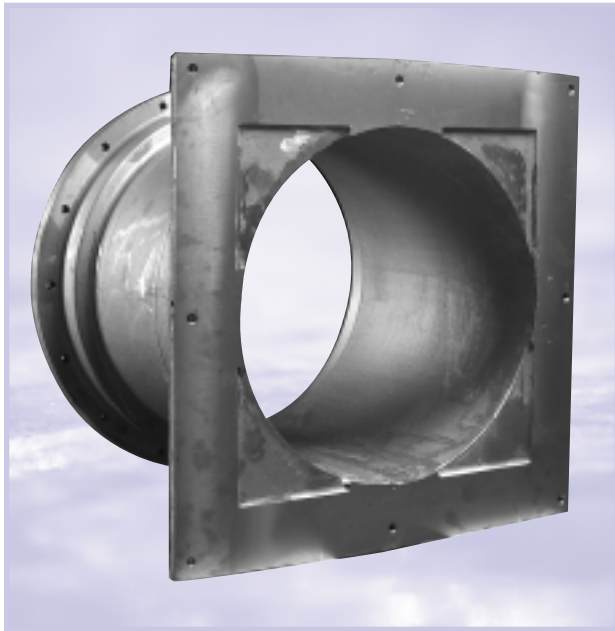


# Wall Thimbles



**Square flange with mechanical joint wall thimble**

## Features

- Cast Iron
- Machined Faces, Drilled, and Tapped for Gate Attachment
- Forms Opening Through Wall

## Description

A wall thimble is an entirely separate part from the gate proper and is made of cast iron. Its front face is machined and drilled for attachment of a gate frame. Its spigot runs parallel to the direction of flow and is of varying length depending upon the thickness of the concrete wall. Thimbles are embedded in concrete, preferably in the original pour, and are one-piece castings.

## Types of Thimbles

Thimble types derive their names from the shapes of their cross sections. The most frequently used thimble, and Hydro Gate's standard, is the F-type. The front machined face (top of the F) mates with the gate frame and holes are drilled and tapped to receive studs for holding the gate to the thimble. The small staff of the letter F acts as a cleat to hold the thimble in the wall under back pressure conditions. Except when gates are subjected to a very high unseating head, this cleat on the F is adequate to distribute the load evenly to the concrete. It also forms a water stop to prevent percolation of water around the thimble.

A thimble similar to the F is the E-type. Another full flange is added to the F and used when the back of the thimble is attached to an extension liner, another flange, a trash rack, or a flap gate. The E-type thimble may also be required when slide gates are subjected to very high unseating heads. (See figure 4-1, p. 31).

Mechanical joint thimbles are available in round openings for attachment of ductile iron pipe. Fasteners, packing, and follower rings are available from pipe suppliers. Another variation of the mechanical joint thimble is the push-on joint type (bell & spigot). These are seldom used due to the wide variation in sizes. It is to the user's advantage to stay with the most common type of thimbles, which are the F, E, and mechanical joint types. Other types of wall thimbles require special patterns that will increase the delivery lead time.

Hydro Gate furnishes, as standard, one or two vent holes at center of the barrel on square or rectangular thimbles 30 in. and wider to vent air out of entrapment zones. If grout holes on 2 ft. centers or thread holes for pressure grouting are desired, they should be specified by the owner or consultant.

Standard lengths are 12 in. to 18 in. and use of standard lengths will facilitate early delivery.

Thimbles are stamped "Top" and have the vertical centerline located to aid in alignment.

## Advantages

Because a thimble is an entirely separate part, it can be shipped prior to the gate so that it can be included in the construction forms before the concrete is poured.

