

APPENDIX

CHARTS AND ANNEXES

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



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).

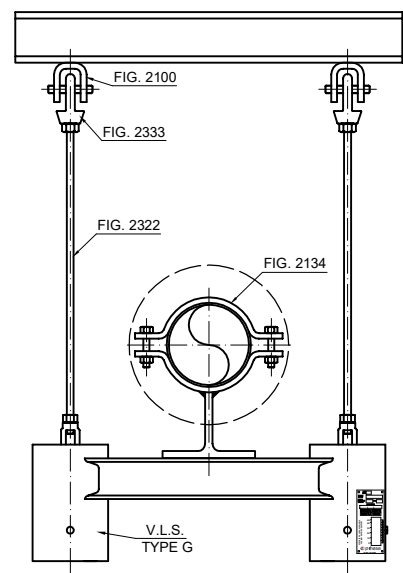
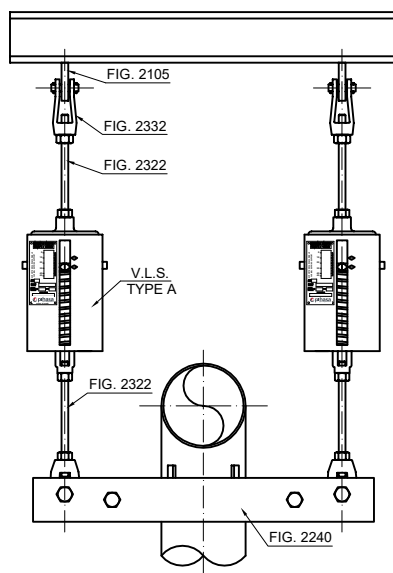
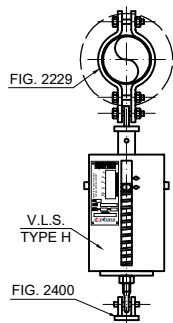
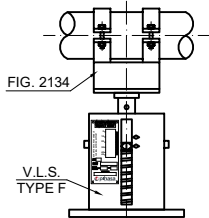
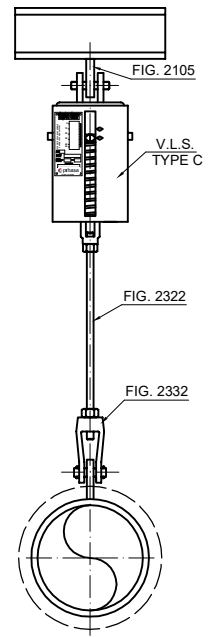
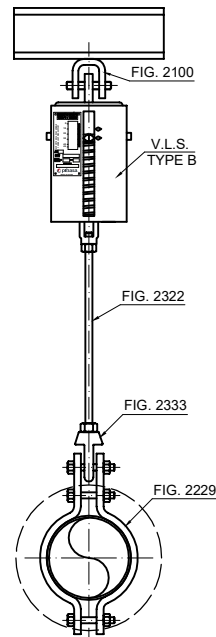
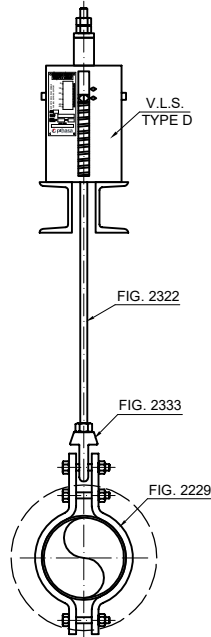
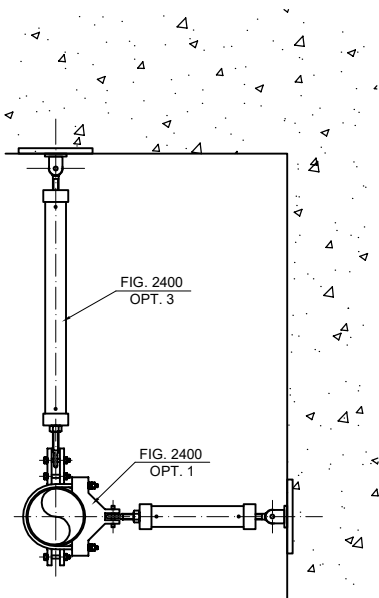
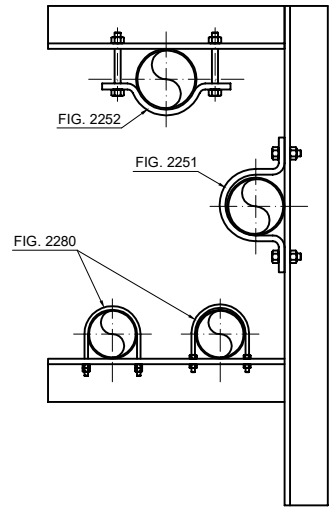
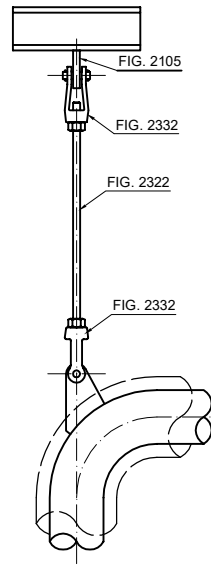
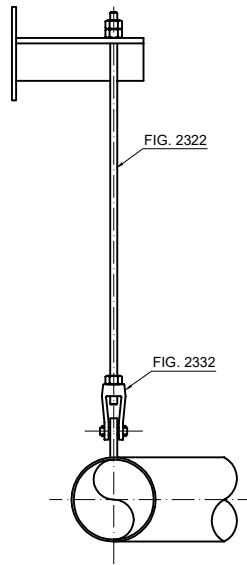
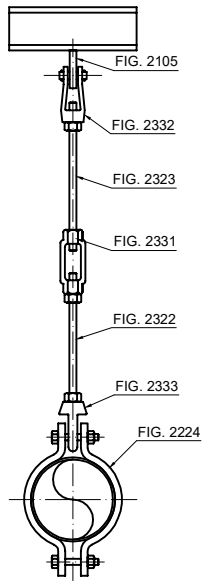
Generally, it is advisable to fit the supports near the concentrated loads, such as valves, flanges, etc.

