

APPENDIX A

REFERENCED STANDARDS

Part I

The following is a listing of the standards referenced in this code, the effective date of the standard, the promulgating agency of the standard and the section(s) of this code that refer to the standard.

AA Aluminum Association
900 19th Street, N.W.
Suite 300
Washington, D.C. 20006

Standard reference	Title	Referenced in code Section number
ASM 35-80	Aluminum Sheet Metal Work in Building Construction - Specifications for	1901.1
SAS 30-86	Aluminum Structures - Specification for	1901.1

AAMA American Architectural Manufacturers Association
2700 River Road, Suite 118
Des Plaines, Illinois 60018

1402-86	Standard Specifications for Aluminum Siding, Soffit and Fascia	Table 2104.1
1503.1-80	Test Methods of Thermal Transmittance of Windows, Doors and Glazed Wall Sections	3108.2

THE MASSACHUSETTS STATE BUILDING CODE

AASHTO

American Association of State Highway and
Transportation Officials
444 North Capitol Street, N.W.
Suite 225
Washington, D.C. 20001

HB-13-83 Highway Bridges, Standard Specifications for
1984, 1985, and 1986 Supplements Table 1106

ACI

American Concrete Institute
P.O. Box 19150
Detroit, Michigan 48219

318-83 Reinforced Concrete
- Building Code Requirements for
- 1986 Revision 1113.5.1, 1113.5.1.2,
1113.5.1.4, 1113.5.5.5,
1209.2, 1209.6, 1410.1,
1411.1, 1599.1, 1500.2,
1501.1, Table 1501.1,
1502.1, 1502.2, 1502.4.2,
1502.5.1, 1502.6.1, 1502.7,
1503.1, 1503.2, 1503.2.1,
1503.3.3, 1503.3.4,
1503.4.1, 1503.4.4,
1504.3.2, 1504.6.2, 1506.1,
1506.3.1, 1506.5, 1506.6.2,
1506.6.5

318.1-83 Structural Plain Concrete
- Building Code Requirements for 1500.2, 1500.7

506.2-77 Shotcrete, Specification for Materials,
Proportioning, and Application of
- 1983 Revision 1508.9

531-79 Concrete Masonry Structures - Building
Code Requirements for - 1983 Revisions 908.3, 1410.1, 1411.1,
1412.1, 1417.3, 1418.1,
1422.3, 1804.1

REFERENCED STANDARDS

AHA

American Hardboard Association
520 N. Hicks Road
Palatine, Illinois 60067

A135.6-84	Hardboard Siding	1709.7, 2104.1.2
A135.4	. . . . .	2104.1.1
A194.1-85	Cellulosic Fiber Board	1709.7

AISC

American Institute of Steel Construction, Inc.
400 N. Michigan Avenue
Chicago, Illinois 60611

AISC-78	Design, Fabrication and Erection of Structural Steel for Buildings - Specification for the - Supplement #1 - Effective Jan. 1, 1989	1801.1
AISC -LF-86	Load and Resistance Factor Design Specifications for Structural Steel Buildings	1801.1

AISI

American Iron and Steel Institute
1000 Sixteenth Street, N.W.
Washington, D.C. 20036

AISI-73	Structural Applications of Steel Cables for Buildings - Manual for	1807.2
AISI-74	Design of Cold Formed Stainless Steel Structural Members - Specification for	1802.1
AISI-80	Designing Fire Protection for Steel Columns . . .	903.1.1
AISI-81	Designing Fire Protection for Steel Trusses	903.1.1
AISI-84	Designing Fire Protection for Steel Beams	903.1.1
AISI-86	Design of Cold Formed Stainless Steel Structural Members - Specification for	1802.1
----	Criteria for Structural Applications of Steel Cables for Buildings	1807.2

THE MASSACHUSETTS STATE BUILDING CODE

AITC

American Institute of Timber Construction
333 W. Hampden Avenue
Englewood, Colorado 80110

108-86	Heavy Timber Construction - Standard for	1702.1
109-84	Structural Glued Laminated Timber - Treating Specification for	1708.2
112-81	Tongue and Groove Heavy Timber Roof Decking - Standard for	1702.1
117-85	Structural Glue Laminated Timber of Softwood Species - Design Specification for - Addendum 1985	1702.1
A190.1-83	Hardwood Glued Laminated Timber - Standard Specification for	1702.1
----	Structural Glued Laminated Timber	1702.1
----	Timber Construction Manual	1113.5.4.1, 1113.5.4.2

ANSI

American National Standards Institute, Inc.
1430 Broadway
New York, New York 10018

A10.5-81	Material Hoists - Safety Requirements for	2614.5
A12.1-73	Floor and Wall Openings, Railings, and Toeboards Safety Requirements for	3013.4
A13.1-81	Scheme for the Identification of Piping Systems .	603.5.3
A58.1-82	Loads, Minimum Design in Building and other Structures - Building Code Requirements for . .	623.4, 1104.1, 1112.12 1112.12.2,
A108.4-85	Ceramic Tile with Organic Adhesives or Water Cleanable Tile Setting Epoxy Adhesives - Installation of	1409.6
A108.5-85	Tile, Ceramic, Installed with Dry Set Portland Cement Mortar	1409.5.1, 1409.5.2
A108.6-85	Tile, Ceramic, Installed with Grouting Epoxy . . .	1409.7
A108.7-85	Tile, Electrically Conductive Ceramic, Installed with Conductive Dry Set Portland Cement Mortar .	1409.5.1
A117.1-86	Making Buildings and Facilities Accessible to, and Usable by, the Physically Handicapped People - Specification for	512.4, 2607.4
A118.1-85	Dry Set Portland Cement Mortar - (For Ceramic Tile)	1409.5.1

REFERENCED STANDARDS

ANSI

(Continued)

A118.2-85	Conductive Dry Set Portland Cement Mortar, Standard Specification for (Ceramic Tile)	1409.5.1
A118.3-85	Epoxy, Chemical Resistant, Water Cleanable Tile Setting and Grouting - Standard Specification for	1409.7
A118.4-85	Latex Portland Cement Mortar- Standard Specification for (Ceramic Tile)	1409.5.2
A136.1-85	Organic Adhesives for Installation of Ceramic Tile	1409.6
A208.1-79	Mat Formed Wood Particle Board	1711.1, 1711.2
B153.1-81	Construction, Care and Use of Automobile Lifts Safety Requirements for	2615.1
Z49.1-83	Safety in Welding and Cutting	3018.5
Z97.1-84	Safety Glazing Material Used in Buildings - Performance Specifications and Methods of Test for	2203.1, 2206.1
A119.1-74	. . . . .	3300.3
101-85	. . . . .	3107.5.1, 3107.5.2
2-80	. . . . .	3107.5.1

APA

American Plywood Association
7011 S. 19th Street
Tacoma, Washington 98466

E30-86	Design/Construction Guide Residential and Commercial	1710.1
E315C-86	Plywood Diaphragms, Report No. 138	1701.1, 1708.3
H815-85	Design and Fabrication of All-Plywood Beams . .	1708.3
S811-85	Plywood Curved Panels - Design and Fabrication of	1707.1, 1708.3
S812-86	Plywood Lumber Beams - Design and Fabrication of	1707.1, 1708.3
U813-84	Plywood Stressed-Skined Panels - Design and Farbrication of	1707.1, 1708.3
U814-82	Plywood Sandwich Panels - Design and Fabrication of	1707.1, 1708.3
Y510-86	Plywood Design Specification	1710.1

THE MASSACHUSETTS STATE BUILDING CODE

ARI

Air-Conditioning & Refrigeration Institute
1501 Wilson Boulevard
Arlington, VA 22209

210-84	.....	Table 3111.4, 3111.5
210-81	.....	Table 3111.4, 3111.5
240-81	.....	Table 3111.4, 3111.5
240-84	.....	Table 3111.4, 3111.5
365-85	.....	Table 3111.6
550-83	.....	Table 3111.6
590-81	.....	Table 3111.6

ASHRAE

American Society of Heating,
Refrigerating and Air Conditioning Engineers
1791 Tullie Circle, N.E.
Atlanta, Georgia 30329

55-81	.....	3105.4.2
AHB-82	Applications Handbook-1982 Edition	..... 3108.5
AHB-85	Applications Handbook-1985 Fundamental Volume	..... 3108.2, 3114.3.2.2, 3114.4.3.2

ASME

American Society of Mechanical Engineers
United Engineering Center
345 East 47th Street
New York, New York 10017

ASME-86	Boiler and Pressure Vessel Code, Section VIII, Division 1&2 - Summer 86 Addenda	..... 2614.4
A17.1-84	Elevator, Dumbwaiters, and Moving Walks Safety Code for - 1985 Supplement	..... 2600.2, 2603.3.2 2604.4, 2607.2
B31.3-84	Power Piping	..... 603.5

REFERENCED STANDARDS

ASTM

American Society for Testing Materials
1916 Race Street
Philadelphia, Pennsylvania 19103

A48-83	Gray Iron Castings - Specifications for	1806.1
A256-82	Cast Iron - Compression Testing of	1806.1
A706-84	Low-Alloy Steel Deformed Bars for Concrete Reinforcement - Specifications for . .	1502.5.2
C5-84	Quicklime for Structural Purposes - Specifications for	Table 1601
C28-86	Gypsum Plasters - Specifications for	Table 1601
C31-84	Making and Curing Concrete Test Specimens in the Field - Practice for	1503.4.2, 1503.4.3
C33-86	Concrete Aggregates - Specifications for	1502.3, Table 1503.1
C34-84	Structural Clay Loadbearing Wall Tile Specifications for	1403.1
C35-81	Inorganic Aggregates for Use in Gypsum Plaster - Specifications for	Table 1601
C36-85	Gypsum Wallboard - Specifications for	Table 1603
C37-84	Gypsum Lath - Specifications for	Table 1601
C39-84	Compressive Strength of Cylindrical Concrete Specimens - Method for	1503.4.2
C56-86	Structural Clay Nonloadbearing Tile - Specifications for	1403.1
C59-83	Gypsum Casting and Molding Plaster Specifications for	Table 1601
C61-81	Gypsum Keene's Cement - Specifications for . . .	Table 1601
C62-85	Building Brick (Solid Masonry Units made from from Clay or Shale) - Specifications for	1402.1
C64-85	Refractories for Incinerators and Boilers Specifications for	2402.2
C67-86	Brick and Structural Clay Tile - Sampling and Testing	1410.2
C73-85	Calcium Silicate Face Brick (Sand and Lime) - Specifications for	1402.1
C79-84	Gypsum Sheathing Board - Specifications for . . .	Table 1603
C94-86a	Ready-Mix Concrete - Specifications for	1504.3.1
C105-81	Ground Fire Clay as a Refractory Mortar for Laying Up Fireclay Brick - Specifications for . .	2402.2
C126-84	Ceramic Glazed Structural Clay Tile, Facing Brick and Solid Masonry Units - Specifications for	1404.1, 1402.1

THE MASSACHUSETTS STATE BUILDING CODE

ASTM (Continued)

C144-84	Aggregate for Masonry Mortar - Specifications for	1409.2.1
C150-86	Portland Cement - Standard Specification for . . .	1502.2, 1503.2.1, 1503.2.2, Table 1601
C172-82	Sampling Freshly Mixed Concrete - Method of . .	1503.4.2
C177-76	Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Guarded Hot Plate	3108.2
C206-84	Finishing Hydrated Lime - Specification for	Table 1601
C208-82	Insulating Board (Cellulosic Fiber) Structural and Decorative - Specifications for . .	1709.1, Table 3106
C212-86	Structural Clay Facing Tile - Specification for . .	1403.1
C216-86	Facing Brick (Solid Masonry Units Made from Clay or Shale) - Specification	1402.1
C231-82	Air Content of Freshly Mixed Concrete by the Pressure Method - Test Method for	1503.3.1
C236-80	Standard Test Method for Steady State Thermal Performance of Building Assemblies by Means of a Guarded Hot Box	3108.2
C260-86	Air-Entraining Admixtures for Concrete - Specification for	1502.6.2
C270-86b	Mortar for Unit Masonry - Specification for	1409.1, 1409.2.1
C330-82	Lightweight Aggregates for Structural Concrete - Specification for	1502.3
C335-79	Test Method for Steady-State Heat Transfer Properties of Horizontal Pipe Insulations	3110.12.1
C404-85	Aggregates for Masonry Grout - Specification for	1409.2.2
C474-85	Joint Treatment Materials for Gypsum Wallboard Construction - Standard Methods of Testing . .	Table 1603
C475-81	Joint Treatment Materials for Gypsum Wallboard Construction - Standard Methods of Testing . .	Table 1603
C476-83	Grout for Masonry - Specification for	1409.1
C494-86	Chemical Admixtures for Concrete - Specification for	1502.6.2
C514-84	Nails for the Application of Gypsum Wallboard - Standard Specification for	Table 1603
C516-80	Vermiculite Loose Fill Thermal Insulation Standard Specification for	Table 3106
C532-79	Structural Insulating Formboard (Cellulosic Fiber) - Specification for	1709.1

ASTM

(Continued)

C549-81	Perlite Loose Fill Insulation Standard Specification for	Table 3106
C587-83	Gypsum Veneer Plaster - Specification for	Table 1601
C588-84	Gypsum Base for Veneer Plasters - Specifications for	Table 1601
C595-85	Blended Hydraulic Cements - Specification for	1503.2.2
C618-85	Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete - Specification for	1502.6.3
C630-85	Water Resistant Gypsum Backing Board - Specification for	Table 1603, 1603.4
C631-81	Bonding Compounds for Interior Plastering - Standard Specification for	Table 1601
C645-83	Non-Load (Axis) Bearing Steel Studs, Runners (Track), and Rigid Furring Channels for Screw Application of Gypsum Board - Standard Specification for	Table 1601, Table 1603
C652-85A	Hollow Brick (Hollow Masonry Units Made from Clay or Shale) - Specification for	1402.1
C685-86A	Concrete Made by Volumetric Batching and Continuous Mixing - Specification for	1504.3.1
C754-82	Steel Framing Members to Receive Screw- Attached Gypsum Wallboard, Backing Board or Water-Resistant Backing Board - Standard Specification for Installation of	Table 1604
C841-85	Installation of Interior Lathing and Furring - Specification for	Table 1604
C842-85	Application of Interior Gypsum Plaster - Specification for	Table 1604
C843-85	Application of Gypsum Veneer Plaster - Specification for	Table 1604
C844-85	Application of Gypsum Base to Receive Gypsum Veneer Plaster - Specification for	Table 1604
C847-83	Metal Lath - Specification for	Table 1601
C887-84	Surface Bonding Mortar - Specification for Packaged, Dry, Combined Materials for	1422.2
C897-83	Aggregate for Job-Mixed Portland Cement-Based Plasters - Standard Specification for	Table 1601

THE MASSACHUSETTS STATE BUILDING CODE

ASTM

(Continued)

C926-86	Portland Cement Based-Plaster - Specification for Application of	1602.3
C932-85	Surface-Applied Bonding Agents for Exterior Plastering - Standard Specification for	Table 1601
C933-85	Welded Wire Lath - Standard Specification for	Table 1601
C946-84	Dry-stacked, Surface-Bonded Walls - Practice for Construction of	1422.2, 1422.4
C954-86	Steel Drill Screws for the Application of Gypsum Board or Metal Plaster Bases to Steel Studs from 0.033 in. to 0.112 in. in Thickness - Standard Specification for	Table 1601, 1603
C955-86	Load Bearing (Transverse and Axial) Steel Studs, Runners (Track), and Bracing or Bridging for Screw Application of Gypsum and Metal Plaster Bases - Standard Specification for	Table 1601
C976-82	Thermal Performance of Building Assemblies by Means of a Calibrated Hot Box	3108.2
C1002-83	Specification for Drill Screws for the Application of Gypsum Board	Table 1601, Table 1603
C1007-83	Installation of Load Bearing (Transverse and Axial) Steel Studs Accessories - Standard Specification for	Table 1604
D25-86	Round Timber Piles - Specification for	1219.2
D56-82	Flash Point by Tag Closed Tester - Test for	Table 306.2
D92-85	Flash and Fire Points by Cleveland Open Cup - Method of Test for	Table 306.2
D93-85	Flash Point by Pensky-Martens Closed Tester - Method of Test for	Table 306.2
D568-85	Rate of Burning and/or Extent and Time of Burning of Flexible Plastics in a Vertical Position, Test Method for	2907.4.2
D632-81	Rating of Burning and/or Extent and Time of Burning of Self Supporting Plastics in a Horizontal Position - Test Method for	2000.2, 2001.1
D635-81	Rate of Burning and/or Extent and Time of Burning of Self-Supporting Plastics in a Horizontal Position - Standard Test Method for	2002.2, 2001.1

ASTM (Continued)

D1143-81	Piles under Axial Compressive Load - Testing Ignition Properties of Plastics - Test Method for	1214.4.2, 1214.4.3
D1557-78	Moisture-Density Relations of Soils and Soil Aggregate Mixtures Using 10-lb Rammer and 18-in. Drop - Standard Test Method for . .	1201.3.2
D2277-80	Fiberboard Nail Base Sheathing - Specification for	1709.1
D2843-77	Density of Smoke from the Burning or Decomposition of Plastics - Test Method for . .	2000.2, 2001.1
D2898-86	Accelerated Weathering of Fire-Retardant Tested Wood for Fire Testing	903.5.2
D3201-86	Fire-Retardant Wood and Wood-Base Products - Test Method for Hygroscopic Properties of . . .	903.5.2
D3679-86	Rigid Poly (Vinyl Chloride) 9PVC0 Siding - Specification for	Table 2104.1 (Notes)
D3689-83	Individual Piles under Static Axial Tensile Load - Testing	1214.7.2
D3966-81	Piles Under Lateral Loads - Standard Method of Testing	1214.6.2
E72-80	Strength Tests of Panels for Building Construction - Conducting	1418.2, 1419.2, 1704.3
E84-84	Surface Burning Characteristics of Building Materials - Test Method for	637.11, 903.4.1.2, 903.5.1, 904.2, 922.3, 922.5.3, 928.2, 928.3, 929.2.1, 929.2.2, 2000.2
E90-85	Airborne Sound Transmission Loss of Building Partitions - Laboratory Measurements of	714.2
E108-83	Fire Tests of Roof Coverings	2204.6.1, 204.6.2, 2301.1
E119-83	Fire Test of Building Construction and Materials Methods of	903.1.1, 2002.2
E136-82	Behavior of Materials in Vertical Tube Furnace at 750° C. - Standard Test Method for	903.4.1.1
E152-81A	Fire Test of Door Assemblies	911.4, 916.1, 916.1.1
E163-84	Fire Test of Window Assemblies	917.1
E447-84	Compressive Strength of Masonry Prisms - Test Method for	1418.2, 1419.2
E492-86	Impact Sound Transmission Through Floor/Ceiling Assemblies Using the Tapping Machine - Laboratory Measurement of	714.3

THE MASSACHUSETTS STATE BUILDING CODE

ASTM (Continued)

E518-80	Flexural Bond Strength of Masonry - Test for . . .	1418.2, 1419.2
E519-81	Diagonal Tension (Shear) in Masonry Assemblages - Test for	1418.2, 1419.2
E648-86	Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source - Test for	904.3, 922.7.5
E814-83	Fire Tests of Through-Penetration Fire Stops -Test Method for	915.4.1, 915.7.1

AWPA American Wood Preservers Association
P.O. Box 849
Stevensville, Maryland 21666

