2012 IBC/2011 MSJC MASONRY CODE COMPILATION

2012 IBC
CHAPTER 21
MASONRY

2011 MSJC CODE
CHAPTER 1
BUILDING CODE REQUIREMENTS AND SPECIFICATION FOR MASONRY STRUCTURES

SECTION 2101
GENERAL

2101.1 Scope. This chapter shall govern the materials, design, construction and quality of masonry.

1.1 — Scope (*MSJC Code*)

1.1.1 *Minimum requirements*

This Code provides minimum requirements for the structural design and construction of masonry elements consisting of masonry units bedded in mortar.

1.1.2 *Governing building code*

This Code supplements the legally adopted building code and shall govern in matters pertaining to structural design and construction of masonry elements, except where this Code is in conflict with requirements in the legally adopted building code. In areas without a legally adopted building code, this Code defines the minimum acceptable standards of design and construction practice.

1.1 — Summary (*MSJC Specification*)

1.1 A. This Specification covers requirements for materials and construction of masonry structures. SI values shown in parentheses are provided for information only and are not part of this Specification.

1.1 B. The Specification supplements the legally adopted building code and governs the construction of masonry elements designed in accordance with the Code, except where this Specification is in conflict with requirements in the legally adopted building code. This Specification defines the minimum acceptable standards of construction practice.

1.1 C. This article covers the furnishing and construction of masonry including the following:

1. Furnishing and placing masonry units, grout, mortar, masonry lintels, sills, copings, through-wall flashing, and connectors.
2. Furnishing, erecting and maintaining of bracing, forming, scaffolding, rigging, and shoring.
3. Furnishing and installing other equipment for constructing masonry.
4. Cleaning masonry and removing surplus material and waste.
5. Installing lintels, nailing blocks, inserts, window and door frames, connectors, and construction items to be built into the masonry, and building in vent pipes, conduits and other items furnished and located by other trades.

2101.2 Design methods. Masonry shall comply with the provisions of one of the following design methods in this chapter as well as the requirements of Sections 2101 through 2104. Masonry designed by the allowable stress design provisions of Section 2101.2.1, the strength design provisions of Section 2101.2.2, the prestressed masonry provisions of Section 2101.2.3, or the direct design requirements of Section 2101.2.7 shall comply with Section 2105.

2101.2.1 Allowable stress design. Masonry designed by the allowable stress design method shall comply with the provisions of Sections 2106 and 2107.

2101.2.2 Strength design. Masonry designed by the strength design method shall comply with the provisions of Sections 2106 and 2108, except that autoclaved aerated concrete (AAC) masonry shall comply with the provisions of Section 2106 and Chapters 1 and 8 of TMS 402/ACI 530/ASCE 5.

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2101.2.3 Prestressed masonry. Prestressed masonry shall be designed in accordance with Chapters 1 and 4 of TMS 402/ACI 530/ASCE 5 and Section 2106. Special inspection during construction shall be provided as set forth in Section 1705.4.

2101.2.4 Empirical design. Masonry designed by the empirical design method shall comply with the provisions of Sections 2106 and 2109 or Chapter 5 of TMS 402/ACI 530/ASCE 5.

2101.2.5 Glass unit masonry. Glass unit masonry shall comply with the provisions of Section 2110 or Chapter 7 of TMS 402/ACI 530/ASCE 5.

2101.2.6 Masonry veneer. Masonry veneer shall comply with the provisions of Chapter 14 or Chapter 6 of TMS 402/ACI 530/ASCE 5.

2101.2.7 Direct Design. Masonry designed by the direct design method shall comply with the provisions of TMS 403.

1.1.3 *Design procedures* (*MSJC Code*)

Masonry structures and their component members shall be designed in accordance with the provisions of this Chapter and one of the following:

(a) Allowable Stress Design of Masonry: Chapter 2.

(b) Strength Design of Masonry: Chapter 3.