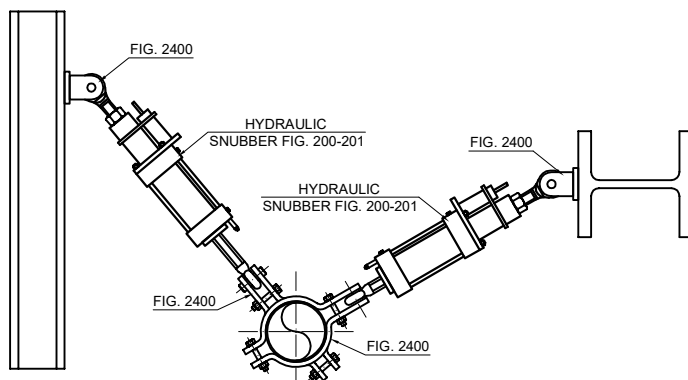
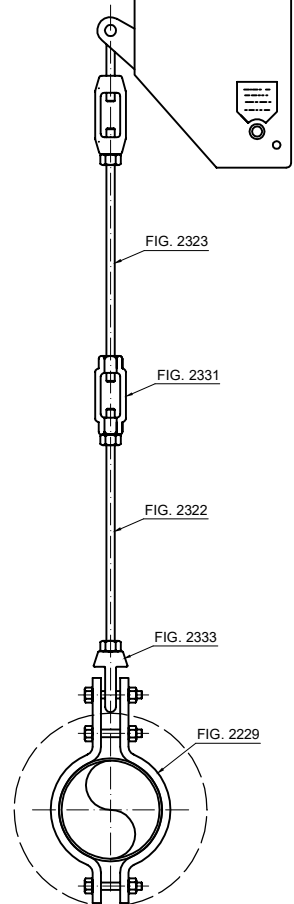
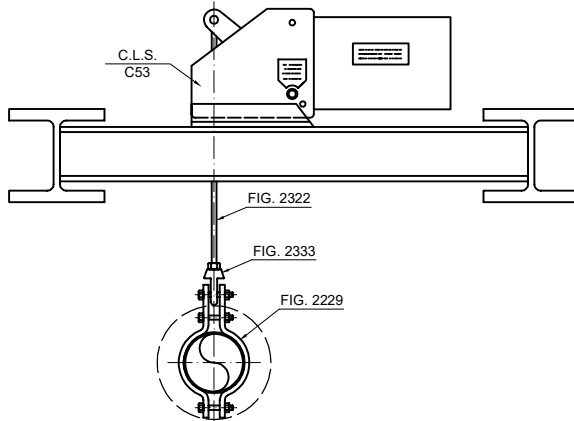
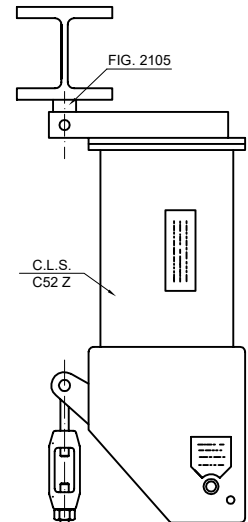
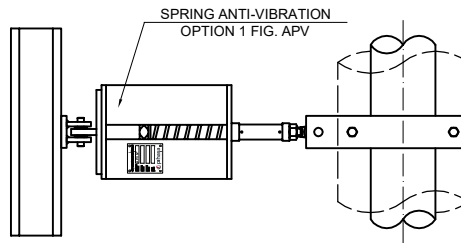
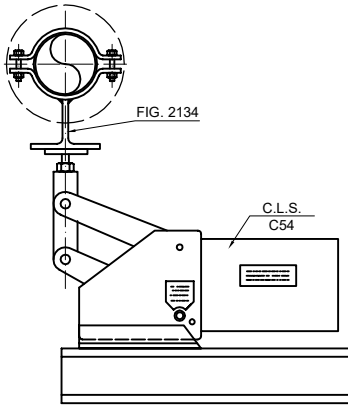
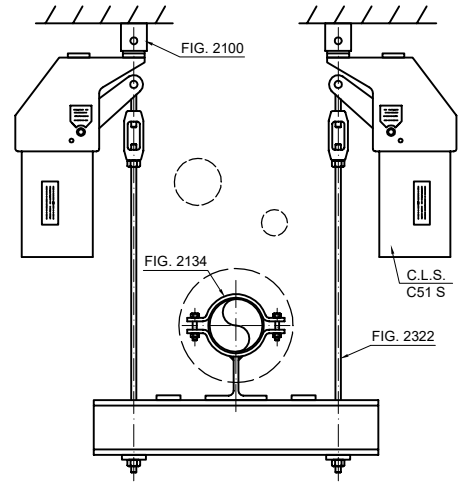
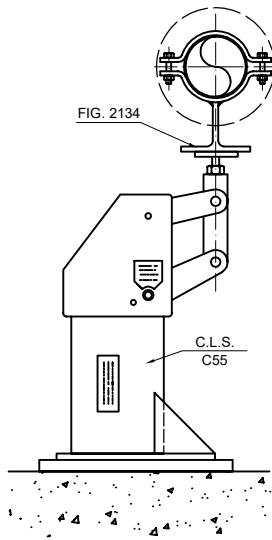
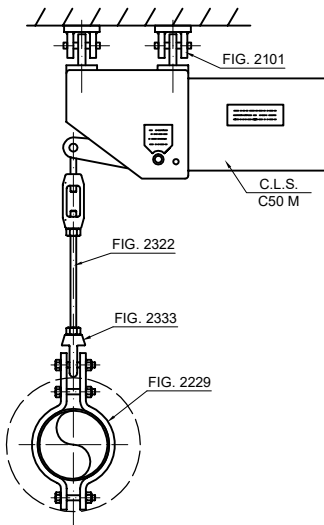
Ensure that there is no interference between other equipment or piping.

