

**CHAPTER 21
MASONRY**

Adopt and/or codify chapter as amended below:

(All existing California amendments that are not revised below shall continue without change)

DRAFT INITIAL EXPRESS TERMS

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SECTION 2114

ADDITIONAL REQUIREMENTS FOR COMMUNITY COLLEGES [DSA-SS/CC]

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2114.3 Additives and Admixtures.

2114.3.1 General. *Additives and admixtures to mortar or grout shall not be used unless approved by the enforcement agency.*

2114.3.2 Antifreeze compounds. *Antifreeze liquids, chloride salts or other such substances shall not be used in mortar or grout.*

2114.2 2114.3.3 Air entrainment. *Air-entraining substances shall not be used in mortar or grout unless tests are conducted to determine compliance with the requirements of this code.*

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2114.5 2114.8 Specified compressive strength. *The specified compressive strength, f'_{m} , assumed in design shall be not less than 2,000 1,500 psi (10.34 MPa) for all masonry construction using materials and details of construction required herein. Testing of the constructed masonry shall be provided in accordance with Section 2114.6.2 2114.9.3.*

In no case shall the f'_{m} assumed in design exceed 3,000 psi (20.68 MPa).

2114.6 2114.9 Additional testing requirements.

2114.6.1 2114.9.1 Mortar and grout tests. *At the beginning of all masonry work, at least one test sample of the mortar ~~and grout~~ shall be taken on three successive*

working days and at least at one-week intervals thereafter. Where mortar is based on a proportion specification, mortar shall be sampled and tested during construction in accordance with ASTM C780 Annex 4 and 5 to verify the proportions specified in ASTM C270, Table 2. Where mortar is based on a property specification, mortar shall be laboratory prepared and tested prior to construction in accordance with ASTM C780 to verify the properties specified in ASTM C270, Table 1 and field sampled and tested during construction in accordance with ASTM C780 to verify the proportions with the laboratory tests. Mortar sampling and testing is not required for approved preblended mortars in conformance with ASTM C270.

Samples of grout shall be taken for each mix design, each day grout is placed, and not less than every 5,000 square feet of masonry wall area. The grout They shall meet the minimum strength requirement given in ASTM C476/TMS 602 Section 2.2. Sections 2103A.9 and 2103A.13 for mortar and grout, respectively. Test specimens for mortar and grout shall be made as set forth in ASTM C 1586 and ASTM C 1019.

Additional samples shall be taken whenever any change in materials or job conditions occur, as determined by the building official, or whenever in the judgment of the architect, structural engineer or the enforcement agency such tests are necessary to determine the quality of the material. When the prism test method of Section 2105A.2.2.2 is used during construction, the tests in this section are not required.

Exception: For non-bearing non-shear masonry walls not exceeding total wall height of 12' above wall base, mortar test shall be permitted to be limited to those at the beginning of masonry work for each mix design.

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2114.6.2 2114.9.3 Masonry core testing. Not less than two cores shall be taken from

each building for each 5,000 square feet (465 m²) of the greater of the masonry wall area or the floor area or fraction thereof. ~~The architect or structural engineer in responsible charge of the project or his/her representative or the inspector of record shall select the areas for sampling. The inspector of record~~ approved agency shall perform or observe the coring of the masonry walls and sample locations shall be subject to approval of the registered design professional.

Cores samples shall comply with the following:

1. Cored no sooner than 7 days after grouting of the selected area;
2. ~~be~~ Be a minimum of 3-3/4" in nominal diameter; and
3. ~~Sampled shall be taken~~ in such a manner as to exclude any masonry unit webs, mortar joint, or and reinforcing steel. If all cells contain reinforcement, alternate core locations or means to detect void or delamination shall be selected by the registered design professional and approved by the building official.

~~If vertical reinforcing steel is placed such that cores will include reinforcing steel, core testing may be waived by the design professional in responsible charge, as approved by the enforcement agency.~~

Visual examination of all cores shall be made by an approved agency ~~a laboratory acceptable to the building official~~ and the condition of the cores reported as required by the California Administrative Code. The ~~S~~shear test shall test both joints between the grout core and the outside wythes or face shell of the masonry. All cores taken shall be tested in shear 28 days after grouting of the sample area using a shear test apparatus acceptable to the enforcement agency. Shear testing apparatus shall be of a design approved by the enforcement agency. Core samples shall not be soaked before testing. Core samples to be tested shall be stored in sealed plastic bags or non-absorbent containers immediately after coring and for at least 5 days prior to testing. The average unit shear value for each pair of cores (4 shear tests) from each 5,000 square feet of wall area (or less) on the cross section of all the cores shall not be less than 2.5 √f 'm psi.

