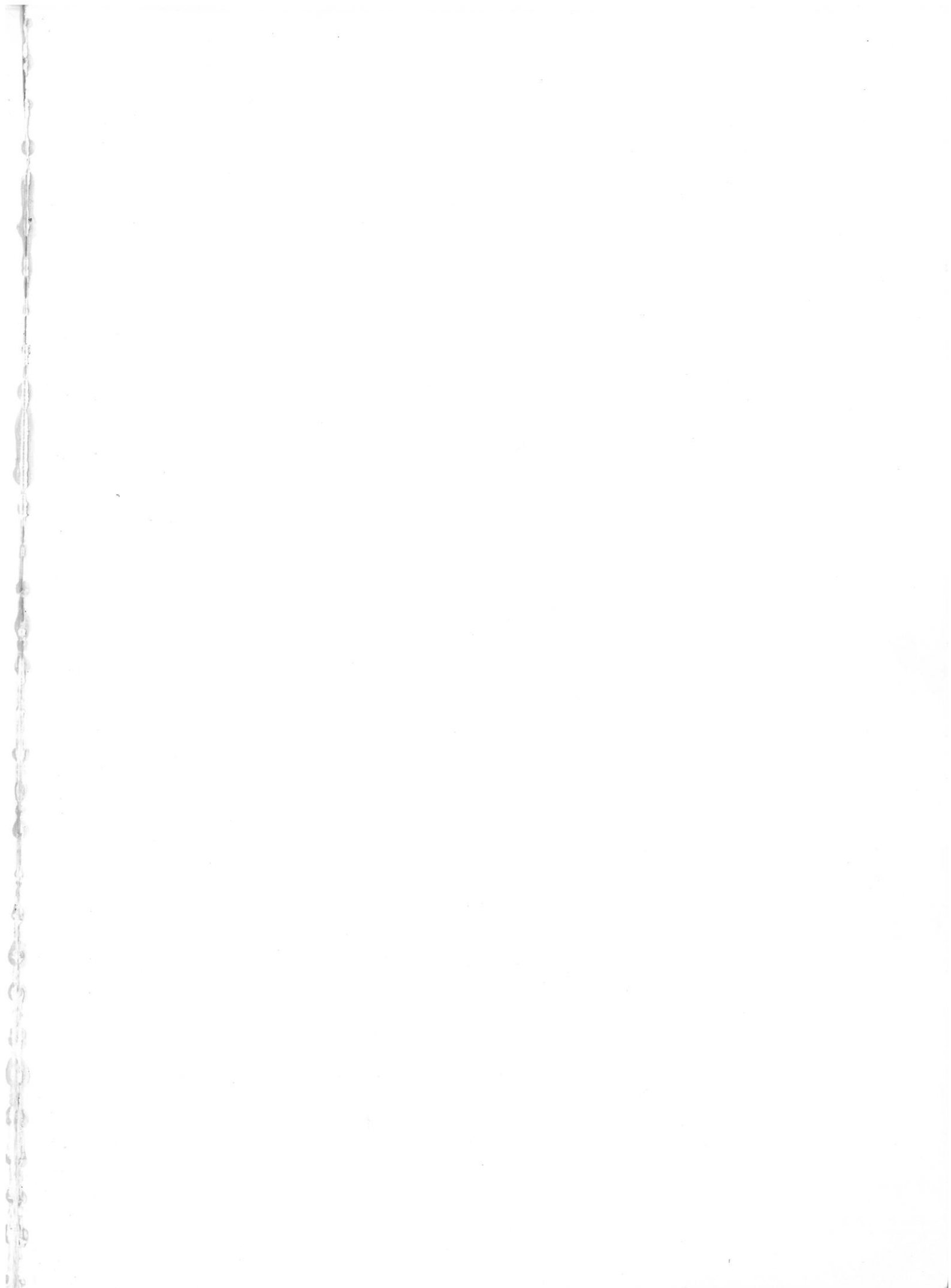


Fittings

Always
Top
Class







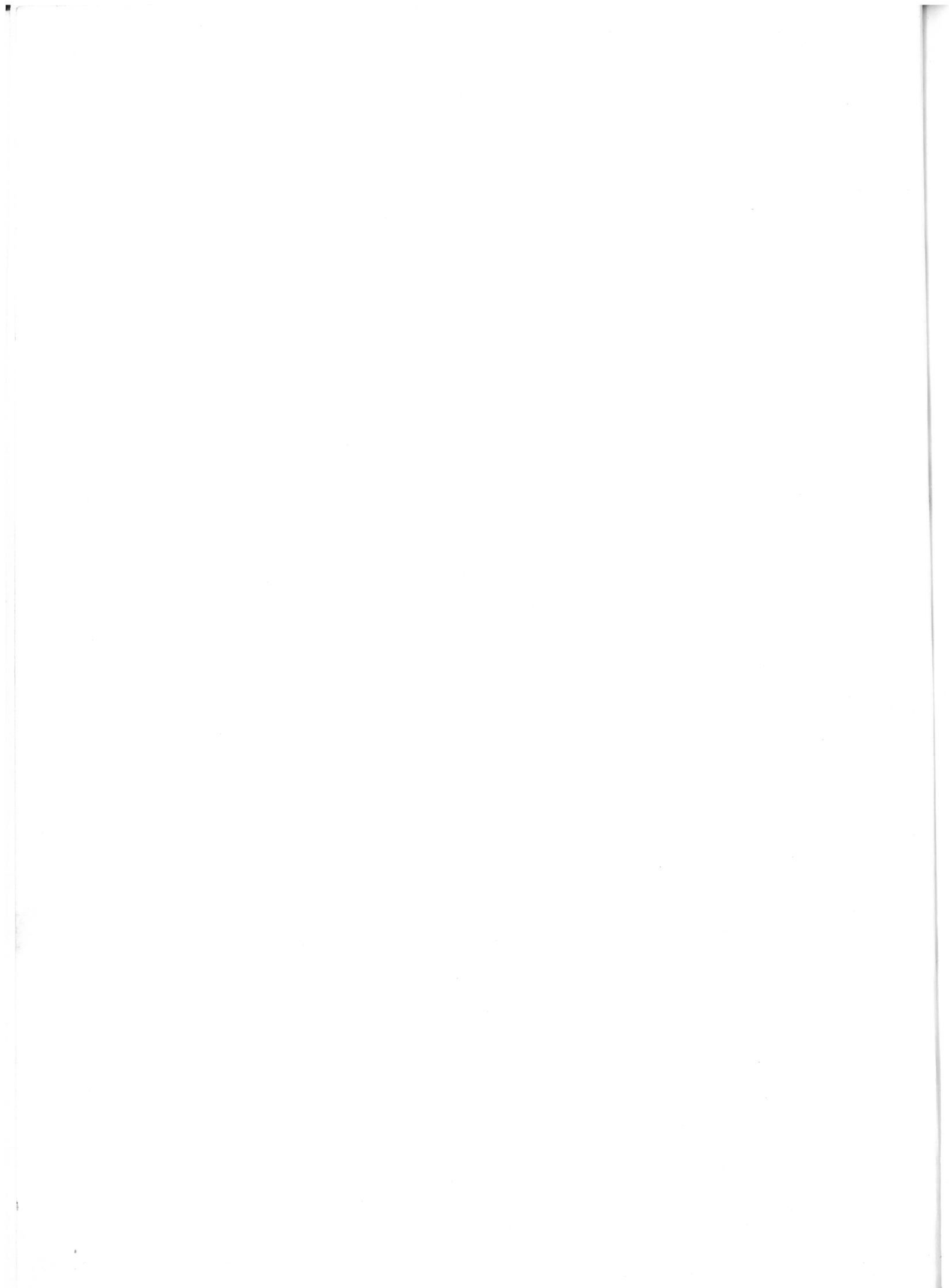


About Us

Established in 2003, **Top Hydrofit Pvt. Ltd.** is fast emerging as a leading manufacturer of Hydraulic fittings. Our customer base includes a wide spectrum of Light & Heavy Engineering Industries, Machine Tool Manufacturers, Automobile Industries and Hydraulic Aggregate Manufacturers.

Saving oil by preventing leaks and thereby ensuring better environmental pollution control is one of our major objectives. To meet this objective, we are working through various initiatives on Safety, Quality, Delivery, Cost And Morale.

We are keen to work with our customers to evolve a right and cost effective solution to meet their needs. Our journey begins with the presentation of this catalogue on Flareless Bite Type Fittings.