C1-86	Pressure Treatment (General Requirements) - All Timber Products	1712.2.2
C2-85	Pressure Treatment - Lumber, Timber, Bridge Ties and Mine Ties	1207.1, 1207.2, 1712.2.2
C3-86	Pressure Treatment - Piles	1207.1, 1219.5.1
C4-86	Pressure Treatment - Poles	1207.2
C9-85	Pressure Treatment - Plywood	1712.2.2
C20-84	Fire Retardant Pressure Treatment -Structural Lumber	903.5.2
C27-84	Fire-Retardant Pressure Treatment - Plywood	903.5.2
M4-84	Preservative Treated Wood Products - Care of .	1712.2.2
P1-78	Creosote - Standard for	1712.2.2
P2-85	Creosote - Coal Tar Solutions	1712.2.2
P5-86	Water Borne Preservatives	1712.2.2
P8-77	Oil Borne Preservatives	1712.2.2
P9-84	Organic Preservatives Systems - Standard for Solvents for	1712.2.2

REFERENCED STANDARDS

AWPB

American Wood Preservers Bureau
P.O. Box 5283
Springfield, Virginia 22150

FDN-80	Softwood Lumber, Timber and Plywood Pressure Treated with Water Borne Preservatives for Ground Contact Use in - Quality Control Program for	1207.3
LP-2-80	Softwood Lumber, Timber and Plywood Pressure Treated with Water Borne Preservatives for Above Ground use - Standard for	1712.2.2, 1712.3.1
LP-22-80	Softwood Lumber, Timber and Plywood Pressure Treated with Water Borne Preservatives for Ground Contact Use - Standard for	1712.2.2, 1712.3.2, 1712.3.3
LP-33-78	Pressure Treated Lumber and Plywood with Light Petroleum Solvent Penta Solution (for Ground Contact) - Quality Control Standards for	1712.2.2, 1712.3.3
LP-44-78	Pressure Treated Lumber and Plywood with Volatile Petroleum Solvent (LPG) Penta Solution (for Ground Contact) - Quality Control Standards for	1712.2.2, 1712.3.3
LP-55-78	Pressure Treated Lumber and Plywood with Creosote or Creosote Coal Tar Solution (for Ground Contact) - Quality Control Standards for	1712.2.2, 1712.3.3
LP-77 - 78	Pressure Treated Lumber and Plywood with Heavy Petroleum Solvent Penta Solution (for Ground Contact) - Quality Control Standards for	1712.2.2, 1712.3.3
MP-1-79	Dual Treatment of Marine Piling Pressure Treated with Water Borne Preservatives and Creosote for Use in Marine Waters - Standards for	1219.5.1
MP-2 - 79	Marine Piling Pressure Treated with Creosote for Use in Marine Waters - Standard for	1219.5.1
MP-4 - 75	Marine Piling Pressure Treated with Water Borne Preservatives for Use in Marine Waters Standard for	1219.5.1

THE MASSACHUSETTS STATE BUILDING CODE

AWPI American Wood Preservers Institute
Mail Order Section
1403 Amory Avenue
Kensington, Maryland 20895

AWPI-PBA-69 Pole Building Design 1207.2

AWS American Welding Society
P.O. Box 351040
Miami, Florida 33135

D1.4-79 Structural Welding Code Reinforcing Steel 1502.5.2

BIA Brick Institute of America
11490 Commerce Park Drive
Suite 300
Reston, Virginia 22091

BIA-69 Engineered Brick Masonry - Building Code
Requirements for 908.3, 1410.1, 1412.1,
1412.2, 1417.2, 1418.1,
1804.1
TN5A-83 Sound Insulation - Clay Masonry Walls 908.3

BOCA Building Officials and Code Administrators International
4051 West Flossmoor Road
Country Club Hills, Illinois 60477-5795

NESC-87 National Existing Structures Code 103.1
NFPC-87 National Fire Prevention Code 103.1, 200.3, 306.2.1
Table 306.2.1, 600.8,
500.8.1, 602.2, 604.1,
617.1, 619.1, 620.1, 622.2,
1000.2, 1004.8, 1005.8,

BOCA (Continued)

NFPC-87	National Fire Prevention Code	1012.1, 1012.7, 1019.1.3, 3018.1
NMC-87	National Mechanical Code	200.3, 401.4.2, 401.4.3, 600.4, 600.5, 607.3, 609.3.1, 609.4, 613.3, 617.3, 619.4, 620.1, 622.3.1, 701.1, 706.3, 707.1, 709.3, 918.2, 928.1, 929.2.3, 929.2.4, 1002.20, 1002.21, 1008.6, 1010.6, 1011.1, 1303.6, 2400.2, 2500.2, 2501.1, 2501.3, 2502.1, 2503.1, 2507.3, 2508.3, 2608.5, 2701.2.3, 3005.2, 3018.3, 3204.1, 3204.2.8

CPSC Consumer Product Safety Commission
Office of the Secretary
Washington, D.C. 20207

16CFR	Architectural Glazing Standards and	
Part 1201-86	Related Materials	2203.1, 2207.2, 2206.1
16CFR	Cellulose Insulation - Interim Safety	
Part 1209-86	Standard	928.4
16CFR	Cellulose Insulation	928.4
Part 1404-86		

CRSI Concrete Reinforcing Steel Institute
933 N. Plum Grove Road
Schamburg, Illinois 60173-4758

CRSI-80	Reinforced Concrete Fire Resistance	903.1.1
---------	---	---------

THE MASSACHUSETTS STATE BUILDING CODE

DOC

United States Department of Commerce
National Bureau of Standard
Washington, D.C. 20234

FF1-70	Surface Flammability of Carpet and Rugs - Standard for the (CPSC 16CFR Part 1630-85)	922.7.1
PSI-83	Plywood - Construction and Industrial	922.7.4
PS20-70	American Softwood Lumber Standard -1986 Amendments	1710.1 (Nominal Dimension)

FM

Factory Mutual Engineering Corporation
Standards Laboratories Department
1151 Boston Providence Turnpike
Norwood, Massachusetts 02062

4450-77	Class I Insulated Steel Deck Roofs - Approval Standard for	2002.3.4
4880-72	Factory Mutual Building Fire Test	2002.4

GA

Gypsum Association
1603 Orrington Avenue, Suite 1210
Evanston, Illinois 60201

216-85	Gypsum Board - Recommended Specifications for Application and Finishing of	Table 1604, 714.4,
600-84	Fire Resistance Design Manual	Table 1604

HPMA

Hardwood Plywood Manufactures Association
P.O. Box 2789
Reston, Virginia 22090

HP-SG-86	Hardwood Plywood - Structural Design Guide for	1701.1
HP-83	Hardwood and Decorative Plywood	1710.1

REFERENCED STANDARDS

IMIAWC International Masonry Industry All Weather Council
International Masonry Institute
823 15th St., N.W.
Washington, D.C. 20005

IMIAWC-84 Cold Weather Masonry - Recommended
Recommended Practices and Guide
Specifications for 1410.3

MBMA Metal Building Manufacturers Association
1230 Keith Building
Cleveland, Ohio 44115

MBMA-86 Low Rise Building Systems Manual 1802.1

NBS National Bureau of Standards
Gaithersburg, Maryland 20760

211-54(A41.1) Masonry - Building Code
Requirements for 903.3, 2112.3, 1421.1,
1419.1

H74-60(A41.2) Reinforced Masonry
- Building Code Requirements for 903.3, 1410.1, 1411.1,
1412.1, 1418.1, 1804.1

NCMA National Concrete Masonry Association
2302 Horse Pen Road
Herndon, Virginia 22070

TEK69 A-78 STC Values of Concrete Masonry Walls . . 714.4
TR 75-B-85 Design and Construction of Load Bearing
Concrete Masonry - Specifications for . . 908.3, 113.5.3.1,
1410.1, 1411.1, 1412.1,
1418.1, 1422.3, 1804.1

NFiPA

National Fire Protection Association
 Batterymarch Park
 Quincy, Massachusetts 02269

10-84	Installation, Maintenance and Use of Portable Fire Extinguishers	1021.2
11-83	Foam Extinguishing Systems	1007.1
11A-83	High Expansion Foam Systems	1007.1
12-85	Carbon Dioxide Extinguishing Systems	1008.1, 1008.5
12A-85	Halogenated Extinguishing Agent Systems - Halon 1301	1009.1, 1009.5
12B-85	Halogenated Fire Extinguishing Agent Systems - Halon 1211	1009.1, 1009.5
13-89	Installation of Sprinkler Systems	606.3, 907.1.1, 1004.1, 1004.3, 637.16
13D-89	Installation of Sprinkler Systems in One- and Two- Family Dwellings and Mobile Homes - Standard for the	636.3.5
14-86	Standpipe and Hose Systems	1012.1
15-85	Water Spray Fixed Systems	1006.1, 1006.4
16-86	Foam Water Sprinkler and Spray Systems	1007.1
17-85	Dry Chemical Extinguishing System	1010.1, 1010.5
17A-86	Liquid Agent Extinguishing Systems - Standard for the Installation of	1011.1, 1011.2
26-83	Supervision of Water Supply Values	1004.6
30-84	Flammable and Combustible Liquids Code	603.4, 619.1
32-85	Dry Cleaning Plants	619.4
33-85	Spray Application Using Flammable and Combustible Materials	622.1
34-87	Dipping and Coating Process Using Flammable or Combustible Liquids - Standard for	622.1
40-82	Cellulose Nitrate Motion Picture Film	613.1
50-85	Bulk Oxygen Systems at Consumer Sites	2510.1
51-83	Oxygen-Fuel Gas Systems for Welding, Cutting and Allied Processes	2510.1
56F-83	Nonflammable Medical Gas Systems	2509.1
61A-84	Manufacturing and Handling Starch	617.1
61B-80	Prevention of Fire and Dust Explosions in Grain Elevators and Bulk Grain Handling Facilities	617.1
61C-84	Prevention of Fire and Dust Explosion in Feed Mills	617.1
61D-84	Milling of Agricultural Commodities for Human Consumption	617.1
65-80	Processing and Finishing of Aluminum	617.1

REFERENCED STANDARDS

NFiPA (Continued)

71-85	Central Station Signaling Systems	636.3.8, 637.12.1, 1 1020.1, 1018.3.4.6, 1017.7.2.4
72A-85	Local Protective Signaling Systems	635.4.1, 636.3.6, 636.3.8, 1017.5, 1017.6, 1017.7.2.4, 1018.3.4.3, 1018.3.4.4, 1018.3.4.8, 1020.1
72B-86	Installation, Maintenance and Use of Auxiliary Protective Signaling System	637.12.1, 1018.3.4.6, 1020.1
72C-86	Remote Station Protective Signaling Systems . . .	636.3.8, 637.12.1, 1020.1, 1018.3.4.6
72D-86	Proprietary Protective Signaling Systems	1020.1
72E-84	Automatic Fire Detectors	636.3.7, 1018.1, 1018.3.4, 1018.3.4.1, 1018.3.4.2 1019.4.1, 2611.4
72F-85	Standard for the Installation, Maintenance and Use of Emergency Voice/Alarm Communication System	1017.7.2.4,
74-75	Installation, Maintenance and Use of Household Fire Warning Equipment	1018.3.4.1, 1018.3.4.3
80-86	Fire Doors and Windows	909.3.1, 916.2
82-83	Incinerators, Waste and Linen Handling Systems and Equipment Standard on	2506.1
85F-82	Pulverized Fuel Systems - Installation and Operation	617.1
99-84	Health Care Facilities	2509.2
101-85	Code for Safety to Life from Fire in Buildings and Structures	632.1
102-86	Assembly Seating, Tents and Air Supported Structures	612.1
231C-86	Rack Storage of Materials, Standard for	504.1, Table 930
418-79	Roof-top Heliport Construction and Protection .	614.3
495-85	Code for Explosive Materials	Table 306.2.1
651-80	Manufacture of Aluminum or Magnesium Powder - Standard for the	617.1
653-71	Dust Explosions in Coal Plants, - Prevention of	617.1
654-82	Dust Explosions in the Plastics Industry - Prevention of	617.1
655-82	Sulfur Fires and Explosions - Prevention of	617.1

THE MASSACHUSETTS STATE BUILDING CODE

NFiPA (Continued)

664-81	Dust Explosions in Woodworking and Wood Floor Manufacturing Plants - Prevention of	617.1
701-77	Fire Tests for Flame Resistant Textile and Film - Standard Methods of	604.2.2, 626.5, 904.4.1, 904.4.3, 2907.4.2
704-85	Identification of the Fire Hazard of Materials . . (Hazardous production material - HPM) 603.5.1	201.0

NFoPA National Forest Products Association
1250 Connecticut Avenue, N.W.
Washington, D.C. 20036

NFoPA-81	Design Values for Joists and Rafters	1705.2, 1706.1
NFoPA-77	Span Tables for Joists and Rafters	1705.2, 1706.1
NFoPA	National Design Specification for Wood Construction - 86 Supplement - Design Values for Wood Construction	1207.1, 1702.1, 1705.2, 1706.1
TR7-82	All Weather Wood Foundation System - Basic Requirements, 1983 Supplement	1207.3, 1224.3

PCI Prestressed Concrete Institute
175 West Jackson Blvd.
Chicago, Illinois 60604

MNL-122 -82	Fire Resistance of Precast Prestressed Concrete - Design for	903.11
-------------	---	--------

REFERENCED STANDARDS

RCSHSB Red Cedar Shingle and Handsplit Shake Bureau
515 116th Avenue, N.E., Suite 275
Bellevue, Washington 98004

RCSHSB-84 Centigrade Red Cedar Shingles
- Grading rules for 2302.1

SFES Southeastern Forest Experiment Station
U.S. Dept. of Agriculture
Forest Service
200 Weaver Blvd., P.O. Box 2680

General Technical Report No. SE-33-85 Performance and Quality Control Standards for Composite Floor, Wall and Truss Framing 1708.4

SJI Steel Joist Institute
1205 48th Avenue North
Suite A
Myrtle Beach, South Carolina 29577

SJI-86 Standard Specifications, Load Tables and Weight Tables for Steel Joists and Joist Girders 1803.1

TFS Texas Forest Service
P.O. Box 310
Lufkin, Texas 75901

TFS-85 Preservative Treated Southern Yellow Pine Taper Sawn Shakes - Grading Rules for 2302.1

THE MASSACHUSETTS STATE BUILDING CODE

TPI

Truss Plate Institute Inc.
583 D'Onofrio Drive
Suite 200
Madison, Wisconsin 53719

TPI-85	Trusses - Design Specifications for Metal Plate Connected Wood - 1985 Supplement	1706.1
PCT-80	Design Specification for Metal Plate Connected Parallel Chord Trusses - 1980 Supplement	1705.2

UL

Underwriters Laboratories, Inc.
333 Pfingsten Road
Northbrook, Illinois 60062

10A-85	Doors - Tin Clad Fire Doors	916.2	
14B-84	Sliding Hardware for Standard Horizontally Mounted Tin-Clad Fire Doors	916.2	
14C-84	Swinging Hardware for Standard Tin-Clad Fire Doors	916.2, 1018.3.4.7	
217-86	Single and Multiple Station Smoke Detectors . . .	610.6.1, 635.4.1	
268-86	Smoke Detectors for Fire Protective Signaling Systems	610.6.1	
555-86	Fire Dampers, and Ceiling Dampers	918.1	
910-85	Fire and Smoke Characteristics of Electrical and Optical-Fiber Cables used in Air-Handling Spaces - Test Method for	929.2.5	
1256-85	Fire Test of Roof Deck Construction	2002.3.4	
Subject	Outline of Investigation for Insulated 1040-85	Wall Construction	2002.4
Subject	Test Method for the Classification of Interior 1715-83	Finish Material Assemblies Using A Room Fire Test	2002.4
UL-86	Fire Resistance Directory	903.1.2	

USD United States Diving, Inc.
 901 W. New York Street
 Indianapolis, Indiana 46202

USD-85	1985-86 Rules and Regulations of United States Diving, Inc. 625.9.1
--------	---

REFERENCED STANDARDS

Part II

The following is a listing of recognized standards not specifically referenced in this code.

NFiPA National Fire Protection Association
 Batterymarch Park
 Quincy, Massachusetts 02269

13A-87	Care and Maintenance of Sprinkler Systems - Recommended Practice for
13R-89	Sprinkler Systems in Residential Occupancies up to Four Stories in Height - Standard for the Installation of
20-89	Centrifugal Fire Pumps - Standard for the Installation of
22-87	Water Tanks for Private Fire Protection - Standard for
130-88	Fixed Guideway Transit Systems - Standard for

THE MASSACHUSETTS STATE BUILDING CODE

CS&SB

Cedar, Shake and Shingle Bureau
515-116TH Avenue N.E, Suite 275
Bellevue, WA 98004

Exterior and Interior Walls - Design and Application

Manual for, 1989

New Roof Coverings - Red Cedar Shingle and Shake Design and Application

Manual for, 1989

Red Cedar Shingles -

Grading Rules for Certi-Grade, 1984

Wood Shakes -

Grading Rules for Certi-Sawn Taper Sawn Red Cedar Shakes, 1981

Grading Rules for Certi-Split Red Cedar Shakes, 1985

Wood Shingles -

Grading Rules for Certi-Grade Shingles, 1984

APPENDIX B

UNIT DEAD LOADS FOR DESIGN PURPOSES

The intent of this appendix is to assist the designer and building official in establishing the minimum weights for materials commonly used in building construction. Some material assemblies have a range in weight. A typical figure is indicated, but when there is reason to suspect a considerable deviation, the actual weight should be determined.

Note on use of Appendix B tables: When making calculations based on the tables in this appendix, the weights of masonry include mortar but not plaster. For plaster, add 5 psf for each face plastered. Values given represent averages. In some cases there is a considerable range of weight for the same construction. For metric conversion, 1 psf equals 4.882 kg/m³.

**Table B-1
UNIT DESIGN DEAD LOADS FOR CONCRETE SLABS**

Concrete slabs	Pounds per square foot
Concrete, reinforced stone, per inch of thickness	12 1/2
Concrete, reinforced lightweight sand, per inch of thickness	9 1/2
Concrete, reinforced, lightweight, per inch of thickness	9
Concrete, plain stone, per inch of thickness	12
Concrete, plain, lightweight, per inch of thickness	8 1/2

THE MASSACHUSETTS STATE BUILDING CODE

**Table B-2
UNIT DESIGN DEAD LOADS FOR RIBBED SLABS**

Ribbed slabs Depth in inches (rib depth plus slab thickness)*	Pounds per square foot					
	Width of rib, in inches					
	4	5	6	7	8	9
12-inch clay tile fillers (normal weight concrete)						
4 plus 2	49	51	52	54	-	-
6 plus 2	60	63	65	67	-	-
8 plus 2 1/2	79	82	85	87	-	-
10 plus 3	96	100	103	106	-	-
12 plus 3	108	112	116	120	-	-
20-inch wide forms:	45	48	50	50	-	-
6 plus 2 1/2	51	54	57	60	-	-
8 plus 2 1/2	57	60	64	68	-	-
10 plus 2 1/2	63	67	72	76	-	-
12 plus 2 1/2	-	74	79	84	-	-
14 plus 2 1/2	-	-	88	93	98	-
16 plus 2 1/2	-	-	-	111	118	-
20 plus 2 1/2	-	-	-	-	-	-

* Make appropriate allowances for tapered ends.