A thimble has a machined flange for mounting of the gate. Special thimbles, such as E-type and the mechanical joint (MJ) thimbles, have surfaces for attaching pipe or equipment on the other end. Embedment of the thimble results in an iron-lined opening and a flat machined face for gate mounting. Thimbles provide a solid mounting for gates under high heads to resist the hydraulic and operating forces to which gates are subjected. Mounting a gate directly on concrete with anchor bolts and a sealing grout pad is not satisfactory for moderate and high heads, since the dynamic loads can cause fatigue failure of the grout. Reasonable care must be exercised in forming, aligning, and bracing of the thimble to prevent warping of the flange face during concrete placement.

When a thimble is used, nearly all anchor bolts are omitted. Only those anchor bolts needed above the gate opening to support the top ends of the gate are required. Problems associated with mounting a gate directly on concrete can be avoided with thimbles. These problems include:

1. The large amount of time required to place and secure anchor bolts in the forms;
2. The likelihood of placing anchor bolts in the wrong location; and
3. The need to realign anchors after removal of forms.

When a thimble is used and the gate arrives on the job, a good machined surface is already in place for attachment of the gate flange. Studs are used for attaching the gate frame to the thimble. These are quickly installed and the back of the machined frame is pulled up against the front face of the thimble. This simple procedure eliminates the time-consuming job of installing the gate on anchor bolts, aligning it, and grouting behind the frame.

A thimble permits the gate to be removed and transferred to another location for cleaning and painting. Future gate installations can be provided for by placing thimbles when the concrete is poured, then covering the openings with blind plate flanges until the gates themselves are required.

## Sealant

There are two options for sealing the joint between the face of the thimble and the back of the gate frame. The first option is to apply a mastic between the machined surfaces. Excess mastic is squeezed out as nuts on studs are uniformly tightened until the flanges are metal to metal. This thin film of mastic provides a watertight joint between the machined flanges. The second option is to use a 1/8-in. rubber gasket, but extra care must be taken to obtain uniform tightening of nuts on the studs. Otherwise, warping of the gate frame may result.

Cloth-inserted gaskets are not recommended, as the fabric has a tendency to rot.

Lead gaskets are not recommended because the thickness of the lead sheet is usually not uniform, and lead is not environmentally acceptable.