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.





Ø Nominal	Ø Ext. (mm)	Thickness (mm)	Identification: S/ANSI-B16.10 or DIN	Weight (Kg/m)
1/8" DN-6	10,2	1,6	DIN-2448	0,344
		2	DIN-2440	0,41
		2,65	DIN-2441	0,493
	10,3	1,24	SCH-10S	0,28
		1,73	STD/SCH-40/SCH-40S	0,36
2,41		XS/SCH-80/SCH-80S	0,46	
1/4" DN-8	13,5	1,8	DIN-2448	0,522
		2,35	DIN-2440	0,65
		2,9	DIN-2441	0,769
	13,71	1,65	SCH-10S	0,49
		2,24	STD/SCH-40/SCH-40S	0,63
		3,02	XS/SCH-80/SCH-80S	0,8
3/8" DN-10	17,14	1,65	SCH-10S	0,63
		2,31	STD/SCH-40/SCH-40S	0,85
		3,2	XS/SCH-80/SCH-80S	1,1
	17,2	1,8	DIN-2448	0,688
		2,35	DIN-2440	0,852
		2,9	DIN-2441	1,02
1/2" DN-15	21,3	1,65	SCH-5S	0,8
		2	DIN-2448	0,962
		2,11	SCH-10S	1
		2,65	DIN-2440	1,22
		2,77	STD/SCH-40/SCH-40S	1,27
		3,25	DIN-2441	1,45
		3,73	XS/SCH-80/SCH-80S	1,62
		4,78	SCH-160	1,94
3/4" DN-20	26,7	1,65	SCH-5S	1,03
		2,11	SCH-10S	1,28
		2,87	STD/SCH-40/SCH-40S	1,68
		3,91	XS/SCH-80/SCH-80S	2,19
		5,56	SCH-160	2,9
	7,82	XXS	3,63	
	26,9	2,3	DIN-2448	1,41
2,65		DIN-2440	1,68	
3,25		DIN-2441	1,9	
-		-	-	
1" DN-25	33,4	1,65	SCH-5S	1,29
		2,77	SCH-10S	2,08
		3,38	STD/SCH-40/SCH-40S	2,5
		4,55	XS/SCH-80/SCH-80S	3,23
		6,35	SCH-160	4,18
		9,09	XXS	5,45
	33,7	2,6	DIN-2448	2,01
		3,25	DIN-2440	2,44
		4,05	DIN-2441	2,97
		-	-	-
-	38	2,6	DIN-2448	2,29
1 1/4" DN-32	42,2	1,65	SCH-5S	1,65
		2,77	SCH-10S	2,69
		3,56	STD/SCH-40/SCH-40S	3,38
		4,85	XS/SCH-80/SCH-80S	4,47
		6,35	SCH-160	5,58
		9,7	XXS	7,76
	42,4	2,6	DIN-2448	2,57
		3,25	DIN-2440	3,14
		4,05	DIN-2441	3,84
		-	-	-
-	44,5	2,6	DIN-2448	2,7

