether designed as simple or continuous spans."

K3. FATIGUE - Add the following paragraph

"The design of overhead beams for elevators and hoisting apparatus and their immediate supporting framing and their connections shall be designed for fatigue loading."

L2. EXPANSION AND CONTRACTION - Precede the present text with the following:

"The provisions of the building code for loads due to thermal forces shall apply."

All exterior members of structural steel, except roofing and siding, that are exposed to the weather shall have a protective coating as required by the provisions of Section M3.9 and shall have a minimum thickness of metal of 0.23 in. Exception: The minimum thickness of metal may conform to the requirements for stress under the following conditions:

1. Exterior members exposed to the weather - A type of atmospheric corrosion resistant steel is used or exposed surfaces are zinc coated with a minimum weight of coating of approximately 0.6 ounces per square foot of exposed surface and covered with a protective coating as required by section M3. or exposed surfaces are protected by other means.
2. Members not exposed to the weather - All members, except that members located where they would be subject to accidental impact, shall be stiffened to resist such impact.
3. Roofing and siding - All members, provided that surfaces which are exposed to the weather, shall have a protective coating.
4. Temporary construction that will be in place for a period of one year or less, provided that all surfaces which are exposed to the weather shall have a protective coating.
5. Joists or purlins that are exposed to the weather but which do not support more than 200 sq. ft. of floor or roof area, and which have a protective coating as required by section M3."

CHAPTER M FABRICATION, ERECTION AND QUALITY CONTROL

M1. SHOP DRAWINGS - Add the following after the first paragraph.

"The plans shall include the location of oversized, short-slotted or long-slotted holes."

M3. SHOP PAINTING - Delete this section and substitute the following:

"M3.PAINTING OF STRUCTURAL STEEL

(a) All structural steel, except as provided in subsection (b) of this section, shall receive one coat of paint, zinc, or bituminous coating, or equivalent metal protection before erection. The protection shall be applied thoroughly and evenly to dry surfaces which have been cleaned of loose mill scale, loose rust, weld slag flux deposit, dirt and other foreign matter. Oil and grease deposits shall be removed. Surfaces inaccessible after assembly shall be treated as required above prior to assembly.
(b) Surfaces of structural steel shall not be required to receive metal protection when the structural steel is used under the conditions listed in paragraph (1) through (7) below. However, these surfaces shall be cleaned of oil and grease by solvent cleaners and be cleaned of dirt and other foreign material by thorough brushing with a fiber brush.
(1) Structural steel that is encased in concrete (other than cinder concrete) or surfaces that abut concrete (other than cinder concrete) at interior locations.
(2) Structural steel encased in non-corrosive fire resistive materials that are bonded or secured to the steel surfaces by approved means.
(3) Surfaces of structural steel that are to be riveted, bolted or welded together.
(4) Surfaces of structural steel within 2 in. of field welds shall be free of protective coatings that would prevent proper welding or produce objectionable fumes while welding is being done.
(5) Surfaces of structural steel that have been machine finished.
(6) Surfaces of types of structural steel that have been specifically approved for use without metal protection.
(7) Structural steel members that are completely concealed by interior finish such as lath and plaster, masonry, etc., need not be painted except that where such members are subject to condensation from piping, are in shower or steam rooms, are exposed to chemical fumes or are exposed to other conditions of potentially aggressive corrosion.
(c) Parts of structural members left unpainted because of welding, bolting or riveting operations, not exempted from painting by the provisions of subsection (b) above, shall receive a field application of metal protection as prescribed in subsection a. above.
(d) Structural steel that will remain exposed to the weather or to a corrosive atmosphere shall receive an additional coat of metal protection of another color after erection, except for types of structural steels that have been specifically approved for use under exposure to the weather without protection.
(e) All abrasions to, or deteriorations of, the protective coating shall be spot painted."

M4. ERECTION - Add the following to subsection 7. Field Connections.

"Field connections shall meet the requirements for corresponding types of shop connections described in section M2., subsection 5, Bolted Construction. No holes, copes or cuts of any type shall be made to facilitate erection unless specifically shown on the shop drawings or authorized in writing by the engineer or architect of record.

M4. ERECTION - Add the following new subsection 8.

"8. Handling and Storing Materials.
All steel members shall be shipped and handled in a manner that will not cause injury to protective coatings or permanent deformations of the members. Steel members shall not be dropped, thrown, or dragged. Any bends, crimps or other evidence of permanent deformations shall be straightened by methods approved by the engineer or architect of record or the piece shall be rejected. Materials shall be stored out of contact with the ground, kept clean, and, in general, protected against damage and corrosion."

M5. QUALITY CONTROL - Add the following paragraph before the initial paragraph:

"The requirements of the building code for quality control shall also apply."
Add this section following Section M5.5 Identification of Steel:
All connections, both field and shop, shall be subject to Controlled Inspection pursuant to the requirements of Section 27-132, Section 27-585 and Table 10-2 of Section 27-586 of the Administrative Building Code."
*****DOB 6-17-96; 617-87 BCR***

*** **REFERENCE STANDARD RS 10-5C**
STEEL STRUCTURES RESISTING EARTHQUAKE FORCES

UBC SECTION 2723-1990 Steel Structures Resisting Forces Induced by Earthquake Motions in Seismic Zones Nos. 1 and 2 with Accumulative Supplement.

MODIFICATIONS - The provisions of UBC Section 2723 shall be subject to the following modifications. The subdivisions, paragraphs, subparagraphs and items are from that standard.

Subdivision (a) General, Paragraph 1.

Delete this paragraph and substitute the following:

"1. Design and construction of steel framing in lateral force resisting systems shall conform to the requirements of this reference standard. The use of reference standard RS 10-5B is prohibited for the design of seismic resisting elements."

Subdivision (b) Definitions.

Delete this subdivision and substitute the following:

"(b) Definitions. **ALLOWABLE STRESSES** are prescribed in reference standard RS 10-5A.

CHEVRON BRACING is that form of

bracing where a pair of braces located either above or below a beam terminates at a single point within the clear beam span.

CONNECTION is the group of elements that connect the member to the joint.

DIAGONAL BRACING is that form of bracing that diagonally connects joints at different levels.

ECCENTRIC BRACED FRAME (EBF) is that form of braced frame where at least one end of each brace intersects a beam at a point away from the column girder joint.

GIRDER is the horizontal member in a seismic frame. The words beam and girder may be used interchangeably.

JOINT is the entire assemblage at the intersections of members.

K BRACING is that form of bracing where a pair of braces located on one side of a column terminates at a single point within the clear column height.

LINK BEAM is that part of a beam in an eccentric braced frame which is designed to yield in shear and/or bending so that buckling of the bracing members is prevented.

STRENGTH is the strength as prescribed in reference standard RS 10-5A.

V BRACING is that form of chevron bracing that intersects a beam above and inverted V bracing is that form of chevron bracing that intersects a beam from below.

X BRACING is that form of bracing where a pair of diagonal braces cross near midlength of the bracing members."

Subdivision (c) Materials.

Delete this subdivision and exception and substitute the following:

"(c) 1. Materials. Materials shall be as prescribed in reference standard RS 10-5A. Structural steel designed to be part of the lateral force resisting system of multistory buildings shall not have a specified yield strength greater than 50,000 psi.

2. Member Strength. When these provisions require that the strength of the member be developed, the following shall be used:

Members:	Strength
Flexure	$M_S=ZF_y$
Shear	$V_S=.55F_ydt$
Axial compression	$P_{sc}=1.7F_aA$
Axial tension	$P_{st}=F_yA$
Connectors:	
Full penetration welds	F_yA
Partial penetration and fillet welds	1.7*Allowable
Bolts	1.7*Allowable

Members need not be compact unless otherwise required by this chapter."