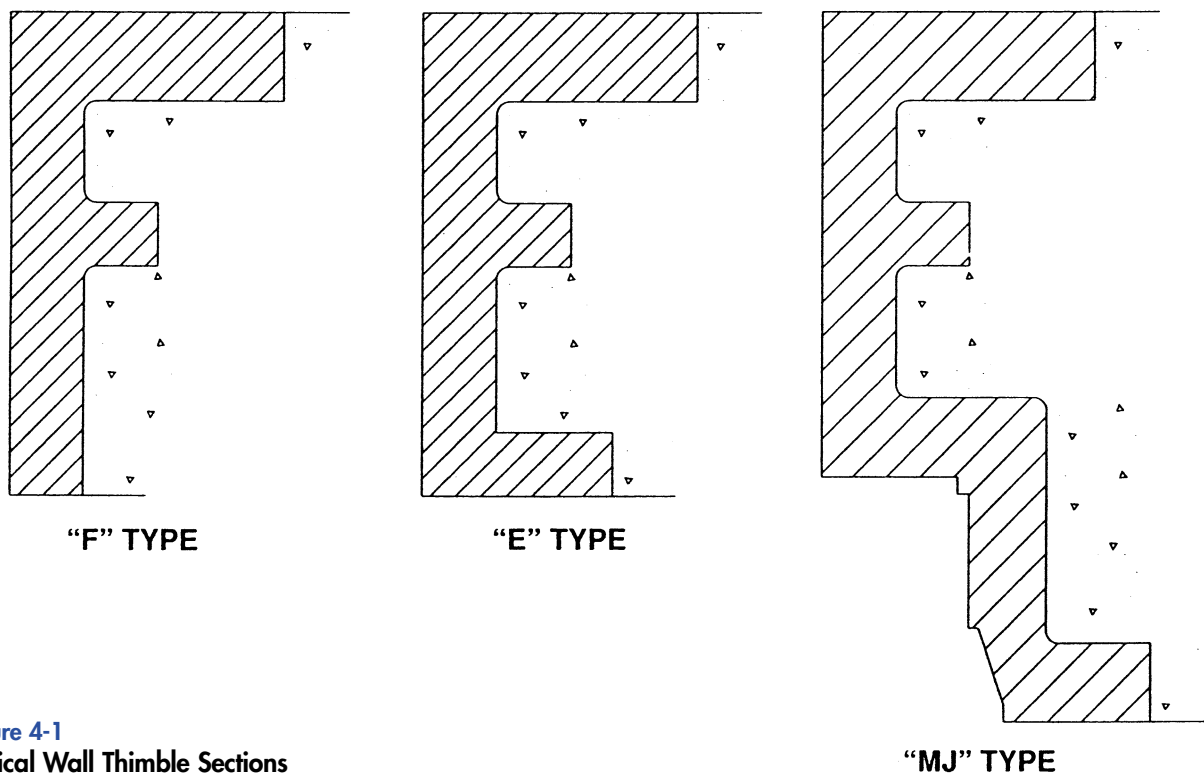
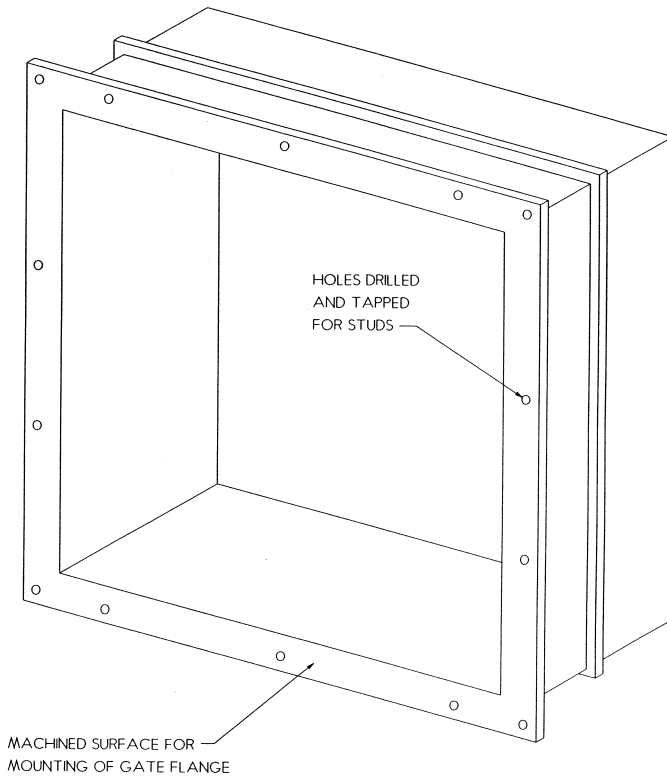


Figure 4-1  
Typical Wall Thimble Sections

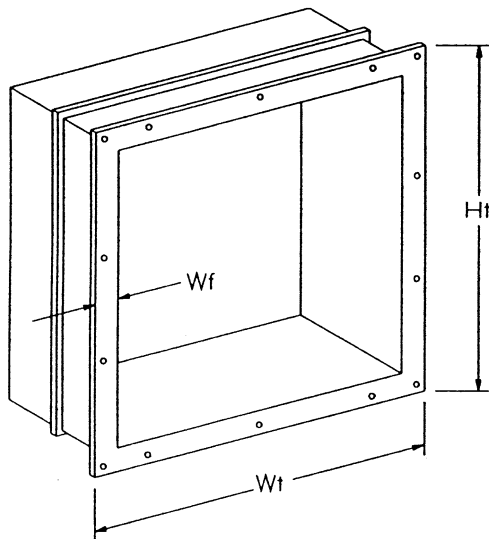
**Figure 4-2**  
Wall Thimble – “F” Type