UNIT DEAD LOADS FOR DESIGN PURPOSES

Table B-2 (continued)
UNIT DESIGN DEAD LOADS FOR RIBBED SLABS

Ribbed slabs Depth,, in inches (rib depth plus slab thickness)*	Pounds Per square foot					
	Width of rib, in inches					
	4	5	6	7	8	9
30-inch wide forms:						
6 plus 2 1/2	41	43	45	47	-	-
8 plus 2 1/2	45	47	50	53	-	-
10 plus 2 1/2	49	52	55	58	-	-
12 plus 2 1/2	53	57	60	64	-	-
14 plus 2 1/2	-	62	66	70	-	-
16 plus 2 1/2	-	-	72	76	80	-
20 plus 2 1/2	-	-	-	90	95	101
Two-way clay tile fillers (12x12):						
4 plus 2	61	62	64	-	-	-
6 plus 2	87	89	90	-	-	-
8 plus 2 1/2	100	103	107	-	-	-
10 plus 3	121	126	131	-	-	-
12 plus 3	136	141	146	-	-	-

THE MASSACHUSETTS STATE BUILDING CODE

**Table B-3
UNIT DESIGN DEAD LOADS FOR WAFFLE SLABS**

Waffle slabs Depth, in inches (Rib depth plus slab thickness)	Pounds per square foot
19x19, 5 @ 24	
6 plus 2 1/2	66
8 plus 2 1/2	78
10 plus 2 1/2	84
12 plus 2 1/2	101
30x30, 6 @ 36	
8 plus 3	73
10 plus 3	83
12 plus 3	95
14 plus 3	106
16 plus 3	114
20 plus 3	135

UNIT DEAD LOADS FOR DESIGN PURPOSES

**Table B-4
UNIT DESIGN DEAD LOADS FOR FLOOR FINISH**

Floor finish	Pounds per square foot
Double 7/8-inch wood on sleepers, light concrete fill	19
Double 7/8-inch wood on sleepers, stone concrete fill	28
Single 7/8-inch wood on sleepers, light concrete fill	16
Single 7/8-inch wood on sleepers, light concrete fill	25
3-inch wood block on mastic, no fill	10
1-inch cement finish on stone concrete fill	32
1-inch terrazzo on stone concrete fill	32
Marble and mortar on stone concrete fill	33
Linoleum on stone concrete fill	32
Linoleum on light concrete fill	22
1 1/2-inch asphalt mastic flooring	18
3-inch wood block on 1/2-inch mortar base	16
Solid flat tile on 1-inch mortar base	23
2-inch asphalt block, 1/2- mortar	30
1-inch terrazzo, 2-inch stone concrete	32
Floor finish tile per inch depth	12
Cement finish per inch depth	12
Gypsum slabs per inch depth	4
Precast concrete plank per inch	(as determined by test)
Hardwood flooring per inch depth	4
Underflooring per inch depth	3
Linoleum	2
Asphalt tile	2
Brick pavers per inch thickness	10

**Table B-5
UNIT DESIGN DEAD LOADS FOR WATERPROOFING**

Waterproofing	Pounds per square foot
Five-ply membrane	5

THE MASSACHUSETTS STATE BUILDING CODE

**Table B-6
UNIT DESIGN DEAD LOADS FOR FLOOR FILL**

Floor Fill	Pounds per square foot
Cinder fill, per inch	5
Cinder concrete per inch	9
Lightweight concrete, per inch	7
Sand, per inch	8
Stone, concrete, per inch	12

**Table B-7
UNIT DESIGN DEAD LOADS FOR WOOD JOIST FLOORS**

Wood joist floors (no plaster) - double wood floor joist sizes in inches	Pounds per square foot	
	12-inch spacing	16-inch 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

UNIT DEAD LOADS FOR DESIGN PURPOSES

**Table B-8
UNIT DESIGN DEAD LOADS FOR MATERIALS**

Materials	Pounds per cubic foot
Cast stone masonry (cement, stone, sand)	144
Cinder fill	57
Concrete, plain:	
Cinder	108
Expanded slag aggregate	100
Haydite (burned clay aggregate)	90
Slag	132
Stone (including gravel)	144
Vermiculite and perlite aggregate, nonloadbearing	25-50
Other light aggregate, loadbearing	70-105
Concrete, reinforced:	
Cinder	111
Slag	138
Stone (including gravel)	150
Earth (dry)	96
Earth (damp)	108
Earth (wet)	120
Cork	15
Masonry, ashler:	
Granite	168
Limestone, crystalline	168
Limestone, oolitic	135
Marble	173
Sandstone	144
Masonry, rubble mortar:	
Granite	153
Limestone, crystalline	147
Limestone, oolitic	138
Marble	156
Sandstone	137
Rubble stone masonry	156
Terra cotta, architectural:	
Voids filled	120
Voids unfilled	72
Timber, seasoned:	
Ash, commercial white	41
Cypress, southern	32
Fir, Douglas, Coast region	34

THE MASSACHUSETTS STATE BUILDING CODE

**Table B-8
UNIT DESIGN DEAD LOADS FOR MATERIALS**

Materials	Pounds per cubic foot
Oak, commercial reds and whites	45
Redwood	28
Spruce, red, white, and Sitka	28
Southern pine, short leaf	39
Southern pine, long leaf	48
Timber, hemlock	30

**Table B-9
UNIT DESIGN DEAD LOADS FOR ROOF AND WALL COVERINGS**

Roof and wall coverings	Pounds per square foot
Asphalt shingles	2
Cement asbestos shingles	4
Cement tile	16
Clay tile (for mortar add 10 lb):	
2-inch book tile	12
3-inch book tile	20
Roman	12
Ludowici	19
Composition:	10
Three-ply ready roofing	
Four-ply felt and gravel	1
Five-ply felt and gravel	5 1/2
Copper or tin	6
Corrugated asbestos cement roofing	1
Fiber board, 1/2 inch	1-3
Formed sheet steel	(see manufacturer)
Formed steel decking	2
Gypsum sheathing, 1/2 inch	3/4
Rigid insulation, 1/2 inch	3
Sheet lead	8
Skylight, metal frame, 3/8-inch wired glass	7
Slate 3/16-inch	10
Slate 1/4 inch	20
Spanish tile	3
Wood sheathing, per inch thickness	3
Wood shingles	

UNIT DEAD LOADS FOR DESIGN PURPOSES

Table B-10
UNIT DESIGN DEAD LOADS FOR SUSPENDED CEILINGS

Suspended ceilings	Pounds per square foot
Cement on wood lath	12
Cement on metal lath	15
Gypsum on wood or metal lath	10
Plaster on tile or concrete	5
Suspended metal lath and gypsum plaster	10
Suspended metal lath and cement plaster	15
Plaster on wood lath	8

THE MASSACHUSETTS STATE BUILDING CODE

**Table B-11
UNIT DESIGN DEAD LOADS FOR UNPLASTERED WALLS AND
PARTITIONS**

Walls and partitions (unplastered)	Pounds per square foot
4 -inch clay brick, high absorption	34
4 -inch clay brick, medium absorption	39
4 -inch clay brick, low absorption	46
4 -inch sand/lime brick	38
4 -inch concrete brick, heavy aggregate	46
4 -inch concrete, light aggregate	33
8 -inch clay brick, high absorption	69
8 -inch clay brick, medium absorption	79
8 -inch clay brick, low absorption	89
8 -inch sand/lime brick	74
8 -inch concrete brick, heavy aggregate	89
8 -inch concrete brick, light aggregate	68
12 -inch common brick	120
12 -inch pressed brick	130
12 -inch sand/lime brick	105
12 1/2 - inch concrete brick, heavy aggregate	130
12 1/2 - inch concrete brick, light aggregate	98
17 -inch clay brick, high absorption	134
17 -inch clay brick, medium absorption	155
17 -inch clay brick, low absorption	173
17 -inch sand/lime brick	138
17 -inch concrete brick, heavy aggregate	174
17 -inch concrete brick, light aggregate	130
22 -inch clay brick, high absorption	168
22 -inch clay brick, medium absorption	194
22 -inch clay brick, low absorption	216
22 -inch sand/lime brick	173
22 -inch concrete brick, heavy aggregate	216
22 -inch concrete brick, light aggregate	160
4 -inch brick, 4 inch load bearing structural clay - tile backing	60
4 -inch brick, 8 inch loadbearing structural clay - tile backing	75
8 -inch brick, 4 inch loadbearing structural clay - tile backing	102
8 -inch combination brick and concrete block	72
12 -inch combination brick and concrete block	90
8 -inch loadbearing structural clay tile	42
12 -inch loadbearing structural clay tile	58

UNIT DEAD LOADS FOR DESIGN PURPOSES

Table B-11 (continued)
**UNIT DESIGN DEAD LOADS FOR UNPLASTERED WALLS AND
 PARTITIONS**

Walls and partitions (unplastered)	Pounds per square foot
8 -inch concrete block, heavy aggregate	55
12 -inch concrete block, heavy aggregate	85
8 -inch concrete block, light aggregate	38
12 -inch concrete block, light aggregate	55
2 -inch furring tile, one side of masonry wall, - add to above figures	12
4 -inch hollow concrete block - stone aggregate	30
-lightweight	20
6 -inch hollow concrete block - stone aggregate	42
-lightweight	30
8 -inch hollow concrete block	55
-lightweight	38
10 -inch hollow concrete block - stone aggregate	62
-lightweight	46
12 -inch hollow concrete block - stone aggregate	85
-lightweight	55
4 -inch solid concrete block - stone aggregate	45
-lightweight	34
6 -solid concrete block - stone aggregate	50
-lightweight	37
8 -inch solid concrete block - stone aggregate	67
-lightweight	48
10 -inch solid concrete block - stone aggregate	84
-lightweight	52
12 -inch concrete block - stone aggregate	108
-lightweight	72
4 -inch loadbearing clay tile	24
6 -inch loadbearing clay tile	36
2 -inch nonloadbearing clay tile	11
3 -inch nonloadbearing clay tile	18
4 -inch nonloadbearing clay tile	20
6 -inch nonloadbearing clay tile	30
8 -inch nonloadbearing clay tile	36
10 -inch nonloadbearing clay tile	40
4 -inch nonloadbearing hollow concrete block	20
6 -inch nonloadbearing hollow concrete block	30
8 -inch nonloadbearing hollow concrete block	40
T.C. 1 1/2-inch split terra cotta furring	8

UNIT DEAD LOADS FOR DESIGN PURPOSES

Table B-12

UNIT DESIGN DEAD LOADS FOR LATH AND PLASTER PARTITIONS
 Lath and plaster partitions Pounds per square foot

2 -inch solid cement on metal lath	25
2 -inch solid gypsum on metal lath	18
2 -inch solid gypsum on gypsum lath	18
2 -inch metal studs, gypsum and metal lath both sides	18
3 -inch metal studs, gypsum and metal lath both sides	19
4 -inch metal studs, gypsum and metal lath both sides	20
6 -inch wood studs, plaster and wood lath both sides	18
6 -inch wood studs, plaster and metal lath both sides	18
6 -inch wood studs, plaster and plaster boards both sides	18
6 -inch wood studs, unplastered gypsum board both sides (dry wall)	10

Table B-13

UNIT DESIGN DEAD LOADS FOR PLASTER WORK
 Plaster Work Pounds per square foot

Gypsum (one side)	5
Cement (one side)	10
Gypsum on wood lath	8
Gypsum on metal lath	8
Gypsum on plaster board or fiber board	8
Cement on wood lath	10
Cement on metal lath	10

THE MASSACHUSETTS STATE BUILDING CODE

This page intentionally left blank

APPENDIX C

RECOMMENDED FASTENING SCHEDULE

Building element	Nail size and type	Number and location
Stud to sole plate	8d common	4 toe-nail or
	16d common	2 direct-nail
Stud to cap plate	16d common	2 toe-nail or
		2 direct-nail
Double studs	10d common	12" o.c. direct
Corner studs	16d common	24" o.c. direct
Sole plate to joist or blocking	16d common	16" o.c.
Double cap plate	10d common	16" o.c. direct
Cap plate laps	10d common	2 direct-nail
Ribbon strip, 6" or less	10d common	2 each direct bearing
Ribbon strip, 6" or more	10d common	3 each direct bearing
Roof rafter to plate	8d common	3 toe-nail
Roof rafter to ridge	16d common	2 toe-nail or direct nail
Jack rafter to hip	10d common	3 toe-nail or
	16d common	2 direct-nail
Floor joists to studs	10d common	5 direct or
(No ceiling joists)	10d common	3 direct
Floor joists to studs	10d common	2 direct
(With ceiling joists)	10d	
Floor joists to sill or girder	<u>3d common</u>	3 toe-nail
Ledger strip	16d common	3 each direct
Ceiling joists to plate	16d common	3 toe-nail
Ceiling joists (laps over partition)	10d common	3 direct-nail
Ceiling joists (parallel to rafter)	10d common	3 direct
Collar beam	10d common	3 direct
Bridging to joists	8d common	2 each direct end
Diagonal brace (to stud & plate)	8d common	2 each direct bearing
Tail beams to headers	20d common	1 each end 4 sq. ft.
(When nailing permitted)		floor area
Header beams to trimmers	20d common	1 each end 8 sq. ft.
		floor area

THE MASSACHUSETTS STATE BUILDING CODE

Building element	Nail size and type	Number and location
1" roof decking (6" or less in width)	8d common	2 ea. direct rafter
1" roof decking (over 6" in width)	8d common	3 each direct rafter
1" subflooring (6" or less)	8d common	2 each direct joist
1" subflooring (8" or more)	8d common	3 each direct joist
2" subflooring	16d common	2 each direct joist
1" wall sheathing (8" or less in width)	8d common	2 each direct stud
1" wall sheathing (over 8" in width)	8d common	3 each direct stud
Plywood roof & wall sheathing (1/2" or less)	6d common	6" o.c. direct edges & 12" o.c. intermediate
(5/8" or greater)	8d common	6" o.c. direct edges & 12" o.c. intermediate
(5/16", 3/8", or 1/2")	16 gauge galvanized wire staples, 3/8"	4" o.c. edges & 8" o.c. intermediate
(5/8")	Same as	2 1/2" o.c. edges & 5" o.c. intermediate
Plywood subflooring:		
(1/2")	6d common or 6d annular or spiral thread	6" o.c. direct edges & 10" o.c. intermediate
(5/8", 3/4")	8d common or 8d annular or spiral thread	6" o.c. direct edges & 10" o.c. intermediate
(1", 1 1/8")	10d common or 8d ring shank or 8d annular or spiral thread	6" o.c. direct edges & 6" o.c. intermediate
(1/2")	16d galvanized wire staples	4" o.c. edges & 7" o.c. intermediate
(5/8")	3/8" minimum crown, 1 5/8"	2 1/2" o.c. edge 4" o.c. intermediate length

RECOMMENDED FASTENING SCHEDULE

Building element	Nail size and type	Number and location
Built-up girders and beams	20d common	32" o.c. direct
Continuous header to stud	8d common	4 toe nail
Continuous header, two pieces	16d common	16" o.c. direct
1/2" fiber board sheathing	1 1/2" galvanized roofing nail or 16 gauge staple, 1 1/2" long with min. crown of 7/16"	3" o.c. exterior edge 6" o.c. intermediate
25/32" fiber board sheathing	1 3/4" galvanized roofing nail or 8d common nail or 16 gauge staple, 1 1/2" long with min. crown of 7/16"	3" o.c. exterior edge 6" o.c. intermediate
Gypsum sheathing	12 gauge 1 3/4" . large head corrosion-resistant	4" o.c. on edge 8" o.c. intermediate
Particle board underlayment (1/4"-3/4")	6d annular threaded	6" o.c. direct edges 10" o.c. intermediate
Particle board roof and wall sheathing 1/2" or less	6d common	6" o.c. direct edges 12" o.c. intermediate
5/8" or greater	8d common	6" o.c. direct edges 12" o.c. intermediate
Particle board subflooring (5/8" or greater)	8d common	6" o.c. direct edges 12" o.c. intermediate
Shingles, wood ^a	No. 14 B&S Gage corrosion resistive	2 each bearing
Weather boarding	8d corrosion	2 each bearing

Note a: Shingle nails shall penetrate not less than 3/4" into nailing strips, sheathing or supporting construction except as otherwise provided in Section 1225.4.4.

THE MASSACHUSETTS STATE BUILDING CODE

**Table C-1
Maximum Spacing of Gypsum Wallboard Fasteners
(For nonfireresistance rated construction assemblies)**

Thickness of gypsum wallboard (inch)	Plane of framing surface	Long dimension of gypsum wallboard sheets in relation to direction of framing members	Maximum spacing of framing members (center-to-center in inches)	Maximum spacing of fasteners (center-to-center in inches)		Nails to wood
				Nails	Screws	
1/2	Horizontal	Either direction	16	7	12	No. 13 gage, 1 3/8" long, 19/54" head No. 098 gage, 1 1/4" long, Annular ringed 5d cooler nail
	Horizontal	Perpendicular	24	7	12	
	Vertical	Either direction	24	8	12	
5/8	Horizontal	Either direction	16	7	12	No. 13 gage, 1 5/8" long, 19/64" head No. 098 gage, 1 3/8" long, Annual ringed 6d cooler nail
	Horizontal	Perpendicular	24	7	12	
	Vertical	Either direction	24	8	12	

Fastening required with adhesive application

Thickness of gypsum wallboard (inch)	Plane of framing surface	Long dimension of gypsum wallboard sheets in relation to direction of framing members	Maximum spacing of framings members (center-to-center in inches)	Maximum spacing of fasteners (center-to-center in inches)		Nails to wood
				Nails	Screws	
1/2 or 5/8	Horizontal	Either direction Perpendicular	16 24	16 12	16 16	As required for 1/2" and 5/8" gypsum wallboard, see above
	Vertical	Either direction	24			
2 layers each 3/8" (3/4" total)	Horizontal	Perpendicular	24	16	16	Base ply nailed as required for 1/2" gypsum wallboard and face ply placed with adhesive
	Vertical	Either direction	24	24	24	

Notes to Table C-1:

Note a. Where the metal framing has a clinching design formed to receive the nails by two edges of metal, the nails shall be not less than 5/8 inch longer than the wallboard thickness, and shall have ringed shanks. Where the metal framing has a nailing groove formed to receive the nails, the nails shall have barbed shanks or be 5d cooler nail (No. 13 1/2 gage, 1 5/8 inches long, 15/ 64 inch head) for 1/2 inch gypsum wallboard; 6d cooler (No. 13 gage, 1 7/8 inches long, 15/64 head) for 5/8-inch gypsum wallboard.

(Table notes continued on next page)

Notes are not keyed in

RECOMMENDED FASTENING SCHEDULE

Notes to Table C-1 (continued)

Note b. Two nails at 2 inches to 2 1/2 inches apart may be used if the pairs are spaced 12 inches center-to-center except around perimeters.

Note c. Screws shall be No. 6 with tapered head and long enough to penetrate into wood framing not less than 5/8 inch and metal framing not less than 1/4 inch

Note d. All nails shall meet ASTM C514 or Federal Specification FF-N-105C.

Note e. For fire-resistance rated construction, see the pertinent fire test information.

Note f. 1 inch = 25.4 mm.

