REFERENCE STANDARD RS 4-3
ESTABLISHED MARKET AREAS

Borough of Bronx-
Hunt's Point District:
Edgewater Road and Halleck Street between Lafayette Avenue and East Bay Avenue.
Lafayette Avenue between Edgewater Road and the Bronx River.
East Bay Avenue between Halleck Street and the Bronx River.
Hunt's Point Avenue between East Bay Avenue and the Bronx River.
Exterior Street between East 149th Street and East 157th Street.
Cromwell Avenue between East 150th Street and East 153d Street.
East 150th Street between Exterior Street and River Avenue.
Westchester Avenue between St. Ann's Avenue and Bergen Avenue.
Brook Avenue between East 150th Street and East 156th Street.
Bergen Avenue between East 149th Street and East 156th Street.
East 152d Street between Bergen Avenue and Brook Avenue.
East 153d Street between Bergen Avenue and Brook Avenue.

Borough of Brooklyn-
North 6th Street between Berry Street and Wythe Avenue.

Borough of Manhattan-
Fulton Market District:
John Street to Fulton Street between South Street and Front Street.
Fulton Street to Dover Street between South Street and Water Street.
South Street and Front Street between John Street and Dover Street.
Water Street between Fulton Street and Dover Street.
Gansevoort Market District:
Horatio Street to West 14th Street between West Street and 9th Avenue.
West Street, Washington Street, Greenwich Street, 9th Avenue and 10th Avenue between Horatio Street and West 14th Street.
West 16th Street, north side, and West 17th Street, south side, between 10th Avenue and 11th Avenue.
West 24th Street to West 26th Street, south side, between 11th Avenue and 12th Avenue.
West 27th Street, north side, to West 28th Street between 11th Avenue and 12th Avenue.
12th Avenue and St. Claire Place between 125th Street and 132d Street.
12th Avenue, west side, between 132d Street and 133d Street.

Borough of Queens-
95th Avenue, north side, between Sutphin Boulevard and 148th Street.

Borough of Richmond-
None.

* REFERENCE STANDARD RS 4-4
FLOOD INSURANCE RATE MAP

The areas of special flood hazard are identified and defined on the following documents prepared by the Federal Emergency Management Agency:

(1) Flood Insurance Rate Map (multiple panels) Index No. 360497 0001-0131, whose effective date is May 21, 2001.

(2) A scientific and engineering report entitled "Flood Insurance Study, City of New York, New York, Bronx, Queens, New York, Kings, and Richmond Counties" dated May 21, 2001.

(3) Flood Boundary and Floodway Map (multiple panels) Index No. 360497 0001-0131, whose effective date is May 21, 2001.

(4) Letter of Map Revision effective July 3, 2002, FEMA case # 01-02-045P, revising FIRM panel 0149.

The Flood Insurance Study and/or maps are on file at: The Department of City Planning, Waterfront Division, 22 Reade Street, New York, New York.
The maps for Staten Island are on file at: The Office of the Borough President, Topographical Bureau, Staten Island Borough Hall, and the Borough Office of the Department of Buildings, Staten Island Borough Hall.

DOB 8-11-02; 5-21-01; 9-24-00; 8-21-99; 8-4-94; Local Law 33-1988; 58-1983; 13-1975; 587-76 BCR.

*** REFERENCE STANDARD RS 4-5
FLOOD PROOFING NON-RESIDENTIAL STRUCTURES AND COASTAL CONSTRUCTION MANUAL

FEMA 55/February 1986-Design and Construction Manual for Residential Buildings in Coastal High Hazard Areas (Coastal construction manual).

FEMA 85/September 1985-Manufactured home installation in flood hazard areas.

FEMA 102/May 1986-Floodproofing non-residential structures.

******Local Law 33-1988; 58-1983; 13-1975; 587-76 BCR***

** REFERENCE STANDARD RS 4-6
FACILITIES FOR PEOPLE HAVING PHYSICAL DISABILITIES

ANSI A117.1-1986, as modified.-American national standard for buildings and facilities providing accessibility and usability for physically handicapped people.

Modifications.-The provisions of ANSI A117.1-1986 shall be subject to the following modifications:

Figure 29(b) Sidewall

Delete 42 min/1065 minimum dimension of sidewall grab bar.

Add 15 min/380.

Figure 47(a) clear floor space for adaptable bathrooms.

Delete 36 min/915 and 18 min/455 at the water closets.

Add 33 min/838 and 16 1/2 min/419.

Figure 48 Location of grab bars and controls of adaptable bathtubs.

Delete 15 max/380 at the control area.

4.5.2 is amended to read as follows:

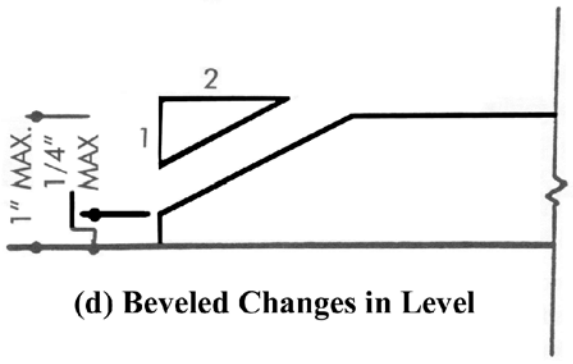
4.5.2 CHANGES IN LEVEL

Changes in level up to 1/4 inch (6 mm) may be vertical and without edge treatment. Changes in level up to 1 inch (25 mm) shall be beveled with a slope no greater than 1:2 (see figure 7 (c) and (d)). A 1-inch rise may be vertical for the first 1/4 inch. Changes in level greater than 1 inch (25 mm) shall be accomplished by means of a ramp that complies with 4.7 or 4.8.

Within a dwelling unit, when the saddle provided is made of a stone or ceramic material that by its nature cannot be brought into compliance with the code requirements for slope, then at the request of a disabled occupant, the owner must bring such a nonconforming saddle into conformance with the code by addition of an adaptable strip as show in diagram 7(e).

Figure 7(d) of such standard is deleted.

Figure 7(d) of such standard shown below is added.



(d) Beveled Changes in Level

Figure 7(e) of such standard shown below is added.

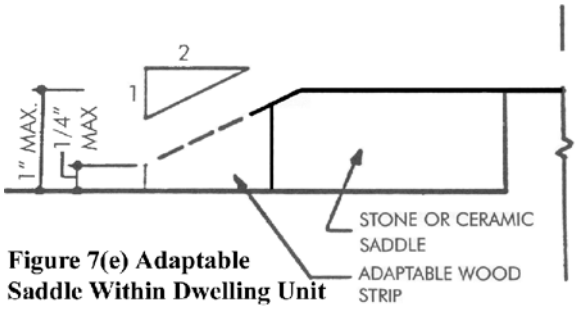


Figure 7(e) Adaptable Saddle Within Dwelling Unit

4.6.2 is amended as follows:

4.6.2 *PARKING FACILITIES. Parking spaces for physically handicapped people shall be at least 96 in. (2440 mm) wide and shall have an adjacent access aisle at least 60 in. (1525 mm) wide (See Fig. 9). Parking access aisles shall be part of the accessible route to the building or facility entrance and shall comply with 4.3. Two accessible parking spaces may share a common access aisle. No obstructions shall reduce the clear width of an accessible circulation route.

In parking facilities containing less than 30 spaces, at least one of the parking spaces required to be accessible to physically handicapped people shall have a minimum vertical clearance of 108 in. (2745 mm), a minimum width of 96 in. (2440 mm) and a minimum access aisle of 96 in. (2440 mm) ("high clearance accessible parking space"). Such a space shall be located on a vehicular access route which maintains the 108 in. (2745 mm) vertical clearance throughout its distance to the high clearance accessible parking space, including at all changes of level.

In parking facilities containing 30 or more spaces, at least two of the parking spaces required to be accessible to people with disabilities shall satisfy the requirements for high-clearance accessible parking spaces. The access aisle for high-clearance accessible parking spaces may be shared by two accessible parking spaces.

Except as otherwise provided in §4.6.2.2 and 4.6.2.3, accessible parking spaces shall be designated as reserved for physically handicapped people by a permanently

posted sign showing the symbol of accessibility (See 4.28.5). Such signs shall not be obstructed by a vehicle parked in the space.

4.6.2.1 MULTIPLE DWELLINGS

In the parking facility of a multiple dwelling, where such a facility is used exclusively on an accessory basis for parking by residents of the multiple dwelling, or employees of the management of the multiple dwelling or of the parking facility, or as provided by §25-412 of the Zoning Resolution, the accessible parking spaces may be leased, rented or assigned to a person without a physical disability on a no longer than month-to-month basis. All leases, rentals, or assignments of such accessible spaces which are not made for the benefit of a person with a disability shall be on written condition that the space shall be relinquished immediately at the end of the term of lease, rental, or assignment to a person who requests of the parking facility's management that such accessible space shall be made available for the benefit of a person with a physical disability whose vehicle bears a special identification permit or license plate. Such a beneficiary shall be a resident or employee of the multiple dwelling. It shall be the responsibility of the Parking Facility Operator to inform the non-disabled user of the parking space that a request for the parking space has been tendered. Signs stating these requirements shall be permanently and prominently posted at each entrance and office of the Parking Facility.

4.6.2.2 ATTENDED PARKING FACILITIES

For the purposes of this Section, the term "attended parking facility" shall mean parking facilities in which vehicles customarily are parked and later returned to their drivers by an attendant employed by the parking facility. Attended parking facilities shall be provided with high-clearance accessible parking facilities as provided in §4.6.2. The remaining accessible parking spaces allocated for the physically handicapped need not be designated by a sign or lines if all of the following conditions are met:

A. The location at which the attendant takes control of the vehicles complies with §4.6.3 (Passenger Loading Zones) of this Reference Standard, except that the minimum vertical clearance shall be 108 in. (2745 mm).

B. At least one parking space allocated for use by a physically handicapped person shall remain available until all the spaces allocated for physically handicapped persons are so used.

C. The attendant shall park and retrieve all vehicles not equipped with special controls entering the facility in which a physically handicapped person is either the driver or a passenger, provided space is available.

D. The attendant shall direct the drivers of vehicles equipped with special controls to parking paces allocated for use by physically handicapped persons. The attendant shall accompany such drivers to and from such space along an accessible route when they enter and exit the facility. If necessary, the accessible route and space shall be created by the repositioning of vehicles parked previously by the attendant.

E. Each high-clearance accessible parking space shall have two permanently and prominently posted signs. One shall designate the space as reserved for people with physical disabilities, as required by §4.6.2. The other shall note that vehicles parked in such spaces are subject to being moved by an attendant of the parking facility in order to accommodate a vehicle which cannot be accommodated in another accessible parking space.

4.6.2.3 SMALL RESIDENTIAL DEVELOPMENTS

Where a parking facility serving one or more particular residential buildings has less than six parking spaces, the accessible parking space need not have a sign reserving that space for such use provided that a pole suitable for mounting such a sign is present; and provided further that a Parking Facility Operator shall post such a sign at such a space upon the request of a physically handicapped person who resides in a building served by such parking facility and whose vehicle bears a special identification permit or license plate. It shall be the responsibility of the Parking Facility Operator to inform the non-disabled user of the parking space that a request for the parking space has been tendered and is required by law to be tendered. Where there is only one parking space serving those residential buildings and where the owner of one or more of those residential buildings or a member of such owner's immediate family lives in one of those buildings and uses that parking space for a vehicle driven by that owner or a member of that owner's immediate family, a physically handicapped person shall not have the right to displace that owner or member of that owner's immediate family from that space.

4.6.2.4 "FULL" SIGNS

Parking facilities which post signs indicating they are "full" shall include on all such signs, in letters of the same size as the primary message, a statement that spaces remain available for physically handicapped persons, when one or more such spaces are available. The latter indication may be by use of the word "except" and the symbol of accessibility (See 4.28.5).

4.6.2.5 SIGNS

In addition to Signs required by §4.6.2 to be posted at individual parking spaces, signs with the following texts shall be permanently and prominently posted as indicated. The appropriate number of spaces must be inserted where indicated in "A" below.

A. At Entrances and Offices to Attended Parking Facilities:

PARKING FOR PEOPLE WITH PHYSICAL DISABILITIES
This Parking Facility contains spaces allocated for people with physical disabilities. Of those spaces are high clearance spaces reserved for use by people with disabilities who could not otherwise be accommodated in this garage; if a vehicle carrying a person with a disability is parked in a high clearance space, but could be accommodated elsewhere in this garage, a garage attendant may move such vehicle to such other space. At least one parking space allocated for physically handicapped persons shall be kept vacant for the use of our customers with disabilities unless the total number of spaces allocated for use by physically handicapped persons are already filled by vehicles of physically handicapped persons. High clearance parking spaces are indicated on the accompanying drawing.
People with disabilities are, of course, encouraged to use the full services of our attendants. A person with a physical disability may either have a garage attendant:

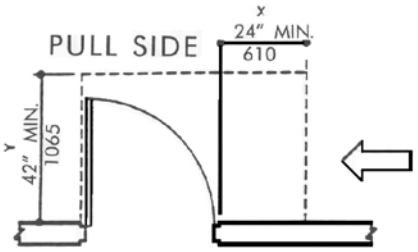
•park the car which the person with a disability is driving (or in which he or she is riding) or

•assist the driver in finding and using a space. At the request of a person with a disability, garage attendants are required to clear an access aisle for a space at the time of parking and removal of the vehicle in order to provide the number of accessible spaces required by law.
New York City Administrative Code
§27-292.19; Reference Standard RS 4-6, §4.6.2

B. At Spaces for High-Clearance Vehicles:
RESERVED PARKING FOR HIGH-CLEARANCE VANS
This space is designed to accommodate high-clearance vans which cannot be parked elsewhere in this garage. With the exception of high-clearance vans and vehicles which are specially equipped for people with physical disabilities and which cannot be moved by garage attendants, vehicles with special permits which use this space may be moved to an accessible space elsewhere in this garage should a high-clearance van or specially equipped vehicle need this space. No vehicle may use this space in any event unless the vehicle bears a special vehicle identification permit or license plate from New York State, New York City or another jurisdiction.
New York City Administrative Code
§27-292.19; Reference Standard RS 4-6, §4.6.2

C. At the Entrance and Office to Parking Facilities Accessory to Residences:
PARKING FOR PEOPLE WITH PHYSICAL DISABILITIES
This Parking Facility contains spaces designed and located to improve access for people with disabilities who need special accommodations. These accessible parking spaces may be leased, rented or assigned to a person without a physical disability on no longer than a month-to-month basis. All leases, rentals and assignments of such accessible spaces which are not made for the benefit of a person with a disability must be on written condition that the space is to be relinquished immediately at the end of the term of the lease, rental or assignment to a person who requests of the parking facility's management to lease, rent or be assigned the space for a physically handicapped person (who may be either the person making the request or another person) residing in the building and whose vehicle bears a special vehicle identification permit or license plate. The accessible parking space so transferred for the benefit of a physically handicapped person shall be the one available within the next thirty calendar days following the date of the request under the terms of its lease, rental or assignment which is not being used for a person with a physical disability.
New York City Administrative Code
§27-292.19; Reference Standard RS 4-6, §4.6.2

4.6.3 is amended to read as follows:
4.6.3 PASSENGER LOADING ZONES
Passenger loading zones shall provide an access aisle at least 48 in. (1220 mm) wide and 20 ft. (6m) long adjacent and parallel to the vehicle pull-up space (See Fig. 10). If there are curbs between the access aisle and the vehicle pull-up space, then a curb ramp complying with 4.7 shall be provided.
A minimum vertical clearance of 114 in. (2895 mm) shall be provided at accessible passenger loading zones and along vehicle access routes to such areas from site entrances.
Figure 25C (Pull side) of §4.13.6 of such standard, is amended to read as follows:



Note: y = 48 in (1220 mm)* minimum for rooms, other than powder rooms, with minimum finished dimensions less than 5'-5" x 7'-4"; y = 54 in (1370 mm) minimum if the door has a closer.

LATCH-SIDE APPROACHES - SWINGING DOORS
Figure 25 (C)

As enacted but probably intended to read "y=42 in. (1050mm)"

4.13.8 of such standard is deleted.
4.26.5 STANDARD FOR INSTALLATION.- For standards for the installation of visual and auxiliary alarms see reference standard RS 17-3C.
Add a new sentence at the end of subsection 4.32.4.1 Doors to read as follows:
Doors may swing into the bathroom of an adaptable dwelling unit if the door, door buck and adjacent space is designed

and constructed so that remounting the hinges is the only change required to swing the door out as shown in Fig. 53.

Add a new subsection 4.32.4.8 to section 4.32.4 Bathrooms to read as follows:

4.32.4.8 Minimum sized adaptable bathrooms may be shown in figure 53 and figure 54.

Fig. 53(A) shows desirable minimum conditions. Where such a plan is not possible to attain, then the arrangement in Fig. 53(B) may be acceptable.

Amend paragraph (1) of subsection 4.32.5.10 Kitchen Storage to read as follows:

(1) The adjustable maximum height shall be 48 in. (1220mm) for at least one shelf of all cabinets and storage shelves mounted above work counters (see figure 50).

Add a new subsection 4.32.5.11 to section 4.32.5 Kitchens to read as follows:

4.32.5.11 Minimum sized adaptable kitchens or kitchenettes may be as shown in figure 55, figure 56, figure 57 and figure 58.

In dwelling units where a dishwasher is provided, but where no other space otherwise is available in the kitchen for the installation of a dishwasher, one may be installed under a work surface described in subsection 4.32.5.4; provided that, at the option of a person with a disability residing in the dwelling unit, the dishwasher shall be removed, and the work surface made to conform with said subsection, by and at the sole expense of the owner of the dwelling unit.

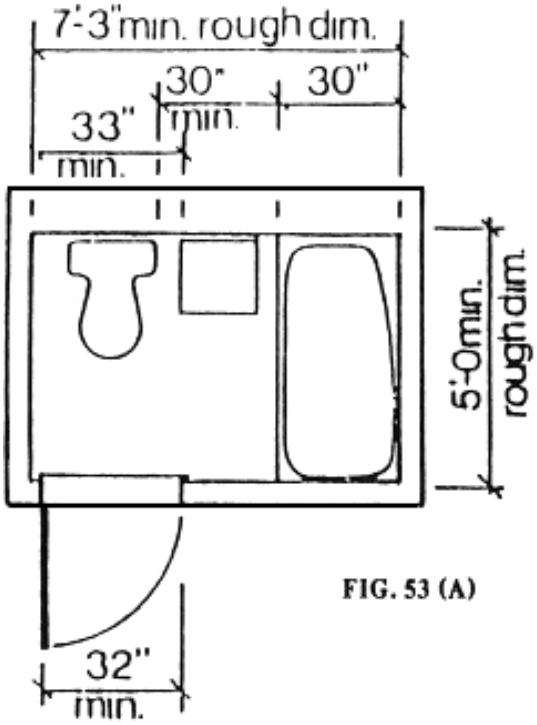


FIG. 53 (A)

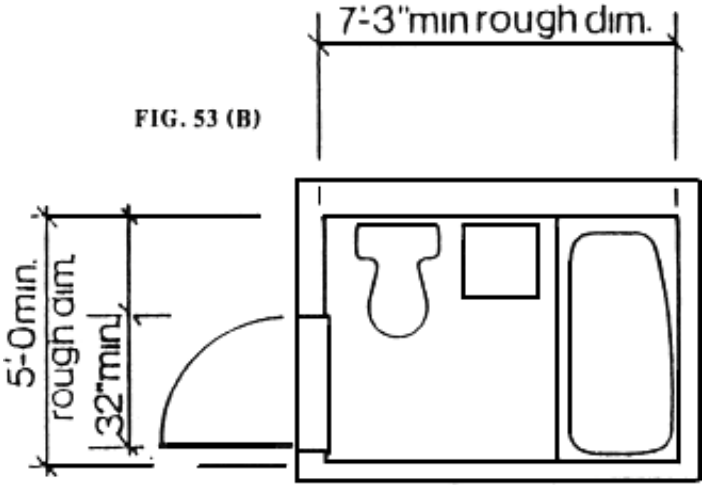


FIG. 53 (B)

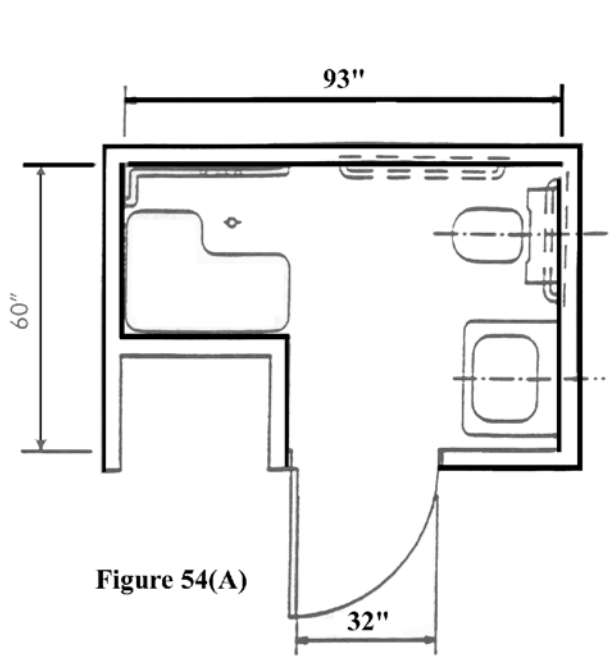


Figure 54(A)

