

WALL THIMBLES

ADVANTAGES OF CAST IRON THIMBLES

- Eliminates the need for cast-in-place anchors or cinch bolts.
- Eliminates the need for grouting behind gate
- Prepositions and aligns gate
- Protects against gate distortion
- Permits gate to be relocated or moved for cleaning or painting
- Forms the opening during pour
- Can act as positive transition from pipe on one side of wall to gate on the other

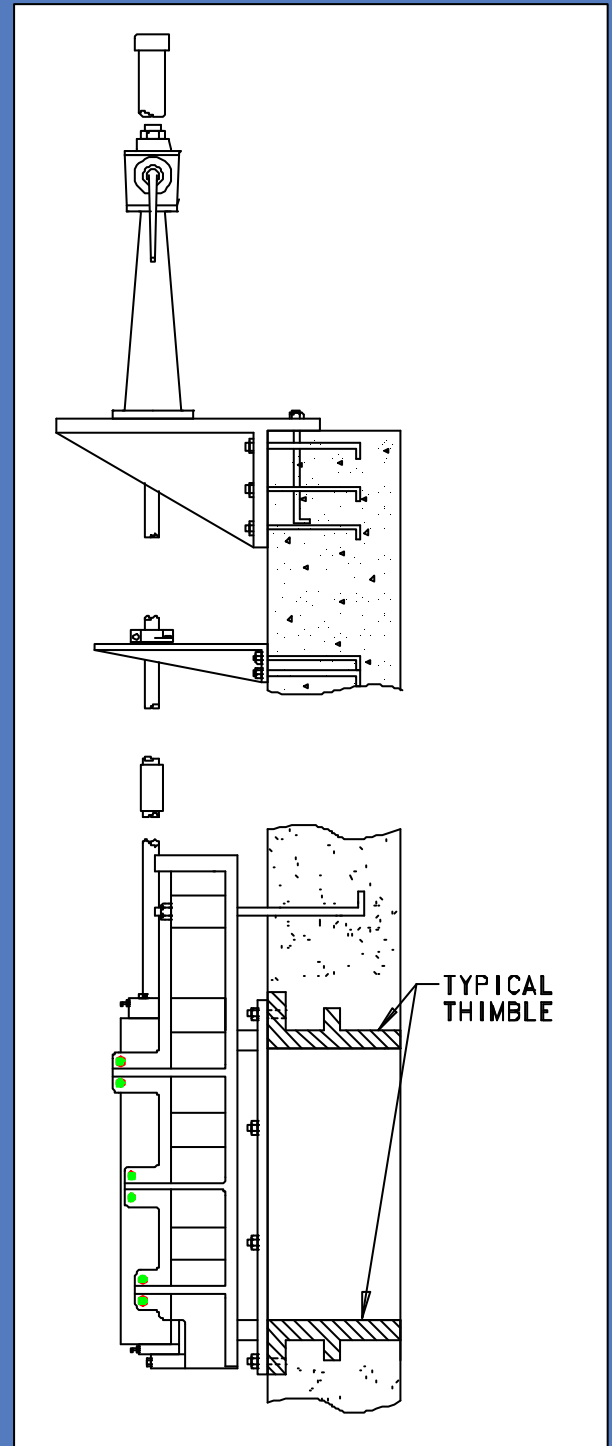
In a typical sluice gate installation, the use of a wall thimble is preferred for mounting the gate.

Construction costs may be reduced, installation time is lessened, a rigid machined surface is provided, and dependency upon the expertise of the installer is not as crucial. Also, gates can be removed and installed again without disturbing the concrete.

A thimble is a separate, cast (usually) piece positioned into the wall structure before the concrete wall is poured. It provides the fixed dimensional opening through the wall, in addition to the accurate mounting surface for the gate.

Holes are drilled and tapped in the thimble flange to match exactly the gate frame mounting dimensions. Correctly mounted, the gate should be plumb and parallel, with the possibility of distortion minimized. The use of thimbles offers considerable advantage to the engineer, contractor, or owner. A thimble is more rigid, and therefore more resistant to pressures during concrete placement. Since most anchor bolts are omitted, time is saved, accuracy is enhanced, and form work is reduced.