**Table C-2
Allowable Shear for Wind or Seismic Forces in Pounds Per Foot
For Vertical Diaphragms of Lath and Plaster or Gypsum Board Frame Wall
Assemblies**

Type of material	Thickness of Material	Wall Construction	Nail spacing maximum (in inches)	Shear value	Minimum nail size
Gypsum lath, plain or perforated	3/8" Lath and 1/2" Plaster	Unblocked	5	100	No. 13 gage, 1 1/8" long, 19/64" head, plasterboard blued nail.
Gypsum sheathing board	1/2" x 2' x 8' 1/2" x 4' 1/2" x 4'	Unblocked	4	75	No. 11 gage, 1 1/4" long, 7/64" head, diamond point, galvanized.
		Blocked	7		
		Unblocked			
Gypsum Wallboard or Veneer base	1/2"	Unblocked	7	175	5d Cooler nails
			4	100	
		Blocked	7	100	
			4	125	
	5/8"	Blocked	4	150	
			Two ply	175	
		Two ply	Base ply 9	175	
			Face ply 7	250	
					6d cooler nails
					Base ply-6d cooler nails Face ply-8d cooler nails

Note a. These vertical diaphragms shall not be used to resist loads imposed by masonry or concrete construction. Values are for short time loading due to wind or earthquake and must be reduced 25 percent for normal loading

Note b. Applies to nailing at all studs, top and bottom plates and blocking.

Note c. Values shown are for gypsum board applied to one side only. The shear values may be doubled when identical materials are applied to both sides of wall

Note d. 1 inch=25.4 mm.

Notes are noted - in

THE MASSACHUSETTS STATE BUILDING CODE

This page intentionally left blank

APPENDIX D

GUIDANCE FOR SELECTION OF FOUNDATION MATERIAL CLASSES IN TABLE 1201

D-101.0 Purpose: The purpose of this appendix is to provide guidance for the selection of the material class and consistency in place when using Table 1201.

D-102.0 Application: This appendix is provided only as a general guide to engineering judgment. All available data should be evaluated and professional engineering judgment exercised in selection of the appropriate material classification for use with Table 1201. The references on soil and rock classification and typical ranges of index properties provided in this appendix should not be considered to be code requirements.

D-103.0 Classification of Soil: Guidelines for generally accepted engineering practice in the description and classification of soils are provided in ASTM D2488-84 Description and identification of Soils (Visual-Manual Procedure) and ASTM D2487-85 Classification of Soils for Engineering Purposes.

D-104.0 Classification of Rock: Guidelines for generally accepted engineering practice in the description and classification of rocks are provided in Chapter 1 of Design Manual 7.1 - Soil Mechanics, Naval Facilities Engineering Command, May 1982 (NAVFAC DM-7.1)

D-105.0 Typical Index Properties: Typical ranges of index properties for the Material Classes listed in Table 1201 are provided in Table D-1.



FOUNDATION MATERIAL CLASSES

TABLE D-1 TYPICAL RANGE OF INDEX PROPERTIES

Material Class	Description	Consistency in Place	Rock Quality Designation RQD%	Unconfined Compressive	St. Penetration Resistance N. blow/Ft
1	Massive bedrock - granite, diorite, gabbro, basalt, gneiss, quartzite, well-cemented conglomerate	Hard rock minor jointing Hard sound rock moderate jointing	> 75 50 to 75	> 8000	-
2	Foliated bedrock	Medium hard rock minor jointing	> 50	> 8000	-
3	Sedimentary bedrock - cementation shale, silt-stone, sandstone, limestone, dolomite, conglomerate	Soft rock, jointing	> 50		
4	Weakly cemented sedimentary bedrock - compaction shale or other similar rock in sound condition	Very soft rock	< 50		
5	Weathered bedrock - any of the above except shale	Very soft rock weathered and/or major jointing and fracturing	< 50		
6	Slightly cemented sand and/or gravel, glacial till (basal or lodgement), haropan	Very dense	-		> 50



FOUNDATION MATERIAL CLASSES

TABLE D-1 (continued)

Material Class	Description	Consistency in Place	Rock Quality Designation RQD%	Unconfined Compressive	St. Penetration Resistance N. blow/Ft
7	Gravel, widely graded sand and gravel, and granular abiation till	Very dense Dense Medium dense Loose Very loose	-		>50 41-50 16-40 8-15 <8
8	Sands and non-plastic silty sands with little or no gravel (except for Class 9 materials)	Dense Medium dense Loose Very loose	-		>30 11-30 6-10 <6
9	Fine sand, silty sand and non-plastic inorganic silt	Dense Medium dense loose Very loose	-		>30 11-30 6-10 <6
10	Inorganic sandy or silty clay, clayey sand, clayey silt, clay or varied clay low to high plasticity	Hard Stiff Medium Soft	-		>20 9-20 4-8 <4
11	Organic soils - peat organic silts, organic clay	-	-		-

See Table D-1 Notes on following page

THE MASSACHUSETTS STATE BUILDING CODE

Notes to table D-1

- Note 1:** For discussion of RQD values see Deere, D.U., Rock Mechanics in Engineering Practice (Chapter 1), Stagg and Zinkiewicz, Eds., 1968, John Wiley and Sons, Inc.
- Note 2:** For determination of Unconfined Compressive Strength see ASTM D2938.
- Note 3:** For determination of Standard Penetration Resistance N-value see ASTM D1586. The presence of large particles (coarse gravel, cobbles, boulders) may cause N-values to be unrealistically high. Such values should not be used. Also standard penetration resistance should not be used over depths less than five (5) feet.

APPENDIX E

PROCEDURE FOR ACCOUNTING FOR SERIES AND PARALLEL HEAT FLOW PATHS

E1: For envelope assemblies containing metal framing: The U_i shall be determined by using one of the following methods:

1. Results from laboratory or field test measurements. One of the procedures specified in Section 3108.2 of this Article shall be used.
2. The thermal resistance of those roof and wall assemblies listed in Tables E-1 and E-2 shall be corrected using the following procedures:

The total resistance of the heat flow path (R_t) is determined from the Equation E-1:

$$R_t = R_i + R_e \quad \text{Equation E-1}$$

Where:

$$R = 1/U$$

R_t = the total resistance of the envelope assembly.

R_i for: $i = 1$ to n , is the resistance of the series elements.

R_e is the equivalent resistance of the element containing the parallel path, and the value of R_e is:

$$R_e = R \text{ value of insulation} \times F_c \quad \text{Equation E-2}$$

(where F_c is the parallel path correction factor)

The Parallel Path correction Factors (F_c) may be obtained from tests conducted using procedures listing in Section 3108.2 of this Article. Parallel Path Correction Factors for some envelope assemblies are listed in Tables E-1 and E-2.

THE MASSACHUSETTS STATE BUILDING CODE

**TABLE E-1
ROOFS: PARALLEL PATH CORRECTION FACTORS⁽¹⁾**

Bridged R-Value	0	5	10	15	20	25	30	40	45	50	55
Correc- tion Factor	1.0	0.96	0.92	0.88	0.85	0.79	0.76	0.73	0.71	0.69	0.67

(1) Table E-1 values are based upon: Metal trusses with 4-ft. spacing that penetrate the insulation, and 0.66 inch diameter crossmembers every 1 ft.

**TABLE E-2
WALL SECTIONS WITH METAL STUDS: PARALLEL PATH
CORRECTION FACTORS**

Size of Members	Gauge of Stud	Spacing of Framing	Cavity Insulation R-Value	Correction Factor
2 x 4	18 - 16	16" o.c.	R-11	0.50
2 x 4	18 - 16	24" o.c.	R-11	0.60
2 x 6	18 - 16	16" o.c.	R-19	0.40
2 x 6	18 - 16	24" o.c.	R-19	0.45

**TABLE E-3
CALCULATION PROCEDURES FOR EVALUATING ALL SERIES
AND PARALLEL HEAT FLOW PATHS**

Type of Material to which bridge is attached	Metal	BRIDGE TYPE	
		Metal	Non-Metal
		Thermal Bridges in Sheet Metal Construction Method	Parallel Path
Non-Metal	Zone Method	Parallel Path	

3. For elements with internal metallic structures bonded on one or both sides to a metal skin or covering, the "Thermal Bridges in Sheet Metal Construction," the calculation procedure as specified in "Thermal Bridges in Sheet Metal Construction," Studies in Building Physics (Johannesson, Gudni. 1981. Division of Building Technology, Lund Institute of Technology, Lund, Sweden. Report of TVBH-3007) shall be used.
4. For elements other than those covered above, the zone method described in Chapter 23 of the ASHRAE Handbook, 1985 Fundamentals Volume shall be used. The formulas on pages 23.13-14 shall be used for calculation.

E2: For envelope assemblies containing Non-metal Framing, the U_i shall be determined from results from one of the laboratory or field test measurements specified in Section 3108.2 or from the ASHRAE series parallel method. Formulas in Chapter 23, page 23.2 of the ASHRAE Handbook, 1985 Fundamentals Volume shall be used for these calculations.

THE MASSACHUSETTS STATE BUILDING CODE

This page intentionally left blank

APPENDIX F

REFERENCE DATA FOR REPAIR, ALTERATION, ADDITION AND CHANGE OF USE OF EXISTING BUILDINGS

PART ONE-GUIDELINES FOR APPLICATION

F-101 Purpose

F-101.1 Intent of Article 32: The purpose of this guideline is to provide guidance to users of the Massachusetts State Building Code as to techniques of acceptable practice which can be used to assess the acceptability of various methods of meeting the intent of code provisions of Article 32 on a case-by-case basis. The purpose of the code provisions in Article 32 and this guideline is to allow the repair, alteration addition, and change of use of existing buildings without requiring the entire building to be brought up to new construction requirements, while still providing for the public health, safety and general welfare. The provisions of Article 32 and this guideline recognize that the provisions of the Massachusetts State Building Code for new construction reflect the latest improvements in materials, construction techniques, standards of living and safety and, therefor, may preclude the repair, alteration, addition, or change of use of existing buildings that have demonstrated their usefulness and safety.

F-102.0 Scope

F-102.1 Techniques: This guideline is intended to demonstrate techniques of analysis and compliance with Article 32 of the Massachusetts State Building Code in the repair, alteration, addition, and change of use of existing buildings.

F-103.1 General conditions: Conceptually, it is the intent of Article 32 and these guidelines to allow repair, alteration, addition, or change of use of existing buildings without meeting all new construction requirements under the following general conditions:

THE MASSACHUSETTS STATE BUILDING CODE

1. all hazardous conditions must be corrected;
2. the existing building becomes the minimum performance standard; and
3. the degree of compliance of the building after changes must not be below that existing before the changes, except that nothing in this section will require compliance with requirements more stringent than that required for new construction.

F-104.0 Implementation

F-104.1 Framework: Implementation of the above concept requires that a framework be established for evaluating the condition of the building; determining the potential for modification; and establishing the acceptability of proposed changes.

F-104.2 Evaluation of existing building: Evaluation of existing conditions in a structure is required to determine the existence of any hazardous conditions, which must be corrected; and to provide a basis for evaluating the impact of the proposed changes on the performance of the building.

The following list of evaluation tools described in Sections F-104.1.1 through F-104.2.7 of this appendix can be used for determining the condition of the structure. However, this list is not necessarily complete and the use of other methods should not be precluded.

F-104.2.1 Available documentation of existing building: Prime sources of design information for existing buildings are the architectural and engineering drawings and specifications used in the construction of the building. Although the passing of time often obscures the identifies of depositaries of such documents, the following are likely prospects in attempting to locate such information:

1. If the building is currently in use, an individual or office responsible for its management may have retained drawings and specifications to facilitate maintenance. A building manager, resident engineer, superintendent, custodian, stationary engineer or plant engineer may be the most direct contact at the building site.
2. Other potential sources (especially if the building is not in use) include the original designer-architect or engineer.
3. The building department which issued the permit for construction may have documentation.
4. Documentation may have been retained by the general contractor or numerous subcontractors. This present the mason, carpenter, plumber, electrician, HVAC installer, steel erector, etc., as well as manufacturers of component parts, as potential sources of documentation.

REFERENCE DATA FOR EXISTING BUILDINGS

5. In the case of large corporations or government agencies, a separate contracting officer may have developed a technical file on the erection of a building.
6. In some cases, individual consultants are contracted to serve as "clerk-of-the-works" and pursue the inspection of a building project from start to finish with the keeping of a file likely.
7. Insurance companies sometimes maintain drawings or records of their insured buildings.
8. Historical or archaeological societies may have considered a building to be important enough to develop a file of documentation.

F-104.2.2 Field surveys: Having drawn upon available documentation to help evaluate a building's condition, such documentation may be augmented by on-site data acquired through field survey. The most obvious approach is to make use of detailed visual examination to confirm and/or alter any previously available information pertaining to the building.

F-104.2.3 Testing: Testing is a tool that may be used in evaluating the condition of a building or structure or parts thereof when other methods of evaluation will not suffice. Testing may be initiated voluntarily on the part of the permit applicant or may be required by the building official in the absence of approved rules as indicated in Section 1300.3 of the code. This section points out that "... the building official shall make or cause to be made the necessary tests and investigations, or he shall accept duly authenticated reports from recognized authoritative sources." The costs of all such tests are to be borne by the permit applicant and should, therefore, be required by the building official only when other methods of evaluation prove inadequate or insufficient. Such testing should be conducted by an approved testing agency under the supervision of a registered architect or engineer. The report of the tests shall be submitted to the building official and shall include the details of test procedures, references to any accepted test standards used, the results of the tests and any conclusions drawn from the test results.

F-104.2.4 Nondestructive testing: This includes techniques where the structural integrity of the building is not affected, such as the following:

1. analyzing various portions of the building to determine dimensions, types and condition of materials, etc.;
2. portable apparatus for impact testing;
3. load application short of failure to determine capacity of materials and components;
4. magnetic methods for detecting flaws in ferrous metal;
5. proximity magnetometers (locating rebars in concrete, concealed ferrous fasteners, etc.);

THE MASSACHUSETTS STATE BUILDING CODE

6. electronic means for measuring the sonic modulus of elasticity of concrete and masonry in assessing its soundness;
7. ultrasonic transmission or reflective methods in detecting flaws in various materials; and
8. x-ray or infrared-ray photographic techniques used to evaluate portions of elements whose integrity is questionable.

F-104.2.6 Destructive testing: In destructive testing a sample of the building could be removed and tested (e.g., concrete core), or components of the building could be reconstructed and tested in the laboratory.

F-104.2.7 Laboratory analysis: In some cases, tests can be performed in the laboratory. Such tests might include the following:

1. chemical or metallurgical test;
2. optical or electronic microscopic examination which can help identify and evaluate the soundness of materials where decay or other molecular degradation is involved;
3. conventional laboratory tests for determining physical properties (strength, ductility, absorption, solubility, permeability, stiffness, etc.; and/or
4. testing of a scale model of the building (computer model, wind tunnel model, etc.).

F-104.3 Evaluation of change in performance level: It is necessary to determine if the level of performance of the building after alteration is below that which existed before the change. The hazard level could be increased for certain attributes (such as fire safety) while decreased for other attributes (such as floor loads) for a given alteration. The evaluation of the change in hazard levels of each attribute can be accomplished using various tools singly or in combination as described below in Section 104.3.1 through 104.3.5.

F-104.3.1 Data on archaic systems: Performance data on architectural and structural systems being encountered in existing buildings in the Commonwealth are tabulated in part four of this appendix. This data can be compared to the proposed altered systems to determine if the performance is being adversely affected.

F-104.3.2 Compliance alternatives: Alternate solutions tabulated in part two of this appendix were developed from appeal data and from accepted practice. The list is not all-inclusive and should not preclude consideration of other alternatives.

F-104.3.3 Analysis methods: Analytical methods based on good engineering practice may be used to determine changes in performance levels.

REFERENCE DATA FOR EXISTING BUILDINGS

F-104.3.4 Test methods: Test procedures as discussed in Sections F-104.2.3 through F-104.2.6 of this appendix can be used to evaluate the performance of existing construction.

F-104.3.5 Professional judgement: Professional judgement based on previous experience with similar buildings should be used to the fullest extent possible.

PART TWO-SUGGESTED COMPLIANCE ALTERNATIVES

F-201.0 Purpose and scope

F-201.1 Purpose: The purpose of this reference is to assist the building official and those regulated by this code in judging the acceptability of compliance alternatives to specific code provisions required by the code.

F-201.2 Application: This reference contains generally acceptable compliance alternatives and examples. The examples are solely for the purpose of illustrating principles which can be applied to the solution of code compliance problems and are not necessarily acceptable under all circumstances. It is recognized that all building systems interact with each other. Therefore, any consideration of compliance alternatives must take into account all existing and proposed conditions to determine their acceptability. The principles applied can be used for the solution of similar compliance problems in other buildings and occupancy groups. Commentaries are provided where the philosophy in establishing the alternatives is not obvious. The examples were developed from appeal data and accepted practice. They are not all-inclusive and should not preclude consideration of other alternatives.

Note: It is anticipated that additional compliance alternatives will be added to this reference through the mechanism of appeal decisions and from results of research being conducted by various organizations in the field of relative permanence of life safety systems.

F-202.0 Compliance alternatives for egress requirements

F-202.1 Number of exits

F-202.1.1 General compliance alternatives:

1. Provide connecting fire balconies.
2. Provide alternate egress facilities (windows, etc.).
3. Provide a fire escape.
4. Provide fire-rated areas of refuge.

THE MASSACHUSETTS STATE BUILDING CODE

F-202.1.2 Examples:

Example 1 involves a five-story "row house" of occupancy group B without a fire suppression system and with only one (1) means of egress.

Solution A. Add one (1) or more fire escapes as may be necessary to provide all tenants with reasonable access to two (2) means of egress in separate directions. Access to a street, public way or area of refuge shall be provided at the termination of the fire escape.

Solution B. Add connecting fire balconies across fire walls if the above solution is impractical due to construction difficulties.

Example 2 involves a building of group R-2 occupancy with an apartment in the basement. There is only one (1) means of egress from the basement.

Solution A. Provide egress windows in each apartment that comply with Article 8.

F-202.2 Travel Distance

F-202.2.1 General Compliance Alternatives:

1. Add detection system.
2. Add a partial fire suppression system.
3. Add smoke doors.
4. Increase fireresistance rating of corridor walls and doors.

F-202.2.2 Example: This example involves a four (4) story building of occupancy group R-2 without a fire suppression system. The length of exitway access travel is one hundred fifty (150) feet.

Solution A. Add a partial fire suppression system off the domestic water supply (if adequate) in the exit access corridor.

Solution B. Subdivide corridor into segments if less than one hundred (100) feet with smoke doors.

Solution C. If not required by other sections of the code, install smoke and fire detectors with audible alarms in the corridor.

Solution D. Increase the fireresistance rating of the exit access corridor from one (1) hour to two (2) hours and provide one-half hour ($\frac{1}{2}$) hour "B" label self-closing or automatic closing fire doors in all openings into the corridor.

F-202.3 Enclosure of exitways

F-202.3.1 General Compliance alternatives

1. Improve enclosure of exitway.
2. Add a partial fire suppression system.
3. Add a detection system.

REFERENCE DATA FOR EXISTING BUILDINGS

F-202.3.2 Examples: This example involves a four (4) story row building of occupancy group R-2 with connecting fire balconies and an interior stair. The stair is enclosed with wood lath and plaster wood stud partitions and paneled doors.

Solution A. Cover partitions on the apartment side with 5/8" Type X gypsum wallboard or its equivalent. Replace or build up panel doors until minimum solid portion is one and three-eighths (1 3/8") and install self-closers.

Solution B. Provide a heat and smoke detection system in the stairwell with an alarm audible to all tenants. Provide self-closers on all stairwell doors.

