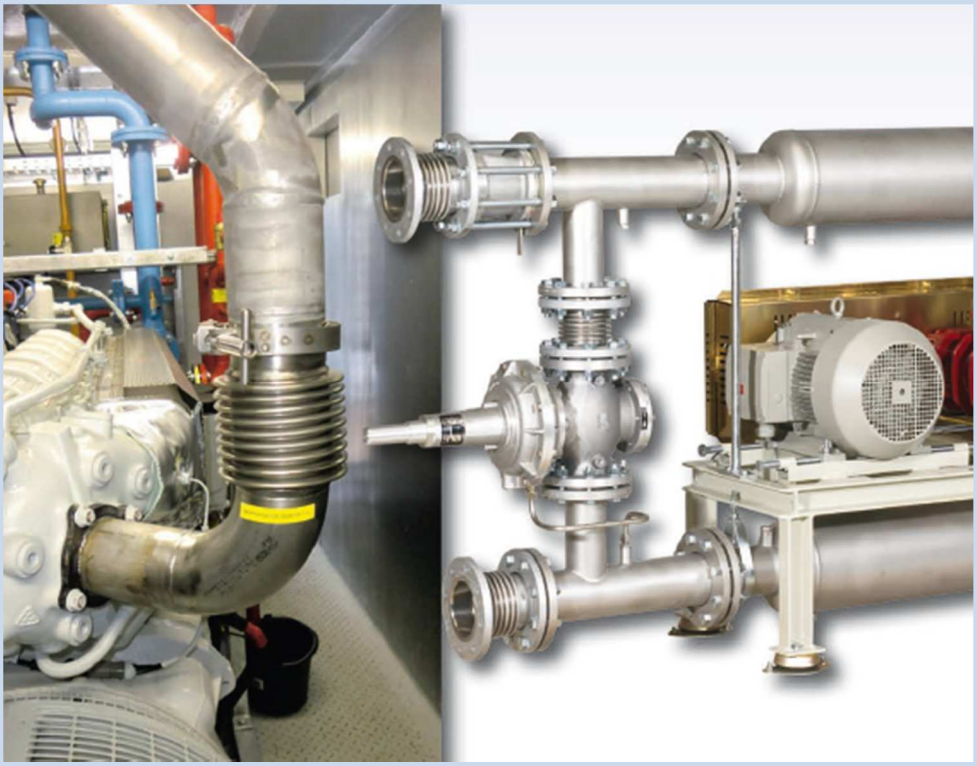
P & T

Piping Technology



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SECTION A

STRUCTURAL ATTACHMENT ELEMENTS

CLAMPS

THREADED ACCESSORIES

ANCHOR BOLTS

TRAPEZES

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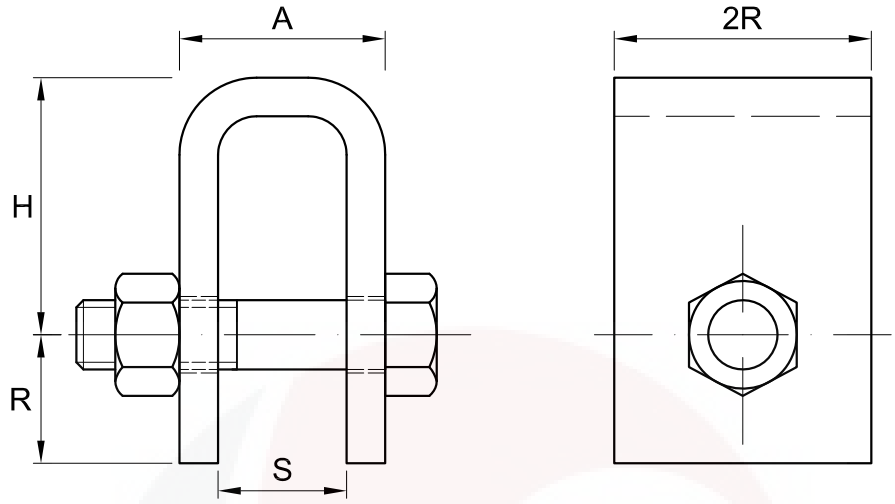
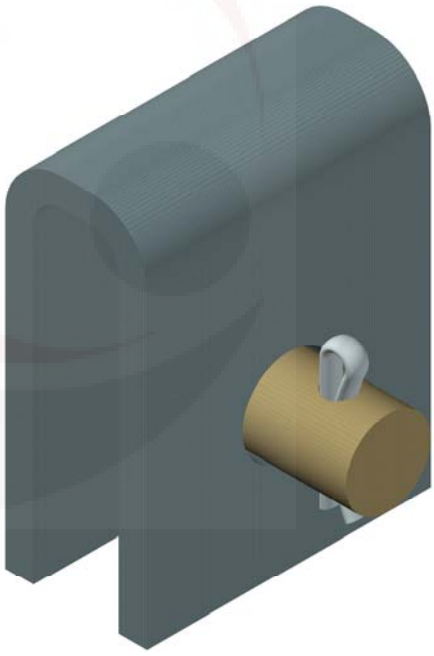
BEAM ATTACHMENT

FIG.: 2100

SECTION A
1





APPLICATION: Upper joint welded to structure; connects with forged eyenut fig. 2333 or with B type variable springs or equivalent upper-connection constant springs.

ORDER FORM:
- Name.
- Figure.
- Number or associated Metric.

MATERIAL: Carbon steel.

No.	Assoaciated ROD	A (mm)	H (mm)	R (mm)	S (mm)	BOLT OR PIN	WEIGHT (Kg)	MAX. REC. LOAD (Kg)
1	M12	32	40	20	20	M12	0,4	575
2	M16	32	55	25	20	M16	0,5	1200
3	M20	46	60	30	30	M20	1	1800
4	M24	55	60	35	35	M24	1,5	2500
5	M30	69	80	40	45	Ø30	3	4100
6	M36	74	95	50	50	Ø35	4,5	6500

N.B.: For siezes greater than M36, refer to Fig. 2101.

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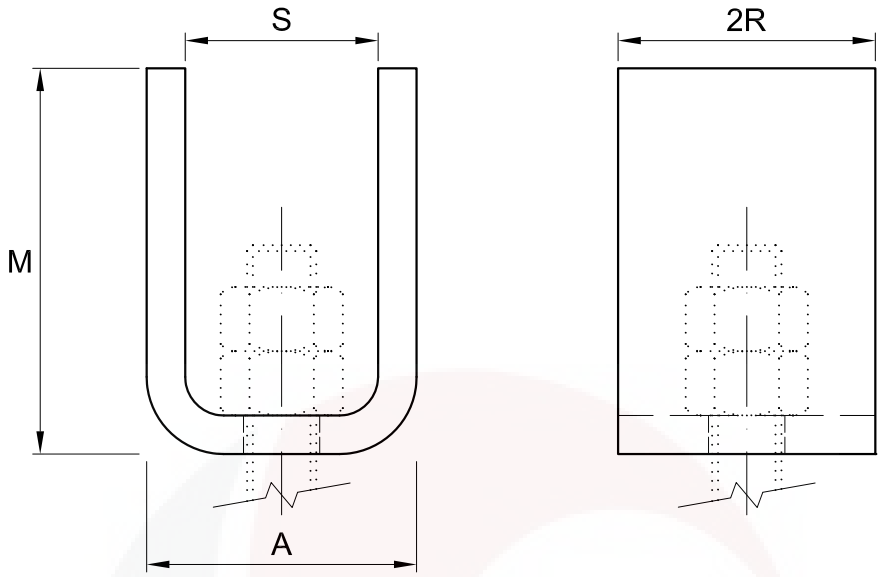
INVERTED BEAM ATTACHMENT

FIG.: 2100 INV	SECTION A 2



APPLICATION: Upper joint welded to structure; connects directly with the hanging rod.

ORDER FORM:
- Name.
- Figure.
- Number or associated Metric.

MATERIAL: Carbon steel.

No.	Associated ROD	A (mm)	2R (mm)	M (mm)	S (mm)	WEIGHT (Kg)	MAX. REC. LOAD (Kg)
1	M12	42	40	60	30	0,3	575
2	M16	52	50	80	40	0,4	1200
3	M20	66	60	90	50	0,8	1800
4	M24	70	70	100	50	1,3	2500
5	M30	89	80	130	65	2,6	4100
6	M36	104	100	150	80	4	6500

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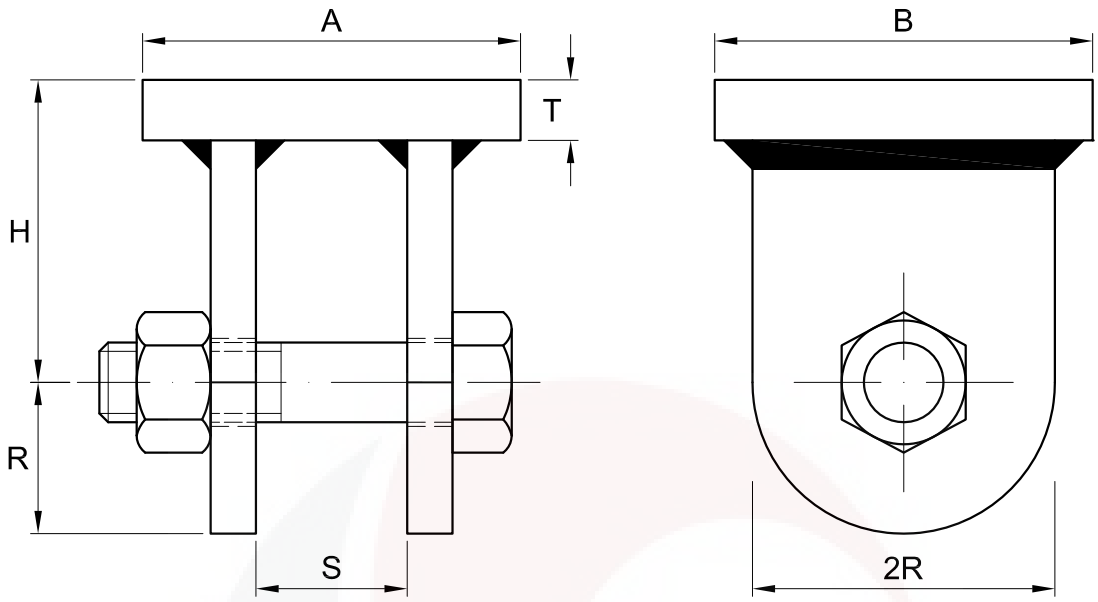
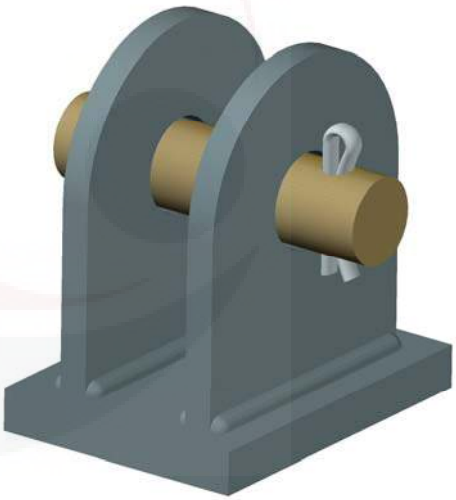
BEAM ATTACHMENT

FIG.: 2101

SECTION A 3



APPLICATION: Upper joint welded to structure; connects with the hanging rod by means of a forged eye nut fig. 2333. It can be connected with B type variable springs or equivalent upper-connection constant springs, or alternatively with special joints to the pipe or equipment.



ORDER FORM:

- Name.
- Figure.
- Number or associated Metric.

MATERIAL: Carbon steel. Can be manufactured in other qualities, to order.

N.B.: For sizes No. 1 to No. 6 (M12 to M36), we recommend referring to fig. 2100 (more economical).

No.	Associated ROD	A (mm)	B (mm)	H (mm)	R (mm)	S (mm)	T (mm)	BOLT OR PIN	WEIGHT (Kg)	MAX. REC. LOAD (Kg)
1	M12	50	50	40	20	20	8	M12	0,4	575
2	M16	50	65	55	25	20	10	M16	0,7	1200
3	M20	65	80	60	30	30	10	M20	1,4	1800
4	M24	80	90	60	35	35	12	M24	2	2500
5	M30	90	100	80	40	40	15	Ø30	3,5	4100
6	M36	90	120	95	50	40	15	Ø35	5,5	6500
7	M42	110	140	110	60	50	20	Ø40	7,6	8500
8	M48	125	150	115	65	50	25	Ø45	11	11000
9	M56	125	180	135	75	50	25	Ø50	14	15000
10	M64	140	200	155	85	50	30	Ø55	22	20000

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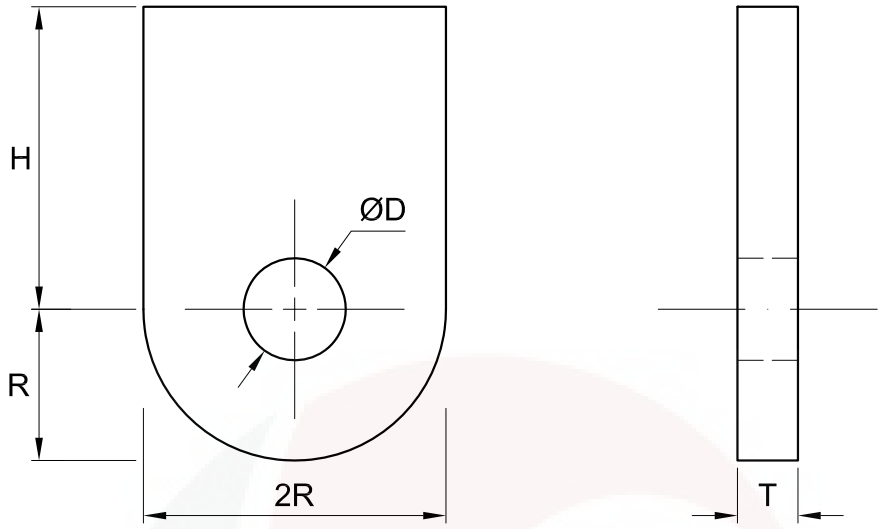
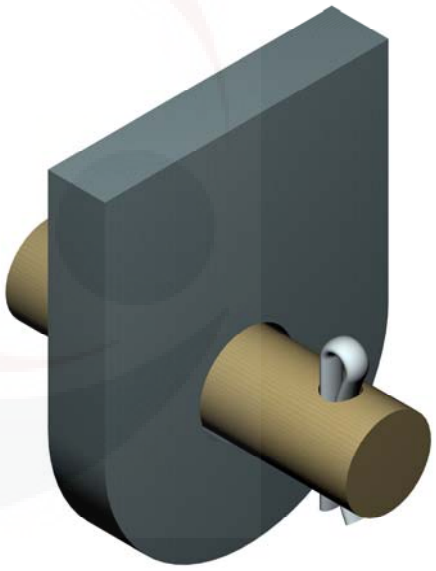
LUG

FIG.: 2105

SECTION A
4



APPLICATION: Upper joint welded to structure; connects with the hanging rod by means of a forged clevis. Can also connect with C type springs. It can be used a lug welded to the uninsulated pipe.



ORDER FORM:

- Name.
- Figure.
- Number or associated Metric.

MATERIAL: Carbon steel. Can be manufactured in other qualities, to order.

No.	Associated ROD	H (mm)	R (mm)	ØD (mm)	T (mm)	WEIGHT (Kg)	MAX. REC. LOAD (Kg)
1	M12	40	20	13,5	8	0,2	575
2	M16	55	25	17,5	10	0,3	1200
3	M20	60	30	21,5	12	0,5	1800
4	M24	60	35	26	15	0,8	2500
5	M30	80	40	33	20	1,7	4100
6	M36	95	50	38	25	2,8	6500
7	M42	110	60	43	25	3,5	8500
8	M48	115	65	48	30	4,8	11000
9	M56	135	75	53	35	8	15000
10	M64	155	85	58	40	11,5	20000

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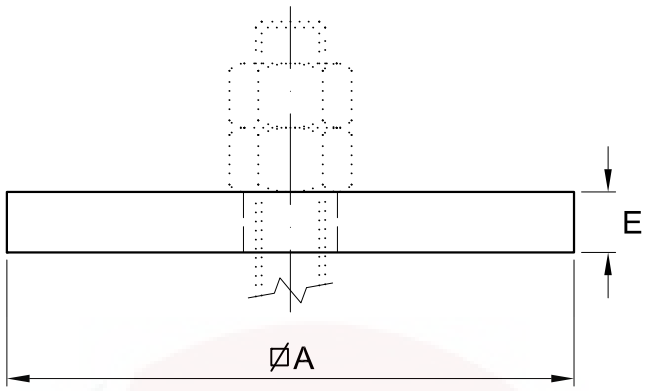
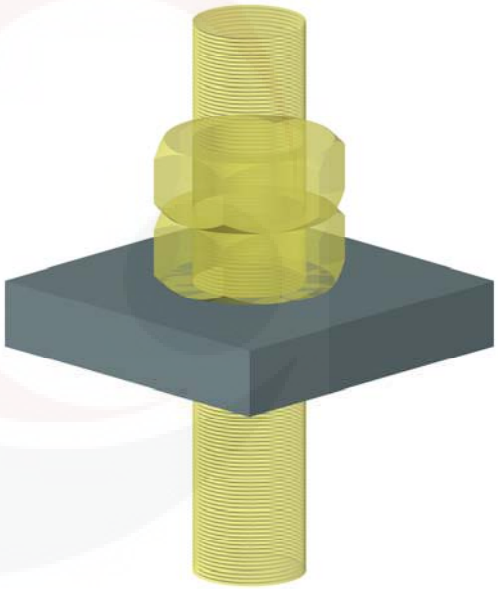
SQUARE SUPPORT PLATE

FIG.: 2110

SECTION A
5





APPLICATION: As a support on hanging rods, both upper and lower. Can be produced in different dimensions, to order.

ORDER FORM:
- Name.
- Figure.
- Number or associated Metric.

MATERIAL: Carbon steel. Can be manufactured in other qualities, to order.

No.	Associated ROD	⌀ A (mm)	E (mm)	WEIGHT (Kg)	MAX. REC. LOAD (Kg)
1	M12	75	8	0,35	575
2	M16	75	10	0,45	1200
3	M20	100	10	0,75	1800
4	M24	100	12	0,9	2500
5	M30	120	15	1,65	4100
6	M36	120	15	1,6	6500
7	M42	130	20	2,5	8500
8	M48	140	20	2,9	11000
9	M56	150	25	4	15000
10	M64	150	25	3,8	20000

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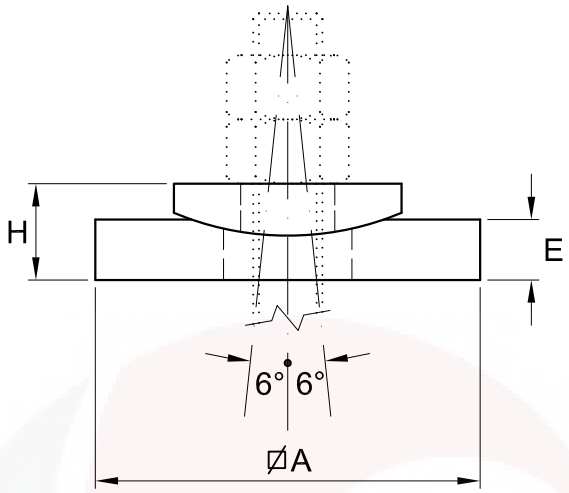
SPHERICAL SUPPORT PLATE

FIG.: 2111

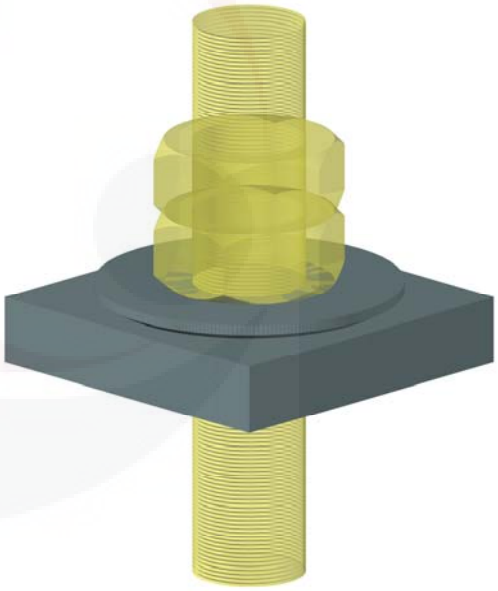
SECTION A
6



APPLICATION: Support on piping hangers where horizontal movements are significant (6º maximun). The base can be produced to order, with different dimensions.

ORDER FORM:
- Name.
- Figure.
- Number or associated Metric.

MATERIAL: Carbon steel. Can be manufactured in other qualities, to order.



No.	Associated ROD	⌀ A (mm)	E (mm)	H (mm)	WEIGHT 2111 (Kg)	MAX. REC. LOAD (Kg)
1	M12	50	8	12	0,2	575
2	M16	60	10	15	0,35	1200
3	M20	70	12	17	0,6	1800
4	M24	80	15	21	0,9	2500
5	M30	100	20	26	1,8	4100
6	M36	100	20	27	1,8	6500
7	M42	120	25	33	3,1	8500
8	M48	120	25	34	3,1	11000
9	M56	160	30	42	6,4	15000
10	M64	200	30	42	10	20000

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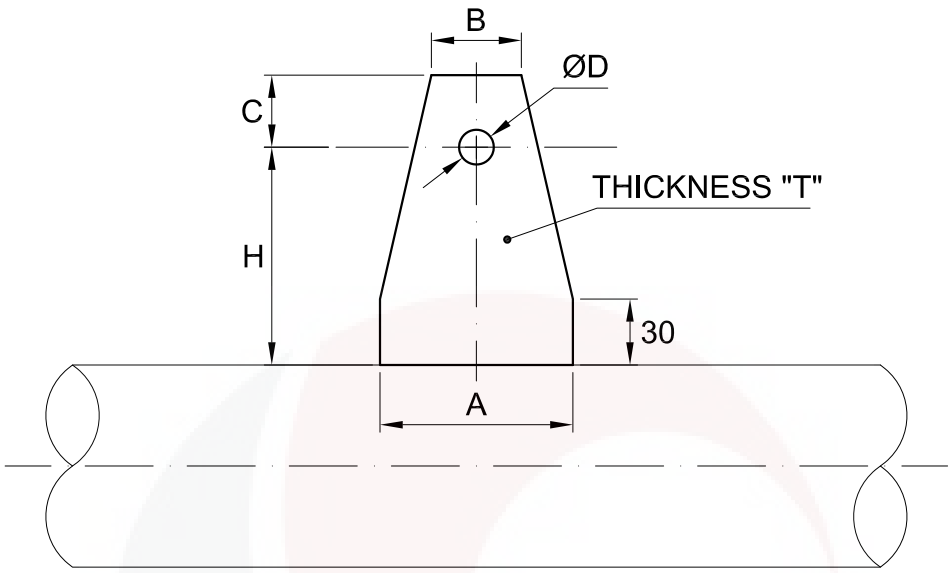
LUG FOR HORIZONTAL PIPE

FIG.: 2200

SECTION A 7



No.	Associated ROD	A (mm)	B (mm)	C (mm)	ØD (mm)	H (mm)	T (mm)	WEIGHT (Kg)	MAX. REC. LOAD (Kg)
1	M12	60	35	20	13,5	110	8	0,4	575
2	M16	70	45	25	17,5	120	10	0,65	1200
3	M20	90	55	35	21,5	120	12	1,05	1800
4	M24	120	70	40	26	130	15	1,9	2500
5	M30	140	80	50	32	130	20	3,1	4100
6	M36	150	90	55	37	140	25	4,6	6500
7	M42	165	110	65	42	150	25	5,8	8500
8	M48	170	115	70	48	160	25	7,2	11000

APPLICATION: For welding to horizontal pipes with or without insulation. In the case of piping with insulation, fig. 2105 lug can be used. This can also be connected to type C springs.

ASSEMBLY: Hang by forged clevis and rod.

ORDER FORM:
- Name.
- Figure.
- Number or associated Metric.
- Insulation Thickness.

MATERIAL: Compatible with the quality of the piping. Load limitations due to high temperature are the same as those indicated on sheet A-20.

N.B.: They can be manufactured with other "H" dimensions to adapt them to any insulation size.

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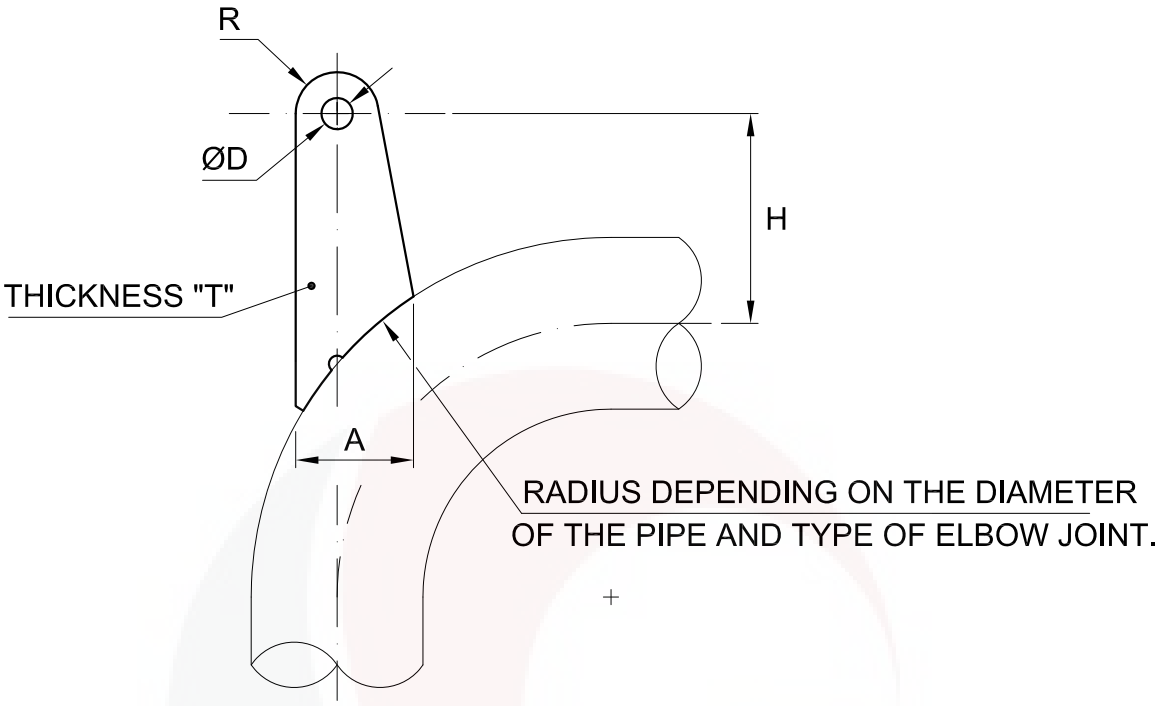
LUG FOR ELBOW

FIG.: 2201

SECTION A 8



No.	Associated ROD	A (mm)	ØD (mm)	H (mm)	R (mm)	T (mm)	MAX. REC. LOAD (Kg)
1	M12	55	13,5	150	20	8	575
2	M16	65	17,5	150	25	10	1200
3	M20	90	21,5	160	35	12	1800
4	M24	105	26	160	40	15	2500
5	M30	130	32	175	50	20	4100
6	M36	145	37	175	55	25	6500
7	M42	160	42	200	65	25	8500
8	M48	200	47	200	80	25	11000

APLICATION: For welding to any type of elbow joint or piping bend, with or without insulation. Can be coupled to any diameter or type of elbow joint.

ASSEMBLY: Hang by forged clevis and rod.

ORDER FORM:

- Name.
- Figure.
- Number or associated Metric.
- Diameter.
- Type of elbow.
- Insulation Thickness.

MATERIAL: Compatible with the quality of the piping. Load limitations due to high temperature are the same as those indicated on sheet A-20.

N.B.: Level "H" is equipped for a maximum insulation of 100 mm. For greater insulation thicknesses, this value is increased as a result.

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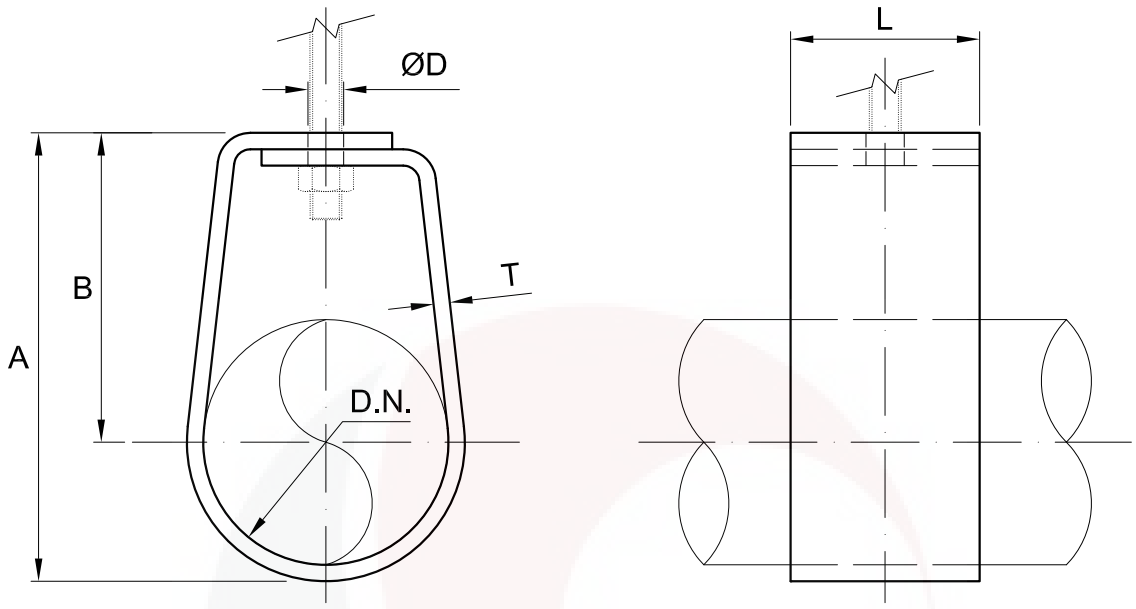
RING CLAMP

FIG.: 2220

SECTION A 9



No.	D.N.	A (mm)	B (mm)	ØD (mm)	FLAT BAR		WEIGHT (Kg)	MAX. REC. LOAD (Kg)
					L (mm)	T (mm)		
1	1/2"	59	46	11,5	25	3	0,11	275
2	3/4"	68	52	11,5	25	3	0,12	275
3	1"	75	55	11,5	30	4	0,22	275
3 a	1 1/4"	90	65,5	11,5	30	4	0,25	275
4	1 1/2"	98	70	11,5	30	4	0,27	275
5	2"	110	76	11,5	30	4	0,30	275
6	2 1/2"	139	98	13,5	35	4	0,43	450
7	3	156	108	13,5	35	4	0,48	450
8	4"	185	124	17,5	35	4	0,60	550
8 a	5"	216	142	17,5	35	4	0,70	550
9	6"	251	162	21,5	40	4	0,90	750
10	8"	306	192	21,5	50	4	1,35	850

APLICATION: To support uninsulated pipes. Makes it possible to adjust rod length.

ORDER FORM:

- Name.
- Figure.
- Pipe diameter.

MATERIAL: Carbon steel.

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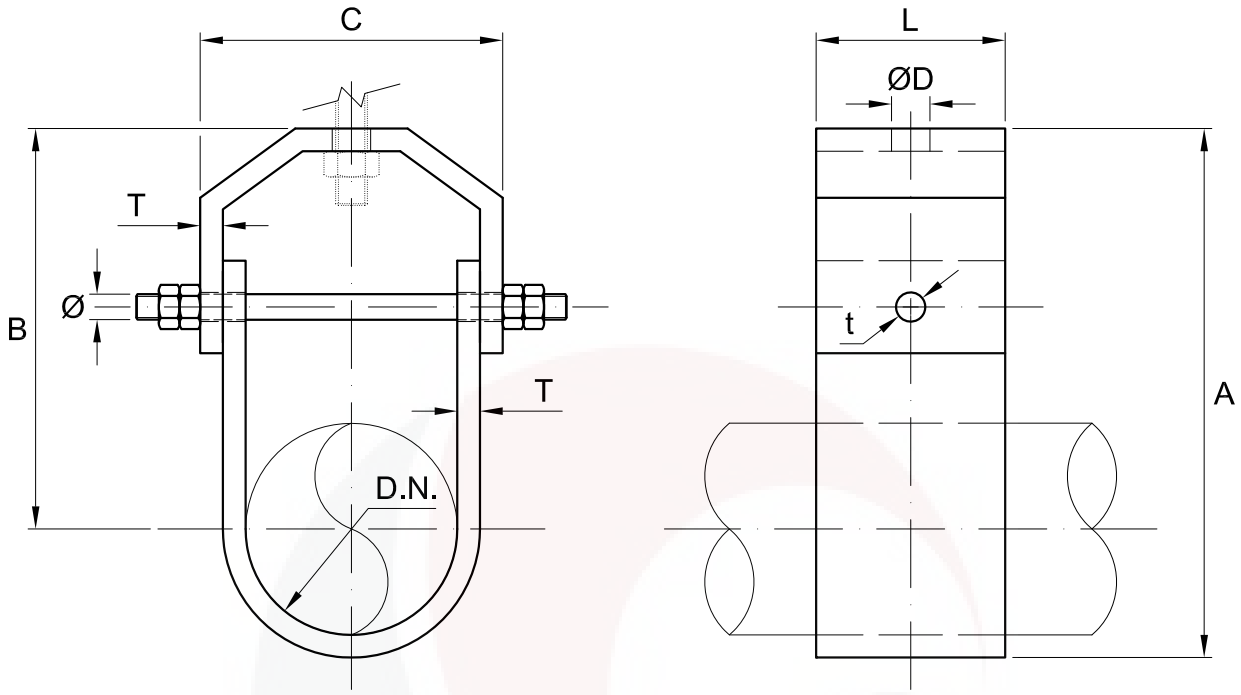
P & T Piping Technology

CLEVIS CLAMP

FIG.: 2221

SECTION A
10



No.	D.N.	A (mm)	B (mm)	C (mm)	ØD (mm)	FLAT BAR		Ø (mm)	t (mm)	WEIGHT (Kg)	MAX. REC. LOAD (Kg)
						L (mm)	T (mm)				
1	1/2"	75	61	34	11,5	25	3	M8	9,5	0,15	275
2	3/4"	92	75	39	11,5	25	3	M8	9,5	0,18	275
3	1"	99	79	46	11,5	25	3	M8	9,5	0,19	275
3 a	1 1/4"	109	84	55	11,5	25	3	M8	9,5	0,21	275
4	1 1/2"	118	90	61	11,5	25	3	M8	9,5	0,23	275
5	2"	128	95	73	11,5	25	3	M8	9,5	0,25	275
6	2 1/2"	155	112	95	13,5	35	5	M10	11,5	0,7	500
7	3	170	120	110	13,5	35	5	M10	11,5	0,8	500
8	4"	202	139	135	17,5	35	5	M10	11,5	1	650
8 a	5"	233	157	162	17,5	35	5	M12	13,5	1,1	650
9	6"	263	173	189	21,5	40	5	M12	13,5	1,5	900
10	8"	326	211	240	25,5	45	5	M16	17,5	2,1	900

APPLICATION: To support uninsulated pipes. Makes it possible to adjust rod length.

ORDER FORM:
- Name.
- Figure.
- Pipe diameter.

MATERIAL: Carbon steel.