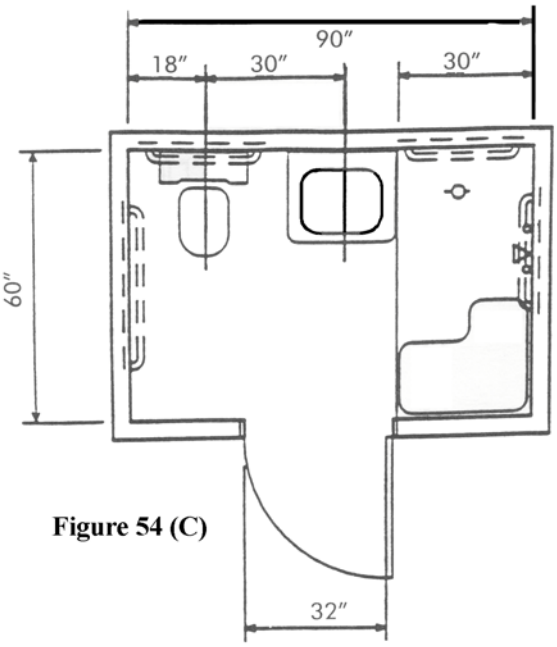


Figure 54 (C)

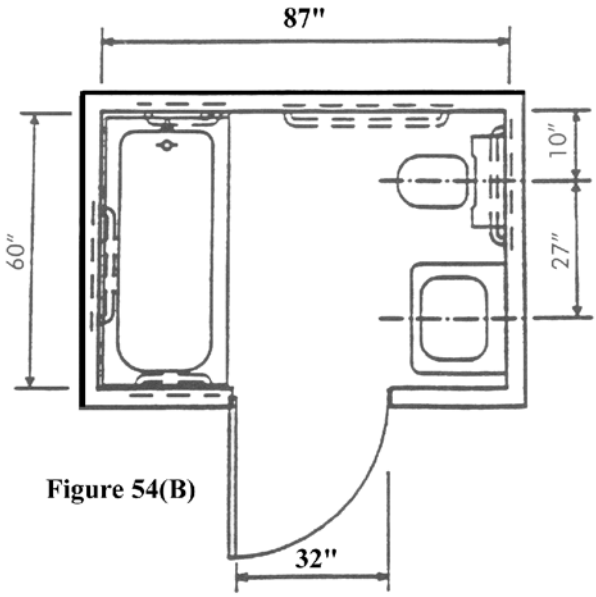


Figure 54(B)

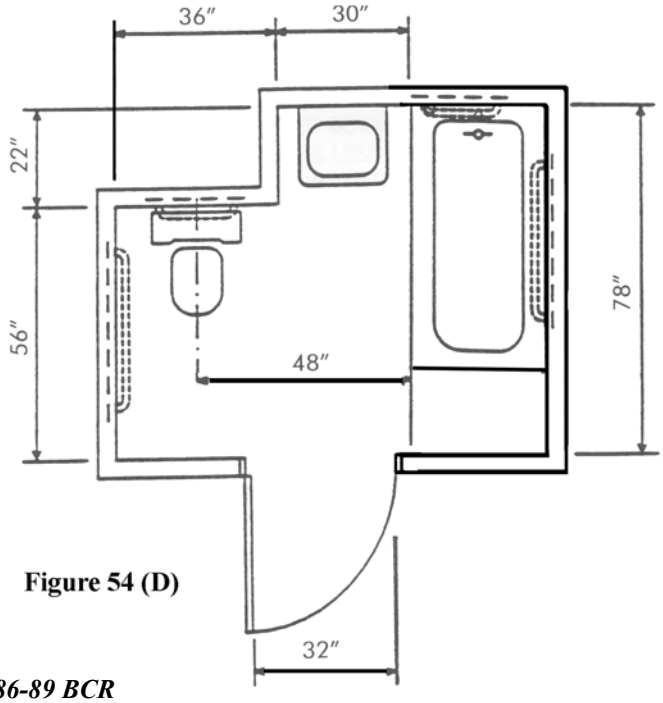


Figure 54 (D)

***Amended, Dated 11/19/91; Local Law 58-1987; 886-89 BCR*

Symbol Key

Shower Location
Bath, Shower Controls
Drain

FIGURE 54
MINIMUM SIZED ADAPTABLE BATHROOMS

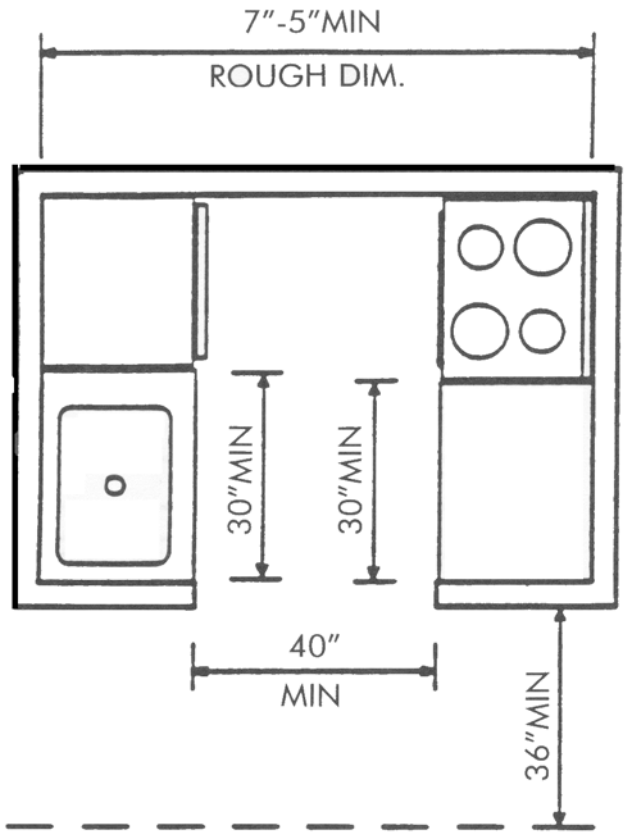


FIG. 55
MINIMUM SIZED ADAPTABLE KITCHEN OR KITCHENETTE

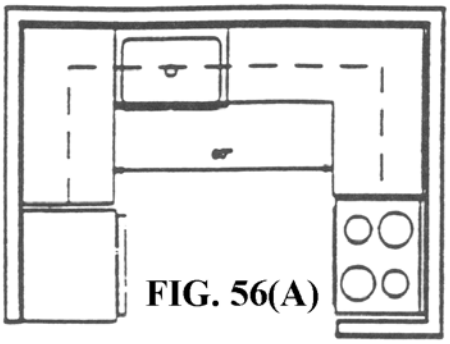


FIG. 56(A)

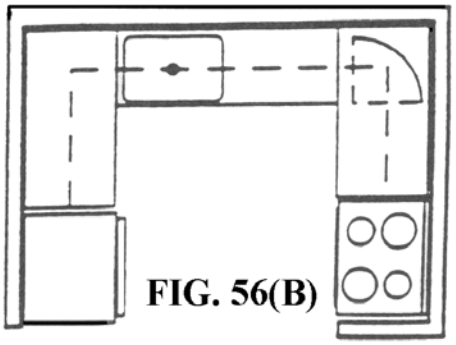
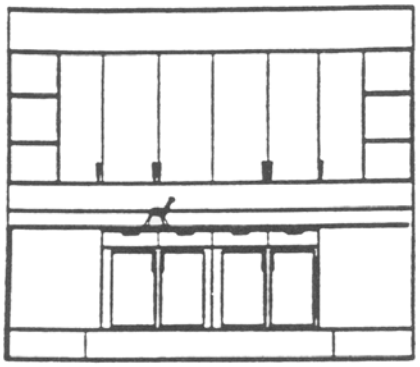
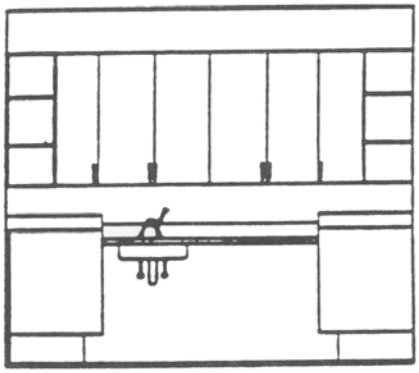
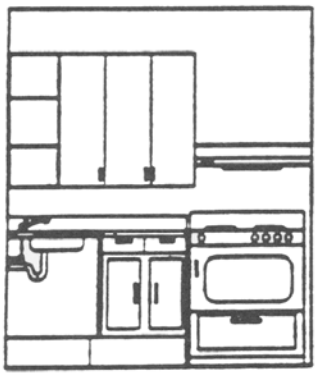
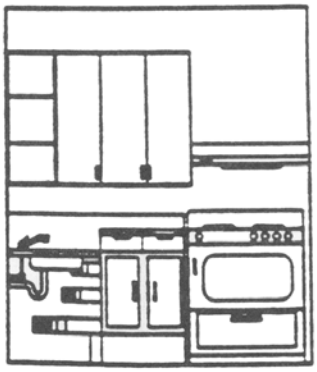


FIG. 56(B)









Accessible; before removal of cabinets and base

Cabinets and base removed, counter height lowered

FIG.57
EXAMPLE OF ADAPTABLE KITCHEN – L-SHAPED PLAN

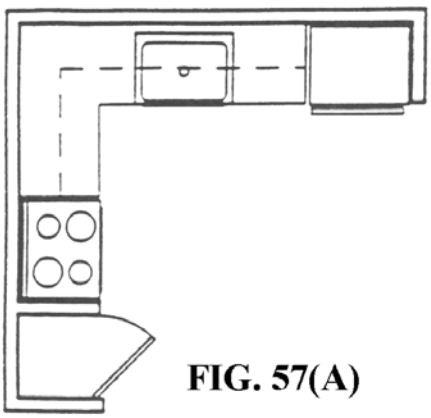


FIG. 57(A)

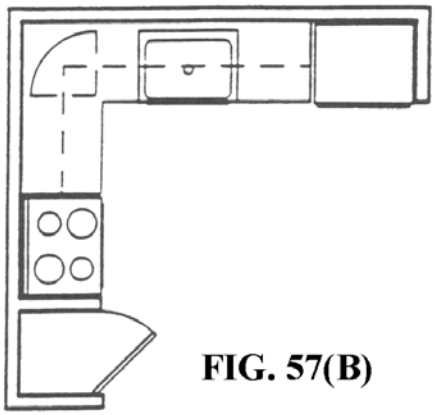
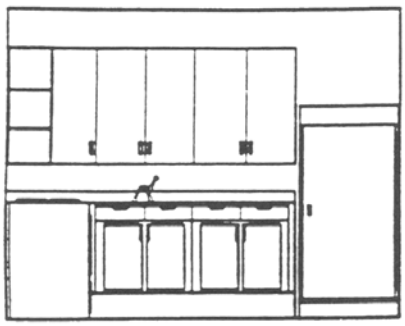
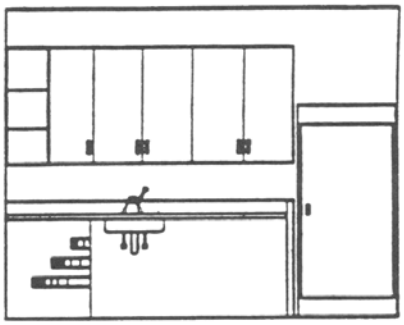
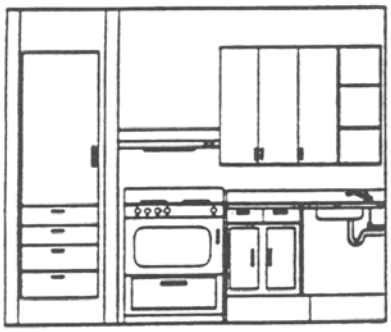


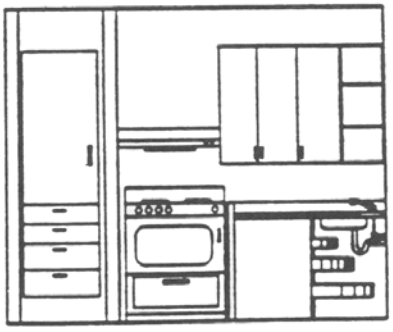
FIG. 57(B)







Accessible: Before Removal of Cabinets and Base



Cabinets and Base Removed, Counter Height Lowered

FIG. 57
EXAMPLE OF ADAPTABLE KITCHEN – L – SHAPED PLAN

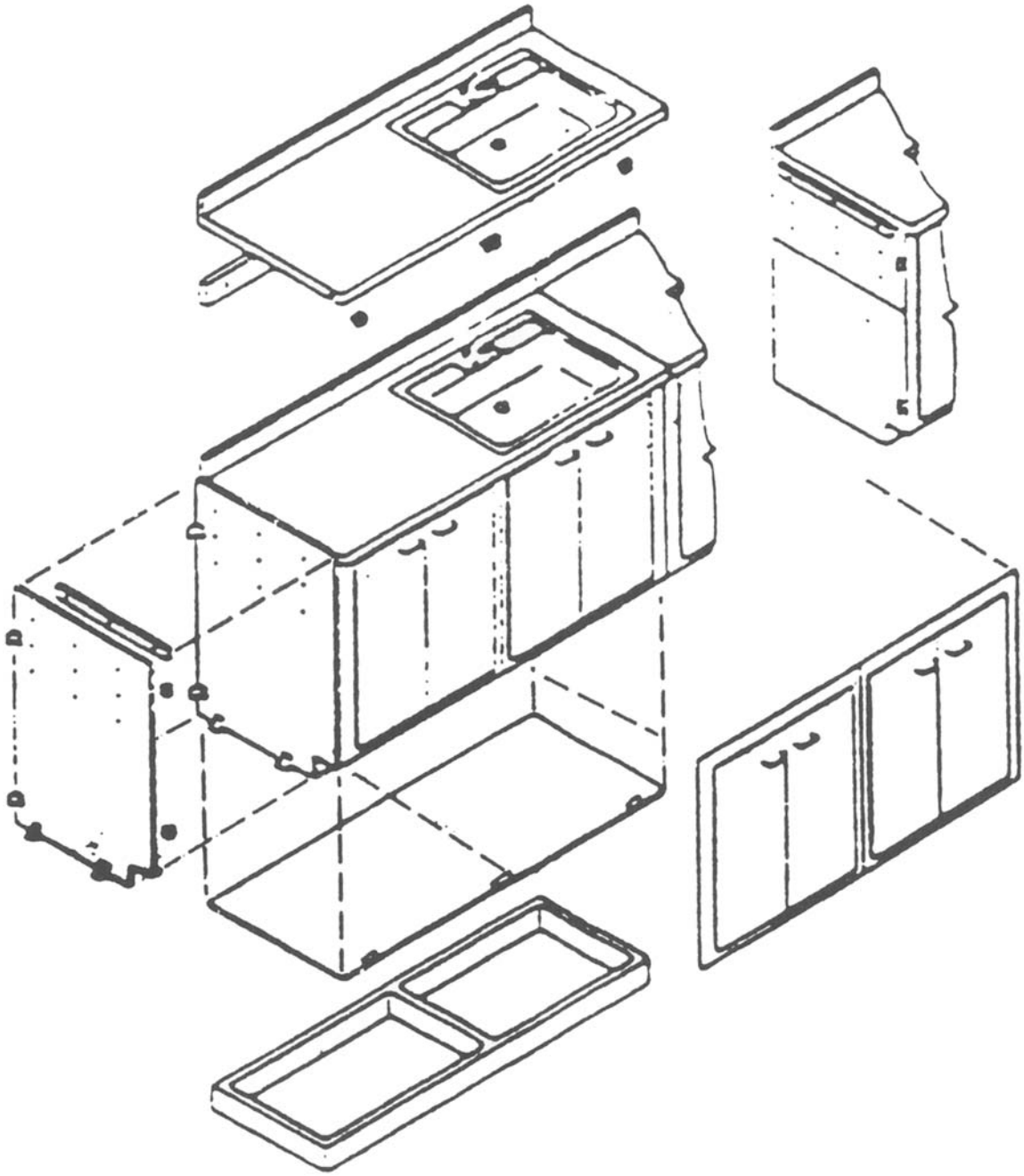


FIG. 58
EXPLODED AXONOMETRIC FOR ADAPTABLE KITCHEN

REFERENCE STANDARD RS-5
FIRE PROTECTION
CONSTRUCTION REQUIREMENTS
* LIST OF REFERENCED NATIONAL STANDARDS

AISG	Fire Resistance Ratings, as Modified	1985
AISI FT-900-0480	Designing Fire Protection for Steel Columns, Third Edition	1980
AISI FT-901	Fire Resistant Rating of Load Bearing Steel Stud Walls	1981
AISI FT-902-0285	Designing Fire Protection for Steel Beams	1984
AISI FT-227-1281	Designing Fire Protection for Steel Trusses, Second Edition	1981
GA-600	Fire Resistance Design Manual, Twelfth Edition, as Modified	1988
NFoPA	Report No. WHI-694-020, Report of Testing on a Load Bearing Stud Partition	1981
NFoPA	Report No. WHI-690-003, Report of Testing on a Load-Bearing Stud Partition	1981
ASTM/E 119	Standard Methods of Fire Tests of Building Construction and Materials	1988
AWPA C 20	Structural Lumber-Fire Retardant Treatment by Pressure Processes	1988
AWPA C 27	Plywood Fire Retardant Treatment by Pressure Processes	1988
ASTM E 84	Standard Method of Test for Surface Burning Characteristics of Building Materials	1987
ANSI/ASTM E 69	Standard Test Method for Combustible Properties of Treated Wood by Fire-Tube Apparatus	1980
ANSI/ASTM E 160	Standard Test Method for Combustible Properties of Treated Wood by Crib Test	1980
ANSI/ASTM E 152	Standard Methods of Fire Test of Door Assemblies	1981a
ANSI/ASTM E 163	Standard Methods of Fire Test of Window Assemblies	1984
NFiPA 80	Standard for Fire Doors and Windows	1986
ANSI/ASTM E 108	Standard Methods of Fire Test of Roof Coverings	1983
NFiPA 204M	Guide for Smoke and Heat Venting	1985
ANSI/ASTM D635	Standard Test for Rate of Burning and/or Extent and Time of Burning of Self-Supporting Plastics in a Horizontal Position	1981
ANSI/ASTM D568	Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Flexible Plastics in a Vertical Position	1977
ANSI/ASTM D374	Standard Test Methods for Thickness of Solid Electrical Insulation	1979
ASTM E 814	Standard Method of Fire Tests of Through-Penetration Fire Stops	1983
DOC FF1	Methanine Pill Test	1970
ASTM E 648	Standard Test Method for Critical Radiant Flux of Floor Covering Systems using a Radiant Heat Energy Source	1988
ASTM E 662	Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials	1983
***UBC Std. 26-9	Method of Test for the Evaluation of Flammability Characteristics of Exterior, Nonload-Bearing Wall Containing Combustible Components Using the Intermediate Scale,Multistory Test Apparatus	1997

Local Law 13-1987; Local Law 16-1984; 242-90 BCR; 1343-88 BCR; 236-87 BCR; 1076-86 BCR; 262-86 BCR; 435-85 BCR; 252-82 BCR

****DOB 3-4-01***

**REFERENCE STANDARD RS 5-1A

AISG 1985-Fire Resistance Ratings, as modified. MODIFICATIONS-The provisions of the AISG Fire Resistance Ratings shall be subject to the following modifications:

1. Delete the following pages in their entirety: 22, 24, 45, 46***, 48, 52, 54, 76, 84, 97, 98, 99, 102, 110, 115, 117.

2. Delete the specified items on the following pages:

PAGE	DESCRIPTION-SPECIFIED ITEMS
25	Protection Type-Unprotected Rating(s) of 45 and 30 min. comb.
28	Protection Type-None Rating(s) of 45 min. comb.
29	2 1/2 slab thickness-Rating 30 min.

41 Ceiling Type-None Rating 5 min.
47 Ceiling Type-Gypsum Wallboard Rating of 30 min. comb.
48 Ceiling Type-Gypsum Wallboard Rating of 25 min. comb.
50 Ceiling Type-Plaster on Gypsum Lath Rating(s) of 45 min. and 30 min. comb.
62 Type-Calcareous Gravel Rating(s) 30 min. and 20 min. comb.
63 Type-Cinder Rating 45 min.
65 Type-Expanded clay, shale or slate (Rotary kiln) Rating 45 min.
68 Type-Siliceous Gravel Rating(s) 20 min. and 15 min.
77 Plaster Type-Gypsum Neat Rating 45 min.
83 Plaster Type-Gypsum and Sand Rating 45 min.
91 Plaster Type-Portland Cement and Sand Rating(s) 45 min. and 30 min.
95 Type-Clay or Shale Rating 45 min.
103 Finish Type-Laminated Wood Rating(s) 45 min., 30 min., 25 min., 15 min. and 10 min. comb.
104 Finish Type-Asbestos Cement Board Rating(s) 40 min. and 30 min. comb.
107 Plaster Type (4)-Gypsum and Sand Rating(s) 45 min. and 30 min. comb.
109 Plaster Type (5)-Gypsum and Sand Rating(s) 45 min., 30 min. and 20 min. comb.
111 Plaster Type-Gypsum and Sand Rating 30 min. comb. Lime and Sand Rating(s) 45 min., 30 min. and 25 min. comb.
112 Finish Type-Asbestos Cement Board Rating(s) 30 min. and 10 min. comb.
114 Finish Type-Gypsum Wallboard Rating(s) 45 min., 30 min., and 25 min. comb.
117 Finish Type-Wood Rating 45 min. comb.

3. An equivalent blend of mineral fibers and cementitious binders may be substituted for asbestos-cement material on the following pages: 46, 51, 52, 92, 104, 112, 114.

*** *1076-86 BCR*

**** As enacted, but "46" probably intended to be omitted.*

* REFERENCE STANDARD RS 5-1B

GA-600 1988-Fire Resistance Design Manual, Twelfth Edition, as Modified.