Solution C. Provide a partial fire suppression system in the stairwell off the domestic water supply (if adequate). Provide self-closers on all stairwell doors.

F-202.3.3 Commentary: The above example, while pertaining to a four (4) story group R-2 building, can also be applied to other buildings of various heights and occupancies. The principle that the degree of compliance may not be reduced should be remembered. If the existing enclosure is of fireresistive construction, it must be maintained. The primary principle to remember, in the required enclosure of exitway, is that an enclosure must be provided, whether fireresistive or not, so as to provide a smoke barrier. The purpose of providing a smoke barrier is to prevent the passage of smoke from a fire on one (1) floor to the exitways and exit access corridors of other floors and thus render them unusable for egress. This principle is illustrated by solutions A, B, and C in the above example.

F-203.0 Compliance alternatives for fire hazards

F-203.1 Fire separations and partitions

F-203.1.1 General compliance alternatives:

1. Improve fire separation.
2. Add a fire suppression system.
3. Add a detection system.

F-203.1.2 Examples: Example 1 involves a three (3) story Type 3A building, of occupancy group M, on the first floor and occupancy group B on the second and third floors. The required separation is three (3) hours.

Solution A. Add a fire suppression system to the first and second floors.

Solution B. Add five-eighths (5/8) inch Type X gypsum wallboard or its equivalent to the underside of the second floor and install a system of smoke and heat detectors with audible alarms on the first and second floors.

Example 2 involves the separation between two (2) tenants of wood lath and plaster on a wood studs partition. The required separation is one (1) hour.

Solution A. Add five-eighths (5/8) inch Type X gypsum wallboard or its equivalent to the either side of the existing partition.

Example 3 involves a building of occupancy B with unrated exit access corridors.

Solution A. Install a partial fire suppression system in the exit access corridors.

THE MASSACHUSETTS STATE BUILDING CODE

Solution B. Add five-eighths (5/8) inch Type X gypsum wallboard or its equivalent to either side of the corridor partition and install self-closers on all corridor doors.

Solution C. Install a smoke and heat detection system in the corridor with and alarm audible to all tenants on the floor and install self-closers on all corridor doors.

F-203.2 Openings and exterior wall protection

F-203.2.1 General compliance alternatives:

1. Add fire suppression system.
2. Improve fireresistance.
3. Remove or improve openings.

F-203.2.2 Examples: **Example 1** involves a two (2) story Type 4B building, of occupancy M, on the first floor with the basement and upper floors used for storage. The distance between the building and the side lot line is five (5) feet and between it and the adjacent building is ten (10) feet. The adjacent building is of Type 4B construction and of occupancy group R-2. The former occupant was a grocery store; the new occupant is a hardware store.

Solution A. Install a deluge sprinkler system along the interior side of the wall affected.

Solution B. Add five-eighths (5/8) inch Type X gypsum wallboard to interior side of the wall affected.

Example 2 is the same as example 1 but with double-hung wood windows in affected wall.

Solution A. Remove windows and close opening with one (1) hour fireresistive construction.

Solution B. Remove windows and install fire windows.

Solution C. Install a deluge sprinkler system as in solution A to example 1.

PART THREE-DETAILED CLASSIFICATION OF OCCUPANCY BY HAZARD INDEX NUMBER AND USE GROUP

This part provides a more detailed guide for users of the code to determine hazard index numbers and use groups for various types of occupancies. It supplements Article 2 and Table 3204 contained in Article 32.

REFERENCE DATA FOR EXISTING BUILDINGS

**TABLE F-1
HAZARD INDEX AND USE GROUP CLASSIFICATION**

Use of Structure	Hazard Index No.	Use Group
Advertising Displays Manufacture including billboards	3	S-1
Airport or other aircraft landing or service facility (see also: Helicopter rooftop landing facility)	3	F
Amusement park, indoor	4	A-3
Animal		
Crematorium	3	F
Hospital, kennel, pound	2	B
Apartment (see Residences)		
Appliances		
Manufacture	3	F
Sales	3	M
Arenas	4	A-3
Asphalt		
Processing and products manufacture	8	H
Athletic equipment		
Manufacture	3	F
Sales	3	M
Auditoriums	6,5 or 4	A-1-A, A-1-B,A-3
Automobile and other motor vehicles		
Gasoline service station	2	B
Rental agency within a building	2	B
Repair	3	S-1
Repair incidental to auto sales		
with limitations	3	S-1
Sales within a building	3	M
Wrecking	3	F
Washing	3	S-1
Awning manufacturer	3	F
Baked goods shop	3	M
Bakeries	3	F
Banks	2	B
Banquet halls	5	A-3
Barber shops	2	B
Beauty shops	2	B

THE MASSACHUSETTS STATE BUILDING CODE

TABLE F-1 (continued)
HAZARD INDEX AND USE GROUP CLASSIFICATION

Use of Structure	Hazard Index No.	Use Group
Beverages		
Bottling	2	F
Manufacture		
Alcoholic	8	H
Less than 0.5% alcohol @ 60°	3	F
Bicycle		
Manufacture	3	F
Rental or repair conducted within a building	3	S-1
Sales	3	M
Billiard Parlor	4	A-3
Blacksmith shops	3	F
Blueprinting, etc. establishments	3	F
Boarding house	2	R-1 or R-2
Boats or ships		
Building or repair of boats	3	F
Bone distillation	3	F
Bowling alleys	4	A-3
Broom or brush manufacture	3	F
Building materials		
Wholesale business in roofed structures	3	M or S-1
Bus terminals or stations	4	A-3
Business schools or colleges	4	A-4
Camera and other photo equipment		
Manufacture except film sales	3	M
Sales	3	M
Canvas or canvas products		
Manufacture or repair	3	F
Carpet and rug		
Cleaning establishments	8 or 3	H,F
Manufacture or repair	3	F
Catering for outside consumption	3	F
Cemeteries		
Crematory in cemetery	3	F
Mausoleum, crypt, columbarium	1	S-2
Mortuary chapel in cemetery	4	A-4

REFERENCE DATA FOR EXISTING BUILDINGS

TABLE F-1 (continued)
HAZARD INDEX AND USE GROUP CLASSIFICATION

Use of Structure	Hazard Index No.	Use Group
Ceramics products manufacture, including pottery, small glazed tile and similar items	3	F
Charcoal, fuel, briquettes, or lampblack manufacture	8	H
Chemicals Packaging	8 or 3	H or F depending on nature of material
Manufacture	8 or 3	H or F depending on nature of material
Churches or other places of worship	4	A-4
Circuses, temporary	4	A-3
Cleaning (see Drycleaning & dying; Laundries; Automobiles, washing)		
Clothing Manufacture	8 or 3	H or F depending on nature of material
Rental establishment	3	M
Retail sales	3	M
Tailoring, custom manufacture or repair (see also Feathers; Felt; Fur; Leather)	3	M
Clubs Private	4	A-3 without residence
Nightclubs (see Eating & drinking establishments)		
Coal, coke or tar products Manufacture	8	H
Colleges and Universities Classroom buildings	4	A-4
Dormitories	2	R-1
Fraternities or sororities	2	R-1
Community centers	4 or 2	R-1
Convalescent homes (see Nursing homes)		
Convents	2	R-1
Cosmetics or toiletries manufacture	8	H

THE MASSACHUSETTS STATE BUILDING CODE

TABLE F-1 (continued)
HAZARD INDEX AND USE GROUP CLASSIFICATION

Use of Structure	Hazard Index No.	Use Group
Cotton ginning	8	H
Cotton wadding or linters manufacture	8	H
Courthouses	2 or 4	8 or A-3
Crematoriums		
Animal	3	F
Human	3	F
Dance halls	7	A-2
Day care agencies	4	I-2 or A-4 E
Day nurseries	4	I-2
Dental offices (see Medical & dental)		
Department stores	3	M
Dormitories	2	R-1 or R-2
Dressmaking shops, custom	8	H
Drinking places (see Eating & drinking establishments)		
Drive-in restaurants	5	A-3
Drug stores	3	M
Dry cleaning and dyeing establishments	8 or 3	H or F depending on solvents used
Dwellings (see Residences)		
Eating or drinking establishments		
Lunchrooms, restaurants, cafeterias, etc., primarily enclosed	5	A-3
Drive-in	4	A-3
With entertainment or dancing	7	A-2
Electric		
Power or steam generating plants	3	F
Substation	3	F
Electrical appliances, bulbs, wiring, supplies, etc.		
Manufacture	3	F
Sales	3	M
Electronic components & supplies		
Manufacture or repair	3	F
Feathers		
Curing, dyeing, washing or bulk processing	8	H
Manufacturing exclusive of above	8	H

REFERENCE DATA FOR EXISTING BUILDINGS

TABLE F-1 (continued) HAZARD INDEX AND USE GROUP CLASSIFICATION

Use of Structure	Hazard Index No.	Use Group
Felt		F
Curing, dyeing, washing or bulk processing	3	F
Products manufacture, exclusive of above	3	H
Fertilizer manufacture	8	F or H
Film, photographic, manufacture	3 or 8	F or H
Storage and studios	3 or 8	B
Fire stations	2	F
Fish processing	3	M
Florida shops		
Food		F
Product processing except meat & fish	3	M
Retail sales	3	R-1 or R-2
Fraternities or sororities	2	A-3
Funeral establishments	4	
Fur		H
Curing, dyeing, finishing, tanning	8	F
Products manufacture exclusive of above	3	
Garage (see Parking garage)		F
Garbage incineration or reduction	3	
Gas		H
Manufacture	8	
Public utility stations for metering or regulating	2	8
Storage		S-1
2500 cu. ft. or less	3	H
more than 2500 cu. ft.	8	
Gasoline service station (see Automobiles)		F
Gelatin manufacture	3	F
Generating plants, electric or steam	3	M
Gift shops	3	F
Glass products from previously manufactured	3	F
Glue manufacture	3	
Golf		A-3
Indoor courses or driving ranges	4	A-3
Gymnasiums	4	H
Grain storage	8	
Hair		F
Curing, dyeing, washing, bulk processing	3	

THE MASSACHUSETTS STATE BUILDING CODE

**TABLE F-1 (continued)
HAZARD INDEX AND USE GROUP CLASSIFICATION**

Use of Structure	Hazard Index No.	Use Group
Product manufacture exclusive of above	3	F
Hardware		
Manufacture		F
Retail sales	3	F
Hat bodies manufacture	3	M
Helicopter landing facility, rooftop	3	F
Home occupations	3	S-1
Homes for the aged	2	B
Hosiery manufacture	4	I-2
Hospitals	3	F
Including convalescent, nursing, or rest homes and sanitariums, provided custodial care is not provided for drug addicts, alcoholics, mentally ill or mentally deficient	4	
For care of drug addicts, mentally ill, or mentally deficient	5	I-2
Research or teaching laboratories (see also Animal hospitals)	5	I-1
Hotels	2	B
Ice manufacturing (dry or natural)	2	I-1
Ice skating rinks	3	F
Incineration or reduction of garbage, offal, or dead animals	4	A-3
Industry uses (see specific items)	3	F
Without resulting noise, vibration, special danger, hazard, dust, smoke, fumes, etc.	3	
Other than above	3 or 8	F
Ink or inked ribbon manufacture	3	F or H
Jewelry	3	F
Kennels (see Animal)	3	F
Laboratories		
Research laboratory not accessory to school or hospital	2	B
Scientific research or teaching laboratory, non-profit, accessory to school, or hospital, subject to limitations	2	B

REFERENCE DATA FOR EXISTING BUILDINGS

TABLE F-1 (continued) HAZARD INDEX AND USE GROUP CLASSIFICATION

Use of Structure	Hazard Index No.	Use Group
Laundries		
Hand laundry	2	B
Self service; pick-up and delivery station of laundry or dry cleaner	2	B
Steam laundries without limitations	3	F
Leather		
Curing, dyeing, finishing or tanning	3	F
Product manufacture exclusive of above	3	F
	4	A-3
Libraries	3	F
Linoleum or oilcloth manufacture	3	M
Liquor sales, package	3	F
Luggage manufacture	3	F
Lumber (see Wood)		
Manufacturing	3 or 8	F or H
Matches manufacture	8	H
Mattress manufacture and renovation	3	F
Meat		
Markets	3	M
Slaughtering or packaging	3	F
Medical & dental offices	2	B
(see also Laboratories; Orthopedic & medical appliances; Hospitals)		
Meeting hall	4	A-3
Metals, manufacture	3	F
Reduction, refining or smelting	8	H
Monasteries	2	R-1
Motels	2	R-1
Motor freight stations (see trucking terminals)		
Museums	4	A-1
Musical instruments manufacture	3	F
Newspaper publishing	3	F
Newsstands	3	M
Novelty products manufacture	3	F
Nursing Homes	4	I-2
Offices	2	B
Oilcloth manufacture	3	F
Optical equipment or similar precision instruments manufacture	3	F
Orphanages	3	I-2

THE MASSACHUSETTS STATE BUILDING CODE

TABLE F-1 (continued)
HAZARD INDEX AND USE GROUP CLASSIFICATION

Use of Structure	Hazard Index No.	Use Group
Orthopedic or medical appliance manufacture	3	F
Paint, turpentine or varnish		
Manufacture	8	H
Spraying booths	8	H
Paper products manufacture	3	F
Parish houses	4	A-3
Parking garages	3	S-1
Petroleum or petroleum products		
Refining	8	H
Storage	3	S-1
Pharmaceutical products manufacture	3	F
Photography studio	2	B
Plastics		
Product manufacture	8	H
Raw, manufacture	8	H
Police stations	2	B
Pool rooms	2	A-3
Post offices	2	B
Printing		
Plant	3	F
Printing or newspaper publishing	3	F
Prisons & other correctional or detention institutions	5	I-1
Pumping station or substation, water or sewage	2	B
Radio		
Sales	3	M
Studios with audience	5	A-1-B
Studios without audience	2	B
Railroad		
Freight terminal	3	S-1
Passenger station	4	A-3
Recreation		
Center, indoor	4	A-3
Community center building	4	A-3
Rectories	2	R-1

REFERENCE DATA FOR EXISTING BUILDINGS

TABLE F-1 (continued) HAZARD INDEX AND USE GROUP CLASSIFICATION

Use of Structure	Hazard Index No.	Use Group
Residences	2	R-3
One-family	2	R-3
Two-family	2	R-2
Apartment	2	R-3
Temporary dwelling structure	2	R-1 or R-2
Boarding or lodging house	2	R-1 or R-2
Dormitory	2	R-1 or R-2
Fraternity or sorority		
Hotel, motel apartment with accessory services	2	R-1
Convents, monasteries, rectories	2	R-1
Research laboratories (see Laboratories)		
Restaurant, lunch room, cafeteria or other establishments primarily for eating	5	A-3
Retail business	3	M
Stores with combustible or flammable goods constructing a high hazard	8	H
Rubber		
Manufacture (natural or synthetic), including tires, tubes, or similar products	8	H
Products (exclusive or processing) including washers, gloves, footwear bathing caps and the like	3	F
Sanatariums		
Not providing custodial care for drug addicts, alcoholics, mentally ill, or mentally deficient	4	I-2
Providing care for the above	5	I-1
Schools	4	A-4
Seminaries	4 or 2	A-4 & R-1
Settlement houses (depending on nature of activities)	4 or 2	A-3 or B
Sewage		
Disposal plant	3	F
Pumping station	3	F
Shoddy manufacture	8	H
Shoes		
Manufacture	3	F

THE MASSACHUSETTS STATE BUILDING CODE

TABLE F-1 (continued)
HAZARD INDEX AND USE GROUP CLASSIFICATION

Use of Structure	Hazard Index No.	Use Group
Repair shop	2	B
Silverware manufacture, plate or sterling	3	F
Size manufacture	3	A-3
Skating rinks	4	A-3
Soap and detergents	8	H
Manufacturing, including fat rendering	3	F
Packaging	8	H
Solvent extracting	3	F
Sporting or athletic goods	3	F
Manufacture	3	M
Stores	3	S-1
Stables	3	S-1
Stadiums	4	A-5
Wholesale business, including accessory storage other than flammable liquids, gases and explosives, in roofed structures	3 or 1	S-1 or S-2 depending on nature of materials
Stores (see Retail stores; or specific items)		
Tailor shops, custom	2	B
Tanning (see leather; Fur)	3	M
Taxidermist shops	2	B
Telephone exchanges	2	B
Automatic	2	B
Non-automatic	2	B
Television	2	B
Sales	3	M
Studios	3	M
	6	A-1A with scenery
	5	A-1B no scenery
	2	B no audience
Textiles		
Manufacture, including knit & yard goods, thread or cordage, spinning, weaving, dyeing & printing, shoddy manufacture	3	F

REFERENCE DATA FOR EXISTING BUILDINGS

TABLE F-1 (continued) HAZARD INDEX AND USE GROUP CLASSIFICATION

Use of Structure	Hazard Index No.	Use Group
Theaters	6	A-1A with scenery
	5	A-1B no scenery, motion picture
Tires, manufacture	8	H
Tobacco products manufacture including curing	3	F
Tools & hardware	3	F
Manufacture	3	M
Sales		
Toys	3	F
Manufacture		
Trailer park (see Mobile homes)		
Truck	3	S-1
Repairs	3	M
Sales	3	S-1
Trucking terminals	8	H
Turpentine manufacture	8,3,or1	H,S-1,orS-2
Warehouses		depending on nature of materials
	2	B
Waterpumping stations	8	H
Wax products manufacture		

PART FOUR-ARCHAIC CONSTRUCTION SYSTEMS

F-401.0 Purpose and Scope

F-401.1 Purpose: The purpose of this part of Appendix F is to assist the building official and those regulated by this code in evaluating the properties of archaic construction systems.

F-401.2 Scope: This part of Appendix F contains data on construction systems no longer in general use but which may be encountered in older existing buildings. It is meant to be used for assessing existing conditions when evaluating how proposed changes will impact upon the performance of the building.

THE MASSACHUSETTS STATE BUILDING CODE

F-401.3 Application: In any given problem, all available data should be collected and professional judgement exercised in arriving at decisions. Evaluative judgment should be used when test data does not exist or when applying the data contained in this standard.

F-402.0 Archaic fireresistive systems

F-402.1 General: This part of Appendix F contains a list of fireresistive materials and construction which are not necessarily currently in common use. Some of the hourly ratings contained in the listing predate ASTM E-119 that is in current use. The hourly ratings may be higher or lower if tested according to ASTM E 119. In addition to the data contained herein, see Report BMS92, Building Materials and Structures, dated October 7, 1942, National Bureau of Standards. The data listed below is extracted from the Boston Building Code, circa 1943.

F-402.2 Fireresistive materials and construction

F-402.2.1 Minimum qualities: Materials, to be given the fireresistive ratings specified in this part, shall have the following minimum qualities set forth in Sections F-402.2.2 through F-402.2.19.

F-402.2.2 Class 1 concrete: Concrete of Class 1 shall be so proportioned as to have a strength of at least fifteen hundred (1500) pounds per square inch (psi) and the coarse aggregate shall consist of limestone, trap rock, blast furnace slag, cinders containing not more than twenty (20) per cent of combustible material, burned clay or shale.

F-402.2.3 Class 2 concrete: Concrete of Class 2 shall be so proportioned as to have a strength of at least fifteen hundred (1500) pounds psi, the coarse aggregate consisting of sandstone, granite, quartzite, siliceous gravel or other similar material not over one (1) inch in size.