Subdivision (d) Ordinary Moment Frame Requirements.

Delete the words "Section 2723(e)1" and insert the words "paragraph 1 of Special Moment-resisting Frame (SMRF) Requirements".

Subdivision (e) Special Moment-resisting Frame Requirements (SMRF).

Paragraph 1, Subparagraph A. Required Strength.

Delete the words "Formula 22-1" in item (ii) and insert the words "the panel zone strength, defined as:

$$V=0.55F_yd_ct\ (1+3b_ct_{cf}^2/d_bd_ct)$$

where:

t = the total thickness of the joint panel zone including doubler plates

d_b = the depth of the beam

d_c = the column depth

b_c = the width of the column flange

t_{cf} = the thickness of the column flange".

Paragraph 3, Subparagraph A. Restrained joint.

Delete item (i) and substitute the following:

"$\Sigma/Z_c(F_{yc} - f_a)/\Sigma Z_bF_{yb}>1.0$

where ($f_a \geq 0$)."

Paragraph 3, Subparagraph B. Unrestrained joint.

Delete the words "Section 2703, Formula (3-2)" in the first sentence and insert the words: "Section 1.6.2 of reference standard RS 10-5A".

Delete the words "Section 2723(e)3A and P-delta" in the sentence following item (ii) and insert the words "Section 2723(f)3A, as well as P-delta effects".

Add new a Paragraph 5 entitled Drift Calculations to read as follows:

"5. Drift Calculations. Drift calculations shall include bending and shear contributions from the clear girder and column spans, column axial deformation, and the rotation and distortion of the panel zone.

Exceptions:

1. Drift calculations may be based on column and girder centerlines where either of the following conditions is met:

a. It can be demonstrated that the drift so computed for frames of similar configuration is typically within 15 percent of that determined above.

b. The column panel zone strength can develop 0.8 Σ/M_s of the girders framing to the column flanges at the joint.

2. Column axial deformations may be neglected if they contribute less than 10 percent to the total drift."

Subdivision (f) Requirements for Braced Frames.

Paragraph 2, Subparagraph A. Stress reduction.

Delete the words "2702(b) 3 and Section 2303(d)" of the definition of "F_a" and substitute the words "1.5.1.3 and Section 1.5.6 of reference standard RS 10-5A".

Paragraph 2, Subparagraph C. Compression elements in braces.
Delete the number "2706" and insert the words "1.9 of reference standard RS 10-5A".
Paragraph 3, Subparagraph B. Net area.
Delete the words “2722(g)3A” in F* and 2722(g)2A in α and insert the words “2723(f)3A” and “2723 (f)2A” for F* and α, respectively.
Subdivision (h) Nondestructive Testing.
Delete the words "Section 2722(i) and insert the words "reference standard RS 10-5A".
******Local Law 17-1995.***

*** REFERENCE STANDARD RS 10-6**

AISC-1986 Specification For The Design of Cold-Formed Steel Structural Members, dated August 19,1986.
MODIFICATIONS-The provisions of AISI 1980 specification for the design of cold-formed steel structural members dated August 19,1986, shall be subject to the following modifications. The section and paragraph numbers are from that standard.

A3 Material—Add the following to the last sentence of section A3.2 Other Steels:

"and provided it is approved for structural applications in accordance with RS 10-6 by the Board of Standards and Appeals."

A4.4 Wind or Earthquake Loads-Delete Section A4.4 and substitute the following:

"The provisions of the Building Code for infrequent stress conditions shall apply."

A5 Structural Analysis and Design-Add the following as the opening paragraph of section A5.1 Design Basis:

"The stresses indicated herein are applicable only in conjunction with the other requirements contained in the following subsections:**

E2 Welded Connections-Add the following paragraph directly under E2:

"The provisions of the Building Code for welding operations, the Board of Standards and Appeals, rules for Arc and Gas Welding and Oxygen Cutting of Steel Covering the Specifications for the Design, and the Qualifications of Welders and Supervisors shall apply. The requirements of Section E2 shall supplement the above requirement not supersede them."

F Test for Special Cases-Delete the text of subsection (a) and substitute the following:

"(a) Tests shall be made in accordance with the provision of the Building Code."

F1 Tests for Determining Structural Performance-Delete the text for subsection (b) and substitute the following:

"(b). The provision of the Building Code for load test shall apply.**

G-FABRICATION, ERECTION, MINIMUM THICKNESS OF METAL AND PAINTING
The applicable provisions of Reference Standard RS 10-5 shall apply supplemented as follows:

G1.1 Fabrication

(a) Straightening and flattening-All materials shall be clean and straight. If straightening or flattening is necessary, it shall be done by a suitable process or method and in a manner that will not injure the material.
(b) Profiles used structurally shall conform to the specified dimension. Care shall be taken not to stretch, bend, or otherwise distort parts of the sections unless such forming is an integral part of the design.
(c) Cutting and punching-Components may be cut by slitting, shearing sawing, or flame cutting. All punched holes and sheared or flame cut edges of material in members subject to calculated stress shall be clean and free from notches and burred edges.

G1.2 Erection-Care shall be taken to avoid damage when loading, unloading, and handling members.

****455-89 BCR; 425-81 BCR; 302-73 BCR; 248-70 BCR***
*****Closed quotations not enacted here; probably intended.***

***** REFERENCE STANDARD RS 10-6A**

Reference Standard 10-6A, AISI 1974 Specification for the Design of Cold-Formed Stainless Steel Structural Members.
MODIFICATIONS-The provisions of AISI-1974 Specification for the Design of Cold-formed Stainless Steel Structural Members shall be subject to the following modifications. The section and paragraph numbers are from that standard.
1.2 Material.
Add the following to the last sentence of the last paragraph of section 1.2: "and provided it is approved for structural applications in accordance with RS 10-6A by the Board of Standards and Appeals."
3.1 Basic design stresses.
Add the following as the opening paragraph of section 3.1: "The allowable stresses indicated herein are applicable only in conjunction with the other requirements contained in the following subsections."
3.1.2 Wind, earthquake and combined forces.
Delete sections 3.1.2.1 and 3.1.2.2 and substitute the following: "The provisions of the building code for infrequent stress conditions shall apply."
4.2 Welds.
4.2.1 Fusion welds.
In the fourth paragraph following the words "Structural Welding Code, D1.1" add "1975 and D1.1 Rev. 1-76 and D1.1 Rev. 2-77."
4.5 Bolted connections.
4.5.4 Shear stress on bolts.
In paragraph two change the date of issuance of ASTM Designation A370 to read as follows: A370-76

6.1 Determination of stress-strain relationships.
Change the date of issuance of the following standards referred to in section 6.1 as indicated.
E8-69
E9-77
E141-69
6.2 Test for special cases.
6.2.1 General
6.2.1(c) Delete and substitute the following:
"Tests shall be made in conformance with the provisions of the Building Code."
6.2.2 Tests for determining structural performance.
Delete paragraph 6.2.2(b) and substitute the following:
"The provisions of the building code for load tests shall apply."
6.2.3 Tests for determining mechanical properties of full sections. Add the date of issuance of the following standard referred to in section 6.2.3(a) as indicated.