(c) Prestressed Masonry: Chapter 4.

(d) Empirical Design of Masonry: Chapter 5.

(e) Veneer: Chapter 6.

(f) Glass Unit Masonry: Chapter 7.

(g) Strength Design of Autoclaved Aerated Concrete (AAC) Masonry: Chapter 8.

(h) Masonry Infill, Appendix B.

1.1.4 *SI information* (*MSJC Code*)

SI values shown in parentheses are not part of this Code. The equations in this document are for use with the specified inch-pound units only. The equivalent equations for use with SI units are provided in Conversion of Units on Page C-69.

1.2 — Contract documents and calculations *(MSJC Code)*

1.2.1 Project drawings and project specifications for masonry structures shall identify the individual responsible for their preparation.

1.2.2 Show all Code-required drawing items on the project drawings, including:

(a) Name and date of issue of code and supplement to which the design conforms.

(b) Loads used in the design of masonry.

(c) Specified compressive strength of masonry at stated ages or stages of construction for which masonry is designed, except where specifically exempted by Code provisions.

(d) Size and location of structural elements.

(e) Details of anchorage of masonry to structural members, frames, and other construction, including the type, size, and location of connectors.

(f) Details of reinforcement, including the size, grade, type, and location of reinforcement.

(g) Reinforcing bars to be welded and welding requirements.

(h) Provision for dimensional changes resulting from elastic deformation, creep, shrinkage, temperature, and moisture.

(i) Size and permitted location of conduits, pipes, and sleeves.

1.2.3 The contract documents shall be consistent with design assumptions.

1.2.4 Contract documents shall specify the minimum level of quality assurance as defined in Section 1.19, or shall include an itemized quality assurance program that equals or exceeds the requirements of Section 1.19.

1.3 — Approval of special systems of design or construction *(MSJC Code)*

Sponsors of any system of design or construction within the scope of this Code, the adequacy of which has been shown by successful use or by analysis or test, but that does not conform to or is not covered by this Code, shall have the right to present the data on which their design is based to a board of examiners appointed by the building official. The board shall be composed of licensed design professionals and shall have authority to investigate the submitted data, require tests, and formulate rules governing design and construction of such systems to meet the intent of this Code. The rules, when approved and promulgated by the building official, shall be of the same force and effect as the provisions of this Code.

1.7 — Loading *(MSJC Code)*

1.7.1 *General*

Masonry shall be designed to resist applicable loads. A continuous load path or paths, with adequate strength and stiffness, shall be provided to transfer forces from the point of application to the final point of resistance.

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1.7.2 *Load provisions*

Design loads shall be in accordance with the legally adopted building code of which this Code forms a part, with such live load reductions as are permitted in the legally adopted building code. In the absence of design loads in the legally adopted building code, the load provisions of ASCE 7 shall be used, except as noted in this Code.

1.7.3 *Lateral load resistance*

Buildings shall be provided with a structural system designed to resist wind and earthquake loads and to accommodate the effect of the resulting deformations.

1.7.4 *Load transfer at horizontal connections*

1.7.4.1 Walls, columns, and pilasters shall be designed to resist loads, moments, and shears applied at intersections with horizontal members.

1.7.4.2 Effect of lateral deflection and translation of members providing lateral support shall be considered.

1.7.4.3 Devices used for transferring lateral support from members that intersect walls, columns, or pilasters shall be designed to resist the forces involved.

1.7.5 *Other effects*

Consideration shall be given to effects of forces and deformations due to prestressing, vibrations, impact, shrinkage, expansion, temperature changes, creep, unequal settlement of supports, and differential movement.

1.7.6 *Lateral load distribution*

Lateral loads shall be distributed to the structural system in accordance with member stiffnesses and shall comply with the requirements of this section.

1.7.6.1 Flanges of intersecting walls designed in accordance with Section 1.9.4.2 shall be included in stiffness determination.