F-402.2.4 Masonry: Masonry shall be laid in lime-cement or cement mortar, or approved masonry cement mortar, except that masonry of gypsum tile shall, and masonry of structural clay tile may, be laid in gypsum mortar. Masonry shall be thoroughly bonded by breaking joints in successive courses or by the use of metal ties.

F-402.2.5 Brick: Brick shall be burned clay or shale, concrete or sand-lime brick of Grade C or better.

F-402.2.6 Stone: Stone shall be limestone, marble, slate or equally fireresistive natural stone. Sandstone, granite or other stone which, because of its crystalline

REFERENCE DATA FOR EXISTING BUILDINGS

structure or for other reason, is less fireresistive, shall not be considered fire protection for structural metal, but may be used in a masonry wall not less than twelve (12) inches thick required to have fireresistance. Stone masonry shall have the same fireresistive rating as brick masonry.

F-402.2.7 Cast stone: Cast stone masonry shall have the same fireresistive rating as brick masonry.

F-402.2.8 Concrete blocks: Concrete blocks, whether solid or hollow, shall have as coarse aggregate limestone, trap rock, blast furnace slag, cinders containing not more than twenty (20) per cent of combustible material, burned clay or shale.

F-402.2.9 Structural clay tile: Structural clay tile shall conform to the specifications for load-bearing tile, floor tile or partition tile. Where partition tile is specified load-bearing tile may be used.

F-402.2.10 Gypsum: Gypsum tile or pre-cast gypsum concrete, whether solid or hollow, shall conform to Standard Specifications for Gypsum Partition Tile or Block of the American Society for Testing Materials and shall not contain more than three (3) per cent by weight of wood or other combustible binder or filler.

F-402.2.11 Gypsum concrete: Gypsum concrete shall not contain more than twelve and one-half (12½) percent by weight of wood or other combustive binder or filler and shall have a compressive strength of at least five hundred (500) psi. It shall not be used where exposed to the elements.

F-402.2.12 Lath: Expanded metal or wire lath as a base or reinforcement for plastering shall weigh not less than two and two-tenths (2.2) pounds per square yard and shall have not less than two and one-half (2½) meshes per inch.

F-402.2.13 Metal mesh for masonry: Metal mesh reinforcement specified for masonry fire protection of structural metal shall consist of wire lath strips the full thickness of the masonry, laid in the beds thereof, or its approved equivalent.

F-402.14 Metal mesh for concrete: Metal mesh reinforcement specified for concrete fire protection of structural metal shall consist of wire mesh weighing not less than one and one-half (1½) pounds per square yard with wire spaced not over four (4) inches, or not less than No. 11 gauge steel wire spaced not over four (4) inches apart, or its approved equivalent.

F-402.2.15 Cement plaster: Cement plaster shall be proportioned of on (1) part Portland cement, and not more than two (2) parts of sand measured by volume dry and loose to which may be added lime putty or hydrated lime not exceeding fifteen (15) per cent of the cement.

THE MASSACHUSETTS STATE BUILDING CODE

F-402.2.16 Gypsum plaster: Gypsum plaster, except where otherwise specified, may contain sand, not in excess of three (3) times the weight of the gypsum.

F-402.2.17 Lime plaster: Lime plaster shall consist of a mixture of one (1) part lime, not over three (3) parts sand, and water.

F-402.2.18 Pneumatically projected mortar: Pneumatically projected mortar made of Portland cement, sand and water shall be rated for fire protection the same as Class 1 concrete.

F-402.2.19 Concrete fill: Concrete fill, where specified in this appendix in connection with hollow masonry units shall consist of Class 1 or Class 2 concrete poured in the hollow spaces of the units as they are laid.

F-402.2.20 Reinforced concrete: Portland cement concrete or gypsum concrete poured in place as fire protection for beams, trusses and other horizontal or inclined members of structural steel and pneumatically projected mortar applied to structural steel as fire protection shall be reinforced with metal mesh reinforcement. Concrete protection for vertical columns of structural metal shall have reinforcing consisting of No. 5 wire spaced not over eight (8) inches apart or its equivalent. Reinforcement shall be wrapped around the structural member and so arranged as to be completely embedded in the fire protection material and to ensure its integrity.

F-402.2.21 Reinforced plaster: Plaster used as fire protection or to resist the spread of fire shall be reinforced with metal lath, except plaster less than one (1) inch thick or masonry or concrete.

F-402.2.22 Replacement material: In the protection of structural metal including reinforcement, one-half ($\frac{1}{2}$) inch of cement or gypsum plaster may replace an equal thickness of poured concrete or pneumatically projected mortar as protective material; and one (1) inch of cement or gypsum plaster reinforced with metal lath may replace an equal thickness of poured concrete, pneumatically projected mortar or masonry protection.

F-402.2.23 Plaster: Where plaster is required without other specification, it shall consist of one-half ($\frac{1}{2}$) inch of cement or gypsum plaster, except that only gypsum plaster shall be used on gypsum masonry.

F-402.2.24 Thickness: In this appendix, except where otherwise specifically stated, the thickness given in a list of materials applies to the next following item only, and not to the total thickness where additional materials are specified.

F-402.2.25 Embedding limitations: Pipes, wires, conduits and ducts shall not be embedded in or placed behind the fire-protective materials required for the

REFERENCE DATA FOR EXISTING BUILDINGS

protection of structural steel or iron except as otherwise provided in this paragraph. Above fire-protective hung ceilings and within the enclosed space in building of Type 1 and Type 2 construction within which, other than the enclosure, fire protection of steel is not required, pipes, wires, conduits and ducts may be placed, provided they are so arranged and so secured that they will not, either by expanding in the event of fire, or otherwise impair, the effectiveness of the enclosing protective materials. Electric conduits and wires and gas pipes may be embedded in concrete or masonry fire protection of structural steel where the protective material is reinforced with wire mesh, provided they shall have protective covering except over the tops of beams and girders, at least as thick as required for the steel.

F-402.2.26 Damage protection: In factories, garages, warehouses and other buildings in which the fire-protective covering required for steel or iron columns may be damaged by the movement of vehicles, materials or equipment, such covering shall be protected by metal or other material in a manner satisfactory to the building official.

F-402.2.27 Firestopping: Firestopping shall mean the stopping off or enclosure at the ends and wherever else specified of the spaces between studs of partitions, joists of floors and roofs and other similar spaces to prevent drafts of air and the communication of fire from one (1) such space to another. Fire-stopping shall consist of wood not less than one and one-half (1½) inches thick, of sheet metal not less than No. 24 gauge or of masonry, or a combination of such materials. Firestopping shall be tightly fitted in the space to be filled, about pipes, wires and ducts and, if cut or disturbed in the placement of pipes, wires and ducts, shall be repaired.

F-402.3 Fire protection of steel columns

F-402.3.1 Protective thickness: Structural steel columns required to have fire protection of a given rating shall be covered on all sides with protective material having not less than the thickness necessary for the required rating. Except where "no fill" is specified, re-entrant and other accessible spaces behind the specified outer protection shall be filled with concrete or brick masonry or the material of the outer protection.

F-402.3.2 Fireresistance rating: Materials shall be assumed to afford to steel columns fire protection of the rating indicated in the following Sections F-402.3.3 through F-402.3.6:

F-402.3.3 Four (4) hour rating:

1. Two (2) inches Class 1 concrete.
2. Three (3) inches Class 2 concrete, metal mesh reinforcement.
3. Three and one-half (3½) inches brick masonry.

THE MASSACHUSETTS STATE BUILDING CODE

4. Two (2) layers two (2) inch structural clay partition tile masonry, metal mesh in beds.
5. Two (2) inches structural clay partition tile masonry, concrete fill, metal mesh in beds, three-fourths (3/4) inch gypsum plaster.
6. Four (4) inches structural clay partition tile masonry, concrete fill, metal mesh in beds, five-eighths (5/8) inch lime plaster.
7. Four (4) inches structural clay partition tile or concrete block masonry, concrete fill, plaster.
8. Three (3) inches hollow gypsum tile masonry and plaster.
9. Two (2) inches gypsum concrete, metal mesh reinforcement.
10. Two (2) inches solid gypsum tile masonry and plaster.
11. Three (3) inches solid cinder concrete block masonry and plaster.
12. Four (4) inches hollow cinder concrete block masonry and plaster

F-402.3.4 Three (3) hour rating:

1. One and three-fourths (1 3/4) inches Class 1 concrete.
2. Two (2) inches Class 2 concrete, metal mesh reinforcement.
3. Two (2) inches gypsum concrete.
4. Two (2) inches solid cinder concrete block masonry and plaster.
5. Two (2) inches structural clay partition tile masonry, concrete fill.
6. Four (4) inches structural clay partition tile masonry, concrete fill, metal mesh in beds, five-eighths (5/8) inch lime plaster.

F-402.3.5 Two (2) hour rating:

1. One and one-half (1½) inches Class 1 concrete.
2. Two (2) inches Class 2 concrete, metal mesh reinforcement.
3. One (1) inch Class 1 or Class 2 concrete encased in standard weight steel or wrought iron pipe.
4. Two (2) inches structural clay partition tile masonry and plaster.
5. Two (2) layers plaster, each on metal lath, with three-fourths (3/4) inch air space between, two (2) inches total thickness.
6. Two (2) inches gypsum concrete.
7. Two (2) inches solid or three (3) inches hollow gypsum tile masonry.

F-402.3.6 One (1) hour rating:

1. One (1) inch Class 1 concrete.
2. One and one-half (1½) inches Class 2 concrete with metal mesh reinforcement.
3. Two and one-fourth (2¼) inches brick masonry.
4. Two (2) inches structural clay partition tile or concrete block masonry.
5. One (1) inch cement or gypsum plaster on metal lath.

REFERENCE DATA FOR EXISTING BUILDINGS

F-402.3.7 Thickness: The thickness of protection on the outer edges of lugs or brackets need not exceed one (1) inch.

F-402.4 Fire protection of cast iron columns

F-402.4.1 Protective thickness: Cast iron columns required to have fire protection of a given rating shall be covered on all sides with protective materials having not less than the thickness necessary for the required rating. Re-entrant spaces, if any on the exterior of cast iron columns, and other accessible spaces behind the specified protection, shall be filled with Class 1 concrete or brick masonry or the material of the outer protection.

F-402.4.2 Fire-resistance rating: Materials shall be assumed to afford to cast iron columns fire protection of the rating indicating in the following Sections F-402.4.3 through F-402.4.5:

F-402.4.3 Four (4) hour rating: Cast iron columns shall not be used where the protection of a four (4) hour rating is required.

F-402.4.4 Three (3) hour rating:

1. Two (2) inches Class 2 concrete.
2. Three (3) inches Class 2 Concrete, metal mesh reinforcement.
3. Two (2) inches structural clay partition tile or concrete block masonry concrete fill.
4. One and one-half (1½) inches cement or gypsum plaster on metal lath and metal furring to form one-half (½) inch air space.
5. One and one-half (1½) inches Class 1 concrete.
6. Two (2) inches Class 2 concrete with metal mesh reinforcement.

F-402.4.5 One (1) hour rating:

1. One (1) inch Class 1 concrete.
2. One and one-half (1½) inches Class 2 concrete with metal mesh reinforcement.
3. One (1) inch cement or gypsum plaster on metal lath.

THE MASSACHUSETTS STATE BUILDING CODE

F-402.5 Fire protection of steel in reinforced concrete columns

F-402.5.1 Protection thickness: The main steel reinforcement, including spiral reinforcement and ties larger than one-half ($\frac{1}{2}$) inch, in reinforced concrete columns required to have fire protection of a given rating shall be covered with concrete having not less than the thickness listed in this section for the rating indicating in the following Sections F-402.5.2 through F-402.5.6:

F-402.5.2 Four (4) hour rating:

1. One and one-half ($1\frac{1}{2}$) inches Class 1 concrete.
2. Two (2) inches Class 2 concrete.

F-402.5.3 Three (3) hour rating: One and one-half ($1\frac{1}{2}$) inches Class 1 or Class 2 concrete.

F-402.5.4 Two (2) hour rating:

1. One (1) inch Class 1 concrete.
2. One and one-half ($1\frac{1}{2}$) inches Class 2 concrete.

F-402.5.5 One (1) hour rating: One (1) inch Class 1 or Class 2 concrete.

F-402.5.6 Ties less than one-half ($\frac{1}{2}$) inch: The thickness of protection on column ties not larger than one-half ($\frac{1}{2}$) inch may be one-half ($\frac{1}{2}$) inch thinner than that listed above.

F-402.6 Fire protection of steel beams, girders, and trusses

F-402.6.2 Protective thickness: Steel beams, girders and trusses or the members of trusses, required to have fire protection of a given rating, shall be covered on all sides with material having not less than the thickness necessary for the required rating.

F-402.6.3 Four (4) hour rating

1. Two (2) inches Class 1 concrete.
2. Three (3) inches Class 2 concrete.
3. Three (3) inches structural clay partition tile or concrete block masonry and plaster.
4. Three (3) inches hollow gypsum tile masonry and plaster.
5. Two (2) inches gypsum concrete.
6. Two (2) inches solid gypsum tile masonry and plaster.

REFERENCE DATA FOR EXISTING BUILDINGS

F-402.6.4 Three (3) hour rating

1. One and three-quarters (1 3/4) inches Class 1 concrete.
2. Two and one-half (2 1/2) inches Class 2 concrete.
3. Two (2) inches gypsum concrete.
4. Two (2) inches structural clay partition tile, or concrete block masonry and plaster.
5. Two (2) inches solid, or three (3) inches hollow gypsum tile masonry.

F-402.6.5 Two (2) hour rating

1. One and one-half (1 1/2) inches of Class 2 concrete.
3. Two (2) inches gypsum concrete.

F-402.6.6 One (1) hour rating

1. One (1) inch Class 1 concrete.
2. One and one-half (1 1/2) inches Class 2 concrete.
3. Seven-eighths (7/8) inch or cement or gypsum plaster on metal lath.

F-402.7 Fire protection of steel in reinforced concrete beams

F-402.7.1 Protective thickness: The main steel reinforcement, including stirrups larger than one-half (1/2) inch, in reinforced concrete beams, girders and trusses, including the ribs of reinforced concrete ribbed floors or roofs where one (1) or both sides of the ribs, in addition to the soffit, are exposed to fire, required to have fire protection of a given rating, shall be covered on all sides with concrete having not less than the thickness listed in this section for the required rating. Where a reinforced concrete floor or roof has a flush ceiling formed with approved permanent masonry filler between ribs, the reinforcement shall have the protection required for reinforcing steel of floors and roofs in Section F-402.8.

F-402.7.2 Four (4) hour rating:

1. One and one-half (1 1/2) inches Class 1 concrete.
2. Two (2) inches Class 2 concrete.

F-402.7.3 Three (3) hour rating: One and one-half (1 1/2) inches Class 1 or Class 2 concrete.

F-402.7.4 Two (2) hour rating:

1. One (1) inch Class 1 concrete.
2. One and one-half (1 1/2) inches Class 2 concrete.

THE MASSACHUSETTS STATE BUILDING CODE

F-402.7.5 **One (1) hour rating: One (1) inch Class 1 or Class 2 concrete.**

F-402.7.6 **Stirrups less than one-half (½) inch:** The thickness of protection on stirrups not larger than one-half (½) inch may be less than that listed by not more than one-half (½) inch.

F-402.8 **Fire protection of steel reinforcing in floors and roofs.**

F-402.8.1 **Protection thickness:** The steel reinforcement in reinforced concrete floors and roofs with flush or plane ceiling, such that the exposure to fire is on the soffit only, required to have fire protection of a given rating, shall be covered with concrete having not less than the thickness listed in this section for the required rating. In floors or roofs having reinforced concrete ribs where the concrete surrounding the steel reinforcement is exposed to fire on one (1) or both sides in addition to the soffit, such reinforcement shall have the protection specified in Section F-402.7 for steel in reinforced concrete beams.

F-402.8.2 **Four (4) hour rating:**

1. One (1) inch Class 1 concrete.
2. One and one-fourth (1¼) inches Class 2 concrete.

F-402.8.3 **Three (3) hour rating:** One (1) inch Class 1 or Class 2 concrete.

F-402.8.4 **Two (2) hour rating:**

1. Three-fourths (¾) inch Class 1 concrete.
2. One (1) inch Class 2 concrete.

F-402.8.5 **One (1) hour rating:** Three-fourths (¾) inch Class 1 or Class 2 concrete.

F-402.9 **Fireresistive floor and roof construction**

F-402.9.1 **Protective thickness:** Floors and roofs required to have resistance of a given rating to the spread of fire shall have such thickness of the materials of which it is constructed, as shall be necessary for the required rating, and structural metal forming a part of such floors or roofs shall have protection against fire of such required rating. Floors and roofs required to have two (2) hour or longer resistance to fire be constructed of noncombustible materials. Granolithic, burned clay tile, ceramic tile or other similar incombustible floor finish of a given thickness may be substituted for an equal thickness, and sand, cinder or other incombustible filling material, with or without embedded wooden screeds, may be substituted for two-thirds (2/3) its thickness, of the floor or roof construction material specified in this

REFERENCE DATA FOR EXISTING BUILDINGS

section, provided that such floors and roofs shall have adequate thickness for structural purposes.

F-402.9.2 Fireresistance rating: Floor or roof construction shall be assumed to afford resistance to the spread of fire of the rating indicated in the following Sections F-402.9.3 through F-402.9.6:

F-402.9.3 Four (4) hour rating

1. Four (4) inches solid slab of reinforced Portland cement concrete or reinforced precast gypsum concrete.
2. Four (4) inches solid masonry arches or slabs.
3. Four (4) inches structural clay floor tile masonry arches or slabs with top covering of not less than two (2) inches of solid masonry or reinforced concrete.
4. Five (5) inches combination reinforced Portland cement concrete slab consisting of permanent fillers of concrete block, gypsum or structural clay tile and one and one-half (1½) inches of concrete topping; but if structural clay partition tiles are used for fillers, they shall be plastered on the soffit.

F-402.9.4 Three (3) hour rating

1. Three (3) inches solid slab of reinforced Portland cement concrete or reinforced precast gypsum concrete.
2. Three (3) inches solid masonry arches or slabs.
3. Four (4) inches structural clay floor tile masonry, arches or slabs with top covering of not less than one and one-half (1½) inches of solid masonry or reinforced concrete.
4. Four (4) inches combination reinforced Portland cement concrete slab consisting of permanent fillers of concrete block, gypsum or structural clay tile and one (1) inch concrete topping; but if structural clay partition tiles are used for fillers, they shall be plastered on the soffit.

F-402.9.5 Two (2) hour rating

1. Two and one-half (2½) inches solid slab of reinforced Portland cement concrete or reinforced precast gypsum concrete.
2. Two and one-half (2½) inches solid masonry arches or slabs.
3. Three (3) inches structural clay floor tile masonry, arches or slabs with top covering of not less than one (1) inch of solid masonry or reinforced concrete.

THE MASSACHUSETTS STATE BUILDING CODE

F-402.9.6 One (1) hour rating

1. Three (3) inches structural clay floor tile masonry, arches or slabs with all joints thoroughly filled with cement or gypsum mortar.
2. Wood floor or roof construction with joists not less than one and five-eighths (1 5/8) inches in least dimension, firestopped, double board floor, approved asbestos felt between lay of boards, and with a ceiling of at least three-quarters (3/4) inch cement or gypsum plaster on metal lath.
3. Steel beams or steel joists not more than thirty-six (36) inches apart on centers with noncombustible floor and a ceiling of at least three-quarters (3/4) inch cement or gypsum plaster on metal lath furring.