MODIFICATIONS.-The provisions of GA-600-1988 shall be subject to the following modifications:

1. Revise the heading on the top of page five in the section on USE OF MANUAL to read as follows:

LIMITING HEIGHTS

(a) NONLOAD-BEARING PARTITIONS

2. Insert the following after the paragraphs on (a) NONLOAD-BEARING PARTITIONS and before the heading PERFORMANCE OF PLASTER:

(b) LOAD BEARING PARTITIONS

Lateral bracing and height limitations shall be designed in accordance with the applicable reference standard independent of the sheathing.

3. In the section on GENERAL EXPLANATORY NOTES under the heading USE OF MANUAL, add the following paragraph:

15. All concrete slabs shall be structurally adequate. Such slabs shall have a minimum compressive strength of 3000 psi., with the reinforcement and thickness at least that as shown in the test.

4. In the assemblies listed under the heading WALLS AND INTERIOR PARTITIONS, NONCOMBUSTIBLE, the following requirements are added to the Detailed Description for (LOAD BEARING) assemblies:

WP 1204, WP 1206, WP 1635, WP 1714 and WP 1716 under the GA and Company Codes:

Steel Studs.-Steel studs shall be a minimum of 3 1/2 inches wide and a minimum galvanized steel or 18 GA (.0478) or heavier, primed steel, cold-formed, and shall comply with Reference Standard RS 10-6 (Specification for the Design of Cold-Formed Steel Structural members by AISI, as modified). Lateral supporting members and all details enhancing the structural integrity of the wall assembly shall be as specified by the steel stud designer, and shall meet the applicable requirements of the Code.

5. In the assemblies listed under METAL CLAD EXTERIOR WALLS, assemblies WP 9010, WP 9060, WP 9225, WP 9325, under the GA File No. heading, are deleted in its entirety.

6. Insert the following heading after the paragraph on USE OF PLENUM SPACE in the section on FLOOR-CEILINGS:

SUSPENSION SYSTEMS

Suspended ceilings contained herein shall comply with the requirements of Reference Standard RS 5-16.

7. In the assemblies listed under FLOOR-CEILING ASSEMBLIES, NON-COMBUSTIBLE, assembly FC 4120, under the GA File No. heading, is deleted in its entirety.

8. In the assemblies listed under FLOOR-CEILING ASSEMBLIES, WOOD-FRAMED, assembly FC 5105, under the GA File No. heading, is deleted in their entirety.

9. In the assemblies listed under BEAMS, GIRDERS, AND TRUSSES, assemblies BM 3310, BM 4410 and BM 4420, under the GA File No. heading, are deleted in their entirety.

10. The following assemblies which were listed in the Gypsum Association Fire Resistance Manual, Eleventh Edition, but do not appear in the Twelfth Edition, may continue to be used:

WP 1016
WP 1260
WP 1300
FC 5010
FC 5108
WP 1725
WP 7083
WP 7086
FC 5430

** 242-90 BCR; 262-86 BCR*

** REFERENCE STANDARD RS 5-1C MISCELLANEOUS TEST REPORTS FOR LOAD-BEARING WALL ASSEMBLIES NON-COMBUSTIBLE: ONE, ONE AND ONE-HALF, AND TWO-HOUR FIRE RATINGS.

AISI FT-901-1981- Fire Resistance of Load-Bearing Steel Stud Walls with Gypsum Wallboard Protection with or without Cavity Insulation.

MODIFICATIONS: The provisions of AISI FT-901-1981, are modified as follows:

1. Delete all Fire Resistive Assemblies with 45 minute ratings.
2. Substitute the following for paragraph 2:

Steel Studs-Corrosion-Protected steel studs, min. 3 1/2 inches wide, min. No. 18 GSG (0.047 inch thick) galvanized steel or No. 18 MSG (0.043 inch thick) primed steel, cold-formed, shall be designed in accordance with Reference Standard RS 10-6 (Specification for the Design of Cold-Formed Steel Structural members by AISI, as modified). All design details enhancing the structural integrity of the wall assembly including the axial design load of the studs, shall be as specified by the steel stud designer and/or the producer, and shall meet all applicable requirements of the code. The maximum stud spacing of wall assemblies shall not exceed 24 inches. Studs shall be attached to floor and ceiling tracks with 1/2 inch long Type S-12 pan head, self-drilling, self-tapping steel screws on both sides of the studs, or welded in accordance with RS 10-6.

3. Substitute the following for paragraph 3:

Lateral Supporting Members (not shown)-Lateral support or bracing shall be provided in accordance with Reference Standard RS 10-6 independent sheathing.

4. Substitute the following for paragraph 4:

Wallboard, Gypsum-Gypsum wallboard shall conform to ASTM C 36 Type X and be identified as such. The wallboard shall be applied vertically with joints between layers staggered. Outer layer of three-layer construction may be applied horizontally. The thickness and number of layers and percent of design load for the 1 hour, 1 1/2 hour and 2 hour ratings shall be as specified in the table above.

5. Substitute the following for paragraph 7:

Batts and Blankets-All insulation and noise control materials included in wall assemblies shall be Approved by the Board of Standards and Appeals or Accepted by the Materials and Equipment Acceptance Division of the Department of Buildings for the intended use.

252-82 BCR

UL FIRE RESISTANCE DIRECTORY
Design U 425

Interior Walls-Wallboard Protection Both Sides of Wall

Rating	Number of Layers and Thickness of Boards in Each Layer	Percent of Design Load
1 hr.	1 layer, 5/8 in. thick	100
1 1/2 hr.	2 layers, 1/2 in. thick	100
2 hr.	2 layers, 5/8 in. thick or	80
	*3 layers, 1/2 in. thick	100

*Ratings applicable to assemblies serving as exterior walls where Classified fire resistive gypsum sheathing type wallboard is substituted on the exterior face.
*Bearing the UL Classification Marking.

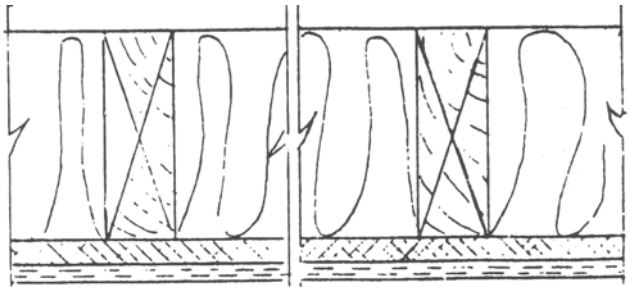
Exterior Walls-Wallboard Protection on Interior Side of Wall

Rating	Number of Layers and Thickness of Boards in Each Layer	Percent of Design Load
1 hr.	2 layer, 1/2 in. thick	100
1 1/2 hr.	2 layers, 5/8 in. thick	100
2 hr	3 layers, 1/2 in. thick	100

6. Steel Floor and Ceiling Tracks-Top and bottom tracks of wall assemblies shall consist of steel members, min. No. 20 GSG (0.036 in. thick) galv. steel or No. 20 MSG (0.033 in.) thick primed steel, that provide a sound structural connection between steel studs and to adjacent assemblies such as a floor, ceiling and or other walls. Attached to floor and ceiling, assemblies with steel fasteners spaced not greater than 24 in.

7. Fasteners-Screws used to attach wallboard to studs: self-tapping bugle head sheet steel type, spaced 12 in. o.c. First layer Type S-12 by 1 in. long; second layer Type S-12 by 1 3/8 in. long: third layer Type S-12 by 1 7/8 in. long.

8. Joint Tape and Compound-Vinyl or casein, dry or premixed joint compound applied in two coats to joints and screwheads of outer layer. Perforated paper tape, 2

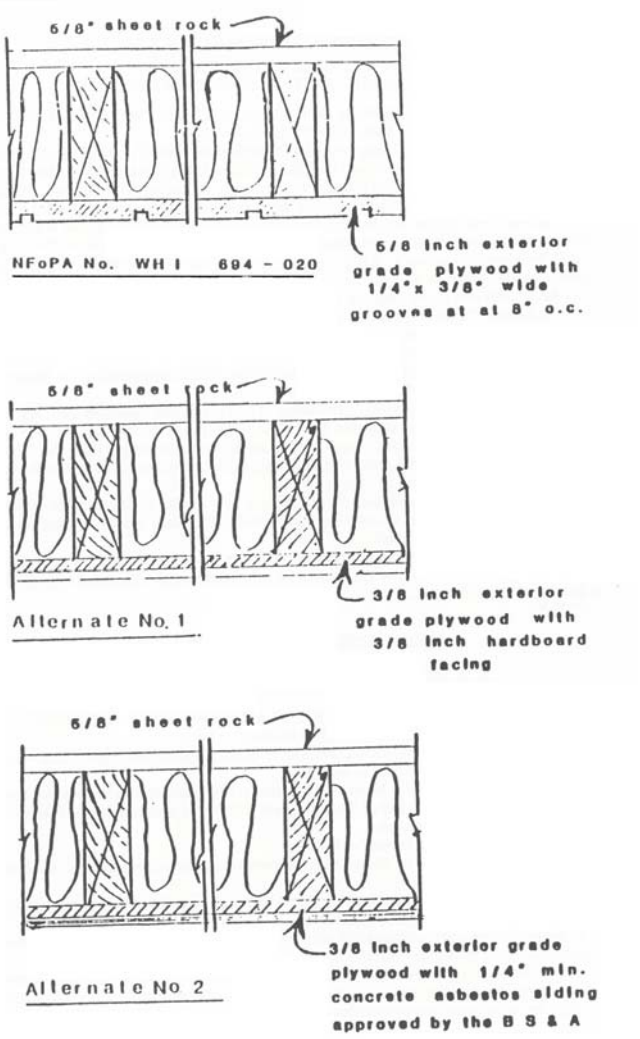


in. wide, embedded in first layer of compound over all joints of outer layer.

Report of Testing on a Load-Bearing Wood Stud Partition -Dated - October 19, 1981

Wall is constructed using 2 in. x 4 in. (nominal) wood studs spaced 16 in. on center. Fire exposed (interior) side is covered with 5/8 in. Type X Gypsum Wallboard applied vertically and fastened with 6d box nails on 7

in. centers. Unexposed side (exterior) is faced with a layer of 1/2 in. thick Fiberboard Sheathing (0.835 psf) applied vertically and fastened with 1 1/2 in. roofing nails on 3 in. centers at edges and 6 in. centers at intermediate supports. Hardboard Shiplap Edge Panel Siding, 3/8 in. thick (1.84 psf) is applied vertically over the Fiberboard Sheathing and fastened with 8d nails on 4 in. centers at edges and 8 in. centers at intermediate supports. The Cavity Spaces (stud spaces) are filled with Mineral Wool Batts having a density of 2.14 lbs./cu ft. (Mineral wool may be rock wool or slag wool of equivalent density.) All insulation and noise control materials included in wall assemblies shall be Approved by the Board of Standards and Appeals or Accepted by the Material and Equipment Acceptance Division of the Department of Buildings for the intended use. The maximum load permissible on the studs in this assembly shall be 2000 lbs. each.



COMBUSTIBLE: ONE HOUR FIRE RATINGS

Report of Testing on a Load-Bearing
Wood Stud Partition - Dated - October 9, 1981
Wall is constructed using 2 in. x 4 in. (nominal) wood studs spaced 16 in. on centers. Fire exposed side (interior) is covered with 5/8 in. Type X Gypsum Wallboard applied vertically and fastened with 6d box nails on 7 in. centers. Unexposed side (exterior) is faced with 3/8 in. thick (5/8 in. between grooves) exterior grade plywood panels applied vertically and fastened with 8d nails on 6 in. centers around edges and 12 in. centers at intermediate supports. The Cavity (stud) Spaces are filled with Mineral Wool Batts having a density of 2 lbs./cu. ft. (Mineral wool may be rock wool or slag wool of equivalent density.) All insulation and noise control materials included in wall assemblies shall be Approved by the Board of Standards and Appeals or Accepted by the Material and Equipment Acceptance Division of the Department of Buildings for the intended use.
The maximum load permissible on the studs in this assembly shall be 2000 lbs. each.

* REFERENCE STANDARD 5-1D
MISCELLANEOUS TEST REPORTS FOR LOAD BEARING STEEL COLUMN ASSEMBLIES NONCOMBUSTIBLE: DESIGN OF ONE, ONE AND ONE-HALF, TWO, THREE AND FOUR HOUR FIRE RATINGS OF PROTECTED COLUMNS

AISI FT-900-0480-1980 Designing Fire Protection for Steel Columns, third edition.

MODIFICATIONS: The provisions of AISI FT-900-0480-1980 are modified as follows:

1. In Part I-Fire Resistance Ratings for Columns Protected with Gypsum Wallboard values determined by formula shall govern when interpolating graphical or tabular results.
2. In Part I-Fire Resistance Ratings for Columns Protected with Gypsum Wallboard, all reference to approved gypsum wallboard shall infer material conforming to ASTM C36 Type X and be identified as such. All gypsum wallboard used in fire resistive steel column assemblies designed in accordance with this Reference Standard shall be installed in accordance with one of the methods recommended in this reference standard.
3. Constants C1 and C2 shall be applicable only to the materials identified in Section C of Part II-Calculating Fire Resistance Ratings for Columns Protected with Spray-Applied Materials. Constants for other spray-applied fire proofing materials shall be determined by ASTM E 119 fire tests. The tests and their evaluation shall be submitted to the Material and Acceptance Division (MEA) for acceptance.
4. The formulas for determining thickness of fire protection materials shall not be used with columns or built-up sections that have W/D ratios larger than those of the W14x233 shape. Fire protection thickness may be applied to columns larger than the W14x233 provided the thickness of fire protection materials to be applied to columns are the same as those required for the W14x233 column.
5. In absence of substantiating fire endurance test results, ducts, conduit, piping and similar mechanical, electrical and plumbing installations shall not be

embedded in any required fire protection materials.
6. The formulas in Part II for calculating the fire-resistance ratings of columns protected with spray-applied material may not be used for tubular or round columns of eight (8) inches or less in width or diameter.
435-85 BCR

**** REFERENCE STANDARD RS 5-1E**
MISCELLANEOUS TEST REPORTS FOR LOAD BEARING STEEL BEAM/GIRDER ASSEMBLIES

NONCOMBUSTIBLE ASSEMBLIES:
RESTRAINED AND UNRESTRAINED

AISI FT-902-0285-1984-Designing Fire Protection for Steel Beams.

MODIFICATIONS: The provisions of AISI FT-902-0285-1984 are modified as follows:
1. In Part V Beam Substitutions, Section 2, Beam Substitution Equation, Subscript 2 and its meaning is revised to read as follows:
Subscript 2 = refers to the beam and protection thickness specified in a fire resistive assembly approved by the Board of the Standards and Appeals or accepted by the Materials and Equipment Acceptance Division.
Subsection 3) is revised to read as follows:
3) the Unrestrained Beam Rating in the approved or accepted assembly is not less than one-hour.
2. The procedures illustrated in Parts V and VI for UL listed assemblies may be applied to similar approved and accepted assemblies.
3. Beam/Girder substitutions shall only be made for similar approved or accepted fire resistive materials for similar assemblies.
4. Fire tested composite designed beams/girders shall not be substituted into assemblies that specify noncomposite beams. However, fire tested noncomposite designed beams/girders may be substituted into assemblies utilizing composite beams/girders.
5. Ducts, conduit, piping and similar mechanical, electrical and plumbing installations shall not be embedded in required fire protection materials without substantiating fire endurance test results.
236-87 BCR

*** REFERENCE STANDARD RS 5-1F**
METHODS OF ANALYTICAL DETERMINATION OF FIRE RESISTANCE OF LOAD BEARING STEEL TRUSS ASSEMBLIES

NONCOMBUSTIBLE ASSEMBLIES:
RESTRAINED AND UNRESTRAINED

AISI FT-227-1281-1981-Designing Fire Protection for Steel Trusses.

MODIFICATIONS: The provisions of AISI FT-227-1281-1981 are modified as follows:
1. Analytically determined fire protection systems for trusses shall be based on fire resistive assemblies approved by the Board of Standards and Appeals or accepted by the Materials and Equipment Acceptance Division.
2. Methods of determining fire resistance of trusses utilizing the column formulas contained in AISI FT-900-0480 shall comply with the requirements and modifications specified in Reference Standard RS 5-1D.
236-87 BCR

REFERENCE STANDARD RS 5-2
ASTM E-119 – a) Standard methods Fire Test of Building Construction Materials 1988 or
b) a combination of small scale and/or half scale tests and engineering evaluation acceptable to the commissioner in conjunction with evaluation of full scale test conforming with ASTM E-119 for a variety of assemblies or combination of materials, or
c) a combination of small-scale, half-scale or full size tests representative of the actual fire exposure of the occupancy and engineering evaluations all acceptable to the commissioner. In either (a), (b), or
d) the materials or combinations of materials constructed shall be in accordance with the specifications of the materials used.
1343-88 BCR; 217-72 BCR

REFERENCE STANDARD RS 5-3
*** AWPA C20-1988-Structural Lumber-Fire Retardant Treatment by Pressure Processes.
****1343-88 BCR; 308-81 BCR; 398-71 BCR***

REFERENCE STANDARD RS 5-4
† AWPA C27-1988-Plywood Fire Retardant Treatment by Pressure Processes.
†1343-88 BCR; 308-81 BCR; 71-79 BCR

REFERENCE STANDARD RS 5-5
††a) ASTM E84-1987-Standard Method for Surface Burning Characteristics of Building Materials, or

b) a combination of small scale tests and engineering evaluations acceptable to the commissioner in conjunction with evaluation of full scale tests conforming with ASTM E84 for a variety of assemblies or combinations of materials. In the case of fire-retardant treated wood, the small scale tests utilized in conjunction with the full scale tests shall conform to either ANSI/ASTM E69-1980-Standard Test Method for Combustible Properties of Treated Wood by Fire-Tube Apparatus or ANSI/ASTM E160-1980-Standard Test Method for Combustible Properties of Treated Wood by the Crib Test.
††1343-88 BCR; 308-81 BCR; 218-72 BCR

REFERENCE STANDARD RS 5-6
† ANSI/ASTM E152-1981a-Standard Methods of Fire Tests of Door Assemblies.
†1343-88 BCR; 308-81 BCR; 71-79 BCR

REFERENCE STANDARD RS 5-7
†ANSI/ASTM E163-1984-Standard Method of Fire Tests of Window Assemblies.
†1343-88 BCR; 308-81 BCR; 71-79 BCR

REFERENCE STANDARD RS 5-8
†ANFiPA 80-1986 Standard for Fire Doors and Windows.
†1343-88 BCR; 308-81 BCR; 71-79 BCR

REFERENCE STANDARD RS 5-9
ROOF COVERING CLASSIFICATIONS

Description	Maximum Incline (In. to Ft.)	Class A	Class B	Class C
Brick Concrete Tile		(1) Brick, 2 1/2 in. thick. (2) Reinforced portland cement, 1 in. thick. (3) Concrete or clay floor or deck tile, 1 in. thick. (4) Flat or French-type clay or concrete tile, 3/8 in. thick with 1 1/2 in. or more end lap and head lock, spacing body of tile 1/2 in. or more above roof sheathing, with underlay of one layer of Type 15 asphalt-saturated asbestos felt or one layer of Type 30 or two layers of Type 15 asphalt-saturated rag felt. (5) Clay or concrete roof tile, Spanish or Mission pattern, 7/16 in. thick, 3 in. end lap, same underlay as above. (6) Slate, 3/16 in. thick, laid American method.		
Metal Roofing	12	Sheet roofing of 16 oz. copper or of 30-*gauge steel or iron protected against corrosion. Limited to non-combustible roof decks or non-combustible roof supports when no separate roof deck is provided.	Sheet roofing of 16 oz. copper or of 30-*gauge steel or iron tile, protected against corrosion; or shingle-pattern roofings with underlay of one layer of Type 15 saturated asbestos-felt, or one layer of Type 30 or two layers of Type 15 asphalt-saturated rag felt.	Sheet roofing of 16 oz. copper or of 30-*gauge steel or iron tile, protected against corrosion; or shingle-pattern roofings, either without underlay or with underlay or rosin-sized paper. Zinc sheets or shingle roofings with an underlay of one layer of Type 30 or two layers of Type 15 asphalt-saturated rag-felt or one layer of 14 lbs. unsaturated or one layer of Type 15 asphalt-saturated asbestos felt.
Cement-Asbestos Shingles	Exceeding 4	Laid to provide two or more thicknesses over one layer of Type 15 asphalt-saturated asbestos felt.	Laid to provide one or more thicknesses over one layer of Type 15 asphalt-saturated asbestos felt.	

As enacted but "gage" probably intended

REFERENCE STANDARD RS 5-10

*(a) ANSI/ASTM E108-1987-Standard Methods of Fire Tests of Roof Coverings, or

b) a combination of small scale and/or half scale tests and engineering evaluations acceptable to the commissioner in conjunction with evaluation of full scale tests conforming with ASTM E 108 for a variety of assemblies or combinations of materials.

1343-88 BCR; 308-81 BCR; 219-72 BCR

REFERENCE STANDARD RS 5-11

** NFiPA 204M-1985-Guide for Smoke and Heat Venting.

****1343-88 BCR; 308-81 BCR***

REFERENCE STANDARD RS 5-12

***ANSI/ASTM D 635-1981-Standard Test for Rate of Burning and/or Extent and Time of Burning of Self-Supporting Plastics in a Horizontal Position.

*****1343-88 BCR***

REFERENCE STANDARD RS 5-13

†ANSI/ASTM D 568-1977-Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Flexible Plastics in a Vertical Position.

†308-81 BCR

REFERENCE STANDARD RS 5-14

†ANSI/ASTM D 374-1979-Standard Test Methods for Thickness of Solid Electrical Insulation.

