

EXPRESS TERMS
FOR
PROPOSED BUILDING STANDARDS
OF THE
BUILDING STANDARDS COMMISSION
REGARDING ADOPTION AND AMENDMENT OF
CALIFORNIA EXISTING BUILDING CODE,
CALIFORNIA CODE OF REGULATIONS, TITLE 24, PART 10

LEGEND FOR EXPRESS TERMS

1. Existing California amendments or code language being modified: All such language appears in *italics*, modified language is underlined.
2. New California amendments: All such language appears underlined and in italics.
3. Repealed text: All such language appears in ~~strikeout~~.

The Building Standards Commission (BSC) proposes to adopt the 2012 edition of the International Existing Building Code (IEBC) for codification and effectiveness into the 2013 edition of the California Building Code (CBC) as presented on the following pages, including any necessary amendments. BSC further proposes to:

- Repeal the 2009 edition of the IEBC and the 2010 CEBC;
- Repeal amendments to the model code that are no longer necessary, repeal or amend building standards that are not addressed by a model code;
- Relocate or codify existing adopted and necessary amendments to the model code into the format of the model code proposed for adoption, the action of which has no regulatory effect; adopt new necessary amendments to the model code proposed for adoption; and/or
- Adopt new building standards that are not addressed by the model code proposed for adoption

PART I: REPEALS, ADOPTIONS AND NEW AMENDMENTS

REPEAL: Appendix Chapter A1 – Seismic Strengthening Provisions for Unreinforced Masonry Bearing Wall Buildings of the 2009 edition of International Existing Building Code of the International Code Council.

ADOPT: Appendix Chapter A1 – Seismic Strengthening Provisions for Unreinforced Masonry Bearing Wall Buildings of the 2012 edition of the International Existing Building Code of the International Code Council.

SECTION A103
DEFINITIONS

~~**BUILDING CODE.** [BSC] The code currently adopted by the jurisdiction for new buildings. [BSC] “Building Code” shall mean the most current edition of the California Building Code, Title 24, Part 2 as adopted by the California Building Standards Commission (BSC).~~

**PART II: EXISTING AMENDMENTS CARRIED FORWARD AND NON-SUBSTANTIVE EDITORIAL AND
FORMATTING AMENDMENTS**

SECTION A100
APPLICATION

A100.1 Vesting Authority. When adopted by a state agency, the provisions of the regulations shall be enforced by the appropriate enforcing agency, but only to the extent of authority granted to such agency by the state legislature.

Following is a list of the state agencies that adopt building standards, the specific scope of application of the agency responsible for enforcement, and the specific statutory authority of each agency to adopt and enforce such provisions of building standards of this code, unless otherwise stated.

1. BSC – California Building Standards Commission.

Application – Existing buildings as specified in Section A102 having at least one unreinforced masonry bearing wall, with the exception of buildings subject to building standards pursuant to Health and Safety Code, commencing with Section 17910.

Enforcing Agency – State or local agency specified by the applicable provisions of the law.

Authority Cited – Health and Safety Code Section 18934.6 Z.

Reference – Health and Safety Code Sections 18901 through 18949.

Notation

Authority: Health and Safety Code Sections 18928, 18928.1, and 18934.6 Z

Reference(s): Health and Safety Code Sections 18916, 18928, 18928.1, 18934.6 Z, and 18938

SECTION A102 SCOPE

A102.1 General. The provisions of this chapter shall apply to all existing buildings having at least one unreinforced masonry bearing wall. The elements regulated by this chapter shall be determined in accordance with Table A1-A. Except as provided herein, other structural provisions of the building code shall apply. This chapter does not apply to the alteration of existing electrical, plumbing, mechanical or fire safety systems.

A102.2 Essential and hazardous facilities. The provisions of this chapter shall not apply to the strengthening of buildings in Risk Categories III or IV. Such buildings shall be strengthened to meet the requirements of the ~~International Building Code~~ California Building Code for new buildings of the same risk category or other such criteria that have been established by the code official.

SECTION A103 DEFINITIONS

For the purpose of this chapter, the applicable definitions in the ~~building code~~ California Building Code as adopted by the California Building Standards Commission (BSC) shall also apply.