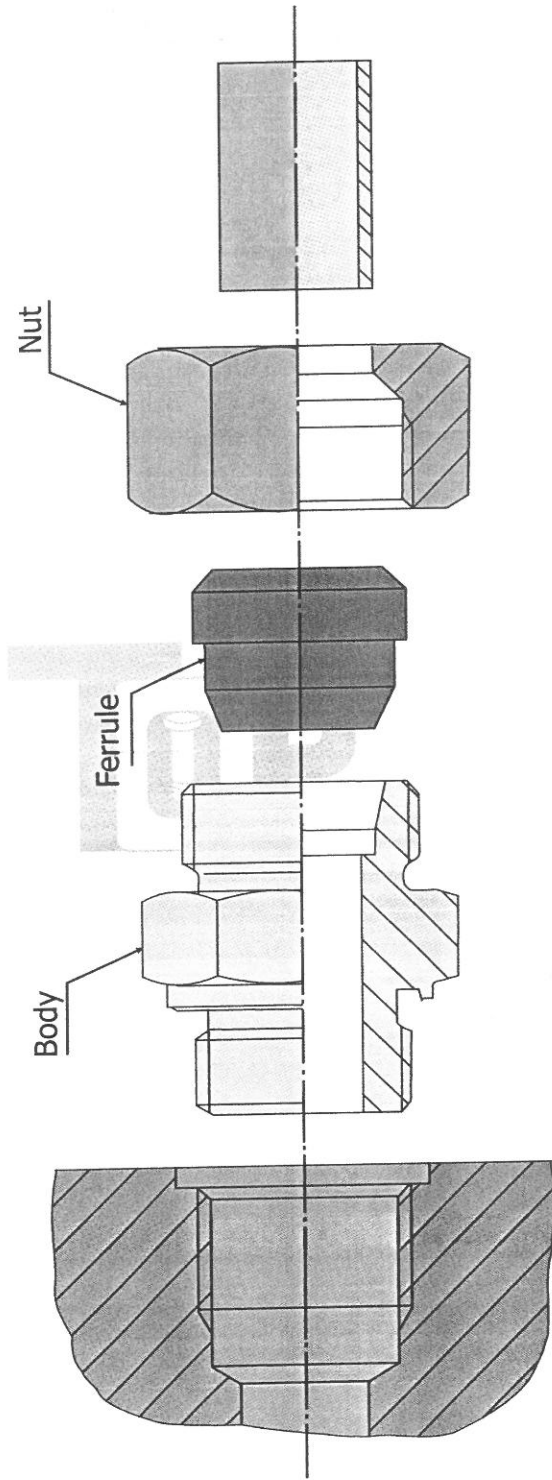




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FLARELESS BITE TYPE FITTING



Fitting components

Flareless Bite Type Fittings

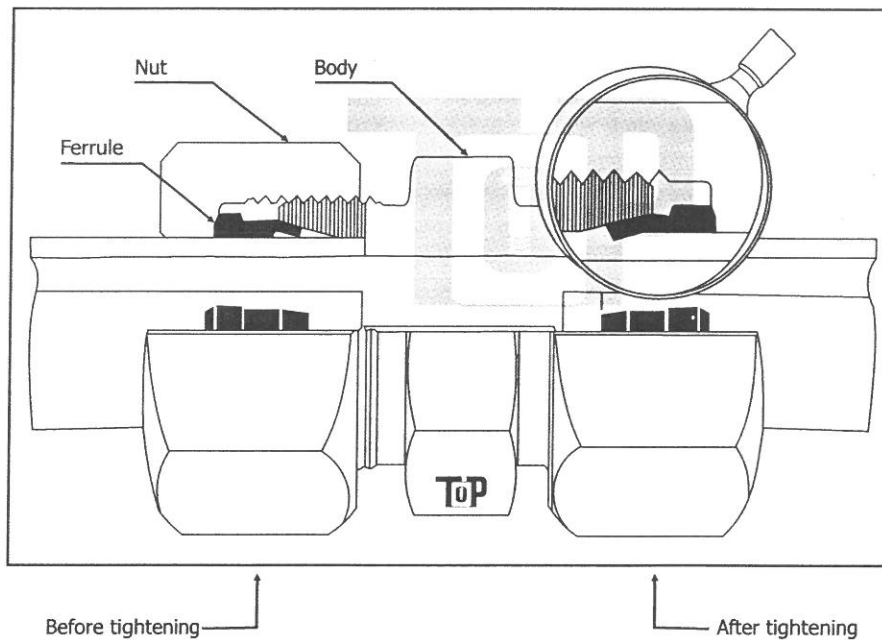
Introduction

Flareless Bite Type Fitting was first developed in Europe in the early 1930s. This fitting consists of a body, a precision machined ferrule and a nut. On assembly, the ferrule 'bites' into the outer surface of the tube with sufficient strength to hold the tube against pressure without significant distortion of the inside tube diameter.

The ferrule also forms a pressure seal against the fitting body. These fittings allow the fitting assembler to visually inspect the 'bite' quality, thus significantly minimizing the risk of improper assembly and related service problems. Such fittings are especially suitable for use with tube wall thicknesses ranging from medium to extra heavy. Robust construction and proven sealing characteristics have given rise to its wide use in markets such as machine tools, chemical industry, military equipments, plastic industries etc.

Design and Construction

TOP fittings basically consist of three precision made components: nut, ferrule and body, all manufactured to very stringent tolerances under rigid quality control procedures.



Body : Bodies are available in different configurations. The shaped products (i.e. elbows, tees, crosses) are hot forged and then machined to stringent fitting specifications. The forging process used further improves the strength and metallurgical properties of the fitting material. Straight products are made from cold drawn bar stock. The cold drawing operation ensures consistently high dimensional tolerances, as well as significantly improved strength.

Ferrules : These are precision machined with all dimensions and surfaces, particularly the critical bite edges, monitored on an on-going basis. Ferrules are then heat treated in a manner that provides the hardness, strength and toughness necessary to satisfy the demanding service conditions.

Nuts : These are either cold formed to required size and shape or machined from cold drawn material. The cold forming and drawing operations provide a more densely packed grain structure, thus improving the material's strength. In addition, cold forming significantly improves the fatigue properties or endurance limits of the nut.

How Flareless Bite Type Fittings WORK

In assembly, the ferrule is driven forward on the tube by the nut during pre-set. As the ferrule moves forward, it contacts the tapered seat area of the body, which causes the ferrule to cam inward into the tube. The leading edge of the hardened ferrule is thus able to make a clean 360 degree cut into the outside diameter of the tubing. This cut in the tubing is often referred to as a 'Bite', thus the term: 'Bite Type Fitting'. As the ferrule makes its bite, a small ridge of material is ploughed up in front of the ferrule.

The intimate contact of this tube ridge with the ferrule's front face and bite edge gives the fitting its ability to retain high pressure without leaking or blowing off. When properly assembled to the recommended tubing (seamless tube with maximum hardness Rb 74), these fittings consistently seal until the applied pressure is high enough to cause tube burst.

Additionally, as the ferrule bites into the tubing, its mid section bows and the inside diameter of the back area firmly grips the tubing. This keeps service stresses, particularly flexural and vibration loadings from being concentrated in the bite area and adversely affecting the life of the connection.

A second seal point is also effected by the hard contact of the ferrule with the tapered seat area of the fitting body.

Fitting assembly consists of the following steps:

- 1) Cutting, deburring and cleaning of the tube
- 2) Pre-setting the ferrule to the tubing
- 3) Inspection after pre-set and
- 4) Assembly or installation

Classification / pipe specifications / applications

TOP fittings are generally manufactured as per DIN Standard 2353 in two series L and S based on the nominal pressure rating. These fittings are designed for use with metric OD controlled, cold drawn, seamless, carbon steel tubes conforming to DIN standard 2391/C. These tubes are with hardness not exceeding Rb 74 and in fully annealed, descaled and phosphated / oiled condition for adequate protection against rust.

General application information on these fittings is given in Table 1. For additional information on minimum wall thickness for metric size OD tubes refer Table 2.

Table 1

S E R I E S	Pipe OD mm	Tolerance on * OD mm	Nominal Working ** Pressure Kg/cm ²	Application
L M E D I U M	6-15	+/-0.07	250	Pneumatic, Lubrication and Hydraulic systems, Automotive and Plastic Industries, Medium size Refrigeration Plants
	18	+/-0.07	160	
	22	+/-0.10	160	
	28	+/-0.10	100	
	35	+/-0.11	100	
	42	+/-0.11	100	
S H E A V Y	6-14	+/-0.07	630	Heavy Industrial (presses), Shipbuilding, mining, construction equipment machinery and chemical industry pressure piping involving severe mechanical stresses
	16	+/-0.07	400	
	20/25	+/-0.10	400	
	30-38	+/-0.11	250	

* For a perfect joint, these tolerances are to be maintained

** These pressure ratings are with a safety factor of 4:1 under uniform load conditions upto a temperature of 120° C. However, for higher temperatures, shock pressures and high mechanical stresses (vibrations), 'S' series is recommended.