†308-81 BCR

REFERENCE STANDARD RS 5-15
MINIMUM COVERING OF PRESTRESSING STEEL FOR VARIOUS FIRE RESISTANCE RATINGS

Type of Unit	Cross-Sectional Area[3] Sq. In.	Rating			
		1 Hour	2 Hour	3 Hour	4 Hour
Prestressed Girders, Beams, and Joists[1,2]	40 to 150	2 in.			
	150 to 300	1 1/2 in.	2 1/2 in.		
	over 300	1 1/2 in.	2 in.	3 in[4]	4 in[4]
Prestressed Slabs, Solid or Cored [1, 2]	—	1 in.	1 1/2 in.	2 in.	2 1/2 in.

Notes:

[1]Members with less covering shall be acceptable where tests show that adequate protection is provided for the required fire resistance rating.

[2]Slab thickness to resist transmission of heat shall be as for non-prestressed concrete. Unbonded tendon anchorage devices shall have 50 per cent greater covering that in the above table.

[3]In computing the cross-sectional area for joists, the area of the flange shall be added to the area of the stem, and the total width of the flange as used shall not exceed three times the average width of the stem.

[4]Adequate provisions against spalling shall be provided by means of a light reinforcement. Reinforcement spacing shall not exceed the depth of the element and shall have a 1-inch concrete covering.

* REFERENCE STANDARD RS 5-16
ACOUSTICAL TILE AND LAY-IN PANEL CEILING SUSPENSION SYSTEMS

Section 1—General

1.1 Scope.-This standard covers ceiling suspension systems used primarily to support acoustical tile or acoustical lay-in panels weighing less than four pounds per square foot, not contributing to the fire-resistance rating of a floor or roof assembly and not used for meeting the noise control requirements of the building code.

Section 2—Definitions

2.1 Where the following terms appear in this standard, they shall have the meaning herein indicated:

Backing board.-The term "backing board" shall mean a flat sheet of gypsum board to which acoustical tile is attached using adhesive, screws, staples or other suitable means (Fig. 1c).

Carrying channel.-The term "carrying channel" shall mean the three sided or "[" shaped metal sections which support the entire structural grid network (Fig. 1 A, B, C). The carrying channels are suspended by hangers from the existing structure and main runners are then attached to the channels.

Ceiling suspension system.-The term "ceiling suspension system" shall mean the entire network or grid of structural components which provides support for acoustical ceiling tile, acoustical ceiling panels, lighting fixtures, and air diffusers.

Cross runner.-The term "cross runner" shall mean the secondary or cross beams of a mechanical ceiling suspension (Fig. 1 A). The cross runners normally support only the acoustical tile. In some forms of suspension systems, however, the cross runners also provide support for other cross runners.

Hanger.-The term "hanger" shall mean the member employed to suspend the acoustical ceiling from the existing structure (wood joists, steel bar joists, steel beams, concrete slabs, etc.) (Figs. 1 A, B, C).

Main runner.-The term "main runner" shall mean the primary or main beams of the type of ceiling suspension system in (Figs. 1 A, B). The main runners

provide direct support for cross runners, and they may support lighting fixtures and air diffusers. In addition, the acoustical tile may also be directly supported by the main runners.

Nailing bar.-The term "nailing bar" or "furring bar" shall mean the continuous sheet metal strips to which a backing board is attached using either nails or screws (Fig. 1 C). The nailing bars are installed perpendicular to and supported by the carrying channels.

Spline.-The term "spline" shall mean a strip of sheet metal or fiber inserted in the kerfs of adjacent acoustical tile to form a concealed mechanical joint seal (Fig 1 B).

Wall molding.-The term "wall molding" shall mean the edge angles or channels of a mechanical ceiling suspension system which are attached to a wall (Figs. 1 A, B). The wall molding provides support for acoustical tile, and cross runners which are located at the periphery of the ceiling.

Section 3—Design

3.1 The provisions of the building code for stresses shall apply.

3.2 The hangers shall be spaced at 4'-6" or less on centers. Each hanger shall be capable of carrying all loads suspended therefrom plus an additional 200 pounds located at midspan. The midspan deflection as attested in accordance with the test method described in Section 6 of this standard or as calculated shall not exceed 1/360 of the span. The connections of the carrying channel to the hangers shall be adequate for the load supported by the carrying channel plus 200 pounds.

3.4 The main runner or nailing bar shall be capable of carrying all loads suspended therefrom. The midspan deflection as tested in accordance with the test method described in Section 6 of this standard or as calculated shall not exceed 1/360 of the span. Each connection of the main runner or nailing bar to the carrying channels shall be adequate for the load supported by the main runner plus two hundred (200) pounds.

* *353-72BCR*

3.5 Cross runners shall be capable of carrying all loads suspended therefrom. The midspan deflection as tested in accordance with the test method described in Section 6 of this standard or as calculated shall not exceed 1/360 of the span.

3.6 Splines shall not be considered as providing nor shall be used for providing structural support for the ceiling material.

3.7 All connection devices other than bolts shall be approved by the Board of Standards and Appeals. However, they may be accepted under the code test method when test results indicating a factor of safety of four are filed in accordance with the provisions of section 27-131 of the building code.

***REFERENCE STANDARD RS 5-16**
Acoustical Tile and Lay-in Panel Ceiling Suspension Systems

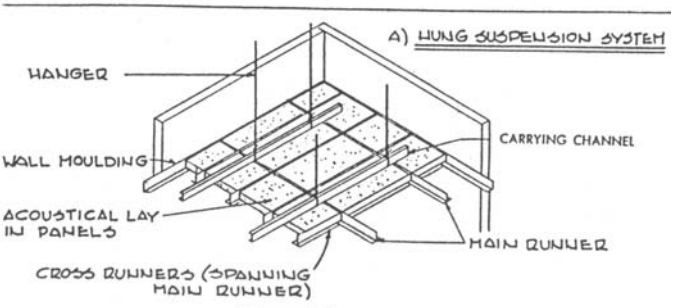


Figure 1-A

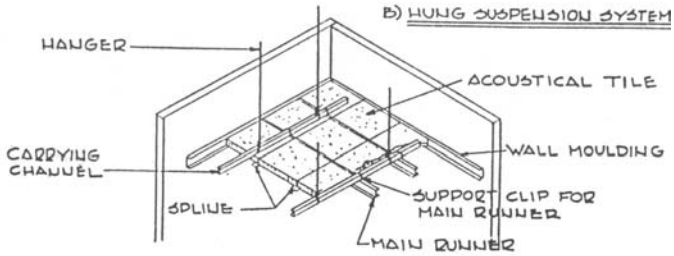


Figure 1-B

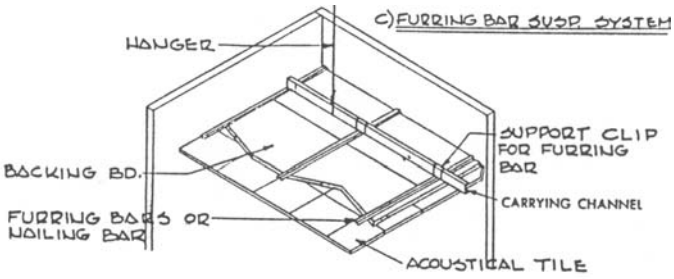


Figure 1-C

Section 4—Coatings

4.1 Protective coatings.-Component materials which oxidize or corrode when exposed to normal use environments shall be provided with protective coatings.

4.1.1 Sheet steel.-Components fabricated from sheet steel shall be given an electro-galvanized, hot dipped galvanized cadmium coating, or zinc coating.

4.1.2 Aluminum alloy.-Components fabricated from aluminum alloys shall be anodized when exposed to a corrosive atmosphere.

Section 5—Installation

5.1 Installation of components.-The components of acoustical ceiling suspension systems shall be installed in accordance with the following requirements and Figures 2A and 2B.

5.1.1 Hangers

5.1.1.1 Buildings of construction group I.-For requirements see Figs. 2A and 2B.

5.1.1.2 Buildings of construction group II.-Every other hanger supported from wood members shall be

attached by two 1/4" diameter through bolts or clinched nails. The remaining hangers shall be attached as described above or by two 1/4" diameter barbed anchor nails 2 1/4" long with oval heads. All bolts and nails shall be at least 2 in. above the bottom of the wood members.

5.1.1.3 Spacing.-Hangers for carrying channels shall be spaced at most 4'-6" on centers.

5.1.1.4 Minimum sizes and quality.-Hangers for suspending carrying channels shall be a minimum of 1/4" diameter galvanized steel rods or flat bars at least 1" x 1/8".

5.1.1.5 Use of existing hangers.-Existing hangers may not be used unless they comply, or are made to comply, with all the above provisions relating to hangers.

5.1.2 Carrying channels

5.1.2.1 Leveling requirements.-Carrying channels shall be installed so that they are level within 1/8 in. in 12 ft. leveling shall be performed with the supporting hangers taut. Local kinks or bends shall not be made in hangers as a means of leveling the carrying channels.

5.1.2.2 Attachment to hangers.-Carrying channels shall be attached to the hangers in a manner that will prevent any vertical movement or rotation.

(See Figure 2-A and 2-B)

5.1.3 Main runners

5.1.3.1 Leveling requirements.- Main runners shall be installed so that they are all level within 1/8 in. in 12 ft. Leveling shall be performed with the main runner in firm contact with the carrying channel.

5.1.3.2 Attachment to carrying channels.- Main runners shall be attached to the carrying channels in a manner that will prevent any vertical movement or rotation.

353-72 BCR

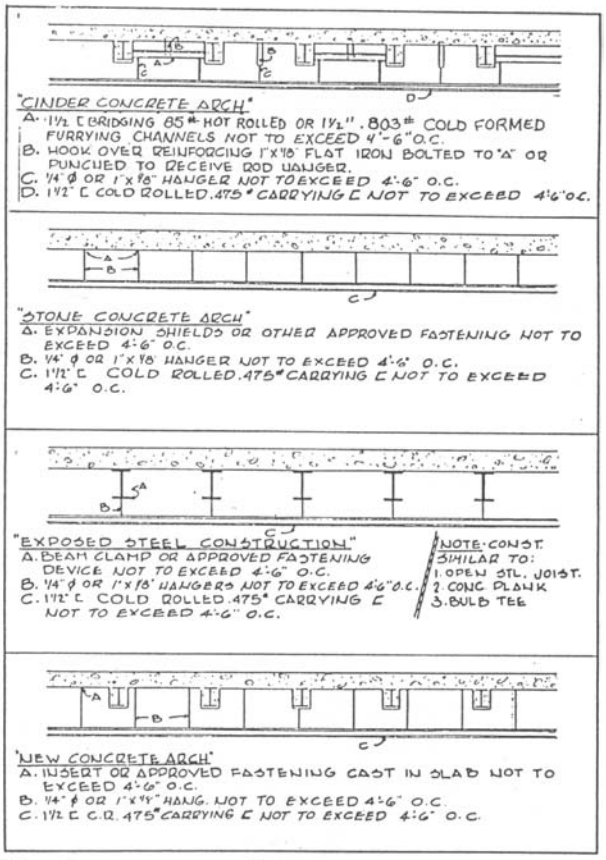
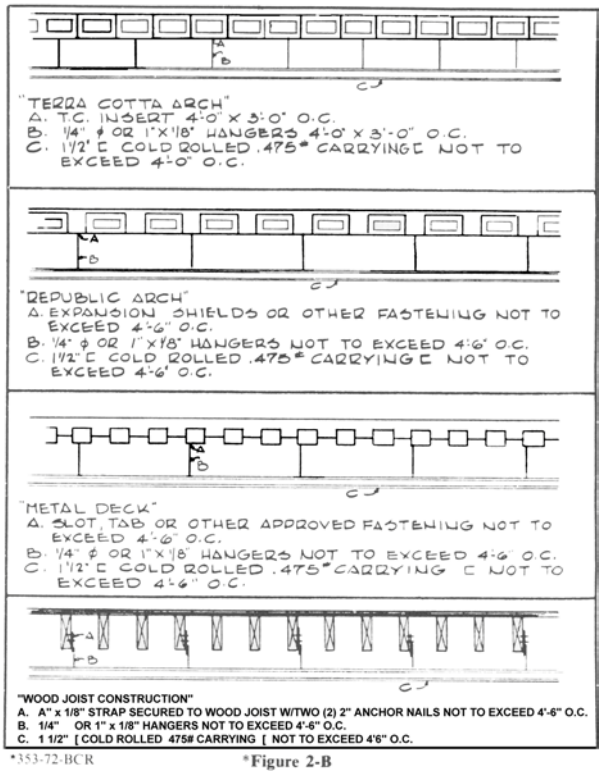


*Figure 2-A



*353-72-BCR

*Figure 2-B

*353-72 BCR

5.2 New suspended ceilings below existing suspended ceilings

5.2.1 Buildings of construction group 1.-In buildings of construction group 1 not more than one existing suspended ceiling may be retained above the new suspended ceiling. All other existing ceilings must be removed. Where an existing ceiling is retained, the new main runners shall be supported directly from the carrying channels adjacent to the hangers.

5.2.2 Buildings of construction group II.-In buildings of construction group II, all existing suspended ceilings shall be removed prior to installation of new suspended ceiling.

5.2.3 Existing hangers.-Existing hangers shall not be used for new suspended ceilings unless found to be in sound structural condition and comply with all the requirements of this standard relating to hangers.

5.3 Ceiling fixtures

5.3.1 General.-Fixtures installed in acoustical tile or lay-in panel ceilings shall be mounted in a manner that will not compromise ceiling performance. Figures 3A, 3B and 3C are to be used as a guide.

5.3.2 Maximum fixture weights.-Fixtures exceeding 80 lbs. in weight shall be supported independent of ceiling suspension system. Fixtures weighing 80 lbs. or less may be supported from the carrying channels. Fixtures weighing 50 lbs. or less may be supported from the main runners.

5.3.3 Eccentric loading.-Fixtures shall be installed so that the main runners or carrying channels will be eccentrically loaded unless suitable accessory devices (Figs. 3 A, B, C) are employed and the main runner and/or carrying channel design provides for the torsional stresses.

5.3.4 Plans.-The plans shall show the necessary details of the acoustical ceiling to satisfactorily identify the number, size, spacing, location, weights, and types of fixtures and means employed to comply with this section.

Section 6—Test Method for Determining Deflection

6.1 Introduction.-The test method outlined provides the means by which data can be secured for characterizing the structural performance of individual suspension systems. The method consists of placing structural members as beams on simple supports, and subjecting them to simulated uniformly distributed loads over their length. The loading is incrementally imposed and the performance of the structural member is obtained from observing the resulting beam deflections.

6.2 Scope.-The test method shall be used for evaluating the load deflection performance of structural members of all acoustical tile and lay-in panel suspension systems. A simple experimental facility is described which can be adjusted as required to permit testing of structural members of different sizes, having various section configurations, and on different appropriate span lengths.

Some suspension systems incorporate a locking assembly system which enhances performance by providing some continuity or load transfer capability between adjacent sections of the ceiling grid. This test method does not provide the means for making a complete evaluation of continuous beam systems, nor for assessing the continuity contribution to overall system performance. However, the method can be used for evaluating primary structural members in conjunction with secondary members which interlock, as well as with those of noninterlocking type.

6.3 Loading facility.-The loading of structural members shall be performed in a manner which closely simulates their use in suspension systems. Span distances, spacing between secondary supports, etc., shall be typical of ceiling grid designs in which the structural member is used.

6.3.1 Support frame.-A rectangular support frame having the essential features of the unit described below shall be provided.

6.3.1.1 The frame (Fig. 4) shall have the capability for length adjustment to permit testing of structural members on clear spans for a maximum of 8 ft. to a minimum of 3 ft. It shall have the capability for overall width adjustment with a maximum length of 4 ft. and a minimum length of 1 ft.

6.3.1.2 The support frame shall have sufficient stiffness so that no significant deflection occurs within the frame during load tests of suspension system structural members.

6.3.1.3 The support frame may either be ceiling mounted or floor supported.

6.3.2 Test loading.-The main runner weight shall not be used for evaluating load-deflection performance. One-half the weight of the cross runners shall be included as part of the test load.

6.3.2.1 Individual test weights appropriate for evaluating the structural member shall be provided. Loads weighing up to 1 lb. shall be provided so that their actual weight is within 0.01 lb. of their marked weight. Weights over 1 lb. shall be within 1 percent of their marked weight. Loading weights of the sizes required can be conveniently provided by weighing lead shot into cloth bags and tying them closed.

6.3.2.2 A sufficient number of weights of suitable mass shall be provided to permit evaluation of the structural member through its elastic range by loading in approximately ten equal load increments. When elastic performance of the member under test is exceeded, loading shall continue using a suitably reduced load increment until significant sectioning yielding has been produced.

6.3.2.3 A complete load increment shall be applied simulating a uniformly distributed load imposed over the entire section length before measuring the deflection of the structural member.

6.3.2.4 Provision shall be made for imposing test loads on the structural member in a symmetrical manner.

6.3.3 Deflection measurements.-The deflection of structural members shall be observed after application of each full load increment during the entre test.

6.3.3.1 The deflection of structural members being tested shall be measured with dial indicators capable of direct reading to 0.001 in.

6.3.3.2 Dial indicators shall be mounted from a separate gauge frame (Fig. 4) having three points of support. The gauge frame shall be supported from the test loading frame and be properly positioned to locate the dial stems vertically over the structural member being tested.

6.3.3.3 The dial indicators used shall have sufficient travel capability to permit the deflection performance of the structural members to be observed during the entire test without requiring resetting.

6.4 Structural members.-The manufacturer, installer, or architect or engineer, shall determine the load-deflection performance.

6.4.1 The structural members tested shall be identical to the sections used in the final system design. All cutouts, slots, etc., as exist in the system component shall be included in the sections evaluated.

6.4.2 Allowable mill variations of sheet stock thickness have a significant effect on section stiffness and load carrying ability. Consequently, load-deflection studies of structural members shall utilize sections fabricated in accordance with system manufacturers published metal thicknesses and dimensions.

6.5 Procedure.-The procedures used for evaluating performance of suspension system structural members shall utilize the general principle of following actual field installation practice wherever possible. As an example of the general procedure to be followed, the setup and testing of a primary structural member is described below.

6.5.1 Experimental setup.-In preparation for testing, the length and width of the support frame shall be adjusted to the typical grid dimensions that are established as appropriate to the evaluation of the structural member. The primary structural member shall be installed along the longitudinal centerline of the frame and supported at its end as an essentially simply supported beam (Fig. 4). Where secondary members are used, they shall be installed normal to the direction of the primary structural member and at the midpoint and quarterpoint locations along the test span length. One end of such secondary members shall be supported from the side of the test frame and at the other from the flange of the primary structural member (Fig. 4.). Clearances between ends of the secondary structural member in the test setup shall be typical of that which exists in the actual ceiling grid.

Where interlocking secondary structural members are used, they shall be assembled into the central primary structural member being tested in customary fashion and using conventional center distance spacing. The other end of the secondary member shall be simply supported from the perimeter support frame. No interlocking of the secondary member and the perimeter support frame shall be permitted.

6.5.2 Section loading.-With the structural member to be evaluated installed in the support frame, the gauge frame shall be positioned to mount the vertical displacement deflection dials directly over the test section at the midspan and quarterspan locations at which time dials are positioned to read zero (Fig. 4). The test loads shall be applied to the structural member in a manner representative of that which exists in service. For test purposes simple wire hangers shall be provided to suitably introduce the load to the section. Extending from such hangers, attachment wires, cords or lightweight chains shall be provided to permit the preweighed incremental test weights to be added as required. The weight of hangers, wires, pans, etc. shall be incorporated as part of the test load.

The test weights, simulating the weight of ceiling tile or panel, shall be applied to the structural member starting 6 in. from the end supports, and at 1 ft. intervals thereafter, always proceeding from the ends toward the center of the span in applying load. After the first uniformly distributed load increment has been applied, the midspan and quarterspan deflection of the structural member shall be measured and recorded. Loading of the structural member shall be continued in the same manner, applying successive increments of uniformly distributed load and observing deflections after each increment. Loading shall be continued until it is apparent that the test section has yielded.

The load deflection performance of secondary structural members of acoustical tile and lay-in panel ceiling systems shall be similarly determined. The units shall be set up and tested in a manner appropriate to their use in actual grid systems.

6.6 Experimental data.-A test log shall be prepared to record all pertinent data regarding the structural member being evaluated and the principal accessory items used. Such information as the following shall be provided:

Manufacturer's name.

Suspension system identification.

Test section identification.

Description of section: Measured overall height and thickness of basic stock, type of material, section weight, etc.

Test span length.

Spacing of lateral supports.

Identification of accessory items and how used.

Sketch of experimental setup, giving dimensions of grid, dial gauge locations, load spacing, etc.

Record of the incrementally applied uniformly distributed loads and the resultant midspan and quarterspan deflection and the resultant midspan and quarterspan deflection measurements for each loading.

6.7 Section performance.-The performance of structural members of suspension systems shall be represented by individual load-deflection plots obtained from tests performed at each different span length used in service.

6.7.2 The results of replicate tests of three individual sections each tested on the same span length, shall be plotted and averaged to obtain a characteristic load-deflection curve for the structural member.

6.7.3 The average load-deflection curve shall be used to establish the maximum uniformly distributed load which the structural member can successfully sustain prior to reaching the deflection limit of 3/360th of the span length in inches (Fig. 5.).

6.7.4 The load-deflection curve shall be used to establish the maximum loading intensity beyond which the structural member begins to yield.