1.7.6.2 Distribution of load shall be consistent with the forces resisted by foundations.

1.7.6.3 Distribution of load shall include the effect of horizontal torsion of the structure due to eccentricity of wind or seismic loads resulting from the non-uniform distribution of mass.

1.8 — Material properties *(MSJC Code)*

1.8.1 *General*

Unless otherwise determined by test, the following moduli and coefficients shall be used in determining the effects of elasticity, temperature, moisture expansion, shrinkage, and creep.

1.8.2 *Elastic moduli*

1.8.2.1 *Steel reinforcement* — Modulus of elasticity of steel reinforcement shall be taken as:

E_s = 29,000,000 psi (200,000 MPa)

1.8.2.2 *Clay and concrete masonry*

1.8.2.2.1 The design of clay and concrete masonry shall be based on the following modulus of elasticity values:

$E_m = 700\, f'_m$ for clay masonry;

$E_m = 900\, f'_m$ for concrete masonry;

or the chord modulus of elasticity taken between 0.05 and 0.33 of the maximum compressive strength of each prism determined by test in accordance with the prism test method, Article 1.4 B.3 of TMS 602/ACI 530.1/ASCE 6, and ASTM E111.

1.8.2.2.2 Modulus of rigidity of clay masonry and concrete masonry shall be taken as:

$E_v = 0.4E_m$

1.8.2.3 *AAC masonry*

1.8.2.3.1 Modulus of elasticity of AAC masonry shall be taken as:

$E_{AAC} = 6500\, (f'_{AAC})^{0.6}$

1.8.2.3.2 Modulus of rigidity of AAC masonry shall be taken as:

$E_v = 0.4\, E_{AAC}$

1.8.2.4 *Grout* — Modulus of elasticity of grout shall be taken as 500 f'_g.

1.8.3 *Coefficients of thermal expansion*

1.8.3.1 *Clay masonry*

$k_t = 4 \times 10^{-6}$ in./in./°F (7.2×10^{-6} mm/mm/°C)

1.8.3.2 *Concrete masonry*

$k_t = 4.5 \times 10^{-6}$ in./in./°F (8.1×10^{-6} mm/mm/°C)

1.8.3.3 *AAC masonry*

$k_t = 4.5 \times 10^{-6}$ in./in./°F (8.1×10^{-6} mm/mm/°C)

1.8.4 *Coefficient of moisture expansion for clay masonry*

$k_e = 3 \times 10^{-4}$ in./in. (3×10^{-4} mm/mm)

1.8.5 *Coefficients of shrinkage*

1.8.5.1 *Concrete masonry*

$k_m = 0.5\, s_l$

1.8.5.2 *AAC masonry*

$k_m = 0.8\, \varepsilon_{cs}/100$

where ε_{cs} is determined in accordance with ASTM C1386.

1.8.6 *Coefficients of creep*

1.8.6.1 *Clay masonry*

$k_c = 0.7 \times 10^{-7}$, per psi (0.1×10^{-4}, per MPa)

1.8.6.2 *Concrete masonry*

$k_c = 2.5 \times 10^{-7}$, per psi (0.36×10^{-4}, per MPa)

1.8.6.3 *AAC masonry*
$k_c = 5.0 \times 10^{-7}$, per psi (0.72×10^{-4}, per MPa)

1.8.7 *Prestressing steel*
Modulus of elasticity shall be determined by tests. For prestressing steels not specifically listed in ASTM A416/A416M, A421/A421M, or A722/A722M, tensile strength and relaxation losses shall be determined by tests.

1.9 — Section properties *(MSJC Code)*

1.9.1 *Stress computations*
1.9.1.1 Members shall be designed using section properties based on the minimum net cross-sectional area of the member under consideration. Section properties shall be based on specified dimensions.