ASTM Designation A370-76

Add the following section:
Section 7. FABRICATION AND ERECTION
The applicable provisions of Reference Standard RS 10-5 shall apply supplemented as follows:
7.1 Fabrication
(a) Straightening and flattening-All material shall be clean and straight. If straightening or flattening is necessary, it shall be done by a suitable process or method and in a manner that will not injure the material.
(b) Profiles and distortion-Profiles used structurally shall conform to the specified dimension. Care shall be taken not to stretch, bend, or otherwise distort parts of the sections unless such forming is an integral part of the design.
(c) Cutting and punching-Components may be cut by slitting, shearing, sawing or flame cutting. All punched holes and sheared or flame cut edges of material in members subject to calculated stress shall be clean and free from notches and burred edges.
(d) Bolted and riveted connections-Holes for bolts or rivets shall be 1/16 inch larger than the nominal diameter of the bolt and rivet when the diameter of bolt or rivet is 1/2 inch and larger, and 1/32 inch larger than the nominal diameter of the bolt or rivet when the diameter is less than 1/2 inch.
7.2 Erection - Care shall be taken to avoid damage when loading, unloading, and handling members.
******249-70 BCR***

*** REFERENCE STANDARD RS 10-7**

SJI Standard Specifications for Open Web Steel Joists, H-series, as modified, February 15,1978, Revised November 7,1983.
SJI Standard Specifications for Open Web Steel Joists, K- Series, November 4,1985, Revised May 19,1987.
SJI Standard Specifications for Longspan Steel Joists, LH-Series, and Deep Longspan Steel Joists,
DLH-Series. February 15,1978. Revised to May 19,1987.
SJI Standard Specifications for Joist Girders, May 15,1978. Revised to May 19,1987.
SJI-1988 Standard Specifications, Load Tables and Weight Tables for Steel Joists and Joist Girder.
**MODIFICATIONS:
(1) Open web steel joists are prohibited in high rise buildings in all occupancy groups except J-2 or J-3.
(2) The provisions of the standard specifications for open web steel joists, longspan steel joists, deep longspan steel joists and joist girders, as listed above, shall be subject to the following modifications. The section and paragraph numbers are from those standards.
*****Local Law 26-2004.***

SPECIFIC MODIFICATIONS-OPEN WEB STEEL JOISTS, H-SERIES

3.1 STEEL

Add the date of publication of the following ASTM specifications:

ASTM A36-88c
ASTM A570-88
ASTM A606-85
ASTM A242-87
ASTM A572-88b
ASTM A607-85
ASTM A441-85
ASTM A588-88
ASTM A611-85

3.2 MECHANICAL PROPERTIES

Add the date of publication of the following ASTM specifications:

ASTM A370-88
ASTM A6-86b
ASTM A611-85

3.3 PAINT

The requirements of Reference Standard RS 10-5 shall also apply.

5.12 INSPECTION

Delete this section.
Minimum Thickness of Material-The provisions of reference standard RS 10-5 shall apply.

SPECIFIC MODIFICATIONS-OPEN WEB STEEL JOISTS K-SERIES

3.1 STEEL

Add the date of publication to the following ASTM specifications:

ASTM A36-88c
ASTM A588-88
ASTM A242-87
ASTM A606-85
ASTM A441-85
ASTM A607-85
ASTM A570-88
ASTM A611-85
ASTM A572-88b

3.2 MECHANICAL PROPERTIES
Add the date of publication to the following ASTM specifications:

ASTM A370-88
ASTM A6-86b
ASTM A611-85

In paragraph three insert "Reference Standard RS10-6" before the words, "of the AISI Specification...."
4.1 METHOD
In paragraph one delete the words, "of latest adoption"
In paragraph (a) insert "Reference Standard RS 10-5" before "American Institute of Steel Construction."
In paragraph (b) insert "Reference Standard RS 10-6" before "American Iron and Steel Institute."
4.8 SHOP PAINT
Add the following as the first paragraph of this section:
Painting of Open Web Steel Joists.-Painting of Open Web Steel Joists shall meet the requirements of reference standard RS 10-7 for Open Web Steel Joists. The shop coat shall be applied at the place of manufacture. All abrasions shall be touched up at the job site with the same material. Steel joists that remain exposed to the weather or a corrosive atmosphere shall receive an additional coat of metal protection of another color after erection, except for types of structural steels that have been specifically approved for use under exposure to the weather without metal protection.
5.12 INSPECTION
Delete this section.
SPECIFIC MODIFICATIONS-LONGSPAN STEEL JOISTS, LH-SERIES AND DEEP LONGSPAN STEEL JOISTS, DLH-SERIES
102.2 STEEL
Add the date of publication to the following ASTM specifications:

ASTM A36-88c
ASTM A588-88
ASTM A242-87
ASTM A606-85
ASTM A441-85
ASTM A607-85
ASTM A570-88
ASTM A611-85
ASTM A572-88b

102.2 MECHANICAL PROPERTIES
Add the date of publication to the following ASTM specifications:

ASTM A370-88
ASTM A6-86b
ASTM A611-85

103.1 METHOD
In paragraph one delete the words, "of latest adoption."
In paragraph (a) insert "Reference Standard RS 10-5" before, "American Institute of Steel Construction."
In paragraph (b) insert "Reference Standard RS 10-6" before, "American Iron and Steel Institute."
103.7 SHOP PAINTING
Add the following as the first paragraph of this section:
Painting of Joist Girders.- Painting of Joist Girders shall meet the requirements of reference standard RS 10-7 for Joist Girders. The shop coat shall be applied at the place of manufacture. All abrasions shall be touched up at the job site with the same material. Steel joists that remain exposed to the weather or a corrosive atmosphere shall receive an additional coat of metal protection of another color after erection, except for types of structural steels that have been specifically approved for use under exposure to the weather without metal protection.
104.13 INSPECTION
Delete this section.
SPECIFIC MODIFICATIONS—JOIST GIRDERS
1002.1 STEEL
Add the date of publication to the following ASTM specifications:

ASTM A36-88c
ASTM A588-88
ASTM A242-87
ASTM A606-85
ASTM A441-85
ASTM A607-85
ASTM A570-88b
ASTM A611-85
ASTM A572-88b

1002.2 MECHANICAL PROPERTIES
Add the date of publication to the following ASTM specifications:

ASTM A370-88
ASTM A6-86b
ASTM A611-85

1003.1 METHOD
In paragraph one delete the words, “of latest adoption”.
In paragraph (a) insert “Reference Standard RS 10-5” before, “American Institute of Steel Construction”.
In paragraph (b) insert “Reference Standard RS 10-6” before, “American Iron and Steel Institute”.
1003.1 SHOP PAINTING
Add the following as the first paragraph of this section:
Painting of Joist Girders.—Painting of Joist Girders shall meet the requirements of reference standard RS 10-7 for Joist Girders. The shop coat shall be applied at the place of manufacture. All abrasions shall be touched up at the job site with the same material. Steel joists that remain exposed to the weather or a corrosive atmosphere shall receive an additional coat of metal protection of another color after erection, except for types of structural steels that have been specifically approved for use under exposure to the weather without metal protection.

***** REFERENCE STANDARD RS 10-8**

LUMBER AND TIMBER CONSTRUCTION

AF&PA 1991 National Design Specification for Wood Construction-and its 1991 Supplement with 1993 Revisions.

MODIFICATIONS-The provisions of AF&PA-National Design Specifications for Wood Construction shall be subject to the following modifications. The section and paragraph numbers are from that standard.

Part 1- General Requirements for Structural Design

1.4.2 Governed by Codes.

The provisions of the New York City Building Code shall constitute the minimum design loads.

Part IV-Sawn Lumber

4.1.2.1- When the design values specified herein are used, the lumber, including end-jointed or edge-jointed lumber shall be identified in accordance with the provisions of the Building Code for Identification. See Sections 26-251 and 27-618 of the code.

Part XIII-Metal Connector Plates

13.2- Design Values for Metal Connector Plates.

13.2.1- Tests for Design Values.