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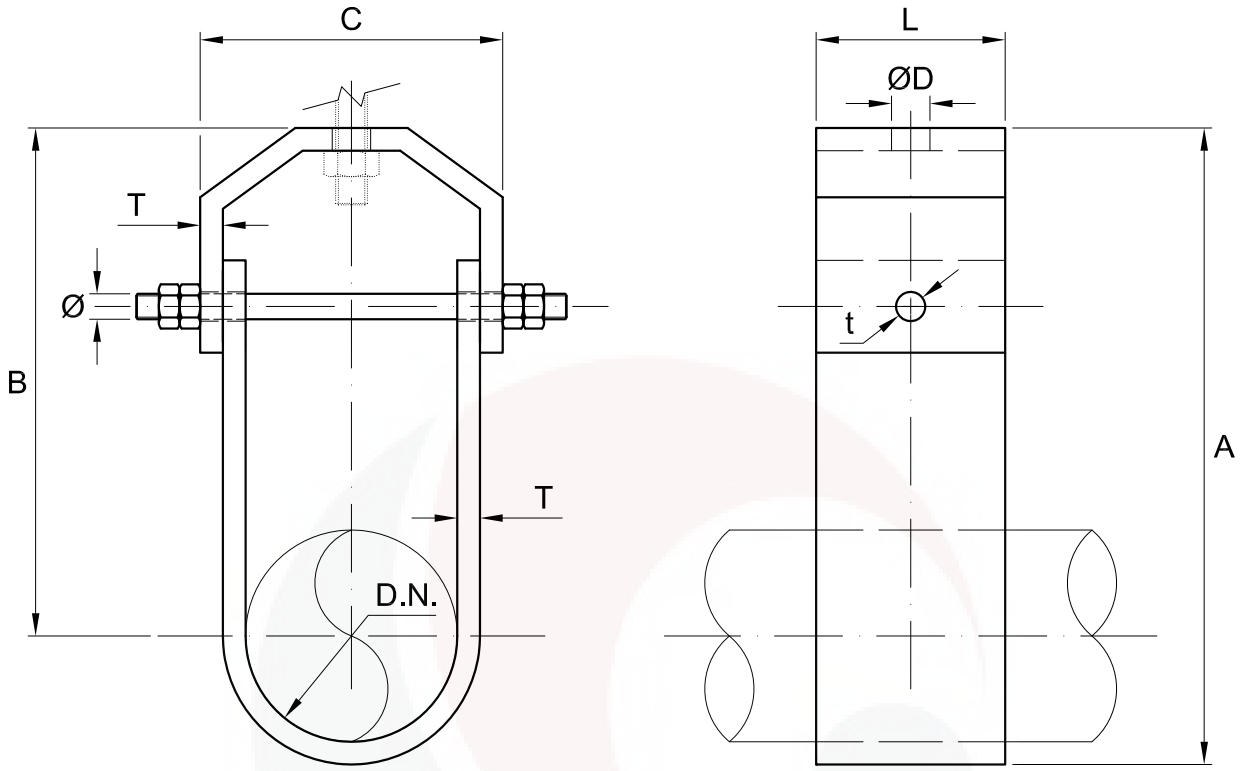
LONG CLEVIS CLAMP

FIG.: 2222

SECTION A 11



No.	D.N.	A (mm)	B (mm)	C (mm)	ØD (mm)	FLAT BAR L (mm)	FLAT BAR T (mm)	Ø (mm)	t (mm)	WEIGHT (Kg)	MAX. REC. LOAD (Kg)
1	1/2"	125	111	34	11,5	25	3	M8	9,5	0,21	275
2	3/4"	142	125	39	11,5	25	3	M8	9,5	0,23	275
3	1"	149	129	46	11,5	25	3	M8	9,5	0,25	275
3 a	1 1/4"	159	134	55	11,5	25	3	M8	9,5	0,27	275
4	1 1/2"	168	140	61	11,5	25	3	M8	9,5	0,29	275
5	2"	228	195	73	11,5	25	3	M8	9,5	0,4	275
6	2 1/2"	255	212	95	13,5	35	5	M10	11,5	1	500
7	3	270	220	110	13,5	35	5	M10	11,5	1,1	500
8	4"	302	239	135	17,5	35	5	M10	11,5	1,25	650
8 a	5"	333	257	162	17,5	35	5	M12	13,5	1,4	650
9	6"	363	273	189	21,5	40	5	M12	13,5	1,75	900
10	8"	426	311	240	25,5	45	5	M16	17,5	2,4	900

APPLICATION: To support uninsulated pipes. Makes it possible to adjust rod length.

ORDER FORM:

- Name.
- Figure.
- Pipe diameter.

MATERIAL: Carbon steel.

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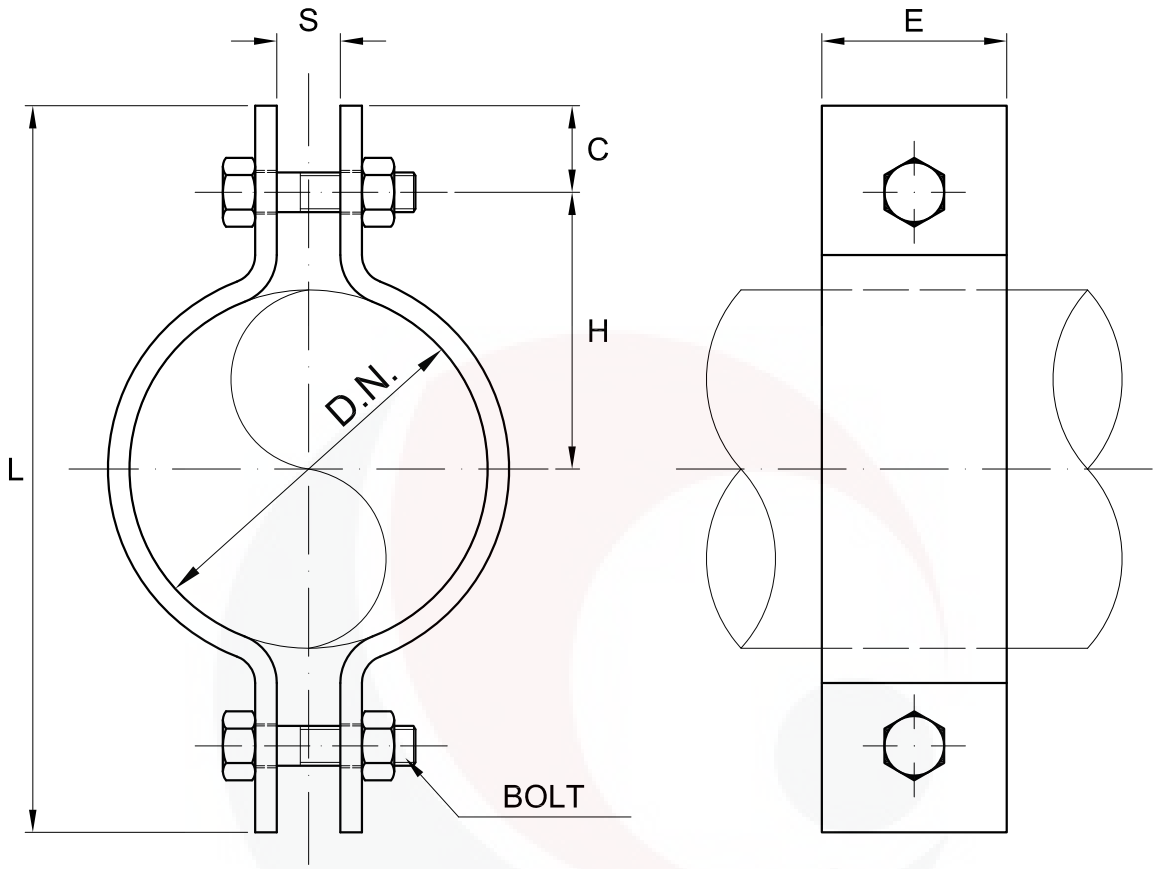
0	21/09/81	INFORMATION	JRS	EAR

P & T Piping Technology

TWO-BOLT CLAMP

FIG.: 2224

SECTION A 12



APPLICATION: For supporting uninsulated piping. Also use on support pipe shoes.

ASSEMBLY: Hang by forged eye nut and rod.

MANUFACTURE: Light series, normal series and heavy series. For loads above those considered, special series will be manufactured.

MATERIAL: Carbon steel, up to 380°C pipe temperature.
Alloy steel type 0.5Mo, for pipe temperature up to 500°C.
Alloy steel type 1Cr-0.5Mo, for pipe temperature up to 540°C.
Alloy steel type 2.25Cr-1Mo, for pipe temperature up to 575-600°C.
Can also be manufactured in stainless steel.

ORDER FORM:

- Name.
- Figure.
- Series.
- Pipe diameter.

N.B.: Can be manufactured in other diameters, special or larger, than those indicated.

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1	17/01/85	INFORMATION	JRS	EAR

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TWO-BOLT CLAMP

FIG.: 2224 L

SECTION A 13

LIGHT SERIES

No.	D.N.	C (mm)	H (mm)	L (mm)	E (mm)	S (mm)	BOLT	WEIGHT (Kg)	MAX. REC. LOAD (Kg)
1	1/2"	13	30	86	25	15	M8	0,12	200
2	3/4"	13	33	92	25	15	M8	0,18	200
3	1"	13	36	98	30	15	M8	0,22	200
3 a	1 1/4"	13	40	106	30	15	M8	0,28	200
4	1 1/2"	16	45	122	30	15	M10	0,4	300
5	2"	16	51	134	30	15	M10	0,45	300
6	2 1/2"	19	62	162	40	20	M12	0,9	425
7	3"	19	70	178	40	20	M12	1,1	425
8	4"	25	85	220	50	25	M16	1,6	500
8 a	5"	25	100	250	50	25	M16	2	500
9	6"	25	118	286	50	25	M16	2,7	600
10	8"	25	144	338	50	25	M16	3,1	600
11	10"	32	182	428	60	25	M20	5,5	900
12	12"	32	208	480	60	25	M20	6,3	900
13	14"	32	232	528	70	25	M20	9,5	1200
14	16"	32	258	580	70	25	M20	10,5	1200
15	18"	32	284	632	80	25	M20	14	1300
16	20"	32	322	708	80	25	M20	19	1500
17	24"	38	375	826	100	30	M24	27	1650
18	28"	38	430	936	100	30	M24	31	1650
19	30"	38	470	1016	100	30	M24	44	1800
20	32"	38	500	1076	100	30	M24	47	1800

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P & T Piping Technology

TWO-BOLT CLAMP

FIG.: 2224 N

SECTION A 14

NORMAL SERIES

No.	D.N.	C (mm)	H (mm)	L (mm)	E (mm)	S (mm)	BOLT	WEIGHT (Kg)	MAX. REC. LOAD (Kg)
1	1/2"	13	34	94	30	15	M8	0,2	250
2	3/4"	13	36	98	30	15	M8	0,3	250
3	1"	16	39	110	30	15	M10	0,5	350
3 a	1 1/4"	16	43	118	30	15	M10	0,6	350
4	1 1/2"	19	47	132	60	20	M12	1	550
5	2"	19	53	144	60	20	M12	1,1	550
6	2 1/2"	25	63	176	60	25	M16	1,5	800
7	3	25	71	192	60	25	M16	1,7	800
8	4"	32	90	244	60	25	M20	3	1000
8 a	5"	32	103	270	60	25	M20	3,5	1000
9	6"	32	130	324	80	25	M20	5,5	1200
10	8"	32	160	384	80	25	M20	6,7	1450
11	10"	32	190	444	80	30	M20	9,5	1450
12	12"	32	215	494	80	30	M20	10,5	1650
13	14"	32	245	554	100	30	M20	17,5	1650
14	16"	32	270	604	100	30	M20	19	1650
15	18"	38	298	672	100	30	M24	22	1875
16	20"	38	325	726	100	30	M24	24	1875
17	24"	38	395	866	100	30	M24	38	2300
18	28"	38	450	976	100	30	M24	43	2300
19	30"	47	485	1064	150	30	M30	70	2750
20	32"	47	510	1114	150	30	M30	74	2750

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P & T Piping Technology

TWO-BOLT CLAMP

FIG.: 2224 H

SECTION A
15

HEAVY SERIES

No.	D.N.	C (mm)	H (mm)	L (mm)	E (mm)	S (mm)	BOLT	WEIGHT (Kg)	MAX. REC. LOAD (Kg)
1	3"	32	81	226	60	30	M20	3	1350
2	4"	38	105	286	80	30	M24	5,5	2000
2 a	5"	38	120	316	80	30	M24	6	2000
3	6"	38	135	346	80	30	M24	7,5	2500
4	8"	38	180	436	100	30	M24	13,5	2800
5	10"	38	205	486	100	30	M24	15,5	2800
6	12"	47	260	614	100	30	M30	26	3300
7	14"	47	275	644	100	30	M30	28	3300
8	16"	47	300	694	100	30	M30	30	3300
9	18"	47	330	754	150	30	M30	48	3750
10	20"	47	355	804	150	30	M30	51	3750
11	24"	47	435	964	150	30	M30	71	4400
12	28"	47	485	1060	150	30	M30	82	4400
13	30"	47	510	1114	150	30	M30	89	4400
14	32"	47	535	1164	150	30	M30	93	4400

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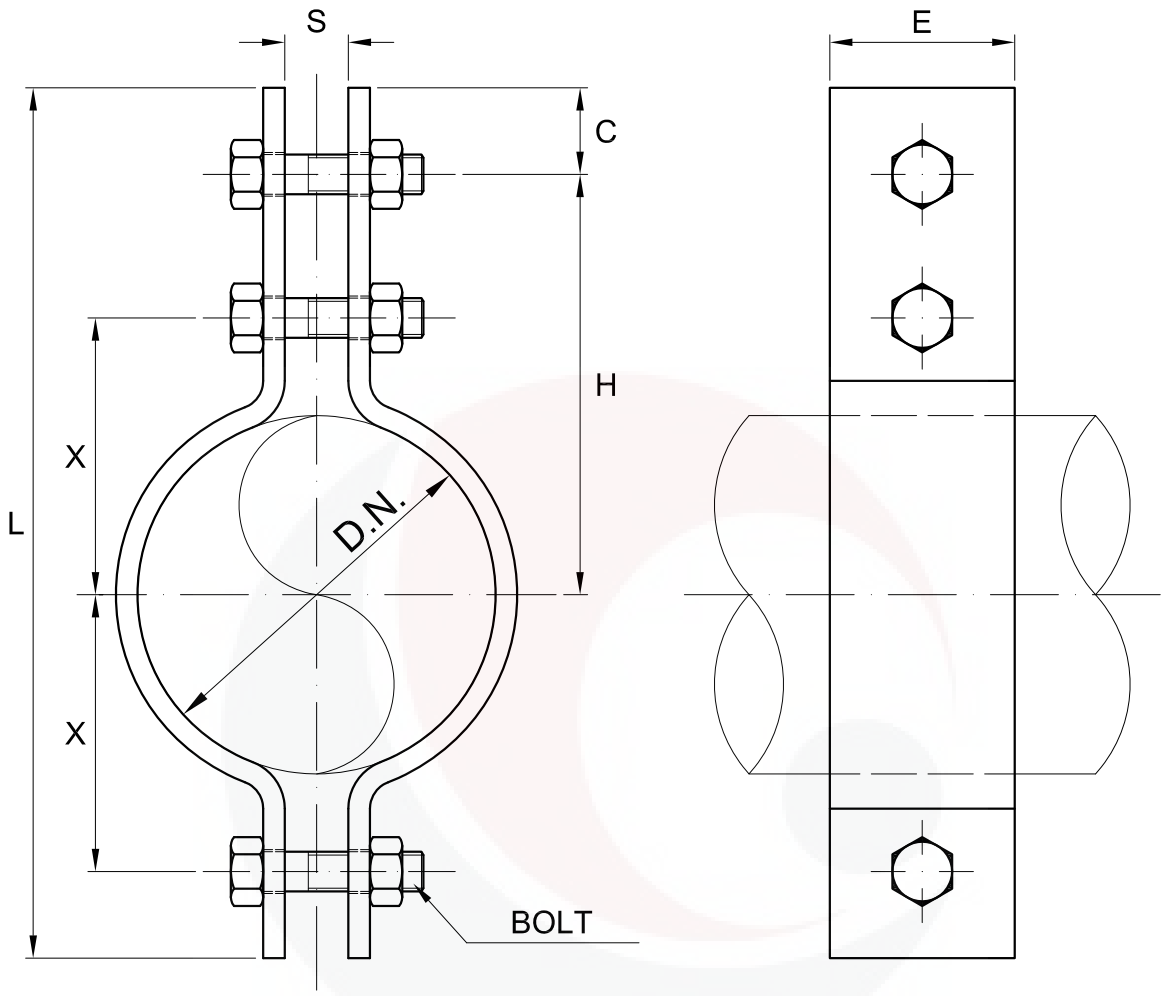
THREE-BOLT CLAMP

FIG.: 2229

SECTION A
16



APPLICATION: For hanging insulated piping.

ASSEMBLY: Hang by forged eye nut and rod.

MANUFACTURE: Light series, normal series and heavy series. For loads above those considered, special series will be manufactured.

MATERIAL: Carbon Steel, up to 380°C pipe temperature.
Alloy steel type 0.5Mo, for pipe temperature up to 500°C.
Alloy steel type 1Cr-0.5Mo, for pipe temperature up to 540°C.
Alloy steel type 2.25Cr-1Mo, for pipe temperature up to 575-600°C.
Can also be manufactured in stainless steel.

ORDER FORM:

- Name.
- Figure.
- Series.
- Pipe diameter.
- Insulation thickness or "H" dimension, if required larger.

N.B.: Can be manufactured in other diameters, special or larger, than those indicated. In the case of higher operating loads than those appearing in the standard clamps on the following sheets, the following should be indicated: pipe diameter, operating temperature, insulation thickness (if applicable) and operating load.

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P & T Piping Technology

THREE-BOLT CLAMP

FIG.: 2229 L

SECTION A 17

LIGHT SERIES

No.	D.N.	C (mm)	H (mm)	L (mm)	E (mm)	S (mm)	X (mm)	BOLT	WEIGHT (Kg)	MAX. REC. LOAD (Kg)
1	1/2"	13	59	114	25	15	29	M8	0,25	300
2	3/4"	13	62	120	25	15	32	M8	0,3	300
3	1"	16	69	137	30	15	36	M10	0,4	350
3 a	1 1/4"	16	73	145	30	15	40	M10	0,5	350
4	1 1/2"	19	90	178	30	20	50	M12	0,8	500
5	2"	19	96	190	30	20	56	M12	0,9	500
6	2 1/2"	25	108	223	50	25	65	M16	1,8	650
7	3"	25	117	241	50	25	74	M16	2,1	650
8	4"	25	128	263	50	25	85	M16	2,3	650
8 a	5"	25	143	293	50	25	100	M16	2,5	650
9	6"	25	161	329	60	25	118	M16	4,2	800
10	8"	32	207	426	60	25	155	M20	5,8	1000
11	10"	32	242	496	70	25	190	M20	9,5	1200
12	12"	32	265	542	70	25	213	M20	10,5	1200
13	14"	38	304	624	80	30	244	M24	16,5	1650
14	16"	38	332	680	80	30	272	M24	18	1650
15	18"	38	357	730	100	30	297	M24	24	2000
16	20"	38	385	786	100	30	325	M24	26	2000
17	24"	38	450	911	100	30	385	M24	39	2000
18	28"	38	510	1036	120	30	450	M24	53	2250
19	30"	38	560	1111	120	30	475	M24	57	2250
20	32"	38	590	1171	120	30	505	M24	61	2250

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THREE-BOLT CLAMP

FIG.: 2229 N

SECTION A 18

NORMAL SERIES

No.	D.N.	C (mm)	H (mm)	L (mm)	E (mm)	S (mm)	X (mm)	BOLT	WEIGHT (Kg)	MAX. REC. LOAD (Kg)
1	1/2"	16	67	133	30	15	34	M10	0,5	400
2	3/4"	16	71	141	30	15	38	M10	0,6	400
3	1"	16	74	147	30	15	41	M10	0,7	400
3 a	1 1/4"	16	76	151	30	15	43	M10	0,8	400
4	1 1/2"	25	89	189	60	25	50	M16	1,7	800
5	2"	25	105	211	60	25	56	M16	2	800
6	2 1/2"	32	126	265	60	25	75	M20	3,2	1250
7	3	32	135	282	60	25	83	M20	3,5	1250
8	4"	32	146	305	60	25	95	M20	3,7	1250
8 a	5"	32	160	332	60	25	108	M20	4,2	1250
9	6"	32	195	406	80	25	135	M20	8,5	1750
10	8"	32	220	456	80	25	160	M20	9,5	1750
11	10"	38	265	546	100	30	205	M24	17	2500
12	12"	38	290	596	100	30	230	M24	19	2500
13	14"	38	330	676	100	30	270	M24	28	2850
14	16"	38	355	726	100	30	295	M24	30	2850
15	18"	38	380	776	100	30	320	M24	33	2850
16	20"	47	435	884	150	30	355	M30	56	3250
17	24"	47	485	984	150	30	405	M30	63	3250
18	28"	47	535	1084	150	30	455	M30	71	3250
19	30"	47	588	1192	150	30	510	M30	95	4250
20	32"	47	613	1242	150	30	535	M30	99	4250

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P & T Piping Technology

THREE-BOLT CLAMP

FIG.: 2229 H

SECTION A 18

HEAVY SERIES

No.	D.N.	C (mm)	H (mm)	L (mm)	E (mm)	S (mm)	X (mm)	BOLT	WEIGHT (Kg)	MAX. REC. LOAD (Kg)
1	3"	38	155	326	80	30	95	M24	7,3	2500
2	4"	38	168	352	80	30	108	M24	7,8	2500
2 a	5"	38	185	386	80	30	125	M24	8,5	2500
3	6"	47	233	482	100	30	155	M30	15	3500
4	8"	47	263	542	100	30	185	M30	17	3500
5	10"	47	313	642	100	42	235	M30	26	5000
6	12"	47	338	692	100	42	260	M30	28	5000
7	14"	56	370	762	150	42	280	M36	52	5700
8	16"	56	395	812	150	42	305	M36	56	5700
9	18"	56	450	922	150	42	360	M36	75	5700
10	20"	56	480	982	150	42	390	M36	80	6000
11	24"	56	530	1082	180	42	440	M36	105	6500
12	28"	56	580	1182	180	42	490	M36	115	6500
13	30"	67	635	1294	180	48	525	M42	149	8500
14	32"	67	660	1344	180	48	550	M42	155	8500

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P & T Piping Technology

PIPE INSULATION THICKNESS FOR THREE BOLT CLAMPS. LOADS CORRECTOR FACTOR

1.- MAXIMUM RECOMMENDED INSULATION THICKNESSES FOR THREE BOLT CLAMPS, ACCORDING TO "H" DIMENSION INDICATED IN PREVIOUS SHEETS.

INSULATION IN mm.

D.N.	FIG. 2229-L.S	FIG. 2229-N.S	FIG. 2229-H.S
1/2" - 3/4"	40	40	-
1" - 1 1/4"	45	45	-
1 1/2" - 2"	50	50	-
2 1/2"	55	65	-
3" - 4"	55	65	75
5"	55	65	80
6"	60	80	110
8"	70	80	110
10"	75	100	125
12"	80	100	125
14" - 16"	100	120	140
18" - 20"	100	120	170
24" - 28"	120	120	170
30" - 32"	150	150	170

FOR LARGER INSULATION THICKNESSES, "H" DIMENSION MUST BE INCREASED IN THE SAME PROPORTION.

THE ORDER SHALL ADVISE SPECIAL "H" DIMENSION AS FOLLOWS:

EXAMPLE: FIG.2229, NORMAL SERIES, Ø6": H=220mm.
(FOR INSULATION UP TO 105mm.)

2.- LOAD CORRECTION FACTORS FOR CLAMPS, TEMPERATURE-DEPENDENT.

TEMP. / MATERIAL	<300°C	350°C	390°C	450°C	500°C	540°C	575°C	600°C
CARBON STEEL	1	0,85	0,70	-	-	-	-	-
ALLOY STEEL (0.5Mo)	-	-	1	0,80	0,60	-	-	-
ALLOY STEEL (1Cr-0.5Mo)	-	-	1	0,90	0,80	0,60	-	-
ALLOY STEEL (2.25Cr-1Mo)	-	-	-	-	-	-	0,55	-
STAINLESS STEEL (TP-304)	1	1	1	0,90	0,85	0,80	0,70	0,55
STAINLESS STEEL (TP-316)	1	1	1	1	0,95	0,90	0,85	0,70

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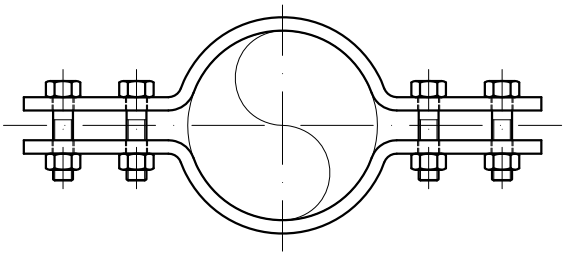
CLAMP FOR VERTICAL PIPING

FIG.: 2240

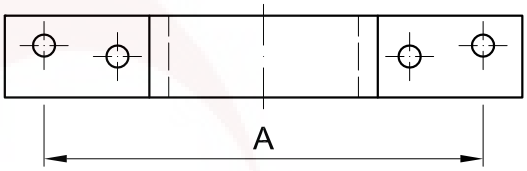
SECTION A
21

APPLICATION: To support stretches of vertical piping, doing away with the use of lugs.



TYPES:
"TYPE 1".- Manufactured with four equal bolts, two external and two internal.
"TYPE 2".- Manufactured with six bolts, two external and four internal.
"TYPE 3".- The same manufacture as with Type 2, but reinforced with gussets.

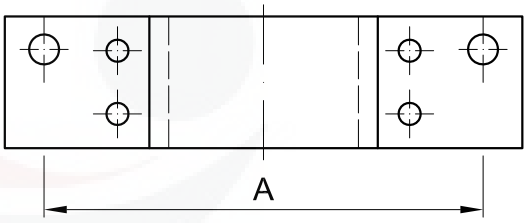
TYPE 1



SELECTION METHOD: According to the illustration on the following page.

1º.- Once the diameter of the piping and the distance between axes on the external bolts (dimension A) is known, determine its point of insertion, using the lower part of the illustration.

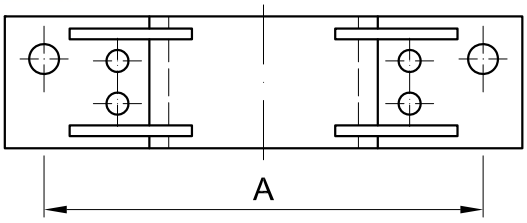
TYPE 2



2º.- Having determined this point of intersection, trace a vertical line upwards until making it meet a horizontal line traced by required load. The point of intersection of both lines will give us the appropriate dimension of the bar. If this bar falls between two bar values, the higher of the two is chosen.

3º.- Going off this last point and once having determined the bar, a horizontal line will be traced until finding the scale of dimensions for the bolts, the appropriate bolt diameter being the intersection with said scale. In the event of this point of intersection falling between two measurements, the higher of the two is chosen.

TYPE 3



ORDER FORM:
- Name.
- Figure.
- Pipe diameter.
- Distance between axes on the external bolts (Level A).
- Load.

N.B.:
ESTANDARDIZATION:
On sheets A-23 and A-24, we have included a standardization of these clamps for different diameters, loads and assembly distances. In the case of alloy steel clamps, the same load correction factors, indicated on sheet A-20, for high temperatures, are to be used.

LUGS TO BE WELDED TO THE PIPE FOR ASSEMBLY:
4 lugs will be welded to the pipe to support on the clamp and avoid the pipe hanging loose.

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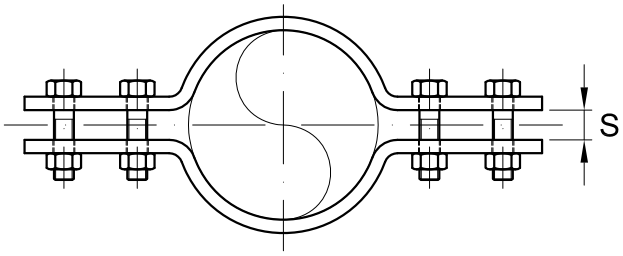
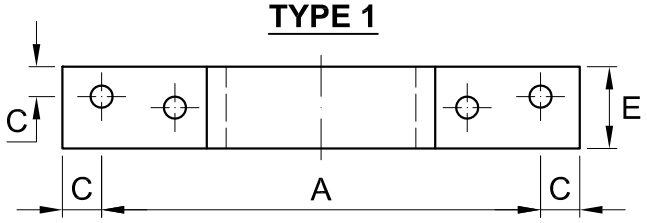
CLAMP FOR VERTICAL PIPE

FIG.: 2240

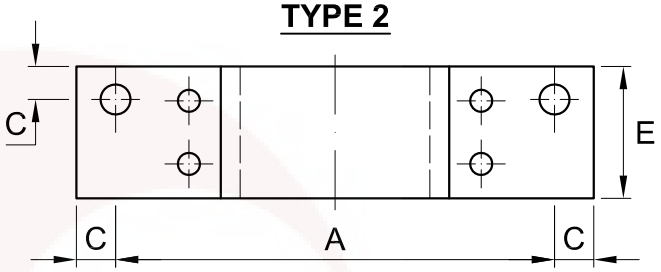
SECTION A 23



TYPE 1



TYPE 2



MATERIAL:

- Carbon steel for temperatures up to 380ºC.
- Alloy steels for temperatures up to 575ºC-600ºC.
- Can be manufactured in stainless steel.

SIZE	TYPE	C (mm)	E (mm)	S (mm)	BOLT	WEIGHT MÍN. "A" (Kg)	MAX. REC. LOAD FOR "A" (Kg)				
							300	450	600	750	900
3" - 01	1	19	80	20	M12	5,1	550	400	300	225	-
3" - 02	1	25	100	25	M16	7,5	1050	775	525	350	-
3" - 03	1	32	100	25	M20	18,5	-	1450	1000	800	-
3" - 04	2	32	150	30	M20	27	-	2700	1775	1400	1150
4" - 05	1	19	80	20	M12	6,2	670	485	375	275	-
4" - 06	1	25	100	25	M16	13,5	-	1050	725	475	-
4" - 07	1	32	100	30	M20	23	-	2100	1550	1250	900
4" - 08	2	32	150	30	M20	27,5	-	2950	2000	1550	1200

SIZE	TYPE	C (mm)	E (mm)	S (mm)	BOLT	WEIGHT MIN. "A" (Kg)	MAX. REC. LOAD FOR "A" (Kg)				
							450	600	750	900	1050
6" - 09	1	19	100	20	M12	11	975	650	425	300	-
6" - 10	1	25	100	25	M16	14	1250	825	550	400	-
6" - 11	1	32	125	30	M20	30	-	1700	1300	1000	750
6" - 12	2	38	150	30	M24	45	-	3750	2950	2400	2025
8" - 13	1	25	100	25	M16	14,5	1400	900	650	425	-
8" - 14	1	32	100	30	M20	25	-	1400	1000	800	600
8" - 15	2	38	150	30	M24	38	-	2500	1750	1400	1100
8" - 16	2	38	150	30	M24	47	-	4550	3250	2550	2150

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CLAMP FOR VERTICAL PIPE

FIG.: 2240

SECTION A
24

SIZE	TYPE	C (mm)	E (mm)	S (mm)	BOLT	WEIGHT MIN. "A" (Kg)	MAX. REC. LOAD FOR "A" (Kg)				
							600	750	900	1050	1200
10" - 17	1	25	100	25	M16	19	1000	725	500	-	-
10" - 18	1	32	125	30	M20	32	2050	1550	1300	950	-
10" - 19	2	38	150	30	M24	49	5000	3250	2550	2100	-
10" - 20	2	47	200	40	M30	78	-	6100	5000	3750	3000
12" - 21	1	25	100	25	M16	20	1200	825	550	450	-
12" - 22	2	32	150	30	M20	47	-	2150	1700	1300	1000
12" - 23	2	38	150	30	M24	60	-	3750	3000	2500	2000
12" - 24	2	47	200	40	M30	81	-	7250	5300	3900	3200

SIZE	TYPE	C (mm)	E (mm)	S (mm)	BOLT	WEIGHT MIN. "A" (Kg)	MAX. REC. LOAD FOR "A" (Kg)				
							750	900	1050	1200	1350
14" - 25	1	32	100	30	M20	32	1300	1000	775	575	-
14" - 26	2	38	150	30	M24	61	4000	3300	2650	2150	1800
14" - 27	2	47	200	40	M30	113	-	6000	5100	4000	3300
16" - 28	1	32	125	30	M20	41	1900	1600	1250	925	-
16" - 29	2	38	150	30	M24	71	-	3900	3000	2300	2000
16" - 30	2	56	200	42	M36	133	-	10000	8100	6450	5000

SIZE	TYPE	C (mm)	E (mm)	S (mm)	BOLT	WEIGHT MIN. "A" (Kg)	MAX. REC. LOAD FOR "A" (Kg)				
							900	1050	1200	1350	1500
18" - 31	2	38	150	30	M24	59	2200	1600	1300	1050	-
18" - 32	2	47	200	40	M30	98	7100	5150	3750	3000	2600
18" - 33	2	56	200	42	M36	138	-	8700	6650	5500	4450
20" - 34	2	38	150	30	M24	61	2400	1700	1350	1100	900
20" - 35	2	47	200	40	M30	113	-	6100	4600	3850	3300
20" - 36	2	56	250	42	M36	193	-	11000	8900	7350	6000
24" - 37	2	38	175	30	M24	82	-	2750	2150	1700	1350
24" - 38	2	47	200	40	M30	118	-	7350	5500	4300	3750
24" - 39	2	56	250	42	M36	222	-	-	10750	8400	6850

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THREADED RODS

FIG.: 2321 2322 Y 2323	SECTION A 25

FIG. 2321
Total right threaded

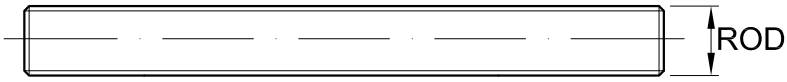


FIG. 2322
Right right threaded

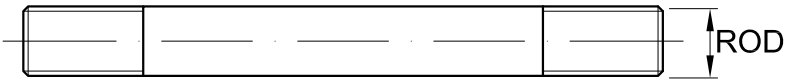
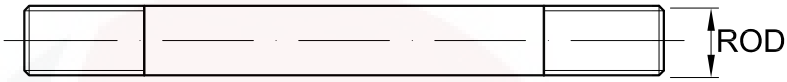


FIG. 2323
Right left threaded



No.	ROD	WEIGHT (Kg/m)	MAX. REC. LOAD (Kg)
1	M12	0,75	575
2	M16	1,35	1200
3	M20	2,1	1800
4	M24	3	2500
5	M30	4,75	4100
6	M36	8,15	6500
7	M42	11	8500
8	M48	14,4	11000
9	M56	19,7	15000
10	M64	25,75	20000
11	M72	34,5	26000
12	M80	40	30000
13	M90	51	35000
14	M100	62	45000

APPLICATION: To hang the piping, coupled to the forged eye nut, to a forged clevis, turnbuckles, couplings or alternatively against drilled plates. When the assembly height of the hanger requires the use of a rod longer than 2000 mm, this is normally replaced by two rods joined by a coupling or turnbuckle.

STANDARD SUPPLY:

- FOR FIG. 2321 y 2322:
We recommend rod lengths from 200 mm to 2000 mm, with 50 mm extensions.

- FOR FIG. 2323:
We recommend rod lengths from 250 mm to 2000 mm, with standard measurements of 250-500-1000-1500-2000 mm.

THREADED LENGTH (Fig. 2322 and 2323):

- ROD ≤ 500 mm:
The length of the threaded will be 200 mm (or as long as possible).

- 500 mm < ROD ≤ 2000 mm:
Depending on the metric, there are two possibilities:
* M12 to M48: threaded length of 250 mm.
* M56 to M100: threaded length of 300 mm.

N.B.: For Fig. 2321 and with a metric the same as or larger than M42, the rod manufactured shall have a maximum length of 1000 mm. Note that several threaded rods can be joined directly onto the clupling until reaching the required length.

MANUFACTURE: To order, can be supplied with any rod length and threaded length (within the limitations of materials) and likewise with special threads and pitches.

ORDER FORM:
- Name.
- Figure.
- Metric.
- Length.

MATERIAL: Carbon steel. Can be manufactured in other qualities, to order.

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ROD COUPLING

FIG.: 2330

SECTION A
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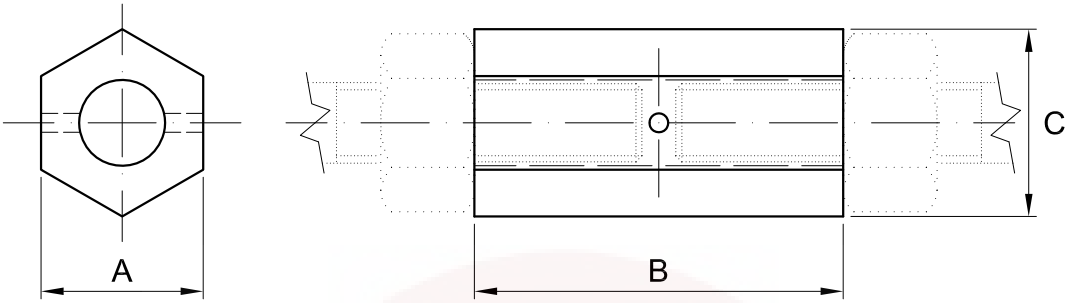
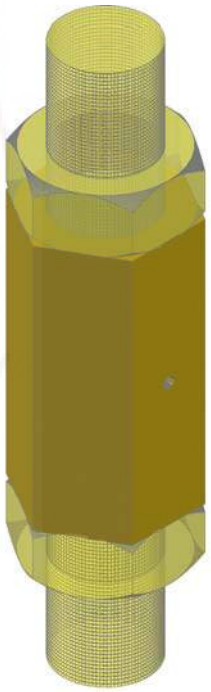


No.	Associated ROD	A (mm)	B (mm)	C (mm)	WEIGHT (Kg)	MAX. REC. LOAD (Kg)
1	M12	19	35	22	0,07	575
2	M16	24	45	28	0,15	1200
3	M20	30	60	35	0,3	1800
4	M24	36	75	42	0,5	2500
5	M30	46	90	53	1	4100
6	M36	55	110	61	1,7	6500
7	M42	65	120	75	2,5	8500
8	M48	75	125	87	3,5	11000
9	M56	85	150	98	6	15000
10	M64	95	170	110	8,5	20000



APPLICATION: To join and connect hanging rods. Used on long, rigid hangers not requiring adjustment. Always used on hangers with springs (if the installation length makes it necessary).