~~All cores shall be submitted to an approved agency the laboratory, acceptable to the building official, for examination, regardless of whether even where the core specimens failed outside wythe or face shells separated during the cutting operation. The approved agency laboratory shall report the location where each core was taken, the findings of their visual examination of each core, identify which cores were selected for shear testing, and the results of the shear tests.~~

Exceptions:

1. Core sampling and testing is not required for non-bearing non-shear masonry walls, not exceeding total wall height of 12' above wall base, built with single-wythe hollow unit concrete masonry that attaches opposite face

shells using webs cast as single unit, when designed using an f'_m not exceeding 2,000 psi (13.79 MPa).

2. An infrared thermographic survey or other nondestructive test procedures, shall be permitted to be approved as an alternative system to detect voids or delamination in grouted masonry in-lieu of core sampling and testing.

2114.7 2114.10 Modifications to TMS 402/ACI 530/ASCE 5.

2114.7.1 2114.10.1 Modify TMS 402/ACI 530/ASCE 5, Section 7.4.4 4.18 as follows:

1. Minimum reinforcement requirements for masonry walls. The total area of reinforcement in reinforced masonry walls shall not be less than 0.003 times the sectional area of the wall. Neither the horizontal nor the vertical reinforcement shall be less than one third of the total. Horizontal and vertical reinforcement shall be spaced at not more than 24 inches (610 mm) center to center. The minimum reinforcing shall be No. 4, except that No. 3 bars may be used for ties and stirrups. Vertical wall reinforcement shall have dowels of equal size and equal matched spacing in all footings. Reinforcement shall be continuous around wall corners and through intersections. Only reinforcement which is continuous in the wall shall be considered in computing the minimum area of reinforcement. Reinforcement with splices conforming to TMS 402/ACI 530/ASCE 5 as modified by Sections 2107 and 2108 shall be considered as continuous reinforcement.

Horizontal reinforcing ~~ement~~ bars in bond beams shall be provided in the top of footings, at the top of wall openings, at roof and floor levels, and at the top of parapet walls. For walls 12 inches (nominal) (305 mm) or more in thickness, horizontal and vertical reinforcement shall be equally divided into two layers, except where designed as retaining walls. Where reinforcement is added above the minimum requirements, such additional reinforcement need not be so divided.

In bearing walls of every type of reinforced masonry, there shall be trim reinforcement of not less than one No. 5 bar or two No. 4 bars on all sides of, and adjacent to, every opening which exceeds 16 inches (406 mm) in either direction, and such bars shall extend not less than 48 diameters, but in no case less than 24 inches (610 mm) beyond the corners of the opening. The bars required by this paragraph shall be in addition to the minimum reinforcement elsewhere required.

When the reinforcement in bearing walls is designed, placed and anchored in position as for columns, the allowable stresses shall be as for columns.

Joint reinforcement shall not be used as principal reinforcement in masonry

~~designed by the strength design method.~~

2. Minimum reinforcement for masonry columns. The spacing of column ties shall be as follows: not greater than 8 bar diameters, 24 tie diameters, or one half the least dimension of the column for the full column height. Ties shall be at least 3/8 inch (10 mm) in diameter and shall be embedded in grout. Top tie shall be within 2 inches (51 mm) of the top of the column or of the bottom of the horizontal bar in the supported beam.

3. Anchor bolts. Bent bar anchor bolts shall not be allowed. The maximum size anchor shall be 1/2-inch (13 mm) diameter for 6-inch (152 mm) nominal masonry, 3/4-inch (19 mm) diameter for 8-inch (203 mm) nominal masonry, 7/8-inch (22 mm) diameter for 10-inch (254 mm) nominal masonry, and 1-inch (25mm) diameter for 12-inch (304.8 mm) nominal masonry.

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