F-402.10 Fireresistive ceiling construction

F-402.10.1 Protective thickness: Ceilings required to afford fire protection of a given rating to the floor or roof framing under which it is supported shall be of fireresistive materials of at least the thickness necessary for the given rating. A fireresistive ceiling and all hangers and fastenings necessary for its support to the protected framing shall be of noncombustible materials. It shall be capable of sustaining its own weight without exceeding allowable stresses. Metal reinforcement in such a ceiling shall be protected from fire as specified in Section F-402.8 for reinforcing in a floor.

F-402.10.2 Fireresistance rating: Ceiling construction shall be assumed to afford to floor or roof framing fire protection of the rating indicated in the following Sections F-402.10.3 through F-402.10.6.

F-402.10.3 Four (4) hour rating

1. Two and one-half (2½) inches solid slab of reinforced Portland cement concrete or reinforced precast gypsum concrete.
2. Two (2) inches precast reinforced gypsum concrete, plastered.

F-402.10.4 Three (3) hour rating

1. Two (2) inches solid slab of reinforced Portland cement concrete or reinforced precast gypsum concrete.
2. Two (2) inches precast reinforced gypsum concrete, lapped or rabbeted joints.

F-402.10.5 Two (2) hour rating: One and one-half (1½) inches solid slab of reinforced Portland cement concrete or reinforced precast gypsum concrete.

REFERENCE DATA FOR EXISTING BUILDINGS

F-402.10.6 One (1) hour rating: Three quarter (3/4) inch cement or gypsum plaster on metal lath.

F-402.11 Fireresistive bearing walls and partitions

F-402.11.1 Protective thickness: Bearing walls and partitions required to have resistance to fire or the spread of fire of a given rating shall be constructed of fireresistive materials and shall have at least the thickness necessary for the required rating. Walls required to have two (2) hour or longer rating shall be of noncombustible materials. Steel reinforcement in reinforced concrete walls shall have the same protection for the given rating as is required in Section F-402.9 for floors.

F-402.11.2 Fireresistance rating: Bearing walls and partitions shall be assumed to have resistance to fire and the spread of fire of the rating indicated in the following Sections F-402.11.3 through F-402.11.6:

F-402.11.3 Four (4) hour rating:

1. Eight inches solid brick masonry.
2. Twelve (1) inches hollow wall of brick masonry, minimum eight (8) inch masonry thickness.
3. Twelve (12) inches structural clay load-bearing tile masonry with two (2) units and not less than three (3) cells in the thickness of the wall.
4. Eight (8) inches structural clay load-bearing tile masonry with one (1) unit and not less than two (2) cells in the thickness of the wall, plastered both sides.
5. Twelve (12) inches concrete block masonry with one (1) unit and not less than two (2) cells in the thickness of the wall.
6. Eight (8) inches one (1) piece concrete block masonry with shells and webs at least one and one-half (1½) inches thick, plastered both sides.
7. Twelve (12) inches total thickness of brick masonry facing bonded to structural clay load-bearing tile masonry backing.
8. Eight (8) inches solid concrete.
9. Six (6) inches solid reinforced concrete.
10. A steel or reinforced concrete frame bearing wall in which the steel has fire protection of four (4) hour rating, with panel filling as specified in Section F-402.12 for a nonbearing wall of four (4) hour rating.

F-402.11.4 Three (3) hour rating:

1. Eight (8) inches structural clay load-bearing tile masonry with two (2) units and not less than four (4) cells in the thickness of the wall.
2. Twelve (12) inches structural clay load-bearing tile masonry with one (1) unit and not less than three (3) cells in the thickness of the wall.

THE MASSACHUSETTS STATE BUILDING CODE

3. Eight (8) inches one (1) piece concrete block masonry with shells and webs not less than one and one-half (1½) inches thick, plastered both sides.
4. Eight (8) inches one (1) piece concrete block masonry with shells and webs not less than two (2) inches thick.
5. Five (5) inches solid reinforced concrete.
6. A steel or reinforced concrete frame bearing wall in which the steel has fire protection of three (3) hour rating, with panel filling as specified in Section F-402.12 for a nonbearing wall of three (3) hour rating.

F-402.11.5 Two (2) hour rating:

1. Eight (8) inches structural clay load-bearing tile masonry with not less than three (3) cells in the thickness of the wall.
2. Eight (8) inches concrete block masonry with shells and webs not less than one and one-half (1½) inches thick.
3. A steel or reinforced concrete frame bearing wall in which the steel has fire protection of two (2) hour rating, with panel filling as specified in Section F-402.12 for a nonbearing wall of two (2) hour rating.

F-402.11.6 One (1) hour rating:

1. A steel or wooden stud bearing wall covered on both sides with one (1) inches cement or gypsum plaster on metal lath, firestopped if of wood.
2. A steel or reinforced concrete frame bearing wall in which the steel has fire protection of one (1) hour rating, with panel filling as specified in Section F-402.12 for a nonbearing wall of one (1) hour rating.

F-402.12 Fireresistive nonbearing walls and partitions

F-402.12.1 Protective thickness: Nonbearing walls and partitions required to have resistance to fire and the spread of fire of a given rating shall be constructed of fireresistive materials and shall have at least the thickness necessary for the required rating. Walls required to have two (2) hour or longer rating shall be of incombustible materials. Steel reinforcement in reinforced concrete walls shall have the same protection for the given rating as is required in Section F-402.8.

F-402.12.2 Fireresistance rating: Nonbearing walls and partitions shall be assumed to have resistance to fire and the spread of fire of the rating indicated in the following Sections F-402.12.3 through F-402.12.6:

F-402.12.3 Four (4) hour rating:

1. Eight (8) inches solid brick masonry.
2. Three and one-half (3½) inches solid brick masonry, plastered both sides.

REFERENCE DATA FOR EXISTING BUILDINGS

3. Six (6) inches structural clay load-bearing tile, plastered both sides.
4. Six (6) inches solid concrete.
5. Four (4) inches solid reinforced concrete.
6. Any wall which, as a bearing wall, has a three (3) hour or four (4) hour rating in Section F-402.11, except the steel or reinforced concrete frame bearing wall.

F-402.12.4 Three hour rating:

1. Three and one-half (3½) inches solid brick masonry.
2. Four (4) inches structural clay load-bearing tile, plastered both sides.
3. Four (4) inches solid concrete.
4. Three (3) inches reinforced concrete.
5. Any wall which, as a bearing wall, has a two (2) hour rating in Section F-402.11 except the steel or reinforced concrete frame bearing wall.

F-402.12.5 Two hour rating:

1. Three (3) inches gypsum tile masonry plastered both sides except in exterior walls.
2. Eight (8) inches structural clay partition tile masonry, plastered both sides.
3. Eight (8) inches structural clay load-bearing tile, with three (3) cells in the thickness of the wall.
4. Two and one-half (2½) inches solid cement or sanded gypsum plaster on metal lath and noncombustible studding.
5. Three (3) inches total thickness of hollow wall, three-quarter (¾) inch cement or gypsum plaster on metal lath and noncombustible studding.
6. Three (3) inches total thickness of hollow wall, three-quarter (¾) inch cement or gypsum plaster on metal lath and wooden studding, firestopped.

F-402.13 Fireresistive doors

F-402.13.1 General: Doors which are required to be fire doors, fireresistive doors, or of fireresistive construction shall conform to the requirements of this section and Section F-402.14

F-402.13.2 Classification: Fire doors shall be classified for the proposes of this code as Class A, Class B, and Class C.

THE MASSACHUSETTS STATE BUILDING CODE

F-402.13.3 Class A fire doors: Class A fire doors shall be doors of the following construction and as specified in Section F-402.14:

1. Tin-clad, three (3) ply wood core, sliding.
2. Tin-clad, three (3) ply wood core, swinging single leaf, doorway not over six (6) feet wide.
3. Tin-clad, three (3) ply wood core, swinging in pairs, doorway not over (4) feet wide.
4. Hollow metal, swinging single leaf, doorway not over four (4) feet wide.
5. Hollow metal, swinging in pairs, doorway not over eight (8) feet wide.
6. Sheet metal, sliding, single, doorway not over ten (10) feet wide.
7. Sheet metal, sliding in pairs, doorway not over twelve (12) feet wide.
8. Sheet metal, swinging single leaf, doorway not over (6) feet wide.
9. Sheet metal, swinging in pairs, doorway not over ten (10) feet wide.
10. Steel rolling doorway not over twelve (12) feet wide.
11. Steel plate, doorway not over four (4) feet wide.
12. Any other construction equal or superior to a tin-clad three (3) ply wood core door in a standard fire test, for resistance to fire, the spread of fire and smoke, and transmission of heat.

F-402.13.4 Class B fire doors: Class B fire doors shall be doors of the following construction and as specified in Section F-402.14:

1. Tin-clad, three (3) ply wood core.
2. Tin-clad, two (2) ply wood core, sliding, doorway not over ten (10) feet wide.
3. Tin-clad, two (2) ply wood core, swinging single leaf, doorway not over six (6) feet wide.
4. Tin-clad, two (2) ply wood core, swinging in pairs, doorway not over (10) feet wide.
5. Hollow metal, sliding, doorway not over eight (8) feet wide.
6. Metal-clad, paneled, swinging single leaf, doorway not over three (3) feet wide.
7. Metal-clad, paneled, swinging in pairs, doorway not over six (6) feet wide.
8. Any other construction equal or superior to a tin-clad two (2) ply wood core door in a standard fire test, for resistance to fire, the spread of fire and smoke, and transmission of heat.

F-402.13.5 Class C fire doors: Class C Fire doors shall be doors of the following construction and as specified in Section F-402.14:

1. Metal-clad, paneled, swinging single leaf, doorway not over four (4) feet wide.
2. Metal-clad, paneled, swinging in pairs, doorway not over eight (8) feet wide.

REFERENCE DATA FOR EXISTING BUILDINGS

F-402.13.6 Substitution: A Class A door may be used where Class b or Class C is specified; a Class B door may be used where Class C is specified. Two (2) Class B or Class C doors on opposite sides of the wall may be used where a single Class A or Class B door is specified.

F-402.13.7 Overlap: Fireresistive doors, when closed, shall completely cover the doorways in the walls and partitions or the openings in the floors or roofs to which they are fitted. A swinging fire door shall either overlap both jambs and the head of the opening not less than four (4) inches or be fitted to a fireresistive frame with a rabbet the full thickness of the door and with not less than one half ($\frac{1}{2}$) inch overlap on the door. A sliding fire door, except in enclosures about passenger elevators, shall overlap both jambs and the head of the opening not less than four (4) inches. A sliding fire door in an enclosure about a passenger elevator shall overlap jambs, head and adjoining panels not less than one half ($\frac{1}{2}$) inch. Fire doors shall fit closely at the floor with clearance of not over one quarter ($\frac{1}{4}$) inch.

F-402.13.8 Thresholds: In buildings with combustible floors, doorways required to have fire doors shall have noncombustible thresholds the full thickness of the wall, extending at least four (4) inches from the face of the wall where a door is hung and extending laterally at least six (6) inches behind each jamb of the doorway. Thresholds may be flush with the floor.

F-402.13.9 Rabbeted frame: The rabbeted frame of a swinging fire door shall be constructed of structural steel built into the concrete, masonry or other fireresistive material of the wall about the opening and secured thereto, except that the rabbeted frame of a Class B or C door may be of wood, covered with sheet metal not less than No. 26 gauge in thickness, secured to the wall in the opening.

F-402.13.10 Fit: Fire doors when closed shall fit tightly against the wall or frame so as to provide an effective stop for fire and smoke. Except for the metal-covered wooden frame specified in this section, combustible material shall not intervene between the door and the fireresistive material of the wall, floor or roof to which it is fitted.

F-402.13.11 Hardware: Hinge hardware for fire doors shall be of malleable iron or rolled structural steel not less than one quarter ($\frac{1}{4}$) inch thick except that tubular steel track for sliding doors may be not less than one eighth ($\frac{1}{8}$) inch thick. Equivalent thickness of solid bronze or brass may be used. Fire doors shall not depend upon cords, cables or chains to support them in closed position except in elevator shafts.

F-402.13.12 Tracks: Tracks for sliding fire doors shall be so supported that a track hanger comes at each door hanger when the door is closed. Track hangers shall be secured to wood stud walls by through bolts and to concrete walls by through bolts

THE MASSACHUSETTS STATE BUILDING CODE

or approved built-in inserts. Expansion shields shall not be used to support fire doors.

F-402.13.13 Hinges: Hinges for swinging fire doors, except in wooden stud walls, shall be riveted or through-bolted to the structural steel frame of the opening, through-bolted to the wall if of masonry or concrete or secured by approved inserts in the concrete or built into masonry in an approved manner

F-402.13.14 Strap hinges: Strap hinges and sliding door hangers shall be secured to fire doors by through-bolting, riveting or welding. Swinging fire doors in rabbeted frames, except tin-clad, wood core doors, may be hung on butts. Other swinging fire doors shall have strap hinges.

F-402.13.15 Straps, locks and latches: Sliding fire doors shall have adequate stops for the closed position. Swinging Class A fire doors shall have surface latches or unit locks. Class B and C doors shall have surface latches, unit or mortise locks. The latch bolts of unit or mortise locks on fire doors shall have a throw of three quarters (3/4) inch. When mounted in pairs, fire doors shall be rabbeted by means of an astragal or otherwise where they come together. One of a pair of swinging fire doors shall have push bolts at top and bottom with a throw of three (3/4) inch and the other shall be held by latch to the first.

F-402.13.16 Opening hardware: Except in detention buildings, fire doors hung in required exits shall be so fitted with hardware that they can be opened from inside without use of a key when the building is occupied.

F-402.14 Fire door construction

F-402.14.1 Fastening: In the construction of fire doors, solder shall not be used except for filling joints. Sheet metal shall be fastened to wood by nailing and to metal frame by bolting, riveting or welding.

F-402.14.2 Glass: Class A doors shall not have glass panels. Class B doors may have glass panels not larger than one hundred (100) square inches in exposed area nor more than twelve (12) inches in width or height. Class C doors may have glass panels not larger than two thousand and sixteen (2,016) square inches in total exposed area, and any single light shall not have an exposed area exceeding twelve hundred and ninety-six (1,296) square inches. Glass in fire doors shall be wire glass not less than one quarter (1/4) inch thick and shall be set five eighths (5/8) inch in grooves three quarters (3/4) of an inch deep.

F-402.14.3: Deleted

REFERENCE DATA FOR EXISTING BUILDINGS

F-402.14.4 Tin-clay, two (2) ply: In-clad, two (2) ply wood core doors shall be constructed in accordance with the specifications of the National Board of Fire Underwriters for such doors in Class B openings and shall bear the label of the Underwriters' Laboratories to this effect.

F-402.14.5 Hollow metals: Hollow metal doors shall have substantial stiles and rails of heavy pressed steel, reinforced for hinges and other hardware. Panels shall be of sheet filled with asbestos board or other approved insulating materials. The door shall be assembled by welding or riveting.

F-402.14.6 Sheet metals: Sheet metal doors shall be constructed with a rolled steel rigid frame covered both sides with one sixteenth (1/16) inch asbestos board and No. 26 gauge corrugated steel metal, with corrugations vertical on one (1) side and horizontal on the other, bound on the edges with rolled steel or pressed steel shapes.

F-402.14.70 Steel rolling: A steel rolling fire door shall be constructed of sheet steel interlocking slats, sliding in grooves, counterweighted by springs, with the roller and mechanism enclosed in heavy sheet metal.

F-402.14.8 Steel plate: A steel plate fire door shall be constructed of not less than No. 12 gauge steel plate mounted on a rolled steel frame, assembled by welding or riveting.

F-402.14.9 Metal clad: A metal clad, paneled fire door shall have a wood core with stiles and rails not less than one and three quarters (1 3/4) inches thick covered with No. 26 gauge sheet steel; panels three quarters (3/4) inch thick covered with No. 26 gauge sheet steel, set three quarters (3/4) inch in grooves; joints of metal lapped and well nailed.

F-402.14.10 Class A label: A door properly bearing the Underwriters' label certifying that it is suitable for the protection of a Class A opening shall be acceptable as a Class A door.

F-402.14.11 Class B label: A door properly bearing the Underwriters' label certifying that it is suitable for the protection of a Class B opening shall be acceptable as a Class B door, except that metal clad doors wider than three (3) feet shall not be accepted as Class B doors.

F-402.14.12 Class C label: A door properly bearing the Underwriters' label certifying that it is suitable for the protection of a Class C opening shall be acceptable as a Class C door.

THE MASSACHUSETTS STATE BUILDING CODE

F-402.15 Fireresistive shutters: Shutters required to be fire shutters or fireresistive shutters shall be constructed and hung as specified for Class B fireresistive doors in Sections F-402.13 and F-402.14.

F-402.16 Fireresistive windows

F-402.16.1 General: Windows which are required to be fire windows, fireresistive windows, or of fireresistive construction shall conform to the requirements of this section.

F-402.16.2 Moveable: Fireresistive windows may be fixed or arranged to open and close. Fixed fireresistive windows shall be so secured in the walls in which they are placed that they may expand in case of fire without buckling. Moveable fireresistive windows shall be opened or closed in one (1) of the following manners:

1. One (1) or more sashes may slide horizontally in a fireresistive frame.
2. One (1) or more sashes may slide vertically with counterweights or with two (2) sashes counterbalanced and hung on chains. If a sash is closed in raised position, it shall have a fastening.
3. A sash may be hinged at top, bottom, or either side.
4. A sash may be pivoted at top and bottom or at the sides.
5. A sash may be arranged to open and close in any other approved manner, with approved hardware.

F-402.16.3 Sash: Moveable sashes in fireresistive windows shall be furred to fireresistive frames of the same or similar construction. Both sashes and frames, and metal mullions between window units, shall be so fitted in the walls in which they are placed as to be continuous with the fireresistive material of the wall and so secured that they may expand in case of fire without buckling.

F-402.16.4 Glass: Glass in fireresistive windows shall be wired glass not less than one quarter ($\frac{1}{4}$) inch thick and the area of a single light shall not exceed seven hundred and twenty (720) square inches. Glass shall be set three eighths ($\frac{3}{8}$) inch grooves at least one half ($\frac{1}{2}$) inch deep. Glass shall be secured by glazing angles or molding screwed to the sash and forming continuous grooves for the glass.

F-402.16.5 Construction: Fireresistive windows shall be of the following construction:

1. Hollow sheet metal sashes and frames fabricated by pressing, welding, riveting or crimping without the use of solder or other fusible alloy, except for filling joints, and bearing the label of Underwriters' Laboratories.
2. Rolled steel or pressed steel sashes fabricated by pressing, welding, riveting or crimping, of a make and style approved by the commissioner.

REFERENCE DATA FOR EXISTING BUILDINGS

3. Any other approved constructions as fireresistive as that specified in item 1 above.

F-402.16.6 Hollow sheet metal: Fired fireresistive windows of hollow sheet metal construction shall not exceed seven (7) feet in width not ten (10) feet in height. Fireresistive windows of hollow sheet metal construction with moveable sashes shall not exceed six (6) feet in width nor ten (10) feet in height.

F-402.16.7 Rolled steel: Fireresistive windows of rolled steel construction shall not exceed eighty-four (84) square feet in area not twelve (12) feet in either height or width.

F-402.16.8 Wind pressure: Fireresistive windows and their fastenings shall be capable of resisting the wind pressure on the wall of the building applied either on the inside or the outside of the window exceeding allowable stresses.