MANUFACTURE: Right threaded on both ends. They can be manufactured to order with special threads or pitches.

ORDER FORM:
- Name.
- Figure.
- Metric.

MATERIAL: Carbon steel. Can be manufactured in other qualities, to order.

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FORGED TURNBUCKLE

FIG.: 2331

SECTION A
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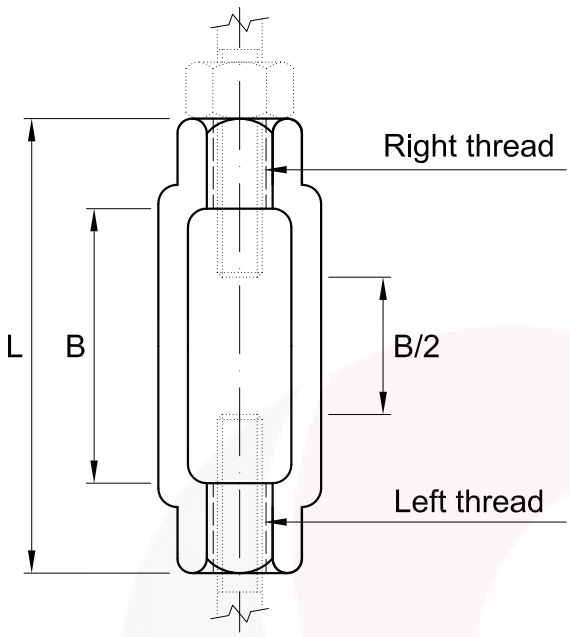

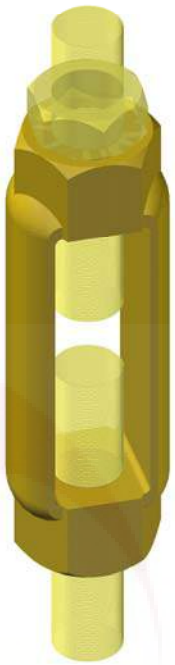

No.	Associated ROD	B (mm)	L (mm)	WEIGHT (Kg)	MAX. REC. LOAD (Kg)
1	M12	110	150	0,5	575
2	M16				1200
3	M20	110	170	1,5	1800
4	M24				2500
5	M30	150	230	3,5	4100
6	M36				6500
7	M42	150	250	7	8500
8	M48				11000
9	M56	150	280	11	15000
10	M64				20000
11	M72	165	360	30	26000
12	M80				30000
13	M90				35000
14	M100				45000

APPLICATION: To join hanging rods and adjust the length of the assembly. Used on long, rigid hangers requiring adjustment. Two turnbuckles should not be assembled under any circumstance on the same rigid hanger, nor one turnbuckle on one spring hanger since this includes one (use coupling instead).

MANUFACTURE: Right threaded at one end and left threaded at the other. They can be manufactured to order with special threads or ptiches. (Section A-9).

ORDER FORM:
- Name.
- Figure.
- Metric.

MATERIAL: Carbon steel. In exceptional circumstances, it can be manufactured in other qualities, to order (subject to a minimum order quantity).

N.B.: The forged turnbuckle can withstand operating loads of up to 75% higher than indicated here, without taking into account the influence of the rod or any other hanging element.

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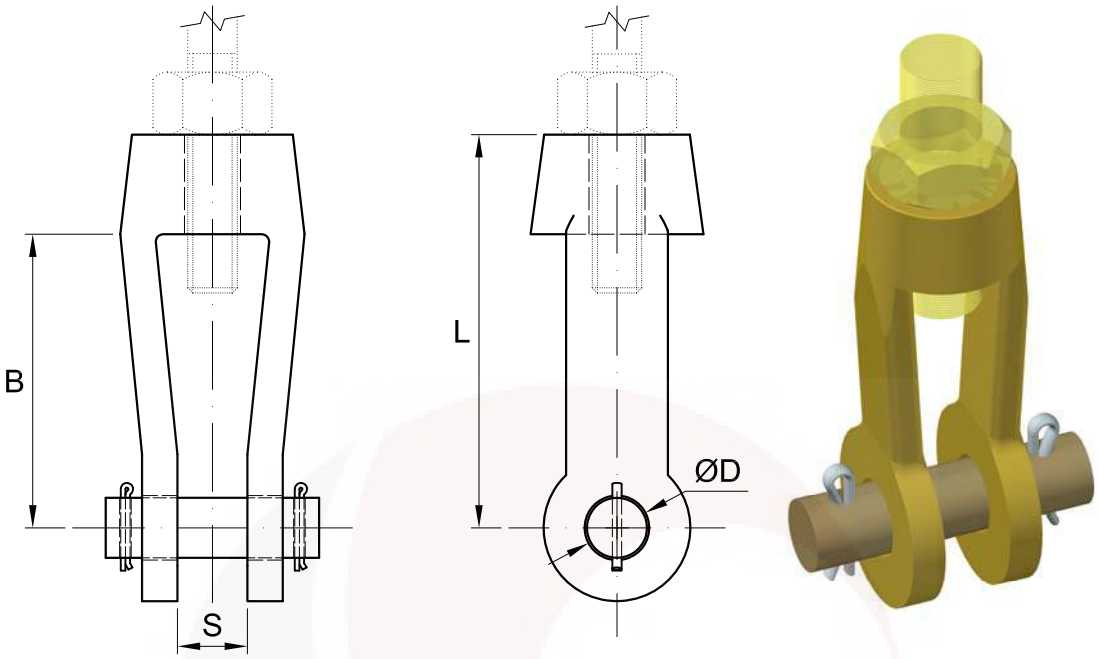
FORGED CLEVIS

FIG.: 2332

SECCIÓN A 28



No.	Associated ROD	B (mm)	L (mm)	S (mm)	ØD (mm)	WEIGHT (Kg)	MAX. REC. LOAD (Kg)
1	M12	93	113	15	12	0,8	575
2	M16				15		1200
3	M20	120	146	22	20	1,6	1800
4	M24				25		2500
5	M30	125	161	28	30	3,5	4100
6	M36	150	195	31	35	5	6500
7	M42	175	230	48	40	12	8500
8	M48				45		11000
9	M56	200	275	60	50	18	15000
10	M64				55		20000
11	M72				65		26000
12	M80	250	350	70	70	45	30000
13	M90				80		35000
14	M100				90		45000

APPLICATION: Connection between rod and lug.

MANUFACTURE: Right threaded on metric sizes as a standard. Can be manufactured to order with left thread or special pitches.

ORDER FORM:

- Name.
- Figure.
- Mtric.
- Thread Direction.

MATERIAL: Carbon steel. In exceptional circumstances, it can be manufactured in other qualities, to order (subject to minimum order quantities).

N.B.: The forged clevis can withstand operating loads of up to 50% higher than the load inicated, without taking into account the influence of the rod or any other hanging element.

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FORGED EYE NUT

FIG.: 2333

SECTION A
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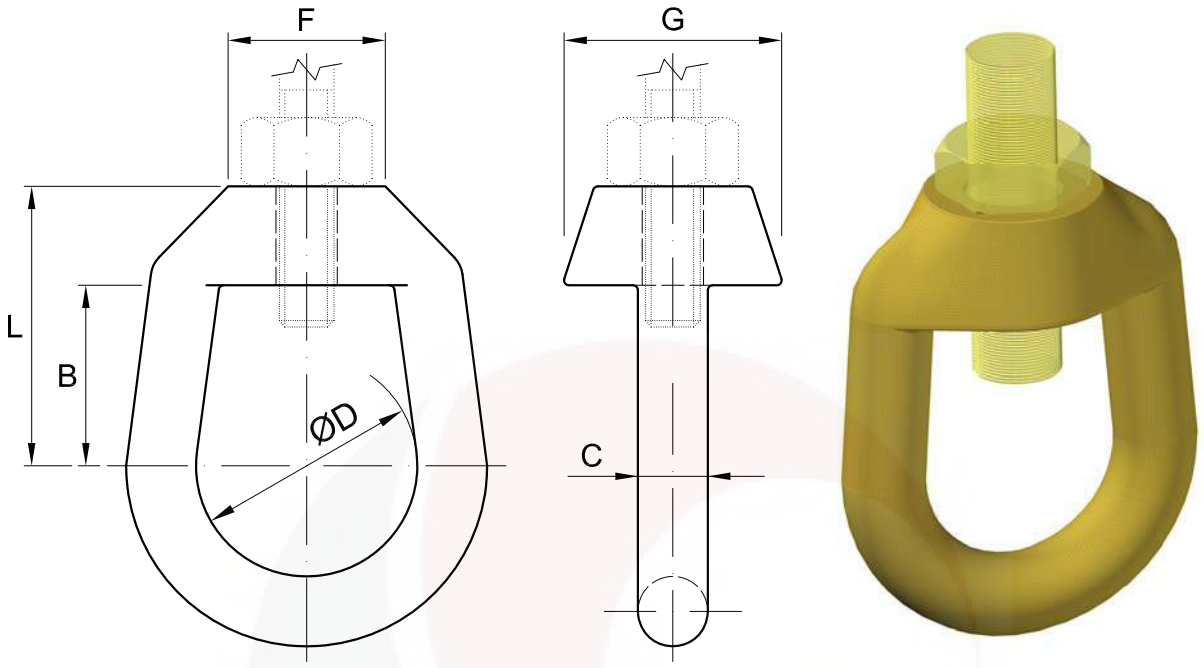

No.	Associated ROD	B (mm)	C (mm)	ØD (mm)	F (mm)	G (mm)	L (mm)	WEIGHT (Kg)	MAX. REC. LOAD (Kg)
1	M12	31	12	38	27	38	48	0,3	575
2	M16								1200
3	M20	41	20	50	45	50	66	1	1800
4	M24								2500
5	M30	54	25	62	55	62	85	2	4100
6	M36								6500
7	M42	95	32	80	75	80	140	5	8500
8	M48								11000
9	M56	108	38	100	95	100	165	8	15000
10	M64								20000

APPLICATION: Connection between rod and clamp or beam attachment.

MANUFACTURE: Right threaded on metric sizes as a standard supply. Left threaded as a common option for short rigid hangers where the eye nut connects to a right-left threaded rod in order to achieve adjustment. They can be manufactured to order with special pitches.

ORDER FORM:

- Name.
- Figure.
- Metric.
- (Lef threaded if required as an option).

MATERIAL: Carbon steel. In exceptional circumstances, it can be manufactured in other qualities, to order (subject to minimum order quantities).

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ANCHOR BOLTS

FIG.: 2340

SECTION A
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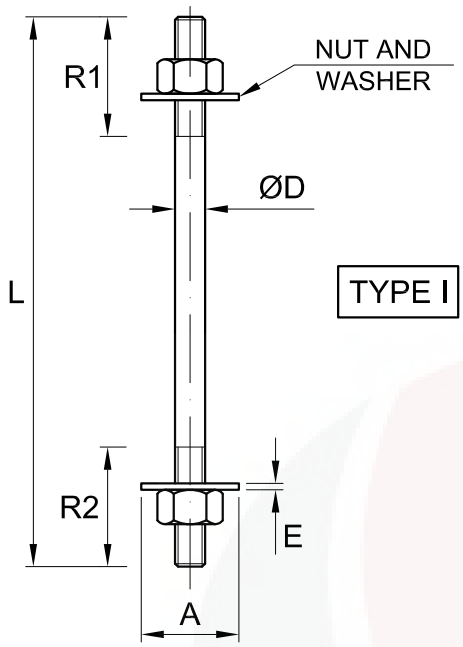

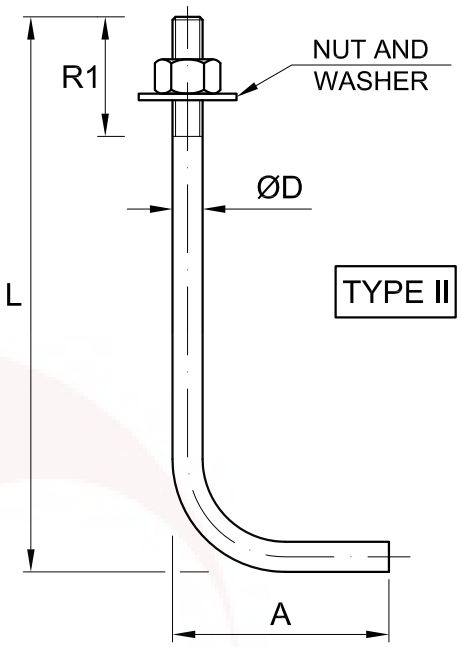

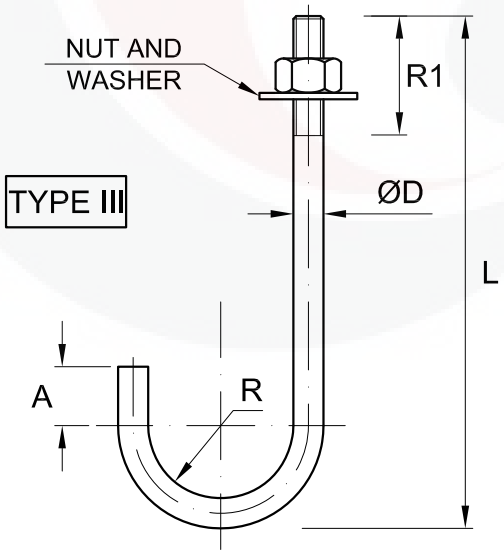

APPLICATION: To anchor plates or equipment to concrete (wall, floor or ceilling).

MANUFACTURE: Can be manufactured in any size and type of threaded, according to client drawings. Any other variation or type of anchor bolt can be manufactured to order.

ORDER FORM:

- Name.
- Figure.
- Type.
- Dimensions as per drawings.
- Quality of the material.

MATERIAL: Carbon steel. Can be manufactured in other qualities, to order.

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TRAPEZE

FIG.: 2350
OPTION 1

SECTION A
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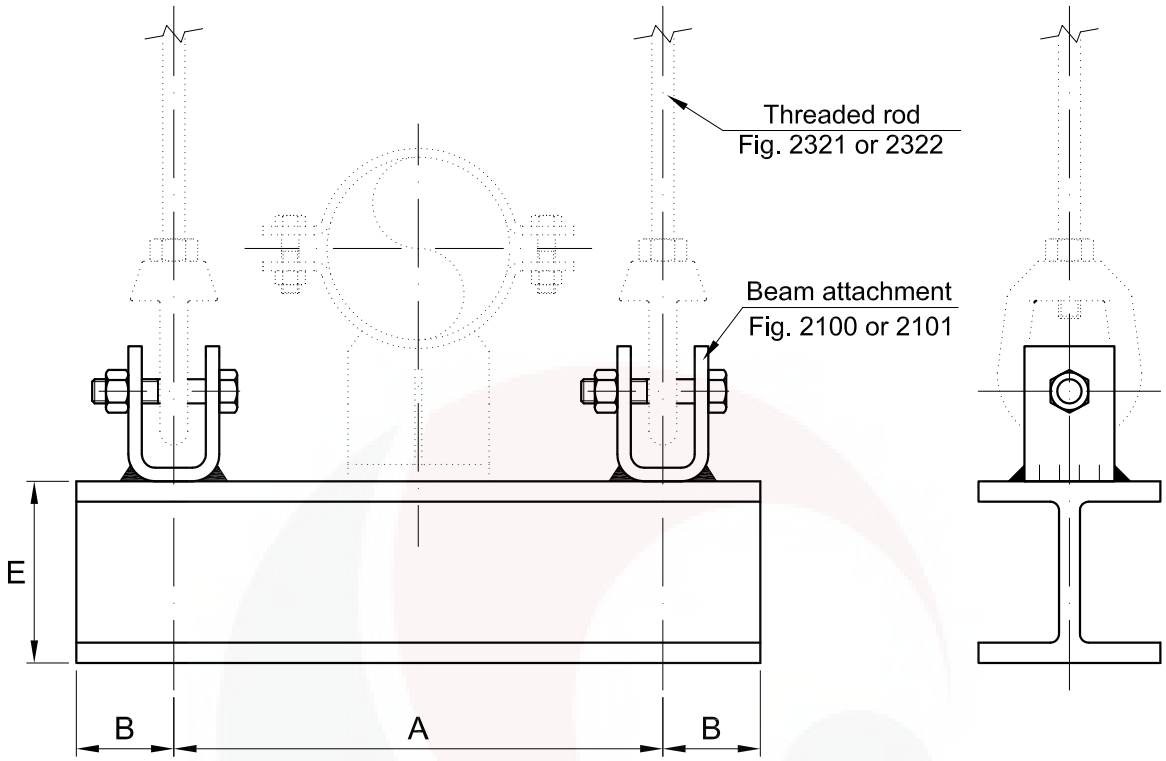

No.	E (mm)	MAX. REC. LOAD (Kg) DEPENDING ON "A"							
		300	500	750	1000	1250	1500	1750	2000
1	100	3500	3150	2300	1725	1450	1200	-	-
2	120	-	4500	3000	2450	2150	1850	1550	-
3	140	-	-	3500	3050	2400	2000	1650	-
4	160	-	-	4525	3900	3100	2650	2200	1850
5	200	-	-	-	7500	6600	5250	4500	4000
6	240	-	-	-	11750	10200	8750	7200	6550
7	300	-	-	-	21500	19500	16900	15250	14500

ASSOCIATED ROD	B
M12 / M16	40
M20 / M24	50
M30 / M36	60
M42 / M48	80
M56	100

APPLICATION: For double hangers. In general, they are used when is not possible to hang above the pipe either due to the lack of space or due to interference.

MANUFACTURE: The size of the beam attachment will depend on the operating load and/or on the size of the spring, where this is the upper element.

ASSEMBLY: Connection to the rod by means of a forged eye nut.

ORDER FORM:
- Name.
- Figure.
- Size.
- "A" dimension.
- Hanging rod.

MATERIAL: Carbon steel.

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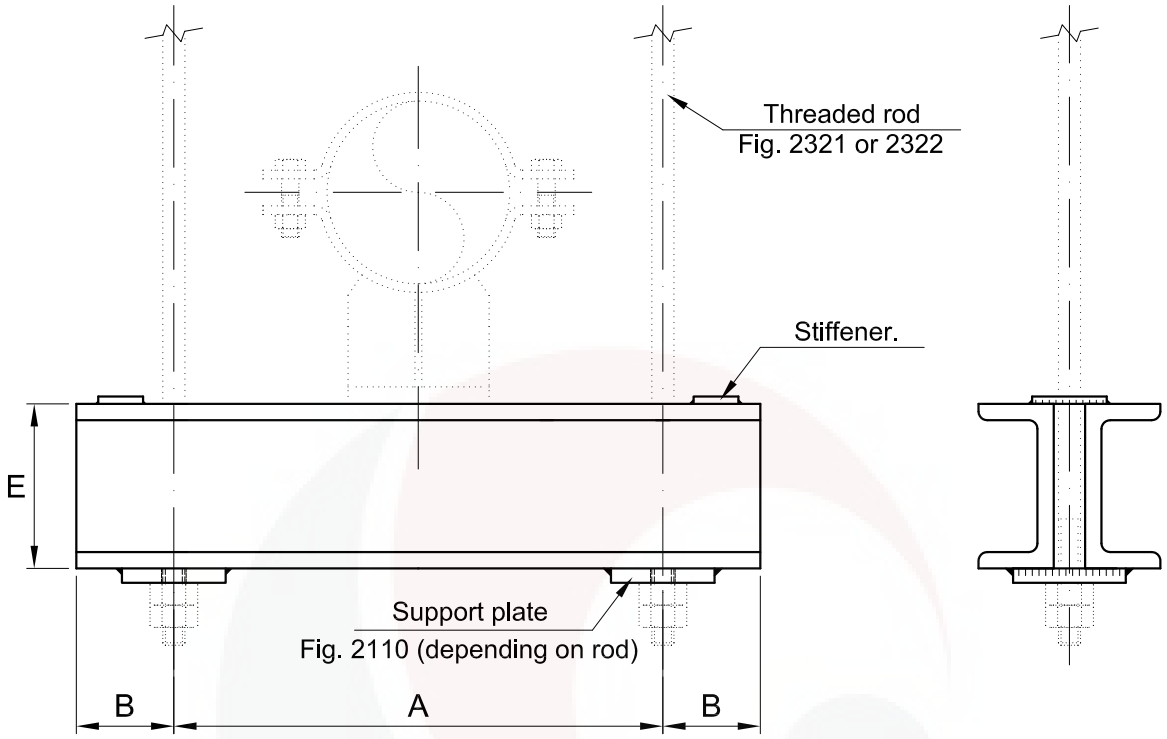
TRAPEZE

FIG.: 2350 OPTION 2

SECTION A 32



No.	E (mm)	MAX. REC. LOAD (Kg) DEPENDING ON "A"								WEIGHT FOR "A"=1000mm (Kg)	INCREASE IN WEIGHT FOR EACH "A"+100mm (Kg)
		300	500	750	1000	1250	1500	1750	2000		
1	80	2750	1950	1375	950	875	-	-	-	20	1,8
2	100	3750	3150	2150	1600	1350	1100	-	-	24,5	2,2
3	120	-	4250	2650	2275	2000	1750	-	-	31	2,7
4	160	-	-	3950	3400	2650	2250	1900	1600	45	3,8
5	200	-	-	-	5950	5150	4100	3500	3150	62	5,1
6	240	-	-	-	10500	9200	7850	6600	5900	84	6,7
7	300	-	-	-	16500	15250	12800	11500	10900	120	9,3

APPLICATION: For double hangers. In general, they are used when it is not possible to hang above the pipe, either due to the lack of space or due to interference. can also be used as an intermediate beam on hangers.

ASSEMBLY: Connects with rod, support plate and nuts. The gap between the two UPN will be determined by the diameter of the rod.

ASSOCIATED ROD	B
M12 / M16	40
M20 / M24	50
M30 / M36	60
M42 / M48	80
M56	100

ORDER FORM:

- Name.
- Figure.
- Size.
- "A" dimension.
- Hanging rod.

MATERIAL: Carbon steel.

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SECTION B

CLAMP BASE

SLIDING PLATES

WELDED PIPE STRAP

U-BOLTS

ROLLERS

SADDLES

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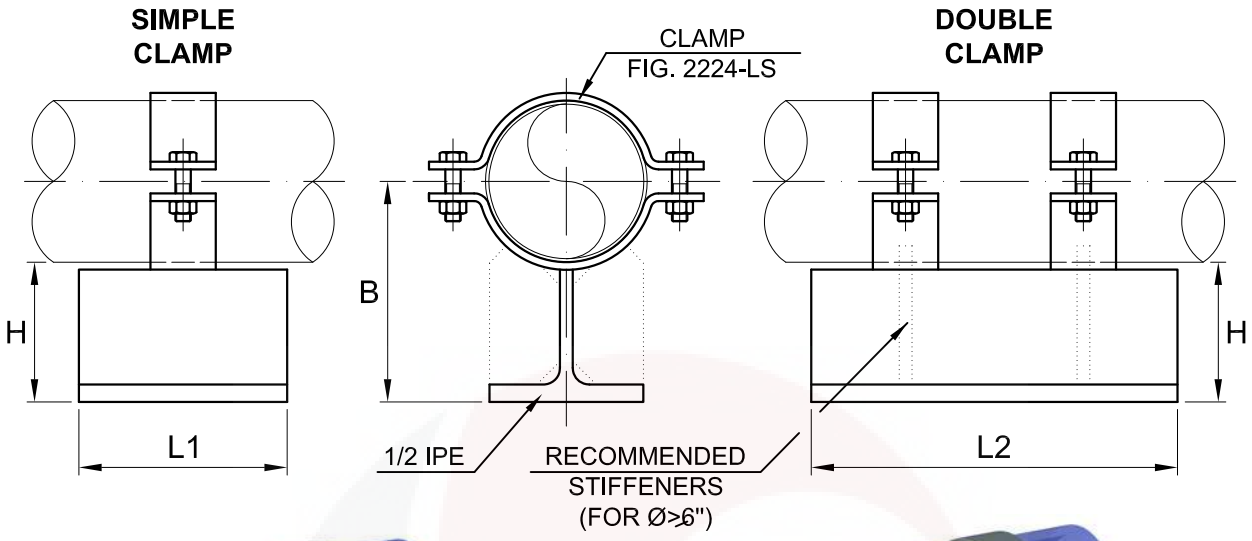
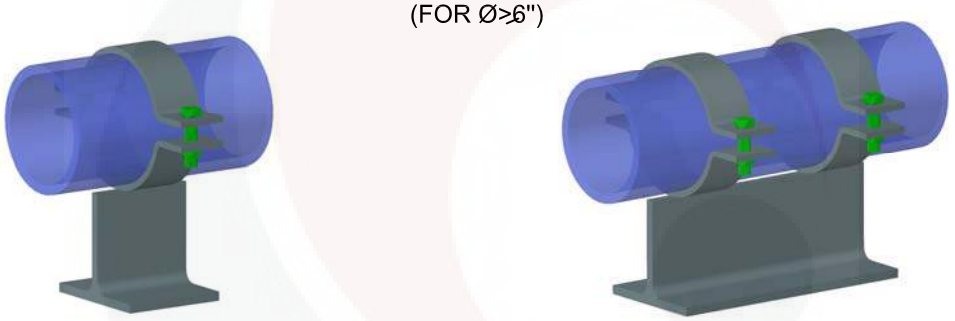
CONTENTS

CLAMP BASE

FIG.: 2134

SECCIÓN B
1





PIPE D.N.	B (mm)				L_1 (mm)	L_2 (mm)	MAX. REC. OPERATING LOAD (Kg)
	IPE 160	IPE 200	IPE 240	IPE 270			
1/2"	93	113	-	-	100	200	250
3/4"	96	116	-	-	100	200	250
1"	99	119	-	-	100	200	250
1 1/4"	103	123	-	-	100	200	250
1 1/2"	108	128	-	-	100	200	350
2"	114	134	-	-	150	200	350
2 1/2"	121	141	-	-	150	250	400
3"	129	149	169	-	150	250	500
4"	141	161	181	-	150	250	500
5"	-	175	195	210	150	250	650
6"	-	190	210	225	150	300	1150
8"	-	216	236	251	150	300	1150
10"	-	245	265	280	150	300	1400
12"	-	270	290	305	-	350	1650
14"	-	288	308	323	-	350	1950
16"	-	313	333	348	-	400	1950
18"	-	339	359	374	-	400	2250
20"	-	367	387	402	-	400	2650

APPLICATION: Pipe shoes with clamps to act as sliding supports for medium-low operating loads. Valid for pipes with or without insulation. They can be used as guided pipe shoes, by means of lateral stops or by welding two, three or four bases to the clamps rotated through 45º.

ORDER FORM:

- Name.
- Figure and type of clamp (Simple/Double)
- Pipe diameter.
- Height "B" or "H".
- Length "L" if not standard.
- Option "G" if clamps are rotated or "SS" if the base is in stainless steel.

MATERIAL: Carbon steel or alloy steel. In the case of alloy steel, "T" sections are to be manufactured with equivalent sheets.

*** N.B.:** For stainless steel piping, clamps in stainless steel, in carbon steel/alloy steel with stainless lining, with elastomeric materials or any other type can be manufactured to avoid direct contact.

*** N.B.:** This can be manufactured with dimensions other than those indicated, as well as with the clamps rotated through 30º to 45º. In order to improve friction on the support base, the can be supplied with stainless steel sheet welded to the base (2 mm thick sheet and 2B finish).

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2	20/10/98	INFORMATION	JB	EAR
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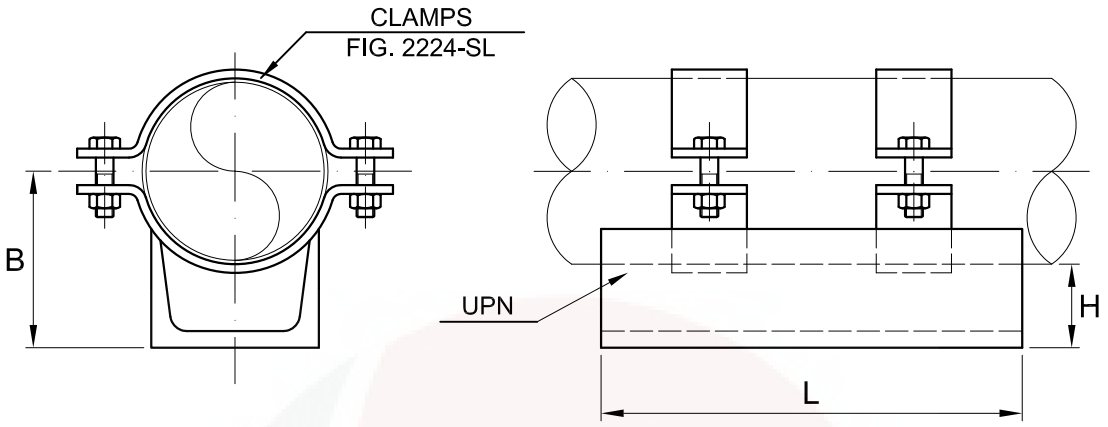
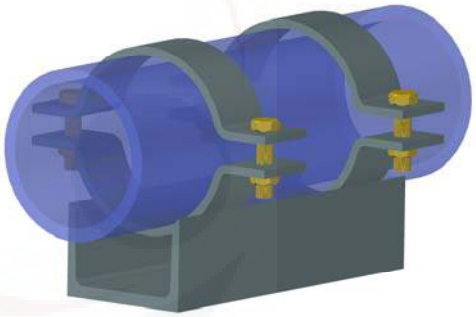
CLAMP BASE

FIG.: 2135

SECTION B
2



PIPE D.N.	UPN	B (mm)	L (mm)	MAX. REC. OPERATING LOAD (Kg)
2"	60	53	200	400
2 1/2"	80	60	250	550
3"	80	77	250	550
4"	100	89	250	750
5"	100	109	250	750
6"	120	125	300	1000
8"	140	155	300	1500
10"	140	189	300	1500
12"	160	217	350	2050
14"	160	237	350	2050
16"	200	265	400	3250
18"	200	282	400	3250
20"	240	326	400	4500



APPLICATION: Pipe shoes with clamps to act as sliding supports for medium-low operating loads. Valid for uninsulated pipe only. Can be used as guided pipe shoes by means of lateral stops.

ORDER FORM:

- Name.
- Figure.
- Pipe diameter.
- Height "B" or "H".
- Length "L" if not standard.
- Option "G" if clamps are rotated or "SS" if the base is in stainless steel.

MATERIAL: Carbon Steel.

N.B.: This can be manufactured with dimensions other than those indicated, as well as with clamps rotated 30° or 45° (when the UPN allows it). In order to improve the friction on the support base, this can be supplied with stainless steel sheet welded to the base (2 mm thick base with 2B finish).

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2	20/10/98	INFORMATION	JB	EAR
1	20/05/91	INFORMATION	FG	EAR

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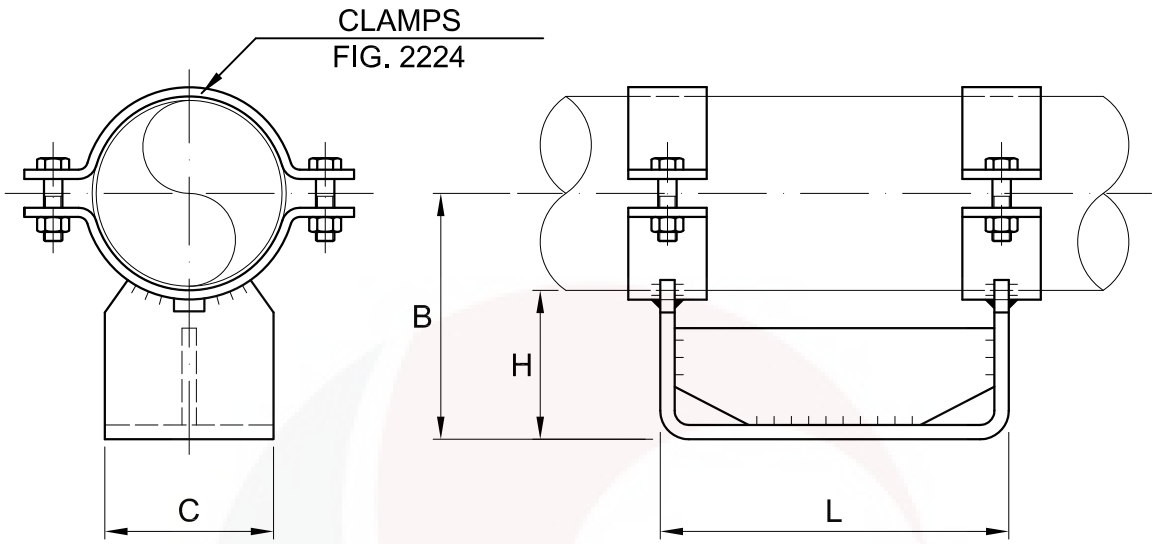
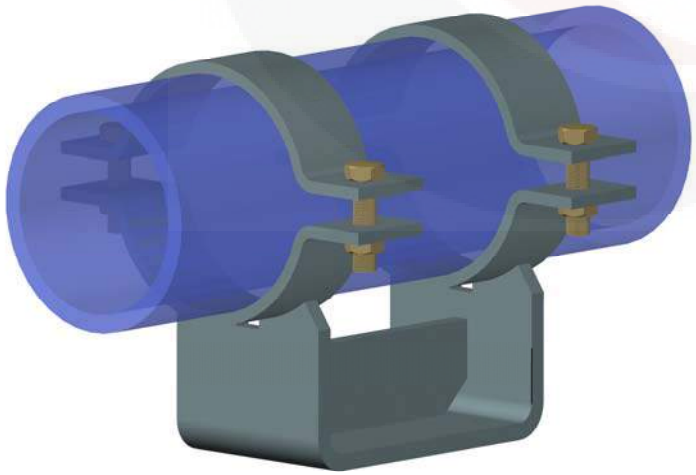
CLAMP BASE

FIG.: 2136

SECTION B
3





APPLICATION: Pipe shoes with clamps to act as sliding supports for any type of operating load. Valid for pipes with or without insulation, either in carbon steel, alloy steel or stainless steel. Can be used as guided pipe shoe by means of lateral stops or double, triple or quadruple bases.

ORDER FORM:

- Namee.
- Figure and type of clamp (Simple/Double)
- Pipe diameter.
- Height "B" o "H".
- Length "L" if not standard.
- Option "G" if clamps are rotated or "SS" if the base is stainless steel.
- Indicate configuration: double, triple or quadruple.

MATERIAL:
Carbon steel or allos steel.

DIMENSIONS TABLE ON SHEET B-9

REV.	DATE	EDITED FOR :	DRAW.	REV.
3	21/07/10	GENERAL REVISION	DDG	EAR
2	20/10/98	INFORMATION	JB	EAR
1	20/05/91	INFORMATION	FG	EAR

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CLAMP BASE

FIG.: 2136

SECTION B
4

PIPE D.N.	B (mm)			C (mm)	L (mm)	MAX. REC. OPERATING LOAD (Kg)			
						SERIES 1	SERIES 2	SERIES 3	SERIES 4
2"	130	180	230	70	200	575	-	-	-
2 1/2"	137	187	237	80	250	650	-	-	-
3"	144	194	244	100	250	750	1100	-	-
4"	157	207	257	110	250	800	1250	-	-
5"	170	220	270	130	250	900	1350	-	-
6"	184	234	284	150	300	1250	1600	2350	-
8"	210	260	310	175	300	1500	2000	2750	-
10"	237	287	337	200	300	2000	3500	4500	-
12"	262	312	362	230	350	2500	3250	4750	6500
14"	278	328	428	250	350	2750	3900	5000	7150
16"	303	403	453	280	400	-	4150	5750	7250
18"	329	429	529	300	400	-	4500	6000	7500
20"	354	454	554	315	400	-	5100	6500	8800
22"	380	480	580	325	450	-	5400	7200	9450
24"	455	505	605	340	450	-	6250	7500	10150
26"	480	530	630	360	450	-	6500	7950	10500
28"	506	556	656	375	450	-	-	8500	11250
30"	531	581	681	400	450	-	-	9100	11800
32"	556	606	706	425	500	-	-	9500	12400
36"	607	657	757	440	500	-	-	10050	12950

N.B.: This can be manufactured with dimensions other than those indicated. They can be manufactured with clamps rotated 30º or 45º. For pipe shoes in high temperature service, both in carbon steel and in alloy steel, loads must consider correction factors depending on the temperature and quality of the steel.

See the table shown on sheet A-20.

In order to improve the friction on the support base, they can be supplied with stainless steel sheet welded to the base (2 mm thick sheet and finish 2B).

For stainless steel piping, clamps can be manufactured in stainless steel, in carbon steel/alloy steel with stainless steel lining, with elastomeric materials or in any other type that avoids direct contact.