Flareless Bite Type Fittings

Metric Steel Tubing

METRIC SIZE OUTSIDE DIAMETER PIPES

Minimum wall thickness for Metric Size OD pipes to DIN 2391/C based on nominal working pressure is given in the following table :

Table 2

Tube o.d. mm	Wall Thickness mm	Tube i.d. mm	Design pressure kg/cm ²	Weight kg. per metre
4	0.5	3	313	.043
6	1.0	4	439	.123
6	1.5	3	549	.166
8	1.0	6	333	.173
8	1.5	5	431	.240
8	2.0	4	549	.269
10	1.0	8	282	.222
10	1.5	7	373	.314
10	2.0	6	478	.395
12	1.0	10	235	.271
12	1.5	9	353	.388
12	2.0	8	409	.439
14	2.0	10	403	.592
15	1.5	12	282	.499
15	2.0	11	376	.641
16	2.0	12	353	.691
16	3.0	10	452	.962
16	1.5	15	235	.610
20	2.0	16	282	.888
20	2.5	15	353	1.079
20	3.0	14	373	1.258
22	1.0	20	128	.518
22	1.5	19	192	.758
22	2.0	18	256	.986
25	3.0	19	338	1.628
25	4.0	17	394	2.072
28	2.0	24	201	1.282
28	2.5	23	252	1.572
30	3.0	24	282	1.998
30	4.0	22	376	2.565
35	2.0	30	161	1.628
35	3.0	29	242	2.367
38	4.0	30	297	3.354
38	5.0	28	371	4.069
42	2.0	38	134	1.973
42	3.0	36	201	2.885

Flareless Bite Type Fittings

NOMENCLATURE

TOP fittings are made in two series to accommodate all types of service requirements & system characteristics and are produced to DIN standard 2353.

Series L: Medium pressure rating

Series S: Heavy/High pressure rating

Series LL: Light/Low pressure rating - Presently not in our manufacturing range

The general nomenclature system for TOP fittings is as follows :

N	-	Nut	BE	-	Banjo Elbow
F	-	Ferrule	BT	-	Banjo Tee
SU	-	Straight Union	BEF	-	Banjo Elbow Throttle Free
EU	-	Elbow Union	BTF	-	Banjo Tee Throttle Free
TU	-	Tee Union	AEU	-	Adjustable Elbow Union
CU	-	Cross Union	ATBU	-	Adjustable Tee Branch Union
WU	-	Weld Union	ATRU	-	Adjustable Tee Run Union
SBH	-	Straight Bulk Head	AES	-	Adjustable Elbow Stud
EBH	-	Elbow Bulk Head	ATBS	-	Adjustable Tee Branch Stud
WBH	-	Weld Bulk Head	ATRS	-	Adjustable Tee Run Stud
SMS	-	Straight Male Stud	PAS	-	Pipe Adaptor Stud
EMS	-	Elbow Male Stud	PCS	-	Pipe Closure Stud
TBS	-	Tee Branch Stud	PCN	-	Pipe Closure Nut
TRS	-	Tee Run Stud	PWN	-	Pipe Welding Nipple
SFS	-	Straight Female Stud	PRS	-	Pipe Reduction Sleeve
MFS	-	Manometer Female Stud	RMF	-	Reducer Male Female
			HAS	-	Hose Adaptor Stud

PART NUMBERS :

The part numbers mentioned in this catalogue refer to completely assembled fitting with parts made of carbon steel.

For ordering only body add 'b' as suffix to part number.

NON-STANDARDS :

TOP also manufactures non-standard fittings, not covered in this catalogue, as per customers specification, on request.

MATERIAL:

TOP fittings are manufactured in Carbon Steel Material as standard, either out of bar stock or forging, based on availability. For other materials of construction, please consult TOP for price and availability.

SURFACE PROTECTION :

Carbon Steel Fittings are supplied with zinc passivated finish as standard. Ferrule is cadmium plated. Fully cadmium plated finish fittings are also offered at extra cost.

PRESSURES :

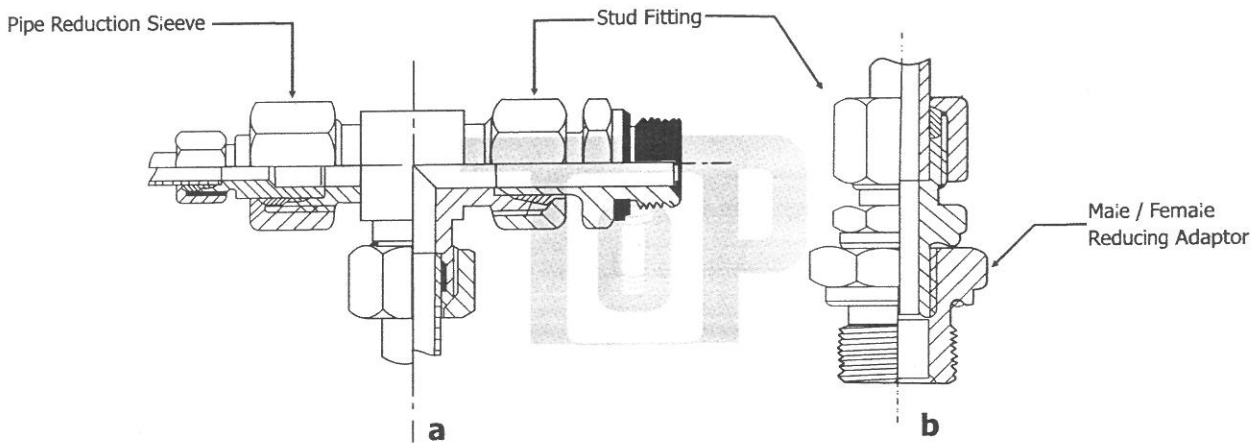
The pressure ratings for TOP fittings are given in each fitting chart under the title 'Series & Nominal working Pressure'.

Programme Overview

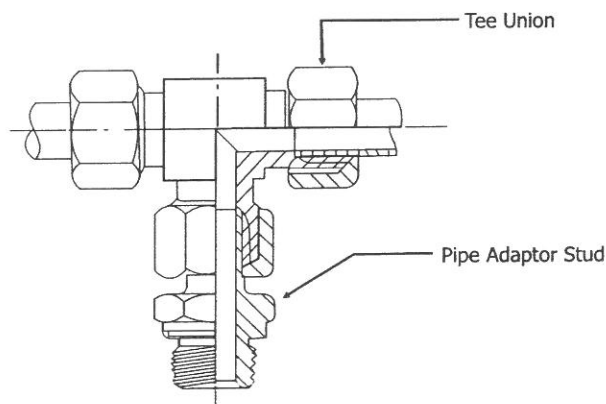
This catalogue features several combinations of fittings within our manufacturing range. Fittings in basic form i.e. other than combination fittings, are generally available ex-stock or with short delivery periods. Depending on the quantities required, all other listed fittings can be made available with comparatively longer delivery periods, as may be appropriate to suit customer's requirements.

Where space restrictions are not a major consideration, we encourage use of two standard units in combination for quicker deliveries. A few examples are given below.

- 1) Stud fitting with stud end thread and pipe end OD not listed in our catalogue can be obtained in two ways provided the pipe OD is less than that listed as standard for the stud end thread
 - a) Stud fitting with thread as required with a pipe reduction sleeve to reduce to the required pipe end
 - b) Male / female reducing adaptor with appropriate stud fitting with the required pipe OD



- 2) Adjustable elbow studs / tee studs can be built with the use of standard pipe adaptor studs with appropriate elbow / tee unions. Thus, pipe adaptor studs considerably reduce inventories in conjunction with elbow / tee unions



Assembly Procedure

In order to ensure positive assembly, we recommend that TOP fittings are always preassembled in the pre-assembly adaptor. However, direct assembly in the fitting body is also possible. The following are the steps involved.