Ø Nominal	Ø Ext. (mm)	Thickness (mm)	Identification: S/ANSI-B16.10 or DIN	Weight (Kg/m)
1 1/2" DN-40	48,3	1,65	SCH-5S	1,9
		2,6	DIN-2448	2,95
		2,77	SCH-10S	3,12
		3,25	DIN-2440	3,61
		3,68	STD/SCH-40/SCH-40S	4,05
		4,05	DIN-2441	4,43
		5,08	XS/SCH-80/SCH-80S	5,41
		7,14	SCH-160	7,22
		10,16	XXS	9,55
		-	51	2,6
-	57	2,9	DIN-2448	3,9
2" DN-50	60,3	1,65	SCH-5S	2,38
		2,77	SCH-10S	3,93
		2,9	DIN-2448	4,14
		3,65	DIN-2440	5,1
		3,91	STD/SCH-40/SCH-40S	5,44
		4,5	DIN-2441	6,17
		5,54	XS/SCH-80/SCH-80S	7,48
		8,74	SCH-160	11,08
		11,07	XXS	13,45
		-	63,5	2,9
-	70	2,9	DIN-2448	4,83
2 1/2" DN-65	73,02	2,11	SCH-5S	3,68
		3,05	SCH-10S	5,26
		5,16	STD/SCH-40/SCH-40S	8,62
		7,01	XS/SCH-80/SCH-80S	11,41
		9,52	SCH-160	14,88
	76,1	14,02	XXS	20,41
		2,9	DIN-2448	5,28
		3,65	DIN-2440	6,51
		4,5	DIN-2441	7,9
		-	82,5	3,2
3" DN-80	88,9	2,11	SCH-5S	4,52
		3,05	SCH-10S	6,45
		3,2	DIN-2448	6,81
		4,05	DIN-2440	8,47
		4,85	DIN-2441	10,1
		5,49	STD/SCH-40/SCH-40S	11,29
		7,62	XS/SCH-80/SCH-80S	15,27
		11,13	SCH-160	20,98
		15,24	XXS	27,67
		3 1/2"	101,6	2,11
3,05	SCH-10S			7,4
3,6	DIN-2448			8,76
5,74	STD/SCH-40/SCH-40S			13,57
8,08	XS/SCH-80/SCH-80S			18,63
-	108	3,6	DIN-2448	9,33
4" DN-100	114,3	2,11	SCH-5S	5,81
		3,05	SCH-10S	8,34
		3,6	DIN-2448	9,9
		4,5	DIN-2440	12,1
		5,4	DIN-2441	14,4
		6,02	STD/SCH-40/SCH-40S	16,07
		8,5	XS/SCH-80/SCH-80S	22,31
		11,13	SCH-120	28,35
		13,49	SCH-160	33,53
		17,12	XXS	41,02

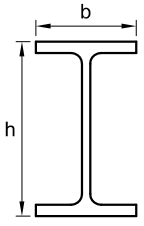
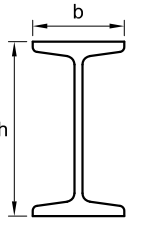
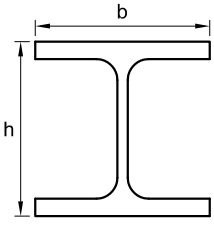
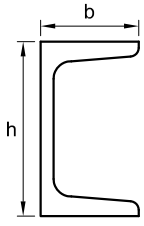
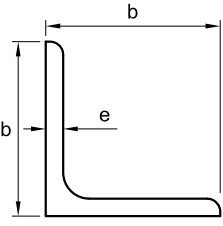
Ø Nominal	Ø Ext. (mm)	Thickness (mm)	Identification: S/ANSI-B16.10 or DIN	Weight (Kg/m)
-	127	4	DIN-2448	12,20
-	133	4	DIN-2448	12,80
5" DN-125	139,7	4	DIN-2448	13,50
		4,85	DIN-2440	16,20
		5,40	DIN-2441	17,80
	141,3	2,77	SCH-5S	9,45
		3,40	SCH-10S	11,56
		6,55	STD/SCH-40/SCH-40S	21,78
		9,52	XS/SCH-80/SCH-80S	30,95
		12,70	SCH-120	40,28
		15,88	SCH-160	49,09
		19,05	XXS	57,42
-	152,4	4,50	DIN-2448	16,40
-	159	4,50	DIN-2448	17,10
6" DN-150	165,1	4,50	DIN-2448	17,80
		4,85	DIN-2440	19,20
		5,40	DIN-2441	21,20
	168,3	2,77	SCH-5S	11,31
		3,40	SCH-10S	13,82
		4,50	DIN-2448	18,10
		7,11	STD/SCH-40/SCH-40S	28,26
		10,97	XS/SCH-80/SCH-80S	42,56
		14,27	SCH-120	54,20
		18,26	SCH-160	67,55
21,95	XXS	79,18		
-	177,8	5	DIN-2448	21,3
DN-175	193,7	5,4	DIN-2448	25
8" DN-200	219,1	2,77	SCH-5S	14,78
		3,76	SCH-10S	19,94
		5,90	DIN-2448	31
		6,35	SCH-20	33,3
		7,04	SCH-30	36,8
		8,18	STD/SCH-40/SCH-40S	42,5
		10,31	SCH-60	52,9
		12,70	XS/SCH-80/SCH-80S	64,6
		15,09	SCH-100	75,8
		18,26	SCH-120	90,4
		20,62	SCH-140	101
		22,22	XXS	107,9
		23,01	SCH-160	111,3
-	244,5	6,3	DIN-2448	37,1
-	159	6,3	DIN-2448	40,6
10" DN-250	273	3,4	SCH-5S	22,6
		4,19	SCH-10S	27,8
		6,35	SCH-20/DIN-2448	41,7
		7,8	SCH-30	51
		9,27	STD/SCH-40/SCH-40S	60,3
		12,7	XS/SCH-60/SCH-80S	81,5
		15,09	SCH-80	96
		18,26	SCH-100	114,7
		21,44	SCH-120	132,7
		25,4	XXS/SCH-140	154,9
28,58	SCH-160	172,1		
-	298,5	7,1	DIN-2448	51,1