Tests to determine lateral design values for metal connector plates shall be conducted in accordance with ASTM Standard D1761-88 (Reference 13) or other approved test methods. The strength value of the metal connector plate in tension and shear shall be determined in accordance with ASTM E489-81. Tensile Strength Properties of Steel Truss Plates and ASTM E 767-80, Shear Resistance of Steel Truss Plates. The design value for normal load duration shall be determined by dividing the test load at wood-to-wood slip of 0.03" by 1.6 or by dividing the ultimate test load by 3.0 using the smaller of the two values as the design value (see Reference 43 for additional information). Design values determined in accordance with these test procedures shall be multiplied by all applicable adjustment factors (see Table 7.3.1) to obtain allowable design values.

13.2.3- Testing.

Full scale tests on representative trusses shall be conducted with ASTM E 73-84* Standard Methods of Testing Truss Assemblies.

1984 version does not exist, "83" probably intended.

13.2.4- Handling, Installation and Bracing.

Handling, installation and bracing metal plate connected wood trusses shall be in accordance with the recommendations of Truss Plate Institute, TPI-HIB-91, Commentary and Recommendations for Handling, Installing and Bracing Metal Plate Connected Wood Trusses.

Part XVI-Fire Protection

16.1-Scope.

This part is added to provide current State-of-the-Art Requirements for firestopping of concealed spaces above dropped ceilings and above ceilings attached to open web combustible trusses. These requirements are in addition to Sections 27-327 and 27-345 of the Building Code.

16.2-General.

16.2.1-General Requirement for Firestopping.

The space between the ceiling and the floor or roof above shall be divided by providing firestopping where ceilings are suspended below solid joists or suspended from or attached directly to the bottom of open wood floor trusses in buildings of combustible construction.

16.2.1.1-The space shall be divided into approximately equal areas not greater than 500 square feet in buildings of combustible construction. The firestopping shall generally be provided parallel to the main framing members. The roof trusses of private dwellings with roofs having a slope greater than 15 degrees from the horizontal may be excluded from this requirement.

16.2.1.2-Exception-Where the space above the ceiling is of combustible construction and the building is sprinklered in accordance with reference standard RS 17-2, above and below the ceiling, the firestopping may be omitted.

******DOB 4-17-96; 455-89 BCR; 288-84 BCR; 510-79 BCR; 394-71 BCR***

**** REFERENCE STANDARD RS 10-9**

PLYWOOD CONSTRUCTION

1. DEFINITIONS.-

(a) Plywood-Plywood is a laminated board or panel, consisting of a number of veneer sheets bonded together with either a water-resistant or waterproof adhesive that forms a bond stronger than the wood itself.

(b) Plywood component-A plywood component, for purposes of this standard, shall be defined as an element of a structural member formed by the assembly of plywood parts or of plywood parts with parts of wood or other materials so as to form an integral assemblage.

2. CONFORMANCE WITH STANDARD.-Materials, design and fabrication shall conform to Reference Standard RS 10-53, RS 10-54, RS 10-56 or RS 10-57, except that the word "should" in the standards shall be mandatory.

3. EXTERIOR USE.-All plywood when permanently exposed in outdoor applications shall be of exterior type. Plywood used for covering the exterior of outside walls and applied directly to supports shall be at least 3/8 in. nominal thickness, or comply with specifications for 303 Specialty Siding published by the American Plywood Association. Panel joints shall be backed solidly by studs or by nailing pieces at least 2 in. wide (nominal), except over sheathing or where applied as lapped siding, or when otherwise made waterproof. Plywood siding applied over sheathing shall be not less than ¼ in. thick.

4. ROOF SHEATHING.-Where plywood is used as roof sheathing the spans shall not exceed the values given in Table RS 10-9.1.

TABLE RS 10-9.1a
ALLOWABLE SPANS FOR PLYWOOD FLOOR AND ROOF SHEATHING CONTINUOUS OVER TWO OR MORE SPANS AND FACE GRAIN PERPENDICULAR TO SUPPORTS [a]

Panel Span Rating,[b] Roof/ Floor Span	Thickness (inches)	Roof Maximum Span (inches) Edges Blocked[c]	Edges Unblocked
10/0	5/16	12	12
16/0	5/16, 3/8	16	16
20/0	5/16, 3/8	19.2	19.2
24/0	3/8	20	20
24/0	15/32, 1/2	20	24
32/16	15/32, 1/2, 5/8	30	28
40/20	19/32, 5/8, 3/4	40	32
48/24	23/32, 3/4	48	36
Panel Span Rating,[b]	Load (psf)		Floor Maximum span[e] (inches)
Roof/ Floor Span	Total	Live	
12/0	135	130	0
16/0	80	65	0
20/0	70	55	0
24/0	60	45	0
24/0	60	45	0
32/16	50	35	16[f]
40/20	40[d]	35[d]	20[f,g]
48/24	40[d]	35[d]	24

Notes:

[a] These values apply for C-D Sheathing Structural I and II and C-C grades only. Spans shall be limited to values shown because of possible effect of concentrated loads.

[b] Span rating appears on all panels in the construction grades listed in footnote[b].

[c] Edges shall be blocked with lumber or other approved type of edge support.

[d] For roof live load of 40 psf or total load of 55 psf, decrease spans by 13 percent or use panel with next greater span rating.

[e] Edges of plywood floor sheathing shall have approved tongue-and-groove joints or shall be supported with blocking, unless 1/4-inch minimum thickness underlayment of 1½ inches of approved cellular or lightweight concrete is installed, or finish floor is 25/32-inch wood strip. Allowable uniform load based on deflection of 1/360 of the span is 165 psf.

[f] Maximum shall be 24 inches if 25/32 - inch wood strip flooring is installed at right angels to joist.

[g] For joists spaced at 24 inches on center, plywood sheathing with span rating numbers 40/20 or greater shall not be used for subfloors except when supporting 1 1/2 inches of lightweight concrete.

5. PLYWOOD SUBFLOORS.-Where plywood is used as structural subflooring the maximum spans shall not exceed the values given in Table RS 10-9.1. If resilient flooring or carpeting is to be applied directly to a plywood subfloor without separate underlayment, the panels shall be underlayment grade, C-C plugged, or any sanded grade of exterior type plywood. The thickness shall not be less than the values prescribed for the given spans and loads shown in Table RS 10-9.2.

6. SPECIAL 1 1/8 IN. PLYWOOD SUBFLOORING FOR 48 IN. SPAN.-
Such material, if conforming to design specifications of the American Plywood Association special 2-4-1 panel, may be used over girders spaced not more than 48 in. on centers, with edges on 2 in. x 4 in. blocking securely attached to main girders, provided the total floor load does not exceed 65 psf. A tongue and groove joint may be used in lieu of blocking.

7. PLYWOOD WALL SHEATHING.-Plywood may be applied either horizontally or vertically and as indicated in building code provisions for the bracing of exterior walls.

8. FASTENING.-Plywood sheathing and subflooring . Plywood sheathing and subflooring shall have the maximum fastener spacing on framing as prescribed in Table RS 10-9.3.

TABLE RS 10.9.1b
ALLOWABLE LOADS FOR PLYWOOD ROOF SHEATHING CONTINUOUS OVER TWO OR MORE SPANS AND FACE GRAIN PARALLEL TO SUPPORTS [a]

	Thickness (inches)	No. of Plies	Span (inches)	Total Load (psf)	Live Load (psf)
	15/32	4	24	30	20
	15/32	5	24	45	35
Structural 1	1/2	4	24	35	25
	1/2	5	24	55	40
	15/32	5	24	25	20
	1/2	5	24	30	25
Other grades	19/32	4	24	35	25
covered in DOC	19/32	5	24	50	40
PS-1	5/8	4	24	40	30
	5/8	5	24	55	45

Note:
[a] Uniform load deflection limitations: 1/180 of span under live load plus dead load, 1/240 under live load only. Edges shall be blocked with lumber or other approved type of edge supports.