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CLAMP BASE

FIG.: 2137

SECTION B
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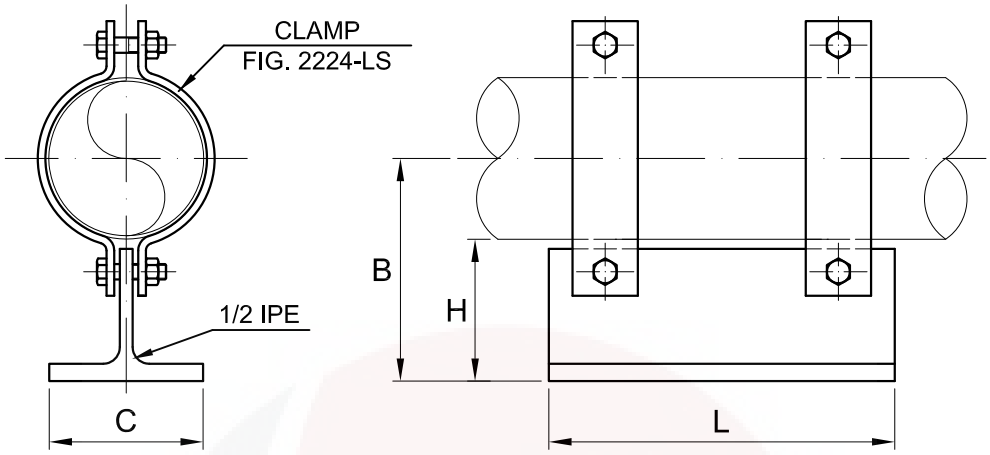
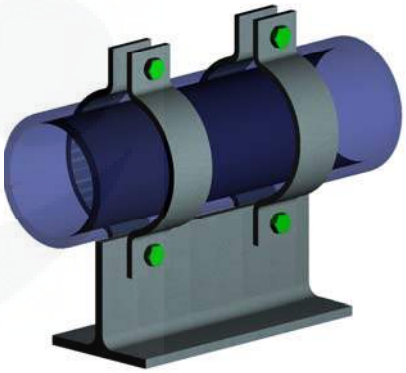


PIPE D.N.	B (mm)				L (mm)	MAX. REC. OPERATING LOAD (Kg)
	IPE-160	IPE-200	IPE-240	IPE-270		
1/2"	95	115	-	-	200	250
3/4"	98	118	-	-	200	250
1"	101	121	-	-	200	250
1 1/4"	105	125	-	-	200	250
1 1/2"	107	127	-	-	200	350
2"	113	133	153	-	200	450
2 1/2"	121	141	161	-	250	500
3"	129	149	169	-	250	500
4"	138	158	178	-	250	500
5"	-	173	193	208	250	650
6"	-	191	211	226	300	750
8"	-	217	237	252	300	750
10"	-	243	263	278	300	850
12"	-	269	289	304	350	950



APPLICATION: Pipe shoes with clamps to act as sliding supports for medium-low operating loads. Piping with or without insulation. Can be used as a guide by fitting double, triple or quadruple base pipe shoes.

ORDER FORM:

- Name.
- Figure.
- Pipe diameter.
- Height "B" or "H".
- Length "L" if not standard.

MATERIAL: Carbon steel.

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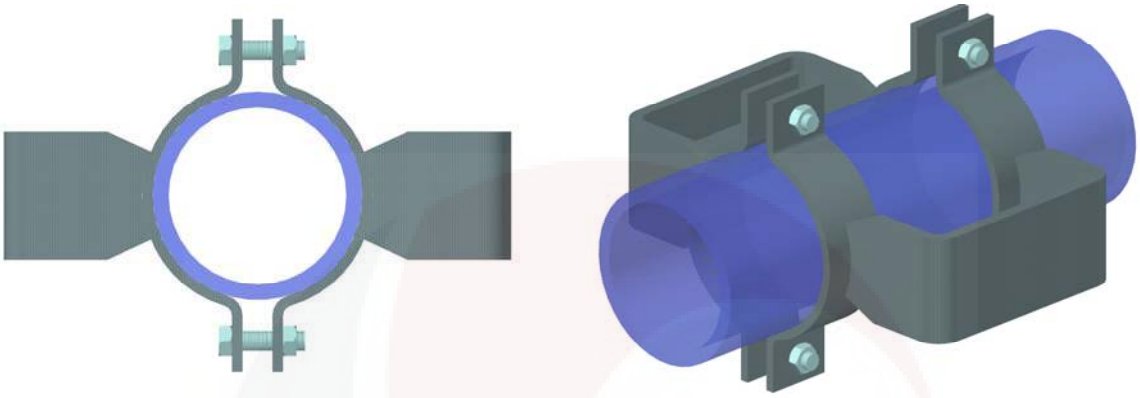
CLAMP BASE VARIATIONS

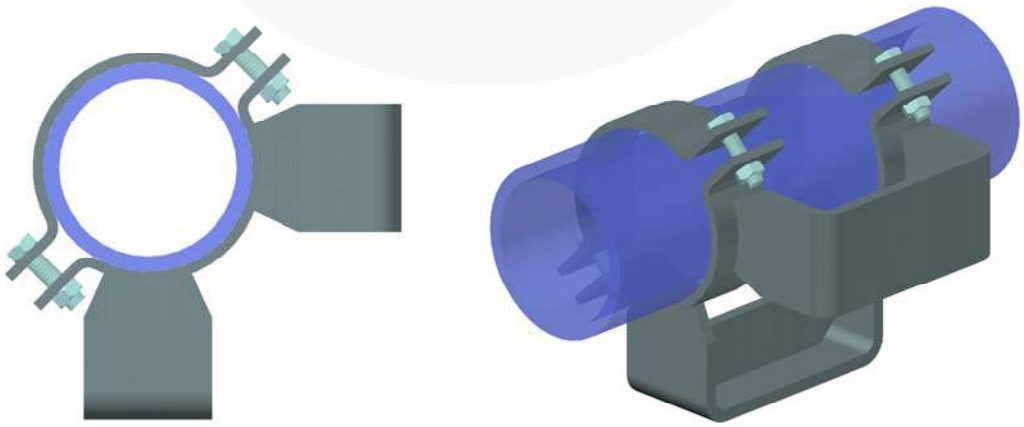
180º DOUBLE PIPE SHOES



TO SUPPORT EITHER VERTICAL LOADS OR LATERAL LOADS IN BOTH DIRECTIONS.

e.g.: Fig. 2136 180º Double.

90º DOUBLE PIPE SHOES



TO SUPPORT VERTICAL LOADS AND LATERAL LOADS IN A SINGLE DIRECTION.
e.g.: Fig. 2136 90º Double.

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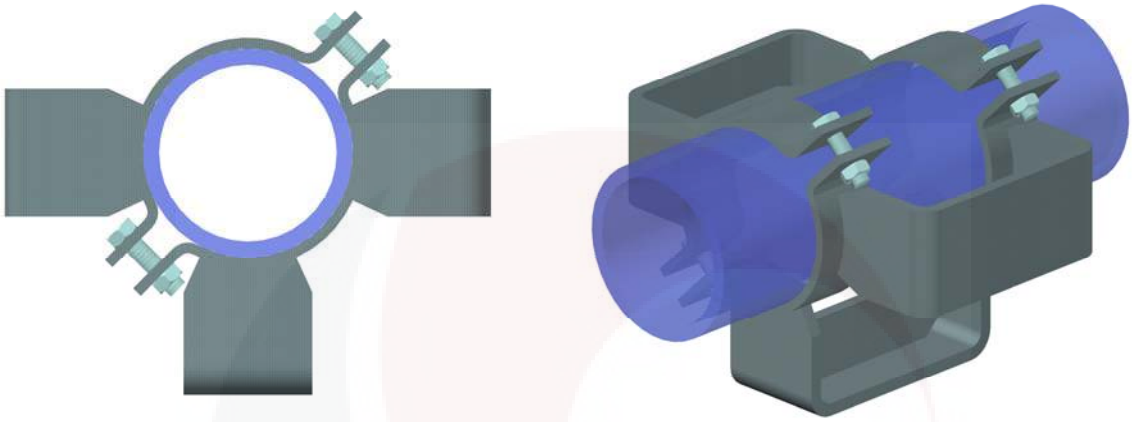
CLAMP BASE VARIATIONS

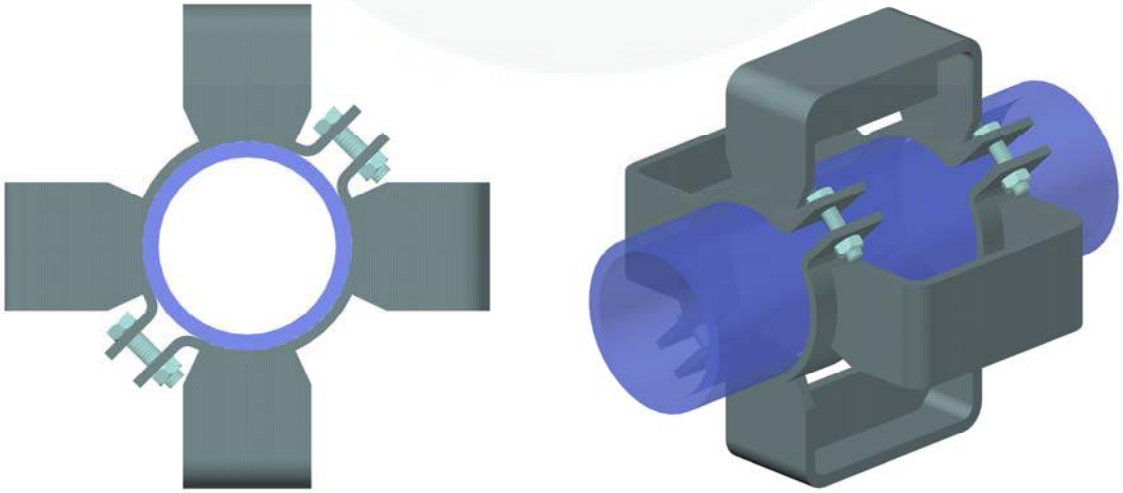
SECTION B
7

TRIPLE PIPE SHOES



TO SUPPORT VERTICAL LOADS AND LATERAL LOADS IN BOTH DIRECTIONS.
e.g.: Fig. 2136 Triple.

QUADRUPLE PIPE SHOES



TO SUPPORT LATERAL AND VERTICAL LOADS IN BOTH DIRECTIONS.
e.g.: Fig. 2136 Quadruple.

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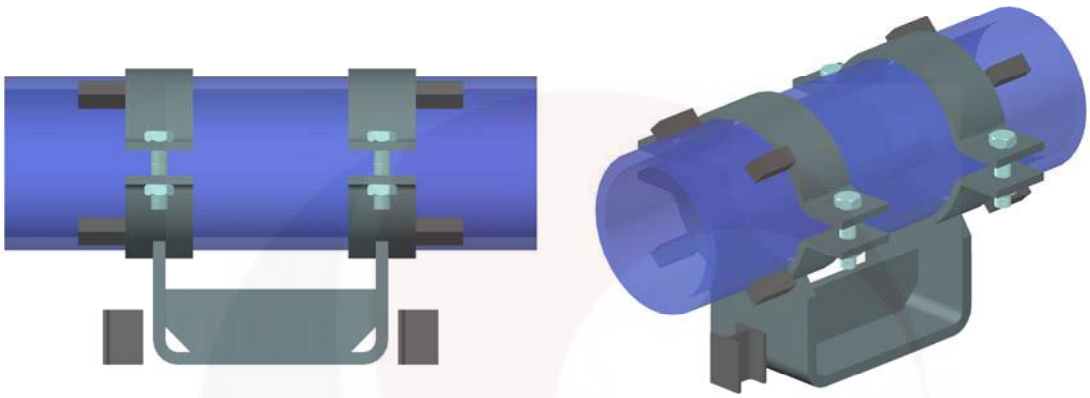
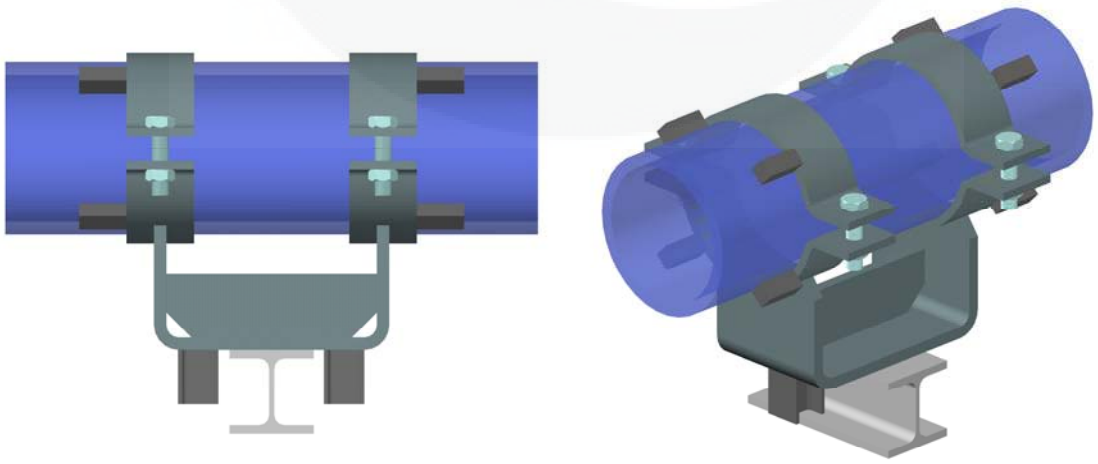
CLAMP BASE VARIATIONS

PIPE SHOES FOR AXIAL LOADS

- WITH LUGS WELDED TO THE PIPE



e.g.: Fig. 2136 FOR AXIAL STOP WITH LUGS. OPTION 1.

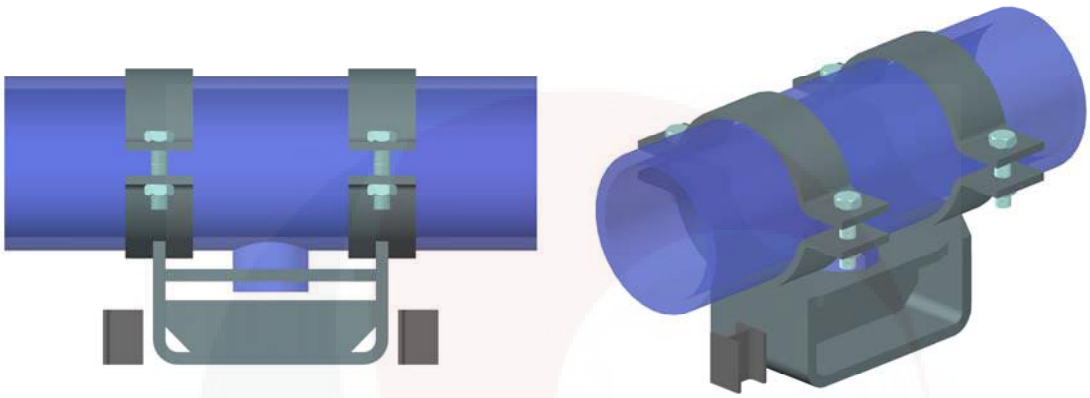


e.g.: Fig. 2136 FOR AXIAL STOP WITH LUGS. OPTION 2

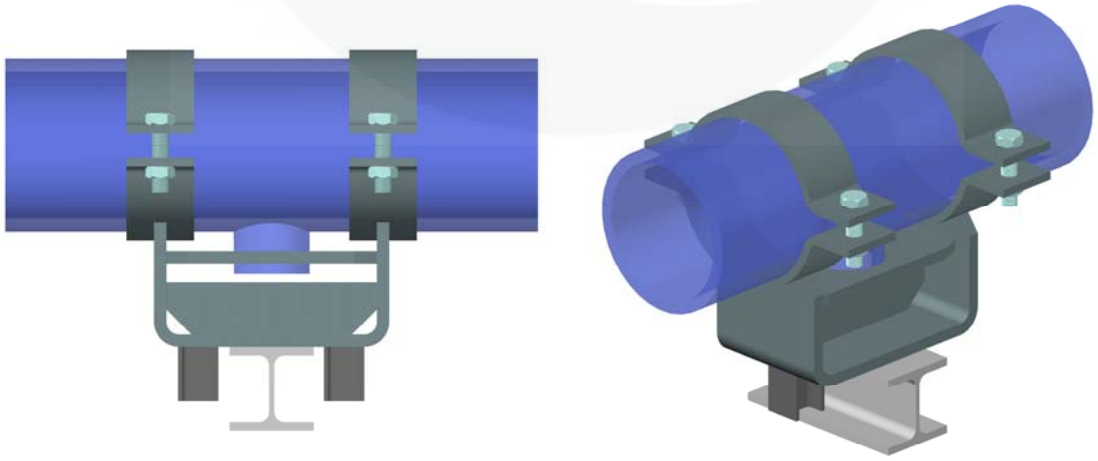
N.B.: The dimensions of the welded lugs and stop beams shall depend on de axial load.

PIPE SHOES FOR AXIAL LOADS

- WITH TRUNNION WELDED TO THE PIPE.



e.g.: Fig. 2136 FOR AXIAL STOP WITH TRUNNION. OPTION 1.



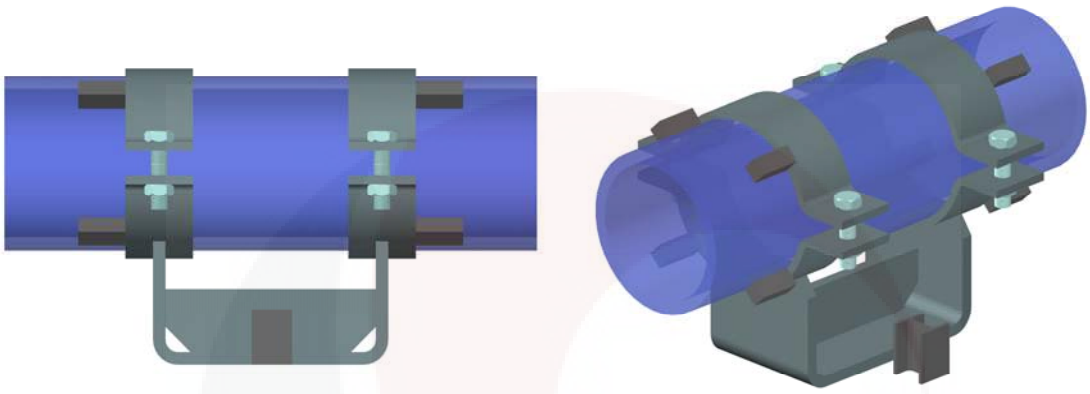
e.g.: Fig. 2136 FOR AXIAL STOP WITH TRUNNION. OPTION 2.

N.B.: The dimensions of the trunnions and the stop beams shall depend on the axial load.

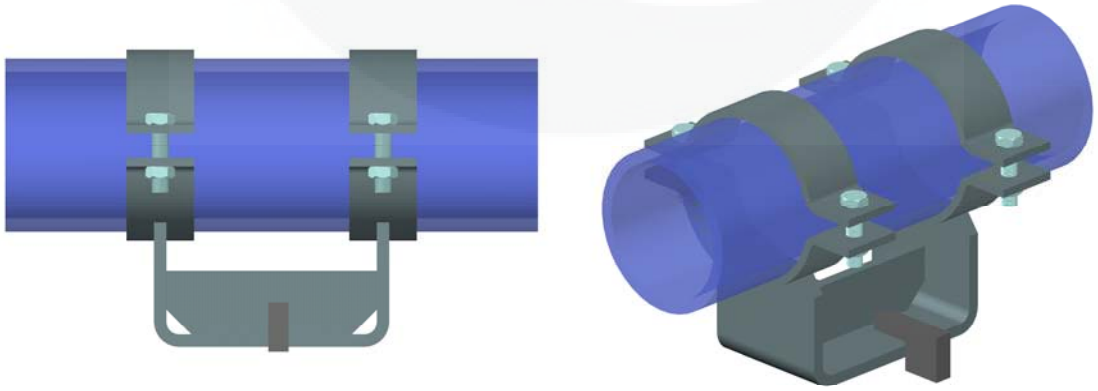
CLAMP BASE VARIATIONS

GUIDED CLAMP BASES

- WITH LUGS WELDED TO THE CLAMPS AND TO THE PIPE.



e.g.: Fig. 2136 FOR GUIDED CLAMP BASE WITH ANTI-ROTATING LUGS.

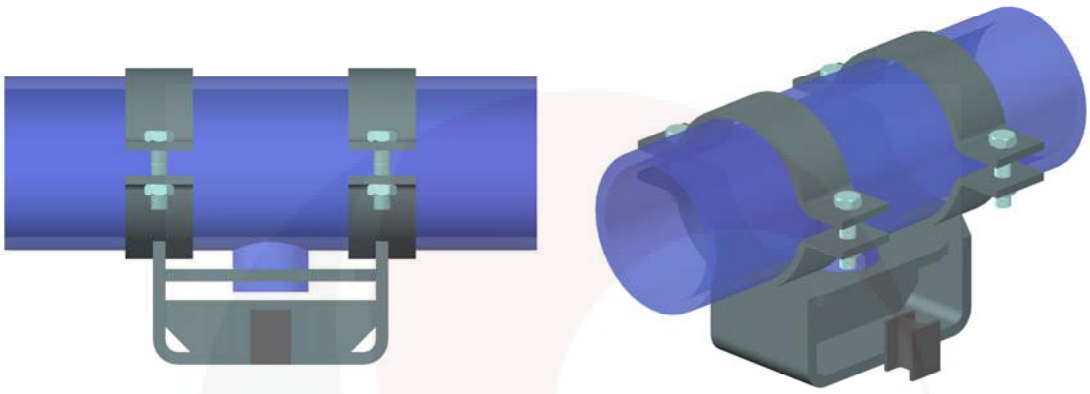


e.g.: Fig. 2136 WITH LIFT-OFF GUIDES.

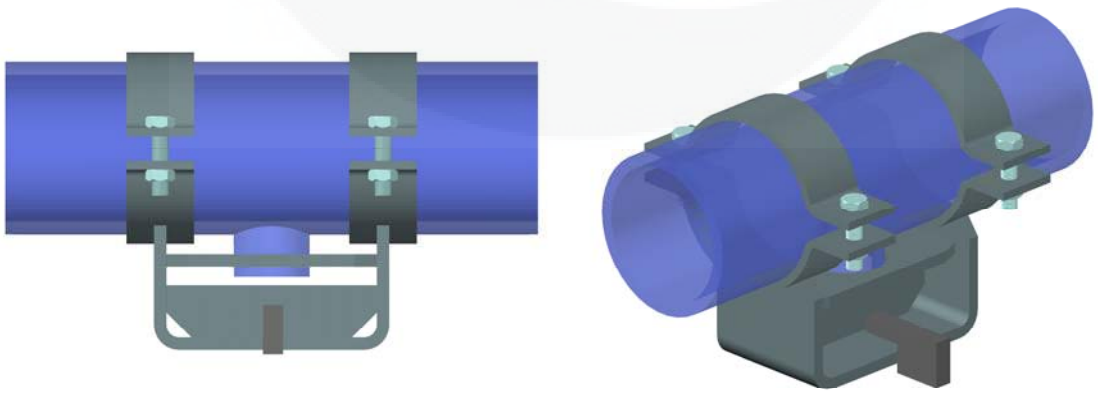
N.B.: The dimensions of the welded lugs, stop beams and lift-off guides will depend on the axial load.

GUIDED CLAMP BASES

- WITH TRUNNION WELDED TO THE PIPE.



e.g.: Fig. 2136 FOR GUIDED CLAMP BASE WITH ANTI-ROTATION LUGS.



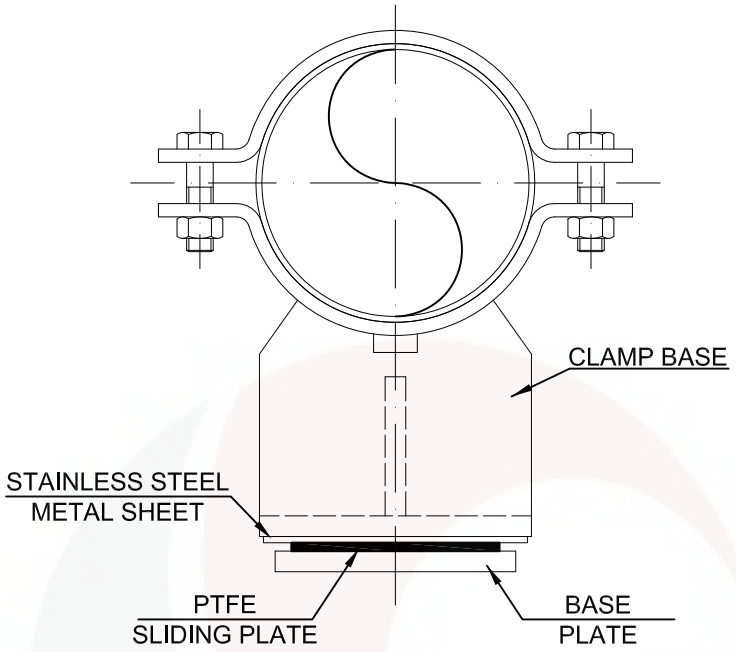
e.g.: Fig. 2136 WITH LIFT-OFF GUIDES

N.B.: The dimensions of the trunnions, anti-rotating lugs, stop beams and lift-off guides will depend on the axial load.

PTFE SLIDING PLATES

FIG.: 2138

SECTION B 12



APPLICATION: Appropriate for coupling sliding supporting points. These are usually fitted under the pipe shoes, on plates according to Fig. 2138 (enclosed sheets) or also on the loading plate of the variable load springs type F. The maximum permanent contact temperature recommended is 120ºC.

ASSEMBLY: The PTFE can be fitted onto different sized seating plates. Between PTFE and the support, generally, a stainless steel plate is fitted with a polished or semi-polished sliding upper plate (minimum recommended in 2B finish).

CHARACTERISTICS:

- Low friction coefficient.
- Chemically inert.
- High non-stick properties.
- Chemical stability between -180ºC and +280ºC.
- Good resilience to fragility at high and low temperatures.
- Maximum recommended operating stress: 10Mpa.

ORDER FORM:

- Name.
- Figure.
- Dimensions or number.

N.B.: Depending on customer requirements, PIHASA will send more complete details and make the appropriate design. The design of the figure is only representative since the assembly of the PTFE plate can be made in different ways, depending on the particular design for each case.

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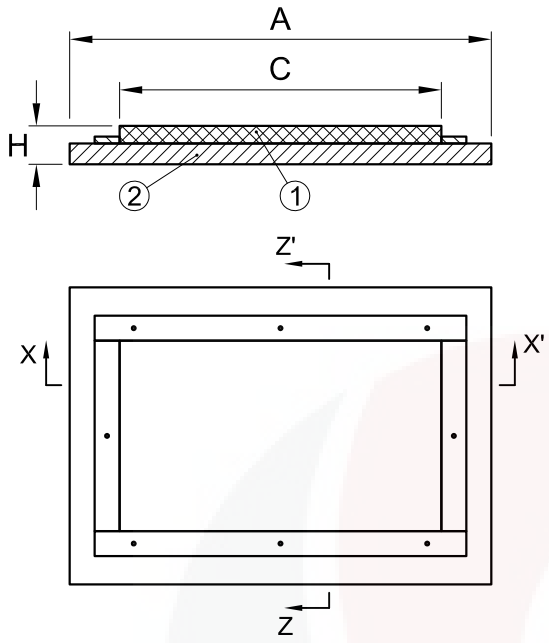
PTFE SLIDING PLATES

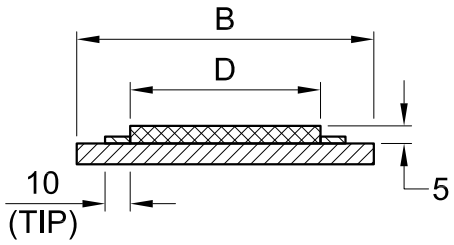
FIG.: 2138

SECTION B 13

VIEW X-X'



VIEW Z-Z'



① PTFE plate threaded on the side for bonding

② Carbon steel seating plate with the frame for inserting the PTFE plate.

No.	A (mm)	B (mm)	C (mm)	D (mm)	H (mm)	CALCULATED LOAD FOR 5 Mpa. (Kg)
01	80	80	50	50	13	1250
02	105	80	75	50	13	1875
03	130	80	100	50	13	2500
04	165	80	125	50	13	3125
05	180	80	150	50	13	3750
06	105	105	75	75	13	2810
07	130	105	100	75	13	3750
08	180	105	150	75	13	5265
09	230	105	200	75	13	7500
10	130	130	100	100	13	5000
11	180	130	150	100	13	7500
12	230	130	200	100	13	10000
13	280	130	250	100	13	12500
14	330	130	300	100	13	15000
15	180	180	150	150	15	11250

No.	A (mm)	B (mm)	C (mm)	D (mm)	H (mm)	CALCULATED LOAD FOR 5 Mpa. (Kg)
16	230	180	200	150	15	15000
17	280	180	250	150	15	18750
18	330	180	300	150	15	22500
19	430	180	400	150	15	30000
20	230	230	200	200	15	20000
21	330	230	300	200	15	30000
22	430	230	400	200	15	40000
23	280	280	250	250	15	31250
24	330	280	300	250	15	37500
25	430	280	400	250	15	50000
26	530	280	500	250	15	62500
27	330	330	300	300	15	45000
28	430	330	400	300	15	60000
29	530	330	500	300	15	75000
30	430	430	400	400	15	80000

N.B.:

- The standard assembly is to support the PTFE plate against a polished or semi-polished stainless steel plate, obtaining a friction coefficient of less than 0.1.
  The dimensions of the stainless steel plate should be oversized in terms of that of the PTFE, depending on the expected movements.

- Support can also be made against another PTFE plate as upper sliding plate. With the oiled surface, the friction coefficient should not exceed a value of 0.05.

- The joint below the structure is made by applying alternate welding beads, with controlled thermal contribution, in order to avoid transmitting excessive heat to the PTFE plate.

- It may be manufactured in intermediate sizes and in any dimension, both the base plate and the PTFE, as well as in any thickness on the condition that it be greater than or equal to 8 mm.

- It is advisable not to exceed 120ºC as continuous operating temperature.

- Other options:
  - Plates incorporating restrictions on movement.
  - Plates that allow for swinging (by cylindrical or spherical supports).
  - Special plates according to the design supplied by the customer.

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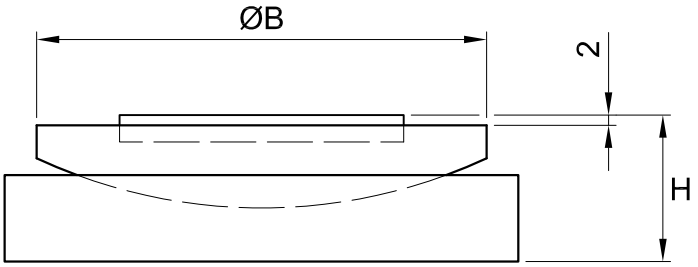
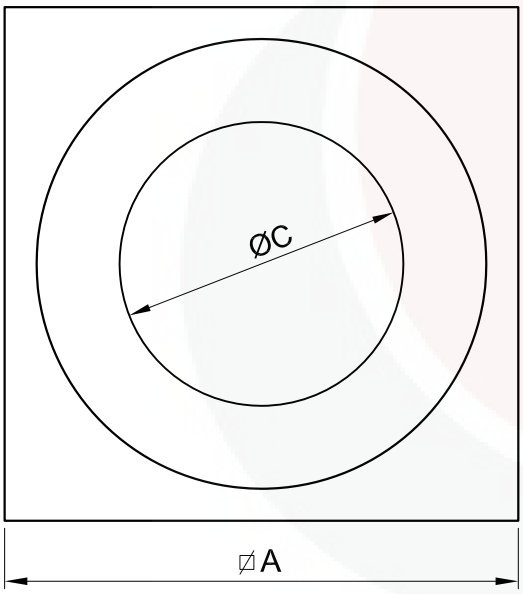
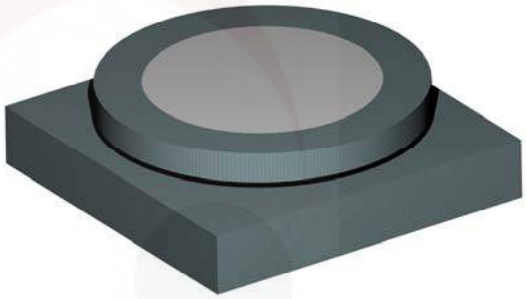
PTFE SPHERICAL SLIDING PLATES

FIG.: 2138 SPH

SECTION B 14







No.	⍁A (mm)	ØB (mm)	ØC (mm)	H (mm)	MAX. REC. LOAD (Kg)
1	90	80	50	32	975
2	115	105	75	35	2200
3	140	130	100	38	3900
4	160	150	120	37	5650
5	190	180	150	44	8825
6	220	210	200	44	15700

N.B.:

- Maximum angling ± 2° in all directions.
- On special request, this angling may be increased, but the dimensions may be affected.

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SELF-LUBRICATING GRAPHITE-BRONZE PLATES

FIG.: 2139

SECTION B
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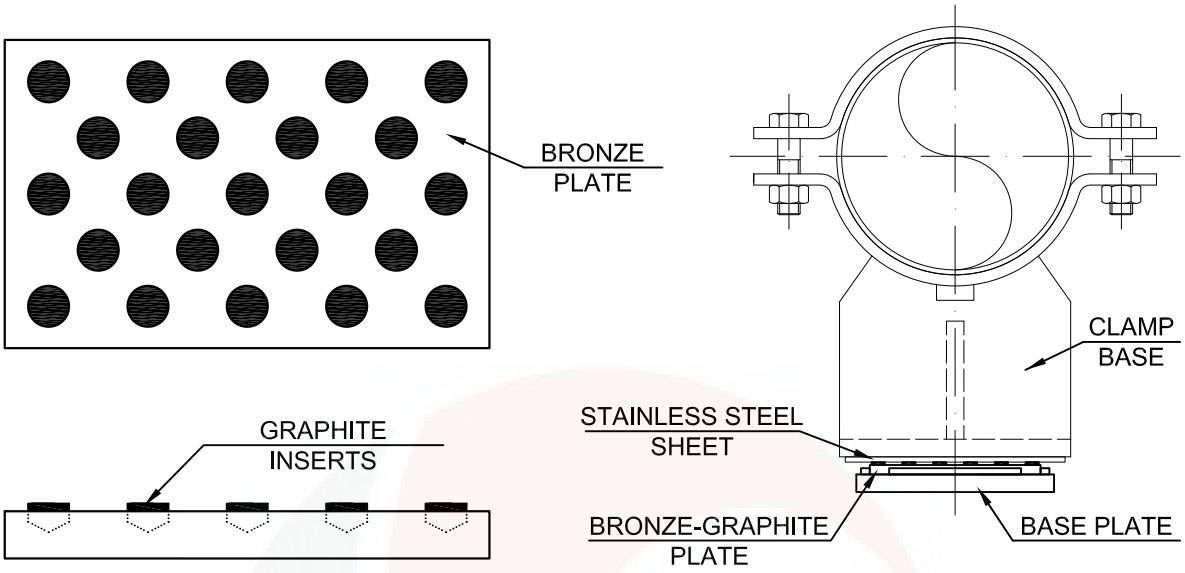

MATERIAL: The base element is a bronze alloy with small amounts of other materials (Pb, Zn, etc.). The lubricant element comprises graphite as the base element, with the addition of small amounts of metals, metal oxides and other lubricant elements.

APPLICATIONS: This material is specially appropriate for coupling to points where the support may need to be made sliding, due to it slow friction coefficient. This has a good response in adverse environmental conditions (sandy areas, etc.), a high resilience to abrasion and a high load capacity.

ASSEMBLY: The graphite-bronze strips can be fitted onto the support plates or profiles in different materials, depending on the design. A stainless steel plate should be fitted between the graphite-bronze strip and the support itself.

GEOMETRICAL FORMS: These supports can be supplied in the form of:
- Square or rectangular plate.
- Circular crown.
- Bushings.
- Rotating joints.

CHARACTERISTICS: The essential characteristic is its low friction coefficient:
- For high loads: 0.04 to 0.08.
- For low loads: 0.09 to 0.1.
- The sliding speed between plates should be less than 150 metres per minute. It has a high resilience to use.
- Work torque should not exceed 15 Mpa.
- The range of temperature use is very broad, with very high temperatures (600ºC).

ORDER FORM: In accordance with customer technical requirements, PIHASA will present full details, fitting the most adequate plate in each particular case.