Additionally thimbles can be shipped early for inclusion in the construction forms, accelerating the job progress and eliminating the need for extra jobsite forming of the opening through the wall.



THIMBLE TYPES

Thimble types are named for the casting cross section shape. Each type has its own application, and remains the same even though the size and depth of thimble may vary. The illustrations at right indicate the most popular types and their particular application.

"F" THIMBLE

The "F" type wall thimble is the most widely used for mounting sluice or flap gates which are subject to any seating pressure and moderate unseating pressure. As is shown, the "F" thimble has a flange for mounting the gate on one side only. The small inner staff of the "F" thimble provides both a cleat for holding the thimble more securely in the wall and a water stop to prevent "end run" seepage. The end opposite the flange merely forms the opening to the other side of the wall or bulkhead.

"E" THIMBLE

The "E" type wall thimble is similar to the "F" thimble except that it has a flange on both ends. It is required for sluice gates subjected to high unseating heads, severe conditions, and when extension, another type flange, trash racks, or flap gates may be added to the back of the thimble. As with the "F" type thimble, the small inner staff of the "E" provides both a holding cleat and a water stop.

"MJ" THIMBLE

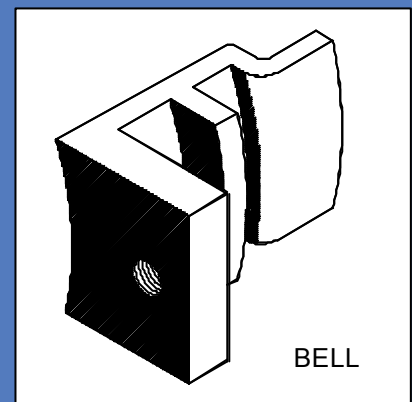
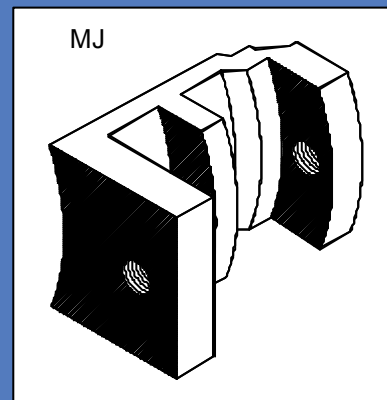
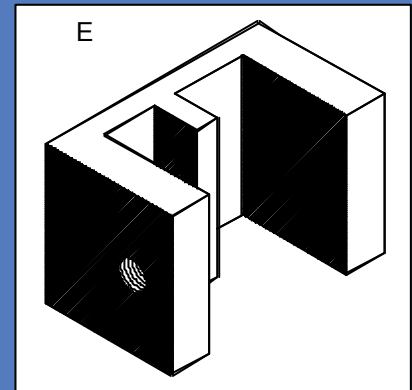
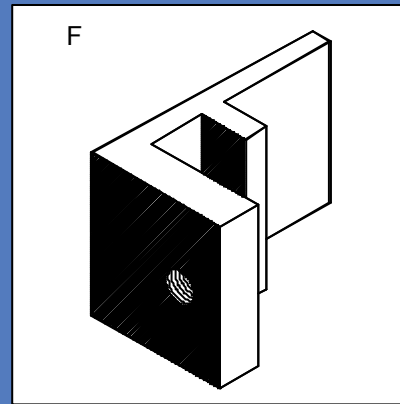
The Mechanical Joint type wall thimble has a standard flange on one end and a mechanical joint type flange on the other. It is the most widely used for direct connection to pipeline or penstock without requiring a flange on the pipe end. The "mechanical joint" employs a following ring around the pipe which is cinched to a minor bolt flange on the thimble end. In cinching the ring a rubber gasket is squeezed between the tapered end of the thimble and the pipe, thus holding the pipe into the thimble end through friction, as well as providing a seal. (It should be noted that mechanical joints are not recommended for concrete pipe.)