1. Saw off the tube at right angles (fig.1). Tube cutters or hacksaws should always be sharp and one should not try to take too deep a cut with each turn of the cutter or with each back and forth motion of the saw blade. Lightly deburr tube ends at the inside and outside, taking care not to bevel the edges (fig.2). This allows more easy entrance of the tube onto the fitting bore and help to assure the pipe fitter that tubing will go all the way through the ferrules without damage to the ferrule sealing edge.

fig.1

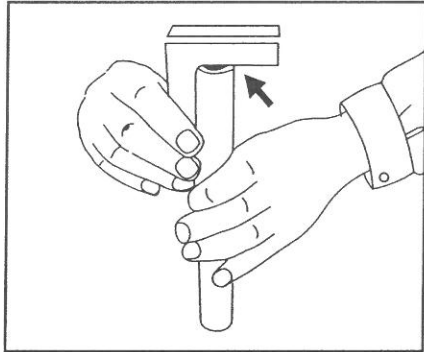
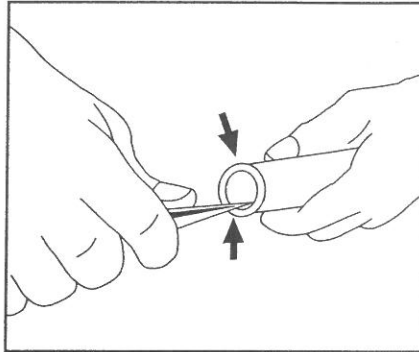
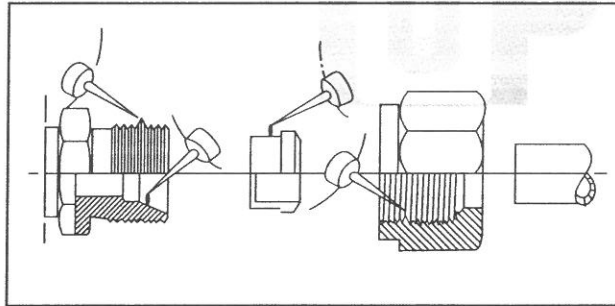


fig.2



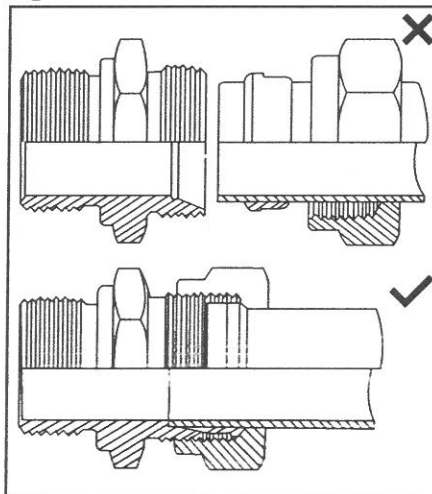
2. Lubricate the body thread and cone, ferrule and nut thread with oil. Grease is not allowed (fig.3).

fig.3



3. Place nut and ferrule on tube as shown, taking care that the biting edge of the ferrule is facing towards the interior cone of the body (fig.4).

fig.4



4. Press tube into fitting body up to tube abutment (fig.5). Tighten nut by hand i.e. finger tighten, until the ferrule grips the tube which is felt by a noticeable increase in torque (fig.6).

fig.5

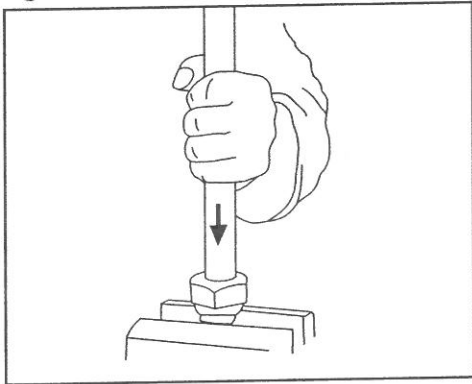


fig.6

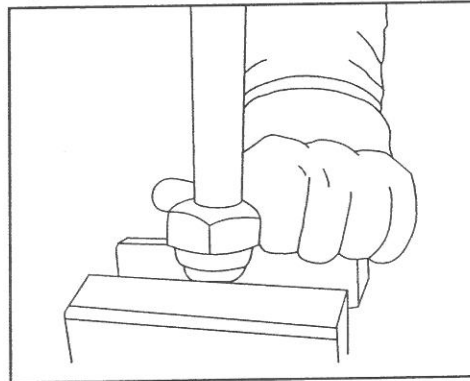
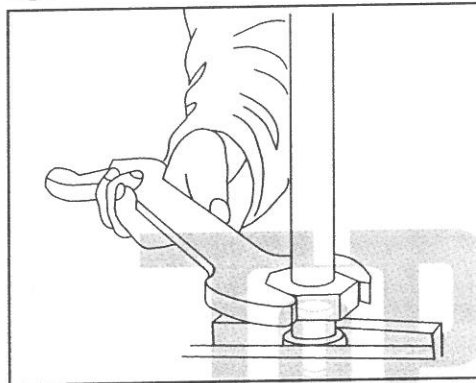


fig.7



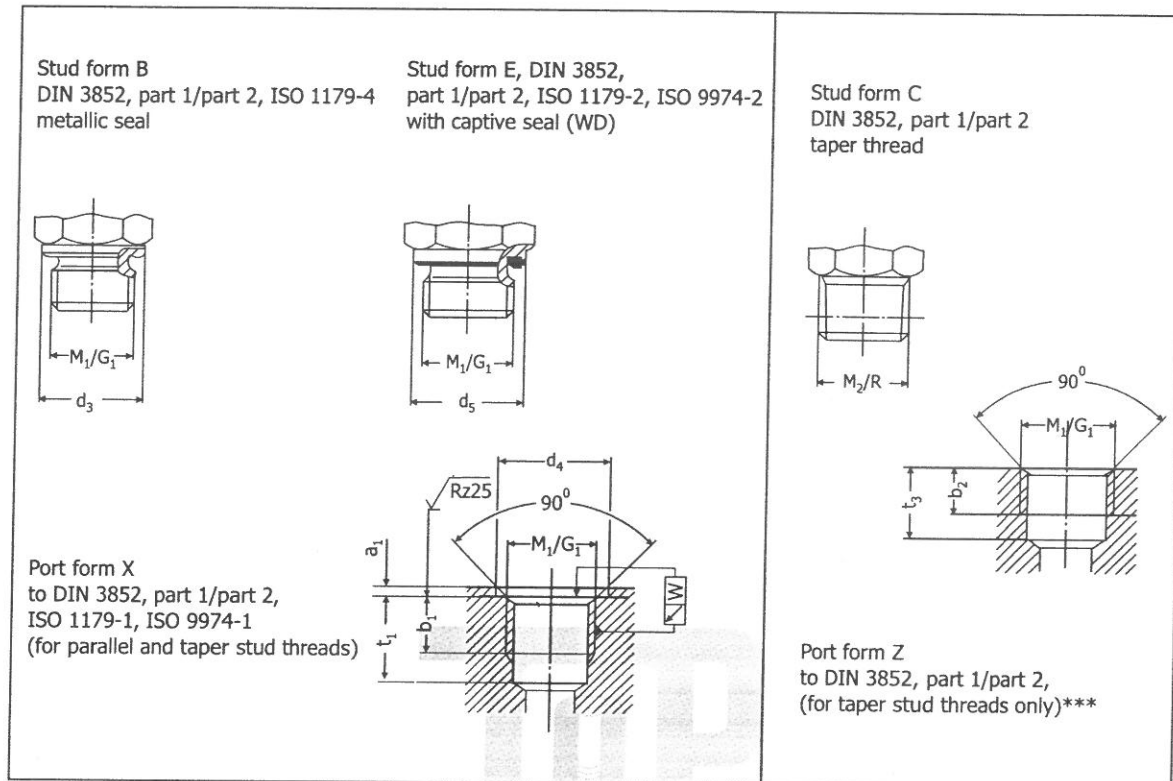
5. Pressing the tube against the stop in the internal cone of the fitting body, tighten the nut with a spanner by about $\frac{3}{4}$ turn, making sure that the tube does not turn around with the nut. (fig.7) The ferrule now grips the tube firmly. It is no longer necessary to press the pipe.
6. Finally, tighten the nut by another $\frac{3}{4}$ turn. This ensures that the ferrule "bites" adequately into the tube to the desired depth, and pushes up a visible collar in front of the cutting edge.
7. Loosen the nut and check for the visible collar in front of the ferrule end face. If not perceptible, tighten slightly more. At this stage, ferrule may rotate on the tube. This does not matter. Only it should not be capable of any axial displacement.
8. For assembly on a pre-assembly adaptor, screw on nut until finger tight, followed by 1 turn of spanner tightening for pre-assembly, and final tightening by another $\frac{1}{2}$ turn with spanner.
9. In case of bent tubes, the straight length of the tube from the tube end abutment in the fitting should not be less than 2 times the height of the nut.
10. In case of thin walled tubes, use reinforcing sleeves as may be appropriate, by pushing into the bore with a soft hammer before starting the fitting assembly process.
11. Scratches on tube OD are a potential source of problems in leak-free tubing systems. Good handling practices can generally reduce scratches and protect the good surface finish which reliable tube manufacturers try to supply. Tubing should never be dragged out of tubing rack. Particularly in sizes 18 mm and larger, the weight of the length being pulled out is sufficient to gouge the OD if any burrs are there on the end of the tubes below it in the rack. Tubing should never be dragged across cement, asphalt, gravel, or any other hard surface which could scratch it.

Note:

- 1) Unless otherwise specified, all dimensions in this catalogue are in millimetres.
- 2) TOP reserves the right to change dimensions / specifications without notice.
- 3) Also appended is a section called "General Information" at the end of this catalogue. The information is compiled from various references in industry, which we thankfully acknowledge for the benefit of practising engineers.