1.9.1.2 In members designed for composite action, stresses shall be computed using section properties based on the minimum transformed net cross-sectional area of the composite member. The transformed area concept for elastic analysis, in which areas of dissimilar materials are transformed in accordance with relative elastic moduli ratios, shall apply.

1.9.2 *Stiffness*
Computation of stiffness based on uncracked section is permissible. Use of the average net cross-sectional area of the member considered in stiffness computations is permitted.

1.9.3 *Radius of gyration*
Radius of gyration shall be computed using average net cross-sectional area of the member considered.

1.9.4 *Intersecting walls*
1.9.4.1 Wall intersections shall meet one of the following requirements:

(a) Design shall conform to the provisions of Section 1.9.4.2.

(b) Transfer of shear between walls shall be prevented.

1.9.4.2 *Design of wall intersection*
1.9.4.2.1 Masonry shall be in running bond.

1.9.4.2.2 Flanges shall be considered effective in resisting applied loads.

1.9.4.2.3 The width of flange considered effective on each side of the web shall be the smaller of the actual flange on either side of the web wall or the following:

(a) 6 multiplied by the nominal flange thickness for unreinforced and reinforced masonry, when the flange is in compression.

(b) 6 multiplied by the nominal flange thickness for unreinforced masonry, when the flange is in flexural tension.

(c) 0.75 multiplied by the floor-to-floor wall height for reinforced masonry, when the flange is in flexural tension.

The effective flange width shall not extend past a movement joint.

1.9.4.2.4 Design for shear, including the transfer of shear at interfaces, shall conform to the requirements of Section 2.2.5; or Section 2.3.6; or Sections 3.1.3 and 3.3.4.1.2; or Sections 3.1.3 and 3.2.4; or Section 4.6; or Sections 8.1.3 and 8.3.4.1.2.

1.9.4.2.5 The connection of intersecting walls shall conform to one of the following requirements:

(a) At least fifty percent of the masonry units at the interface shall interlock.

(b) Walls shall be anchored by steel connectors grouted into the wall and meeting the following requirements:

(1) Minimum size: $^1/_4$ in. x $1^1/_2$ in. x 28 in. (6.4 mm x 38.1 mm x 711 mm) including 2-in. (50.8-mm) long, 90-degree bend at each end to form a U or Z shape.

(2) Maximum spacing: 48 in. (1219 mm).

(c) Intersecting reinforced bond beams shall be provided at a maximum spacing of 48 in. (1219 mm) on center. The area of reinforcement in each bond beam shall not be less than 0.1 in.^{2} per ft (211 mm^2/m) multiplied by the vertical spacing of the bond beams in feet (meters). Reinforcement shall be developed on each side of the intersection.

1.9.5 *Bearing area*
The bearing area, A_{br}, for concentrated loads shall not exceed the following:

(a) $A_1\sqrt{A_2 / A_1}$

(b) $2A_1$

The area, A_2, is the area of the lower base of the largest frustum of a right pyramid or cone that has the loaded area, A_1, as its upper base, slopes at 45 degrees from the horizontal, and is wholly contained within the support. For walls not laid in running bond, area A_2 shall terminate at head joints.

1.9.6 *Effective compressive width per bar*
1.9.6.1 For masonry not laid in running bond and having bond beams spaced not more than 48 in. (1219 mm) center-to-center, and for masonry laid in running bond, the width of the compression area used to calculate element capacity shall not exceed the least of:

(a) Center-to-center bar spacing.

(b) Six multiplied by the nominal wall thickness.

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(c) 72 in. (1829 mm).

1.9.6.2 For masonry not laid in running bond and having bond beams spaced more than 48 in. (1219 mm) center-to-center, the width of the compression area used to calculate element capacity shall not exceed the length of the masonry unit.

1.9.7 *Concentrated loads*

1.9.7.1 Concentrated loads shall not be distributed over a length greater than the minimum of the following:

(a) The length of bearing area plus the length determined by considering the concentrated load to be dispersed along a 2 vertical: 1 horizontal line. The dispersion shall terminate at half the wall height, a movement joint, the end of the wall, or an opening, whichever provides the smallest length.