A105.4 Structural observation, testing and inspection. Structural observation, in accordance with Section 1709 of the ~~International Building Code~~ California Building Code, shall be required...

Structural testing and inspection for new construction materials shall be in accordance with the ~~building code~~ California Building Code, except as modified by this chapter.

A108.2 Masonry shear strength...

- When ***f_m*** has been estimated by categorization of the units and mortar in accordance with Section 2105.2.2.1 of the ~~International Building Code~~ California Building Code, the unreinforced masonry shear strength, ***v_m*** shall not exceed 200 pounds per square inch (1380 kPa) or the lesser of the following:...

REFERENCED STANDARDS

UNIFORM BUILDING CODE STANDARD 21-4 HOLLOW AND SOLID LOAD-BEARING CONCRETE MASONRY UNITS

Based on Standard Specification C 90-95 of the ASTM International.
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Note: See Appendix Chapter 1, Section A106, California Existing Building Code

Section 21.401 — Scope

This standard covers solid (units with 75 percent or more net area) and hollow load-bearing concrete masonry units made from portland cement, water and mineral aggregates with or without the inclusion of other materials.

Section 21.402 — Classification

21.402.1 Types. Two types of concrete masonry units in each of two grades are covered as follows:

21.402.1.1 Type I, moisture-controlled units. Units designated as Type I shall conform to all requirements of this standard including the moisture content requirements of Table 21-4-A.

21.402.1.2 Type II, nonmoisture-controlled units. Units designated as Type II shall conform to all requirements of this standard except the moisture content requirements of Table 21-4-A.

21.402.2 Grades. Concrete masonry units manufactured in accordance with this standard shall conform to two grades as follows:

21.402.2.1 Grade N. Units having a weight classification of 85 pcf (1360 kg/m³) or greater, for general use such as in exterior walls below and above grade that may or may not be exposed to moisture penetration or the weather and for interior walls and backup.

21.402.2.2 Grade S. Units having a weight classification of less than 85 pcf (1360 kg/m³), for uses limited to above-grade installation in exterior walls with weather-protective coatings and in walls not exposed to the weather.

Section 21.403 — Materials

21.403.1 Cementitious materials. Materials shall conform to the following applicable standards:

1. Portland Cement—ASTM C 150 modified as follows:

Limitation on insoluble residue—1.5 percent maximum.

Limitation on air content of mortar,

Volume percent—22 percent maximum.

Limitation on loss on ignition—7 percent maximum.

Limestone with a minimum 85 percent calcium carbonate (CaCO₃) content may be added to the cement, pro-

vided the requirements of ASTM C 150 as modified above are met.

2. Blended Cements—ASTM C 595.
3. Hydrated Lime, Type S—UBC Standard 21-13.

21.403.2 Other constituents and aggregates. Air-entraining agents, coloring pigments, integral water repellents, finely ground silica, aggregates, and other constituents, shall be previously established as suitable for use in concrete or shall be shown by test or experience to not be detrimental to the durability of the concrete.

Section 21.404 — Physical Requirements

At the time of delivery to the work site, the units shall conform to the physical requirements prescribed in Table 21-4-B. The moisture content of Type I concrete masonry units at time of delivery shall conform to the requirements prescribed in Table 21-4-A.

At the time of delivery to the purchaser, the linear shrinkage of Type II units shall not exceed 0.065 percent.

Section 21.405 — Minimum Face-shell and Web Thicknesses

Face-shell (FST) and web (WT) thicknesses shall conform to the requirements listed in Table 21-4-C.

Section 21.406 — Permissible Variations in Dimensions

21.406.1 Precision units. For precision units, no overall dimension (width, height and length) shall differ by more than $\frac{1}{8}$ inch (3.2 mm) from the specified standard dimensions.