Stud and port forms

Metric ISO thread (parallel) DIN 13
 BSP thread (parallel) DIN-ISO 228 (up to now DIN 259)



M ₁	d ₃	d ₄ ^{+0,4}	d ₅	a _{1 max}	b _{1 min}	t _{1 min}	Ø* LL	Ø* L	Ø* S	W
M 8x1	12	13	12	1	8	13,5	3,5	—	—	0,1
M 10x1	14	15	14	1	8	13,5	5	4	—	0,1
M 12x1,5	17	18	17	1,5	12	18,5	—	6	4	0,1
M 14x1,5	19	20	19	1,5	12	18,5	—	7	5	0,1
M 16x1,5	21	22	21,9	1,5	12	18,5	—	9	7	0,1
M 18x1,5	23	24	23,9	2	12	18,5	—	11	8	0,1
M 20x1,5	25	26	25,9	2	14	20,5	—	—	10	0,1
M 22x1,5	27	28	27	2,5	14	20,5	—	14	12	0,1
M 26x1,5	31	32	31,9	2,5	16	22,5	—	18	—	0,2
M 27x2	32	33	32	2,5	16	24	—	—	16	0,2
M 33x2	39	40	39,9	2,5	18	26	—	23	20	0,2
M 42x2	49	50	49,9	2,5	20	28	—	30	25	0,2
M 48x2	55	56	55	2,5	22	30	—	36	32	0,2

G ₁	d ₃	d ₄ ^{+0,4}	d ₅	a _{5 max}	b _{1 min}	t _{1 min}	Ø* LL	Ø* L	Ø* S	W
G 1/8 A**	14	15	14	1	8	13	5	4	—	0,1
G 1/4 A**	18	19	18,9	1,5	12	18,5	—	7	5	0,1
G 3/8 A**	22	23	22	2	12	18,5	—	9	8	0,1
G 1/2 A**	26	27	26,9	2,5	14	22	—	14	12	0,1
G 3/4 A**	32	33	32	2,5	16	24	—	18	16	0,2
G 1 A**	39	40	39,9	2,5	18	27	—	23	20	0,2
G 1 1/4 A**	49	50	49,9	2,5	20	29	—	30	25	0,2
G 1 1/2 A**	55	56	55	2,5	22	31	—	36	32	0,2

M ₂	b _{2 min}	t _{3 min}
M 8 x 1 taper	5,5	10
M 10 x 1 taper	5,5	10
M 12 x 1,5 taper	8,5	13,5
M 14 x 1,5 taper	8,5	13,5
M 16 x 1,5 taper	8,5	13,5
M 18 x 1,5 taper	8,5	13,5
M 20 x 1,5 taper	10,5	15,5
M 22 x 1,5 taper	10,5	15,5

R	b _{2 min}	t _{3 min}
R 1/8 taper	5,5	9,5
R 1/4 taper	8,5	13,5
R 3/8 taper	8,5	13,5
R 1/2 taper	10,5	16,5

***Caution : Additional sealing material required!

*Stud hole. For special types deviating holes may be required.

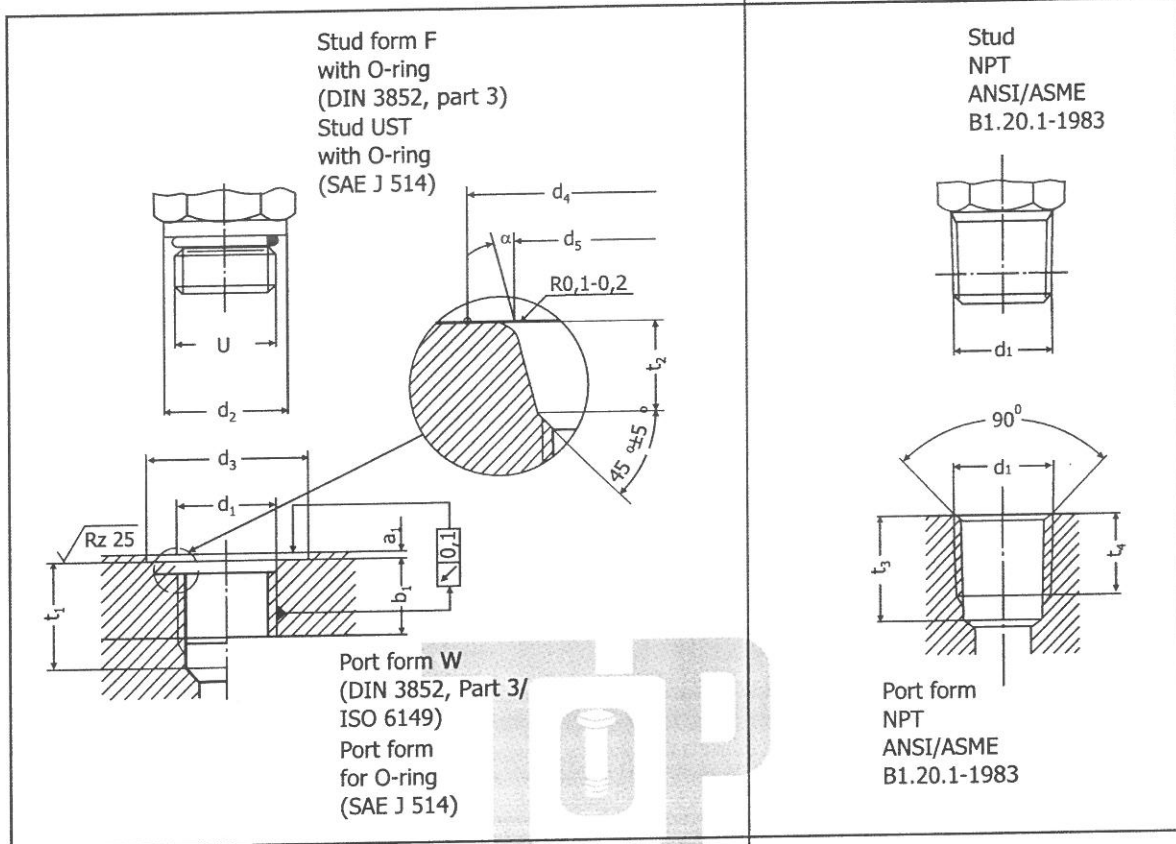
** For female threads, A does not apply.

TOP Fittings with Parallel Male Threads can be tightened without any washer or seal, provided the area of the bearing is spot faced and at right angles to the axis of the threads. Counterbore d₄ is necessary to locate Copper / Aluminium washer (To Form A and as per DIN 7603) in position.

Stud and port forms

Metric ISO thread = DIN 3852, ISO 6149
 UNF / UN thread = SAE J 514, ISO 11926

NPT thread = ANSI/ASME B1.20.1 - 1983



d ₁ M	d ₂	d ₃ min.	d ₄	d ₅ + 0,1	a ₁ max.	t ₂	t ₁ min.	b ₁ min.	α ± 1°
M 8x1	10,9	17	11	9,1	1	1,6	11,5	10	12°
M 10 x 1	12,9	20	13	11,1	1	1,6	11,5	10	12°
M 12 x 1,5	16,9	22	16	13,8	1,5	2,4	14	11,5	15°
M 14 x 1,5	18,9	25	18	15,8	1,5	2,4	14	11,5	15°
M 16 x 1,5	20,9	27	20	17,8	1,5	2,4	15,5	13	15°
M 18 x 1,5	22,9	29	22	19,8	2	2,4	16,5	14,5	15°
M 20 x 1,5	24,9	32	24	21,8	2	2,4	16,5	14	15°
M 22 x 1,5	26,9	34	26	23,8	2	2,4	18	15,5	15°
M 26 x 1,5	30,9	37	31	29,05	2	3,1	18,5	16	15°
M 27 x 2	31,9	40	32	29,4	2	3,1	22	19	15°
M 33 x 2	37,9	46	38	38	2,5	3,1	22	19	15°
M 42 x 2	47,9	56	47	47	2,5	3,1	22,5	19,5	15°
M 48 x 2	54,9	64	53	53	2,5	3,1	25	22	15°

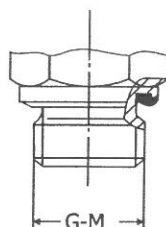
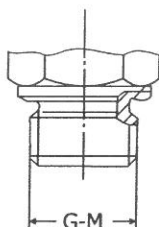
d ₁ NPT	t ₃ min.	t ₄ min.
1/8 - 27 NPT	11,6	6,9
1/4 - 18 NPT	16,4	10
1/8 - 18 NPT	17,4	10,3
1/2 - 14 NPT	22,6	13,6
3/4 - 14 NPT	23,1	14,1
1 - 11,5 NPT	27,8	16,8
1 1/4 - 11,5 NPT	28,3	17,3
	28,3	17,3

d ₁ UNF/UN	d ₂	d ₃ min.	d ₄	d ₅ + 0,1	a ₁ max.	t ₂	t ₁ min.	b ₁ min.	α ± 1°
7/16 - 20 UNF	14,4	21	15	12,4	1,6	2,4	14	11,5	12°
9/16 - 18 UNF	17,6	25	18	15,6	1,6	2,5	15,5	12,7	12°
3/4 - 16 UNF	22,3	30	23	20,6	2,4	2,5	17,5	14,3	15°
7/8 - 14 UNF	25,5	34	26	23,9	2,4	2,5	20	16,7	15°
1/16 - 12 UN	31,9	41	32	29,2	2,4	3,3	23	19	15°
1 5/16 - 12 UN	38,2	49	39	35,5	3,2	3,3	23	19	15°
1 5/8 - 12 UN	47,7	58	48	43,5	3,2	3,3	23	19	15°

