

From the New Mexico Addenda to the 1997 Uniform Building Code:

CHAPTER 21. **MASONRY.**

Refer to 1997 Uniform Building Code for provisions of this Chapter, with exception of **Sec. 2109.9.** [12-31-98]

2109.9 Unburned Clay Masonry. Delete 1997 Uniform Building Code provisions for this Section, and substitute the following. [12-31-98]

2109.9 Unburned Clay Masonry (Adobe) [12-31-98]

2109.9.1 General.

Masonry of unburned clay units shall not be used in any building more than two (2) stories in height. The height of every wall of unburned clay units without lateral support shall be not more than ten (10) times the thickness of such walls. Exterior walls, which are laterally supported with those supports located no more than twenty-four (24) feet apart, are allowed a minimum thickness of ten (10) inches for single-story and a minimum thickness of fourteen (14) inches for the bottom story of a two-story, and a with the upper story allowed a minimum thickness of ten (10) inches. Interior bearing walls are allowed a minimum thickness of eight (8) inches. Upward progress of walls shall be in accordance with acceptable practices. [12-31-98]

2109.9.2 Soil.

Soil for use in adobe bricks should have a mixture of coarse sand, sand silt and clay, naturally occurring or amended with sand or straw, that will make a sun-dried brick without serious warping or cracking. The best way to determine the fitness of a soil is to make a sample brick and allow it to cure in the open, protected from moisture. Soils with visible alkali salts or brackish water for mixing should not be used. [12-31-98]

2109.9.3 Classes of Earthen Construction. [12-31-98]

2109.9.3.1 Stabilized adobes.

The term "stabilized" is defined to mean water-resistant adobes made of soil to which certain admixtures are added in the manufacturing process in order to limit the adobe's water adsorption. Exterior walls constructed of stabilized mortar and adobe require no additional protection. Cement stucco or other waterproof coating is not required. The test required is that a dried four (4) inch cube cut from a sample unit shall absorb not more than four (4) percent moisture by weight when placed upon a constantly water-saturated porous surface for seven (7) days. An adobe unit that meets this specification shall be considered "stabilized". [12-31-98]

2109.9.3.2 Untreated adobes.

Untreated or "natural" adobes that do not meet the water absorption specifications indicated in Section 2109.3.1 above. Use of untreated adobes is prohibited within four (4) inches of the finished floor grade. Stabilized adobes or waterproof masonry units and mortar may be used for the first four (4) inches above floor grade. [12-31-98]

2109.9.3.3 Hydraulically pressed units.

Sample units must be prepared from the specific soil source to be used and tested in accordance with Section 2109.9.4.5. [12-31-98]

2109.9.3.4 Terrones.

The term "terrones" shall refer to cut sod bricks. Their use is permitted if units are dry and the wall design is in conformance with this code. [12-31-98]

2109.9.3.5 Burned adobe.

The term "burned adobe" shall refer to mud adobe bricks that have been cured by low-temperature kiln firing. This type of brick is not generally dense enough to be "frost-proof" and may deteriorate rapidly with seasonal freeze-thaw cycles. Its use for exterior locations is discouraged in climate zones with daily freeze-thaw cycles. [12-31-98]

2109.9.4 Properties, Sampling and Testing. [12-31-98]

2109.9.4.1 General

Each of the tests prescribed in this section shall be applied to sample units selected at random at a ratio of five (5) units per twenty-five thousand (25,000) bricks to be used or at the discretion of the building official. [12-31-98]

2109.9.4.2 Shrinkage cracks.

No units shall contain more than three (3) shrinkage cracks, and no shrinkage crack shall exceed two (2) inches in length or one-eighth (1/8) inch in width. [12-31-98]

2109.9.4.3 Compressive strength

The units shall have an average compressive strength of three hundred (300) pounds per square inch when tested. One (1) sample out of five (5) may have a compressive strength of not less than two hundred fifty (250) pounds per square inch.

The brick shall be tested in a flat position, subjected to a uniform compressive load that is gradually increased at a rate of five hundred (500) psi/min. until failure occurs.

The bearing surfaces of the brick must be carefully smoothed or capped with plaster of Paris capping compound so the load is uniformly distributed. If plaster of Paris is used, it is common practice to first coat the brick surfaces with paraffin in order to prevent moisture migration from the plaster into the brick, or to dry the capped specimen before testing. A true flat platen should be used in the testing machine, along with a swivel head to accommodate nonparallel bearing surfaces. The crushing strength is defined as

$$\delta = P/bt$$

[12-31-98]

2109.9.4.4 Modulus of rupture.

The unit shall average fifty (50) pounds per square inch in modulus of rupture when tested according to the following procedures:

A standard 4" x 10" x 14" cured unit shall be laid over (cylindrical) supports two (2) inches from each end, and extending across the full width of the unit. A cylinder two (2) inches in diameter shall be laid midway between and parallel to the supports. Load shall be applied to the cylinder at the rate of five hundred (500) pounds per minute until rupture occurs. The modulus of rupture is equal to:

$$\delta_{sb} = 3P/2bt^2 \text{ (that's } t \text{ squared)}$$

Where P = rupture load (pounds)

l = span between supports

b = width of brick

t = thickness of brick

[12-31-98]

2109.9.5 Testing of hydraulically pressed units.

In addition to other tests specified in this Section, three (3) freshly pressed sample bricks made from the soils proposed for use will be submitted to the testing laboratory for curing, quality and dimensional stability. [12-31-98]

2109.9.6 Mortar.

The use of earth mortar is allowed if earth mortar material is of the same type as the adobe bricks.