21.406.2 Particular feature units. For particular feature units, dimensions shall be in accordance with the following:

1. For molded face units, no overall dimension (width, height and length) shall differ by more than $\frac{1}{8}$ inch (3.2 mm) from the specified standard dimension. Dimensions of molded features (ribs, scores, hex-shapes, patterns, etc.) shall be within $\frac{1}{16}$ inch (1.6 mm) of the specified standard dimensions and shall be within $\frac{1}{16}$ inch (1.6 mm) of the specified placement of the unit.
2. For split-faced units, all non-split overall dimensions (width, height and length) shall differ by no more than $\frac{1}{8}$

REFERENCED STANDARDS

inch (3.2 mm) from the specified standard dimensions. On faces that are split, overall dimensions will vary. Local suppliers should be consulted to determine dimensional tolerances achievable.

- For slumped units, no overall height dimension shall differ by more than 1/8 inch (3.2 mm) from the specified standard dimension. On faces that are slumped, overall dimensions will vary. Local suppliers should be consulted to determine dimension tolerances achievable.

Note: Standard dimensions of units are the manufacturer’s designated dimensions. Nominal dimensions of modular size units, except slumped units, are equal to the standard dimensions plus 3/8 inch (9.5 mm), the thickness of one standard mortar joint. Slumped units are equal to the standard dimensions plus 1/2 inch (13 mm), the thickness of one standard mortar joint. Nominal dimensions of nonmodular size units usually exceed the standard dimensions by 1/8 inch to 1/4 inch (3.2 mm to 6.4 mm).

Section 21.407 — Visual Inspection

All units shall be sound and free of cracks or other defects that would interfere with the proper placing of the unit or impair the strength or permanence of the construction. Units may have minor cracks incidental to the usual method of manufacture, or minor chipping resulting from customary methods of handling in shipment and delivery.

Units that are intended to serve as a base for plaster or stucco shall have a sufficiently rough surface to afford a good bond.

Where units are to be used in exposed wall construction, the face or faces that are to be exposed shall be free of chips, cracks or other imperfections when viewed from 20 feet (6100 mm),

except that not more than 5 percent of a shipment may have slight cracks or small chips not larger than 1 inch (25.4 mm).

Section 21.408 — Methods of Sampling and Testing

The purchaser or authorized representative shall be accorded proper facilities to inspect and sample the units at the place of manufacture from the lots ready for delivery.

Sample and test units in accordance with ASTM C 140.

Total linear drying shrinkage shall be based on tests of concrete masonry units made with the same materials, concrete mix design, manufacturing process and curing method, conducted in accordance with ASTM C 426 and not more than 24 months prior to delivery.

Section 21.409 — Rejection

If the samples tested from a shipment fail to conform to the specified requirements, the manufacturer may sort it, and new specimens shall be selected by the purchaser from the retained lot and tested at the expense of the manufacturer. If the second set of specimens fails to conform to the specified requirements, the entire lot shall be rejected.

**TABLE 21-4-A
MOISTURE CONTENT REQUIREMENTS FOR TYPE I UNITS**

LINEAR SHRINKAGE, PERCENT	MOISTURE CONTENT, MAX. PERCENT OF TOTAL ABSORPTION (Average of 3 Units)		
	Humidity Conditions at Job site or Point of Use		
	Humid ¹	Intermediate ²	Arid ³
0.03 or less	45	40	35
From 0.03 to 0.045	40	35	30
0.045 to 0.065, max.	35	30	25

¹Average annual relative humidity above 75 percent.

²Average annual relative humidity 50 to 75 percent.

³Average annual relative humidity less than 50 percent.

**TABLE 21-4-B
STRENGTH AND ABSORPTION REQUIREMENTS**

COMPRESSIVE STRENGTH, MIN, psi (MPa)		WATER ABSORPTION, MAX, lb./ft. (kg/m) (Average of 3 Units)		
Average Net Area		Weight Classification—Oven-dry Weight of Concrete, lb./ft. (kg/m)		
Average of 3 Units	Individual Unit	Lightweight, Less than 105 (1880)	Medium Weight, 105 to less than 125 (1680-2000)	Normal Weight, 125 (2000) or more
1900 (13.1)	1700 (11.7)	18 (288)	15 (240)	13 (208)