Ø Nominal	Ø Ext. (mm)	Thickness (mm)	Identification: S/ANSI-B16.10 or DIN	Weight (Kg/m)		
12" DN-300	323,85	3,96	SCH-5S	33		
		4,57	SCH-10S	36		
		6,35	SCH-20	49,7		
		7,1	DIN-2448	55,6		
		8,38	SCH-30	65,2		
		9,52	STD/SCH-40S	73,8		
		10,31	SCH-40	79,7		
		12,7	XS/SCH-80S	93,4		
		14,27	SCH-60	109		
		17,48	SCH-80	132		
		21,44	SCH-100	159,5		
		25,4	XXS/SCH-120	186,8		
		28,58	SCH-140	207		
		33,34	SCH-160	238,1		
		14" DN-350	355,6	3,96	SCH-5S	34,2
4,78	SCH-10S			41,3		
6,35	SCH-10			54,7		
7,92	SCH-20			67,9		
8	DIN-2448			68,3		
9,52	STD/SCH-30/SCH-40S			81,3		
11,13	SCH-40			94,5		
12,7	XS/SCH-80S			107,4		
15,09	SCH-60			126,5		
19,05	SCH-80			158,1		
23,83	SCH-100			194,9		
27,79	SCH-120			224,4		
31,57	SCH-140			253,1		
35,71	SCH-160			281,4		
-	368			8	DIN-2448	70,8
16" DN-400	406,4	4,19	SCH-5S	41,6		
		4,78	SCH-10S	47,3		
		6,35	SCH-10	62,6		
		7,92	SCH-20	77,9		
		8,8	DIN-2448	85,9		
		9,52	STD/SCH-30/SCH-40S	93,2		
		12,7	XS/SCH-40/SCH-80S	123,3		
		16,64	SCH-60	160		
		21,44	SCH-80	203,2		
		26,19	SCH-100	245,3		
		30,96	SCH-120	286,4		
		36,52	SCH-140	332,6		
		40,49	SCH-160	364,8		
		-	419	10	DIN-2448	101
		18" DN-450	457,2	4,19	SCH-5S	46,8
4,78	SCH-10S			53,3		
6,35	SCH-10			70,6		
7,92	SCH-20			87,8		
9,52	STD/SCH-40S			105,1		
10	DIN-2448			110		
11,13	SCH-30			122,4		
12,7	XS/SCH-80S			139,2		
14,27	SCH-40			151,9		
19,05	SCH-60			205,8		
23,83	SCH-80			254,6		
29,36	SCH-100			309,4		
34,92	SCH-120			363,2		
39,69	SCH-140			408		
45,24	SCH-160			459,2		




Ø Nominal	Ø Ext. (mm)	Thickness (mm)	Identification: S/ANSI-B16.10 or DIN	Weight (Kg/m)
20" DN-500	508	4,78	SCH-5S	59,2
		5,54	SCH-10S	68,5
		6,35	SCH-10	78,5
		9,52	STD/SCH-20/SCH-40S	117,1
		11	DIN-2448	135
		12,7	XS/SCH-30/SCH-80S	155,1
		15,09	SCH-40	183,1
		20,62	SCH-60	247,8
		26,19	SCH-80	310,9
		32,54	SCH-100	381
		38,1	SCH-120	440,9
		44,45	SCH-140	509
50,01	SCH-160	564,1		
22" DN-550	558,8	6,35	SCH-10	86,5
		9,52	STD/SCH-20/SCH-40S	129
		12,5	DIN-2448	170
		12,7	XS/SCH-30/SCH-80S	171
		22,22	SCH-60	224
		28,58	SCH-80	373,6
		34,92	SCH-100	451,1
		41,28	SCH-120	526,8
		47,62	SCH-140	600
		53,98	SCH-160	671
24" DN-600	609,6	5,54	SCH-5S	82,6
		6,35	SCH-10/SCH-10S	94,5
		9,52	STD/SCH-20/SCH-40S	140,8
		12,7	XS/SCH-80S	186,9
		14,27	SCH-30	209,5
		17,48	SCH-40	255,1
		24,61	SCH-60	354,6
		30,96	SCH-80	441,1
		38,89	SCH-100	547
		46,02	SCH-120	639
		52,3	SCH-140	716
59,54	SCH-160	807		
26"	660,4	7,92	SCH-10	127,5
		9,52	STD/SCH-40S	152,9
		12,7	XS/SCH-20-SCH-80S	202,8
28" DN-700	711,2	7,92	SCH-10	137,4
		9,52	STD/SCH-40S	164,8
		12,7	XS/SCH-20/SCH-80S	218,7
		15,88	SCH-30	272,2
30"	762	7,92	SCH-10	147,4
		9,52	STD/SCH-40S	176,7
		12,7	XS/SCH-20/SCH-80S	234,6
32" DN-800	812,8	15,88	SCH-30	292,1
		7,92	SCH-10	157,3
		9,52	STD/SCH-40S	188,7
		12,7	XS/SCH-20/SCH-80S	250,5
15,88	SCH-30	312		
17,48	SCH-40	342,7		

Ø Nominal	Ø Ext. (mm)	Espesor (mm)	Identification: S/ANSI-B16.10 or DIN	Weight (Kg/m)
34"	863,6	7,92	SCH-10	162,2
		9,52	STD/SCH-40S	200,6
		12,7	XS/SCH-20/SCH-80S	266,5
		15,88	SCH-30	331,8
		17,48	SCH-40	364,6
36" DN-900	914,4	7,92	SCH-10	177,1
		9,52	STD/SCH-40S	212,5
		12,7	XS/SCH-20/SCH-80S	282,4
		15,88	SCH-30	351,7
		19,05	SCH-40	421
38"	965,2	7,92	STD/SCH-40S	224,5
		9,52	XS/SCH-80S	298,3
40" DN-1000	1016	7,92	STD/SCH-40S	236,4
		9,52	XS/SCH-80S	314,1
42"	1066,8	7,92	STD/SCH-40S	248,3
		9,52	XS/SCH-80S	330,1
44" DN-1100	1117,6	7,92	STD/SCH-40S	260,2
		9,52	XS/SCH-80S	346




N.B.: In pipes according to DIN-2448, only those considered as "essential series" are included.