F-402.16.9 Substitution: Where fireresistive windows are required, wooden windows and plain glass may be substituted provided the openings are protected by fireresistive doors or shutters, or, in buildings of approved occupancy and construction, by an approved system of open sprinklers.

F-402.17 Fireresistive roof covering

F-402.17.1 Classification: Roof covering allowed under this code shall be classified as fire-retardant or ordinary, according to resistance to fire outside, as provided in this section. Fire-retardant roof covering is the more fireresistive and may be used where fire-retardant roofing is specified. Roof covering less fireresistive than ordinary roof covering shall not be used on any building.

F-402.17.2 Fire-retardant roofing: Fire-retardant roofing shall be any roof covering than meets the requirements of Class A or Class B roofing under the specifications of the Underwriters' Laboratories, Inc. The following roof covering shall be assumed to meet the requirements for fire-retardant roofing:

1. Built-up roofing consisting of successive layers of roofing felt impregnated with asphalt; a final layer of asphalt in which, while molten, is embedded a continuous layer of roofing gravel or slag.
2. Built-up roofing consisting of successive layers of roofing felt impregnated with coal tar; a final layer of tar in which, while molten, is embedded a continuous layer of roofing gravel or slag.
3. Built-up roofing consisting of successive layers of roofing felt impregnated with asphalt; a final layer of asbestos roofing felt impregnated with asphalt weighing not less than fourteen (14) pounds per hundred (100)

THE MASSACHUSETTS STATE BUILDING CODE

square feet, or a final layer of asphalt-saturated prepared roofing coated with granulated slate or other similar material.

4. Built-up roofing consisting of successive layers of roofing felt impregnated with tar or asphalt and a finish of burned clay floor tile, stone flagging, cement concrete or other similar material.
5. Sheet metal with locked and soldered joints not less than No. 26 gauge in thickness.
6. Shingles of natural slate.
7. Shingles of burned clay tile.
8. Shingles of sheet metal not less than No. 26 gauge in thickness.
9. Shingles of asbestos board not less than one-eighth (1/8) inch thick.
10. Shingles of asphalt saturated felt surfaced with granulated slate or other similar material and carrying the Underwriters Class "C" label.
11. Corrugated sheet metal with lapped joints not less than No. 26 gauge in thickness.
12. Corrugated asbestos board not less than three-sixteenths (3/16) inch thick.

F-402.17.3 Ordinary roofing: Ordinary roofing shall be of any roof covering which meets the requirements of Class C roofing under the specifications of the Underwriters' Laboratories, Inc. The following roof covering shall be assumed to meet the requirements for ordinary roofing:

1. Built-up roofing consisting of successive layers of roofing felt impregnated with asphalt, coal tar or other approved material, not equal in fireresistance to a fire-retardant roofing.
2. Prepared roofing consisting of felt or fabric impregnated or coated, or both, with asphalt, tar or other approved material or shingles of such prepared roofing, not equal in fireresistance to fire-retardant roofing.
3. Canvas stretched tightly and coated with paint.

F-402.17.4 Means of securing: Built up roofing shall be secured to the roof deck in the following manner:

1. Over masonry slab, the first layer shall be laid in molted asphalt or tar mopped on the roof deck, after the deck is properly primed, or by nailing a layer of building paper to nailing inserts other than wood placed in the deck.
2. Over wood decks, the built-up roofing shall be secured by nailing a layer of building paper to the roof deck over which the prepared roofing is to be laid with the first layer laid in molten asphalt or tar.
3. Roofings other than built-up roofings, such as shingles, slates, and tile roll roofing shall be well secured to the deck by nailing, bolting, wiring, or other approved methods.

APPENDIX G

SPECIALIZED MASSACHUSETTS RULES AND REGULATIONS OTHER THAN STATE BOARD OF BUILDING REGULATIONS AND STANDARDS

Specific numbers have been established by the Massachusetts Office of the Secretary of State to identify for reference purposes all rules and regulations promulgated by agencies of the Commonwealth of Massachusetts. These numbers are designated as "Code of Massachusetts Regulations" (CMR's).

EXECUTIVE OFFICE OF CONSUMER AFFAIRS, DIVISION OF REGISTRATION

Board of State Examiners of Plumbers and Gas Fitters

Massachusetts State Plumbing Code 248 CMR 2.00
Massachusetts Fuel Gas Code 248 CMR 3.00 - 8.00

EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS OUTDOOR ADVERTISING DIVISION

Outdoor Advertising Board

Control and Restriction of Billboards, Signs,
and other Advertising Devices, August 1, 1978
Rules and Regulations for 311 CMR 3.00

THE MASSACHUSETTS STATE BUILDING CODE

EXECUTIVE OFFICE OF HUMAN SERVICES, DEPARTMENT OF PUBLIC HEALTH, DIVISION OF ENVIRONMENTAL HEALTH

Division of Health Care Standards

Designer's Guide (Bureau of Planning and Construction)

Dispensaries and Clinics, December 21, 1966-

Rules and Regulations for the licensure of 105 CMR 140.00

Hospitals in Massachusetts, 1971 - Licensure

Rules and Regulations for 105 CMR 130.000

Intensive Care Unit Amendment, October 1, 1972 105 CMR 130.520
through 103.535

Long Term Care Facilities in Massachusetts,
September 29, 1972, General Standards of

Construction-Rules and Regulations for 105 CMR 151.000

The State Sanitary Code

Camp Grounds, Developed Family Type-

Minimum Standards for 310 CMR 18.00 Article VIII*

Farm Labor Camps - Housing and Sanitation

Standards for 105 CMR 420.000 Article III

Food Service Establishments-

Minimum Sanitation Standards for 105 CMR 595.000 Article X

General Application and Administration 105 CMR 400.00 Article I

Human Habitation , Fitness-

Minimum Standards of 105 CMR 410.000 Article II

Recreational Camps for Children-

Sanitation Standards for 105 CMR 430.000 Article IV

Swimming Pools-Minimum Standards for 310 CMR 16.00 Article VI*

*Articles VI and VIII of the State Sanitary Code have been transferred to the
Department of Environmental Quality and Engineering.

SPECIALIZED MASSACHUSETTS RULES AND REGULATIONS

EXECUTIVE OFFICE OF MANPOWER AFFAIRS, DEPARTMENT OF LABOR AND INDUSTRIES

Division of Industrial Safety

Accidents on Construction Operations- Rules and Regulations for	441 CMR 10.00 Industrial Bulletin No. 12
Accidents in Window Cleaning-Rules and Regulations for the Prevention of	441 CMR 19.00 Industrial Bulletin No. 21
Care of Employees, Injured or Taken Ill in Industrial Establishments	441 CMR 12.00 Industrial Bulletin No. 14
Lighting Code for Factories, Workshops, Manufacturing, Mercantile Establishments	441 CMR 16.00 Industrial Bulletin No. 18
Structural Painting-Revised Rules and Regulations and Recommendations Pertaining to	441 CMR 11.00 Industrial Bulletin No. 13
Toilets in Industrial Establishments	441 CMR 2.00 Industrial Bulletin No. 4

EXECUTIVE OFFICE OF PUBLIC SAFETY, DEPARTMENT OF PUBLIC SAFETY

Architectural Barriers Board

Architectural Barriers Board- Rules and Regulations of the	521 CMR 3.00 (161AB)
Board of Boiler Rules Part 1 of Steam Boiler Rules	522 CMR 2.00 (BLR-1)
Part 1-A of Steam Boiler Rules, Atomic Energy Installations	522 CMR 3.00 (BLR-1-A)
Part II of Steam Boiler Rules, Power and Miniature Class	522 CMR 4.00 (BLR-2)
Low Pressure Steam-Heating Boilers	522 CMR 5.00 (BLR-3)
Part IV-Steam Boiler Rules	522 CMR 6.00 (BLR-4)
Part I-Air Tank Regulations, Installation and Inspection	522 CMR 7.00 (BLR-5)

THE MASSACHUSETTS STATE BUILDING CODE

Part II-Air Tank Regulations, Installation and Inspection	522 CMR 8.00 (BLR-6)
Refrigeration and Air Conditioning	522 CMR 9.00 (BLR-7)
Material Specifications	522 CMR 10.00 (BLR-8)
Welding Specifications	522 CMR 11.00 (BLR-9)
Fiberglass-Reinforced Plastic Pressure Vessels	522 CMR 12.00 (BLR-11)
Board of Elevator Regulations	
Elevator and Escalator Regulations	524 CMR 2.00 (ELV-1) through 11.0
Elevator, Dumbwaiter, Escalator, and Moving Walk Regulations	524 CMR 15.00 (ELV-2) through 34.0
Board of Fire Prevention Regulations	
Dry-Cleaning and Dry-Dyeing and the Keeping, Storage and Use of Cleaning and Dyeing Fluid in Connection Therewith- Rules and Regulations Governing	527 CMR 3.00 (FPR-2)
Fires, the Prevention of Fire and Fire Hazards, Remedying any Condition Found to Exist in or about any Building or other Premises or on any Ship or Vessel in Respect to-Rules and Regulations for the Purpose of	527 CMR 10.00 (FPR-9)
Flammable Decorations in Public Buildings, Places of Assembly, Hotels, Family Hotels, Stores, Public or Private Institutions, Public or Private School Buildings, Churches, Theaters, Special Halls, Public Halls or Miscellaneous Halls-Rules and Regulations Prohibiting or Regulating	527 CMR 21.00 (FPR-20)
Flammable Fluids, Solids or Gases, Keeping, Storage, Manufacture or Sale in Limited Quantities of- Rules and Regulations Governing	527 CMR 14.00 (FPR-13)

SPECIALIZED MASSACHUSETTS RULES AND REGULATIONS

- Garages, and the Related Storage, Keeping
and Use of Gasoline, the Construction
and Maintenance of Buildings or Other
Structures used as-
Rules and Regulations Governing 527 CMR 5.00 (FPR-4)
- Liquefied Petroleum Gas Systems, Gas
Piping and Appliance Installation in
Building, the Construction, Location,
Installation and Operation-
Rules and Regulations Governing 527 CMR 6.00 (FPR-5)
- Massachusetts State Electrical Code 527 CMR 12.00 (FPR-11)
- Oil Burning Equipment and the Keeping,
Storage and Use of Fuel Oil or other
Inflammable Liquid Products used in
Connection Therewith-
Rules and Regulations Governing the Construction,
Installation, and Operation of 527 CMR 4.00 (FPR-3)
- Plastics, Manufacturing and Handling of-
Rules and Regulations Governing 527 CMR 7.00 (FPR-6)
- Tanks and Containers, Construction,
Location, Use and Maintenance of-
Rules and Regulations Governing 527 CMR 9.00 (FPR-8)

THE MASSACHUSETTS STATE BUILDING CODE

This page intentionally left blank

APPENDIX H

HISTORIC STRUCTURES

Historic structure individually listed in the National Register of Historic Places, qualifying as totally preserved buildings (see Section 436.3).

Acton	Faulkner Homestead, High Street
Agawam	Capt. Charles Leonard House, Main Street
Amesbury	Rocky Hill Meetinghouse, Portsmouth Road
Arlington	Fowle-Reed-Wyman House, 64 Old Mystic Street Jason Russell, 7 Jason Street Old Schwamb Mill, 17 Mill Lane
Barre	Barre Historical Society, Common Street
Barnstable	Barnstable Custom House, Route 6A
Bedford	Job Lane House, 295 North Road
Beverly	John Balch House, 448 Cabot Street Capt. John Cabot House, 117 Cabot Street Rev. John Hale House, 39 Hale Street
Boston	Gleason House, Beacon Street James Blake House, E. Cottage Street (Dor.) Clapp Houses, 105 Boston Street (Dor.) Loring-Greenough House, 12 South Street (JP) Old State House, 15 State Street Pierce House, 24 Oakten Avenue (Dor.) South End Historical Soc., 532 Mass. Avenue Isabella Stewart Gardner Museum, 280 The Fenway
Boxford	Holyoke-French House, Elm Street Sylvanius-Thayer Birthplace, 786 Washington St

THE MASSACHUSETTS STATE BUILDING CODE

Brookline	Edward Devotion House, 347 Harvard Street
Burlington	Francis Wyman House, Francis Wyman Road
Cambridge	Cooper-Frost-Austin House, 21 Linnaean St.
Charlton	Ryder Tavern, Stafford Street
Chelmsford	Old Chelmsford Garrison House, 105 Garrison Road
Chelsea	Gov. Bellingham-Cary House, 34 Parker Street
Cohasset	Caleb Lothrop House, 14 Summer Street
Danvers	Fowler House, 166 High Street Rebecca Nurse House Glen Magna House
Dennis	Josiah Dennis Manse, Nobscuset Road West Schoolhouse
Duxbury	Gershom Bradford House, 931 Tremont Street King Caesar House, King Caesar Road
Gloucester	Beauport, Eastern Pt. Blvd. Hammond Castle, 80 Hesperus Avenue
Hadley	Hadley Farm Museum, Russell Street Porter Phelps Huntinghouse, 130 River Drive
Haverhill	The Whittier House, 305 Whittier Road
Holyoke	Wisteriahurst, 238 Cabot Street
Ipswich	Castle Hill, Argilla Road
Lee	Merrell Tavern, Route 102
Lexington	Buckman Tavern, 1 Bedford Street Sanderson House, 314 Massachusetts Ave. Monroe Tavern, 1332 Massachusetts Ave.
Lincoln	The Grange, Codman Road

HISTORIC STRUCTURES

Lowell	Whistler House, Worthen Street
Lynnfield	Meetinghouse
Medford	Peak House, 347 Main Street
Milton	Dr. Amos Holbrook House, 203 Adams Street Daniel Vose House, 1370 Canton Avenue
Nantucket	Whaling Museum, Broad Street Fire Hose Cart House, 8 Gardner Street Greater Light, 8 Howard Court Old Gaol, 15 Vestal Street 1800 House, 4 Mill Street Old Mill, 50 Prospect Street Hawden House, 96 Main Street Nathaniel Macy House, 12 Liberty Street Thomas Macy Warehouse, 10 Straight Wharf Fair Street Museum, 7 Fair Street Quaker Meeting House, 7 Fair Street
New Bedford	Benjamin Rodman House, 50 North Second Street
New Salem	Whitaker-Clary House, Elm Street
Newbury	Tristram Coffin House, 16 High Road Spencer-Pierce-Little House, Little Lane
Newton	Jackson Homestead, 527 Washington Street
No. Andover	Parson Barnard House, Osgood Street
No. Easton	Old Colony Railroad Station, Oliver Street
Norwood	Fred Holland Day, 93 Bay Street
Orleans	French Cable Station, Cove Road
Oxford	Clara Barton Homestead, Clara Barton Road
Peabody	Gen. Gideon Foster House, 35 Washington Street
Pittsfield	Herman melville House, 78 Holmes Road

THE MASSACHUSETTS STATE BUILDING CODE

Plymouth	Plymouth Antiquarian Society, 126 Water Street Harlow Old Ft. House, 19 Sandwich Street Pilgrim Hall, 75 Court Street Richard Sparrow House, 42 Summer Street
Quincy	Adams Academy, 8 Adams Quincy Homestead, 34 Butler Street Josiah Quincy House, 20 Muirhead Street
Randolph	Johnathan Belcher House, 360 N. Main
Reading	Parker Tavern, 103 Washington Street
Rockport	Old Castle, Castle Lane
Salem	House of 7 Gables, 46-54 Turner Street Essex Institute, Essex Street The Norbone House Witch Museum Crowningshield Bently, Essex Street Gardner-Pingree House, 128 Essex Street Gedney House, 21 High Street Cox House, 19 High Street
Sandwich	Hoxie House, 18 Water Street Eldred House, 4 Water Street Wing Fort House, Spring Hill Road
Sheffield	Col. John Ashley House, Cooper Hill Road
Shrewsbury	Gen. Artemas Ward Homestead, Main Street
Springfield	Alexander House, State Street George Walter Vincent Smith Art Museum
Stockbridge	Naumkeag, Prospect Hill
Swansea	The Luther Store, 160 Old Warren Road The Martin House, 22 Stoney Hill Road
Taunton	Old Colony Historical Society, 66 Church Green Parson Capen House
Watertown	Edmund Fowle House, 26 Marshall Street

HISTORIC STRUCTURES

Wenham	Clafin-Richard House, 132 Main
West Springfield	Josiah Day House, 70 Park Street
Weston	Gold Ball Tavern, Old Post Road
Woburn	Loammi Baldwin Mansion, 2 Alfred Street
Wilmington	Harden Tavern, 436 Salem Street
Worcester	Timothy Paine House, 140 Lincoln Street

National Historic Landmarks

Amesbury	John Greenleaf Whittier Home, 86 Friend Street
Boston	African Meeting House, 8 Smith Court Nichols House, 55 Mt. Vernon Street Brook Farm, 678 Baker Street (Rox.) Christ Church, 191 Salem Street Faneuil Hall, Dock Square 1st Harrison Gray Otis House, 141 Beacon Street Paul Revere House, 19 North Street
Concord	Ralph Waldo Emerson House, 28 Cambridge Tpk. The Old Manse Orchard House, 299 Lexington Road
Dedham	Fairbanks House
Deerfield	Old Deerfield Village Historic District
Hancock	Hancock Shaker Village
Harvard	Fruitlands, Prospect Street
Hingham	Old Ship Meetinghouse, Main Street
Ipswich	John Whipple House, 53 S. Main Street
Lexington	Hancock Clarke House, 35 Hancock Street
Marblehead	Jeremiah Lee House, Washington Street King Hooper Mansion, Hooper Street

THE MASSACHUSETTS STATE BUILDING CODE

Marshfield	Daniel Webster Law Office, Webster Street
Medford	Peter Tufts House, 350 Riverside Drive Isaac Royal House, 15 George Street
Milton	Capt. R. B. Forbes House, 215 Adams
Nantucket	Nantucket Historic District Jethro Coffin House, Sunset Hill
New Bedford	New Bedford Historic District
Newburyport	Caleb Cushing House, 98 High Street
Quincy	John Adams Birthplace, 133 Franklin Street John Quincy Adams Birthplace, 141 Franklin Street
Salem	Peabody Museum The Custom House, 178 Derby Street
Saugus	Scotch Boardman House, 117 Howard Street
Stockbridge	Chesterwood, Williamsville Road The Mission House, Main Street
Waltham	The Vale, Lyman Street Gore Place, 52 Gore Street
Woburn	Count Rumford Birthplace, 90 Elm Street
Worcester	American Antiquarian Society, 185 Salisbury Street

HISTORIC STRUCTURES

Historic structures individually listed in the National Register of Historic Places not qualifying as totally preserved buildings (see Partially preserved buildings, Section 639.0). Refer to:

1. National Register of Historic Places, U.S. Federal Register, February 1, 1978, Part II.
2. National Register of Historic Place (additions). Contact the Massachusetts Historical Commission at 294 Washington Street, Boston, 02108.

Historic districts listed in the National Register of Historic Places. Refer to:

1. National Register of Historic Places, U.S. Federal Register, February 1, 1979, Part II.
2. National Register of Historic Place (additions). Contact the Massachusetts Historical Commission at 294 Washington Street, Boston, 02108.

Structures proposed for certification as partially preserved not listed in the national register of historic places. Refer to Massachusetts Historical Commission Inventory Forms.

Contact the Massachusetts Historical Commission at 294 Washington Street, Boston, 02108.

THE MASSACHUSETTS STATE BUILDING CODE

This page intentionally left blank