## Types of Openings

### Square Flange – Square Opening and Rectangular Flange – Rectangular Opening

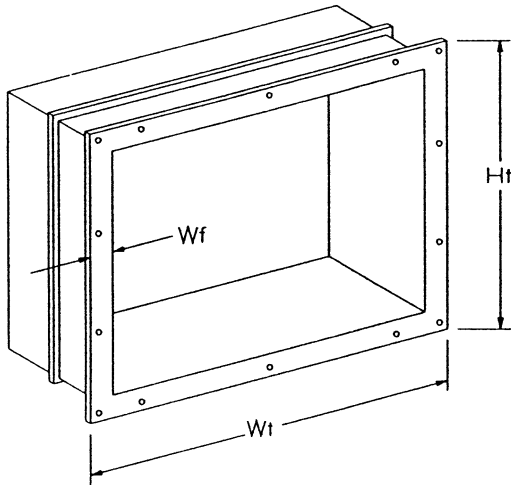
These thimbles, used with square or rectangular opening slide or flap gates, are commonly of the F-type, supplied in standard lengths of 12 in. and 18 in., depending on the gate size and wall thickness.



**Figure 4-3**  
Square Flange, Square Opening

## “F” Thimbles for Square Openings

Opening Size (In.)	Overall Width $W_T$ (In.)	Overall Height $H_T$ (In.)	Width of Flange $W_f$ (In.)
6 x 6	14.25	14.25	4.12
8 x 8	16.25	16.25	4.12
10 x 10	18.25	18.25	4.12
12 x 12	20.25	20.25	4.12
14 x 14	22.25	22.25	4.12
15 x 15	23.25	23.25	4.12
16 x 16	24.25	24.25	4.12
18 x 18	26.25	26.25	4.12
20 x 20	28.25	28.25	4.12
21 x 21	29.25	29.25	4.12
24 x 24	32.25	32.25	4.12
30 x 30	38.25	38.25	4.12
36 x 36	47.25	47.25	5.62
42 x 42	53.25	53.25	5.62
48 x 48	59.25	59.25	5.62
54 x 54	65.25	65.25	5.62
60 x 60	73.50	73.50	6.75
66 x 66	79.50	79.50	6.75
72 x 72	85.50	85.50	6.75
78 x 78	91.50	91.50	6.75
84 x 84	97.50	97.50	6.75
96 x 96	109.50	109.50	6.75
108 x 108	123.00	123.00	7.50
120 x 120	135.00	135.00	7.50
132 x 132	147.00	147.00	7.50
144 x 144	159.00	159.00	7.50