6.8 Suspension system performance.-Published performance data for individual suspension systems shall be developed by the manufacturer upon the basis of results obtained from load-deflection tests of its principal structural members. Where a ceiling design incorporates a number of components, each of which experiences some deflection as used in the system, the additive nature of these displacements shall be recognized in setting an allowable system deflection criteria.

* ***353-72 BCR***

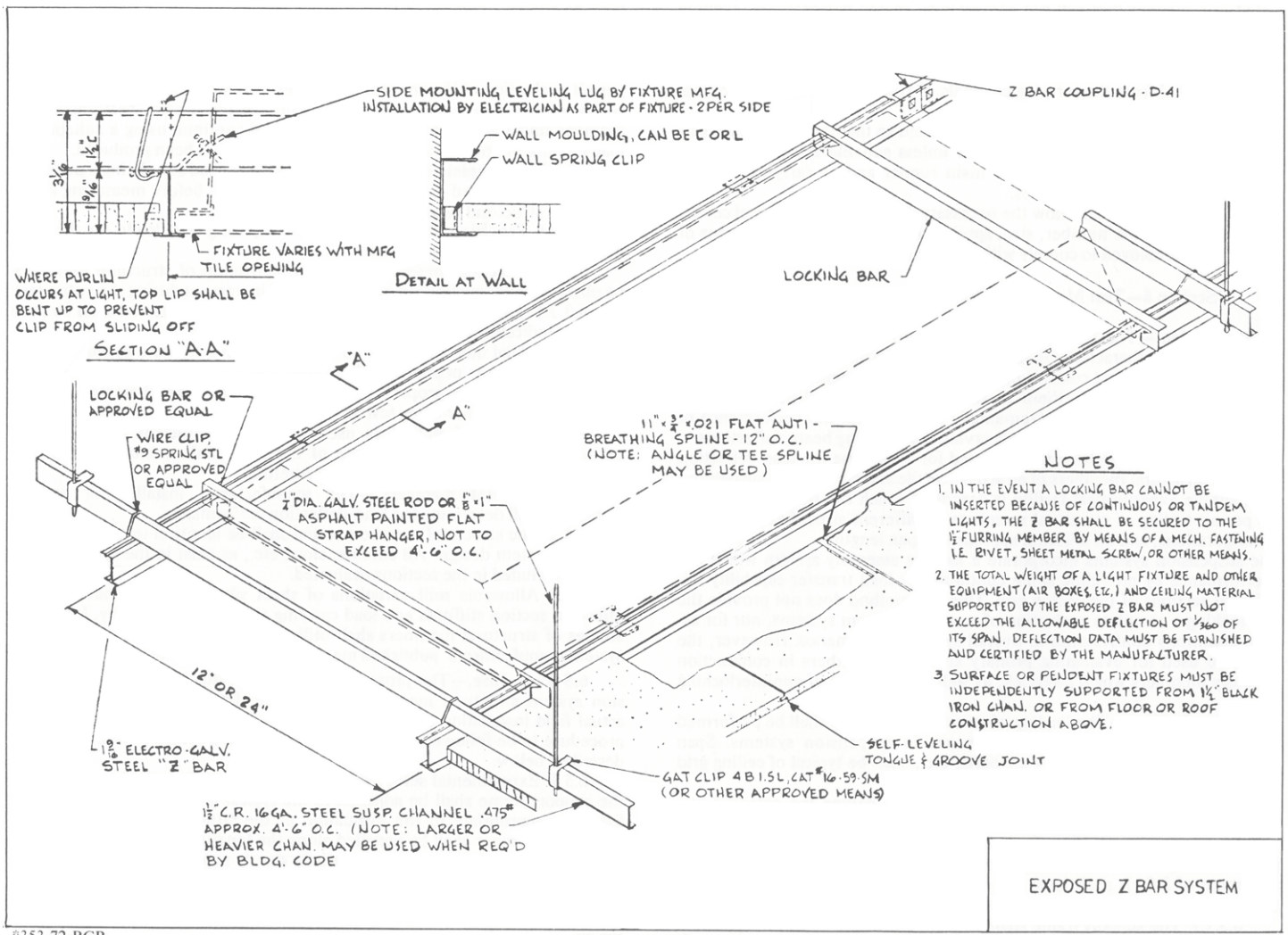


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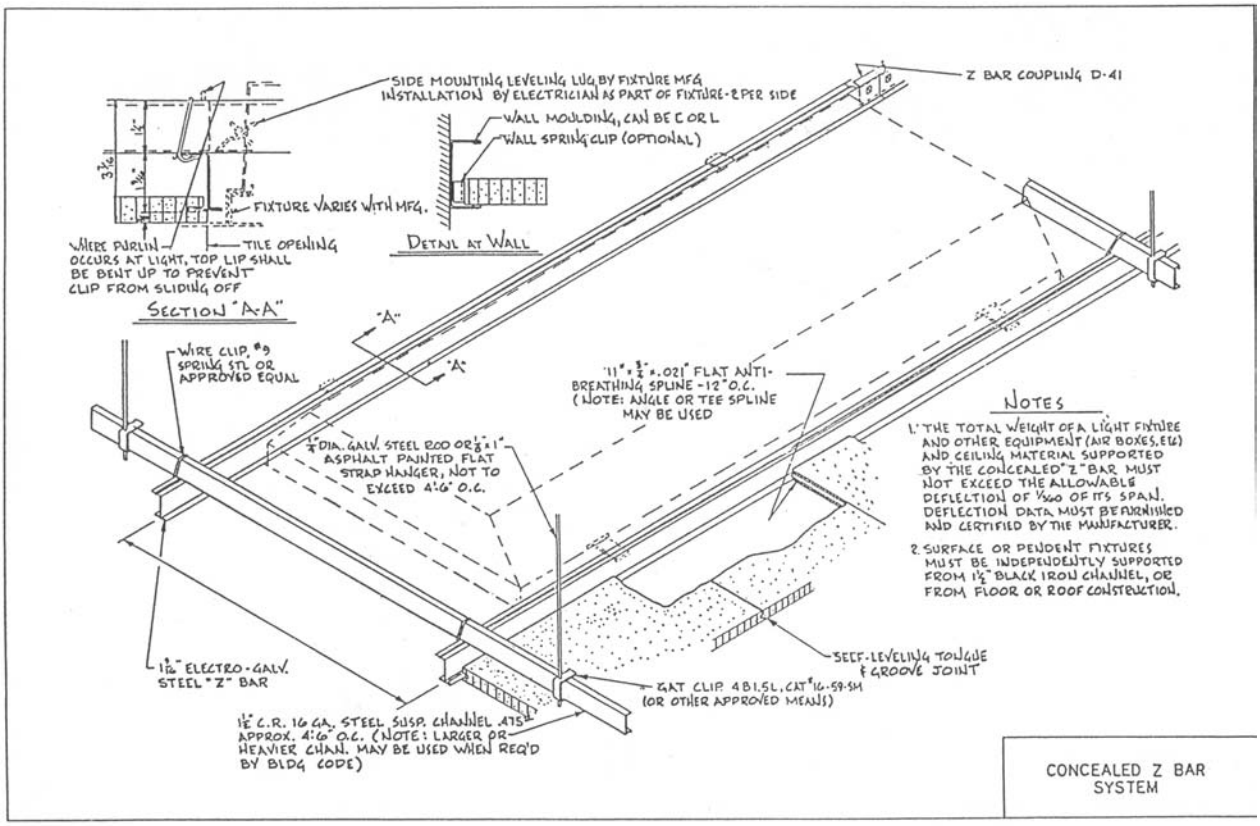
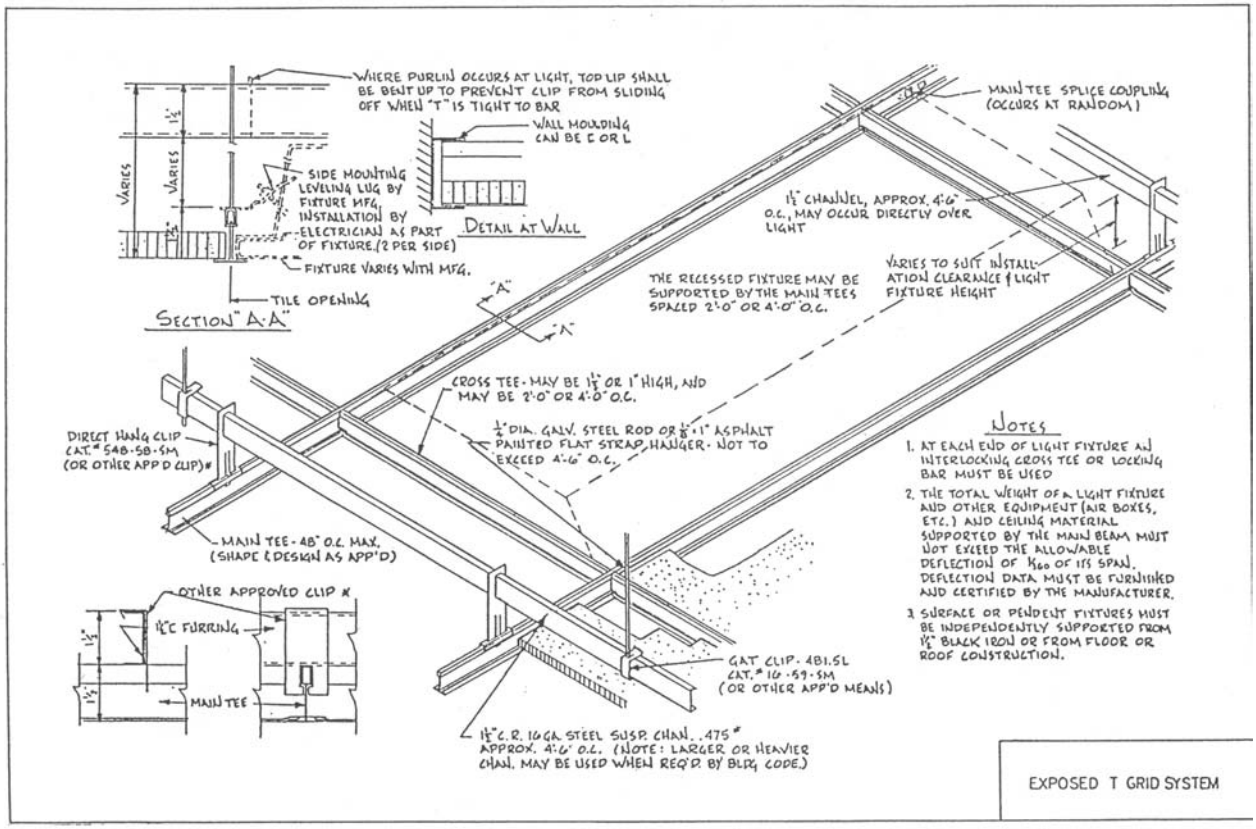
***Figure 3-A**



*353-72 BCR

*Figure 3-B



*353-72 BCR

*Figure 3-C

***
REFERENCE STANDARD RS 5-17
Standards for the Installation of Smoke Shafts

1. Smoke shafts shall be constructed as required for shafts in section 27-344.
2. Shafts may serve more than a single compartment on a given floor but in all cases shall have at least one wall common to or abutting the compartments served, or each added compartment shall be connected to the shaft by an individual duct with the same fire resistive rating as required for the smoke shaft.
3. The size of the shaft shall be uniform throughout and of such dimensions as to provide 60 air changes per hour in the largest compartment served and at a velocity of not less than 1,600 fpm nor more than 4,000 fpm.
4. Openings into the shaft shall be provided at each floor and shall be of a size to permit the number of air changes prescribed in 3 above at a maximum air velocity of 3,000 fpm. Such openings shall be located as high as possible and designed to vent the entire compartment. They shall be equipped with an opening protective or closure having a fire protective rating complying with table 5-3 (§27-342). Such closures shall be automatically openable individually upon the activation of a detector located at the return shaft of the compartment and upon the activation of any other detectors installed within the compartment.
5. An approved, automatically controlled, exhaust fan of such capacity as to exhaust 60 air changes per hour from the largest compartment served by the shaft and capable of maintaining not less than a 2-inch negative static pressure at its inlet under flow conditions shall be installed in the shaft.

a. The fan shall be located so that the bottom of the fan inlet is located not less than 3 feet above the top of the automatic protective closure in the highest fire floor served by the shaft.
b. The shaft shall terminate at least 3 feet above the roof level where it penetrates the roof and shall be provided with a protective weather closure which can be opened manually from the outside.
c. When the closure in the required opening on a floor opens, this shall automatically open the weather closure and start the fan.
d. The shaft exhaust fan shall also be controlled from a local start-stop station at the fan, and at either the mechanical control center or the fire command station.
e. The fan shall be operated from circuits that are separate from the general lighting and power circuits, either taken off ahead of the main switch or connected to an emergency power source when such source is provided.

****Local Law 5-1973***

**
REFERENCE STANDARD RS 5-18
Standards for the Pressurization of Stairs

1. Each stair shall be provided with air in such amount as to satisfy the following requirements:

a. The air shall be mechanically supplied at one or more levels.
b. Each fan shall supply 100 percent outdoor air.
c. Any opening shall be provided with an intake closure complying with the requirements for opening protectives of Title 27, Chapter 1 of the administrative code with an approved smoke detector located between the outside air intake and the supply fan. Upon the activation of this detector, only the system serviced by such detector shall shut down.
d. The maximum velocity of air supplied at the openings into the stair shall not exceed 3,000 fpm at its point of discharge within the stair enclosure.
e. Intake closures shall open and the supply fan or fans shall start upon the activation of any detector in the building except that called for in paragraph c above. However, only the fan system associated with the activation of the detector shall shut down.

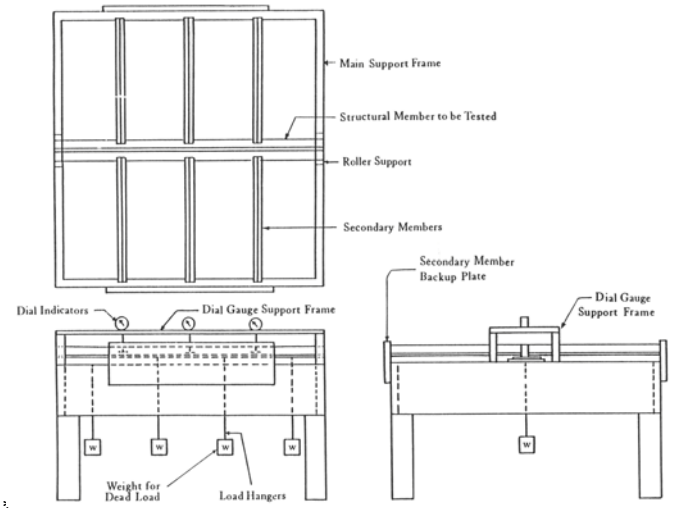


Figure 4 Schematic Diagram of Experimental Loading Facility
****353-72 BCR***

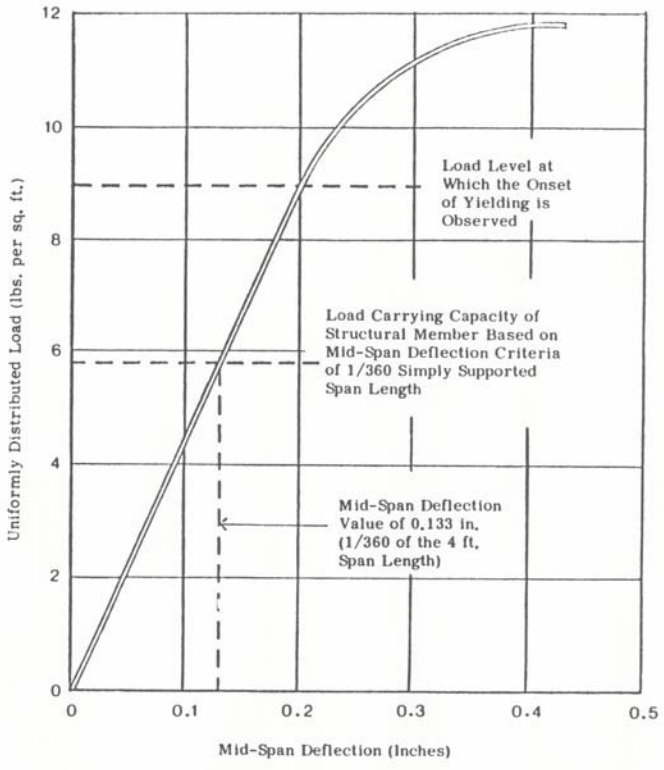


Figure 5. Applied Load vs. Mid-span Deflection for a Hypothetical Structural Member Having a Simply Supported Span Length of 4 Ft.
*** 353-72 BCR***

2. An approved, automatically controlled louver and weather closure open to the exterior at the highest floor served by the stair shall be installed in the case of a fan or fans producing an upward flow of air, or at the furthest point or points from the fan or fans when more than one fan is used, or at the lower end of the stair venting to outside if a single fan is located at the upper end of the shaft. The size shall be not less than 2 sq. in. per 100 cu. ft. of total shaft volume. Any existing fixed ventilating opening may be included in meeting this requirement. The louver shall be normally closed and shall open automatically by fusible link or other approved device when subjected to a temperature of 135°F. or to a rapid rise in temperature at a rate of 15 to 20°F. per minute, and the louver shall also be remotely operable from the fire command center. Such louver shall also satisfy the requirements of subdivision d of section 27-344.

3. The total supply of air introduced into each stair shall be equal to and not less than the algebraic sum of 24,000 cfm plus 200 cfm per story of stair.

4. Other operating requirements.

a. All weather closures may normally be in closed position.

b. The air supply fans shall provide positive pressure differential between the stair shaft and each floor at a maximum of 0.4 inches of water column whether doors are open or closed. Minimum positive pressure differentials between the stair shafts and each floor of 0.10 inches of water column when all doors are closed, and no less than 0.050 inches of water column when any three doors are open, shall be maintained. As an alternative to the maintenance of 0.050 inches of water column, a minimum average velocity of 400 feet per minute, measured in the plane of any open door, with any three doors open, shall be maintained.

c. Excess positive pressure within the stair closure may be relieved at one or more levels through protected openings in the stair enclosure in the following manner:

(1) Each opening shall be provided with an approved adjustable barometric backdraft damper so arranged as to permit air flow out of the stair enclosure only and shall be adjusted to close if the pressure differential is less than 0.05 inches of water column, and to remain open if the pressure differential is greater than 0.4 inches of water column.

(2) Each opening shall be protected with two 1 1/2-hour fire dampers arranged in series, each with fusible links rated to melt at 125°F.

(3) Acceptable alternative systems for the relief of excessive positive pressure other than through the protective openings in the stair enclosure may be installed, subject to the approval of the Commissioner.

(4) Spill ducts located entirely within the stair enclosure and utilizing barometric dampers may be installed as an acceptable alternative system referred to in sub-paragraph 3 above.

d. Air supply fans shall also be controlled from a local start-stop station at the fans and from the fire command station. In addition, fan controls may also be located at the mechanical control center. These controls shall over-ride the automatic detection shut-down.

e. The fans shall be operated from circuits that are separate from the general lighting and power circuits taken off ahead of the main switch and connected to an emergency power source when such source is provided.

*** 5. Full system testing shall be required for each installation and shall be subject to controlled inspection. Pressure or velocity measurements shall be taken for the purpose of determining whether the desired control of smoke will be established and reports of such measurements shall be made and copies thereof filed with the department as provided in Section 27-132 for controlled inspection. A full system test shall be performed after any construction and/or modifications to the stair enclosures altering the volume of such enclosures.

*** 6. Operational tests of the stair pressurization systems shall be conducted every twelve months by building maintenance personnel and witnessed by the Fire Safety Director or by a Registered Architect or Professional Engineer to ensure that each system functions. The owner or his authorized representative shall retain at the premises a record of each test performed for Building and Fire Departments' use.

*** 7. Operational tests shall determine that initiating devices such as fire alarms, sprinkler alarms, elevator recall, manual switches, and smoke detectors other than those designed to cause the shutdown of outside air intake systems, will cause the stair pressurization systems' intake dampers to open and fans to start.

**** Local Law 84-1979***

****DOB 8-26-98***

* REFERENCE STANDARD RS 5-19

ASTM E814-1983 Standard Method of Fire Tests of Through-Penetration Fire Stops.

****Local Law 16-1984; 1343-88 BCR***

* REFERENCE STANDARD RS 5-20

Standards for the flammability of Carpets

DOC FF1-1970 Methane Pill Test.

ASTM E648-1988 Standard Test Method for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Source.

ASTM E662-1988 Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials.

****Local Law 16-1984; 1343-88 BCR***

*** REFERENCE STANDARD RS 5-21

UBC Std. 26-9-1997 Method of Test for the Evaluation of Flammability Characteristics of Exterior, NonloadBearing Wall Assemblies Containing Combustible Components Using the Intermediate-Scale,Multistory Test Apparatus.

