



INFORMATIONAL BULLETIN

Bulletin No. 200

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Effective: 5/1/90

Revised: 2/20/96

Approve: *[Signature]*

SPECIAL DESIGN AND DETAILING REQUIREMENTS

FOR FOUR STORY WOOD-FRAME CONSTRUCTION

The general construction requirements of Section 2318 of the Uniform Building code, 1994 Edition states that:

"Wood stud walls and bearing partitions shall not support more than two floors and a roof unless an analysis satisfactory to the building official shows that shrinkage of the wood framing will not have adverse effects upon the structure nor any plumbing, electrical, mechanical systems nor other equipment installed therein due to excessive shrinkage or differential movements caused by shrinkage. The analysis shall also show that the roof drainage system and the foregoing systems or equipment will not be adversely affected or as an alternate, such systems shall be designed to accommodate the differential shrinkage or movements."

In a four story wood frame construction, wood shrinkage must be considered. The following requirements are intended to minimize the adverse effects on the structure or plumbing, mechanical, or electrical systems due to excessive shrinkage or differential movement caused by shrinkage. Plans and calculations demonstrating compliance with the following requirements shall be included with all building permit submittals for four story wood frame buildings.

Design Requirements:

1. The moisture content of horizontal load bearing wood framing with a thickness less than 4" inches nominal shall not exceed 16% prior to the concealment of any wood frame or application of any finish materials.
2. The owner or the engineer or architect of record acting as the owner's agent shall employ a City approved testing laboratory to verify that the moisture content of the wood framing does not exceed 16% prior to the concealment of any wood frame or application of finish materials. The testing laboratory shall furnish reports as required by the Uniform Building Code Section 1701.3. Reports shall be submitted to the City for review and approval prior to the application of any finish materials.



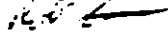
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3. Shrinkage calculations showing the anticipated shrinkage based on an original moisture content of both 19% (if lumber with 19% moisture content is specified) and 15% (the condition prior to application of finishes) shall be provided.
4. Wood framing systems shall be designed to minimize differential shrinkage.
5. Where studs or posts bear on plates, beams, or joists, the design value used for compression perpendicular to grain shall be based on a deformation factor of 0.02 inches. The design values are not to be increased for the duration of load. Values can be adjusted by use of the formula:

$$X = 0.73X + 5.60.$$

.02 .04

6. Where a load-bearing, fire-rated wood stud wall assembly is used, the design value for compression parallel to grain shall be taken as 78 percent of the maximum allowable value adjusted for slenderness ratio.

Detailing Requirements:

7. Architectural details for accommodating the effects of the anticipated shrinkage on interior and exterior finishes shall be provided on the plans. The integrity of fire-rated assemblies shall be maintained.
8. Plumbing and mechanical systems shall be detailed to accommodate the effects of shrinkage.
 - a) Piping shall be attached with non-rigid flexible mountings.
 - b) Swing joints shall be provided on branches connecting to risers.
 - c) Vent penetrations through the roof shall be designed to accommodate shrinkage without compromising the water tightness of the installation.



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- d) A means of adjustment to relieve stresses in the piping system shall be provided. Adjustments to relieve stresses shall be made 120 days after the completion of construction.
 - e) Holes bored in studs for piping shall be sized to allow for anticipated shrinkage and the piping shall be installed at the bottom of the holes. Notes regarding the cutting, notching and boring of holes in studs in conformance with Uniform Building Code Sections 2326.11.9 and 2326.11.10 shall be provided on the plans.
 - f) Vertical mechanical ducts shall be designed to accommodate the anticipated shrinkage.
9. Shrinkage factors shall be considered in the design of roof drainage systems.