Conventional lime/sand/cement mortars of Types M, S, N are also allowed. Mortar "bedding" joints shall be fully bedded, with partially open "head" joints allowable if the surface is to be plastered. All joints shall be bonded (overlapped) a minimum of four (4) inches. Liquid mud slip mortar is allowed if made from the same soil (screened) as the brick, providing adhesion to the bricks equal to regular earth mortar. This must be demonstrated to and approved by the building official. [12-31-98]

2109.9.7 Use.

No adobe shall be laid in the wall until fully cured. [12-31-98]

2109.9.8 Foundations.

Adobes may not be used for foundations or basement walls. All adobe walls, except as noted under Group M buildings, shall have a continuous footing at least eight (8) inches thick and not less than two (2) inches wider on each side that supports the foundation walls above. All foundation walls that support adobe units shall extend to an elevation not less than six (6) inches above the finish grade.

Foundation walls shall be at least as thick as the exterior wall. Where perimeter insulation is used, a variance is allowed for the stem wall width to be two (2) inches smaller than the width of the adobe wall it supports. Alternative foundation systems must be approved by the building official.[12-31-98]

2109.9.9 Tie beams.

All bearing walls shall be topped with a continuous belt or tie beam (except patio walls less than six {6} feet high above stem). [12-31-98]

2109.9.9.1 Concrete tie beam.

Concrete tie beam shall be a minimum of six (6) inches thick by width of the top of the wall. A bond beam centered to cover two-thirds (2/3) of the width of the top of the wall by six (6) inches thick shall be allowed for walls wider than ten (10) inches. All concrete tie beams shall be reinforced with a minimum of two (2) No. 4 reinforcing rods at each floor and ceiling plate line. All bond beam construction shall be in accordance with accepted engineering practices. [12-31-98]

2109.9.9.2 Wood tie beam.

The wood tie beam shall be a minimum of six (6) inch thickness except as provided for walls thicker than ten (10) inches above. Wood tie beams may be solid in the six (6) inch dimension or may be built up by applying layers of lumber. Ends of wood tie beams are to be lapped a minimum of twelve (12) inches to provide a "cinch" or "belt". FHA straps or perforated metal straps one-eighth (1/8) inch thick, twelve (12) inches long, may be used to joint ends of wood bond beam members with full nailing. No layer shall be less than one (1) inch nominal thickness. The building official shall approve all wooden tie beams for walls thicker than ten (10) inches. [12-31-98]

2109.9.10 Lintels.

Lintels shall be minimum in size, six (6) inches by wall thickness. All ends shall have a wall bearing of at least twelve (12) inches. All lintels, wood or concrete, in excess of nine (9) feet shall have specific approval of the building official. [12-31-98]

2109.9.11 Anchorage.

Roof and floor structures will be suitably anchored to tie beams. Wood joints (sic), vigas or beams shall be attached to the wood or concrete tie beams with adequate metal fasteners. Door and window frames shall be secured to wood adobes ("gringo blocks") placed in the adobe walls as they are laid up. [12-31-98]

2109.9.12 Plastering.

Untreated exterior adobe walls can be protected with portland cement plaster with a minimum thickness of seven-eights (7/8) inch if adequate roof, parapet, scupper and window flashing is provided. If portland cement plaster is used, it must be reinforced with metal wire mesh, minimum seventeen (17) gauge by one-and-a-half (1-1/2) inch opening, securely attached to the exterior adobe wall surface by nails or staples with a minimum penetration of one-and-a-half (1-1/2) inches. Such mesh fasteners shall have a maximum spacing sixteen (16) inches from each other. Any wood surfaces to be covered with stucco or plaster must be protected from moisture with asphalt felt, reinforced with expanded metal lath. Protective coatings other than plaster are allowed.

If desired, exterior adobe walls may be protected with mud plaster. Alternative plastering systems shall be submitted for approval by the building official. [12-31-98]

2109.9.13 Wall insulation.

All methods of wall insulation shall comply with the manufacturer's recommendations.
[12-31-98]

2109.9.14 Stop work.

The building inspector shall have the authority to issue a "stop work" order if the provisions of this Section are not complied with. [12-31-98]

2109.9.15 Fireplaces.

Fireplaces shall be secured to the wall be suitable reinforcement and rebar in the manner shown in Fig. 2109.9.15. Partitions of wood shall be constructed as specified in Chapter 23 of the 1997 Uniform Building Code. Wood and metal partitions may be secured to nailing blocks laid up in the adobe wall or other approved methods.