***DOB 3-4-01; Local Law 13-1987; 1343-88 BCR

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REFERENCE STANDARD RS-7
SPECIAL USES AND OCCUPANCIES

* LIST OF REFERENCED NATIONAL STANDARDS

NFiPA No. 701 Standard Methods of Fire Tests for Flame-Resistant Textiles and Films 1977
888-80 BCR

* REFERENCE STANDARD RS 7-1

Deleted.
888-80 BCR

** REFERENCE STANDARD RS 7-2
RESTRICTED LOCATIONS FOR PROJECTING SIGNS

Borough of Manhattan -
No permanent projecting sign shall be erected on any building on:
5th Avenue between Washington Square north and 110th Street,
34th Street between Park Avenue and 7th Avenue,
Madison Avenue between 23d Street and 96th Street,
57th Street between Lexington Avenue and Broadway,
Vanderbilt Avenue between 42d Street and 47th Street,
Park Avenue between 32d Street and 40th Street,
Park Avenue between 45th Street and 96th Street,
33rd Street between Lexington Avenue and 5th Avenue,
35th through 41st Streets between Lexington Avenue and 5th Avenue,
43rd through 56th Streets between Lexington Avenue and 5th Avenue,
58th Street between Lexington Avenue and 5th Avenue,
60th Street between Lexington Avenue and 5th Avenue,
Nassau Street between Wall Street and Frankfort Street, or
John Street between Broadway and William Street.
No permanent illuminated projecting sign shall be erected on any building on:
72rd Street between Central Park West and Riverside Drive.
Borough of Brooklyn-
No permanent projecting sign shall be erected on any building on:
Fulton Street between Flatbush Avenue and Joralemon Street and Willoughby Street.
No permanent illuminated projecting sign shall be erected on any building on:
Fulton Street between Flatbush Avenue and Prospect Street and Henry Street,
Washington Street between Myrtle Avenue and Prospect Street,
Court Street between Fulton Street and Livingston Street,
Pierrepont Street between Fulton Street and Clinton Street,
Montague Street between Court Street and Clinton Street,
Remsen Street between Court Street and Clinton Street,
Joralemon Street between Court Street and Clinton Street.
82-88 BCR

* REFERENCE STANDARD RS 7-3

NFiPA No. 701-1977 - Standard Methods of Fire Tests for Flame-Resistant Textiles and Films.
****888-80 BCR***

* REFERENCE STANDARD RS 7-4

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*888-80 BCR

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REFERENCE STANDARD RS-8
PLACES OF ASSEMBLY

* LIST OF REFERENCED NATIONAL STANDARDS

ANSI/SMPTE 223M	Specifications for Motion-Picture Film-Safety Film	1985
ANSI PH 1.25	Specifications for Photography (Film-) Safety Photographic Film.....	1984
ANSI/NFiPA 40	Cellulose Nitrate Motion-Picture Film	1982

739-86 BCR; 260-86 BCR; 745-80 BCR

** REFERENCE STANDARD RS 8-1

ANSI/SMPTE 223M-1985-Specifications for Motion-Picture Film-Safety Film.
ANSI PH 1.25-1984-Specifications for Photography (Film-) Safety Photographic Film.
ANSI/NFiPA 40-1982-Cellulose Nitrate Motion-Picture Film.

***739-86 BCR; 260-86 BCR*

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REFERENCE STANDARD RS 9 LOADS
* LIST OF REFERENCED NATIONAL STANDARDS

**AASHTO HB-13	Standard Specifications for Highway Bridges, Thirteenth Edition and 1984, 1985 and 1986 Interim Specifications……1983
AREA	Specifications for Steel Railway Bridges, Chapter 15, Steel Structures, Manual for Railway Engineering……1987
*UBC SECTION 2312	Earthquake Regulations With Accumulative Supplement…… 1990

135-88BCR

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

REFERENCE STANDARD RS 9-1
MINIMUM UNIT DESIGN DEAD LOADS FOR STRUCTURAL DESIGN PURPOSES

	Weight (psf)
WALLS AND PARTITIONS (unplastered).—	
Clay brick—	
High absorption (per 4 in. wythe)…….	33
Low absorption (per 4 in. wythe)……..	45
Concrete brick—	
4 in……	46
4 in. lightweight aggregate……	33
8 in……	89
8 in. lightweight aggregate……..	68
12 in……..	130
12 in. lightweight aggregate…….	98
Sand-lime brick—	
per 4 in. wythe……..	38
Solid concrete block—	
4 in……	40
4 in. lightweight aggregate……..	27
8 in……	67
8 in. lightweight aggregate……..	48
12 in……..	108
12 in. lightweight aggregate…….	72
Hollow concrete block—	
4 in……	30
4 in. lightweight aggregate……..	20
8 in……	53
8 in. lightweight aggregate……..	38
12 in……..	85
12 in. lightweight aggregate…….	55
Solid gypsum block—	
(per in. thickness)…….	6
Hollow gypsum block—	
2 in……	9.5
4 in……	12.5
6 in……	18.5
Clay, tile, load bearing—	
4 in……	24
8 in……	42
12 in……..	58
Clay tile, non-load bearing—	
2 in……	11
4 in……	18
8 in……	34
12 in……..	46
Facing tile—	
2 in……	16
6 in……	29
8 in……	41

Split terra cotta furring tile—	
1 1/2 in…..……	8
2 in……	10
3 in……	12
Glass block—	
4 in……	20
PLASTER PARTITIONS—	
2 in. thick, solid cement plaster on metal lath……..	25
2 in. thick, solid gypsum plaster on metal lath…….	18
Metal studs, any lath, and 3/4 in. gypsum plaster, both sides……..	18
Wood studs, any lath, and 3/4 in. gypsum plaster, both sides……	19

EQUIVALENT UNIFORM PARTITION LOADS

Partition Weight (plf)	Equivalent Uniform Load (psf) (To be added to floor dead and live loads)
50 or less……	0
51 to 100……	6
101 to 200……..	12
201 to 350……..	20
Greater than 350……	20 plus a concentrated live load of the weight in excess of 350 plf..

	Weight (psf)
PLASTER ON MASONRY SURFACES.—	
Gypsum, with sand aggregate, per in…….	8.5
Gypsum, with lightweight aggregate, per in……..	4
Gypsum, with wood fibers, per in……..	6.5
Cement, with sand aggregate, per in……..	10
Cement, with lightweight aggregate, per in……...	5
FLOOR FINISHES (Excluding fill or base).—	
Resilient flooring (asphalt tile, linoleum, etc.)……..	2
Asphalt block, 2 in…….	24
Wood block, 3 in……	10
Hardwood flooring, 7/8 in…….	4
Softwood sub-flooring, per in……	3
Plywood sub-flooring, 1/2 in……..……	1.5
Ceramic or quarry tile, 1 in……	12
Terrazzo, 1 in…….	12
Slate, 1 in……	15
Cement, 1 in……...	12
FLOOR FILL—	
Cinders, no cement, per in……..	5
Cinders, with cement, per in……...	9
Sand, per in. ……...	8

FLOORS — WOOD JOIST CONSTRUCTION
(With double layer wood flooring - no ceiling)

	Total Weight (psf)	
**Joint Sizes (in.)	12 in. Joist Spacing	16 in. Joist Spacing
2 x 6	6	5
2 x 8	6	6
2 x 10	7	6
2 x 12	8	7
3 x 6	7	6
3 x 8	8	7
3 x 10	9	8
3 x 12	11	9
3 x 14	12	10

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

	Weight (psf)
CEILINGS: (including suspension system).—	
Plaster on tile or concrete—see "Plaster on Masonry Surfaces"	
Suspended metal lath and gypsum plaster, 3/4 in. ……..	9
Suspended metal lath and cement plaster, 3/4 in..……	11
Suspended acoustical tile…….	2
ROOF AND WALL COVERINGS—	
Clay roofing tiles……..	14
Built-up roofing:	
3-ply……..	1.5
5-ply……..	2.5
Gravel, 1/4 to 5/8 in……..	4
Slag, 1/4 to 5/8 in……..	3
Crushed rock, 1/4 to 5/8 in……...	4.5
Aluminum sheet:	
0.050 in. thick, flat……	0.72
0.032 in. thick, corrugated……	0.55
0.032 in. thick, V-Beam……	0.58
Steel, 20 gauge, protected V-Beam……..	2.3
Tin sheet, 28 gauge……..	1
Asbestos-cement, corrugated roofing, 3/8 in……	4
Fiberboard, 1/2 in……	0.8
Gypsum sheathing, ½ in……...	2
Wood sheathing, per in…….	3
Wood shingles, in place……	3
Asphalt shingles, in place…….	6
Asbestos-cement shingles, in place……..	4
Cement tile, 3/8 in. in place……..	16
Stucco (cement), per in…….	10
Slate, 3/16 in. in place……..	7
Slate, 1/4 in. in place……..……..	10
Skylight, metal frame, 3/8 in. wire glass……..	10
MISCELLANEOUS MATERIALS—	
Glass—	
singlestrength…….....	1.2
double strength……..	1.6
plate, wired or structured, 1/8 in……...	1.6
insulating, double 1/8 in. plates w/air space…….	3.5
insulating, double 1/4 in. plates w/air space……..……...	7.1
Insulation—	
fiber glass, per in…….	1.5
foam glass, per in……	0.8
Urethane, 1 in……..	1.0
2 in……..	1.2
cork, per in…….	1.0
vegetable fiber boards, per in…….	1.5
bats and blankets, per in…….	0.5
vermiculite, loose fill—0.6 pcf……..	
expanded polystyrene—1.0 pcf……..	
Marble, interior, per in…….	14
Plastic, acrylic, 1/4 in……...…….	1.5
Slate, per in……..……...	15
Asphaltic concrete…….	144
Cast-stone masonry (cement, stone, sand)……	144
Cinder fill……..	57
Concrete, plain (other than expanded aggregates)—	

cinder….	108
slag….	132
stone (including gravel)….	144
Reinforced concrete—	
Add 6 pcf to unit weights shown for plain concrete	
Cork, compressed……..	14
Earth……..	100
Masonry, ashlar—	
granite….	165
limestone (crystalline)….	165
limestone (oolitic)……...	135
marble….	173
sandstone (bluestone)….	144
Masonry, rubble w/ mortar—	
granite….	153
limestone (crystalline)….	147
limestone (oolitic)……...	138
marble….	156
sandstone (bluestone)….	137
Masonry, dry rubble—	
Granite….	130
limestone (oolitic)……..	125
marble….	130
Sandstone (bluestone)….	110
Terra cotta, architectural—	
voids filled……..	120
voids empty….	72
Timber, seasoned—	
pine, Douglas fir, and similar species….	35
oak, elm, and similar species……..	45

*As enacted but “gage” probably intended.

REFERENCE STANDARD RS 9-2
MINIMUM REQUIREMENTS FOR UNIFORMLY DISTRIBUTED AND CONCENTRATED LIVE LOADS UNIFORMLY DISTRIBUTED LIVE LOADS

Occupancy or Use of Spaces	Live load (psf)
Assembly spaces	
Drill rooms……..	150
Assembly spaces having fixed seats, including auditorium areas in churches, schools, theaters, courthouses, lodges, lecture halls, and similar buildings……	60[a]
Dance floors, restaurant serving and dining areas, mess halls, museums, gymnasiums, skating rinks, promenades, and roof gardens…….	100
Private assembly spaces, including conference rooms and card rooms……..	50
Stadium, grandstand, and reviewing stand seating areas……	100
Other assembly spaces……	See note [d]
Balconies	
Exterior……	See note [b]
Interior (as required for occupancy or use)	
Mezzanines (as required for occupancy or use)	
Catwalks	30
Corridors	
(1) Corridors in schools…….	100
(2) Corridors, elevators, and stairs in office buildings (other than first floor lobbies)……...	75
(3) Corridors serving first floor elevator lobbies, auditoriums, and similar areas of public assembly…...	100
(4) Other (same as that required for the occupancy of the area being served)……	100
Elevator machine rooms (see Reference Standard RS 18)	
Equipment rooms, including pump rooms, generator rooms, transformer vaults, and areas for switch gear, ventilating, air conditioning, and similar electrical and mechanical equipment……	75
Fire escapes	
Multiple dwellings……..	40
Others……..	100
Hospitals	
Operating rooms, laboratories, and service areas……	60
Rooms and wards……	40
Personnel areas……	40
Other (as required for occupancy or use of the area)	
Libraries	
Reading and study room areas……...	60
Stack areas (see Storage)	
Other (as required for occupancy or use of the area)	
Lobbies and similar areas…….	100
Manufacturing and repair areas……	100
Marquees……..	60
Office areas (not including record storage areas)…….	50
Parking areas	
For passenger cars, provided that the clear headroom at the entrance does not exceed 8 ft……...	50
Penal institutions	
Cell blocks……..	40
Other (as required for occupancy or use of the area)	
Plaza areas (open) accessible to the public (including landscaped portions)	100
Recreational areas	
Bowling alleys (alleys only)……	40
Poolrooms……...	75
Other (see assembly areas)	
Residential areas	
Dormitories	
Non-partitioned……..	60
Partitioned……..	40
Dwellings	
Multi-family units	
Apartments ……..	40

Public rooms (as required for occupancy or use)	
One- and two-family units	
First floor……..	40
Upper floors and habitable attics……..	30
Uninhabitable attics……..	20[c]
Hotels	
Guest rooms……..	40
Public rooms (as required for occupancy or use)	
Schools	
Classrooms……..	40
Shops (automotive and press shops)…….	100
Shops (others)…….	60
Other (as required for occupancy or use of the area)	
Stairs and exit passages (same as Fire escapes)	
Storage	
Light……	100
Warehouse……..	150
Stores	
Wholesale sales……..	100
Retail sales	
Basement and first floor……	100
Upper floors……..	75
Telephone equipment rooms……	80
Theaters	
Dressing rooms……	40
Projection room……...	100
Stage floor……...	150
Toilet areas……...	40

*** Notes:**

[a] Uniform load shall be applied to the gross floor area.

[b] 150 per cent of live load on adjoining occupied area, but not more than 100 psf.

[c] Live load need be applied to joists or to bottom chords of trusses or trussed rafters only in those portions of attic space having a clear height of 42 in. or more between joist and rafter in conventional rafter construction; and between bottom chord and any other member in trussed or trussed rafter construction. However, joists or the bottom chords of trusses or trussed rafters shall be designed to sustain the imposed dead load or 10 psf, whichever is greater, uniformly distributed over the entire span.

[d] Live loads for assembly spaces other than those described in this reference standard shall be determined from the occupant load requirements as established by section C26-601.2 using the formula 100/net floor area per occupant but shall not be less than 50 psf nor more than 100 psf.

****Local Law 39-1972***

CONCENTRATED LIVE LOADS

Use or Location	Load (lbs.)[a]	Remarks
Elevator machine room floor		See Reference Standard RS 18
Gratings, checkered plates and similar metal decks	200 (on area of 1.0 sq. in.)	Nonconcurrent with uniform live load.
Floor registers and similar floor insets	250 (on area of 2 ft. x 2 ft.)	Nonconcurrent with uniform live load.
Parking areas—passenger vehicles accommodating nine passengers, or less	2,500 (on area of 20 sq. in.) For slab or deck design	The concentrated load may be assumed to represent the reaction of a jack placed under one end of the vehicle. Omit uniform live load in area (6 ft. x 9 ft.) representing one half the vehicle, adjacent to the point of load concentration.
	1,500 (each wheel)	To be used in lieu of uniform live load in stalls of mechanized garages where there is no slab or deck.
Parking areas—trucks, buses and passenger vehicles accommodating more than nine passengers	150 per cent of maximum wheel load with vehicle loaded (on area of 20 sq. in.)	Same as for Parking areas—passenger vehicles accommodating nine passengers, or less.
Floor of office areas	2,000	Nonconcurrent with uniform live load.
Resident and multiple dwellings	200 (on area of 4.0 sq. in.)	Nonconcurrent with uniform live load.
Scuttles and skylights ribs	200	Nonconcurrent with uniform live load.
Steel joists—for each individual joist	800 (for trussed joists apply at a panel point)	Nonconcurrent with uniform live load.
Roofs	250 (on area of 2 ft. x 2 ft.)	Nonconcurrent with uniform live load. Not applicable for awnings, canopies, and similar constructions where access by persons is difficult and not intended.
Stair and fire escape treads	300 (on area 1 ft. wide by depth of the tread and spaced at 3 ft. center-to-center)	Nonconcurrent with uniform live load.
Boiler rooms	3,000	The concentrated load of 3,000 lbs. may be assumed to represent the weight of minor items of equipment (pumps, etc.) in temporary locations during installation. In addition provision shall be made for supporting the weight of the empty boiler at pertinent locations on the floor to provide for replacement of the boiler.

Note:-

[a] Except when otherwise indicated loads are assumed to be applied over an area 2 1/2 ft. x 2 1/2 ft.

UNIFORMLY DISTRIBUTED AND CONCENTRATED LIVE LOADS FOR CONSTRUCTION ELEVATOR AND MATERIAL HOIST TOWER BACK STRUCTURES

DEFINITION:
Back Structure: A system of landing platforms and/or supports designed to transmit construction elevator or material hoist tower loads into the building structure.
WALKWAY PLATFORMS
{L} Live load
1. Uniformly Distributed: 100 psf defined by the area enclosed by handrail, or by the gross area of the walkway if handrails are not provided.
2. Concentrated: 40% of the highest rated capacity of the hoist cars, non-concurrently with the uniform load,acting on a 4 square inch area anywhere within the boundary of handrail, or within the gross area of the walkway if handrails are not provided.
FRAME STRUCTURE
{L} Live load values determined by detailed analysis performed by the design professional acting on any combination of differing floor levels equal to the number of hoist cars plus one but not less than 50 psf or the carrying capacity of the elevator cars and hoist cars, whichever is greater.
SNOW LOAD
{S} 20 psf acting on the top two floors of gross plan area of the back structure.
ICE LOAD
{I} 40% of the dead load or a detailed analysis performed by the design professional based on the equivalent of one-quarter inch ice.
DYNAMIC LOADING
{d} Lateral force and moment resulting from the starting and stopping of the hoist cars. When more than one car is in operation, the dynamic loading shall reflect the most critical combination. The Dynamic loading is to be considered basic loading. Impact loading need not be considered.
DEAD LOADS {D}– REFER TO RS 9-1
WIND LOADS {W} & {w}– REFER TO RS 9-5
DESIGN LOAD COMBINATIONS
For Allowable Stress Design, factors used in loading combinations conform to section 27-594 of the Building Code. The back structures shall be designed for the critical combination of:
1. {D} + {L} + {d}
2. 0.67 ({D} + {W})
3. 0.75 ({D} + {L} + {d} + {w})
4. 0.67 ({D} + {I} + {w} + {S})

Load factors for LRFD designs shall adhere to the LRFD recommendations and guidelines contained in the reference standard for the material used.
DOB 9-2-01

* REFERENCE STANDARD RS 9-3

AASHTO HB-13-1983-Standard Specifications for Highway Bridges, Thirteenth Edition, and 1984, 1985 and 1986 Interim Specifications.
135-88 BCR

* REFERENCE STANDARD RS 9-4

AREA-1987-Specifications for Steel Railway Bridges, Chapter 15, Steel Structures, Manual for Railway Engineering.
135-88 BCR

REFERENCE STANDARD RS 9-5
MINIMUM DESIGN WIND PRESSURES

1. DESIGN WIND PRESSURES ON STRUCTURAL FRAMES.-Minimum design pressures due to wind acting on vertical surfaces shall be in accordance with table RS 9-5.1, and minimum design pressures acting normal to horizontal or inclined surfaces shall be in accordance with table RS 9-5.2. The occurrence of the pressures on vertical, horizontal, and inclined surfaces of the building shall be considered as simultaneous.

TABLE RS 9-5.1 DESIGN WIND PRESSURES ON VERTICAL SURFACES

Height zone (ft. above curb level)	Design Wind Pressure on Vertical Surfaces (psf of projected solid surface)	
	Structural Frame	Panels Glass
0-50 (signs and similar constructions of shallow depth only)…….	15	—
0-100……	20	30
101-300……	25	30
301-600……	30	35
601-1000…….	35	40
Over 1000……	40	40

TABLE RS 9-5.2 DESIGN WIND PRESSURES ON HORIZONTAL AND INCLINED SURFACES

Roof Slope	Design Wind Pressure Normal to Surface
30 degrees or less	Either pressure or suction equal to 40 per cent of the values in Table RS 9-5.1 over the entire roof area
More than 30 degrees	Windward slope—pressure equal to 60 per cent of values in Table RS 9-5.1. Leeward slope—suction equal to 40 per cent of values in Table RS 9-5.1.

2. WALL ELEMENTS.-For design of mullions, muntins, girts, panels, and other wall elements (including their fastenings), other than glass panels, the wind pressure acting normal to wall surfaces shall be 30 psf or a 20 psf suction, for all height zones up to 500 ft. These values shall be deemed to include allowance for gust pressures. For height zones over 500 ft., the applicable design pressures shall be specifically investigated, but shall not be less than the values indicated in table RS 9-5.1.

3. ROOF ELEMENTS.-The wind pressures acting on purlins, roofing, and other roof elements (including their fastenings) supporting small contributory areas of wind presentment shall be 1 1/2 times the values given in table RS 9-5.2.

4. OTHER BUILDING ELEMENTS.-Minimum wind pressures to be used in the design of other building elements shall be the values in table RS 9-5.1 multiplied by the following shape factors given in table RS 9-5.3.

TABLE RS 9-5.3 SHAPE FACTORS

Construction	Shape Factor
Signs (and their supports), or portions thereof, having 70 per cent or more of solid surface……	1.5
Signs (and their supports), or portions thereof, having less than 70 per cent of solid surface……	2.0
Tanks, cooling towers, and similar constructions…….	1.5
Upright, circular cylindrical surfaces…….	0.7
Square and rectangular chimneys….	1.5

For special structures such as curved and saw-toothed roofs, guys and cables, open trussed structures, parallel solid girders, and spheres, the design wind pressure shall be determined on the basis of recognized engineering analysis or by test.

5. EAVES AND CORNICES.-Eaves, cornices, and overhanging elements of the building shall be designed for upward pressures of twice the values given in table RS 9-5.1.

6. WIND LOAD BY MODEL TEST.-In lieu of the design wind pressures established in sections 1 and 2 of this reference standard, and subject to review and approval of the commissioner, design wind pressures may be approximated from suitably conducted model tests. The tests shall be predicated on a basic wind velocity of 80 mph at the 30 ft. level, and shall simulate and include all factors involved in considerations of wind pressure, including pressure and suction effects, shape factors, functional effects, gusts, and internal pressures and suctions.