TABLE RS 10-9.2 MINIMUM THICKNESS FOR PLYWOOD COMBINATION SUBFLOOR-UNDERLAYMENT[a]
(Plywood continuous over two or more spans and face grain perpendicular to supports)

	Maximum Spacing of Supports (in.)		
Species Group	16	20	24
1	1/2 in.	5/8 in.	3/4 in.
2, 3	5/8 in.	3/4 in.	7/8 in.
4	3/4 in.	1/8 in.	1 in.

Notes:
[a] Applicable to underlayment grade, C-C (Plugged) and all grades of sanded exterior type plywood. Spans limited to values shown because of possible effect of concentrated loads. Allowable uniform load based on deflection of 1/360th of span is 100 psf. Plywood edges shall have approved tongue and groove joints or shall be supported with blocking, unless 1/4 - inch minimum thickness underlayment is installed, or finish floor is 25/32-inch wood strip. If wood strips are perpendicular to supports, thickness as shown for 16-and 20-inch spans may be used on 24 - inch span.
Except for 1/2 inch, Underlayment grade and C-C(plugged) panels may be of nominal thickness 1/32 inch thinner than the nominal thicknesses shown when marked with the reduced thickness.

TABLE RS 10-9.3 FASTENING SCHEDULE

Thickness (in.)	Common Nail and Staple Size/ Type	Fastener Spacing (in.)[a] Panel Edges	Intermediate Support
	Roof and Wall Sheathing		
1/2 or less	6d Smooth or deformed……..	6	12
5/8 or greater	8d Smooth or deformed ……..	6	12
5/16, 3/8,1/2	16 gage galvanized wire staples, 1/8 in. minimum crown. Length of one in. plus plywood thickness except 1 1/4 in. for 5/16 in. plywood...	4	8
	Subflooring		
1/2	6d Smooth or deformed……..	6	12
5/8, 3/4, 7/8	8d Smooth or 6d deformed……..	6	12
1, 1 1/8	10d Smooth or 8d deformed……...	6	6
1/2	16 gage galvanized wire staples, 3/8 in. minimum crown. ……	4	7
5/8	1 5/8 in. long……...	2 1/2	4

Note:
[a] Where spans are 48 in., or more, nails shall be spaced at 6 in. at all supports.

9. PLYWOOD SIDING.-Plywood siding shall be applied and nailed as prescribed in Table RS 10-9.4.

TABLE RS 10-9.4 PLYWOOD SIDING

Type of Siding	Plywood [b,c,] Thickness (in.)	Nail Size	Nail Type	Nail Spacing (in.) Panel Edges[a]	Nail Spacing (in.) Intermediate Supports
Panel Siding	3/8[d]	6d	Corrosive resistant box or casing nails	6	12
	1/2, 5/8 and thicker	8d			12
Lap Siding	3/8	6d	Corrosive resistant box or casing nails	6	One nail per stud for width 12 in. or less.
	1/2 and thicker	8d			
				4	8 in. for width greater than 12 in.

Notes:

[a]Minimum edge distance of 3/8 in.

[b]In direct-to-stud applications 5-ply panels of 1/2 in. nominal thickness or more may be used over studs 24 in. o.c. if texturing does not penetrate through the face veneer. All other panels must be used over studs spaced not more than 16 in. on center.

[c]Special requirement: Nails on ship-lap edges of 5/8 in. and thicker panel siding 3/8 in. from exposed edge and slant driven towards edge; do not set.

[d]When separate sheathing is applied, 3/8 in. panel and 303 siding may be used over supports spaced 24 in. on center 1/4 in. over supports 16 in. on center.

***10. PLYWOOD DIAPHRAGMS**.-Plywood diaphragms may be used to resist horizontal forces in horizontal and vertical distributing or resisting elements, provided the deflection in the plane of the diaphragm, as determined by calculations, tests, or analogies drawn therefrom, does not exceed the permissible deflection of attached distributing or resisting elements. Diaphragms to resist earthquake loads may be designed and constructed in accordance with reference standard RS 10-58.

Permissible deflection shall be that deflection up to which the diaphragm and any attached distributing or resisting element will maintain its structural integrity under assumed load conditions; i.e, continue to support assumed loads without danger to occupants of the structure.

Connections and anchorages capable of resisting the design forces shall be provided between the diaphragms and the resisting elements. Openings in diaphragms that materially affect the strength of the diaphragms shall be fully detailed on the plans, and shall have their edges reinforced to adequately transfer all shearing stresses. Structural diaphragm shapes shall be limited to the proportions given in Table RS 10-9.5.

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

TABLES RS 10-9.5 DIAPHRAGM PROPORTIONS

Type	Horizontal Diaphragms-Maximum Span-Width Ratios	Vertical Diaphragms-Maximum Height-Width Ratios
Nailed all edges....	4 : 1	31/2 : 1
Blocking omitted at intermediate joints	4 : 1	2 : 1

Design-

Horizontal and vertical plywood diaphragms shall be used at shear values not exceeding those set forth in Tables RS 10-9.6 and RS 10-9.7 and respectively or shall be designed by principles of stress analysis. Plywood thickness for horizontal diaphragms shall not be less than as set forth in Tables RS 10-9.1 and RS 10-9.2 for corresponding joist spacing and loading, except that 1/4 in. may be used where design analysis justifies.

All framing members shall be proportioned and spliced where necessary to transmit direct stresses. The width of framing members shall be at least 2 in. nominal. In general, panel edges shall bear on the framing members and butt along their center lines. Nails shall be placed at least 3/8 in. from the panel edges, and spaced not more than 12 in. apart along intermediate supports and 6 in. apart along the panel edge-bearings. All nails shall be firmly driven into the framing members. No unblocked panel less than 12 in. wide shall be used. (See Tables RS 10-9.6 and RS 10-9.7).

11. PLYWOOD COMPONENTS.-Plywood components shall be acceptable when designed and fabricated according to procedures in reference standard RS 10-55.

12. STRUCTURAL USE PANELS.-Panels shall comply with Reference Standards RS 10-54 and RS 10-56 and shall include those manufactured using only veneer as in regular plywood, with veneer faces and a reconstituted wood core as in composite plywood, or using only reconstituted wood as in structural flakeboard. waferboard, oriented strandboard and particleboard.

13. MARKING OF PANELS.-Structural-use sheathing panels shall be marked with a Span Rating symbol as required in RS 10-54 and RS 10-56. The left-hand number shall denote the maximum roof span in inches, and the right-hand number the floor span.

Structural-use panels designated for use as single-layer floor panels shall be marked with a floor Span Rating. Structural-use panels intended for use solely as wall sheathing shall be marked with a stud spacing of 16 o.c. or 24 o.c.

14. PANEL SPANS.-Spans for structural-use panels used for floor or roof sheathing shall not exceed the Span Rating. Live loads on floors or roofs shall not exceed those specified in Tables RS 10-9.1a and RS 10-9.1b. Spans for structural-use panels for wall sheathing may be applied either horizontally or vertically. Maximum stud spacing shall not exceed 16 inches o.c. for panels with a rated wall span of 16 inches or roof span of 16 or 20 inches, and 24 inches o.c. for panels with rated wall span of 24 inches or roof span of 24 inches or more.

*****455-89 BCR; 208-85 BCR; 288-84 BCR***

15. HORIZONTAL SHEAR.-Structural-use panels may be used to resist horizontal forces and shall be assigned shear values equal to those for C-D plywood and other grades in Tables RS 10-9.6 and RS 10-9.7.