Tightening torques for studs

Stud with metallic seal,
form B, DIN 3852

Stud with
captive seal



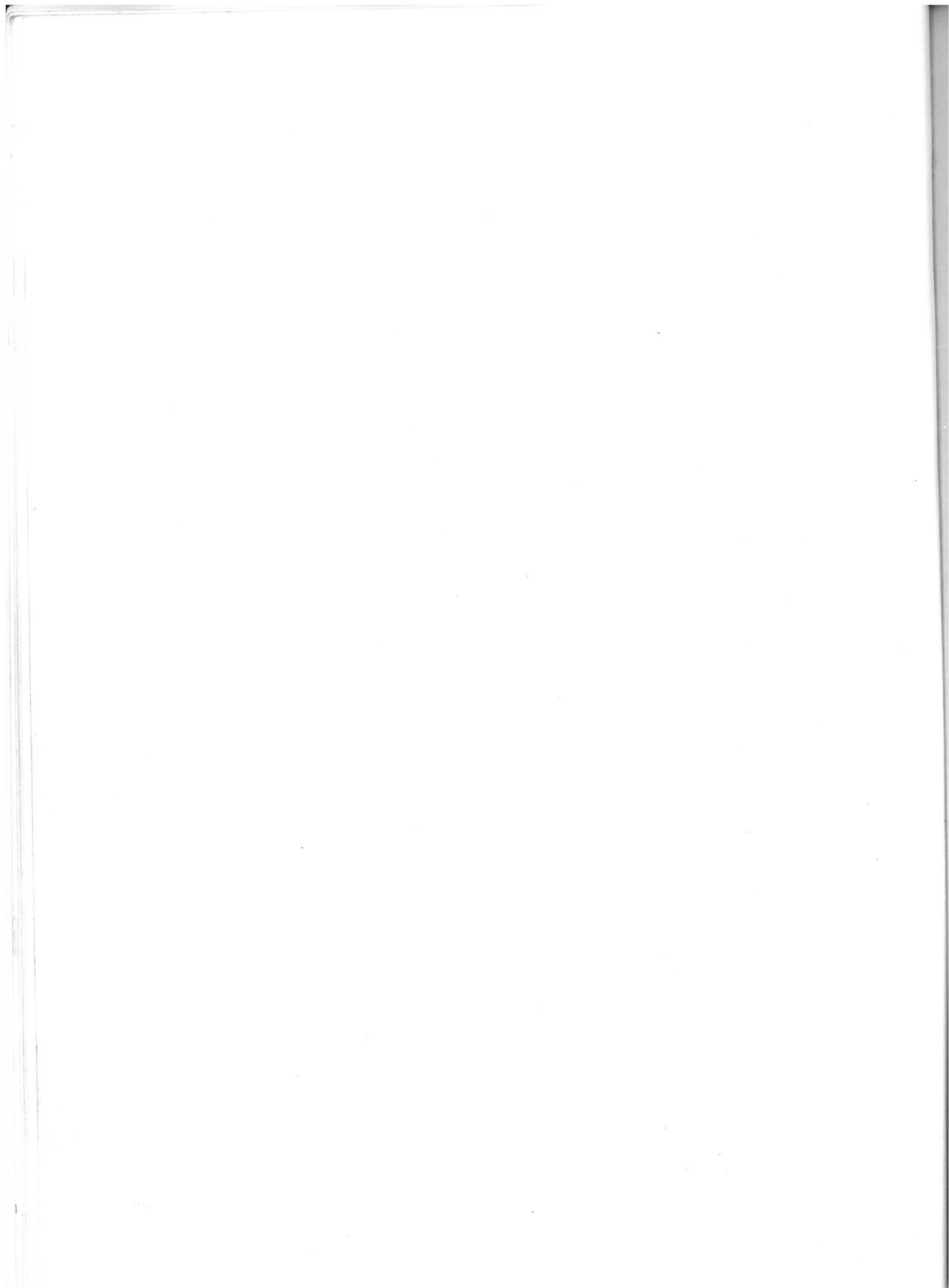
G-BSP	Torque Standard value Md (Nm)	Threads Per Inch	Threads Pitch mm	Major Dia mm	Pitch Dia mm	Minor Dia mm
G 1/8	25	28	0.907	9.728	9.147	8.566
G 1/4	40	19	1.337	13.157	12.301	11.445
G 3/8	95	19	1.337	16.662	15.806	14.950
G 1/2	130	14	1.814	20.955	19.793	18.631
G 3/4	250	14	1.814	26.441	25.279	24.117
G 1	400	11	2.309	33.249	31.770	30.291
G 1 1/4	600	11	2.309	41.910	40.431	38.952
G 1 1/2	800	11	2.309	47.803	46.324	44.845

M- METRIC	Torque Standard value Md (Nm)
M 10 x 1	25
M 12 x 1,5	30
M 14 x 1,5	50
M 16 x 1,5	60
M 18 x 1,5	60
M 20 x 1,5	140
M 22 x 1,5	140
M 26 x 1,5	220
M 27 x 2	250
M 33 x 2	400
M 42 x 2	600
M 48 x 2	800

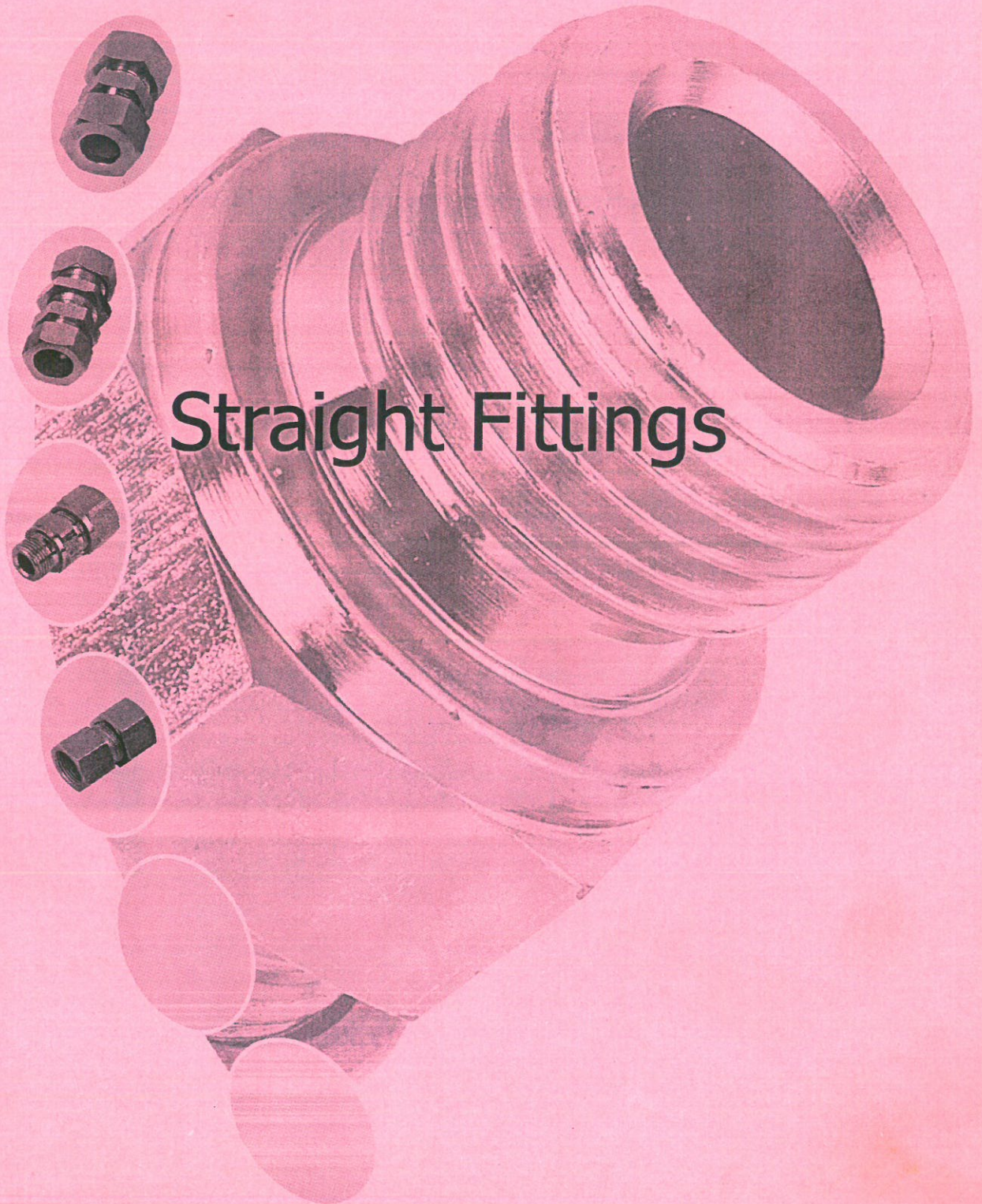
Note:

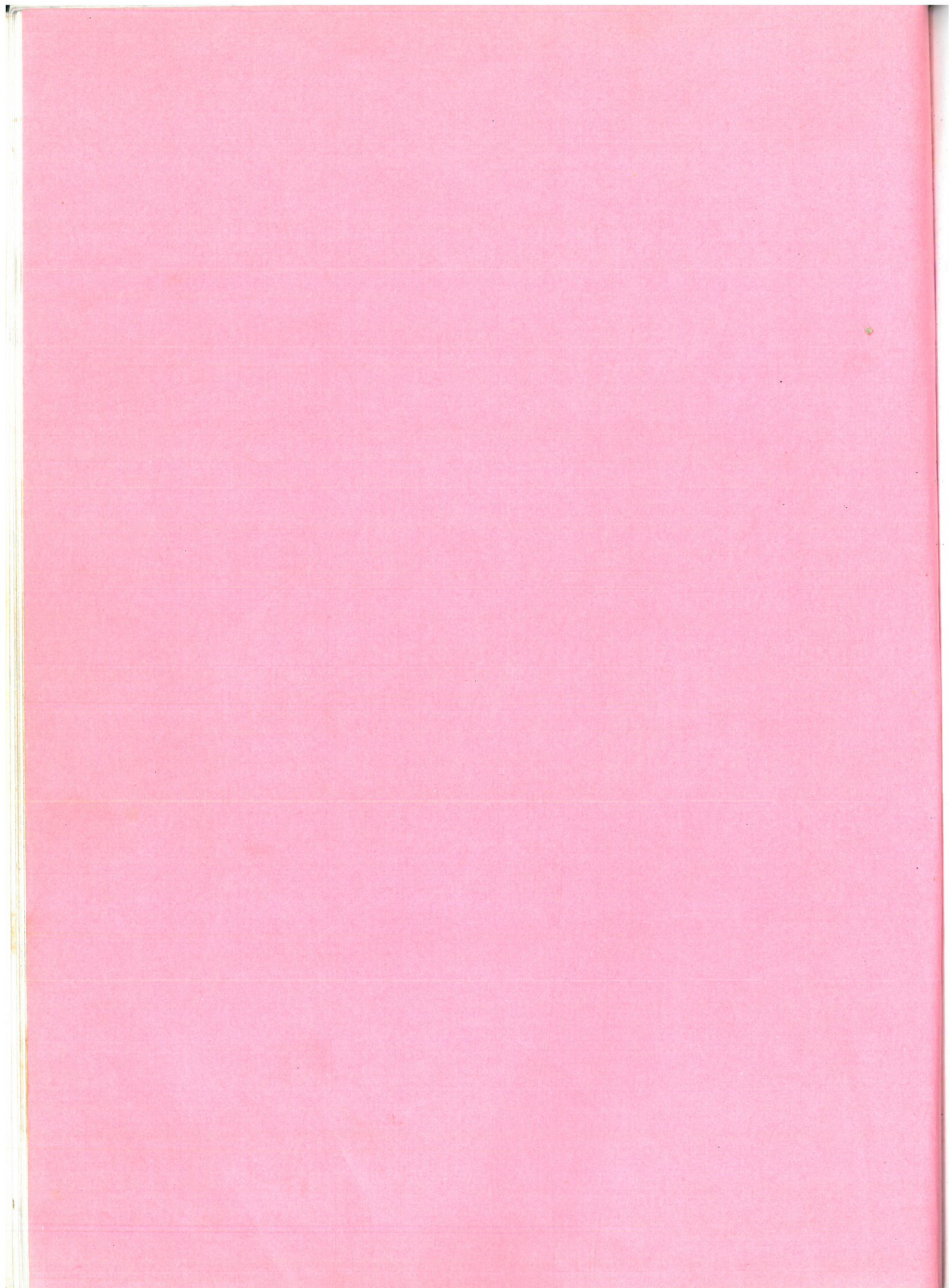
Lubricate stud before screwing in!

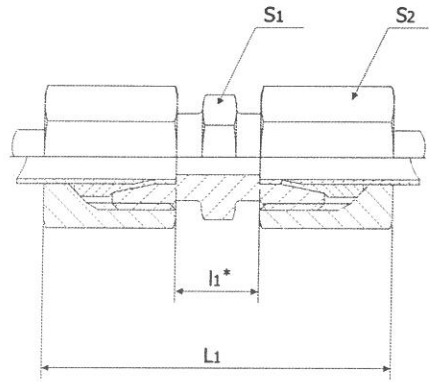
Tightening torques relate to counterpart made of steel.



Straight Fittings





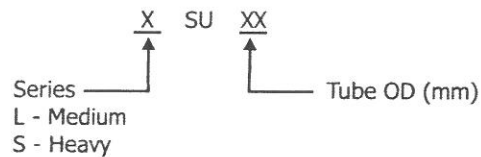


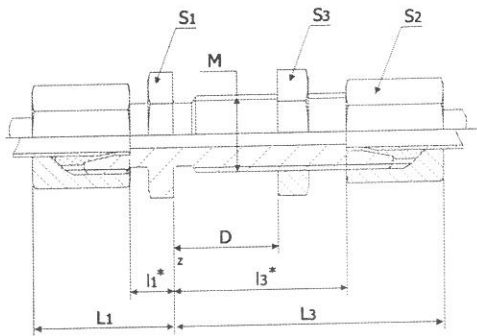
* refers to tube end

STRAIGHT UNION

S E R I E S	NOMINAL WORKING PRESSURE	TUBE O.D.	S1	S2	l1	L1	PART NUMBER	WT. Kg/100 Pieces
L M E D I U M	250Kg/cm ²	6	12	14	10	39	LSU 06	3.5
		8	14	17	11	41	LSU 08	4.9
		10	17	19	13	43	LSU 10	6.9
		12	19	22	14	44	LSU 12	8.5
		15	24	27	16	46	LSU 15	13.8
	160Kg/cm ²	18	27	32	16	49	LSU 18	19.5
		22	32	36	20	53	LSU 22	26.2
		28	41	41	21	54	LSU 28	31.5
	100Kg/cm ²	35	46	50	20	63	LSU 35	49.4
		42	55	60	21	67	LSU 42	72.8
S H E A V Y	630Kg/cm ²	6	14	17	16	46	SSU 06	5.9
		8	17	19	18	47	SSU 08	7.8
		10	19	22	17	48	SSU 10	11.0
		12	22	24	19	50	SSU 12	13.6
		14	24	27	22	52	SSU 14	18.2
	400Kg/cm ²	16	27	30	21	58	SSU 16	22.3
		20	32	36	23	68	SSU 20	34.7
		25	41	46	26	74	SSU 25	66.9
	250Kg/cm ²	30	46	50	27	80	SSU 30	80.9
		38	55	60	29	91	SSU 38	119.4