(b) The center-to-center distance between concentrated loads.

1.9.7.2 For walls not laid in running bond, concentrated loads shall not be distributed across head joints. Where concentrated loads acting on such walls are applied to a bond beam, the concentrated load is permitted to be distributed through the bond beam, but shall not be distributed across head joints below the bond beams.

1.10 — Connection to structural frames *(MSJC Code)*

Masonry walls shall not be connected to structural frames unless the connections and walls are designed to resist design interconnecting forces and to accommodate calculated deflections.

1.11 — Masonry not laid in running bond *(MSJC Code)*

For masonry not laid in running bond, the minimum area of horizontal reinforcement shall be 0.00028 multiplied by the gross vertical cross-sectional area of the wall using specified dimensions. Horizontal reinforcement shall be placed at a maximum spacing of 48 in. (1219 mm) on center in horizontal mortar joints or in bond beams.

1.13 — Beams (*MSJC Code*)

Design of beams shall meet the requirements of Section 1.13.1 or Section 1.13.2. Design of beams shall also meet the requirements of Section 2.3, Section 3.3 or Section 8.3. Design requirements for masonry beams shall apply to masonry lintels.

1.13.1 *General beam design*

1.13.1.1 *Span length* — Span length shall be in accordance with the following:

1.13.1.1.1 Span length of beams not built integrally with supports shall be taken as the clear span plus depth of beam, but need not exceed the distance between centers of supports.

1.13.1.1.2 For determination of moments in beams that are continuous over supports, span length shall be taken as the distance between centers of supports.

1.13.1.2 *Lateral support* — The compression face of beams shall be laterally supported at a maximum spacing based on the smaller of:

(a) 32b

(b) 120b^2/d

1.13.1.3 *Bearing length* — Length of bearing of beams on their supports shall be a minimum of 4 in. (102 mm) in the direction of span.

1.13.1.4 *Deflections* — Masonry beams shall be designed to have adequate stiffness to limit deflections that adversely affect strength or serviceability.

1.13.1.4.1 The computed deflection of beams providing vertical support to masonry designed in accordance with Section 2.2, Section 3.2, Chapter 5, or Section 8.2, shall not exceed $l/600$ under unfactored dead plus live loads.

1.13.1.4.2 Deflection of masonry beams shall be computed using the appropriate load-deflection relationship considering the actual end conditions. Unless stiffness values are obtained by a more comprehensive analysis, immediate deflections shall be computed with an effective moment of inertia, I_{eff} , as follows.

$$I_{eff} = I_n \left(\frac{M_{cr}}{M_a}\right)^3 + I_{cr}\left[1-\left(\frac{M_{cr}}{M_a}\right)^3\right] \le I_n$$

(Equation 1-1)

For continuous beams, I_{eff} shall be permitted to be taken as the average of values obtained from Equation 1-1 for the critical positive and negative moment regions.

For beams of uniform cross-section, I_{eff} shall be permitted to be taken as the value obtained from Equation 1-1 at midspan for simple spans and at the support for cantilevers. For masonry designed in accordance with Chapter 2, the cracking moment, M_{cr}, shall be computed using the allowable flexural tensile stress taken from Table 2.2.3.2 multiplied by a factor of 2.5. For masonry designed in accordance with Chapter 3, the cracking moment, M_{cr}, shall be computed using the value for the modulus of rupture, f_r, taken from Table 3.1.8.2. For masonry designed in accordance with Chapter 8, the cracking moment, M_{cr}, shall be computed using the value for the modulus of rupture, f_{rAAC}, as given by Section 8.1.8.3.

1.13.1.4.3 Deflections of reinforced masonry beams need not be checked when the span length

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does not exceed 8 multiplied by the effective depth to the reinforcement, d, in the masonry beam.

