

J-Bolt Embedment Guide

Tip: Set your PDF viewer to "Actual size" before printing to maintain scale.

Minimum Embedment Depths by Thread Size

Thread Size	Minimum Embedment	Recommended Embedment	Hook Length	Concrete Strength Min.	Typical Applications
1/4"-20	3"	4" to 6"	1-1/2" to 2"	2500 PSI	Light equipment, small posts
3/8"-16	4"	6" to 8"	2" to 3"	3000 PSI	Medium equipment, fence posts
1/2"-13	6"	8" to 10"	3" to 4"	3000 PSI	Heavy equipment, structural
5/8"-11	8"	10" to 12"	4" to 5"	3000 PSI	Large machinery, columns
3/4"-10	10"	12" to 15"	5" to 6"	4000 PSI	Heavy structural, seismic
7/8"-9	12"	15" to 18"	6" to 7"	4000 PSI	Major structural, high load
1"-8	12"	15" to 18"	6" to 8"	4000 PSI	Major structural, wind/seismic

Edge Distance and Spacing Requirements

Thread Size	Min. Edge Distance	Preferred Edge Distance	Min. Bolt Spacing	Preferred Bolt Spacing
1/4"	1-1/2"	2" to 3"	3"	4" to 6"
3/8"	2"	3" to 4"	4"	6" to 8"
1/2"	3"	4" to 6"	6"	8" to 10"
5/8"	4"	5" to 7"	7"	10" to 12"
3/4"	4-1/2"	6" to 9"	9"	12" to 15"
7/8"	5"	7" to 10"	10"	14" to 18"
1"	6"	8" to 12"	12"	16" to 20"

Critical Installation Factors

Embedment Depth

- Must meet or exceed minimum specifications for your calculated load
- Deeper embedment provides higher pull-out resistance
- For structural or seismic applications, consult a licensed structural engineer
- Use recommended depth whenever possible - minimum is for light-duty only

Concrete Strength

- Minimum 2500 PSI for light-duty applications (1/4" and 3/8")
- Minimum 3000 PSI recommended for general structural use
- 4000 PSI or higher for heavy structural, seismic, or high-wind applications
- Allow concrete to cure minimum 7 days (preferably 28 days) before loading

Edge Distance

- Minimum edge distance prevents concrete breakout failure
- Rule of thumb: minimum = 4× bolt diameter, preferred = 6× bolt diameter
- Closer edge distances significantly reduce holding capacity
- Increase edge distance for dynamic or impact loads

Bolt Spacing

- Multiple bolts must be spaced adequately to avoid overlapping stress cones
- Minimum spacing = 6× bolt diameter, preferred = 10× bolt diameter
- Closer spacing reduces individual bolt capacity
- For maximum efficiency, use preferred spacing whenever layout allows

Installation Procedures and Best Practices

Pre-Installation Planning

1. Calculate required loads and verify bolt size is adequate for application
2. Determine embedment depth based on load calculations and concrete strength
3. Layout bolt positions ensuring adequate edge distance and spacing
4. Create installation template or use forming system to ensure accurate positioning
5. Account for any formwork thickness when measuring projection length

During Concrete Pour

1. Clean J-bolt threads and protect with tape or thread protector cap
2. Position J-bolts using template or forming system before concrete is placed
3. Pour concrete carefully around J-bolts to avoid displacement
4. Vibrate concrete thoroughly to eliminate voids around J-bolt hook
5. Verify bolt alignment and position while concrete is still workable
6. Keep bolts plumb and at correct projection height - adjust if necessary
7. Protect exposed threads from concrete splash and debris

Post-Installation

1. Allow concrete to cure minimum 7 days before applying loads (28 days preferred)
2. Remove thread protectors and clean threads with wire brush if necessary
3. Check that threads are undamaged and nuts thread on smoothly
4. Use appropriate washers to distribute load and prevent crushing
5. Torque nuts to appropriate specification for thread size and application

■ ■ CRITICAL SAFETY WARNINGS

- J-bolt capacity is HIGHLY dependent on proper installation, concrete strength, embedment depth, edge distance, and spacing
- Structural applications MUST be designed by a licensed engineer and installed per approved plans
- Seismic and wind-load applications require special consideration - consult building codes
- Never exceed rated capacities or use J-bolts in applications beyond their design intent
- Inspection of J-bolt installations should be performed by qualified personnel
- Cracked, damaged, or questionable installations must be evaluated by an engineer

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