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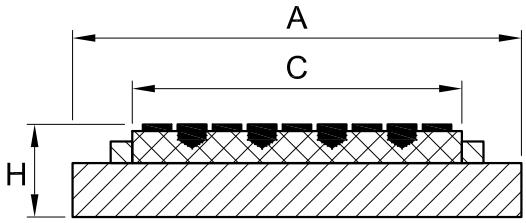
SELF-LUBRICATING GRAPHITE-BRONZE PLATES

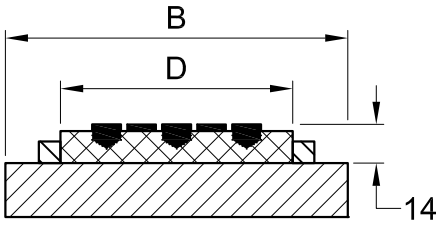
FIG.: 2139

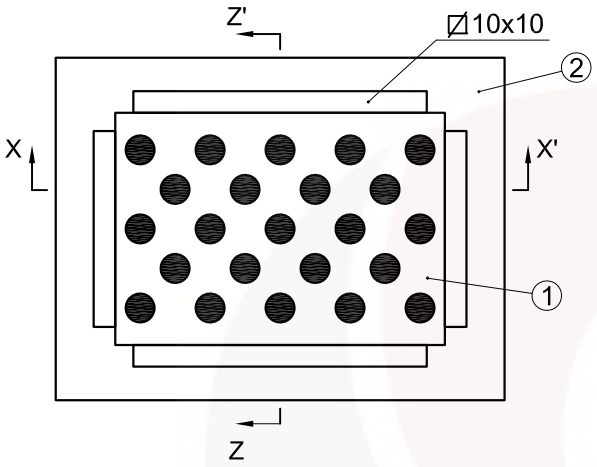
SECTION B 16

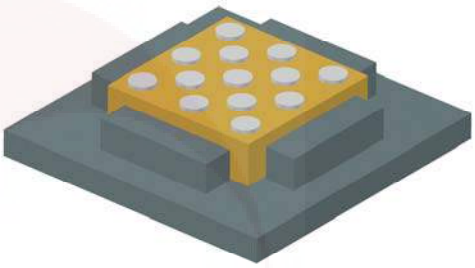
VIEW X-X'



VIEW Z-Z'







No.	A (mm)	B (mm)	C (mm)	D (mm)	H (mm)	NUMBER OF PLATES	MAX. REC. LOAD (Kg)
01	90	90	50	50	22	1	3750
02	115	90	75	50	22	1	5625
03	140	90	100	50	22	1	7500
04	190	90	150	50	22	1	11250
05	115	115	75	75	22	1	8435
06	140	115	100	75	22	1	11250
07	190	115	150	75	22	1	16875
08	240	115	200	75	22	1	22500
09	340	115	300	75	22	2	33750
10	140	140	100	100	24	1	15000
11	190	140	150	100	24	1	22500
12	240	140	200	100	24	1	30000
13	340	140	300	100	24	2	45000
14	190	190	150	150	24	1	33750
15	240	190	200	150	24	1	45000
16	340	190	300	150	24	2	67500
17	440	190	400	150	24	2	90000
18	240	240	200	200	26	1	60000
19	340	240	300	200	26	2	90000
20	440	240	400	200	26	2	120000
21	540	240	500	200	26	3	150000

① Self-lubricating bronze plate with graphite inserts.

② Carbon steel plate with 10x10 square frame for fitting graphite-bronze plate.

N.B.:

- The installation is made by welding to the supporting structure.
- This can be manufactured in intermediary sizes and in any dimension, both the base plate and the graphite-bronze, as well as any thickness, on the condition that it be greater than or equal to 15 mm.
- It allows for a operating temperature of up to 500ºC - 600ºC.

- Other options:
* Plates incorporating restrictions on movement.
* Plates that allow for swinging (by means of cylindrical or spherical supports).
* Special plates, following the design supplied by the customer.

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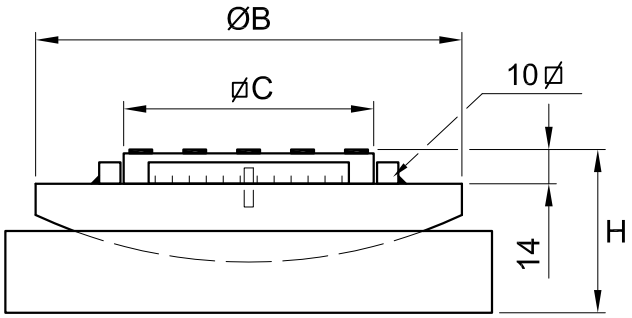
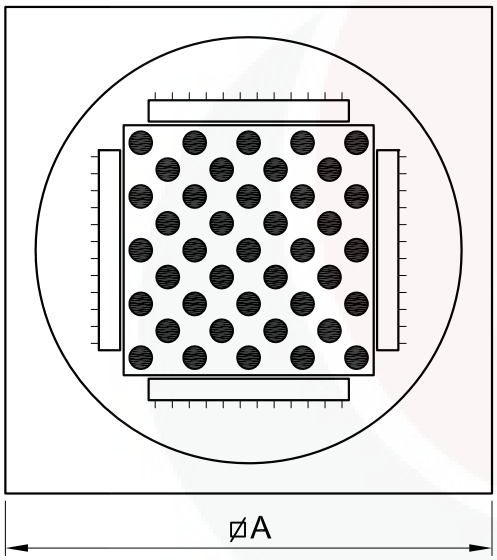
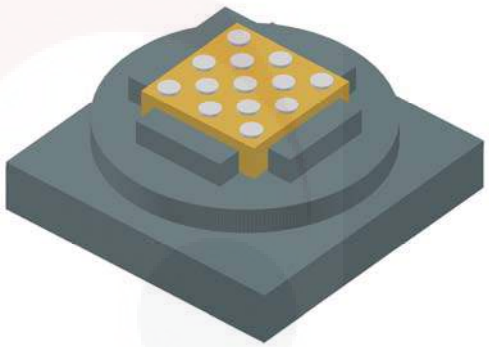
SELF-LUBRICATING SPHERICAL GRAPHITE-BRONZE PLATES

FIG.: 2139 SPH

SECTION B 17







No.	⌀A (mm)	ØB (mm)	⌀C (mm)	H (mm)	MAX. REC. LOAD (Kg)
1	100	90	50	39	2250
2	130	120	75	42	5050
3	170	160	100	50	9000
4	200	190	120	54	12750
5	240	230	150	61	20000

N.B.:

- Maximum angling ±2° in all directions.
- On special request, this angling may be increased, but the dimensions may be affected.

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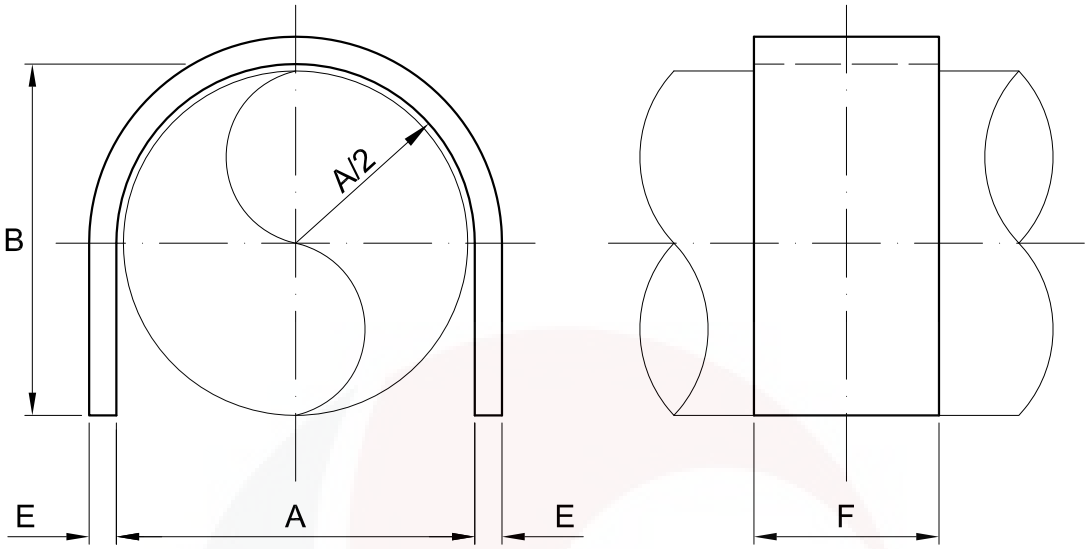
WELDED PIPE STRAP
DIAM. Ø ≤ 6"

FIG.: 2250

SECTION B
18



PIPE Ø	A (mm)	B (mm)	E (mm)	F (mm)	WEIGHT (Kg)	MAX. REC. LATERAL LOAD (Kg)
1/2"	23	23	6	30	0,1	150
3/4"	28	28	6	30	0,12	150
1"	35	35	6	40	0,2	200
1 1/4"	44	43	6	40	0,25	200
1 1/2"	50	49	8	50	0,45	250
2"	62	61	8	50	0,55	250
2 1/2"	75	74	8	50	0,7	250
3"	91	90	10	60	1,2	300
4"	117	116	10	60	1,5	300
5"	145	144	10	60	1,9	300
6"	172	171	12	70	3,1	375

APPLICATION: For guiding uninsulated pipes.

ORDER FORM:
- Name.
- Figure.
- Pipe diameter.

N.B.: - can be manufactured in greater diameters (not recommended) by similar parts with side stiffeners.

- Vertical orientated loads are far greater than the lateral loads indicated (not less than 4 times that indicated).

- Tolerances at levels A and $B^{+1,5}_{-0}$

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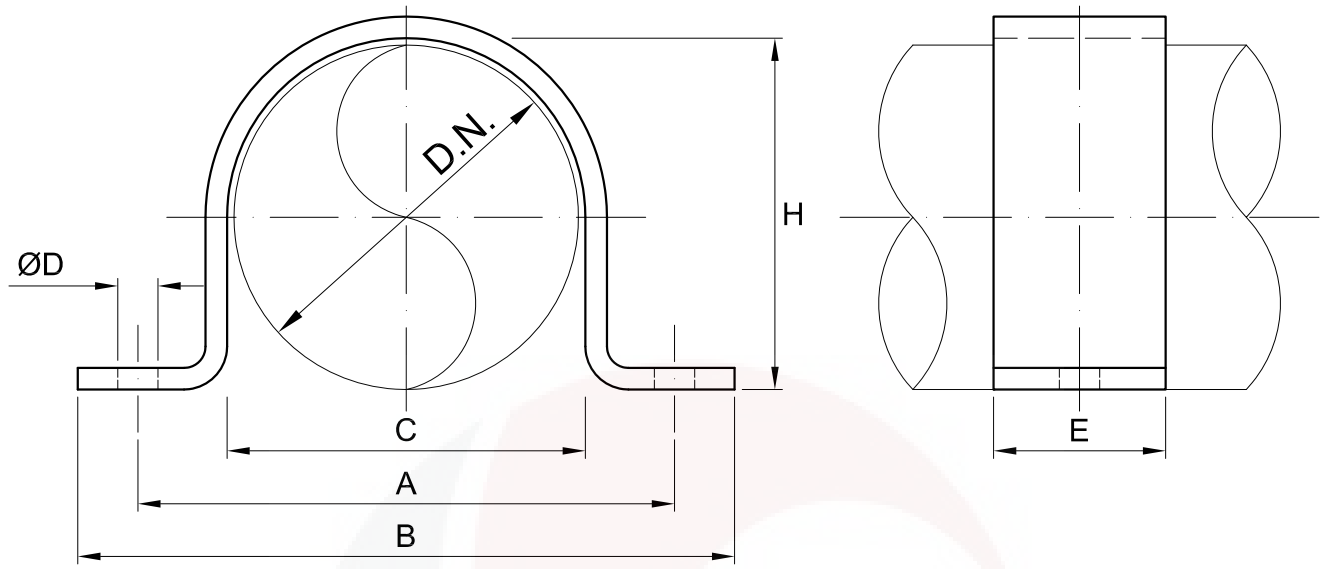
GUIDE CLAMP

FIG.: 2251

SECTION B
19



No.	D.N.	A (mm)	B (mm)	C (mm)	ØD (mm)	E (mm)	H (mm)	WEIGHT (Kg)
1	1/2"	70	110	25	11,5	30	23	0,18
2	3/4"	75	115	31	11,5	30	29	0,2
3	1"	85	135	38	11,5	35	35	0,28
3 a	1 1/4"	95	145	47	11,5	35	44	0,32
4	1 1/2"	110	170	53	13,5	60	50	0,65
5	2"	140	200	65	13,5	60	62	0,8
6	2 1/2"	155	215	77	13,5	60	75	0,9
7	3"	170	240	93	15,5	60	91	1
8	4"	196	266	118	15,5	60	116	1,6
8 a	5"	222	292	146	15,5	60	144	1,8
9	6"	250	320	174	15,5	60	171	2,1
10	8"	312	382	225	17,5	60	222	2,7
11	10"	375	445	279	17,5	80	276	5,3
12	12"	416	486	330	17,5	80	327	6,2
13	14"	460	530	362	19,5	80	359	8,5
14	16"	514	584	412	19,5	80	409	9,2
15	18"	565	635	463	19,5	80	460	10,5
16	20"	617	687	514	19,5	80	511	11,5

APPLICATION: For guiding the pipe in lines on the ground or on a structure.

MATERIAL: Carbon steel, alloy steel and stainless steel.

ORDER FORM:
- Name.
- Figure.
- Pipe diameter.

N.B.: Can be manufactured in other diameters, special or greater, than those indicated.

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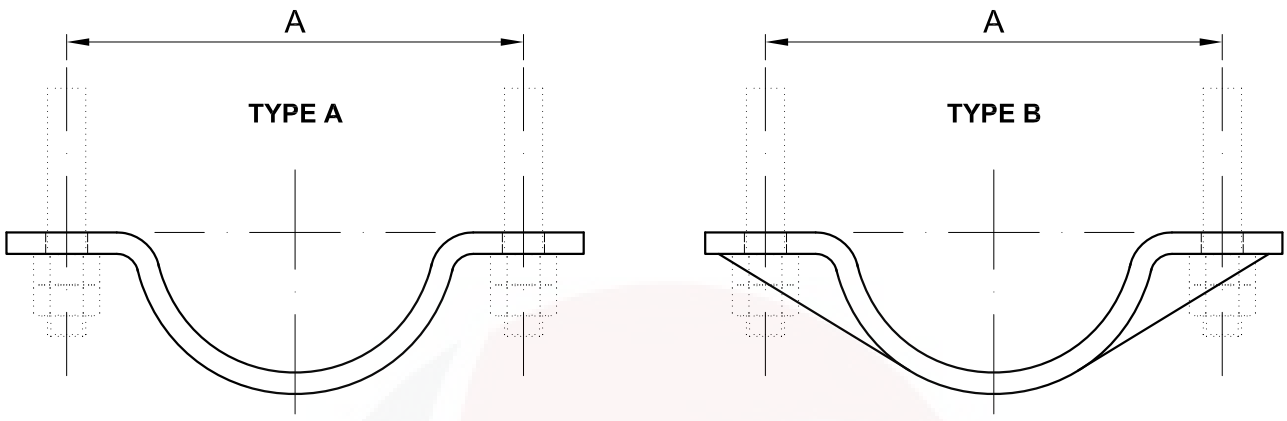
SEMI-CLAMP

FIG.: 2252

SECTION B
20



APPLICATION: hanging piping by hanger rods, coupled to the ends of the semi-clamp. Requires little space between the structure and the piping.

TYPES:
"TYPE A".- Semi-clamp with no stiffeners.
"TYPE B".- Semi-clamp with side stiffeners.

SELECTION METHOD: According to the illustration on the following page.
In this illustration, the required flatbar size is obtained in terms of the required load and the distance between the hanger rods (Level "A"). Selection is valid for carbon steel semi-clamps up to temperatures of 300ºC. The same coefficients and qualities as indicated on sheet A-20 will be used for high temperatures.

1º.- At the required load point, a horizontal is traced until it crosses with the vertical traced from the distance between axes (Level "A") required. The intersection of these two straight lines will give the flatbar to be used.
In the event of this point falling between two flatbar values, the higher of the two is chosen.

2º.- A horizontal is traced through the previous intersection, until it crosses with the scale of hanger rods, at the intersection, giving the rod metric to use.

MATERIAL: Carbon steel, alloy steel and stainless steel.

ORDER FORM:
- Name.
- Figure.
- Pipe diameter.
- Distance between axes on the external bolts (level "A").
- Load.
- Operating temperature on the piping.

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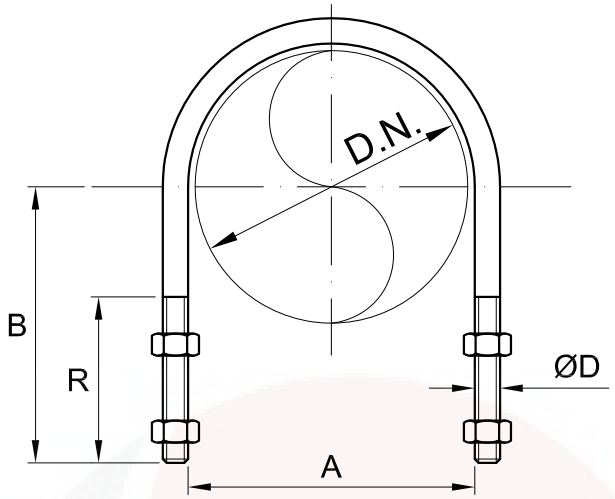
U-BOLT

FIG.: 2280

SECTION B 22



No.	D.N.	A (mm)	B (mm)	R (mm)	THREAD	WEIGHT (Kg)	MAX. REC. LOAD (Kg)
1	1/2"	24	40	35	M6	0,04	300
2	3/4"	29	45	40	M6	0,05	300
3	1"	36	50	40	M8	0,07	500
3 a	1 1/4"	45	50	40	M8	0,09	500
4	1 1/2"	51	55	45	M10	0,17	700
5	2"	64	70	55	M10	0,2	700
6	2 1/2"	76	80	65	M12	0,3	1000
7	3"	92	90	65	M12	0,4	1000
8	4"	118	115	75	M12	0,5	1000
8 a	5"	145	135	85	M12	0,7	1000
9	6"	172	155	95	M16	1,1	2200
10	8"	223	180	95	M16	1,5	2200
11	10"	277	215	100	M20	2,5	3500
12	12"	328	245	105	M24	4,2	5000
13	14"	360	260	105	M24	4,5	5000
14	16"	411	285	105	M24	5	5000
15	18"	462	320	120	M24	5,5	5000
16	20"	512	350	120	M24	6	5000
17	24"	614	400	120	M24	7	5000
18	30"	766	475	120	M24	8	5000

APPLICATION: securing piping to the structure by fitting four nuts. Valid for guiding uninsulated pipes, for low lateral loads (maximum 30% of the given vertical load).

MATERIAL: Carbon steel and stainless steel.

ORDER FORM:

- Name.
- Figure.
- Pipe diameter.

N.B.: Can be manufactured in dimensions other than those indicated.

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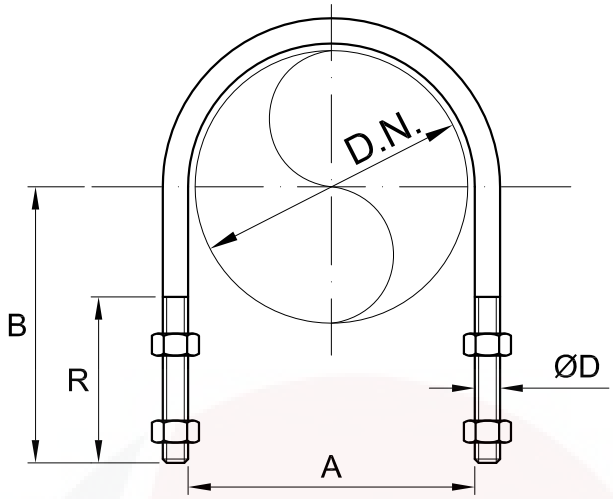
LIGHT U-BOLT

FIG.: 2281

SECTION B 23



No.	D.N.	A (mm)	B (mm)	R (mm)	THREAD	WEIGHT (Kg)	MAX. REC. LOAD (Kg)
1	1/2"	24	30	22	M6	0,03	250
2	3/4"	29	35	24	M6	0,03	250
3	1"	36	44	29	M6	0,04	250
3 a	1 1/4"	45	49	29	M6	0,05	250
4	1 1/2"	51	54	32	M8	0,08	350
5	2"	64	59	32	M8	0,09	350
6	2 1/2"	76	79	43	M10	0,18	550
7	3"	92	84	43	M10	0,20	550
8	4"	118	95	43	M10	0,24	550
8 a	5"	145	113	48	M10	0,28	550
9	6"	172	126	48	M10	0,31	550
10	8"	223	152	48	M10	0,38	550
11	10"	277	179	48	M10	0,45	550
12	12"	328	214	60	M12	0,75	1050
13	14"	360	229	60	M12	0,80	1050
14	16"	411	264	70	M12	0,90	1050
15	18"	462	296	80	M12	1,9	1150
16	20"	512	324	80	M12	2,1	1150

APPLICATION: Securing piping to the structure by fitting four nuts.

MATERIAL: Carbon steel and stainless steel

ORDER FORM:

- Name.
- Figure.
- Pipe diameter.

N.B.: Can be manufactured in dimensions other than those indicated.

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ROLLERS

FIG.: 2297

SECTION B
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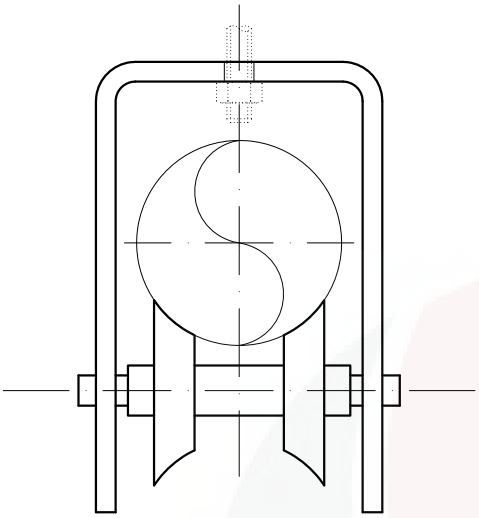
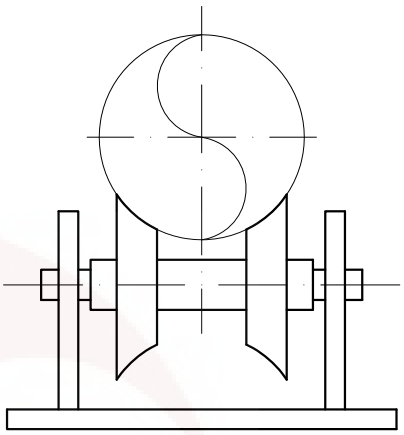
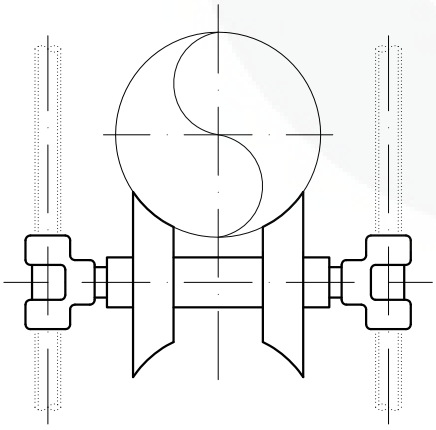
TYPE A
(For hanging with a single rod)



TYPE B
(For supporting on the floor)

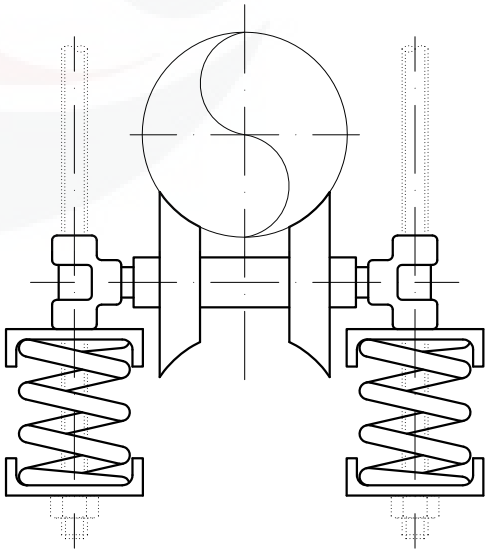


TYPE C
(For hanging with two rods)



TYPE D
(For hanging with springs)

No.	1	2	3
LOAD (Kg)	400	1300	3000



APPLICATION: To allos for axial movements due to thermal dilation of the pipe.

ORDER FORM:

- Name.
- Figure.
- Type.
- Load.
- Pipe diameter.

N.B.: Having received the data on the required roller, the most suitable will be manufactured for the dimensions and loads requested by the client.

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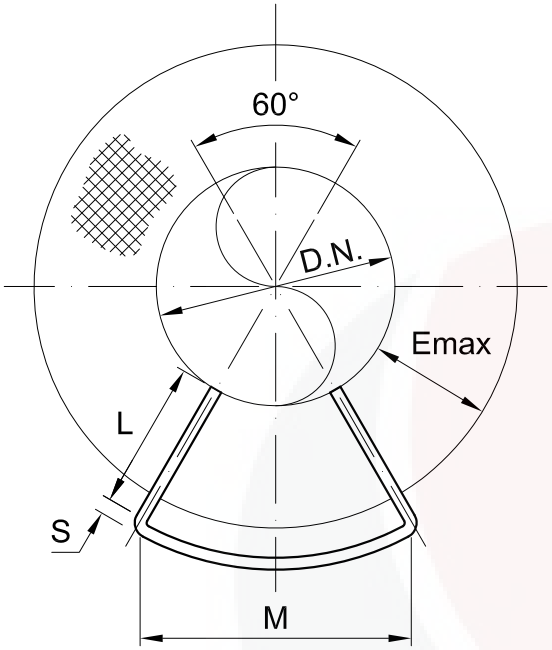
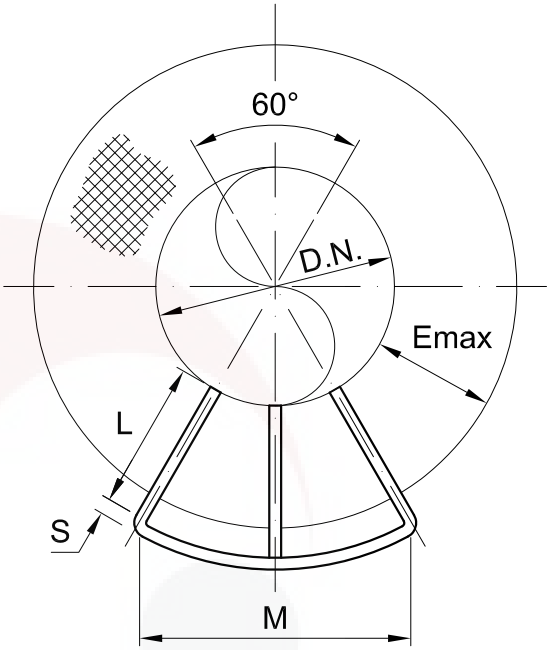
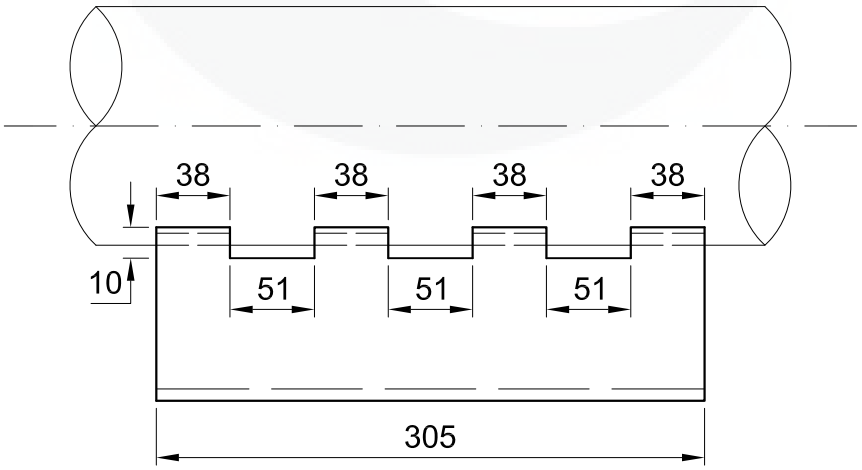
SADDLES	FIG.: 2300 TO 2310	SECTION B 25

NORMAL SADDLE



WIDE SADDLE





APPLICATION: For supporting piping with insulation.

ORDER FORM:

- Name.
- Figure.
- Pipe diameter.

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FIG. 2300 -NORMAL SADDLE - 25 mm. INSULATION

No.	D.N.	Emax. (mm)	L (mm)	M (mm)	S (mm)	MAX. REC. LOAD (Kg)
1	3/4"	25	26	40	4	525
2	1"	25	28	45	4	525
3	1 1/2"	25	28	53	4	525
4	2"	25	28	59	4	525
5	2 1/2"	25	28	66	5	525
6	3"	25	28	75	5	525
7	4"	25	28	86	6	800
8	6"	25	32	117	6	800

FIG. 2301 - NORMAL SADDLE - 40 mm. INSULATION

No.	D.N.	Emax. (mm)	L (mm)	M (mm)	S (mm)	MAX. REC. LOAD (Kg)
1	3/4"	40	41	55	4	525
2	1"	40	43	60	4	525
3	1 1/2"	40	43	68	4	525
4	2"	40	43	74	4	525
5	2 1/2"	40	43	81	6	525
6	3"	40	43	90	6	800
7	4"	40	43	101	6	800
8	6"	40	43	128	6	800
9	8"	40	44	154	6	800

FIG. 2302 - WIDE SADDLE - 40 mm. INSULATION

No.	D.N.	Emax. (mm)	L (mm)	M (mm)	S (mm)	MAX. REC. LOAD (Kg)
1	10"	40	45	182	10	800
2	12"	40	50	213	10	2250
3	14"	40	45	223	12	2250
4	16"	40	50	254	12	2250
5	18"	40	46	269	12	2250
6	20"	40	46	301	15	3250
7	24"	40	46	351	15	3250
8	30"	40	46	426	15	3250
9	36"	40	46	503	15	3250

FIG. 2303 - NORMAL SADDLE -50 mm. INSULATION

No.	D.N.	Emax. (mm)	L (mm)	M (mm)	S (mm)	MAX. REC. LOAD (Kg)
1	3/4"	50	51	65	4	525
2	1"	50	53	70	4	525
3	1 1/2"	50	53	78	5	800
4	2"	50	53	84	6	800
5	2 1/2"	50	53	91	6	800
6	3"	50	55	100	6	800
7	4"	50	55	114	6	800
8	6"	50	57	142	6	800
9	8"	50	54	164	8	800

FIG. 2304 - WIDE SADDLE - 50 mm. INSULATION

No.	D.N.	Emax. (mm)	L (mm)	M (mm)	S (mm)	MAX. REC. LOAD (Kg)
1	10"	50	55	192	10	2250
2	12"	50	60	223	10	2250
3	14"	50	55	233	12	2250
4	16"	50	60	264	12	2250
5	18"	50	51	276	15	3250
6	20"	50	56	311	15	3250
7	24"	50	56	361	15	3250
8	30"	50	56	436	15	3250
9	36"	50	56	513	20	3250

SADDLES

FIG.: 2305 TO 2310

SECTION B 27

FIG. 2305 - NORMAL SADDLE - 65 mm. INSULATION

No.	D.N.	Emax. (mm)	L (mm)	M (mm)	S (mm)	MAX. REC. LOAD (Kg)
1	1 1/2"	65	68	93	5	800
2	2"	65	68	99	5	800
3	2 1/2"	65	68	106	6	800
4	3"	65	68	113	6	800
5	4"	65	68	126	6	800
6	6"	65	70	157	8	800
7	8"	65	70	179	8	800

FIG. 2306 - WIDE SADDLE - 65 mm. INSULATION

No.	D.N.	Emax. (mm)	L (mm)	M (mm)	S (mm)	MAX. REC. LOAD (Kg)
1	10"	65	70	207	12	2250
2	12"	65	76	239	12	2250
3	14"	65	71	250	12	2250
4	16"	65	71	276	15	3250
5	18"	65	66	291	15	3250
6	20"	65	71	326	15	3250
7	24"	65	71	376	15	3250
8	30"	65	71	451	20	3250
9	36"	65	71	528	20	3250

FIG. 2307 - NORMAL SADDLE - 75 mm. INSULATION

No.	D.N.	Emax. (mm)	L (mm)	M (mm)	S (mm)	MAX. REC. LOAD (Kg)
1	2"	75	78	109	5	800
2	2 1/2"	75	78	116	5	800
3	3"	75	80	125	5	800
4	4"	75	78	136	6	800
5	6"	75	82	167	8	800
6	8"	75	79	189	8	800

FIG. 2308 - WIDE SADDLE - 75 mm. INSULATION

No.	D.N.	Emax. (mm)	L (mm)	M (mm)	S (mm)	MAX. REC. LOAD (Kg)
1	10"	75	81	218	12	2250
2	12"	75	86	249	12	2250
3	14"	75	80	258	12	2250
4	16"	75	82	286	15	3250
5	18"	75	76	301	15	3250
6	20"	75	81	336	15	3250
7	24"	75	81	386	20	3250
8	30"	75	81	461	20	3250
9	36"	75	81	538	20	3250

FIG. 2309 - NORMAL SADDLE - 100 mm. INSULATION

No.	D.N.	Emax. (mm)	L (mm)	M (mm)	S (mm)	MAX. REC. LOAD (Kg)
1	4"	100	103	161	8	800
2	6"	100	108	193	8	800
3	8"	100	104	214	8	800

FIG. 2310 - WIDE SADDLE - 100 mm. INSULATION

No.	D.N.	Emax. (mm)	L (mm)	M (mm)	S (mm)	MAX. REC. LOAD (Kg)
1	10"	100	106	243	12	2250
2	12"	100	111	274	12	2250
3	14"	100	102	280	15	3250
4	16"	100	107	311	20	3250
5	18"	100	101	326	20	3250
6	20"	100	106	361	20	3250
7	24"	100	106	411	20	3250
8	30"	100	106	486	20	3250
9	36"	100	106	563	20	3250

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SECTION C

PREINSULATED SUPPORTS

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PREINSULATED SUPPORTS: THERMAL, COLD & CRIOGENIC SUPPORTS

Preinsulated supports use high density, mechanically capable, insulation materials between the pipe and the steel clamp or shoe in order to bear the load and movement of the pipe while ensuring the following additional benefits compared to conventional supports:

- minimize thermal losses from the piping system to the outside environment through the pipe support
- avoid the formation of ice blocks or condensation around the support in cryogenic or cold service
- guarantee personal protection around hot or cold pipelines
- make it technically and economically viable to support very high temperature pipelines which use very special steel grades

In order to be able to provide these solutions to our clients, at PIHASA we have established alliances with several partners that provide us with access to the most innovative and efficient materials that can be used for the fabrication and supply of preinsulated supports for hot and cold service:

- high density molded polyurethane foam (“PUF”), which is currently the most commonly used insulation material for pipe supports in cold and cryogenic pipelines, with a service temperature range from -196ºC up to +100ºC
- cellular glass, very convenient for dual-operation pipelines due to its wide temperature range, from -260ºC to +430ºC
- densified hardwood for cold and cryogenic service, which is commonly used as a high-density insulation material for stops and anchors
- calcium silicate and other inorganic composite materials with a very wide range of densities and temperature ranges, up to +1000ºC

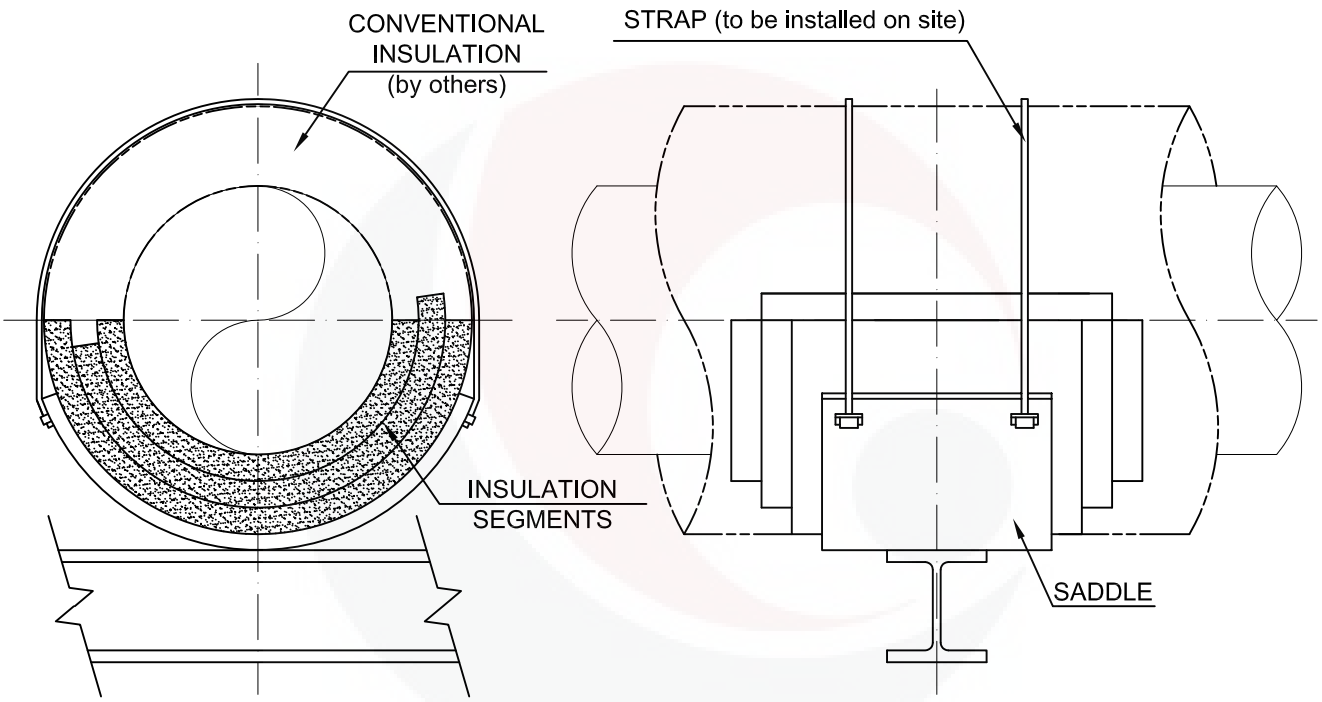
It must be taken into consideration that all these insulation materials display their best mechanical properties when working under compression, so the support designs must ensure that load is transferred to the insulation material in such manner. As a result, there are three main types of preinsulated supports:

a) Simple or guided supports, where the pipe is surrounded by insulation material, which is clamped by the steel support, which rests on the supporting structure or is hanged from it. When lateral loads are significant, double, triple or quadruple clamp bases are used, so that loads on insulation materials work under compression.

b) Axial stops, where the pipe is welded with a center thrust ring that becomes embedded into the insulation materials, and the clamps bear end thrust rings that ensure that the axial load becomes a compression load when transferred to the steel support.

c) “Sandwich” type supports, which are very typical for supporting trunnions, elbows, ladders or equipment, or even as lower insulation materials for clamp bases. These are square, rectangular or circular sized blocks with countersunk drills or insulation washers that ensure that there is no thermal bridge through the bolts that connect both ends of the sandwich.