1.13.2 *Deep beams*

Design of deep beams shall meet the requirements of Section 1.13.1.2 and 1.13.1.3 in addition to the requirements of 1.13.2.1 through 1.13.2.5.

1.13.2.1 *Effective span length* — The effective span length, l_{eff}, shall be taken as the center-to-center distance between supports or 1.15 multiplied by the clear span, whichever is smaller.

1.13.2.2 *Internal lever arm* — Unless the internal lever arm, z, between the compressive and tensile forces is determined by a more compressive analysis, it shall be taken as:

(a) For simply supported spans

(1) When $1 \le \dfrac{l_{eff}}{d_v} < 2$

$$z = 0.2(l_{eff} + 2d_v) \qquad \text{(Equation 1-2a)}$$

(2) When $\dfrac{l_{eff}}{d_v} < 1$

$$z = 0.6l_{eff} \qquad \text{(Equation 1-2b)}$$

(b) For continuous spans

(1) When $1 \le \dfrac{l_{eff}}{d_v} < 3$

$$z = 0.2(l_{eff} + 1.5d_v) \qquad \text{(Equation 1-3a)}$$

(2) When $\dfrac{l_{eff}}{d_v} < 1$

$$z = 0.5l_{eff} \qquad \text{(Equation 1-3b)}$$

1.13.2.3 *Flexural reinforcement* — Distributed horizontal flexural reinforcement shall be provided in the tension zone of the beam for a depth equal to half of the total depth of the beam, d_v. The maximum spacing of distributed horizontal flexural reinforcement shall not exceed one-fifth of the total depth of the beam, d_v, nor 16 in. (406 mm). Joint reinforcement shall be permitted to be used as distributed horizontal flexural reinforcement in deep beams. Horizontal flexural reinforcement shall be anchored to develop the yield strength of the reinforcement at the face of supports.

1.13.2.4 *Minimum shear reinforcement* — The following provisions shall apply when shear reinforcement is required in accordance with Section 2.3.6, Section 3.3.4.1.2, or Section 8.3.4.1.2.

(a) The minimum area of vertical shear reinforcement shall be 0.0007 bd_v.

(b) Horizontal shear reinforcement shall have cross-sectional area equal to or greater than one half the area of the vertical shear reinforcement. Such reinforcement shall be equally distributed on both side faces of the beam when the nominal width of the beam is greater than 8 inches (203 mm).

(c) The maximum spacing of shear reinforcement shall not exceed one-fifth the total depth of the beam, d_v, nor 16 in. (406 mm).

1.13.2.5 *Total reinforcement* — The sum of the cross-sectional areas of total horizontal and vertical reinforcement shall be at least 0.001 multiplied by the gross cross-sectional area, bd_v, of the deep beam, using specified dimensions.

1.14 — Columns (*MSJC Code*)

Design of columns shall meet the requirements of Section 1.14.1 or Section 1.14.2. Design of columns shall also meet the requirements of Section 2.3, or Section 3.3, or Section 8.3.

1.14.1 *General column design*

1.14.1.1 *Dimensional limits* — Dimensions shall be in accordance with the following:

(a) The distance between lateral supports of a column shall not exceed 99 multiplied by the least radius of gyration, r.

(b) Minimum side dimension shall be 8 in. (203 mm) nominal.

1.14.1.2 *Construction* — Columns shall be fully grouted.

1.14.1.3 *Vertical reinforcement* — Vertical reinforcement in columns shall not be less than $0.0025A_n$ nor exceed $0.04A_n$. The minimum number of bars shall be four.

1.14.1.4 *Lateral ties* — Lateral ties shall conform to the following:

(a) Vertical reinforcement shall be enclosed by lateral ties at least $^1/_4$ in. (6.4 mm) in diameter.