**7. CONSTRUCTION ELEVATOR AND MATERIAL HOIST TOWER BACK STRUCTURES DEFINITIONS:

Back Structure: A system of landing platforms and/or supports designed to transmit construction elevator or material hoist tower loads into the building structure.

Inland: As defined by ASCE 7-98, exposure Category A

Coastal: As defined by ASCE 7-98, exposure Category D

WIND LOADS

{W} Storm Wind Load: equivalent to 25 yr. Mean recurrence wind per ASCE 7-98 standard, taking into account the exposure terrain, height zone, shielding coefficients, etc. In lieu of detailed analysis by the design professional, the following values may be used:

Design storm wind (25 yr. Mean Recurrence)
Wind pressure loading (in psf) on gross cross sectional area of the back structure

Zone/ Elevation	0-50 feet	50-150 feet	150-400 feet	400-700 feet	>700 feet
Inland	14.4	20.7	25.6	33.8	40
Coastal	14.4	25.6	43.2	65.5	69.6

Unless the structure is fully enclosed in curtain walls, the following wind loading shall be analyzed:

1. Parallel to the building façade per the above table.
2. Normal to the building façade at one-half the value of the above table.

Wind directions shall be considered to be non-concurrent.
{w} In-Service wind: a 35 mph (wind pressure of 3.13 psf) from any direction acting on the back structure.
*** DOB 9-2-01***

* REFERENCE STANDARD RS 9-6
EARTHQUAKE LOADS

UBC SECTION 2312-1990
Earthquake Regulations with Accumulative Supplement
MODIFICATIONS- The provisions of UBC Section 2312 shall be subject to the following modifications. The subdivisions, paragraphs, subparagraphs and items are from this section.
Subdivision (a) General.
Paragraph 1. Minimum seismic design.
Delete this paragraph and substitute the following:
"The following types of construction shall, at a minimum, be designed and constructed to resist the effects of seismic ground motions as provided in this section:
new structures on new foundations;
new structures on existing foundations; and
enlargements in and of themselves on new foundations.
Buildings classified in New York City occupancy group J-3 and not more than three stories in height need not conform to the provisions of this section.
The Commissioner may require that the following types of construction be designed and constructed to incorporate safety measures as necessary to provide safety against the effects of seismic ground motions at least equivalent to that provided in a structure to which the provisions of the section are applicable:
new buildings classified in occupancy group J-3 and which are three stories or less in height; and
enlargements in and of themselves where the costs of such enlargement exceeds sixty percent of the value of the building.
Pursuant to section 27-191 of the code the Commissioner shall have the authority to reject an application for a building permit which fails to comply with the requirements of this section.
Subdivision (b) Definitions.
Delete the definitions of the following terms and substitute the following new definitions:
"ECCENTRIC BRACED FRAME (EBF) is a steel-braced frame designed in conformance with reference standard RS 10-5C.
ESSENTIAL FACILITIES are those structures which are necessary for emergency operations subsequent to a natural disaster.
STORY DRIFT is the displacement of one level relative to the level above or below, including translational and torsional deflections."
Add the following definition before "SHEAR WALL":
"REINFORCED MASONRY SHEAR WALL is that form of masonry wall construction in which reinforcement acting in conjunction with masonry is used to resist lateral forces parallel to the wall and which is designed using reinforcement in conformance with Chapter 7 of reference standard RS 10-2."
Delete the definitions of the five frames under the SPACE FRAME paragraph and substitute the following stand-alone definitions:
"INTERMEDIATE MOMENT-RESISTING FRAME (IMRF) is a concrete frame designed in accordance with the requirements of Chapters 1 through 20 and Sections 21.1, 21.2 and 21.9 of reference standard RS 10-3.
MOMENT-RESISTING FRAME is a frame in which members and joints are capable of resisting forces primarily by flexure.
ORDINARY MOMENT-RESISTING FRAME (OMRF) is a moment-resisting frame conforming to the requirements of Chapters 1 through 20 of reference standard RS 10-3 or reference standards RS 10-5A and RS 10-5C but not meeting special detailing requirements for ductile behavior.
SPECIAL MOMENT-RESISTING FRAME (SMRF) is a moment-resisting frame conforming to reference standards RS 10-3 or RS 10-5A and RS 10-5C and specially detailed to provide ductile behavior by complying with the requirements of Chapters 1 through 20 and Sections 21.1 through 21.8 of reference standards RS 10-3 or reference standards RS 10-5A and RS 10-5C.
VERTICAL LOAD-CARRYING FRAME is a frame designed to carry all vertical gravity loads."
Subdivision (d) Criteria Selection.
Paragraph 1. Basis for design.
Delete the word "zoning" in the first sentence and delete the last sentence.
Paragraph 2. Seismic Zones.
Delete the title and paragraph and substitute the following:
"2. Seismic Zone. The seismic zone factor, Z, for buildings, structures and portions thereof in New York City shall be 0.15. The seismic zone factor is the effective zero period acceleration for S_1 type rock."
Paragraph 3. Site geology and soil characteristics.
Delete the title and the paragraph and substitute the following:
"3. Site geology, soil characteristics and foundations.
A. General.
Soil profile type and site coefficient, S, shall be established in accordance with Table No. 23-J.
B. Liquefaction.
(i) Soils of classes 7-65, 8-65, 10-65 and non-cohesive class 11-65 below the ground water table and less than fifty feet below the ground surface shall be considered to have potential for liquefaction.
(ii) The potential for liquefaction of level ground shall be determined on the basis of Standard Penetration Resistance (N) in accordance with Figure No. 4;

Category A: Soil shall be considered liquefiable.
Category B: Liquefaction is possible.
Soil shall be considered liquefiable for structures of Occupancy Categories I, II and III of Table No.23-K.
Category C: Liquefaction is unlikely need not to be considered in design.
At any site the highest category of liquefaction potential shall apply to the most critical strata or substrata.
(iii) Liquefiable soils shall be considered to have no passive (lateral) resistance or bearing capacity value during an earthquake. An analysis shall be submitted by an engineer which demonstrates, subject to the approval of the Commissioner, that the proposed construction is safe against liquefaction effects on the soil.
(iv) Where liquefiable soils are present in sloped ground or over sloped non liquefiable substrata and where lateral displacement is possible, a stability analysis shall be submitted by an engineer which demonstrates, subject to the approval of the Commissioner, that the proposed construction is safe against failure of the soil.
C. Foundation Plates and Sills.
Foundation plates or sills shall be bolted to the foundation or foundation wall with not less than one-half inch nominal diameter steel bolts embedded at seven inches into the concrete or masonry and spaced not more than six feet apart. There shall be a minimum of two bolts per piece with one bolt located within twelve inches of each end of each piece. A properly sized nut and washer shall be tightened on each bolt to the plate.
D. Foundation Interconnection of Pile Caps and Caissons.
Individual pile caps and caissons of every structure subjected to seismic forces shall be interconnected by ties. Such ties shall be capable of resisting, in tension or compression, a minimum horizontal force equal to the product of ZI/4 and the larger column vertical load at the end of each tie.
Exception: Other approved effective methods of foundation interconnection may be used where it can be demonstrated by an analysis that equivalent restraint and relative displacement can be provided."
Paragraph 5, subparagraph C, Irregular structures.
Delete the entire last sentence in item (i).
Paragraph 6, subparagraph E, Dual system.
Delete items (ii) and (iii) and substitute the following:
"(ii) Resistance to lateral load is provided by shear walls or braced frames and a moment-resisting frame (SMRF, IMRF or OMRF). The moment-resisting frames shall be designed to independently resist at least 25 percent of the design base shear. The shear walls or braced frames shall be designed to resist at least 75 percent of the cumulative story shear at every level. Overturning effects may be distributed in accordance with item (iii) below.
(iii) The two systems shall be designed to resist the total design base shear in proportion to their relative rigidities considering the interaction of the dual system at all levels."
Paragraph 7. Height limits.
Delete this paragraph.
Paragraph 8. Selection of lateral force procedure.
Delete paragraph 8 and substitute the following:
"8. Selection of lateral force procedure. All structures shall be designed using either the static lateral force procedure of Section 2312 (e) or using the dynamic lateral force procedure of Section 2312(f). In addition, the dynamic lateral force procedure shall be considered, but is not required, for the design of the following:
A. Structures over 400 feet in height.
B. Irregular structures.
C. Structures located on Soil Profile Type S_4 which have a period greater than 1 second. The analysis should include the effects of soils at the site and should conform to Section 2312(f)2."
Paragraph 9, subparagraph C, Irregular features.
Delete this subparagraph and substitute the following:
"C. Irregular features. Only structures having either vertical irregularities Type D or E as defined in Table No. 23-M or horizontal irregularities Type D or E as defined in Table No. 23-N shall be designed to meet the additional requirements of those sections referenced in the tables."
Paragraph 10. Alternate procedures.
Add at the end of the paragraph the words "when such procedures are consistent with this standard and subject to the approval of the Commissioner".
Subdivision (e) Minimum Design Lateral Forces and Related Effects.
Paragraph 1. General, subparagraph A.
Add the words "parking structures" before the word "storage" in the first sentence.
Paragraph 1. General, subparagraph C.
Delete this subparagraph.
Paragraph 2, subparagraph A, Design base shear.
Change the value for the minimum ratio of C/R_W shown at the end of this subparagraph to "0.050".
Paragraph 2, subparagraph B, Structure period.
Delete the values in item (i) for C_t and substitute the following:
"C_t = 0.035 for concrete and steel moment-resisting frames.
C_t = 0.030 for eccentric braced frames.
C_t = 0.030 for dual systems where the building height exceeds 400 feet or 0.020 for heights less than 160 feet and varies linearly from 0.020 to 0.030 for building heights from 160 to 400 feet.
C_t = 0.020 for all other structures."
Delete the sentence immediately after "C_t = 0.020 for all other structures" and substitute the following:
"Alternately, the value of T for structures with concrete or masonry shear walls may be taken as $0.1(h_n)$ ¾ √Ac."
Paragraph 3, subparagraph C, Combinations along different axes.

Delete this subparagraph.
Paragraph 6. Horizontal torsional moments.
Delete the fourth paragraph starting with words "Where torsional irregularity exists" and ending with the words "considered for design."
Paragraph 7, Overturning, subparagraph B.
Delete the words "Seismic Zones 3 and 4" at the beginning of this subparagraph.
Delete item (iii) and substitute the following:
"(iii) Such columns shall meet the detailing or member limitations of reference standard RS 10-3 for concrete and reference standard RS 10-5C for steel structures."
Paragraph 7, subparagraph C.
Delete this subparagraph and substitute the following:
"C. For regular buildings, the force F_t may be omitted when determining the overturning moment to be resisted at the foundation-soil interface."
Paragraph 8. Story drift limitation.
Change the value for the minimum ratio of C/R_w shown at the end of this paragraph to "0.050".
Paragraph 9. P-delta effects.
Delete the last sentence of this paragraph.
Paragraph 10. Vertical component of seismic forces.
Delete this paragraph in its entirety and substitute the following:
"10. Vertical component of seismic forces. Horizontal cantilever components shall be designed for a net upward force of 0.05 W_p."
Subdivision (f) Dynamic lateral force procedure.
Paragraph 2. Ground motion.
Add the following at the end of subparagraph A.:
"For soil type S_4 profile, see B. below."
Add the following at the end of subparagraph B.:
"The design of all structures located on a soil of type S_4 profile shall be based on properly substantiated site-specific spectra."
Paragraph 5, subparagraph C, Scaling of results.
Add after the word "procedures" in the first sentence, the words "including the appropriate Importance Factor, I,".
Delete item (i) and substitute the following:
"(i) The base shear shall be increased to the following percentage of the value determined from the procedures of Section 2312 (e), including consideration of the minimum value of C/R_w, except that the coefficient C, for a period T greater than 3 seconds, may be calculated as 1.80 S/T:
(a) 100 percent for irregular buildings; or
(b) 90 percent for regular buildings, except that base shear shall not be less than 80 percent of that determined from Section 2312 (e) using the period, T, calculated from Method A."
Paragraph 5, subparagraph D, Directional effects.
Delete the words "and prestressed elements" in the second sentence and delete the word "Alternately" at the start of the third sentence.
Paragraph 5, subparagraph F, Dual systems.
Delete this subparagraph and substitute the following:
"F. Dual systems. Where the lateral forces are resisted by a dual system, as defined in Section 2312(d)6E above, the combined system shall be capable of resisting the base shear determined in accordance with this section. The moment-resisting frame, shear walls and braced frames shall conform to Section 2312(d)6E. The moment-resisting frame may be analyzed using either the procedures of Section 2312(e)4 or those of Section 2312(f)5."
Paragraph 6. Time history analysis.
Add the following words at the end of the sentence: "and the results shall be scaled in accordance with Section 2312(f)5C".
Subdivision (h) Detailed Systems Design Requirements.
Paragraph 1. General.
Delete the words "Chapters 24 through 28" in the fourth sentence of the first paragraph and insert the words "reference standard RS 10".
Delete the words "in Seismic Zones 2, 3 and 4" in the second and fourth paragraphs.
Paragraph 2, subparagraph A, General.
Delete the words "Chapters 24 through 27" at the end of this subparagraph and insert the words "reference standard RS 10".
Paragraph 2, subparagraph C, Connections.
Delete this subparagraph.
Paragraph 2, subparagraph D, Deformation compatibility.
Delete the words "to the reinforcing steel" from the last sentence.
Paragraph 2, subparagraph G, Concrete frames.
Delete this subparagraph and substitute the following:
"G. Concrete frames. Concrete frames required by design to be part of the lateral force resisting system shall, at a minimum, be intermediate moment-resisting frames, except as noted in Table 23-0."
Paragraph 2, subparagraph H, Anchorage of concrete or masonry walls.
Delete the words "Section 2310" in the fifth line and insert the words "reference standards RS 9-6, 10-1B and 10-2".
Paragraph 2, subparagraph I, Diaphragms.
Delete items (iv), (v) and (vi).
Paragraph 2, subparagraph J, Framing below the base.
Delete the words "Chapters 26 and 27" in the third line and insert the words "reference standards RS 10-3 and RS 10-5C".
Paragraph 2, subparagraph K, Building separations.
Delete this subparagraph and substitute the following:
"K. Building Separations. All structures shall be separated from adjoining structures. Separation due to seismic forces shall allow for 1 inch displacement for each 50 feet of total building height. Smaller separation may be permitted when the effects of pounding can be accommodated without collapse of the building."
Subdivision (i) Nonbuilding Structures.
Paragraph 4. Other nonbuilding structures.

Delete in the first sentence of item (iii) the word "national" and insert the word "reference", and delete the words "seismic zones and" in the paragraph following item (iii).
Subdivision (j) Earthquake-recording Instrumentations.
Delete this subdivision.
Table No. 23-I, Seismic Zone Factor Z.
Delete this table and substitute the following new table:

TABLE NO. 23-I
SEISMIC ZONE FACTOR Z

ZONE	NEW YORK CITY
Z	0.15

Table No. 23-J, Site Coefficients.
Delete this table and notes and substitute the following new table and notes:

TABLE NO. 23-J
SITE COEFFICIENTS

TYPE	DESCRIPTIONS	FACTOR
S_o	A profile of Rock materials of class 1-65 TO 3-65	0.67
S_1	A soil profile with either: (a) Soft Rock (4-65) or Hardpan (5-65) or similar material characterized by shear-wave velocity greater than 2500 feet per second, or (b) Medium Compact to Compact Sands (7-65) and Gravels (6-65) or Hard Clays (9-65), where the soil depth is less than 100 feet.	1.0
S_2	A soil profile with Medium Compact to Compact Sands (7-65) and Gravels (6-65) or Hard Clays (9-65), where the soil depth exceeds 100 feet.	1.2
S_3	A total depth of overburden of 75 feet or more and containing more than 20 feet of Soft to Medium Clays (9-65) or Loose Sands (7-65, 8-65) and Silts (10-65), but not more than 40 feet of Soft Clay or Loose Sands and Silts.	1.5
S_4	A soil profile containing more than 40 feet of Soft Clays (9-65) or Loose Sands (7-65, 8-65), Silts (10-65) or Uncontrolled Fills (11-65), where the shear-wave velocity is less than 500 feet per second.	2.5

Notes:

1. The site S Type and correspondings S Factor shall be established from properly substantiated geotechnical data with the classes of materials being defined in accordance with Section 27-675 (C26-1103.1) of the administrative code of the City of New York.
2. The soil profile considered in determining the S Type shall be the soil on which the structure foundations bear or in which pile caps are embedded and all underlying soil materials.
3. Soil density/consistency referred to in the table should be based on standard penetration test blow counts (N-values) and taken as: (a) for sands, loose - where N is less than 10 blows per foot, medium compact - where N is between 10 and 30, and compact - where N is greater than 30 blows per foot; and (b) for clays, soft - where N is less than 4 blows per foot, medium - where N is between 4 and 8, stiff to very stiff - where N is between 8 and 30, and hard - where N is greater than 30 blows per foot.
4. When determining the type of soil profile for profile descriptions that fall somewhere in between those provided in the above table, the S Type with the larger S factor shall be used.
5. For Loose Sands, Silts or Uncontrolled Fills below the ground water table, the potential for liquefaction shall be evaluated by the provisions of Section 2312(d)3.

Table No. 23-K, Occupancy Categories.

Add the words "Buildings for schools through secondary or day-care centers - capacity more than 250 students" below the words "Fire and police stations" in the Essential Facilities category, and delete those words from within the Special Occupancy Structure Category.

Add in item III Special Occupancy Structure to the words, "All structures with occupancy > 5000 persons", the words "excluding Occupancy Group E buildings".

Table No. 23-0, Structural Systems.
Delete this table and notes and substitute the following new Table No. 23-0 and notes.

TABLE NO. 23-O
STRUCTURAL SYSTEMS

BASIC STRUCTURAL SYSTEM	LATERAL LOAD-RESISTING SYSTEM DESCRIPTION	R_w
A. Bearing Wall System	1. Light-framed walls with shear panels	
	a. Plywood walls for structures three stories or less	8
	b. All other light-framed walls	6
	2. Shear Walls	
	a. Concrete	6
	b. Reinforced masonry	5
	3. Light steel-framed bearing walls with tension-only bracing	4
	4. Braced frames where bracing carries gravity load	
	a. Steel	6
	b. Concrete	4
	c. Heavy timber	4
B. Building Frame System	1. Steel eccentric braced frame (EBF)	10
	2. Light-framed walls with shear panels	
	a. Plywood walls for structures three-stories or less	9
	b. All other light-framed walls	7
	3. Shear Walls	
	a. Concrete	8
	b. Reinforced masonry	6
	4. Concentric braced frames	
	a. Steel	8
	b. Concrete	8
	c. Heavy timber	8
C. Moment-Resisting Frame System	1. Special moment-resisting frames (SMRF)	
	a. Steel	12
	b. Concrete	12
	2. Concrete intermediate moment-resisting frames (IMRF)	8
	3. Ordinary moment-resisting frames (OMRF)	
	a. Steel	6
	b. Concrete [4]	4
D. Dual System	1. Shear Walls	
	a. Concrete with SMRF	12
	b. Concrete with Steel OMRF	6
	c. Concrete with concrete IMRF	9
	d. Concrete with concrete OMRF	5
	e. Reinforced masonry with SMRF	8
	f. Reinforced masonry with steel OMRF	6
	g. Reinforced masonry with concrete IMRF	7
	2. Steel eccentric braced frame	
	a. With steel SMRF	12
	b. With steel OMRF	6
	3. Concentric braced frames	
	a. Steel with steel SMRF	10
	b. Steel with steel OMRF	6
	c. Concrete with concrete SMRF	9
	d. Concrete with concrete IMRF	6

Notes:

1. Basic structural systems are defined in Section 2312(d)6.
2. See Section 2312(e)3 for combinations of structural systems.
3. See Sections 2312(d)8C and 2312(d)9B for undefined systems.
4. Prohibited with S_3 or S_4 soil profiles or where the height exceeds 160 feet.

Table No. 23-P, Horizontal Force Factor C_p.
Delete this table and notes and substitute the following new Table No. 23-P and notes:

TABLE NO. 23-P
HORIZONTAL FORCE FACTOR C_P[1]

ELEMENTS OF STRUCTURES, NONSTRUCTURAL COMPONENTS AND EQUIPMENT	VALUE OF C_p
I. Part of Portion of Structure	
1. Walls, including the following:	
a. Unbraced (cantilevered) parapets.	2.00
b. Other exterior walls above street grade[2].	0.75
c. All interior bearing walls.	0.75
d. All interior nonbearing walls and partitions around vertical exits, including offsets and exit passageways.	0.75
e. Nonbearing partitions and masonry walls in areas of public assembly > 300 people.	0.75
f. All interior nonbearing walls and partitions made of masonry in Occupancy I, II and III.	0.50
g. Masonry or concrete fences at grade over 10 feet high.	0.75
2. Penthouses (defined in article 2 of subchapter 2 of chapter 1 of title 27 of the building code) except where framed by an extension of the building frame.	0.75
3. Connections for prefabricated structural floor and roof elements other than walls (see above) with force applied at center of gravity.	
4. Diaphragms[3].	
II. Nonstructural Components	
1. a. Exterior ornamentation and appendages including cornices, ornamental statuaries or similar pieces of ornamentation.	2.00
b. Interior ornamentation and appendages in areas of public assembly including cornices, ornamental statuaries or similar pieces of ornamentation.	2.00
2. Chimneys, stacks, trussed towers and tanks on legs.	
a. Supported on or projecting as an unbraced cantilever above the roof more than one-half its total height.	2.00
b. All others, including those supported below the roof with unbraced projection above the roof less than one-half its height, or braced or guyed to the structural frame at or above its center of mass.	0.75
3. Exterior signs and billboards.	2.00
III. Equipment and Machinery[4].	
1. Tanks and vessels (including contents), including support systems and anchorage.	0.75

Notes:

1 See Section 2312(g)2 for additional requirements for determining C_p for nonrigid equipment or for items supported at or below grade.
2 See Section 2312(h)2D(iii) and Section 2313(g)2.
3 See Section 2312(h)2I.
4 Equipment and machinery include such items as pumps for fire sprinklers, motors and switch gears for sprinkler pumps, transformers and other equipment related to life-safety including control panels, major conduit ducting and piping serving such equipment and machinery.