**Figure 4-4**  
**Rectangular Flange, Rectangular Opening**

## “F” Thimbles for Rectangular Openings

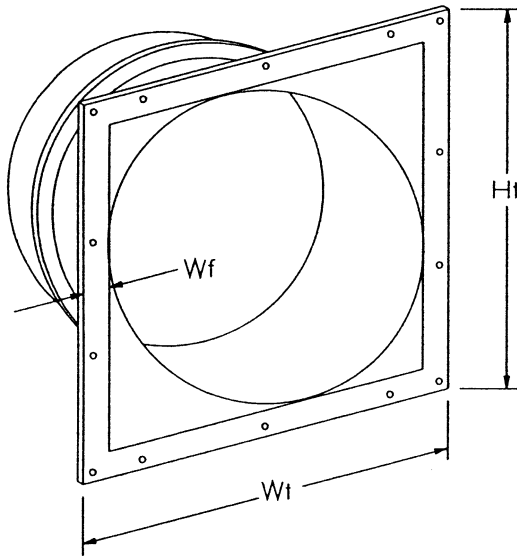
Opening Size (In.)	Overall Width $W_T$ (In.)	Overall Height $H_T$ (In.)	Width of Flange $W_F$ (In.)
12 x 18	20.25	26.25	4.12
18 x 12	26.25	20.25	4.12
18 x 24	26.25	32.25	4.12
18 x 30	26.25	38.25	4.12
18 x 36	29.25	47.25	5.62
24 x 18	32.25	26.25	4.12
24 x 30	32.25	38.25	4.12
24 x 36	35.25	47.25	5.62
24 x 42	35.25	53.25	5.62
24 x 48	35.25	59.25	5.62
30 x 18	38.25	26.25	4.12
30 x 24	38.25	32.25	4.12
30 x 36	41.25	47.25	5.62
30 x 42	41.25	53.25	5.62
30 x 48	41.25	59.25	5.62
30 x 60	43.50	73.50	6.25
36 x 18	47.25	29.25	5.62
36 x 24	47.25	35.25	5.62
36 x 30	47.25	41.25	5.62
36 x 42	47.25	53.25	5.62
36 x 48	47.25	59.25	5.62
36 x 54	47.25	65.25	5.62
36 x 60	49.50	73.50	6.75
36 x 72	49.50	85.50	6.75
36 x 84	49.50	97.50	6.75
42 x 30	53.25	41.25	5.62
42 x 36	53.25	47.25	5.62
42 x 48	53.25	59.25	5.62
42 x 60	55.50	73.50	6.75

Opening Size (In.)	Overall Width $W_T$ (In.)	Overall Height $H_T$ (In.)	Width of Flange $W_F$ (In.)
48 x 24	59.25	35.25	5.62
48 x 30	59.25	41.25	5.62
48 x 36	59.25	47.25	5.62
48 x 42	59.25	53.25	5.62
48 x 54	59.25	65.25	5.62
48 x 60	61.50	73.50	6.75
48 x 72	61.50	85.50	6.75
48 x 84	61.50	97.50	6.75
48 x 96	61.50	109.50	6.75
48 x 108	63.00	123.00	7.50
54 x 36	65.25	47.25	5.62
54 x 48	65.25	59.25	5.62
60 x 30	73.50	43.50	6.75
60 x 36	73.50	49.50	6.75
60 x 42	73.50	55.50	6.75
60 x 48	73.50	61.50	6.75
60 x 72	73.50	85.50	6.75
60 x 84	73.50	97.50	6.75
60 x 96	73.50	109.50	6.75
60 x 120	75.00	135.00	7.50
72 x 36	85.50	49.50	6.75
72 x 48	85.50	61.50	6.75
72 x 60	85.50	73.50	6.75
72 x 84	85.50	97.50	6.75
72 x 96	85.50	109.50	6.75
72 x 108	87.00	123.00	7.50
72 x 120	87.00	135.00	7.50
72 x 144	87.00	159.00	7.50
84 x 36	97.50	49.50	6.75
84 x 48	97.50	61.50	6.75
84 x 60	97.50	73.50	6.75
84 x 72	97.50	85.50	6.75
84 x 96	97.50	109.50	6.75
84 x 108	99.00	123.00	7.50
84 x 120	99.00	135.00	6.75
96 x 48	109.50	61.50	6.75
96 x 60	109.50	73.50	6.75
96 x 72	109.50	85.50	6.75
96 x 84	109.50	97.50	6.75
96 x 120	111.00	135.00	7.50
96 x 144	111.00	159.00	7.50
102 x 108	117.00	123.00	7.50
108 x 72	123.00	87.00	7.50
108 x 84	123.00	99.00	7.50
108 x 102	123.00	117.00	7.50
108 x 120	123.00	135.00	7.50
120 x 60	135.00	75.00	7.50
120 x 72	135.00	87.00	7.50
120 x 84	135.00	99.00	7.50
120 x 96	135.00	111.00	7.50
120 x 108	135.00	123.00	7.50
120 x 132	135.00	147.00	7.50
120 x 144	135.00	159.00	7.50
132 x 120	147.00	135.00	7.50
144 x 72	159.00	87.00	7.50
144 x 96	159.00	111.00	7.50
144 x 120	159.00	135.00	7.50

## Round Opening Thimbles

### Square Front Flange – Round Opening

Locations requiring round openings through the wall should utilize this type of thimble. The front face is cast with a square flange to receive the square gate. The opening through the thimble is round. All four corners are cast with webs of iron to convert from the square flange to the round opening. Four reinforcing ribs are cast on the back of the thimble to give the corners the stiffness and strength required. This reinforcing is embedded in the wall when the concrete is poured.