PREINSULATED SADDLE	FIG.: 5000	SECTION C 2



FRONT VIEW **LATERAL VIEW**

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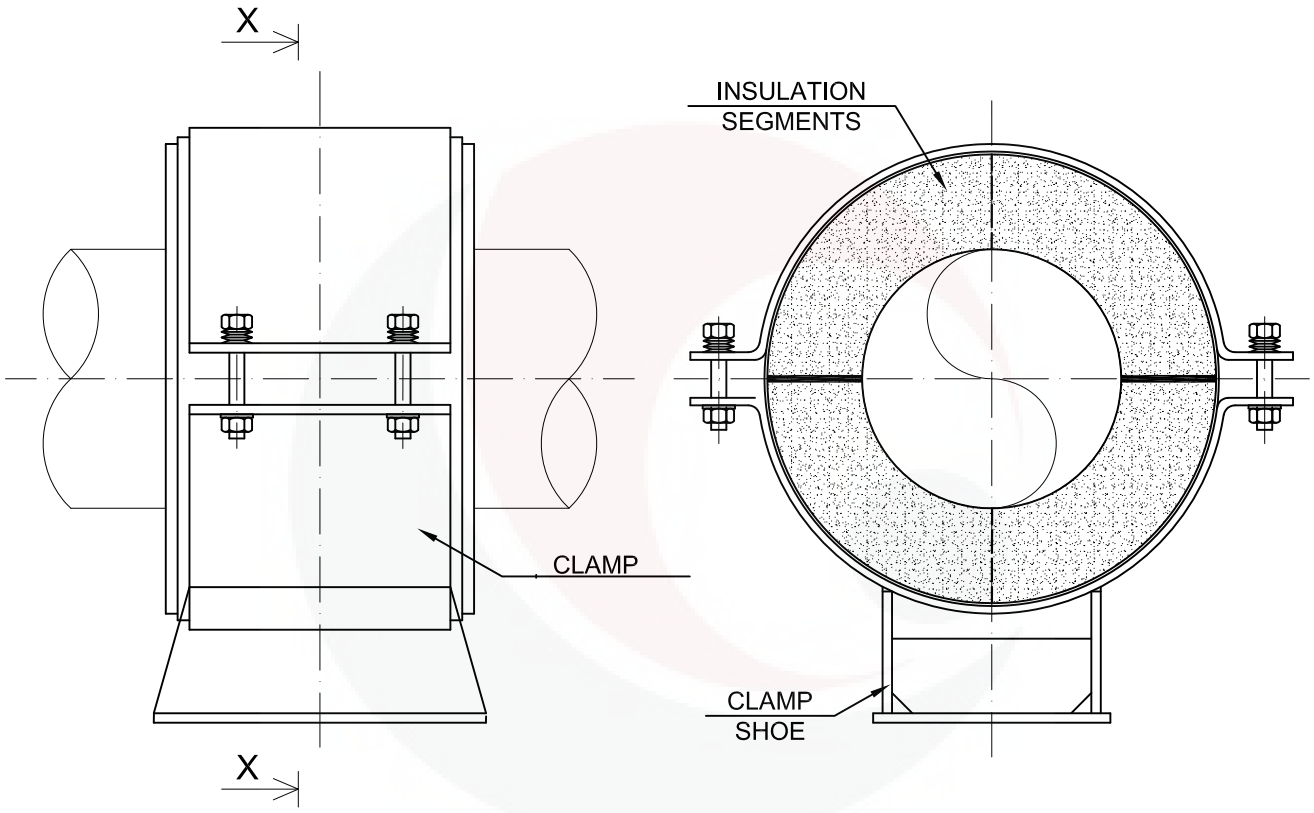
PREINSULATED CLAMP BASE	FIG.: 5100	SECTION C 3



LATERAL VIEW **VIEW X-X**

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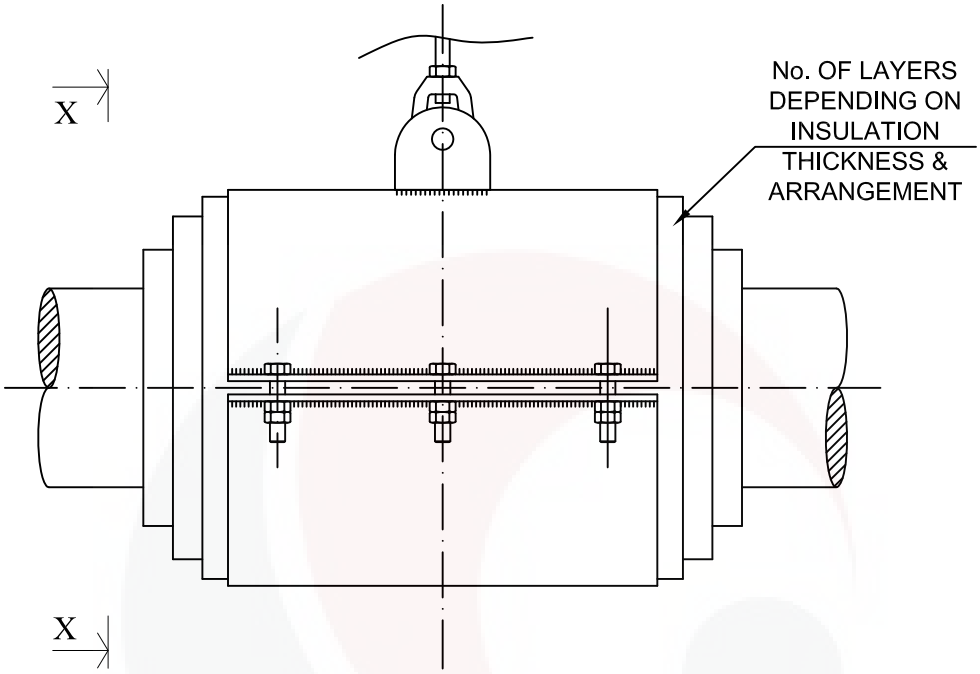
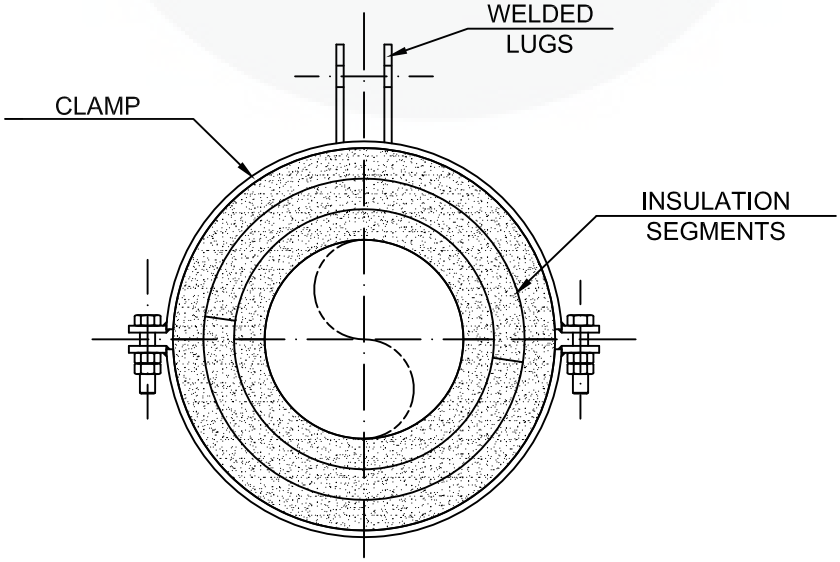
PREINSULATED CLAMP FOR HANGER

FIG.: 5200

SECTION C
4



LATERAL VIEW



VIEW X-X

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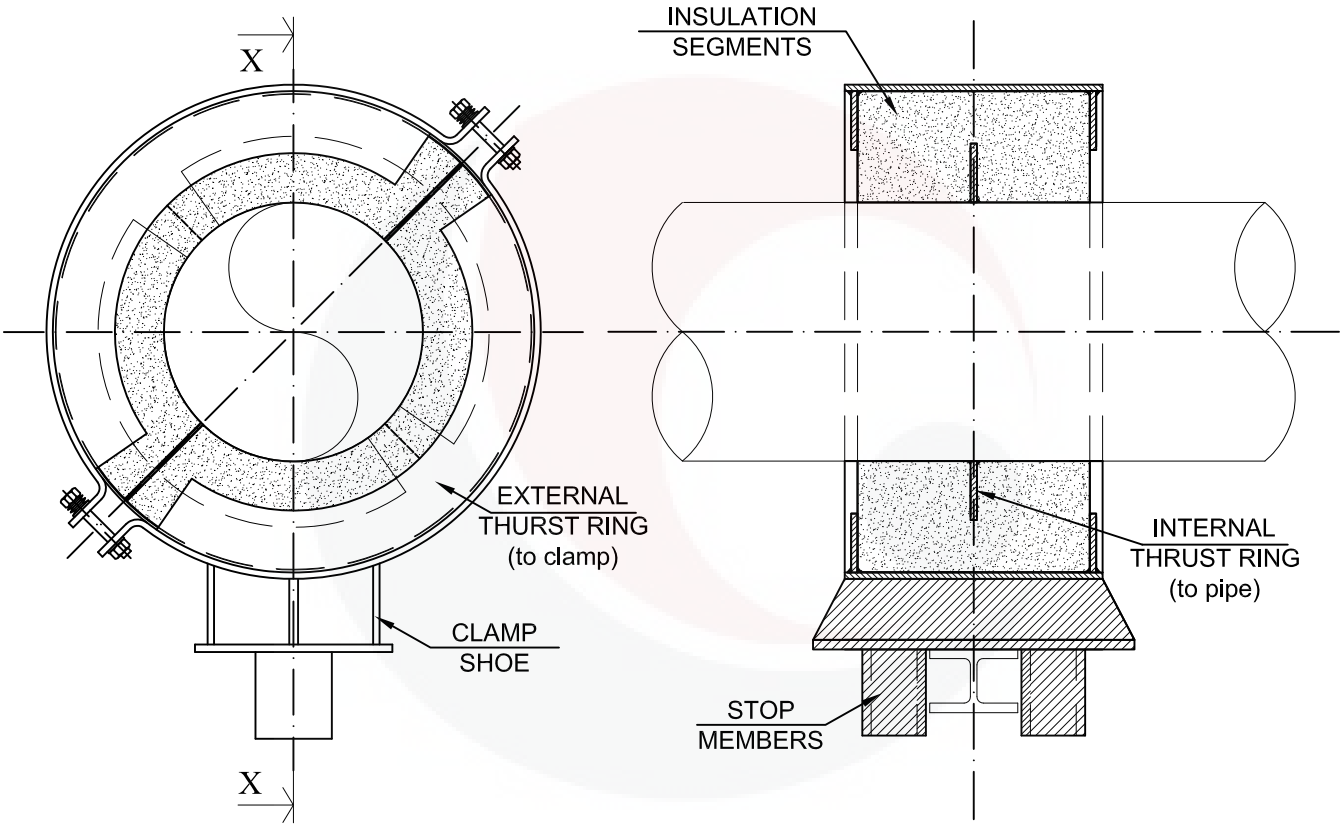
PREINSULATED AXIAL STOP

FIG.: 5300

SECTION C
5



FRONT VIEW

VIEW X-X

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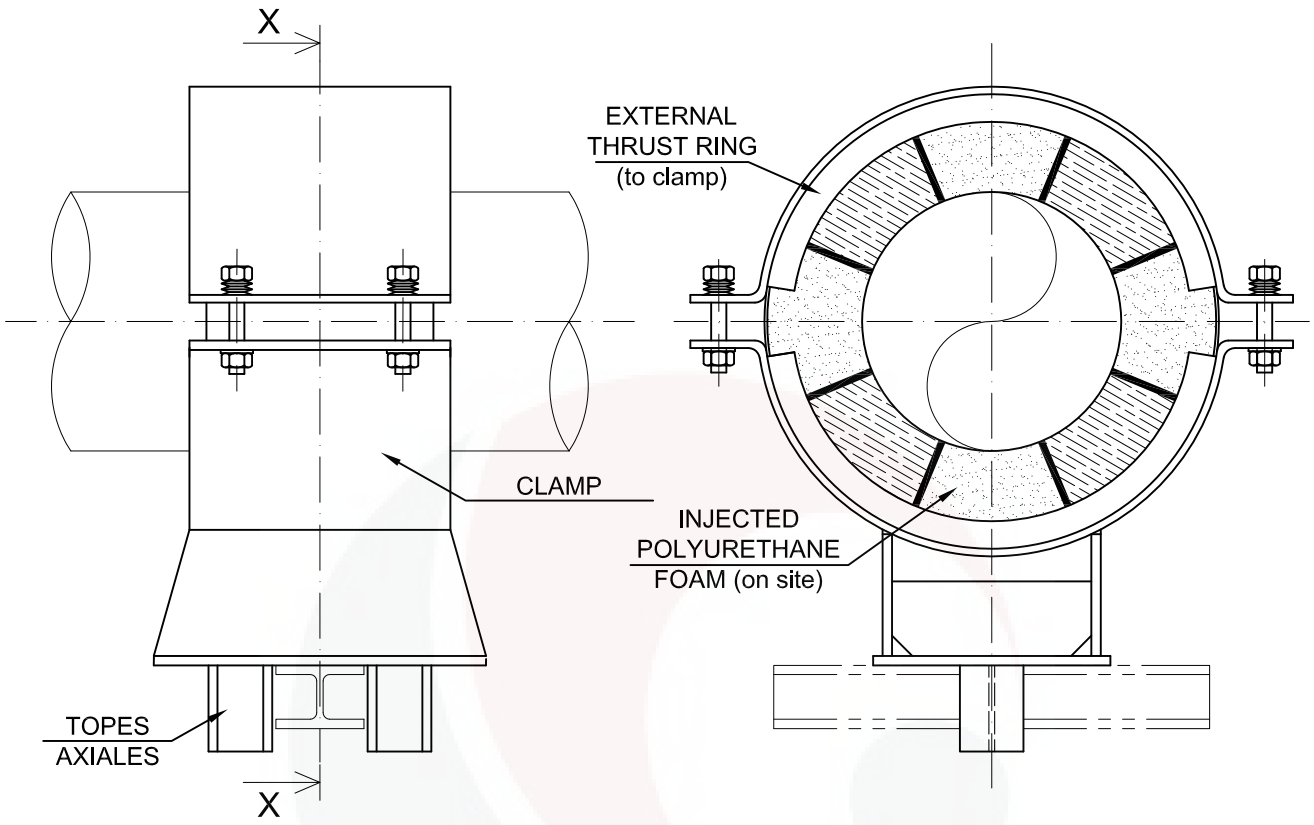
HIGH STRENGTH AXIAL STOP

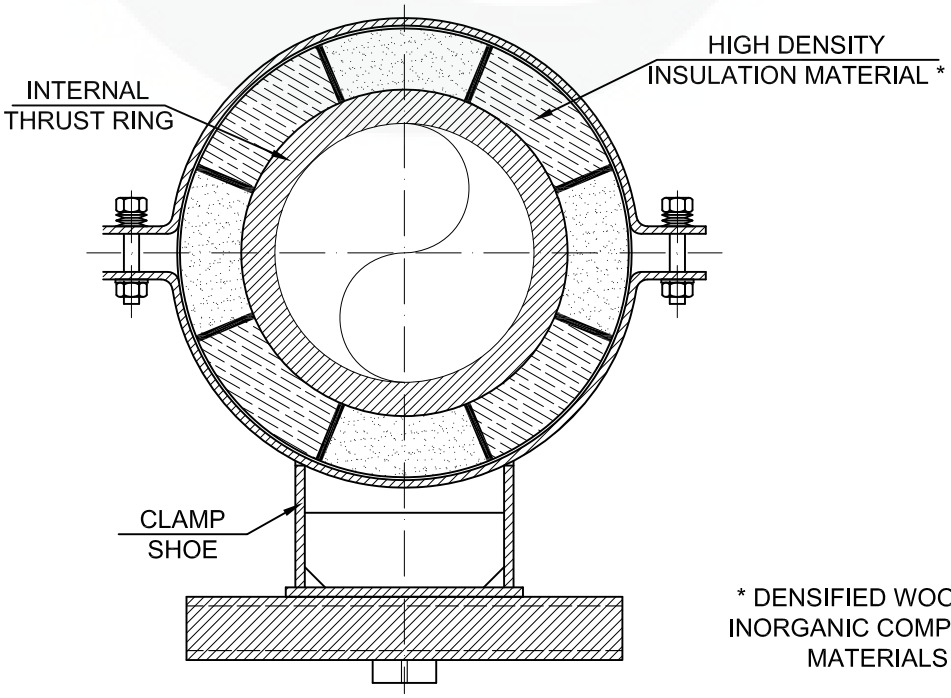
FIG.: 5400

SECTION C 6



LATERAL VIEW

FRONT VIEW



* DENSIFIED WOOD OR INORGANIC COMPOSITE MATERIALS

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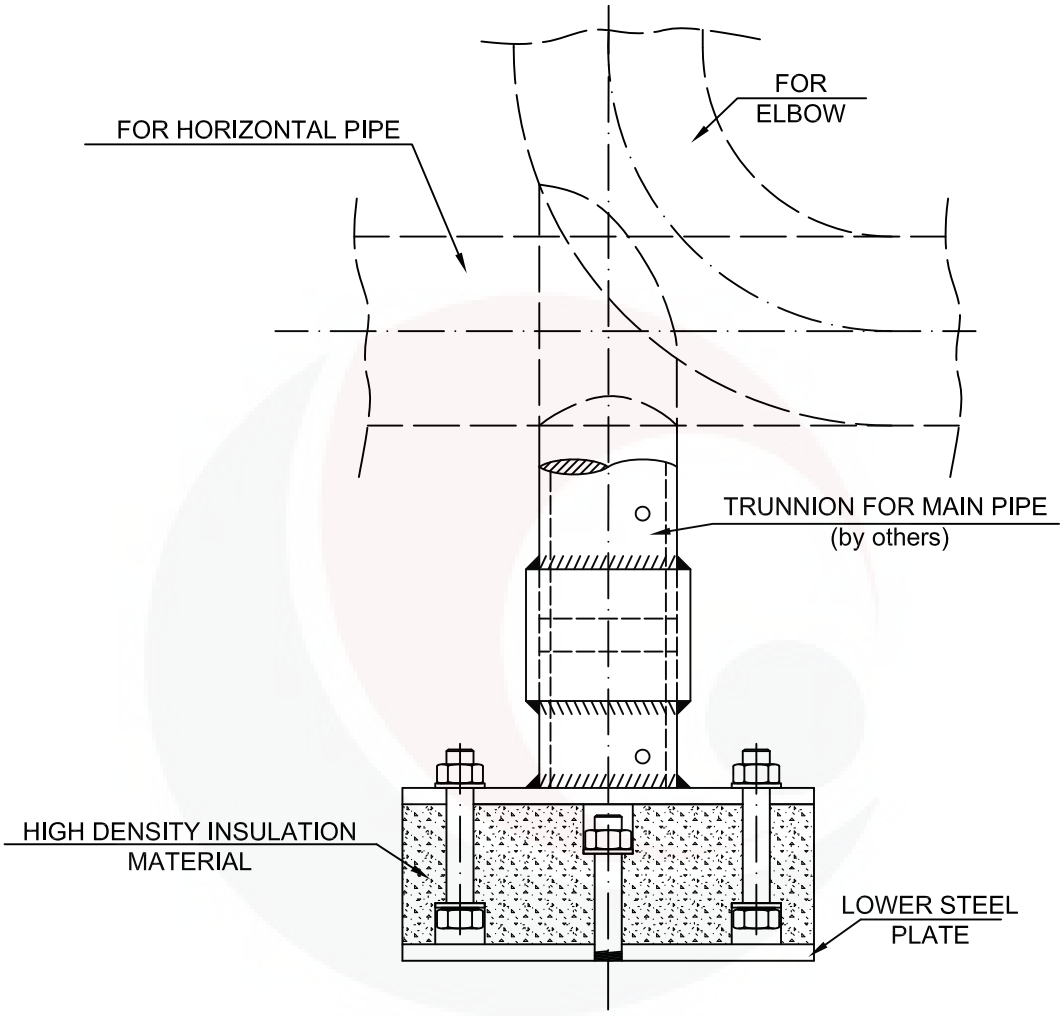
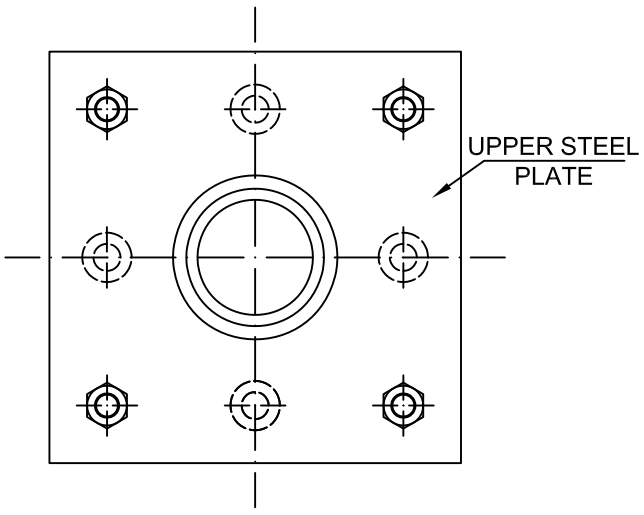
PREINSULATED "SANDWICH" FOR TRUNNION	FIG.: 5500	SECTION C 7

FRONT VIEW



PLANT VIEW



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SECTION D

VARIABLE LOAD SPRINGS

SPRING SWAY BRACES (APV)

SMALL SPRINGS

SPRING ANTI-VIBRATING CLAMPS

					P & T Piping Technology
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VARIABLE LOAD SPRING SUPPORTS

Variable load spring supports are inserted into a piping system when relatively small (up to 80 mm) vertical movements are absorbed. They are generally related to expansions or thermal contractions. The springs always work under compression.

They are made up of a helicoidal rolling spring, inserted into a cylindrical housing with a welded or bolted down construction. Riveted to the support is a scaleplate indicating the model, type, size, loads and movement.

Springs are classified according to the MODEL-SIZE-TYPE combination.

MODEL

There are four models: CVC, CV, CVL and CVLL. They support the same loads, but they are differentiated between by the different travels that they accept.

In order to select the suitable model, it should be taken into account that the variation in load from the cold position of the spring to the hot position must be equal to or less than 25%. This value is accepted by the majority of the national and international standards, but however, it is the engineering that should set this variability or an even lower threshold, conducting an individualized study for each specific case.

According to this latter criterion, the result is approximately as follows:

- MODEL CVC → $\Delta y \leq 12$ mm.
- MODEL CV → 12 mm < $\Delta y \leq 25$ mm.
- MODEL CVL → 25 mm < $\Delta y \leq 50$ mm.
- MODEL CVLL → 50 mm < $\Delta y \leq 80$ mm.

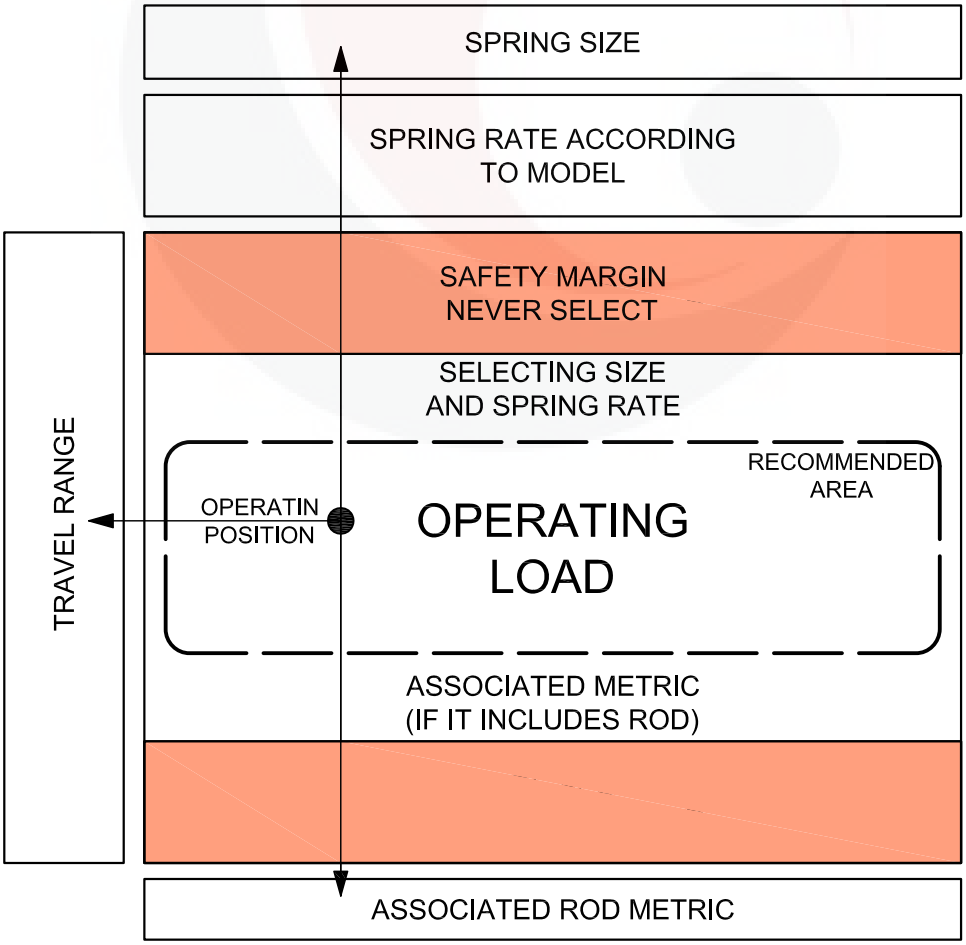
Where Δy is vertical movement.

$$(*)\ \text{Variability} = \frac{\text{ABS (CF - CC)}}{\text{CC}}$$

Where ABS (CF - CC) is the absolute value resulting from deducting the cold load from the hot load.

SIZE

Spring size is indicated by a number, from 1 to 21, and determines the load range that the spring can support. This is selected using the loads table and in terms of the characteristics of the variable load supports (page 19). In this table, there are two zones (upper and lower) indicated as “safety margins”. These zones should never be considered as operating positions. The selection criterion is as follows: depending on the specified operating load (also known as “hot load”), a load is chosen from the table, either equal to or greater than the required load. It is recommended to select a load in the central zone of the table, so that the operating position of the spring is as centred as possible on the total travel of the spring (life span will be greater and there will be more margin for readjusting the load or for absorbing variations in the design). It can be noted that, depending on the model of the spring, the total travel varies, the CVLL model being the one that accepts a longer travel, as indicated in the section MODEL. This is related to the spring rate (kg/mm), a value indicated below the size of the spring. The greater the movements, the lower the value of the spring rate.



VARIABLE LOAD SPRING SUPPORTS

SECTION D
3

OPERATING LOAD TABLE AND CHARACTERISTICS OF THE VARIABLE LOAD SPRING SUPPORTS

MOD.	CVC	CV	CVL	CVLL
CORRESPONDING TYPE	A B C D E F G H	A B C D E F G H	A B C D E F G H	A B C D E F G H

MODEL	SUPPORT SIZE																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
	SPRING RATE IN Kg/mm																				
CVC	0,75	1	1,25	1,75	2,3	3	4	5,5	7,25	9,5	12,5	16,5	22	29	39	52	70	94	125	170	250
CV	0,375	0,5	0,625	0,875	1,15	1,5	2	2,75	3,625	4,75	6,25	8,25	11	14,5	19,5	26	35	47	62,5	85	125
CVL	0,188	0,25	0,313	0,438	0,575	0,75	1	1,375	1,813	2,375	3,125	4,125	5,5	7,25	9,75	13	17,5	23,5	31,25	42,5	62,5
CVLL	0,125	0,167	0,208	0,292	0,383	0,5	0,667	0,917	1,208	1,583	2,083	2,75	3,667	4,833	6,5	8,667	11,67	15,67	20,83	28,33	41,67

CVC	CV	CVL	CVLL	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
SAFETY MARGIN				15	20	25	35	46	60	80	110	145	190	250	330	440	580	780	1040	1400	1880	2500	3400	3750
				17	23	28	39	52	68	90	124	163	214	281	371	495	652	878	1170	1575	2115	2812	3825	4375
0	0	0	0	19	25	31	44	58	75	100	138	181	238	313	413	550	725	975	1300	1750	2350	3125	4250	5000
2,5	5	10	15	21	28	34	48	63	83	110	151	200	261	344	454	605	797	1072	1430	1925	2585	3437	4675	5625
5	10	20	30	23	30	38	53	69	90	120	165	218	285	375	495	660	870	1170	1560	2100	2820	3750	5100	6250
7,5	15	30	45	24	33	41	57	75	98	130	179	236	309	406	536	715	942	1267	1690	2275	3055	4062	5525	6875
10	20	40	60	26	35	44	61	81	105	140	193	254	333	438	578	770	1015	1365	1820	2450	3290	4375	5950	7500
12,5	25	50	75	28	38	47	66	86	113	150	206	272	356	469	619	825	1087	1462	1950	2625	3525	4687	6375	8125
15	30	60	90	30	40	50	70	92	120	160	220	290	380	500	660	880	1160	1560	2080	2800	3760	5000	6800	8750
17,5	35	70	105	32	43	53	74	98	128	170	234	308	404	531	701	935	1232	1657	2210	2975	3995	5312	7225	9375
20	40	80	120	34	45	56	79	103	135	180	248	326	428	562	742	990	1305	1755	2340	3150	4230	5625	7650	10000
22,5	45	90	135	36	48	59	83	109	143	190	261	345	451	593	784	1045	1377	1852	2470	3325	4465	5937	8075	10625
25	50	100	150	38	50	62	88	115	150	200	275	363	475	625	825	1100	1450	1950	2600	3500	4700	6250	8500	11250
27,5	55	110	165	39	53	66	92	121	158	210	289	381	499	656	866	1155	1522	2047	2730	3675	4935	6562	8925	11875
30	60	120	180	41	55	69	96	127	165	220	303	399	523	687	908	1210	1595	2145	2860	3850	5170	6875	9350	12500
32,5	65	130	195	43	58	72	100	132	173	230	316	417	547	719	949	1265	1667	2242	2990	4025	5405	7187	9775	13125
35	70	140	210	45	60	75	105	138	180	240	330	435	570	750	990	1320	1740	2340	3120	4200	5640	7500	10200	13750
37,5	75	150	225	47	63	78	109	144	188	250	344	453	594	781	1030	1375	1812	2437	3250	4375	5875	7812	10620	14375
40	80	160	240	49	65	81	114	150	195	260	358	471	618	813	1070	1430	1885	2535	3380	4550	6110	8125	11050	15000
42,5	85	170	255	51	68	84	118	155	203	270	371	490	641	844	1113	1485	1957	2632	3510	4725	6345	8437	11470	15625
45	90	180	270	53	70	88	123	161	210	280	385	508	665	875	1155	1540	2030	2730	3640	4900	6580	8750	11900	16250
SAFETY MARGIN				54	73	91	127	167	218	290	399	526	689	906	1196	1595	2102	2827	3770	5075	6815	9062	12325	16875
				56	75	94	131	173	225	300	413	544	713	938	1237	1650	2175	2925	3900	5250	7050	9375	12750	17500
CVC	CV	CVL	CVLL	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
MODEL				SUPPORT SIZE - LOADS IN Kg.																				
ROD SIZE				M-12						M-16			M-20		M-24		M-30		M-36		M-42	M-48	M-56	M-64

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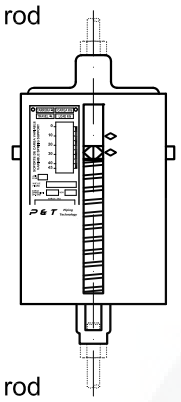
VARIABLE LOAD SPRING SUPPORTS

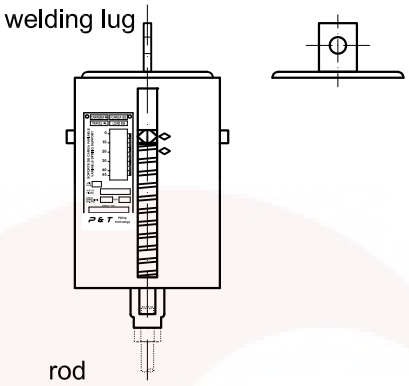
TYPE

The different types of support are classified by a letter - from A to H - and are differentiated by the assembly conditions regarding joining to the structure.

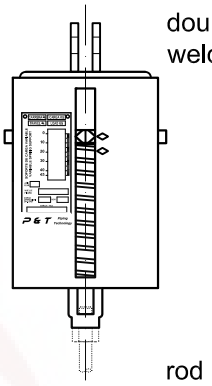
TYPE A



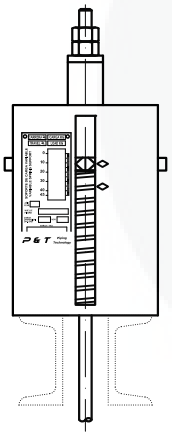
TYPE B



TYPE C

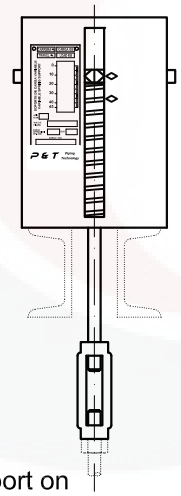


TYPE D

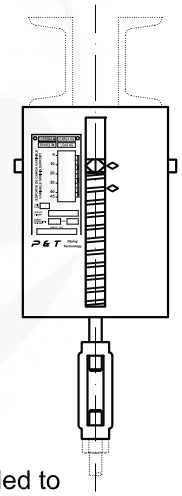


Support on
structure - hanging

TYPE E

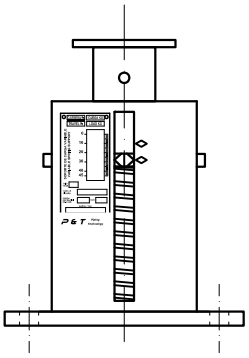


Support on
structure - hanging



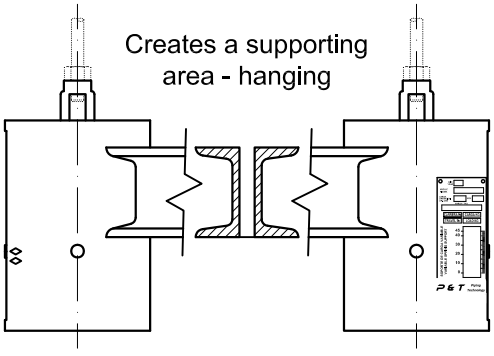
Welded to
structure - hanging

TYPE F

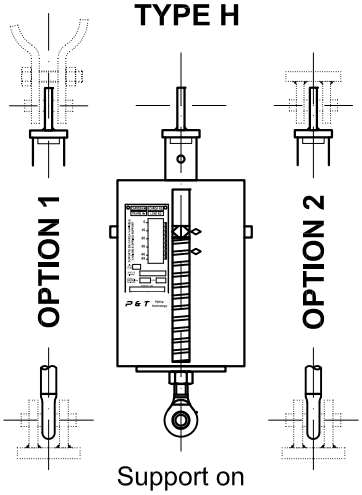


Support on
structure - support

TYPE G



TYPE H



Support on
structure - support

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ORDER

To place an order, the following details must be indicated:

- Model, size and type.
- Hot and/or cold load.
- Vertical movement ("travel") of the pipe from the cold position to the hot position. If movement is upwards, indicate so with the positive sign (+), and with the sign (-) if movement is downwards.
- Identification mark ("tag number").
- Options: corrosion resistant / continuous blocking.

