Metraflex
for pipes in motion

Structural I-Beam Pipe Anchors

Load Rated, Pre-Engineered

When pressurized, all bellows type expansion joints exert tremendous anchor loads. Even "hard pipe" expansion loops impose significant loads.

Working with structural engineers and contractors, Metraflex has designed the I-Beam series of pipe anchors to fit almost every application.

The I-Beam series is a Load Rated, Pre-Engineered anchor designed specifically for pipe attachments to the building. The base plate can be welded in place or pre-drilled for bolting.

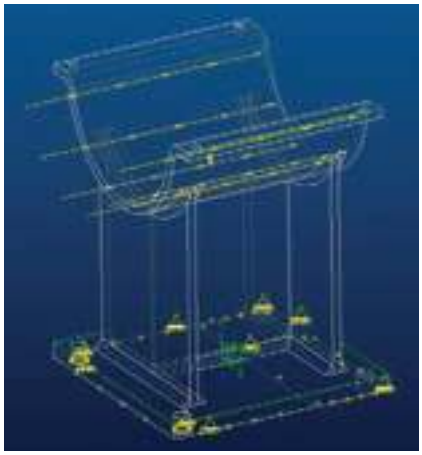

Figure 1

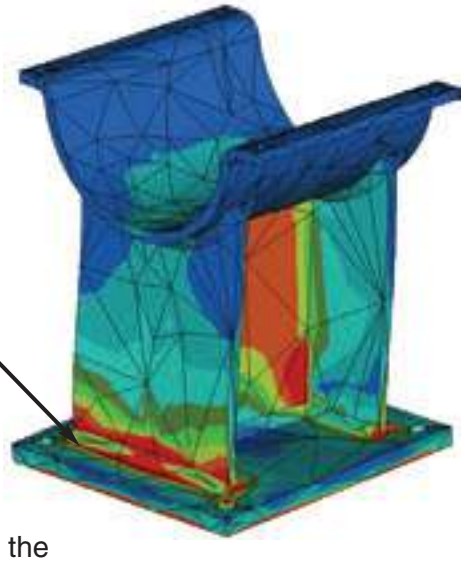

Figure 2

Design Analysis:
Von Mises stress was used to calculate the safety factor of the anchor with various load requirements. The highest stressed point was the base of the weld at the front edge of the I-Beam. This point is shown in Figure 2.

The Pro/MECHANICA® Finite Element Model (Figure 1) was used to determine the high stress areas on the anchor and calculate the safety factor. The model was constrained along the edges of the base plate to simulate the welding of the anchor to the existing structure. This method of constraint was chosen because of the unknown factors in the bolting of the anchor to different structures. All edges of the base plate were constrained in XYZ translation. The model was meshed with "P" elements, which also included the weld geometry.

Choosing the Right Anchor:
All expansion joint manufacturers can provide you with the effective area of their bellows and its spring rate. Using this formula calculate the anchor load expected, then select the appropriate anchor from the selection on drawing PAI-04.

$$\text{Bellows Thrust Anchor Load} = \text{Effective Area of Joint} \times \text{Max. System Pressure*} + \left(\text{Spring Rate} \times \text{Actual Movement}\right)$$

Sample calculation for a 6 inch Metraflex model "Metragator" externally pressurized expansion joint. Maximum pressure of 135 psi* and 3.25 inches of movement. Add to the above weight of pipe, media, insulation and frictional forces.

$$\text{Bellows Thrust Anchor Load} = 58.9\ \text{in}^2 \times 135\ \text{psi*} + (269\ \text{lbs/in} \times 3.25\ \text{in})$$

8,825.75 lbs**

*Use your systems max test pressure!

**More than your structure can handle? See the Metraloop section of our website.

For complete information, visit us at: www.metraflex.com

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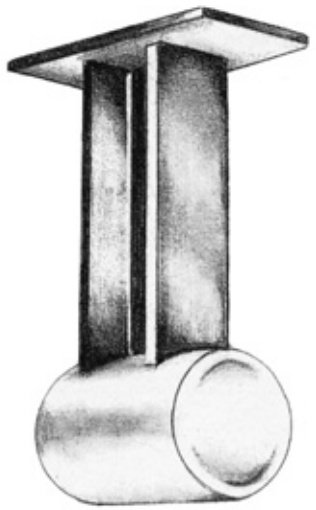
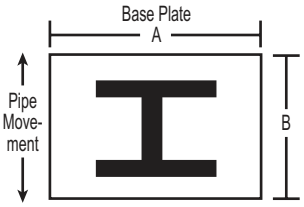
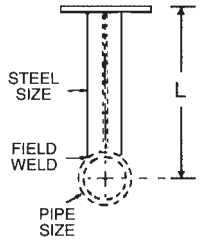
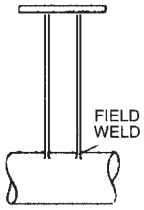


STRUCTURAL I-BEAM ANCHORS



Material . . . . . Steel
Finish . . . . . Painted
Style W Designed for FIELD WELDING to pipe





MIN PIPE DIA.	ANCHOR SIZE	I-BEAM SIZE	"L" DIM. & MAX. ANCHOR FORCE (KIPS)					BASE PLATE DIM	
			12"	18"	24"	36"	48"	DIM A (WIDTH)	DIM B (LENGTH)
2	PAI-1	S3X5.7	1.397	0.951	0.732	0.497	0.371	9	9
2.5	PAI-2	S4X7.7	2.338	1.545	1.149	0.76	0.565	9	10
3	PAI-3	S5X14.75	3.211	2.15	1.617	1.08	0.812	9	11
3	PAI-4	S6X12.5	4.256	2.945	2.293	1.586	1.229	10	12
4	PAI-5	W8X10	5.143	3.404	2.535	1.678	1.249	12	14
4	PAI-6	W12X14	10.183	7.089	5.596	3.919	3.072	10	18
6	PAI-7	W6X20	7.467	4.887	3.6	2.357	1.733	14	12
6	PAI-8	W8X24	13.388	9.371	7.366	5.137	4.015	14	14
6	PAI-9	W12X26	18.846	13.178	10.341	7.189	5.629	12	18
8	PAI-10	W14X30	24.545	16.444	12.393	8.388	6.385	13	20
8	PAI-11	W16X36	30.912	21.165	16.289	11.135	8.558	13	22
10	PAI-12	W10X49	31.101	22.319	17.928	12.745	10.153	16	16
10	PAI-13	W12X58	42.936	30.298	23.979	16.823	13.245	16	18
10	PAI-14	W14X74	52.225	36.957	29.319	20.595	16.236	16	20
10	PAI-15	W16X67	62.308	41.328	30.838	20.453	15.261	16	22
16	PAI-16	W14X90	63.399	53.456	37.304	23.703	16.802	20	20

Quantity	Length	Pipe Size	Anchor Size	KIPS	Model* No.	Notes

*** Model Numbers = Anchor Size - Style - Length - Pipe Size — i.e. PAI 7 w 36 6**

CUSTOMER _____

PROJECT _____

ENGINEER _____

ARCHITECT _____

PRO. OR P.O. NO _____

Metraflex®
for pipes in motion
Chicago, IL

DESCRIPTION:

STRUCTURAL I-BEAM ANCHORS

DRAWN BY:	DATE:	DRAWING NO:
JRR	**1-8-04**	**PAI-04A**