Figure No. 3, Normalized Response Spectra Shapes.
Delete the Figure No. 3 and insert the new Figure 3 and Table No. 23-R.

TABLE NO. 23-R
SPECTRAL ACCELERATION IN FRACTION OF G 5% DAMPING

T-SEC	S_0	S_1	S_2	S_3
.01	0.150	0.150	0.150	0.150
.02	0.150	0.150	0.150	0.150
.05	0.375	0.283	0.262	0.244
.075	0.375	0.375	0.336	0.303
.090	0.375	0.375	0.375	0.334
.112	0.375	0.375	0.375	0.375
.267	0.375	0.375	0.375	0.375
.40	0.250	0.375	0.375	0.375
.48	0.208	0.313	0.375	0.375
.60	0.167	0.250	0.300	0.375
1.00	0.100	0.150	0.180	0.225
2.00	0.050	0.075	0.090	0.113
3.00	0.033	0.050	0.060	0.075

Note: This table presents acceleration (g) versus natural period (seconds) to facilitate the presentation of spectra in log-log form.
Local Law 17-1995.

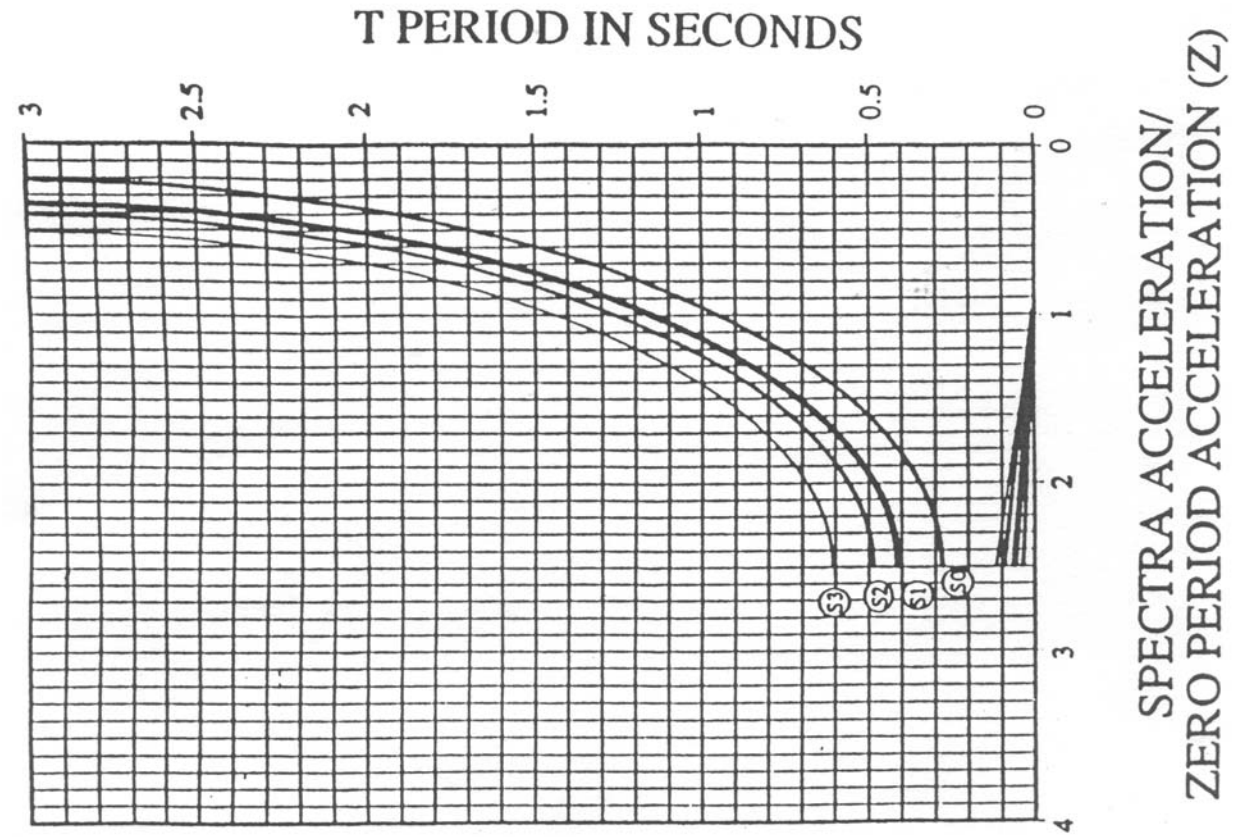
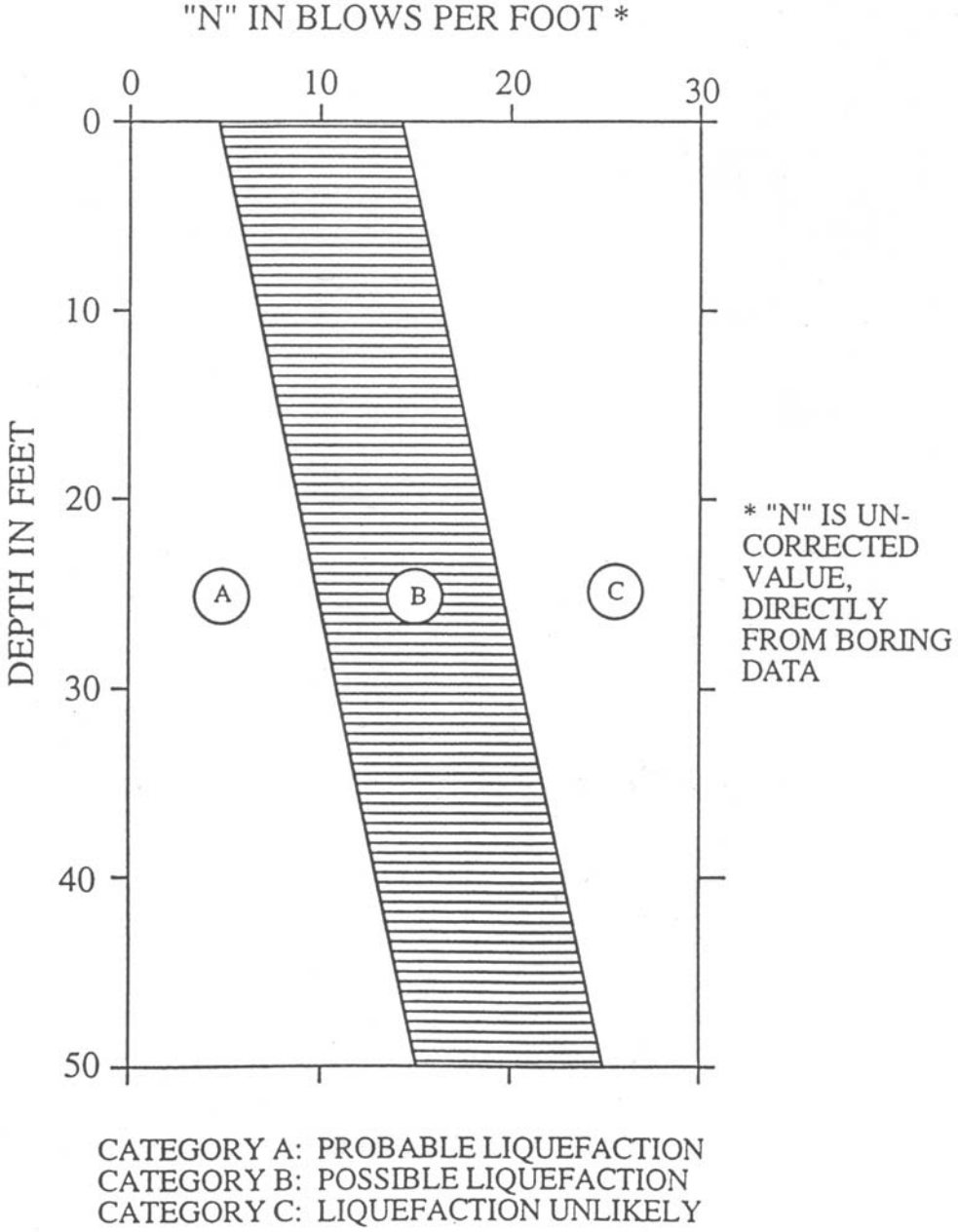


FIGURE NO. 3
NORMALIZED RESPONSE SPECTRA
5% DAMPING

FIGURE NO. 4



CATEGORY A: PROBABLE LIQUEFACTION
CATEGORY B: POSSIBLE LIQUEFACTION
CATEGORY C: LIQUEFACTION UNLIKELY

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REFERENCE STANDARD RS-10
STRUCTURAL WORK
* LIST OF REFERENCED NATIONAL STANDARDS

ANSI-A41.2	Building Code Requirements for Reinforced Masonry as Modified	1960
ANSI/ACI-318	Building Code Requirements for Reinforced Concrete (with Modifications)	1983
ACI-525	Minimum Requirements for Thin Section Precast Concrete Construction as Modified	1963
***AISC Steel Specification ASD	Specification for Structural Steel Buildings, Allowable Stress Design and Plastic Design, June 1, 1993	1993
***AISC Steel Specification LRFD	Load and Resistance Factor Design Specification for Structural Steel Buildings, Effective December 1, 1993	1993
RCSCEF/AISC	Specifications for Structural Joints Using ASTM A325 or A490 Bolts. Approved November 13, 1985	1985
AISI	Specification for the Design of Cold-Formed Steel Structural Members, August 19, 1986, as Modified	1986
AISI	Specification for the Design of Cold-Formed Stainless Steel Structural Members	1974
SJI	Standard Specifications for Open Web Steel Joists, H-Series, February 15, 1978, Revised November 7, 1983, as Modified	1978
SJI	Standard Specifications for Open Web Steel Joists, K-Series, November 4, 1985, Revised May 19, 1987	1985
SJI	Standard Specification for Long Span Steel Joists, and LH-Series and Deep Long Span Steel Joists, and DLH-Series, February 5, 1978 Revised May 19, 1987, as Modified	1978
SJI	Standard Specification for Joist Girders, May 15, 1978, Revised May 19, 1987, as Modified	1978
SJI	Standard Specifications, Load Tables and Weight Tables for Steel Joists and Joist Girders	1988
ACI 506.2	Specification for Materials, Proportioning and Application of Shotcrete-1983 Revision	1977
NFoPA	National Design Specifications for Wood Construction and its January 1986 Supplement with 1987 Revisions	1986
****AA	Aluminum Design Manual Part 1-A Specification for Aluminum Structures Allowable Stress Design (Seventh Edition, January 2000)	2000
**** 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)	2000
ASTM C317 76	Standard Specification for Gypsum Concrete (Reapproved 1981)	1976
NFoPA	Span Tables for Joists and Rafters	1977
ACI-214	Recommended Practice for Evaluation of Strength Test Results of Concrete (Reapproved 1983)	1977
ANSI/ASTM-C42	Standard Method of Obtaining and Testing Drilled Cores and Sawed Beams of Concrete	1984a
ANSI/ASTM-C39	Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens	1984
ASTM B209	Standard Specification for Aluminum and Aluminum Alloy Sheet and Plate	1988
ASTM B308	Standard Specification for Aluminum-Alloy 6061-T6 Standard Structural Shapes, Rolled or Extruded	1988
ASTM B429	Standard Specification for Aluminum Alloy Extruded Structural Pipe and Tube	1988
ANSI/AITC-A190.1	Structural Glued Laminated Timber and AITC 200-83 Inspection Manual	1983
ANSI/ASTM-C79	Standard Specification for Gypsum Sheathing Board	1987
AWPA-C2	Standard for the Preservative Treatment of Lumber, Timbers, Bridge Ties and Mine Ties by Pressure Processes	1988
ANSI/ASTM-C192	Standard Method of Making and Curing Concrete Test Specimens in the Laboratory	1981
AWPA-C9	Standard for the Preservative Treatment of Plywood by Pressure Processes	1985
ANSI/ASTM-A153	Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware	1982
ASTM-A90	Tests for Weight of Coating on Zinc-Coated (Galvanized) Iron or Steel Articles	1981
ANSI/ASTM-A586	Standard Specification for Zinc-Coated Steel Parallel and Helical Steel Wire Structural Strand	1986
ASTM-A603	Standard Specification for Zinc-Coated Steel Structural Wire Rope	1988
ASTM A434	Specification for Quenched and Tempered Alloy Steel Bars, Hot-Wrought or Cold Finished	1981

Reference Standard 10

ASTM-B6	Standard Specification for Zinc (Slab Zinc)………………………………….……………..…... 1987
ASTM-D2277	Specification for Fiberboard Nail-Base Sheathing………………………………….……......…... 1987
AWPA-C4	Standard for Preservative Treatment of Poles by Pressure Processes...……………………… 1988
AWPA-M4	Standard for the Care of Pressure-Treated Wood Products..………….……………………… 1984
ANSI-A82.1/ASTM-C67	Standard Methods of Sampling and Testing Brick and Structural Clay Tile..…….…………. 1987
ANSI-A98.1/ASTM-C62	Standard Specification for Building Brick (Solid Masonry Units Made from Clay or Shale).. 1988
ANSI-A99.1/ASTM-C216	Standard Specification for Facing Brick (Solid Masonry Units made from Clay or Shale)…..1987a
ANSI-ASTM-C652	Standard Specification for Hollow Brick (Hollow Masonry Units made from Clay or Shale)…….1988
ANSI-A78.1/ASTM-C73	Standard Specification for Calcium Silicate Face Brick (Sand-Lime Brick)......................….. 1985
ANSI-A75.1/ASTM-C55	Standard Specification for Concrete Building Brick ..……………………………………….. 1985
ANSI-A74.1/ASTM-C34	Standard Specification for Structural Clay Load Bearing Wall Tile………………………….. 1984
ANSI-ASTM-C56	Standard Specification for Structural Clay Non-Load Bearing Tile (Reapproved 1986)..........1971
ANSI-A81.1/ASTM-C145	Standard Specification for Solid Load-Bearing Concrete Masonry Units…………………… 1985
ANSI-A79.1/ASTM-C90	Standard Specification for Hollow, Load-Bearing Concrete Masonry Units........................... 1985
ANSI-A80.1/ASTM-C129	Standard Specification for Hollow, Non-Load Bearing Concrete Masonry Units....……......... 1985
ANSI/ASTM-/C52	Standard Specification for Gypsum Partition Tile or Block (Reapproved 1977)..........…….. 1954
ANSI/A101.1/ASTM-C126	Standard Specification for Ceramic Glazed Structural Clay Facing Tile, Facing Brick and Solid Masonry Units……………..………………………..…………………………………..1986
ANSI/ASTM-A116	Standard Specification for Zinc-Coated (Galvanized) Steel Woven Fence Fabric.................. 1988
ANSI/ASTM-B227	Standard Specifications for Hard-Drawn Copper-Clad Steel Wire (Reapproved 1980)……... 1970
FS SS-S-721C	Stone, Architectural, Cast..........……..……...............…..... …………………..…………... 1964
ANSI/ASTM-C494	Standard Specification for Chemical Admixtures for Concrete..………………………....…... 1986
ACI-ASCE-334	Concrete Shell Structures Practice and Commentary. Report of Committee 334 of American Concrete Journal of the American Concrete Institute, Proc. V61, M.9, Sept. 1964 (Revised 1982)........1964
ANSI/ASTM-C270	Standard Specification for Mortar for Unit Masonry…….…………………………………... 1988
ANSI/ASTM-C476	Standard Specification for Grout for Reinforced and Non-Reinforced Masonry......………… 1983
ANSI/ASTM-C22	Standard Specification for Gypsum………………………………………………………... 1983
ASTM-C143	Standard Test Method for Slump of Portland Cement Concrete……………...……………… 1978
ANSI/ASTM-C172	Standard Method of Sampling Freshly Mixed Concrete………………………...………… 1982
ANSI/ASTM-C31	Standard Method of Making and Curing Concrete Test Specimens in the Field...................... 1987
APA	Plywood Design Specifications...…………..…...............……………………………………… 1986
APA PRP-108	Performance Standards and Policies for Structural-Use Panels……………………………… 1986
APA	Design and Fabrication Specification of all Plywood Lumber Components............................1985
TECO	Standard and Policies for Structural-Use Panels…………………………………………... 1981
DOC PS 1-83	U.S. Product Standard for Construction & Industrial Plywood (Revised June 1987)..........….1983
ACI-211.2	Standard Practice for Selecting Proportions for Structural Lightweight Concrete.........……..1981
ANSI-Z97.1	Safety Performance Specifications and Methods of Test for Safety Glazing Materials Used in Buildings.......…………………………………………………………………………… 1984
ASTM C1036	Standard Specification for Flat Glass....…………...…….………………………………… 1985
ASTM C1048	Standard Specification for Heat-Treated Flat Glass Kind HS, Kind FT Coated and Uncoated Glass... 1987
AISC- LRFD	Load and Resistance Factor Design Specification for Structural Steel Buildings, effective September 1, 1986, as Modified ………………………………………………………... 1986
ANSI/ASTM-C173	Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method….. 1978
ANSI/ASTM-C231	Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method… 1982
ANSI/ASTM-C138	Standard Test Method for Unit Weight, Yield, and Air Content (Gravimetric) of Concrete… 1981
ANSI/ASTM-C567	Standard Test Method for Unit Weight of Structural Lightweight Concrete………………… 1985
**ACI 530/ASCE 5	Building Code Requirements for Masonry Structures, as modified…………………...…... 1992
**ACI 530.1/ASCE 6	Specifications for Masonry Structures, as modified ………………..……….……..…….... 1992
**ANSI/ACI-318	Building Code Requirements for Reinforced Concrete, as modified……………….……... 1989

Reference Standard 10

**MNL-120	Prestressed Concrete Institute Design Handbook, Third Edition……..…	1985
**UBC Section 2723	Steel Structures Resisting Forces Induced by Earthquake Motions in Seismic Zones Nos. 1 and 2 with Accumulative Supplement, as modified…….……....	1990
**AITC 117	Specification for Structural Glued Laminated Timber of Softwood Species - Design Standard…..	1987
	and Manufacturing Standard ……..……	1988
**APA Form No. L350C	Diaphragms - Design/Construction Guide……	1989
**APA Form No. E30K	Residential & Commercial Design/Construction Guide..…….……	1989

Local Law 65-1990; 455-89 BCR; 617-87 BCR; 9-87 BCR; 1077-86 BCR; 738-86 BCR; 208-85 BCR; 288-84 BCR; 425-81 BCR; 714-80 BCR;493-80 BCR; 390-80 BCR; 142-80 BCR; 51-80 BCR; 799-79 BCR; 510-79 BCR; 302-73 BCR; 302-71 BCR

****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.
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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.
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*** 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.

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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.

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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.

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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.

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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-1993 Specification for Structural Steel Buildings - Allowable Stress Design and Plastic Design, effective June 1, 1993, 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-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.

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.
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, ½	20	24
32/16	15/32, ½, 5/8	30	28
40/20	19/32, 5/8, ¾	40	32
48/24	23/32, 3/4	48	36
Panel Span Rating,[b] Roof/ Floor Span	Load (psf) Total	Live	Floor Maximum span[e] (inches)
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 1 1/2 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	½	4	24	35	25
	½	5	24	55	40
	15/32	5	24	25	20
	½	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	½ in.	5/8 in.	¾ in.
2, 3	5/8 in.	¾ in.	7/8 in.
4	¾ 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 thicknesses 1/32 inch thinner than the norminal 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.

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

Local Law 17-1995.

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.

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.

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

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	
					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)
Plywood Grade	Common Nail Size	Minimum Nail Penetration in Framing (in.)	Minimum Nominal Plywood Thickness (in.)	Minimum Nominal Width of Framing Member (in.)	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 3/8	1/2	2	290	385	575[b]	655[b]	255	190
Product				3	325	430	650	735	290	215
Standard			3/8	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.

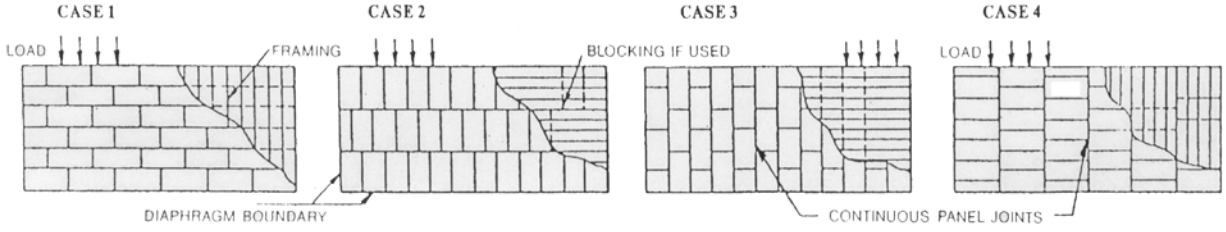

TABLE RS 10-9.7 ALLOWABLE SHEAR FOR WIND FOR VERTICAL PLYWOOD DIAPHRAMS a,b
(lbs. per ft. of vertical run)

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 ½ 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.

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.

* **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 Hollow, 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

****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-C125 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.

††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

#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