(b) Vertical spacing of lateral ties shall not exceed 16 longitudinal bar diameters, 48 lateral tie bar or wire diameters, or least cross-sectional dimension of the member.

(c) Lateral ties shall be arranged so that every corner and alternate longitudinal bar shall have lateral support provided by the corner of a lateral tie with an included angle of not more than 135 degrees. No bar shall be farther than 6 in. (152 mm) clear on each side along the lateral tie from such a laterally supported bar. Lateral ties shall be placed in either a mortar joint or in grout. Where longitudinal bars are located around the perimeter of a

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circle, a complete circular lateral tie is permitted. Lap length for circular ties shall be 48 tie diameters.

(d) Lateral ties shall be located vertically not more than one-half lateral tie spacing above the top of footing or slab in any story, and shall be spaced not more than one-half a lateral tie spacing below the lowest horizontal reinforcement in beam, girder, slab, or drop panel above.

(e) Where beams or brackets frame into a column from four directions, lateral ties shall be permitted to be terminated not more than 3 in. (76.2 mm) below the lowest reinforcement in the shallowest of such beams or brackets.

1.14.2 *Lightly loaded columns*

Masonry columns used only to support light frame roofs of carports, porches, sheds or similar structures assigned to Seismic Design Category A, B, or C, which are subject to unfactored gravity loads not exceeding 2,000 lbs (8,900 N) acting within the cross-sectional dimensions of the column are permitted to be constructed as follows:

(a) Minimum side dimension shall be 8 in. (203 mm) nominal.

(b) Height shall not exceed 12 ft (3.66 m).

(c) Cross-sectional area of longitudinal reinforcement shall not be less than 0.2 in.^{2} (129 mm^2) centered in the column.

(d) Columns shall be grouted solid.

1.15 — Pilasters (*MSJC Code*)

Walls interfacing with pilasters shall not be considered as flanges, unless the construction requirements of Sections 1.9.4.2.1 and 1.9.4.2.5 are met. When these construction requirements are met, the pilaster's flanges shall be designed in accordance with Sections 1.9.4.2.2 through 1.9.4.2.4.

2101.3 Construction documents. The construction documents shall show all of the items required by this code including the following:

1. Specified size, grade, type and location of reinforcement, anchors and wall ties.
2. Reinforcing bars to be welded and welding procedure.
3. Size and location of structural elements.
4. Provisions for dimensional changes resulting from elastic deformation, creep, shrinkage, temperature and moisture.
5. Loads used in the design of masonry.
6. Specified compressive strength of masonry at stated ages or stages of construction for which masonry is designed, except where specifically exempted by this code.
7. Details of anchorage of masonry to structural members, frames and other construction, including the type, size and location of connectors.
8. Size and permitted location of conduits, pipes and sleeves.
9. The minimum level of testing and inspection as defined in Chapter 17, or an itemized testing and inspection program that meets or exceeds the requirements of Chapter 17.

2101.3.1 Fireplace drawings. The construction documents shall describe in sufficient detail the location, size and construction of masonry fireplaces. The thickness and characteristics of materials and the clearances from walls, partitions and ceilings shall be indicated.

2012 IBC
SECTION 2102
DEFINITIONS

2011 MSJC CODE
1.6—Definitions

2011 MSJC SPECIFICATION
1.2—Definitions

2102.1 General. The following terms are defined in Chapter 2.

AAC MASONRY. Masonry made of autoclaved aerated concrete (AAC) units, manufactured without internal reinforcement and bonded together using thin- or thick-bed mortar.*

A. *Acceptable, accepted* — Acceptable to or accepted by the Architect/Engineer.

ADOBE CONSTRUCTION. Construction in which the exterior load-bearing and nonload-bearing walls and partitions are of unfired clay masonry units, and floors, roofs and interior framing are wholly or partly of wood or other approved materials.

Adobe, stabilized. Unfired clay masonry units to which admixtures, such as emulsified asphalt, are added during

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*the MSJC has a consistent Definition

the manufacturing process to limit the units' water absorption so as to increase their durability.