**Figure 4-5**  
Square Front Flange, Round Opening

Gate installation is simplified with the square flange. All studs are around the outside square where they are readily accessible. When a flange-back gate is used, and installation clearances are to be kept at a minimum, studs can be projected through the frame of the gate to reduce side and bottom clearances needed.

### Square Front Flange, Round Opening

*For all round openings with square, flat, or flange back slide gates.*

Opening Size (In.)	Overall Width $W_T$ (In.)	Overall Height $H_T$ (In.)	Width of Flange $W_F$ (In.)
6	14.25	14.25	4.12
8	16.25	16.25	4.12
10	18.25	18.25	4.12
12	20.25	20.25	4.12
14	22.25	22.25	4.12
15	23.25	23.25	4.12
16	24.25	24.25	4.12
18	26.25	26.25	4.12
20	28.25	28.25	4.12
21	29.25	29.25	4.12
24	32.25	32.25	4.12
30	38.25	38.25	4.12
36	47.50	47.50	5.62
39*	50.50	50.50	5.62
42	53.25	53.25	5.62
48	59.25	59.25	5.62
54	65.25	65.25	5.62
60	73.50	73.50	6.75
66	79.50	79.50	6.75
72	85.50	85.50	6.75
78	91.50	91.50	6.75
84	97.50	97.50	6.75
96	109.50	109.50	6.75
108	123.50	123.50	7.50

\*One Meter Diameter

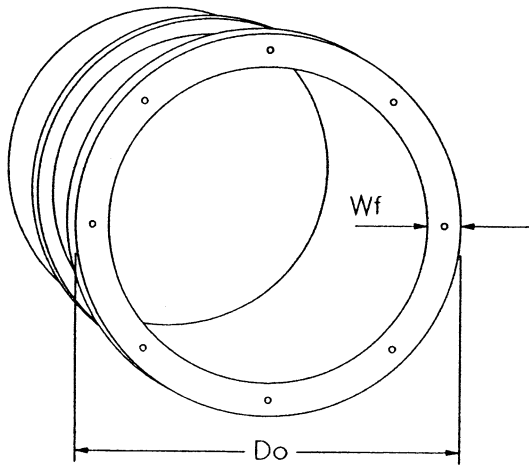
### Round Front Flange – Round Opening

This thimble consists of a round flange attached to the round opening portion of the thimble. It is recommended with round opening flap gates only. Openings for slide gates are best provided through use of square flange, round opening thimbles.

Round flange-back gates can be attached to round flange thimbles, but much larger clearances along the side and bottom of the gate and wall thimble are necessary.

## Round Front Flange, Round Opening

*For round flap gates and round back slide gates only.*



**Figure 4-6**  
Round Front Flange, Round Opening

Opening Size (In.)	Outside Diameter $D_o$ (In.)	Width of Flange $W_f$ (In.)
6	11.00	2.50
8	13.50	2.75
10	16.00	3.00
12	19.00	3.50
14	21.00	3.50
15	22.00	3.50
16	23.50	3.75
18	25.00	3.50
20	27.50	3.75
21	28.50	3.75
24	32.00	4.00
30	39.50	4.75
36	46.00	5.00
42	53.00	5.50
48	59.50	5.75
54	66.25	6.25
60	73.00	6.50
66	80.00	7.00
72	87.00	7.50
78	93.50	7.75
84	100.00	8.00
96	113.50	8.75
108	125.00	8.50