 IPE			 IPN			 HEB			 UPN			 LPN		
h	b	Weight Kg/m	h	b	Weight Kg/m	h	b	Weight Kg/m	h	b	Weight Kg/m	b	e	Weight Kg/m
80	46	6	80	42	5,95	100	100	20,4	80	45	8,64	20	3	0,88
100	55	8,1	100	50	8,32	120	120	26,7	100	50	10,6	20	4	1,14
120	64	10,4	120	58	11,1	140	140	33,7	120	55	13,4	25	3	1,12
140	73	12,9	140	66	14,4	160	160	42,6	140	60	16	25	4	1,46
160	82	15,8	160	74	17,9	180	180	51,2	160	65	18,8	30	3	1,36
180	91	18,8	180	82	21,9	200	200	61,3	180	70	22	30	4	1,78
200	100	22,4	200	90	26,3	220	220	71,5	200	75	25,3	35	3	1,60
220	110	26,2	220	98	31,1	240	240	83,2	220	80	29,4	35	4	2,09
240	120	30,7	240	106	36,2	260	260	93	240	85	33,2	40	4	2,42
270	135	36,1	260	113	41,9	280	280	103	260	90	37,9	40	5	2,97
300	150	42,2	280	119	48	300	300	117	280	95	41,8	50	5	3,77
330	160	49,1	300	125	54,2	320	300	127	300	100	46,2	50	6	4,47
360	170	57,1	320	131	61,1	340	300	134	-	-	-	60	6	5,42
400	180	66,3	340	137	68,1	360	300	142	-	-	-	60	8	7,09
450	190	77,6	360	143	76,2	400	300	155	-	-	-	70	7	7,38
500	200	90,7	380	149	84	450	300	171	-	-	-	80	8	9,63
550	210	106	400	155	92,6	500	300	187	-	-	-	80	10	11,9
600	220	122	450	170	115	550	300	199	-	-	-	90	8	10,9
-	-	-	500	185	141	600	300	212	-	-	-	90	10	13,4
-	-	-	550	200	167	-	-	-	-	-	-	100	10	15
-	-	-	600	215	199	-	-	-	-	-	-	120	12	21,6
-	-	-	-	-	-	-	-	-	-	-	-	150	12	27,3
-	-	-	-	-	-	-	-	-	-	-	-	150	15	33,8

SIZE				
Milimeters	Inches	Kg/m	Kg/m	Kg/m
3		0,056	0,071	0,061
3,1750	1/8	0,062	0,079	0,069
3,5		0,076	0,096	0,083
3,9687	5/32	0,097	0,124	0,107
4		0,099	0,126	0,109
4,5		0,125	0,159	0,138
4,7625	3/16	0,140	0,178	0,154
5		0,154	0,196	0,170
5,5		0,187	0,237	0,206
5,5562	7/32	0,190	0,242	0,210
6		0,222	0,283	0,245
6,3500	1/4	0,247	0,317	0,274
6,5		0,261	0,332	0,287
7		0,302	0,385	0,333
7,1436	9/32	0,315	0,401	0,347
7,5		0,347	0,442	0,382
7,9375	5/16	0,388	0,495	0,428
8		0,395	0,502	0,435
8,5		0,445	0,567	0,491
8,7312	11/32	0,470	0,598	0,518
9		0,499	0,636	0,551
9,5		0,556	0,708	0,614
9,5250	3/8	0,559	0,712	0,617
10		0,617	0,785	0,680
10,3787	13/32	0,657	0,836	0,724
10,5		0,680	0,865	0,750
11		0,746	0,950	0,823
11,1125	7/16	0,761	0,969	0,840
11,5		0,815	1,035	0,899
11,9062	15/32	0,874	1,113	0,964
12		0,888	1,130	0,979
12,5		0,963	1,227	1,062
12,6698	1/2	0,994	1,266	1,096
13		1,042	1,327	1,149
13,4937	17/32	1,123	1,429	1,238
13,5		1,124	1,431	1,239
14		1,208	1,539	1,332
14,2875	9/16	1,259	1,602	1,388
14,5		1,296	1,650	1,429
15		1,387	1,766	1,530
15,0812	19/32	1,402	1,785	1,546
15,5		1,481	1,883	1,633
15,8750	5/8	1,557	1,978	1,713
16		1,578	2,010	1,740
16,5		1,678	2,137	1,851
16,6687	21/32	1,713	2,181	1,889
17		1,782	2,269	1,965
17,4625	11/16	1,880	2,394	2,073
17,5		1,888	2,404	2,082
18		1,998	2,543	2,203
18,2562	23/32	2,055	2,617	2,266
18,5		2,110	2,687	2,327
19		2,226	2,834	2,454
19,0500	3/4	2,237	2,849	2,467
19,5		2,344	2,985	2,585
19,8431	25/32	2,426	3,091	2,677
20		2,466	3,140	2,719
20,6375	13/16	2,626	3,343	2,895
21		2,719	3,462	2,998