Note that on a variable load spring, the following condition is always met:

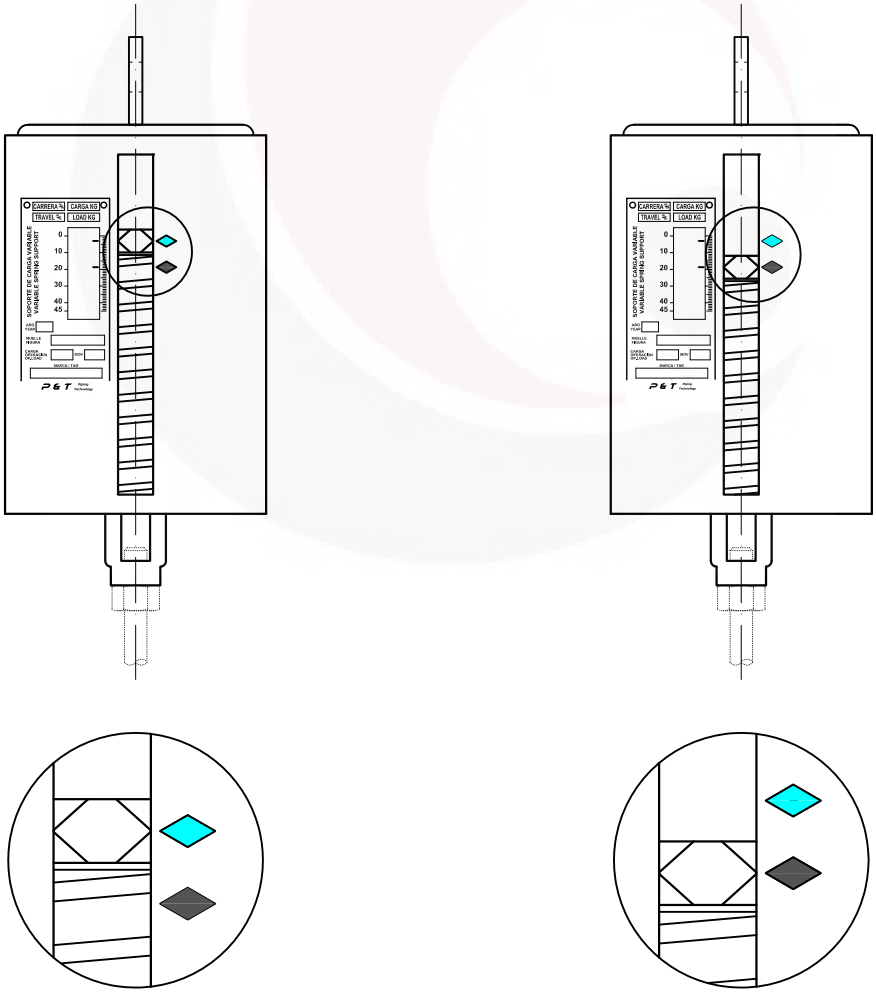
$$CF = CC + \Delta y \cdot k$$

Where "k" is the spring rate (depending on the model selected). For this reason, different combinations of cold load, hot load and movement are given for each spring manufacturer.

TRAVEL STOPS

Unless required otherwise, the support will be preset on the cold or installation load, by two travel stops. These stops should not be removed until the installation stages and hydraulic testing are completed. Once removed (with the plant still “cold”), the indicator should coincide with the peak of the cold load / installation load indicator. When the plant starts up, the indicator will tend to shift until it coincides with the position of the hot load / operating load indicator.

The operating position for the spring is theoretical, i.e., it is designed for “ideal” work conditions; in real life conditions, certain factors can come into play that affect the actual operationg position of the spring. For instance, a spring located on a draining line will normally be in the cold position, and will only move when draining really causes change of load and temperature on the piping.



GENERAL INSTALLATION AND OPERATION CONSIDERATIONS:

In this section, we set out to indicate the general aspects to be considered in order to carry out a correct installation of the variable load spring supports, as well as explaining precautions to take for correct working order and subsequent maintenance of said elements.

Firstly, in order to avoid the thermal movements of the piping being restrained, it should be taken into account that the installed accessories may cause interference with other elements that have nothing to do with supporting the piping.

This possibility often occurs when the supports are fitted with rods of a certain length, since throughout their length, they may approach the beams, other piping or accessories which, due to their proximity, may cause said interference.

To make identification of the supports easy, it is advisable to position the spring support in such a manner that the scaleplate is on the side with the best visibility.

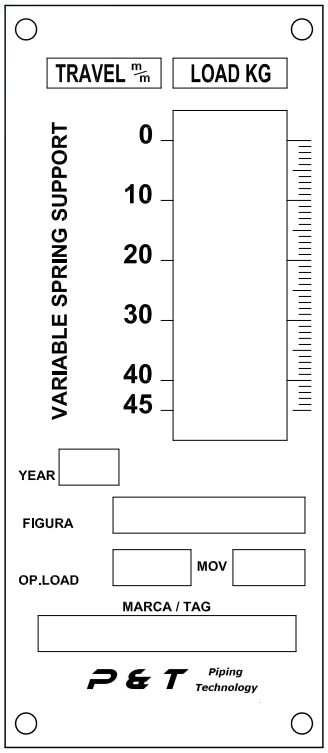
When welding to install the support, they must be coated with the appropriate paint in order to avoid any oxidation that may spread to the housing, leading to undesirable damage.

It is appropriate that, in the threaded zones, grease is applied in order to avoid deterioration due to oxidation of the same and that they make subsequent adjustment or dismantling operations difficult.

We recommend that once the spring support is finally installed, the travel stops should be kept so that they can be used in the event of having to dismantle the support for inspection, recalibrating, etc., or to carry out changes of piping accessories. However, if not available, temporary blocking may be achieved with plates and profiles that may be tack welded to the spring casing.

Since during maintenance operations on installing, touching up paintwork of the supporting elements is part of these activities, special care should be taken not to paint the sliding surfaces, threaded zones and scaleplates.

As a final recommendation, it should be remembered that it is appropriate to conduct a visual inspection of all the spring supports installed on the pipeline before starting up, in order to ensure that all the travel stops have been removed, that the springs are correctly positioned and that all the lock nuts are tightened.



IDENTIFICATION CARD
MODEL CVC

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1	20/10/98	INFORMATION	JMD	EAR
0	04/09/94	INFORMATION	BM	JMD

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INSTALLATION INSTRUCTIONS FOR VARIABLE LOAD SPRING SUPPORTS

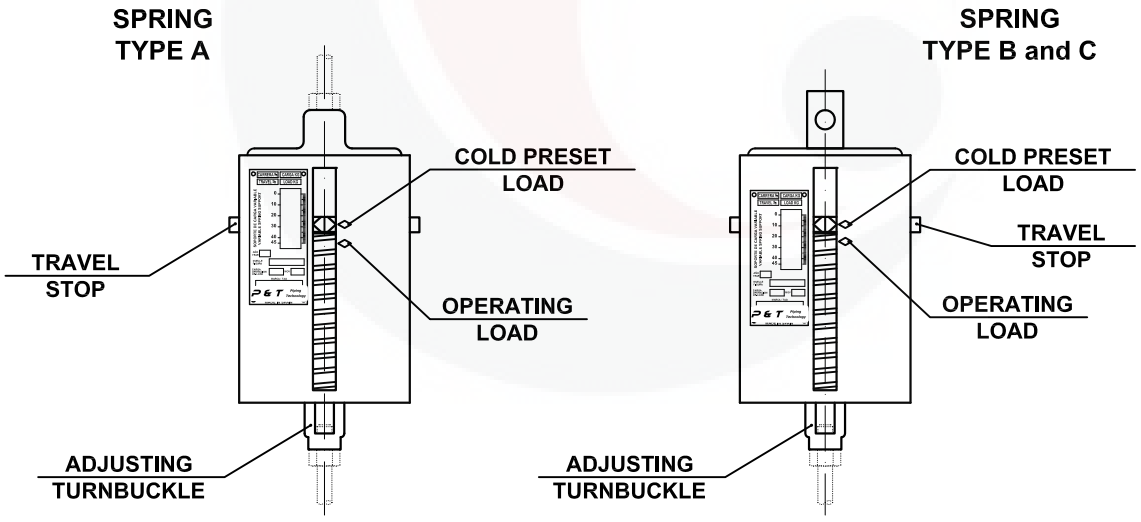
Before installing a variable load support, there must be a provisional, rigid support able to sustain the piping in its correct position so that no deformities occur on the same nor overstresses occur at any of its points.

Once the point has been located where the variable load support should be fitted, install all the accessories, both on the piping and on the supporting structure, according to the design drawings for the support.

Depending on the type of spring support selected, certain manoeuvres will have to be carried out, until the supporting element can take the required load.

INSTALLATION INSTRUCTIONS

SPRINGS TYPE A, B and C.



For these types of springs, once the relevant accessories have been installed (clamp, lug, rods, eye nuts, beam attachments, etc.), locate them in the position of COLD PRESET LOAD. To do so, act on the adjustment turnbuckles until the travel stops are loose and can be removed by hand or, at the most, with the help of pliers.

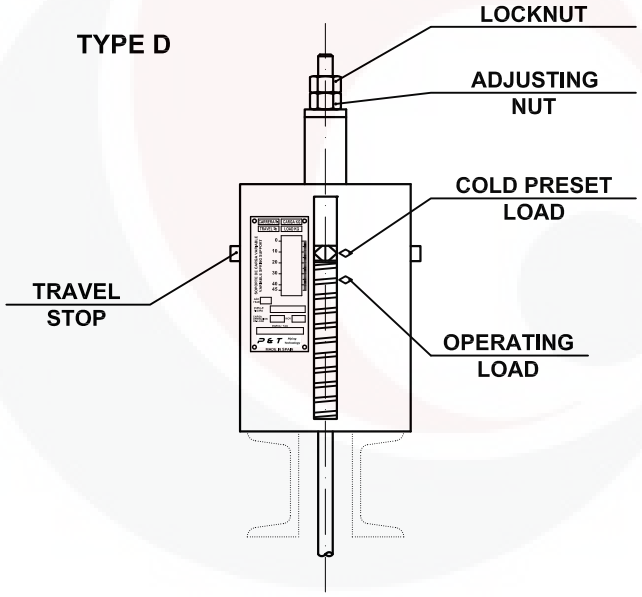
The operation of removing the travel stops must be carried out once the hydraulic test is completed, and on the condition that no other manoeuvres are going to be carried out on the piping that may leave the spring out of its position in COLD PRESET LOAD.

When the piping reaches the temperature considered in the stress analysis, the spring position indicator should indicate OPERATING LOAD, which will be located above or below that of COLD PRESET LOAD, depending on whether there is vertical displacement at that point or not.

INSTALLATION INSTRUCTIONS

TYPE D SPRINGS

To install this type of spring, once the corresponding accessories have been fitted (clamp, lug, rods, etc.), some welding may have to be carried out to join the spring housing to the supporting structure in order to ensure the position of the element in terms of any incident caused by manoeuvres close to the supporting point, or any transitional vibration in the piping.



In order to ensure that the spring takes the COLD PRESET LOAD, act on the nut located in the upper part of the rod, until the travel stops can be released by hand or, at the most, with the help of a hand tool such as pliers.

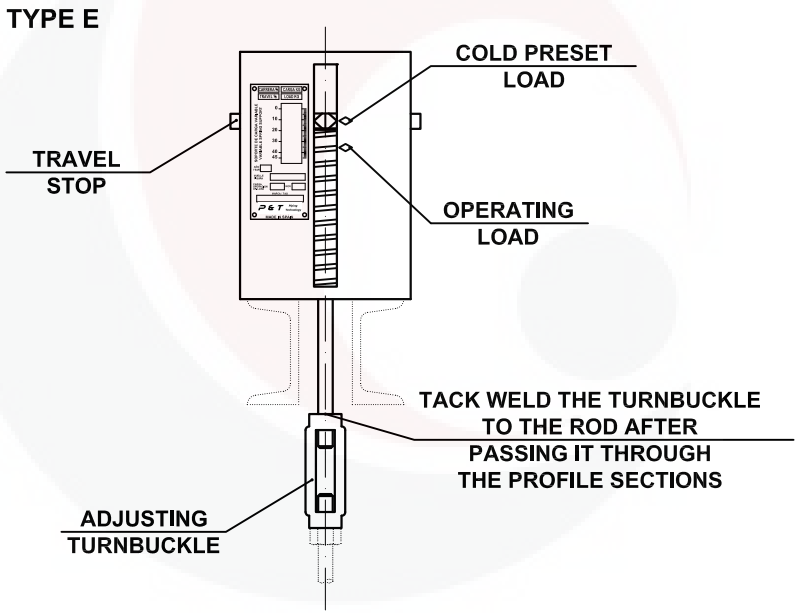
The operation of removing the travel stops must be carried out once the hydraulic test is completed, and on the condition that no other manoeuvres are going to be carried out on the piping that may leave the spring out of its position in COLD PRESET LOAD.

When the piping reaches the temperature considered in the stress analysis, the spring position indicator should indicate OPERATING LOAD, which will be located above or below that of COLD PRESET LOAD, depending on whether there is vertical displacement at that point or not.

INSTALLATION INSTRUCTIONS

SPRINGS TYPE E

As in the case of Type D springs, to install this type of spring, once the corresponding accessories have been fitted (clamp, lug, rods, etc.), some welding may have to be carried out to join the spring housing to the supporting structure in order to ensure the position of the element in terms of any incident caused by manoeuvres close to the supporting point, or any transitional vibration in the piping.



In order to ensure that the spring takes the COLD PRESET LOAD, act on the adjustment turnbuckle located on the rod, until the travel stops can be released by hand or, at the most, with the help of a hand tool such as pliers.

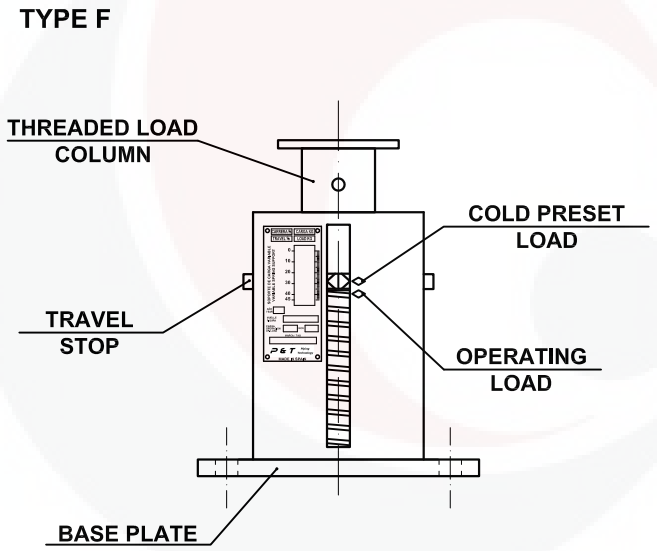
The operation of removing the travel stops must be carried out once the hydraulic test is completed, and on the condition that no other manoeuvres are going to be carried out on the piping that may leave the spring out of its position in COLD PRESET LOAD.

When the piping reaches the temperature considered in the stress analysis, the spring position indicator should indicate OPERATING LOAD, which will be located above or below that of COLD PRESET LOAD, depending on whether there is vertical displacement at that point or not.

INSTALLATION INSTRUCTIONS

SPRINGS TYPE F

Installation of this type of spring on the supporting structure is made by means of bolts located in the holes in the base plate, although if the structural arrangement does not allow for this, or if it is preferred, said spring base plate can also be welded to the supporting structure, in order to ensure that the unit does not turn over or move from its position in the case of movements, in the horizontal plane, of the pipe.



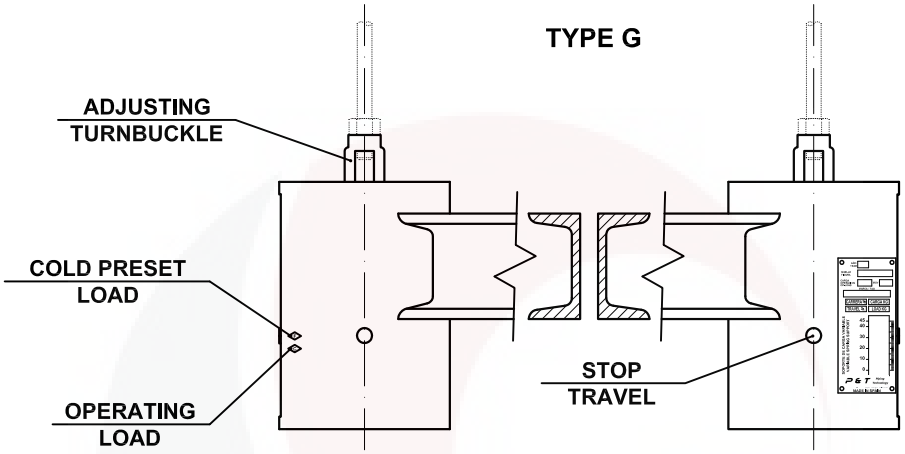
To ensure that the spring takes the COLD PRESET LOAD, act on the threaded load column located in the upper part of the housing, until the travel stops can be released by hand or, at the most, with the help of a hand tool such as pliers.

The operation of removing the travel stops must be carried out once the hydraulic test is completed, and on the condition that no other manoeuvres are going to be carried out on the piping that may leave the spring out of its position in COLD PRESET LOAD.

When the piping reaches the temperature considered in the stress analysis, the spring position indicator should indicate OPERATING LOAD, which will be located above or below that of COLD PRESET LOAD, depending on whether there is vertical displacement at that point or not.

INSTALLATION INSTRUCTIONS

SPRINGS TYPE G



For these types of springs, once the relevant accessories have been installed (clamp, lug, rods, eye nut, beam attachment, etc.), locate them in the position of COLD PRESET LOAD.

To ensure that the springs take the COLD PRESET LOAD, act on the adjustment turnbuckles until the travel stops are loose and can be removed by hand or, at the most, with the help of pliers. It is advisable that the adjustment operation is carried out alternating between the two springs, or simultaneously on both, if possible.

The operation of removing the travel stops must be carried out once the hydraulic test is completed, and on the condition that no other manoeuvres are going to be carried out on the piping that may leave the spring out of its position in COLD PRESET LOAD.

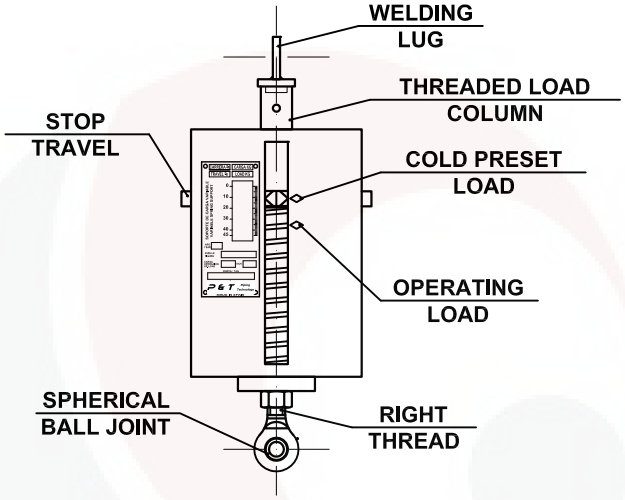
When the piping reaches the temperature considered in the stress analysis, the spring position indicator should indicate OPERATING LOAD, which will be located above or below that of COLD PRESET LOAD, depending on whether there is vertical displacement at that point or not.

It is advisable to give some welding points to join the support pipe shoe to the centre of the sections on the springs, if the movements occurring in the horizontal plane justify it. In this way, it will avoid the piping displacement towards one of the springs and thus ensure that both are subject to the same load.

INSTALLATION INSTRUCTIONS

SPRINGS TYPE H

TYPE H



As in the case of Type F springs, the installation of this type of spring is by means of welding the lower element, the rear bracket, to the support structure. At the upper end, a clamp can be installed (Option 1) or another rear bracket (Option 2).

In order to ensure that the spring reaches the COLD PRESET LOAD, it is essential to act on the upper threaded load column until the travel stops can be released by hand, or at the most, with the help of a hand tool such as pliers.

The operation of removing the travel stops must be carried out once the hydraulic test is completed, and on the condition that no other manoeuvres are going to be carried out on the piping that may leave the spring out of its position in COLD PRESET LOAD.

When the piping reaches the temperature considered in the stress analysis, the spring position indicator should indicate OPERATING LOAD, which will be located above or below that of COLD PRESET LOAD, depending on whether there is vertical displacement at that point or not.

VARIABLE LOAD SPRING SUPPORT
TYPE A

SECTION D
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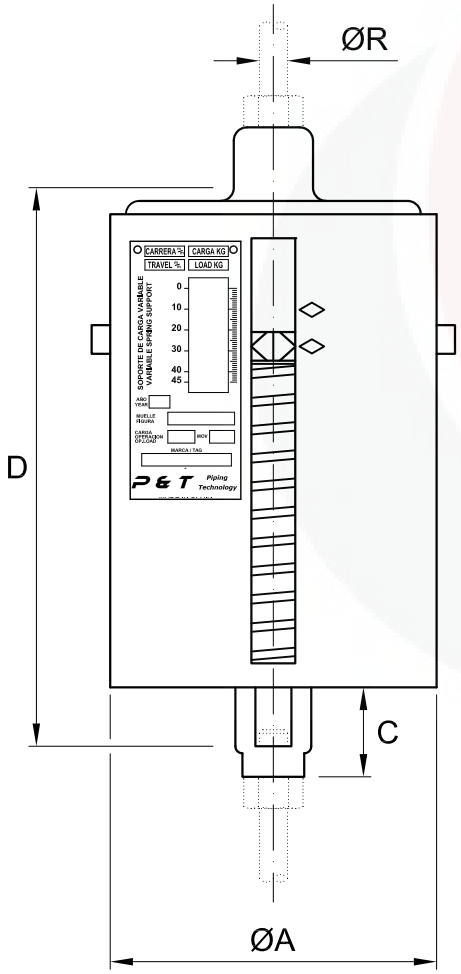

SIZE	MOD.	ØA	C	D	ØR	WEIGHT (Kg.)
1	CVC	98	45	177	M12x1,75	3,5
	CV		10	236		5
	CVL		10	401		7
	CVLL		10	588		8,5
2	CVC	98	45	177	M12x1,75	3,5
	CV		10	241		5
	CVL		10	415		7
	CVLL		10	609		8,5
3	CVC	98	45	182	M12x1,75	3,5
	CV		10	246		5
	CVL		10	435		7,5
	CVLL		10	639		9,5
4	CVC	98	45	182	M12x1,75	4
	CV		10	246		5
	CVL		10	439		7,5
	CVLL		10	645		9,5
5	CVC	98	45	187	M12x1,75	4
	CV		10	251		5
	CVL		10	451		7,5
	CVLL		10	663		9,5
6	CVC	134	50	204	M12x1,75	7
	CV		15	268		9
	CVL		15	485		14
	CVLL		15	696		18
7	CVC	134	50	209	M16x2	7
	CV		15	278		10
	CVL		15	508		15
	CVLL		15	738		19
8	CVC	134	50	214	M16x2	7,5
	CV		15	298		11
	CVL		15	543		17
	CVLL		15	788		22
9	CVC	134	50	230	M16x2	8
	CV		25	330		11
	CVL		25	595		18
	CVLL		25	850		23
10	CVC	134	55	245	M20x2,5	8
	CV		25	340		12
	CVL		25	605		19
	CVLL		25	870		24
11	CVC	168	55	247	M20x2,5	18
	CV		25	342		23
	CVL		25	622		35
	CVLL		25	902		44
12	CVC	168	55	257	M24x3	19
	CV		25	357		25
	CVL		25	652		38
	CVLL		25	947		49
13	CVC	168	50	282	M24x3	21
	CV		25	377		27
	CVL		25	680		43
	CVLL		25	987		57
14	CVC	168	70	312	M30x3,5	23
	CV		30	415		30
	CVL		30	750		50
	CVLL		30	1085		68
15	CVC	236	80	325	M30x3,5	46
	CV		30	415		59
	CVL		30	750		89
	CVLL		30	1085		113
16	CVC	236	80	340	M36x4	52
	CV		40	450		67
	CVL		40	810		106
	CVLL		40	1170		139
17	CVC	236	80	350	M36x4	59
	CV		40	510		79
	CVL		40	900		130
	CVLL		40	1290		172
18	CVC	304	60	370	M42x4,5	106
	CV		40	510		134
	CVL		40	900		204
	CVLL		40	1290		264
19	CVC	304	60	380	M48x5	120
	CV		40	525		152
	CVL		40	955		243
	CVLL		40	1385		323
20	CVC	304	60	390	M56x5,5	138
	CV		40	550		176
	CVL		40	1005		291
	CVLL		40	1460		390
21	CVC	304	60	420	M64x6	160
	CV		70	680		219
	CVL		70	1240		373
	CVLL		70	1790		520

REV.	DATE	EDITED FOR :	DRAW.	REV.
3	21/07/10	GENERAL REVISION	DDG	EAR
2	12/07/91	INFORMATION	JMD	EAR
1	17/01/85	INFORMATION	JRS	EAR

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VARIABLE LOAD SPRING SUPPORT
TYPE B

SECTION D
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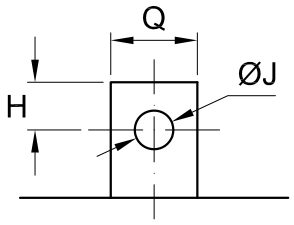

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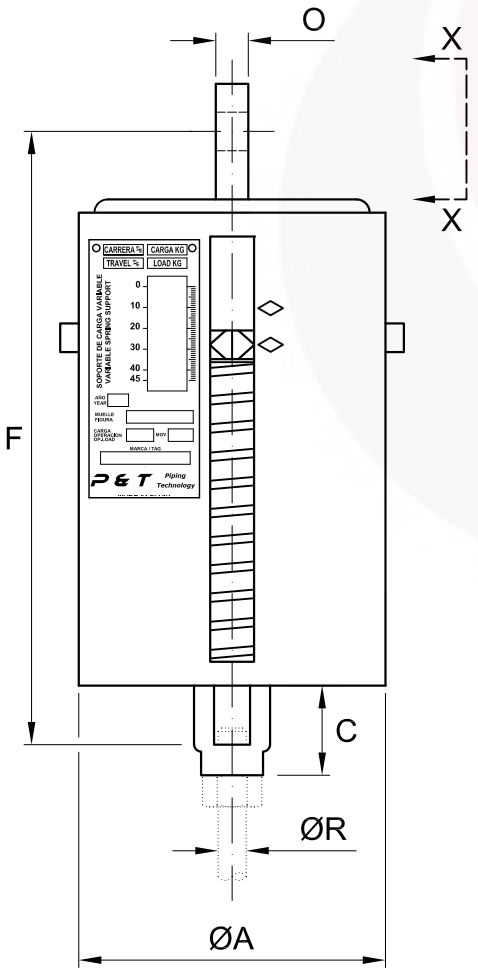

SIZE	MOD.	ØA	C	F	H	ØJ	O	Q	ØR	WEIGHT (Kg.)
1	CVC	98	45	217	20	13,5	6	65	M12x1,75	3,5
	CV		10	277						5
	CVL		10	442						7
	CVLL		10	629						8,5
2	CVC	98	45	217	20	13,5	6	65	M12x1,75	3,5
	CV		10	282						5
	CVL		10	456						7
	CVLL		10	650						8,5
3	CVC	98	45	222	20	13,5	6	65	M12x1,75	3,5
	CV		10	289						5
	CVL		10	476						7,5
	CVLL		10	678						9,5
4	CVC	98	45	222	20	13,5	6	65	M12x1,75	4
	CV		10	289						5
	CVL		10	480						7,5
	CVLL		10	684						9,5
5	CVC	98	45	227	20	13,5	6	65	M12x1,75	4
	CV		10	292						5
	CVL		10	492						7,5
	CVLL		10	704						9,5
6	CVC	134	50	244	20	13,5	6	65	M12x1,75	7
	CV		15	309						9
	CVL		15	509						14
	CVLL		15	737						18
7	CVC	134	50	254	25	17,5	8	65	M16x2	7
	CV		15	324						10
	CVL		15	554						15
	CVLL		15	784						19
8	CVC	134	50	259	25	17,5	8	65	M16x2	7,5
	CV		15	344						11
	CVL		15	589						17
	CVLL		15	834						22
9	CVC	134	50	275	25	17,5	8	65	M16x2	8
	CV		25	365						11
	CVL		25	649						18
	CVLL		25	905						23
10	CVC	134	55	290	35	21,5	8	65	M20x2,5	8
	CV		25	375						12
	CVL		25	650						19
	CVLL		25	925						24
11	CVC	168	55	280	35	21,5	8	65	M20x2,5	18
	CV		25	389						23
	CVL		25	669						35
	CVLL		25	949						44
12	CVC	168	55	307	40	26,5	10	75	M24x3	19
	CV		25	412						25
	CVL		25	707						38
	CVLL		25	1002						49
13	CVC	168	50	322	40	26,5	10	75	M24x3	21
	CV		25	427						27
	CVL		25	730						43
	CVLL		25	1037						57
14	CVC	168	70	372	50	33	12	75	M30x3,5	23
	CV		30	480						30
	CVL		30	815						50
	CVLL		30	1140						68
15	CVC	236	80	375	50	33	12	75	M30x3,5	46
	CV		30	470						59
	CVL		30	805						89
	CVLL		30	1130						113
16	CVC	236	80	410	55	38	15	100	M36x4	52
	CV		40	520						67
	CVL		40	890						106
	CVLL		40	1240						139
17	CVC	236	80	390	55	38	15	100	M36x4	59
	CV		40	570						79
	CVL		40	960						130
	CVLL		40	1360						172
18	CVC	304	60	415	75	43	20	125	M42x4,5	106
	CV		40	575						134
	CVL		40	965						204
	CVLL		40	1365						264
19	CVC	304	60	450	75	48	25	150	M48x5	120
	CV		40	625						152
	CVL		40	1070						243
	CVLL		40	1485						323
20	CVC	304	60	480	90	53	25	150	M56x5,5	138
	CV		40	665						176
	CVL		40	1115						291
	CVLL		40	1575						390
21	CVC	304	60	555	115	58	30	170	M64x6	160
	CV		70	815						219
	CVL		70	1375						373
	CVLL		70	1935						520

REV.	DATE	EDITED FOR :	DRAW.	REV.
3	21/07/10	GENERAL REVISION	DDG	EAR
2	12/07/91	INFORMATION	JMD	EAR
1	17/01/85	INFORMATION	JRS	EAR

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VARIABLE LOAD SPRING SUPPORT
TYPE C

SECTION D
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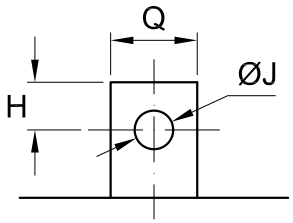

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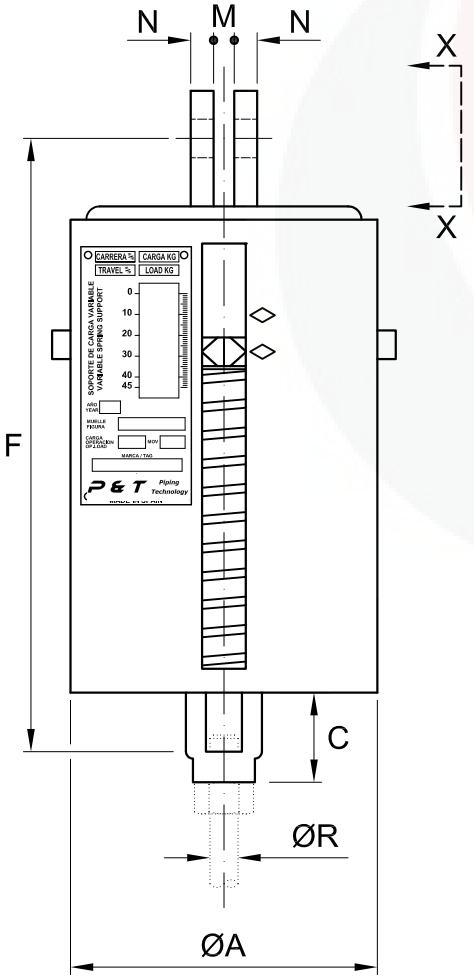

SIZE	MOD.	ØA	C	F	H	ØJ	M	N	Q	ØR	WEIGHT (Kg.)
1	CVC	98	45	217	20	13,5	18	6	65	M12x1,75	3,5
	CV		10	277							5
	CVL		10	442							7
	CVLL		10	629							8,5
2	CVC	98	45	217	20	13,5	18	6	65	M12x1,75	3,5
	CV		10	282							5
	CVL		10	456							7
	CVLL		10	650							8,5
3	CVC	98	45	222	20	13,5	18	6	65	M12x1,75	3,5
	CV		10	289							5
	CVL		10	476							7,5
	CVLL		10	678							9,5
4	CVC	98	45	222	20	13,5	18	6	65	M12x1,75	4
	CV		10	289							5
	CVL		10	480							7,5
	CVLL		10	684							9,5
5	CVC	98	45	227	20	13,5	18	6	65	M12x1,75	4
	CV		10	292							5
	CVL		10	492							7,5
	CVLL		10	704							9,5
6	CVC	134	50	244	20	13,5	18	6	65	M12x1,75	7
	CV		15	309							9
	CVL		15	509							14
	CVLL		15	737							18
7	CVC	134	50	254	25	17,5	22	6	65	M16x2	7
	CV		15	324							10
	CVL		15	554							15
	CVLL		15	784							19
8	CVC	134	50	259	25	17,5	22	6	65	M16x2	7,5
	CV		15	344							11
	CVL		15	589							17
	CVLL		15	834							22
9	CVC	134	50	275	25	17,5	22	6	65	M16x2	8
	CV		25	365							11
	CVL		25	649							18
	CVLL		25	905							23
10	CVC	134	55	290	35	21,5	22	6	65	M20x2,5	8
	CV		25	375							12
	CVL		25	650							19
	CVLL		25	925							24
11	CVC	168	55	280	35	21,5	22	6	65	M20x2,5	18
	CV		25	389							23
	CVL		25	669							35
	CVLL		25	949							44
12	CVC	168	55	307	40	26,5	24	6	75	M24x3	19
	CV		25	412							25
	CVL		25	707							38
	CVLL		25	1002							49
13	CVC	168	50	322	40	26,5	24	6	75	M24x3	21
	CV		25	427							27
	CVL		25	730							43
	CVLL		25	1037							57
14	CVC	168	70	372	50	33	32	8	75	M30x3,5	23
	CV		30	480							30
	CVL		30	815							50
	CVLL		30	1140							68
15	CVC	236	80	375	50	33	32	8	75	M30x3,5	46
	CV		30	470							59
	CVL		30	805							89
	CVLL		30	1130							113
16	CVC	236	80	410	55	38	38	12	100	M36x4	52
	CV		40	520							67
	CVL		40	890							106
	CVLL		40	1240							139
17	CVC	236	80	390	55	38	38	12	100	M36x4	59
	CV		40	570							79
	CVL		40	960							130
	CVLL		40	1360							172
18	CVC	304	60	415	75	43	44	15	125	M42x4,5	106
	CV		40	575							134
	CVL		40	965							204
	CVLL		40	1365							264
19	CVC	304	60	450	75	48	50	20	150	M48x5	120
	CV		40	625							152
	CVL		40	1070							243
	CVLL		40	1485							323
20	CVC	304	60	480	90	53	57	20	150	M56x5,5	138
	CV		40	665							176
	CVL		40	1115							291
	CVLL		40	1575							390
21	CVC	304	60	555	115	58	57	25	170	M64x6	160
	CV		70	815							219
	CVL		70	1375							373
	CVLL		70	1935							520

REV.	DATE	EDITED FOR :	DRAW.	REV.
3	21/07/10	GENERAL REVISION	DDG	EAR
2	12/07/91	INFORMATION	JMD	EAR
1	17/01/85	INFORMATION	JRS	EAR

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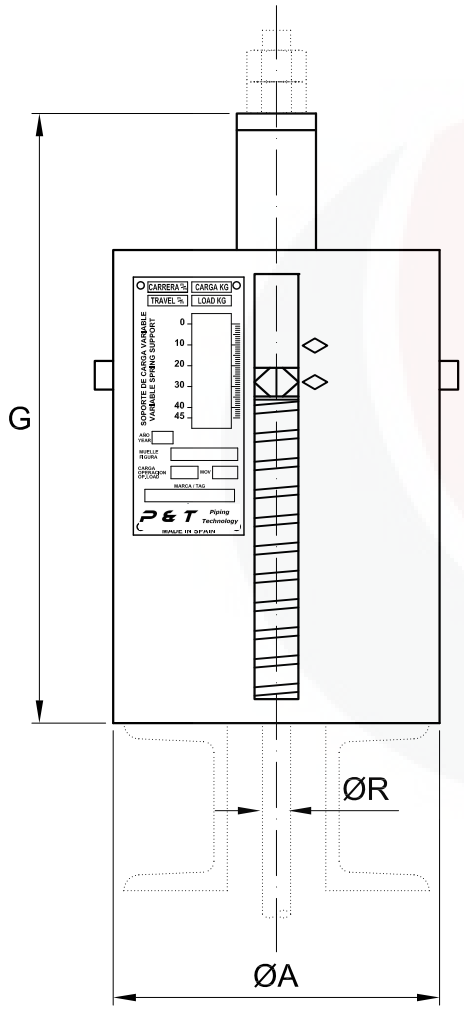
VARIABLE LOAD SPRING SUPPORT
TYPE D