Adobe, unstabilized. Unfired clay masonry units that do not meet the definition of "Adobe, stabilized."

ANCHOR. Metal rod, wire or strap that secures masonry to its structural support.*

Anchor pullout — Anchor failure defined by the anchor sliding out of the material in which it is embedded without breaking out a substantial portion of the surrounding material.

C. *Architect/Engineer* — The architect, engineer, architectural firm, engineering firm, or architectural and engineering firm, issuing drawings and specifications, or administering the work under project specifications and project drawings, or both.

ARCHITECTURAL TERRA COTTA. Plain or ornamental hard-burned modified clay units, larger in size than brick, with glazed or unglazed ceramic finish.

AREA (for masonry).

Gross cross-sectional. The area delineated by the out-to-out specified dimensions of masonry in the plane under consideration.*

Net cross-sectional. The area of masonry units, grout and mortar crossed by the plane under consideration based on out-to-out specified dimensions.*

Area, net shear — The net area of the web of a shear element.

AUTOCLAVED AERATED CONCRETE (AAC). Low density cementitious product of calcium silicate hydrates, whose material specifications are defined in ASTM C1386.*

Autoclaved aerated concrete (AAC) masonry — Autoclaved aerated concrete units manufactured without reinforcement, set on a mortar leveling bed, bonded with thin-bed mortar, placed with or without grout, and placed with or without reinforcement.

Backing — Wall or surface to which veneer is attached.

BED JOINT. The horizontal layer of mortar on which a masonry unit is laid.*

BOND BEAM. A horizontal grouted element within masonry in which reinforcement is embedded.

Bond beam — A horizontal or sloped element that is fully grouted, has longitudinal bar reinforcement, and is constructed within a masonry wall.

Bonded prestressing tendon — Prestressing tendon that is encapsulated by prestressing grout in a corrugated duct that is bonded to the surrounding masonry through grouting.

Bounding frame — The columns and upper and lower beams or slabs that surround masonry infill and provide structural support.

BRICK.

Calcium silicate (sand lime brick). A pressed and subsequently autocalved unit that consists of sand and lime, with or without the inclusion of other materials.

Clay or shale. A solid or hollow masonry unit of clay or shale, usually formed into a rectangular prism, then burned or fired in a kiln; brick is a ceramic product.

Concrete. A concrete masonry unit made from Portland cement, water, and suitable aggregates, with or without the inclusion of other materials.

Building official — The officer or other designated authority charged with the administration and enforcement of this Code, or the building official's duly authorized representative.

CAST STONE. A building stone manufactured from Portland cement concrete precast and used as a trim, veneer or facing on or in buildings or structures.

Cavity wall — A masonry wall consisting of two or more wythes, at least two of which are separated by a continuous air space; air space(s) between wythes may contain insulation; and separated wythes must be connected by wall ties.

CELL (masonry). A void space having a gross cross-sectional area greater than $1^1/_2$ square inches (967 mm^2).

[M] CHIMNEY. A primarily vertical enclosure containing one or more passageways for conveying flue gases to the outside atmosphere.

CHIMNEY TYPES.

High-heat appliance type. An approved chimney for removing the products of combustion from fuel-burning, high-heat appliances producing combustion gases in excess of 2,000°F (1093°C) measured at the appliance flue outlet (see Section 2113.11.3).

Low-heat appliance type. An approved chimney for removing the products of combustion from fuel-burning, low-heat appliances producing combustion gases not in excess of 1,000°F (538°C) under normal operating conditions, but capable of producing combustion gases of

Shaded text is 2012 IBC.	Non-shaded text is from 2011 MSJC Code.
Large arrow refers to text deleted from 2009 IBC.	Small arrow refers to text deleted from 2008 MSJC Code.
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*the MSJC has a consistent Definition