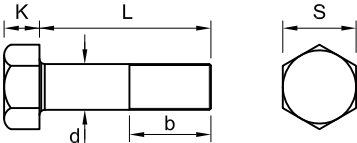
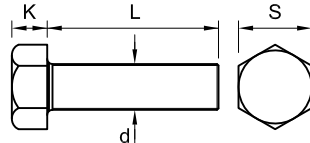
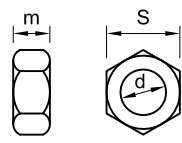
SIZE				
Milimeters	Inches	Kg/m	Kg/m	Kg/m
21,4312	27/32	2,832	3,605	3,122
22		2,984	3,799	3,290
22,2250	7/8	3,045	3,875	3,358
23		3,262	4,153	3,596
23,0187	29/32	3,267	4,159	3,602
23,8125	15/16	3,496	4,451	3,855
24		3,551	4,522	3,916
24,6062	31/32	3,733	4,753	4,116
25		3,853	4,906	4,249
25,4000	1	3,978	5,065	4,352
26		4,168	5,307	4,593
27		4,495	5,723	4,956
28		4,824	6,154	5,330
28,5750	1 1/8	5,034	6,410	5,551
29		5,185	6,602	5,717
30		5,549	7,065	6,118
31		5,925	7,544	6,533
31,7499	1 1/4	6,215	7,913	6,853
32		6,313	8,038	6,961
33		6,714	8,549	7,403
34		7,127	9,075	7,859
34,9249	1 3/8	7,520	9,575	8,292
35		7,553	9,616	8,328
36		7,990	10,174	8,811
37		8,440	10,747	9,307
38		8,903	11,335	9,817
38,0999	1 1/2	8,950	11,395	9,868
39		9,378	11,940	10,340
40		9,865	12,560	10,877
41		10,364	13,190	11,428
41,2749	1 5/8	10,504	13,373	11,582
42		10,876	13,647	11,992
43		11,400	14,515	12,570
44		11,936	15,198	13,162
44,4499	1 3/4	12,181	15,510	13,432
45		12,485	15,896	13,767
46		13,046	16,611	14,385
47		13,619	17,341	15,017
47,6249	1 7/8	13,984	17,805	15,419
48		14,205	18,086	15,663
49		14,803	18,848	16,323
50		15,413	19,625	16,996
50,7999	2	15,911	20,258	17,544
51		16,036	20,418	17,682
52		16,671	21,226	18,383
53		17,319	22,051	19,096
53,9749	2 1/8	17,962	22,869	19,805
54		17,978	22,891	19,824
55		18,650	23,746	20,565
56		19,335	24,818	21,319
57		20,031	25,505	22,088
57,1499	2 1/4	20,137	25,639	22,201
58		20,740	26,407	22,869
59		21,462	27,326	23,665
60		22,195	28,260	24,474
60,3249		22,436	28,567	24,740
61	2 1/4	22,941	29,210	25,296
62		23,700	30,175	26,133
63		24,470	31,157	26,982

For density = 7.85 kg/dm³

SIZE				
Milimeters	Inches	Kg/m	Kg/m	Kg/m
63,4999	2 1/2	24,861	31,653	27,412
64		25,253	32,154	27,846
65		26,049	33,166	28,723
66		26,856	34,195	29,613
66,6749	2 5/8	27,408	34,898	30,222
67		27,676	35,239	30,518
68		28,509	36,298	31,435
69		29,353	37,374	32,367
69,8499	2 3/4	30,081	38,300	33,169
70		30,210	38,465	33,312
72		31,961	40,694	35,242
73,0249	2 7/8	32,878	41,861	36,253
74		33,762	42,987	37,227
75		34,680	44,156	38,240
76		35,611	45,352	39,267
76,1199	3	35,799	45,580	39,474
78		37,510	47,759	41,361
80		39,458	50,240	43,509
82,5499	3 1/4	42,013	53,494	45,204
85		44,545	56,716	49,118
88,8998	3 1/2	48,726	62,040	53,728
90		49,939	63,585	55,066
95		55,642	70,846	61,355
95,2468	3 3/4	55,936	71,219	61,678
100		61,654	78,500	67,983
101,5988	4	63,642	81,032	70,175
105		67,973	86,546	74,951
107,9489	4 1/4	71,846	91,477	79,222
110		74,601	94,985	82,259
114,2998	4 1/2	80,547	102,556	88,816
115		81,537	103,816	89,907
120		88,781	113,040	97,895
120,6498	4 3/4	89,745	114,268	98,958
125		96,337	122,656	106,226
126,9998	5	99,441	126,612	108,649
130		104,195	132,665	114,891
133,3498	5 1/4	109,634	139,590	120,888
135		112,364	143,066	123,899
139,6998		120,323	153,201	132,676
140	5	120,841	153,860	133,247
145		129,627	165,046	142,934
146,0497	5 3/4	131,511	167,445	145,011
150		138,721	176,625	152,962
152,2997	6	143,195	182,321	157,895
155		148,123	188,596	163,329
158,7497	6 1/4	155,376	197,809	171,327
160		157,833	200,960	174,036
165		167,853	213,716	185,084
165,0997	6 1/2	168,055	213,975	185,307
170		178,179	226,865	196,471
171,4407	6 3/4	181,231	230,751	199,836
175		188,814	240,406	208,198
177,7997	7	194,904	248,160	214,913
180		199,757	254,340	220,265
184,1497	7 1/4	209,075	266,202	230,538
185		211,010	268,666	232,672