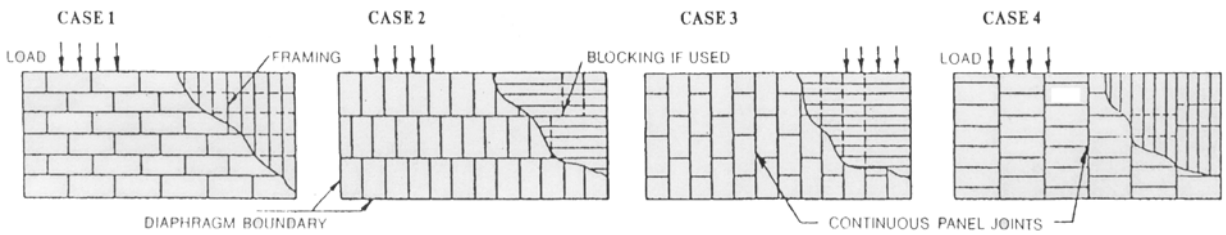
16. FASTENINGS.-Structural-use panels shall be fastened to the framing system in accordance with Table RS 10-9.3.

17. FIRE RESISTANCE.-Structural-use panels SHALL NOT BE USED as an element of a fire resistive assembly unless it has been specifically tested and approved for such use.

TABLE RS 10-9.6 ALLOW SHEAR FOR WIND FOR HORIZONTAL PLYWOOD DIAPHRAGMS
(lbs. Per st. of horizontal run)

					Blocked Diaphragms				Unblocked Diaphragms	
					Nail Spacing at Diaphram Boundaries (all cases) and Continuous Panel Edges Parallel to Load (Cases 3 & 4)				Nails Spaced 6 in. Maximum at Supported End	
Plywood Grade	Common Nail Size	Minimum Nail Penetration in Framing (in.)	Minimum Nominal Plywood Thickness (in.)	Minimum Nominal Width of Framing Member (in.)	6 in.	4 in.	2 ½ in.	2 in.	Load Perpendicular to Unblocked Edges and Continous Panel Joints (Case 1)	All Other Config-urations (Cases 2, 3, and 4)
					Nail Spacing at Other Plywood Panel Edges					
					6 in.	6 in.	4 in.	3 in.		
	6d	1 1/4	5/16	2	185	250	375	420	165	125
Structural I			or 1/4	3	210	280	420	475	185	140
	8d	1 1/2	3/8	2	270	360	530	600	240	180
				3	300	400	600	675	265	200
	10d	1 5/8	1/2	2	320	425	640[b]	730[b]	285	215
				3	360	480	720	820	320	240
	6d	1 1/4	5/16	2	170	225	335	380	150	110
Structural II			or 1/4	3	190	250	380	430	170	125
C-C			3/8	2	185	250	375	420	165	125
Exterior,				3	210	280	420	475	185	140
Standard	8d	1 1/2	3/8	2	240	320	480	545	215	160
Sheathing				3	270	360	540	610	240	180
and other			1/2	2	270	360	530	600	240	180
Grades				3	300	400	600	675	265	200
covered in	10d	1 5/8	1/2	2	290	385	575[b]	655[b]	255	190
Product				3	325	430	650	735	290	215
Standard			5/8	2	320	425	640[b]	730[b]	285	215
PS 1				3	360	480	720	820	320	240

Notes:
a These values are for short time loads due to wind and shall be reduced 25 percent for normal loading. Space nails 12 in. on center along intermediate framing members.
b Reduce tabulated values 10 per cent when boundary members provide less than 3 in. nominal nailing surface.



11. PLYWOOD COMPONENTS. – Plywood components shall be acceptable when designed and fabricated according to procedures in reference standards RS 10-57 through RS 10-64, inclusive.

TABLE RS 10-9.7 ALLOWABLE SHEAR FOR WIND FOR VERTICAL PLYWOOD DIAPHRAMS a,b
(lbs. per ft. of vertical run)

Plywood Grade	Nail Size (Common or Galvanized Box)	Minimum Nail Penetration in Framing (in.)	Minimum Nominal Plywood Thickness (in.)	Plywood Applied Direct to Framing — Nail Spacing at Plywood Panel Edges: 6	4	2 1/2	2	Nail Size (Common or Galvanized Box)	Plywood Applied over 1/2 inch Gypsum Sheathing — Nail Spacing at Plywood Panel Edges (in.): 6	4	2 1/2	2
	6d	1 1/4	5/16	200	300	450	510	8d	200	300	450	510
Stuctural I	8d	1 1/2	3/8	280	430	640	730	10d	280	430	640	730
	10d	1 5/8	1/2	340	510	770	870	—	—	—	—	—
Stuctural II, C-C Exterior, Standard												
Sheathing, Plywood Panel Siding,	6d	1 1/4	5/16	180	270	400	450	8d	180	270	400	450
and other grades covered in Product	8d	1 1/2	3/8	260	380	570	640	10d	260	380	570	640
Standard PS 1	10d	1 5/8	1/2	310	460	690	770	—	—	—	—	—
	Nail Size (Galvanized Casing)							Nail Size (Galvanized Casing)				
Plywood Panel Siding in grades	6d	1 1/4	5/16	140	210	320	360	8d	140	210	320	360
covered in Product Standard PS 1	8d	1 1/2	3/8	160	240	360	410	10d	160	240	360	410

Notes:
a These values are for short time loads due to wind and shall be reduced 25 per cent for normal loading. All panel edges backed with 2-inch nominal or wider framing. Plywood installed either horizontally or vertically. Space nails at 12 in. on center along intermediate framing members.
b For unblocked vertical plywood diaphragms use the values in the last column of Table RS 10-9.6.

***REFERENCE STANDARD RS 10-10A**
SPECIFICATION FOR ALUMINUM STRUCTURES ALLOWABLE STRESS DESIGN

AA Aluminum Design Manual Part 1-A Specification for Aluminum Structures Allowable Stress Design (Seventh Edition, January 2000).
Modification:

* * *

Section 2.3 Loads– is hereby amended to read as follows:

The dead load to be used in the design of the structure is the weight of the structure and all material permanently attached to and supported by the structure.

Static and dynamic live loads, as well as snow, ice, ponding and wind loads shall be based on [appropriate building codes] the New York City Building Code and its appropriate Reference Standards. [Where building codes do not apply, requirements shall be established from performance specifications for the structure.

Allowable stresses provided in *Specification for Aluminum Structures* shall be permitted to be increased by one-third when stresses are produced by wind or seismic loading , acting alone or in combination with the dead load or in combination with dead and live loads. Allowable stresses shall not be increased by one-third if prohibited by the applicable code or specification used to determine the load. Also, the section shall be not less than that required for the dead and other live loads acting alone.]

Combination of loads shall be in accordance with section 27-594 of the Building Code, or, with Reference Standard RS 9-2 if applicable.

In the case of wind and ice loads, the form of the structure and any of its exposed components (e.g. increased area exposed to wind due to icing) shall be considered.

* * *

****DOB 9-2-01;455-89 BCR***

***REFERENCE STANDARD RS 10-10B**
SPECIFICATION FOR ALUMINUM STRUCTURES LOAD AND RESISTANCE FACTOR DESIGN OF BUILDINGS AND SIMILAR TYPE STRUCTURES

AA Aluminum Design Manual Part 1-B Specification for Aluminum Structures Load and Resistance Factor Design of Buildings and Similar Type Structures (Second Edition, January 2000).
Modification:

* * *

Section 2.3 Loads– is hereby amended to read as follows:

The nominal loads shall be the minimum design loads stipulated by the [applicable building code or performance specification] New York City Building Code and its applicable Reference Standards. Nominal loads shall be factored and combined in accordance with the [applicable building code or performance specification. In the absence of a code or performance specification, ASCE 7-98, *Minimum Design Loads for Buildings and Other Structures*, shall be used] New York City Building Code and its applicable Reference Standards.