REFERENCED STANDARDS

TABLE 21-4-C
MINIMUM THICKNESS OF FACE-SHELLS AND WEBS

NOMINAL WIDTH (W) OF UNIT (inches)	FACE-SHELL THICKNESS (FST) MIN., (inches) ^{1, 4}	WEB THICKNESS (WT)	
		Webs ¹ Min., (inches)	Equivalent Web Thickness, Min., In./Lin. Ft. ²
× 25.4 for mm		× 83 for mm/lin. m	
3 and 4	$\frac{3}{4}$	$\frac{3}{4}$	$1\frac{5}{8}$
6	1	1	$2\frac{1}{4}$
8	$1\frac{1}{4}$	1	$2\frac{1}{4}$
10	$1\frac{3}{8}$	$1\frac{1}{8}$	$2\frac{1}{2}$
12	$1\frac{1}{4}$ ³	$1\frac{1}{8}$	$2\frac{1}{2}$
	$1\frac{1}{2}$		
	$1\frac{1}{4}$ ³		

¹Average of measurements on three units taken at the thinnest point.

²Sum of the measured thickness of all webs in the unit, multiplied by 12 (305 when using metric), and divided by the length of the unit. In the case of open-ended units where the open-ended portion is solid grouted, the length of that open-ended portion shall be deducted from the overall length of the unit.

³This face-shell thickness (FST) is applicable where allowable design load is reduced in proportion to the reduction in thicknesses shown, except that allowable design load on solid-grouted units shall not be reduced.

⁴For split-faced units, a maximum of 10 percent of a shipment may have face-shell thicknesses less than those shown, but in no case less than $\frac{3}{4}$ inch (19 mm).

REFERENCED STANDARDS

**UNIFORM BUILDING CODE STANDARD 21-6
IN-PLACE MASONRY SHEAR TESTS**

See Appendix Chapter 1, Sections A1 06.3.3 and A1 07.2, *Uniform Code for Building Conservation*
Note: See Appendix Chapter A1, Section A104, *California Existing Building Code*.

SECTION 21.601 — SCOPE

This standard applies when the *Uniform Code for Building Conservation (California Existing Building Code)* requires in-place testing of the quality of masonry mortar.

SECTION 21.602 — PREPARATION OF SAMPLE

The bed joints of the outer wythe of the masonry shall be tested in shear by laterally displacing a single brick relative to the adjacent bricks in the same wythe. The head joint opposite the loaded end of the test brick shall be carefully excavated and cleared. The brick adjacent to the loaded end of the test brick shall be carefully removed by sawing or drilling and excavating to provide space for a hydraulic ram and steel loading blocks.

SECTION 21.603 — APPLICATION OF LOAD AND DETERMINATION OF RESULTS

Steel blocks, the size of the end of the brick, shall be used on each end of the ram to distribute the load to the brick. The blocks shall not contact the mortar joints. The load shall be applied horizontally, in the plane of the wythe, until either a crack can be seen or slip occurs. The strength of the mortar shall be calculated by dividing the load at the first cracking or movement of the test brick by the nominal gross area of the sum of the two bed joints.

**UNIFORM BUILDING CODE STANDARD 21-7
TESTS OF ANCHORS IN UNREINFORCED MASONRY WALLS**

See Appendix Chapter 1, Section A1 07.3 and A1 07.4, *Uniform Code for Building Conservation*
Note: See Appendix Chapter A1, Section A105, A107.3, A107.4 and Table A1-E, *California Existing Building Code*.

SECTION 21.701 — SCOPE

Shear and tension anchors in existing masonry construction shall be tested in accordance with this standard when required by the *Uniform Code for Building Conservation (California Existing Building Code)*.

SECTION 21.702 — DIRECT TENSION TESTING OF EXISTING ANCHORS AND NEW BOLTS

The test apparatus shall be supported by the masonry wall. The distance between the anchor and the test apparatus support shall not be less than one half the wall thickness for existing anchors and 75 percent of the embedment for new embedded bolts. Existing wall anchors shall be given a preload of 300 pounds (1335 N) prior to establishing a datum for recording elongation. The tension test load reported shall be recorded at $\frac{1}{8}$ inch (3.2 mm) relative movement of the existing anchor and the adjacent masonry surface. New embedded tension bolts shall be subject to a direct tension load of not less than 2.5 times the design load but not less than 1,500 pounds (6672 N) for five minutes (10 percent deviation).