"BELL" THIMBLE

The "Bell" type wall thimble is similar to the Mechanical Joint thimble in that opposite the flanged end the opening is "belled" out to accept a pipe. It does not have a minor bolt flange for cinching a following ring. After the pipe is inserted into the "belled" end, caulking is required to provide a seal.

OTHER THIMBLES

For special applications, such as thin or narrow walls, "C" (or "U") and "L" type thimbles are available.



THIMBLE SHAPES

Thimble shape is determined by the combination formed by the opening or body of the thimble, which is cast into the wall, and the flange(s) to which the gate, or gates, is attached. Shown at right are the basic shapes. However, combinations of those shapes such as square flange-round opening-round flange "E" thimbles can occur but are not pictured.

ROUND FLANGE-ROUND OPENING

This thimble consists of a round opening with a round flange attached to it. It is used primarily for round flap gates, although it may be used with round flange sluice gates. If used for round flange sluice gates extra clearance is needed at both sides and bottom.

SQUARE FLANGE-ROUND OPENING

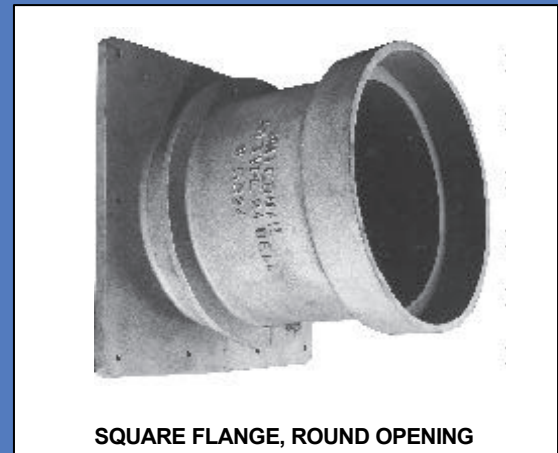
This thimble is used where a round opening is desired but a normally square flanged gate is required. Although the body of the thimble is round the front face is cast with a square flange. All four corners are cast with webs or quadrants of iron to fill the corner quadrants between square frame perimeter and the round body. Reinforcing ribs are cast on the back of the thimble flange to impart stiffness and strength. These ribs are imbedded in the wall. Installation of a gate is simplified with the square flange. All studs are around the outside square, where they are readily accessible. When minimum installation clearance is desired Waterman flatback gates should be used.

SQUARE FLANGE-SQUARE OPENING, RECTANGULAR FLANGE-RECTANGULAR OPENING

These thimbles are used with square or rectangular gates. They are normally the "F" type and are supplied in a variety of thicknesses from 8" deep or more depending on wall thickness.



ROUND FLANGE, ROUND OPENING



SQUARE FLANGE, ROUND OPENING

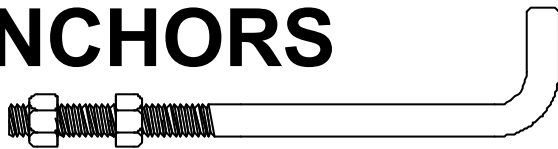


SQUARE FLANGE, SQUARE OPENING

THIMBLE SPECIFICATIONS

Wall thimbles shall be heavy, one piece castings. The front flange shall be machined to a plane and shall be drilled and holes tapped to mate the drilling pattern of the gate frame. Holes shall be plugged as to prevent concrete from intruding into threaded area. The vertical centerline shall be clearly shown by permanent marks at the top and bottom of the machined face. The word "top" shall be marked permanently near the top centerline of the thimble opening. The surfaces to be cast into the concrete shall be free of paint, oil, and grease. Corrosion-resistant studs and nuts shall be provided for attaching the gate. Mastic is recommended to form a seal between the front face of the thimble and the back of the gate frame.