SECTION D
17



SIZE	MOD.	ØA	G	ØR	WEIGHT (Kg.)
1	CVC	98	205	M12x1,75	3,5
	CV		355		5
	CVL		630		7
	CVLL		927		8,5
2	CVC	98	205	M12x1,75	3,5
	CV		360		5
	CVL		645		7
	CVLL		948		8,5
3	CVC	98	210	M12x1,75	3,5
	CV		365		5
	CVL		665		7,5
	CVLL		978		9,5
4	CVC	98	210	M12x1,75	4
	CV		365		5
	CVL		670		7,5
	CVLL		984		9,5
5	CVC	98	215	M12x1,75	4
	CV		370		5
	CVL		680		7,5
	CVLL		1002		9,5
6	CVC	134	225	M12x1,75	7
	CV		380		9
	CVL		700		14
	CVLL		1028		18
7	CVC	134	230	M16x2	7
	CV		390		10
	CVL		730		15
	CVLL		1070		19
8	CVC	134	240	M16x2	7,5
	CV		410		11
	CVL		765		17
	CVLL		1120		22
9	CVC	134	250	M16x2	8
	CV		420		11
	CVL		790		18
	CVLL		1160		23
10	CVC	134	255	M20x2,5	8
	CV		430		12
	CVL		805		19
	CVLL		1180		24
11	CVC	168	280	M20x2,5	18
	CV		460		23
	CVL		850		35
	CVLL		1240		45
12	CVC	168	290	M24x3	19
	CV		475		25
	CVL		880		38
	CVLL		1285		47
13	CVC	168	295	M24x3	21
	CV		490		27
	CVL		905		43
	CVLL		1320		50
14	CVC	168	315	M30x3,5	23
	CV		520		30
	CVL		975		50
	CVLL		1430		55
15	CVC	236	325	M30x3,5	46
	CV		520		59
	CVL		960		89
	CVLL		1400		114
16	CVC	236	340	M36x4	52
	CV		550		67
	CVL		1020		106
	CVLL		1490		138
17	CVC	236	365	M36x4	59
	CV		595		79
	CVL		1115		130
	CVLL		1625		172
18	CVC	304	385	M42x4,5	106
	CV		600		134
	CVL		1095		204
	CVLL		1585		262
19	CVC	304	415	M48x5	120
	CV		645		152
	CVL		1185		243
	CVLL		1720		323
20	CVC	304	430	M56x5,5	138
	CV		670		176
	CVL		1235		291
	CVLL		1790		390
21	CVC	304	455	M64x6	160
	CV		770		219
	CVL		1440		373
	CVLL		2110		520

REV.	DATE	EDITED FOR :	DRAW.	REV.
3	21/07/10	GENERAL REVISION	DDG	EAR
2	12/07/91	INFORMATION	JMD	EAR
1	17/01/85	INFORMATION	JRS	EAR

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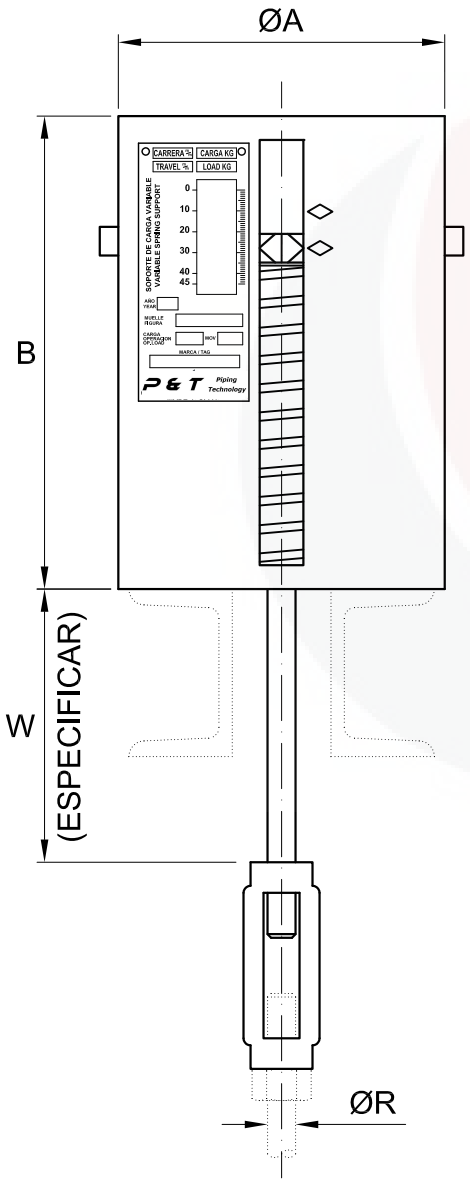
VARIABLE LOAD SPRING SUPPORT
TYPE E

SECTION D
18



SIZE	MOD.	ØA	B	ØR	WEIGHT (Kg.)
1	CVC	98	145	M12x1,75	3,5
	CV		240		5
	CVL		405		7
	CVLL		592		8,5
2	CVC	98	145	M12x1,75	3,5
	CV		245		5
	CVL		419		7
	CVLL		613		8,5
3	CVC	98	150	M12x1,75	3,5
	CV		250		5
	CVL		439		7,5
	CVLL		643		9,5
4	CVC	98	150	M12x1,75	4
	CV		250		5
	CVL		442		7,5
	CVLL		649		9
5	CVC	98	155	M12x1,75	4
	CV		255		5
	CVL		455		7,5
	CVLL		667		9
6	CVC	134	165	M12x1,75	7
	CV		265		9
	CVL		477		14
	CVLL		693		18
7	CVC	134	170	M16x2	7
	CV		275		10
	CVL		505		15
	CVLL		735		19
8	CVC	134	180	M16x2	7,5
	CV		295		11
	CVL		540		17
	CVLL		785		20
9	CVC	134	190	M16x2	8
	CV		305		11
	CVL		565		18
	CVLL		825		22
10	CVC	134	195	M20x2,5	8
	CV		315		12
	CVL		580		19
	CVLL		845		24
11	CVC	168	220	M20x2,5	18
	CV		345		23
	CVL		625		35
	CVLL		905		45
12	CVC	168	230	M24x3	19
	CV		360		25
	CVL		655		38
	CVLL		950		47
13	CVC	168	235	M24x3	21
	CV		375		27
	CVL		680		43
	CVLL		985		50
14	CVC	168	255	M30x3,5	23
	CV		410		30
	CVL		750		50
	CVLL		1090		55
15	CVC	236	265	M30x3,5	46
	CV		405		59
	CVL		735		89
	CVLL		1065		114
16	CVC	236	280	M36x4	52
	CV		435		67
	CVL		795		106
	CVLL		1155		138
17	CVC	236	305	M36x4	59
	CV		480		79
	CVL		890		130
	CVLL		1290		172
18	CVC	304	325	M42x4,5	106
	CV		485		134
	CVL		870		204
	CVLL		1250		262
19	CVC	304	355	M48x5	120
	CV		530		152
	CVL		960		243
	CVLL		1385		323
20	CVC	304	370	M56x5,5	138
	CV		555		176
	CVL		1010		291
	CVLL		1455		390
21	CVC	304	395	M64x6	160
	CV		655		219
	CVL		1215		373
	CVLL		1765		520

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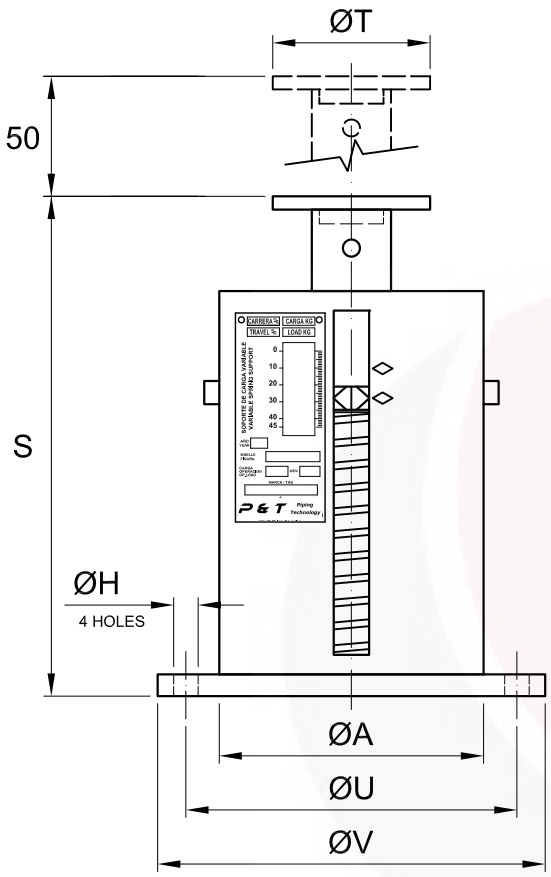
2	12/07/91	INFORMATION	JMD	EAR
1	17/01/85	INFORMATION	JRS	EAR

P&T Piping Technology

VARIABLE LOAD SPRING SUPPORT
TYPE F

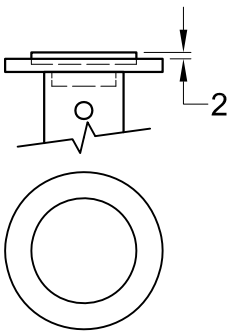
SECTION D
19



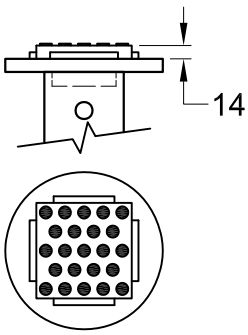
N.B.:

For this type of spring, a PTFE plate or bronze-graphite plate can optionally be installed in the load plate.

PTFE



BRONZE - GRAPHITE



SIZE	MOD.	S MIN.	S MAX.	ØA	ØH	ØU	ØV	ØT	WEIGHT (Kg.)
1	CVC	192	242	98	17,5	155	195	95	5
	CV	287	337						6,5
	CVL	452	502						9
	CVLL	665	715						11
2	CVC	192	242	98	17,5	155	195	95	5
	CV	292	342						6,5
	CVL	466	516						9
	CVLL	686	736						11
3	CVC	197	247	98	17,5	155	195	95	5
	CV	297	347						6,5
	CVL	486	536						9,5
	CVLL	716	766						12
4	CVC	197	247	98	17,5	155	195	95	6
	CV	297	347						7
	CVL	490	540						9,5
	CVLL	722	772						12
5	CVC	202	252	98	17,5	155	195	95	6
	CV	307	357						7
	CVL	502	552						9,5
	CVLL	740	790						12
6	CVC	227	277	134	17,5	190	230	120	9
	CV	327	377						11
	CVL	539	589						16
	CVLL	770	820						20
7	CVC	232	282	134	17,5	190	230	120	9
	CV	337	387						12
	CVL	567	617						17
	CVLL	813	863						21
8	CVC	242	292	134	17,5	190	230	120	10
	CV	357	407						13
	CVL	602	652						19
	CVLL	863	913						23
9	CVC	252	302	134	17,5	190	230	120	10
	CV	367	417						13
	CVL	627	677						20
	CVLL	903	953						24
10	CVC	257	307	134	17,5	190	230	120	11
	CV	377	427						15
	CVL	642	692						21
	CVLL	923	973						26
11	CVC	291	341	168	21,5	225	265	150	22
	CV	416	466						28
	CVL	695	745						40
	CVLL	990	1040						49
12	CVC	301	351	168	21,5	225	265	150	23
	CV	431	481						30
	CVL	725	775						44
	CVLL	1035	1085						53
13	CVC	306	356	168	21,5	225	265	150	25
	CV	446	496						32
	CVL	750	800						47
	CVLL	1070	1120						56
14	CVC	326	376	168	21,5	225	265	150	26
	CV	481	531						34
	CVL	820	870						54
	CVLL	1175	1225						64
15	CVC	363	413	236	21,5	295	335	220	55
	CV	503	553						68
	CVL	835	885						98
	CVLL	1160	1210						123
16	CVC	378	428	236	21,5	295	335	220	59
	CV	533	583						76
	CVL	895	945						114
	CVLL	1250	1300						144
17	CVC	403	453	236	21,5	295	335	220	66
	CV	578	628						86
	CVL	990	1040						134
	CVLL	1385	1435						174
18	CVC	433	483	304	21,5	365	405	275	114
	CV	593	643						141
	CVL	980	1030						208
	CVLL	1355	1405						266
19	CVC	463	513	304	21,5	365	405	275	125
	CV	638	688						157
	CVL	1070	1120						250
	CVLL	1490	1540						332
20	CVC	478	528	304	21,5	365	405	275	145
	CV	663	713						173
	CVL	1120	1170						300
	CVLL	1550	1600						410
21	CVC	535	585	304	21,5	365	405	275	166
	CV	795	845						215
	CVL	1355	1405						387
	CVLL	1915	1965						537

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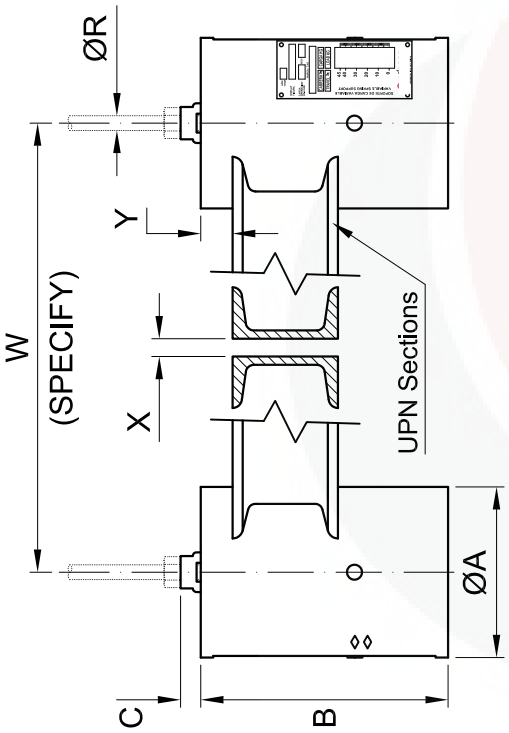
2	12/07/91	INFORMATION	JMD	EAR
1	17/01/85	INFORMATION	JRS	EAR

P & T Piping Technology

VARIABLE LOAD SPRING SUPPORT
TYPE G

SECTION D
20



SIZE	MOD.	B	C	Y	ØA	ØR	X	2 UPN	W (MAX.)
1	CVC	145	45	20	98	M12x1,75	20	80	2500
	CV	240	10	30					
	CVL	405	10	50					
	CVLL	592	10	70					
2	CVC	145	45	20	98	M12x1,75	20	80	2500
	CV	245	10	30					
	CVL	419	10	50					
	CVLL	613	10	70					
3	CVC	150	45	20	98	M12x1,75	20	80	2500
	CV	250	10	30					
	CVL	439	10	50					
	CVLL	643	10	70					
4	CVC	150	45	20	98	M12x1,75	20	80	2500
	CV	250	10	30					
	CVL	442	10	50					
	CVLL	649	10	70					
5	CVC	155	45	20	98	M12x1,75	20	80	2500
	CV	255	10	30					
	CVL	455	10	50					
	CVLL	667	10	70					
6	CVC	165	50	20	134	M12x1,75	28	100	2500
	CV	265	15	30					
	CVL	477	15	50					
	CVLL	693	15	70					
7	CVC	170	50	20	134	M16x2	28	100	2500
	CV	275	15	30					
	CVL	505	15	50					
	CVLL	735	15	70					
8	CVC	180	50	20	134	M16x2	28	100	2500
	CV	295	15	30					
	CVL	540	15	50					
	CVLL	785	15	70					
9	CVC	190	50	20	134	M16x2	28	100	2500
	CV	305	25	30					
	CVL	565	25	50					
	CVLL	825	25	70					
10	CVC	195	55	20	134	M20x2,5	28	100	2500
	CV	315	25	30					
	CVL	580	25	50					
	CVLL	845	25	70					
11	CVC	220	55	20	168	M20x2,5	36	140	2500
	CV	345	25	40					
	CVL	625	25	60					
	CVLL	905	25	80					
12	CVC	230	55	20	168	M24x3	36	140	2500
	CV	360	25	40					
	CVL	655	25	60					
	CVLL	950	25	80					
13	CVC	235	50	20	168	M24x3	36	140	2500
	CV	375	25	40					
	CVL	680	25	60					
	CVLL	985	25	80					
14	CVC	255	70	20	168	M30x3,5	36	140	2500
	CV	410	30	40					
	CVL	750	30	60					
	CVLL	1090	30	80					
15	CVC	265	80	20	236	M30x3,5	50	220	2500
	CV	405	30	40					
	CVL	735	30	60					
	CVLL	1065	30	80					
16	CVC	280	80	20	236	M36x4	50	220	2500
	CV	435	40	40					
	CVL	795	40	60					
	CVLL	1155	40	80					
17	CVC	305	80	20	236	M36x4	50	220	2500
	CV	480	40	40					
	CVL	890	40	60					
	CVLL	1290	40	80					
18	CVC	325	60	15	304	M42x4,5	66	220	1400
	CV	485	40	50					
	CVL	870	40	80				300	2500
	CVLL	1250	40	110					
19	CVC	355	60	15	304	M48x5	66	220	1400
	CV	530	40	50					
	CVL	960	40	80				300	2500
	CVLL	1385	40	110					
20	CVC	370	60	15	304	M56x5,5	66	220	1400
	CV	555	40	50					
	CVL	1010	40	80				300	2500
	CVLL	1455	40	110					

N.B.:

The weight of the unit will be double the corresponding "E" type spring, plus the weight of the sections with length= W-A.

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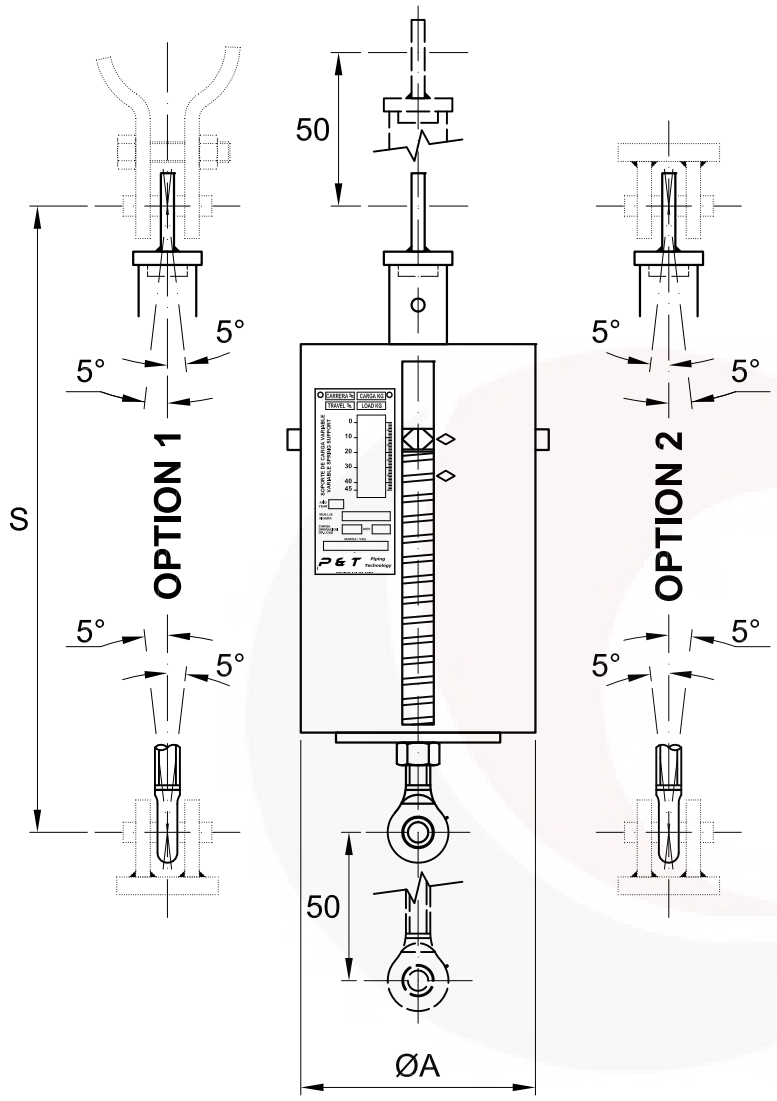
3	21/07/10	GENERAL REVISION	DDG	EAR
2	12/07/91	INFORMATION	JMD	EAR
1	17/01/85	INFORMATION	JRS	EAR

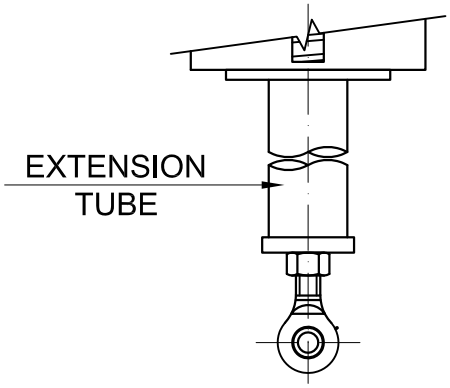
P & T Piping Technology

VARIABLE LOAD SPRING SUPPORT
TYPE H

SECTION D
21



N.B.: The "S" dimension can be increased by using an extension tube.



SIZE	MOD.	S mín	ØA	STRUCTURE CONNECTION FIG. 2400
1	CVC	286	98	00
	CV	381		00
	CVL	546		00
	CVLL	759		00
2	CVC	286	98	00
	CV	386		00
	CVL	560		00
	CVLL	780		00
3	CVC	291	98	00
	CV	391		00
	CVL	580		00
	CVLL	810		00
4	CVC	291	98	00
	CV	391		00
	CVL	584		00
	CVLL	816		00
5	CVC	296	98	00
	CV	401		00
	CVL	596		00
	CVLL	834		00
6	CVC	319	134	00
	CV	419		00
	CVL	631		00
	CVLL	862		00
7	CVC	324	134	00
	CV	429		00
	CVL	659		00
	CVLL	905		00
8	CVC	334	134	00
	CV	449		00
	CVL	694		00
	CVLL	955		00
9	CVC	369	134	0
	CV	484		0
	CVL	744		0
	CVLL	1020		0
10	CVC	374	134	0
	CV	494		0
	CVL	759		0
	CVLL	1040		0
11	CVC	404	168	0
	CV	529		0
	CVL	808		0
	CVLL	1103		0
12	CVC	414	168	0
	CV	544		0
	CVL	838		0
	CVLL	1148		0
13	CVC	464	168	1
	CV	604		1
	CVL	908		1
	CVLL	1228		1
14	CVC	484	168	1
	CV	639		1
	CVL	978		1
	CVLL	1333		1
15	CVC	548	236	2
	CV	688		2
	CVL	1020		2
	CVLL	1345		2
16	CVC	563	236	2
	CV	718		2
	CVL	1080		2
	CVLL	1435		2
17	CVC	588	236	2
	CV	763		2
	CVL	1175		2
	CVLL	1570		2
18	CVC	653	304	3
	CV	813		3
	CVL	1200		3
	CVLL	1575		3
19	CVC	683	304	3
	CV	858		3
	CVL	1290		3
	CVLL	1710		3
20	CVC	763	304	4
	CV	948		4
	CVL	1405		4
	CVLL	1835		4
21	CVC	1035	304	4
	CV	1295		4
	CVL	1855		4
	CVLL	2415		4

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0	20/10/98	INFORMATION	JMD	EAR

P&T Piping Technology

SPECIAL CORROSION RESISTANT VARIABLE SPRINGS WITH CONTINUOUS BLOCKING SYSTEM

The standard surface finish is a two-coat epoxy-polyurethane paint system, with a total dry film thickness of approximately 100 µm.

However, when environmental conditions are particularly severe, we are ready to apply special surface treatments that further protect the spring support against corrosion, either by the application of more complex paint systems (three or even four coats up to 200-300 µm DFT) or by hot dip galvanizing the spring casing, once specified and agreed with the client.

Special corrosion resistant variable springs with hot dip galvanized casing use a hybrid welded/bolted construction, while standard variable springs are all welded.

In addition, special corrosion resistant variable springs with hot dip galvanized casing include the continuous blocking system, so the spring can be blocked at any working position, while standard variable springs use travel stops that are also valid for blocking at the unique cold preset load that is specified for each individual unit.

The continuous blocking system can also be used to establish a limited travel range or specific load stops.

Selection of spring model, size and type for special corrosion resistant supports with continuous blocking system is the same as with standard supports.

DESCRIPTION OF THE CONTINUOUS BLOCKING SYSTEM

The purpose of the continuous blocking system in the variable load spring supports manufactured at PIHASA is the capacity to block the spring in any working position, with the following requirements:

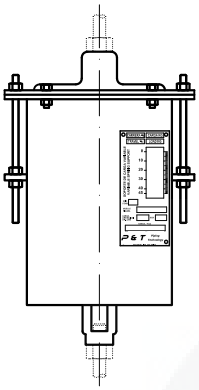
- Block the support by absorbing the expansion strength of the spring itself, in each position.
- At the same time, the purpose is to block the spring in terms of compression (downwards), being able to support loads during the inspection and assembly stage. The value achieved in these stages is up to two and a half times the operating load.
- Blocking should act on all the travel range of the spring.
- The system will continue to be available in the support housing throughout the life cycle of the spring, so that it allows for blocking whenever required.

VARIABLE LOAD SPRING SUPPORTS

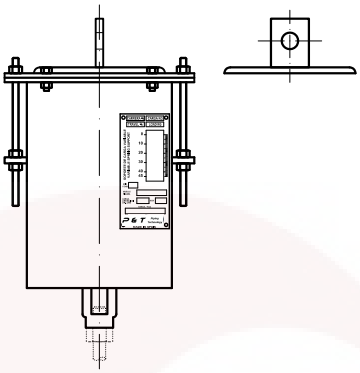
SECTION D
23

SPECIAL CORROSION RESISTANT VARIABLE SPRINGS WITH CONTINUOUS BLOCKING SYSTEM

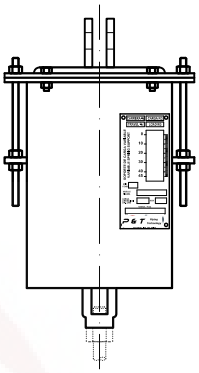
TYPE A



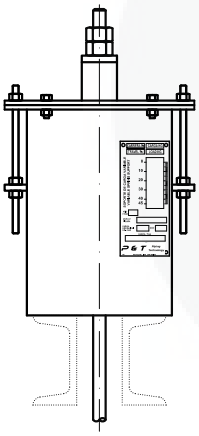
TYPE B



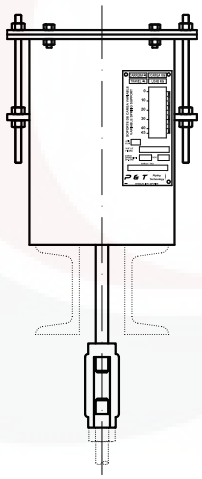
TYPE C



TYPE D



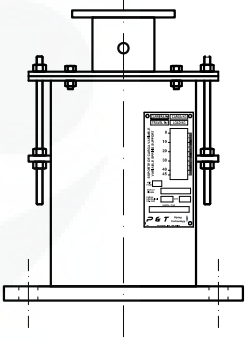
TYPE E



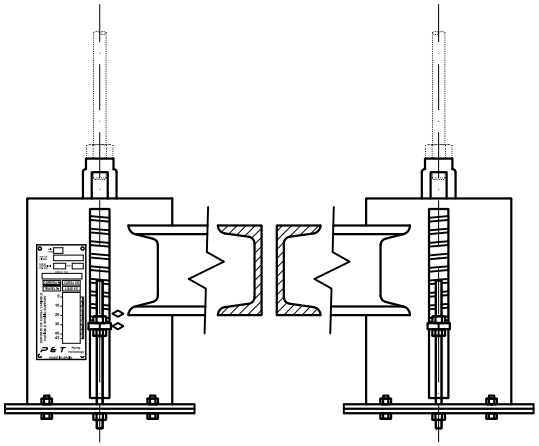
N.B.:

The welded assembly for type E is not considered.

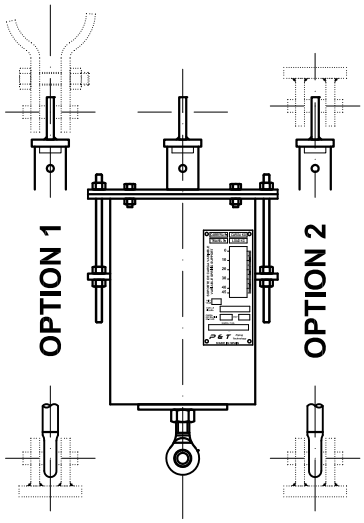
TYPE F



TYPE G



TYPE H



REV.	DATE	EDITED FOR :	DRAW.	REV.
0	21/07/10	GENERAL REVISION	DDG	EAR

P & T Piping Technology

1.- BLOCKING PROCESS:

1.1 Having completed the surface finish operations (P & T standards or any specified by the client), proceed to blocking the support. The rods and nuts are electro-galvanized to ensure protection against corrosion.

1.2 Once the spring has been calibrated to its cold preset load/position, tighten up the lower and upper nuts on the load plate against the guides.

1.3 The upper side of the load plate should coincide with the installation load mark or cold mark of the scaleplate.

2.- INSTALLATION INSTRUCTIONS - UNBLOCKING THE SYSTEM:

Please first read sheets D7-D13 above for a description of the different types. The blocking system does not affect the way of installing the support, but only affects the way of blocking and unblocking it.

The upper and lower blocking nuts should be in permanent contact with the load plate until such time as it is decided to proceed with the unblocking manoeuvres, which should be carried out once known that no loads other than operational loads are going to occur, such as in the hydraulic test, during cleaning operations or in the course of other situations.

The unblocking process involves following these steps:

- First, loosen the lower blocking nuts and scrape them (on both sides) at the end of the spring travel, as indicated on the support scaleplate.

- Then, tighten up the support to reach the installation or cold load (weight of the piping at the point where the support is installed). This operation involves:

  - Acting on the adjusting turnbuckles (types A-B-C-E or G).
  - Acting on the upper nuts on the hanging rod on supports installed on the structure (Type D).
  - Acting on the threaded load column on supports installed on the ground (Type F).

- The installation load is reached when the load plate starts to move downwards.

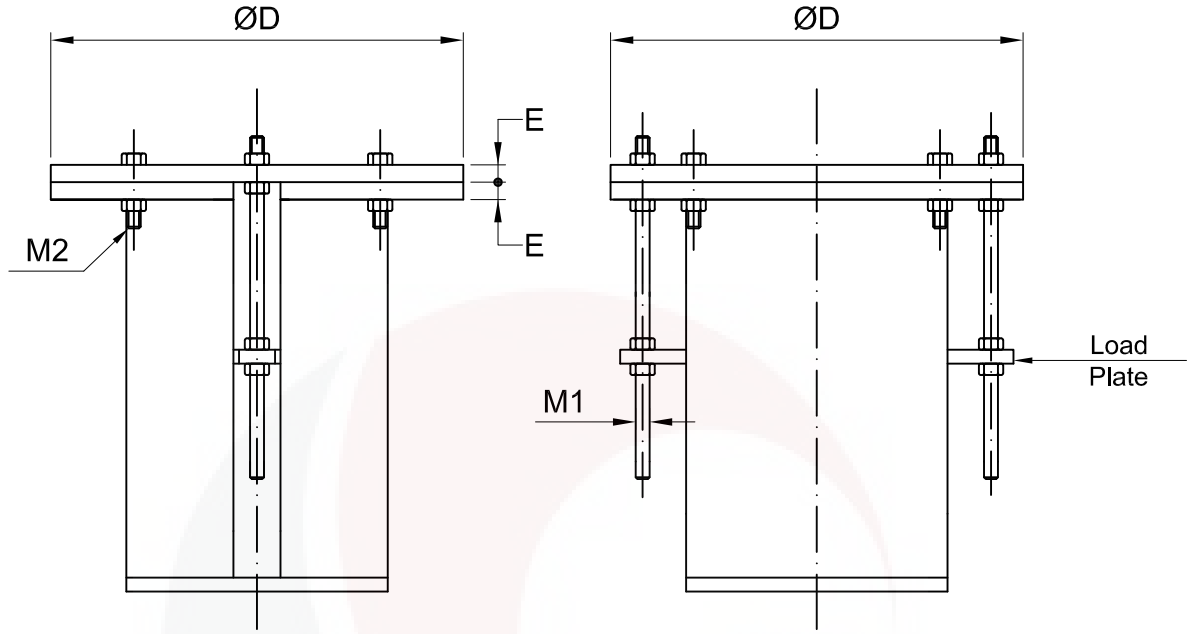
- The final step is to loosen the upper blocking nuts until reaching the start of the spring travel: point “O” indicated on the label.

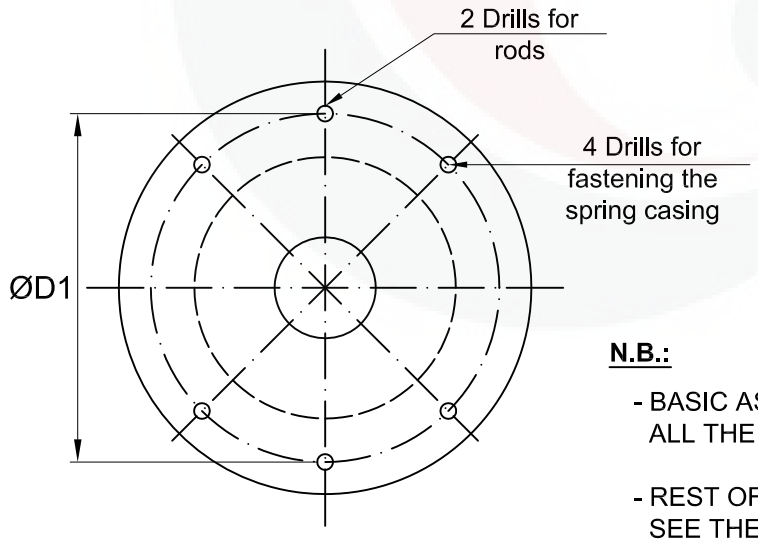
SUPPLEMENTARY NOTES:

- For any subsequent operation on the piping system, it is essential to first block the support in order to prevent modifications in the work conditions of the support. This is achieved by tightening the upper and lower blocking nuts until they come into contact with the load plate. Then, unblock by following the steps in point 4 of these instructions.

- The continuous blocking system on P & Tpiping variable load supports makes it possible to insert travel limits. These limits can be set to avoid the spring going past certain points (upwards or downwards) if this is required by the engineering. Quite simply, this is achieved by setting the upper and/or lower blocking nuts in the required position.

CORROSION RESISTAN VARIABLE LOAD SUPPORTS WITH CONTINUOUS BLOCKING SYSTEM





N.B.:

- BASIC ASSEMBLY APPLIES FOR ALL THE DIFFERENT MODELS.

- REST OF DIMENSIONS: SEE THE CORRESPONDING TYPE IN PREVIOUS PAGES D-14 TO D-12.

SIZE	ØD	ØD1	E	M1	M2
1 / 5	145	124	8	M10	M8
6 / 10	205	174	10	M16	M12
11 / 14	260	216	15	M20	M16
15 / 17	360	300	20	M27	M22
18 / 21	455	385	25	M36	M27

All the piping systems should be supported in accordance with a specific engineering study.

During basic and detail engineering, especially in the case of piping subject to thermal dilation, firstly, it is essential to establish the location of the support points. Then, calculation of loads and the resulting thermal displacements are made for each support point. To do so, the following is taken into account:

Materials, dilation coefficients and acceptable tensions.
Weight of the piping, accessories, insulation, etc.
Working conditions, temperature, pressure, etc.
External factors such as wind, earthquake, etc.
Environmental conditions.

These calculations are made using computer-based calculation programmes, which are only fed with data on batches, geometry, operating conditions, modes of operation, etc.. It is advisable to comply with the following conditions:

- The sum of the weights of the line should be equal to the sum of the support forces.
- The sum of the moments of weight of the piping, at its centre of gravity, and the support forces, should be equal to zero.

SPECIAL CONSIDERATIONS:

The variable load supports should be located at points subjected to vertical movement with acceptable load variations of up to 25%.
Constant load supports are installed when the piping is subjected to vertical movements and a minimum load variation is required.
Anchors are installed to allow for the free expansion and contraction of the line towards one side and another of the anchoring point, and therefore, they should be designed in terms of the load conditions and their location.
When expansion joints are used, guides should be installed on the piping to allow for dilation in the direction of the joint.
Elements controlling vibration are installed on flexible lines when required to dampen vibration or side movement.

SUPPORT POINTS:

Support points should be selected taking into consideration:

The distance between supports should be sufficiently close as to avoid high flexion tensions due to the weight of the piping and insulation. (See maximum separation table between supports in terms of the diameter of the piping).
Generally, it is advisable to fit the supports near the concentrated loads, such as valves, flanges, etc.
Ensure that there is no interference between other equipment or piping.
Locate them taking into account the prior availability of existing structure.

MAXIMUM SPACING BETWEEN SUPPORTS																		
Nominal diam. of pipe	15	20	25	40	50	65	80	100	125	150	200	250	300	350	400	450	500	600
Gap in meters	2	2,5	3	3,5	4	4,5	5,5	6	6,5	7	8,5	9	10	10	10,5	11	12	14

This maximum spacing should be limited by factors such as insulation and operating conditions of the piping.

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SUPPORTS AND HANGERS TYPICAL UNITS

SECTION H
2