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Anchor Bolt Grouting

Surface Preparation

Bolts: Free of oil, grease and rust. Preferably sandblasted to a “bright metal” condition.

Holes: A. Dry drilled holes shall be cleaned of dust and debris.

B. Wet drilled holes shall be cleaned of drilling slurry.

C. Formed and/or core drilled holes shall be scarified to roughen anchor hole surface.

D. Concrete shall be saturated with water for 24 hours prior to grouting.

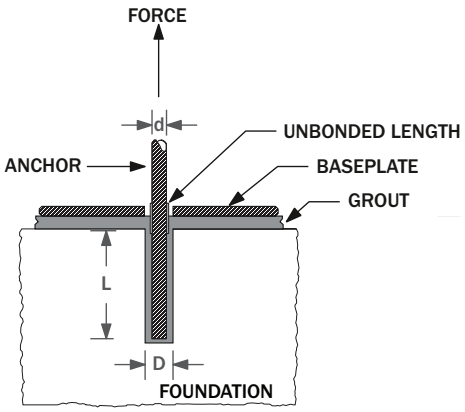
E. Standing water shall be removed immediately prior to grouting.

Dimensions

The dimensions called for in this technical bulletin are designed to eliminate the possibility of a grout failure. A concrete or steel failure is still possible. Therefore, if the concrete is designed to withstand maximum steel tension, the bolt/bar will be the governing design factor. (i.e. failure due to cone mechanism is eliminated due to reinforced concrete or because of baseplate.)

L = Length of Embedment
D = Diameter of Hole
d = Diameter of Bolt/Bar
Fy = Yield Strength of Bolt/Bar
C = Bolt/Bar Shape Factor
S = Factor of Safety

C = 1.0 for Smooth Bolt/Bar
C = 1.5 for Deformed Bolt/Bar
C = 2.0 for Threaded Bolt/Bar



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Length of Embedment

Based on a shear/bond strength of 1,000 psi:

1,000 psi x C x πdL = πd^2 Fy x ¼

Solving for *L:* minimum *L = Fyd ÷ [4,000 x C]*

Therefore:

With Fy = 80,000 psi (moderate strength steel)

minimum *L = 20d* for Smooth Bolt/Bar

minimum *L = 15d* for Deformed Bolt/Bar

minimum *L = 10d* for Threaded Bolt/Bar

With Fy = 135,000 psi (high strength steel)

minimum *L = 34d* for Smooth Bolt/Bar

minimum *L = 23d* for Deformed Bolt/Bar

minimum *L = 16d* for Threaded Bolt/Bar

Hole Diameter

The diameters called for in this bulletin are minimum diameters. The requirements will ensure an adequate size bonding surface between grout and concrete. Larger dimensions may ease placement on deep or awkward pours.

When bolt diameter; *$d \leq 1.0$ in,* then hole diameter shall be a minimum of *2 in.*

When bolt diameter; *$d \geq 1.0$ in,* then hole diameter shall be a minimum *2d.*

NOTE: These calculations are for reference only. Design calculation should be approved by a professional engineer.