SECTION 21.703 — TORQUE TESTING OF NEW BOLTS

Bolts embedded in unreinforced masonry walls shall be tested using a torque-calibrated wrench to the following minimum torques:
 $\frac{1}{2}$ -inch-diameter (13 mm) bolts—40 foot pounds (54.2 N · m) $\frac{5}{8}$ -inch-diameter (16 mm) bolts—50 foot pounds (67.8 N · m) $\frac{3}{4}$ -inch-diameter (19 mm) bolts—60 foot pounds (81.3 N · m)

SECTION 21.704 — PREQUALIFICATION TEST FOR BOLTS AND OTHER TYPES OF ANCHORS

This section is applicable when it is desired to use tension or shear values for anchors greater than those permitted by Table A-1-E of the *Uniform Code for Building Conservation (California Existing Building Code)*. The direct-tension test procedure set forth in Section 21.702 for existing anchors may be used to determine the allowable tension values for new embedded or through bolts, except that no preload is required. Bolts shall be installed in the same manner and using the same materials as will be used in the actual construction. A minimum of five tests for each bolt size and type shall be performed for each class of masonry in which they are proposed to be used. The allowable tension values for such anchors shall be the lesser of the average ultimate load divided by a factor of safety of 5.0 or the average load of which $\frac{1}{8}$ inch (3.2 mm) elongation occurs for each size and type of bolt and class of masonry.

Shear bolts may be similarly prequalified. The test procedure shall comply with ASTM E 488-90 or another approved procedure.

The allowable values determined in this manner may exceed those set forth in Table A-1-E of the *Uniform Code for Building Conservation (California Existing Building Code)*.

SECTION 21.705 — REPORTS

Results of all tests shall be reported. The report shall include the test results as related to anchor size and type, orientation of loading, details of the anchor installation and embedment, wall thickness, and joist orientation.

**UNIFORM BUILDING CODE STANDARD 21-8
POINTING OF UNREINFORCED MASONRY WALLS**

See Appendix Chapter 1, Section A1 06.3.3.2, *Uniform Code for Building Conservation*
Note: See Appendix Chapter A1, Section A103 and A106.3.3.9, California Existing Building Code.

SECTION 21.801 — SCOPE

Pointing of deteriorated mortar joints when required by the *Uniform Code for Building Conservation (California Existing Building Code)* shall be in accordance with this standard.

SECTION 21.802 — JOINT PREPARATION

The old or deteriorated mortar joint shall be cut out, by means of a toothing chisel or nonimpact power tool, to a uniform depth of $\frac{3}{4}$ inch (19 mm) until sound mortar is reached. Care shall be taken not to damage the brick edges. After cutting is complete, all loose material shall be removed with a brush, air or water stream.

SECTION 21.803 — MORTAR PREPARATION

The mortar mix shall be Type N or Type S proportioned as required by the construction specifications. The pointing mortar shall be pre-hydrated by first thoroughly mixing all ingredients dry and then mixing again, adding only enough water to produce a damp unworkable mix which will retain its form when pressed into a ball. The mortar shall be kept in a damp condition for one and one-half hours; then sufficient water shall be added to bring it to a consistency that is somewhat drier than conventional masonry mortar.

SECTION 21.804 — PACKING

The joint into which the mortar is to be packed shall be damp but without freestanding water. The mortar shall be tightly packed into the joint in layers not exceeding $\frac{1}{4}$ inch (6.4 mm) in depth until it is filled; then it shall be tooled to a smooth surface to match the original profile.

REFERENCED STANDARDS

**UNIFORM BUILDING CODE STANDARD 21-13
HYDRATED LIME FOR MASONRY PURPOSES**

Based on Standard Specification C 207-91 (Reapproved 1992) of the ASTM International. Extracted, with permission, from the *Annual Book of ASTM Standards*, copyright ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428

See Section 2102.2, Item 3, *Uniform Building Code*
Note: See Referenced Standard UBC 21-4

Section 21.1301 — Scope

This standard covers four types of hydrated lime. Types N and S are suitable for use in mortar, in the scratch and brown coats of cement plaster, for stucco, and for addition to portland-cement concrete. Types NA and SA are air-entrained hydrated limes that are suitable for use in any of the above uses where the inherent properties of lime and air entrainment are desired. The four types of lime sold under this specification shall be designated as follows:

Type N—Normal hydrated lime for masonry purposes.