ANCHOR BOLTS & DRILL-IN ANCHORS

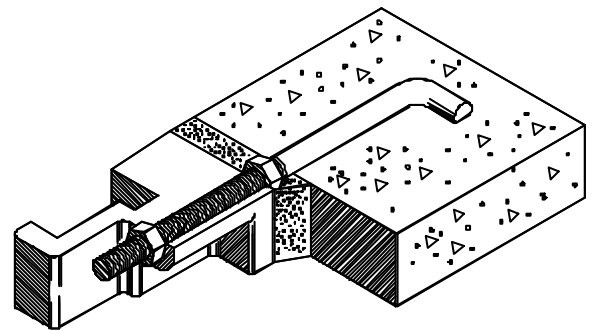


Anchor bolts are commonly used to mount sluice gates and other control gates to a headwall in the absence of thimbles. Waterman can supply anchor bolts of all materials, including galvanized steel and silicon bronze. Stainless steel is the most commonly preferred material, and is available either plain or epoxy coated. The accepted practice for mounting gates on anchor bolts is to utilize double nuts, one for positioning the gate, and the other for securing the gate.

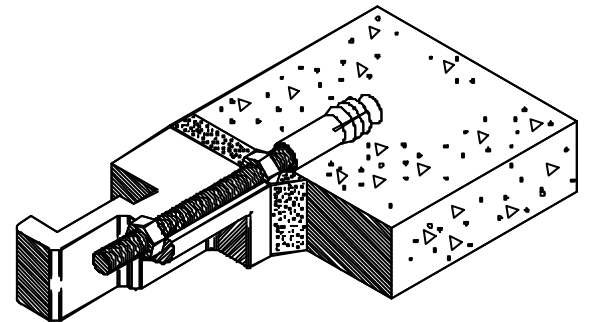
Note: In those locations where extended flangeback gates are used on headwalls without sufficient side or bottom clearance for nut adjustments, anchor bolts can be brought through the gate frame to the front face. Special anchors and frame drilling must be ordered.



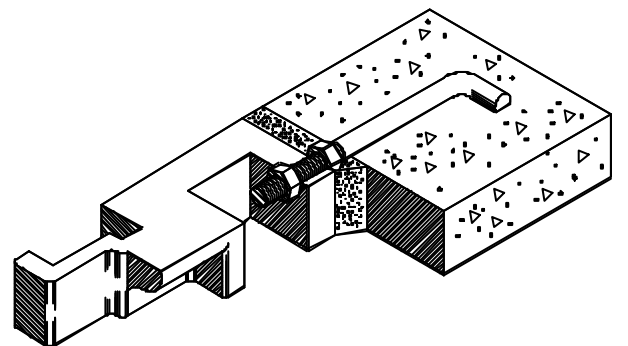
Expansion (tap-in) or chemical bonding anchors or studs are also commonly used to attach gates to headwalls. While the least preferred of the three methods, it is sometimes necessary to use this type of anchor, as in a retrofit situation to an existing structure. Waterman can supply most major brands of expansion anchors.



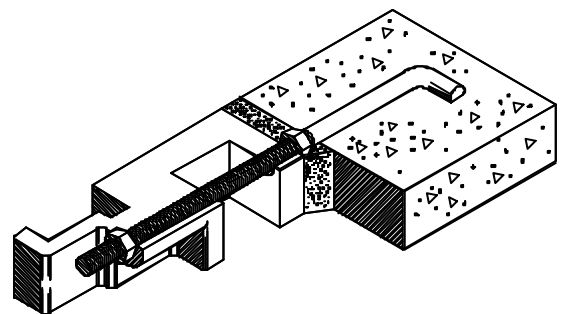
FLANGEBACK SLUICE GATE ON "J" ANCHORS



FLANGEBACK SLUICE GATE ON EXPANSION ANCHORS



EXTENDED FLANGEBACK SLUICE GATE WITH "J" ANCHORS PROJECTING THRU BACK FLANGE



EXTENDED FLANGEBACK SLUICE GATE WITH "J" ANCHORS THRU BOTH FLANGES