* * *

****DOB 9-2-01;455-89 BCR***

***REFERENCE STANDARD RS 10-11**
SPECIFICATIONS FOR ALUMINUM

MATERIALS
ASTM B209-1988 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
ASTM B308-1988 - Standard Specification for Aluminum-Alloy 6061-T6 Standard Structural Shapes, Rolled or Extruded.
ASTM B429-1988 - Standard Specification for Aluminum-Alloy Extruded Structural Pipe and Tube.
455-89 BCR

***REFERENCE STANDARD RS 10-12**
ASTM C317-1976 Standard Specification for Gypsum Concrete (Reapproved 1981).
455-89 BCR

****REFERENCE STANDARD RS 10-13**
SPAN TABLES FOR JOISTS AND RAFTERS
AF&PA - SPAN TABLES for JOISTS AND RAFTERS
1993 and its Supplement. Design Values for Joists and Rafters. February 1992.
MODIFICATIONS - The provisions of AF&PA - Span Tables for Joists and Rafters 1993, shall be subject to the following modifications. The section and paragraph numbers are from the standard.
Under the section EXPLANATION OF TABLES
2. LUMBER DESIGN VALUES - Add the following paragraph
AF&PA publication Design Values for Joists and Rafters, February 1992 Supplement, shall be acceptable for determining design values for joists and rafters.
7. LUMBER IDENTIFICATION - Delete the paragraph and substitute the following:
LUMBER IDENTIFICATION - The lumber, including end-jointed or edge-jointed lumber shall be identified in accordance with the provisions of the Building Code for Identification. See Sections 26-251 and 27-618 of the code.
10. DESIGN LOADS - The provisions of the New York City Building Code shall constitute the minimum design loads.
DOB 4-17-96; 511-79 BCR; 264-73 BCR; 394-71 BCR

*****REFERENCE STANDARD RS 10-14**
ACI-214 1977 - Recommended Practice for Evaluation of Strength Test Results of Concrete (Reaffirmed 1983).
****1077-86 BCR; 208-85 BCR; 288-84 BCR***

REFERENCE STANDARD RS 10-15
ACI-506 1966 - Recommended Practice for Shotcreting (Revised 1983).

***REFERENCE STANDARD RS 10-16**
ANSI/ASTM-C42 1984a - Standard Method of Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.
1077-86 BCR; 288-84 BCR; 887-80 BCR

***REFERENCE STANDARD RS 10-17**
ANSI/ASTM-C39 1984 - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
1077-86 BCR; 288-84 BCR; 887-80 BCR

†**REFERENCE STANDARD RS 10-18**
GLUED-LAMINATED TIMBER DESIGN, MANUFACTURING AND CONSTRUCTION
ANSI/AITC A190.1-1992 Structural Glued Laminated Timber and AITC 200-92 Inspection Manual.
MODIFICATIONS - The provisions of ANSI/AITC A190.1-1992 shall be subject to the following modifications. The section and paragraph numbers are from that standard.
Section 3: List of Referenced Publications.
(a) American Institute of Timber Construction
7012 S. Revere Pkwy., Suite 140
Englewood, CO 80112
AITC 117-93 Design Values/Specifications.
AITC 117-93 Manufacturing Standard Specifications for Structural Glued Laminated Timber of Softwood Species.
†DOB 3-8-96; Local Law 17-1995; 288-84 BCR; 512-79 BCR

††**REFERENCE STANDARD RS 10-19**
ANSI/ASTM-C79 1987-Standard Specification for Gypsum Sheathing Board.
††455-89 BCR; 288-84 BCR; 390-80 BCR

†††**REFERENCE STANDARD RS 10-20**
AWPA-C2 1988-Standard for the Preservative Treatment of Lumber, Timbers, Bridge Ties and Mine Ties by Pressure Processes.
†††455-89 BCR; 288-84 BCR; 512-79 BCR

##**REFERENCE STANDARD RS 10-21**
ANSI/ASTM-C192 1981 - Standard Method of Making and Curing Concrete Test Specimens in the Laboratory.
##288-84 BCR; 887-80 BCR

†††**REFERENCE STANDARD RS 10-22**
AWPA-C9 1985 - Standard for the Preservative Treatment of Plywood by Pressure Process.
†††455-89 BCR; 288-84-BCR; 512-79 BCR

***REFERENCE STANDARD RS 10-23**
ANSI/ASTM-A153 1982 - Standard Specification for Zinc Coating (Hot Dip) on Iron and Steel Hardware.
288-84 BCR; 493-80 BCR; 302-73 BCR

REFERENCE STANDARD RS 10-24
ASTM-A90 1969 - Tests for Weight of Coating on Zinc-Coated (Galvanized) Iron or Steel Articles.

****REFERENCE STANDARD RS 10-24A**
ANSI/ASTM-A586 1986 - Specification for Zinc-coated Parallel and Helical Steel Wire Structural Strand.
****455-89 BCR; 288-84 BCR; 493-80 BCR***

****REFERENCE STANDARD RS 10-24B**
ASTM-A603 1988 - Standard Specification for Zinc-Coated Steel Structural Wire Rope

*****455-89 BCR; 288-84 BCR; 493-80 BCR***

*****REFERENCE STANDARD RS 10-25**
Delete
******455-89 BCR; 208-85 BCR; 288-84 BCR***

†**REFERENCE STANDARD RS 10-26**
ANSI/ASTM-B6 1987 - Standard Specification for Zinc (Slab Zinc).
†455-89 BCR; 288-84 BCR; 493-80 BCR; 302-73 BCR

*****REFERENCE STANDARD RS 10-27**
ASTM-D2277 1987 - Specification for Fiberboard Nail-base Sheathing (Reapproved 1980).
******455-89 BCR; 208-85 BCR; 288-84 BCR***

†††**REFERENCE STANDARD RS 10-28**
AWPA-C4 1988 - Standard for Preservative Treatment of Poles by Pressure Processes.
†††455-89 BCR; 288-84 BCR; 512-79 BCR

*****REFERENCE STANDARD RS 10-29**
AWPA-M4 1984 - Standard for the Care of Pressure-Treated Wood Products.
******455-89 BCR; 208-85 BCR; 288-84 BCR***

#**REFERENCE STANDARD RS 10-30**
ANSI-A82.1/ASTM-C67 1987 - Standard Methods of Sampling and Testing Brick and Structural Clay Tile.
#455-89 BCR; 288-84 BCR; 390-80 BCR

#**REFERENCE STANDARD RS 10-31**
ANSI-A98.1/ASTM-C62 1988 - Standard Specification for Building Brick (Solid Masonry Units Made from Clay or Shale).
#455-89 BCR; 288-84 BCR; 390-80 BCR

#**REFERENCE STANDARD RS 10-31A**
ANSI-A99.1/ASTM-C216 1987a Standard Specification for Facing Brick (Solid Masonry Units Made from Clay or Shale).
#455-89 BCR; 288-84 BCR; 390-80 BCR

#REFERENCE STANDARD RS 10-31B
ANSI/ASTM-C652 1988 Standard Specification for Hollow Brick (Hollow Masonry Units Made from Clay or Shale).
#455-89 BCR; 288-84 BCR; 390-80 BCR

