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## BOLTS USED IN WOOD CONSTRUCTION

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# IR 23-5

References:

California Code of Regulations (CCR), Title 24, Part 2:  
California Building Code (CBC), Chapter 23  
National Design Specifications (NDS)-05, Chapter 11

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Discipline: Structural

This Interpretation of Regulations (IR) is intended for use by the Division of the State Architect (DSA) staff, and as a resource for design professionals, to promote more uniform statewide criteria for plan review and construction inspection of projects within the jurisdiction of DSA which includes State of California public elementary and secondary schools (grades K-12 and community colleges), and state-owned or state-leased essential services buildings. This IR indicates an acceptable method for achieving compliance with applicable codes and regulations, although other methods proposed by design professionals may be considered by DSA.

This IR is reviewed on a regular basis and is subject to revision at any time. Please check the DSA web site for currently effective IRs. Only IRs listed in the document at <http://www.dgs.ca.gov/dsa/Resources/IRManual.aspx> at the time of plan submittal to DSA are considered applicable.

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**Purpose:** The purpose of this Interpretation of Regulations (IR) is to clarify dimensional requirements for bolts used in wood frame construction.

**1. General:** Cut-thread or rolled-thread bolts with full diameter bodies meeting the requirements of ASME B18.2.1 or ASME B18.2.6 are permitted for use on projects approved by DSA. See Table 1 below for dimensional requirements of cut-thread or rolled-thread bolts with full diameter bodies. Rolled-thread bolts with reduced diameter bodies per ASME B18.2.1 are not permitted.

**2. Background:** Dimensional requirements for bolts are given in ASME B18.2.1, "Square and Hex Bolts and Screws", and ASME B18.2.6, "Fasteners for Use in Structural Applications." Bolt threads are formed either by cutting or rolling.

**2.1 Cut-Thread Bolts.** The original blank must be full size, and equal to the major thread (outside) diameter. Threads are formed by cutting and removing metal from the blank. A bolt blank is a headed rod or bar intended for a subsequent threading operation.

**2.2 Full Diameter Body Rolled-Thread Bolts.** The blank diameter is full size and the threaded length portion is reduced to the thread pitch diameter during extrusion. Threads are formed by rotating dies that displace the metal.

**2.3 Reduced Diameter Body Rolled-Thread Bolts.** Similar to full diameter body rolled-thread bolts, except that the blank diameter is reduced along the entire length of the bolt.

**2.4 Commercially,** the terms "cut-thread" and "rolled-thread" may not indicate the method of forming threads. The term "cut-thread bolt" may refer to either a cut-thread bolt or a full diameter body rolled-thread bolt. The term "rolled-thread bolt" may refer to a reduced diameter body rolled-thread bolt.

**3. Application:** Cut-thread or rolled-thread bolts with full diameter bodies are permitted. For each nominal bolt size utilized on a project, the minimum shank or body diameter shall be specified and ASME B18.2.1 or ASME B18.2.6 shall be referenced on the drawings or specifications.

**Table 1 Diameter of Full Diameter Body Bolts**

<b>Nominal Size (inches)</b>		<b>Body or Shank Diameter (inches)</b>	
		<b>Max.</b>	<b>Min.</b>
1/2	0.5000	0.515	0.482
5/8	0.6250	0.642	0.605
3/4	0.7500	0.768	0.729
7/8	0.8750	0.895	0.852
1	1.0000	1.022	0.976

**Notes:**

- 1) Adopted from ASME B18.2.1 and ASME B18.2.6.
- 2) For bolt diameters not indicated, refer to ASME B18.2.1 and B18.2.6.
- 3) The body or shank of a bolt is the smooth portion between the head and the threads.