SIZE				
Milimeters	Inches	Kg/m	Kg/m	Kg/m
190		222,570	283,385	245,418
190,4997	7 1/2	223,742	284,799	246,711
195		234,438	298,496	258,505
196,8497	7 3/4	238,907	304,186	263,433
200		246,614	314,000	271,932
203,1996	8	254,509	324,127	280,702
205		259,100	329,896	285,698
210		271,893	346,185	299,805
215		284,994	362,866	314,251
215,8996	8 1/2	287,384	365,909	316,886
220		298,403	379,940	329,038
225		312,122	397,406	344,164
228,5996	9	322,189	410,224	355,264
230		326,148	415,265	359,630
235		340,483	433,516	375,436
240		355,125	452,160	391,582
241,2996	9 1/2	358,981	457,070	395,834
245		370,076	471,196	408,068
250		385,336	490,625	424,894
253,9996	10	397,768	506,433	438,583
255		400,903	510,446	442,059
260		416,779	530,660	459,565
265		432,963	551,266	477,410
266,6995	10 1/2	438,534	558,360	483,553
270		449,455	572,265	495,596
275		466,256	593,656	514,121
279,3995	11	481,294	612,803	530,702
280		483,365	615,440	532,986
285		500,782	637,616	552,192
290		518,508	660,185	571,737
292,0995	11 1/2	526,042	669,779	580,045
295		536,541	683,146	591,622
300		554,883	706,500	611,847
304,7995	12	572,780	729,286	631,580
305		573,534	730,246	632,411
310		592,492	754,385	653,316
315		611,759	778,916	674,561
317,4995	12 1/2	621,506	791,327	685,301
320		631,334	803,840	696,146
325		651,217	829,156	718,070
330		671,409	854,865	740,334
330,1994	13	672,220	855,898	741,229
335		691,909	880,966	762,933
340		712,717	907,460	786,883
342,8994	13 1/2	724,924	923,003	799,343
345		733,833	934,346	809,167
350		755,258	961,625	832,791
355		776,991	989,296	856,775
355,5994	14	779,617	992,640	859,650
360		799,032	1017,360	881,059
365		821,381	1045,816	905,703
368,2994	14 1/2	836,298	1064,809	922,150
370		844,039	1074,665	930,687
375		867,005	1103,906	956,010
380		890,279	1133,540	981,674
380,9993	15	894,968	1139,510	986,843

For density = 7.85 kg/dm³

 S/DIN-931							 S/DIN-933				 S/DIN-934		
d	b			K	S	L min	d	K	S	L min	d	m	S
	(1)	(2)	(3)										
M6	18	24	-	4	10	30	M6	4	10	6	M6	5	10
M8	22	28	-	5.5	13	35	M8	5.5	13	8	M8	6.5	13
M10	26	32	45	7	17	40	M10	7	17	8	M10	8	17
M12	30	36	49	8	19	45	M12	8	19	10	M12	10	19
M14	30	40	53	9	22	50	M14	9	22	10	M14	11	22
M16	38	44	57	10	24	55	M16	10	24	12	M16	13	24
M18	42	48	61	12	27	60	M18	12	27	16	M18	15	27
M20	46	52	65	13	30	65	M20	13	30	16	M20	16	30
M22	50	56	69	14	32	70	M22	14	32	16	M22	18	32
M24	54	60	73	15	36	75	M24	15	36	16	M24	19	36
M27	60	66	79	17	41	80	M27	17	41	16	M27	22	41
M30	66	72	85	19	46	90	M30	19	46	35	M30	24	46
M33	72	78	91	21	50	100	M33	21	50	35	M33	26	50
M36	78	84	97	23	55	110	M36	23	55	35	M36	29	55
M39	84	90	103	25	60	110	M39	25	60	35	M39	31	60
M42	90	96	109	26	65	120	M42	26	65	40	M42	34	65
M45	96	102	115	28	70	120	M45	28	70	40	M45	36	70
M48	-	108	121	30	75	130	M48	30	75	40	M48	38	75
M52	-	116	129	33	80	140	M52	33	80	50	M52	42	80
M56	-	124	137	35	85	160	-	-	-	-	M56	45	85
M60	-	132	145	38	90	160	-	-	-	-	M60	48	90
M64	-	140	153	40	95	170	-	-	-	-	M64	51	95
M72	-	156	169	45	105	190	-	-	-	-	M72	58	105
M80	-	172	185	50	115	200	-	-	-	-	M80	64	115
M90	-	-	205	57	130	240	-	-	-	-	M90	72	130
M100	-	-	225	63	145	260	-	-	-	-	M100	80	145
(1) For: L ≤ 125 mm. (2) For: 125 < L ≤ 200 mm. (3) For: L > 200 mm. - Recommended lengths from 10 to 10 mm. - Qualities according to DIN 267.							- Recommended lengths: * From 5 en 5 mm L ≤ 60 mm. * From 10 en 10 mm L > 60 mm. - Qualities according to DIN 267.				- Qualities according to DIN 267.		