#**REFERENCE STANDARD RS 10-32**
ANSI-A78.1/ASTM-C73 1985 - Standard Specifications for Calcium Silicate Face Brick (Sand-Lime Brick).
#455-89 BCR; 288-84 BCR; 390-80 BCR

#**REFERENCE STANDARD RS 10-33**
ANSI-A75.1/ASTM-C55 1985 - Standard Specification for Concrete Building Brick.
#455-89 BCR; 288-84 BCR; 390-80 BCR

#**REFERENCE STANDARD RS 10-34**
ANSI-A74.1/ASTM-C34 1984 Standard Specification for Structural Clay Load-bearing Wall tile.
#455-89 BCR; 288-84 BCR; 390-80 BCR

#**REFERENCE STANDARD RS 10-35**
ANSI/ASTM-C56 1971 - Standard Specification for Structural Clay Non-loadbearing Tile 1986.
#455-89 BCR; 288-84 BCR; 390-80 BCR

#**REFERENCE STANDARD RS 10-36**
ANSI-A81.1/ASTM-C145 1985 - Standard Specification for Solid Loadbearing Concrete Masonry Units.
#455-89 BCR; 288-84 BCR; 390-80 BCR

#**REFERENCE STANDARD RS 10-37**
ANSI-A79.1/ASTM-C90 1985 - Standard Specification for Loadbearing Concrete Masonry Units.
#455-89 BCR; 288-84 BCR; 390-80 BCR

#**REFERENCE STANDARD RS 10-38**
ANSI-A80.1/ASTM-C129 1985 - Standard Specification for *Hollow Non-load-bearing Concrete Masonry Units.
#455-89 BCR; 288-84 BCR; 390-80 BCR
****As enacted but "Hollow" probably not intended.***

****REFERENCE STANDARD RS 10-39**
ANSI/ASTM-C52 1954 - Standard Specification for Gypsum Partition Tile or Block (Reapproved 1977).
*****288-84 BCR; 390-80 BCR***

#**REFERENCE STANDARD RS 10-40**
ANSI-A101.1/ASTM-C126 1986 - Standard Specification for Ceramic Glazed Structural Clay Facing Tile, Facing Brick and Solid Masonry Units.
#455-89 BCR; 288-84 BCR; 390-80 BCR

*****REFERENCE STANDARD RS 10-41**
ANSI/ASTM-A116 1988 - Standard Specification for Zinc-Coated (Galvanized) Steel Woven Wire Fence Fabric.
******455-89 BCR; 288-84 BCR; 493-80 BCR; 302-73 BCR***

†**REFERENCE STANDARD RS 10-42**
ANSI/ASTM-B227 1970 - Standard Specifications for Hard-Drawn Copper-Clad Steel Wire. (Reapproved 1980)
†208-85 BCR; 288-84 BCR

REFERENCE STANDARD RS 10-43
*FS SS-S-721C 1964 Stone, Architectural, Cast.
****As enacted but this standard has been cancelled without a replacement.***

††**REFERENCE STANDARD RS 10-44**
ANSI/ASTM-C494 1986 - Standard Specification for Chemical Admixtures for Concrete.
††455-89 BCR; 288-84 BCR; 887-80 BCR

REFERENCE STANDARD RS 10-45
ACI-ASCE-334 Concrete Shell Structures Practice and Commentary. Report of Committee 334 of the American

Concrete Journal of the American Concrete Institute, proc. V61, M.9, Sept. 1964 (Revised 1982).

#REFERENCE STANDARD RS 10-46
ANSI/ASTM-C270 1988 Specifications for Mortar for Unit Masonry.
#455-89 BCR; 288-84 BCR; 390-80 BCR

#REFERENCE STANDARD RS 10-47
*ANSI/ASTM-C476 1983 Standard Specification for Grout for Reinforced and Non-Reinforced Masonry.
#455-89 BCR; 288-84 BCR; 390-80 BCR
****As enacted but "ANSI/ASTM-C476 1983 Standard Specification for Grout for Masonry."probably intended.***

#REFERENCE STANDARD RS 10-48
ANSI/ASTM-C22 1983 - Standard Specification for Gypsum.
#455-89 BCR; 288-84 BCR; 390-80 BCR

†††REFERENCE STANDARD RS 10-49
ASTM-C143 1978 - Standard Test Method for Slump of Portland Cement Concrete
†††1077-86 BCR

REFERENCE STANDARD RS 10-50
Deleted.

***REFERENCE STANDARD RS 10-51**
ANSI/ASTM-C172 1982 - Standard Method of Sampling Freshly Mixed Concrete.
****1077-86 BCR; 288-84 BCR; 887-80 BCR***

****REFERENCE STANDARD RS 10-52**
ANSI/ASTM-C31 1987 - Standard Method of Making and Curing Concrete Test Specimens in the Field.
*****455-89 BCR; 1077-86 BCR; 288-84 BCR; 887-80 BCR***

*****REFERENCE STANDARD RS 10-53**
APA 1986-Plywood Design Specifications.
******455-89 BCR; 208-85 BCR; 288-84 BCR***

*****REFERENCE STANDARD RS 10-54**
APA-PRP-108-1988 - Performance Standards and Policies for Structural-Use Panels.
******455-89 BCR; 208-85 BCR; 288-84 BCR***

*****REFERENCE STANDARD RS 10-55**
APA-1985 Design and Fabrication Specification of all Plywood-Lumber Components.
******455-89 BCR; 208-85 BCR; 288-84 BCR***

†REFERENCE STANDARD RS 10-56
TECO-1981 - Standards and Policies for Structural-Use Panels.
†208-85 BCR

*****REFERENCE STANDARD RS 10-57**
DOC PS 1-83-U.S. - Product Standard for Construction & Industrial Plywood. (Revised June 1987).
******455-89 BCR; 208-85 BCR; 288-84 BCR***

***REFERENCE STANDARD RS 10-58**
APA Form No. L350C-1989 - Diaphragms - Design/ Construction Guide.
APA Form No. E30K-1989 - Residential & Commercial, Design/Construction Guide.
****Local Law 17-1995.***

††REFERENCE STANDARD RS 10-59
Deleted.
††208-85 BCR; 288-84 BCR

REFERENCE STANDARD RS 10-60
Deleted.

###REFERENCE STANDARD RS 10-61
ANSI/ASTM-C173 1978 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.
###Local Law 65-1990.

###REFERENCE STANDARD RS 10-62
ANSI/ASTM-C231 1982 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
###Local Law 65-1990

###REFERENCE STANDARD RS 10-63
ANSI/ASTM-C138 1981 - Standard Test Method for Unit Weight Yield and Air Content (Gravimetric) of Concrete.
###Local Law 65-1990

###REFERENCE STANDARD RS 10-64
ANSI/ASTM-C567 1985 - Standard Test Method for Unit Weight of Structural Lightweight Concrete.
###Local Law 65-1990

†††REFERENCE STANDARD RS 10-65
ACI-211.2 1981 - Standard Practice for Selecting Proportions for Structural Lightweight Concrete.
†††1077-86 BCR

#REFERENCE STANDARD RS 10-66
Deleted.
#302-73 BCR

##REFERENCE STANDARD RS 10-67
ANSI-Z97.1 1984 - Safety Performance Specifications and Methods of Test for Safety Glazing Material Used in Buildings.
##455-89 BCR; 714-80 BCR

##REFERENCE STANDARD RS 10-68
SPECIFICATIONS FOR FLAT GLASS
ASTM C1036-1985 - Standard Specification for Flat Glass.
ASTM C1048-1987 - Standard Specification for Heat-Treated Flat Glass-Kind HS, Kind FT Coated and Uncoated Glass.
##455-89 BCR; 714-80 BCR