### Thimbles for Attaching Gate and Pipe

Hydro Gate can furnish two styles of special thimbles to facilitate attachment of incoming or outgoing pipelines from treatment plants. Both styles utilize the square front flange for attaching the square slide gate. The opening through the thimble and wall is converted to round to match the pipe. The other end of the E-type thimble has a round flange which can be drilled to match the commercially available flange for various cast iron, steel, or concrete pipes or pipe made from other materials. This round flange is drilled and tapped for ease of field assembly to the flange on the pipe. The length of the E thimble can be varied to match the thickness of the wall and thus avoid any other special concrete forming or adaptation.

### Mechanical Joint Thimbles

The mechanical joint end of the thimble is bored to receive ductile iron pipe, packing and followers. The end is drilled and tapped for studs.

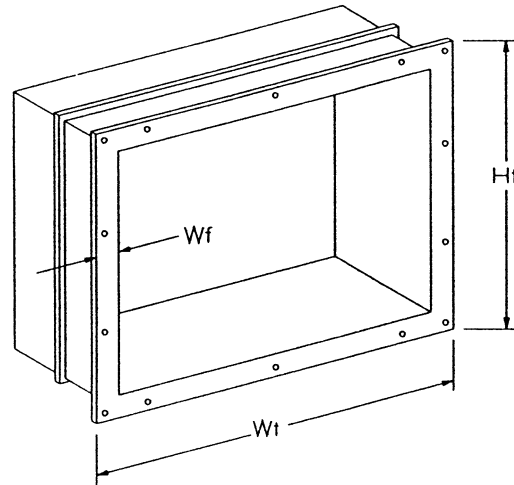
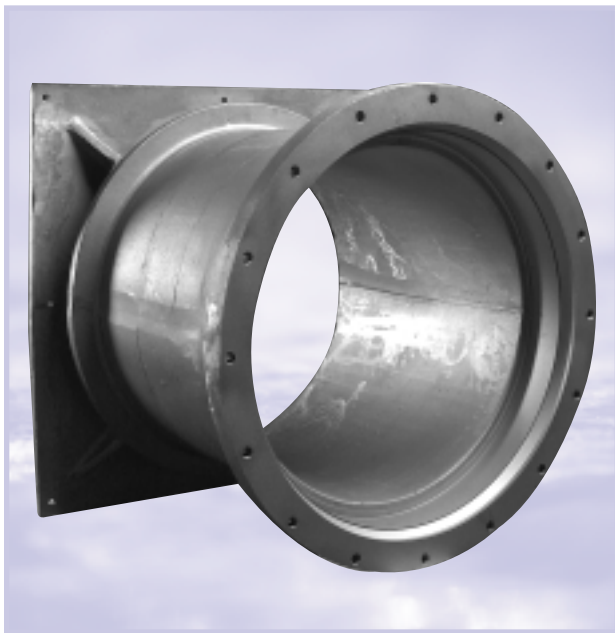


Figure 4-7  
Mechanical Joint



Square flange with mechanical joint wall thimble.

### Mechanical Joint

Opening Size (In.)	Overall Width $W_T$ (In.)	Overall Height $H_T$ (In.)	Width of Flange $W_F$ (In.)
6	14.25	14.25	4.12
8	16.25	16.25	4.12
10	18.25	18.25	4.12
12	20.25	20.25	4.12
14	22.25	22.25	4.12
15	23.25	23.25	4.12
16	24.25	24.25	4.12
18	26.25	26.25	4.12
20	28.25	28.25	4.12
21	29.25	29.25	4.12
24	32.25	32.25	4.12
30	38.25	38.25	4.12
36	47.50	47.50	5.62
39*	50.50	50.50	5.62
42	53.25	53.25	5.62
48	59.25	59.25	5.62

\*One Meter Diameter