



ANCHOR BOLTS FOR MAGNUM ANGLE BRACKETS

This technical bulletin addresses the required number of anchor bolts in Magnum angle brackets. Angle brackets are defined as those brackets that have a horizontal plate that fits under concrete foundation elements. Magnum Piering, Inc. manufactures a variety of angle brackets. Specific angle bracket part numbers that are the subject of this bulletin are listed below.

Magnum Angle Brackets:

MP1002-3 Wide Angle Bracket
MP1002-2 Light Duty Angle Bracket
MP1005-3 Gusseted Angle Bracket
MP1027-3 Adjustable Angle Bracket
MP1030-150 Angle Bracket
MP1030-175 Angle Bracket

These angle brackets have between 4 and 8 holes for securing the bracket to the foundation using anchor bolts. The main foundation load is transferred through the bracket to the pile shaft via the horizontal plate. The purpose of the anchor bolts is for stability. As a rule of thumb, the lateral bracing on the bracket provided by the anchor bolts is proportionate to the vertical load on the brackets. As a general rule, the number of anchor bolts required as a function of vertical load is given below:

up to 40 kips vertical:

min. 1 anchor bolt each side (total 2 bolts)

greater than 40 kips vertical:

min. 2 anchor bolts each side (total 4 bolts)

The additional bolt holes provided in Magnum brackets are intended to allow alternate anchor bolt locations should one of the anchor bolts hit

a re-bar and cannot be installed. If obstructions prohibit installation of a sufficient number of bolts using the manufactured holes, then Magnum recommends field drilling through the bracket near one of the obstructed holes and attempt to install a new anchor at that location.

Per Magnum's standard bracket mounting procedures, the horizontal seating plate on angle brackets should be covered with a layer of thin-set grout when attaching to concrete foundations. Thin-set helps bridge concrete irregularities and prevent plate-to-concrete stress concentrations which helps prevent point stress cracking. Magnum recognizes that some helical manufacturers do not require anchor bolts with angle brackets, nor do they recommend thin-set grouts. We believe this is based in part on idealized bracket testing with perfect, smooth, braced concrete. Based on 35-years experience manufacturing foundation brackets, Magnum believes that "real" field conditions and proper building code interpretation necessitates bracing through use of anchor bolts and the use of thin-set grouts for best underpinning performance.