Type S—Special hydrated lime for masonry purposes.

Type NA—Normal air-entraining hydrated lime for masonry purposes.

Type SA—Special air-entraining hydrated lime for masonry purposes.

Note: Type S, special hydrated lime, and Type SA, special air-entraining hydrated lime, are differentiated from Type N, normal hydrated lime, and Type NA, normal air-entraining hydrated lime, principally by their ability to develop high, early plasticity and higher water retentivity and by a limitation on their unhydrated oxide content.

Section 21.1302 — Definition

HYDRATED LIME. The hydrated lime covered by Type N or S in this standard shall contain no additives for the purpose of entraining air. The air content of cement-lime mortars made with Type N or S shall not exceed 7 percent. Types NA and SA shall contain an air-entraining additive as specified by Section 21.1305. The air content of cement-lime mortars made with Type NA or SA shall have a minimum of 7 percent and a maximum of 14 percent.

Section 21.1303 — Additions

Types NA and SA hydrated lime covered by this standard shall contain additives for the purpose of entraining air.

Section 21.1304 — Manufacturer's Statement

Where required, the nature, amount and identity of the air-entraining agent used and of any processing addition that may have been used shall be provided, as well as test data showing compliance of such air-entraining addition.

**Section 21.1305 — Chemical Requirements
Composition**

Hydrated lime for masonry purposes shall conform to the requirements as to chemical composition set forth in Table 21-13-A.

Section 21.1306 — Residue, Popping and Pitting

The four types of hydrated lime for masonry purposes shall conform to one of the following requirements:

1. The residue retained on a No. 30 (600 μ m) sieve shall not be more than 0.5 percent, or
2. If the residue retained on a No. 30 (600 μ m) sieve is over 0.5 percent, the lime shall show no pops and pits when tested.

Section 21.1307 — Plasticity

The putty made from Type S, special hydrate, or Type SA, special air-entraining hydrate, shall have a plasticity figure of not less than 200 within 30 minutes after mixing with water, when tested.

Section 21.1308 — Water Retention

Hydrated lime mortar made with Type N, normal hydrated lime, or Type NA, normal air-entraining hydrated lime, after suction for 60 seconds, shall have a water-retention value of not less than 75 percent when tested in a standard mortar made from the dry hydrate or from putty made from the hydrate which has been soaked for a period of 16 to 24 hours.

Hydrated lime mortar made with Type S, special hydrated lime, or Type SA, special air-entraining hydrated lime, after suction for 60 seconds, shall have a water-retention value of not less than 85 percent when tested in a standard mortar made from the dry hydrate.

Section 21.1309 — Special Marking

When Type NA or SA air-entraining hydrated lime is delivered in packages, the type under this standard and the words "air-entraining" shall be plainly indicated thereon or, in case of bulk shipments, so indicated on shipping notices.

Section 21.1310 — Quality Control

Every 90 days, each lime producer shall retain an approved agency to obtain a random sample from a local point of supply in the market area served by the producer.

The agency shall test the lime for compliance with the physical requirements of Sections 21.1306, 21.1307 and 21.1308.

Upon request of the building official, the producer shall furnish (at no cost) test results to the building official, architect, structural engineer, general contractor and masonry contractor.

ASTM 653/A & 653M-08 [HCD]

Standard specifications for steel sheet, zinc-coated (galvanized) or zinc-iron alloy-coated (galvannealed) by the hot-dip process

TABLE 21-13-A—CHEMICAL REQUIREMENTS

	HYDRATE TYPES			
	N	NA	S	SA
Calcium and magnesium oxides (nonvolatile basis), min. percent	95	95	95	95
Carbon dioxide (as-received basis), max. percent				
If sample is taken at place of manufacture	5	5	5	5
If sample is taken at any other place	7	7	7	7
Unhydrated oxides (as-received basis), max. percent	—	—	8	8