PART NUMBER CODE



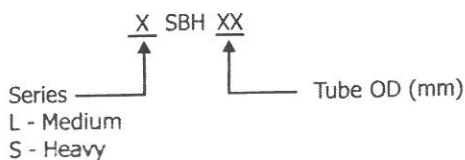


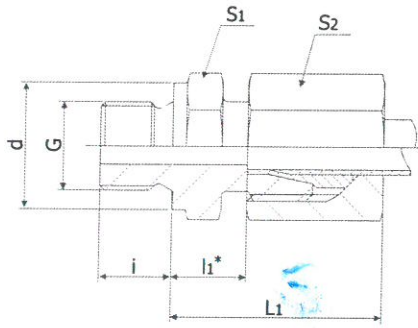
* refers to tube end D=16mm - max

STRAIGHT BULKHEAD

Series	NOMINAL WORKING PRESSURE	TUBE O.D.	METRIC THREADS M	S1	S2	S3	l1	L1	l3	L3	PART NUMBER	WT. Kg/100 Pieces
L M E D I U M	250Kg/cm ²	6	M12x1.5	17	14	17	7	22	27	42	LSBH 06	6.7
		8	M14x1.5	19	17	19	8	23	27	42	LSBH 08	8.4
		10	M16x1.5	22	19	22	10	25	28	43	LSBH 10	11.0
		12	M18x1.5	24	22	24	10	25	29	44	LSBH 12	13.3
		15	M22x1.5	27	27	30	12	27	31	46	LSBH 15	22.8
	160Kg/cm ²	18	M26x1.5	32	32	36	13.5	30	32.5	49	LSBH 18	33.2
		22	M30x2	36	36	41	16.5	33	34.5	51	LSBH 22	41.5
	100Kg/cm ²	28	M36x2	41	41	46	18.5	35	35.5	52	LSBH 28	52.5
		35	M45x2	50	50	55	18.5	40	36.5	58	LSBH 35	80.0
		42	M52x2	60	60	65	19	42	36	59	LSBH 42	119.3
S H E A V Y	630Kg/cm ²	6	M14x1.5	19	17	19	12	27	29	44	SSBH 06	9.6
		8	M16x1.5	22	19	22	13	28	29	44	SSBH 08	12.4
		10	M18x1.5	24	22	24	14.5	31	29.5	46	SSBH 10	18.1
		12	M20x1.5	27	24	27	14.5	31	30.5	47	SSBH 12	21.0
		14	M22x1.5	30	27	30	17	35	32	50	SSBH 14	29.0
	400Kg/cm ²	16	M24x1.5	32	30	32	16.5	35	31.5	50	SSBH 16	31.0
		20	M30x2	41	36	41	17.5	39	33.5	55	SSBH 20	54.5
		25	M36x2	46	46	46	20	44	35	59	SSBH 25	89.0
	250Kg/cm ²	30	M42x2	50	50	50	21.5	48	37.5	64	SSBH 30	107.7
		38	M52x2	65	60	65	22	53	37	68	SSBH 38	173.0

PART NUMBER CODE



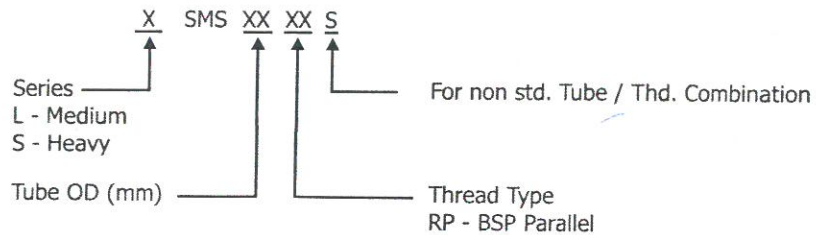


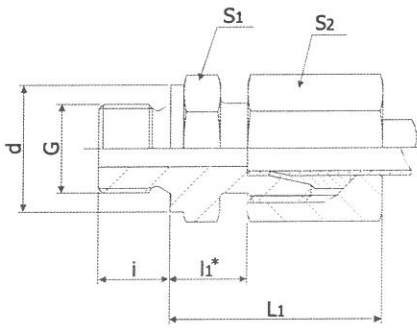
* refers to tube end

STRAIGHT MALE STUD BSP-PARALLEL

SERIES	NOMINAL WORKING PRESSURE	TUBE O.D.	S1	S2	i	l1	L1	d	BSP THD G	PART NUMBER	WT. Kg/100 PIECES
L	250Kg/cm ²	6	14	14	8	8.5	23	14	1/8"	LSMS 06 RP	2.5
		6	19	14	12	10	25	18	1/4"	LSMS 06 RPS	4.0
		8	19	17	12	10	25	18	1/4"	LSMS 08 RP	4.5
		10	19	19	12	11	26	18	1/4"	LSMS 10 RP	4.7
		10	22	19	12	12.5	27.5	22	3/8"	LSMS 10 RPS	6.0
		12	22	22	12	12.5	27.5	22	3/8"	LSMS 12 RP	7.0
		12	27	22	14	13	28	26	1/2"	LSMS 12 RPS	9.5
		15	24	27	12	14	29	22	3/8"	LSMS 15 RP	9.5
		15	27	27	14	14	29	26	1/2"	LSMS 15 RPS	11.5
		M	160Kg/cm ²	18	27	32	14	14.5	31	26	1/2"
22	32			36	16	16.5	33	32	3/4"	LSMS 22 RP	18.5
22	41			36	18	17.5	34	39	1"	LSMS 22 RPS	25.0
U	100Kg/cm ²	28	41	41	18	17.5	34	39	1"	LSMS 28 RP	25.9
		35	50	50	20	17.5	39	49	1 1/4"	LSMS 35 RP	42.2
		42	55	60	22	19	42	55	1 1/2"	LSMS 42 RP	57.2

PART NUMBER CODE



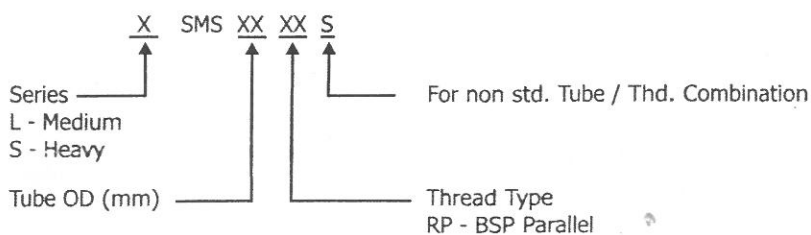


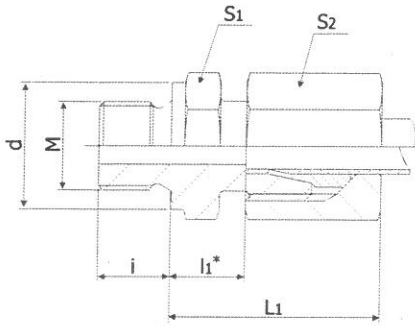
* refers to tube end

STRAIGHT MALE STUD BSP-PARALLEL

Series	NOMINAL WORKING PRESSURE	TUBE O.D.	S1	S2	i	l1	L1	d	BSP THD G	PART NUMBER	WT. Kg/100 PIECES
S	630Kg/cm ²	6	19	17	12	13	28	18	1/4"	SSMS 06 RP	5.0
		8	19	19	12	15	30	18	1/4"	SSMS 08 RP	5.5
		10	22	22	12	15	31.5	22	3/8"	SSMS 10 RP	8.6
		12	22	24	12	17	33.5	22	3/8"	SSMS 12 RP	10.0
		12	27	24	14	17.5	34	26	1/2"	SSMS 12 RPS	13.5
		14	27	27	14	19	37	26	1/2"	SSMS 14 RP	14.8
HEAVY	400Kg/cm ²	16	27	30	14	18.5	37	26	1/2"	SSMS 16 RP	16.1
		20	32	36	14	18.5	41	26	1/2"	SSMS 20 RPS	25.3
		20	32	36	16	20.5	43	32	3/4"	SSMS 20 RP	25.3
		25	41	46	16	21	45	32	3/4"	SSMS 25 RPS	46.0
		25	41	46	18	23	47	39	1"	SSMS 25 RP	46.5
HEAVY	250Kg/cm ²	30	46	50	18	23.5	50	39	1"	SSMS 30 RPS	61.5
		30	50	50	20	23.5	50	49	1 1/4"	SSMS 30 RP	63.5
		38	55	60	20	26	57	49	1 1/4"	SSMS 38 RPS	85.0
		38	55	60	22	26	57	55	1 1/2"	SSMS 38 RP	87.0

PART NUMBER CODE



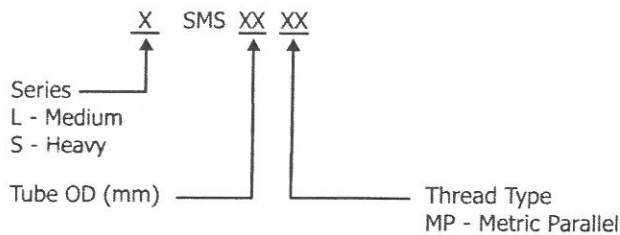


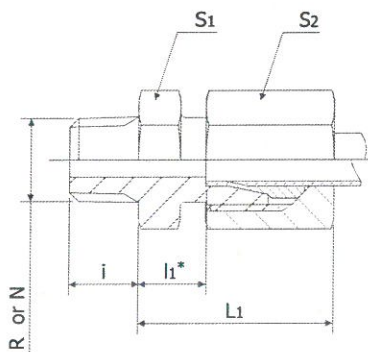
* refers to tube end

STRAIGHT MALE STUD METRIC-PARALLEL

SERIES	NOMINAL WORKING PRESSURE	TUBE O.D.	S1	S2	i	l1	L1	d	METRIC THD M	PART NUMBER	WT. Kg/100 Pieces
L M E D I U M	250Kg/cm ²	6	14	14	8	8.5	23	14	M10x1	LSMS 06 MP	2.5
		8	17	17	12	10	25	17	M12x1.5	LSMS 08 MP	4.0
		10	19	19	12	11	26	18	M14x1.5	LSMS 10 MP	4.9
		12	22	22	12	12.5	27.5	22	M16x1.5	LSMS 12 MP	7.0
		15	24	27	12	13.5	28.5	24	M18x1.5	LSMS 15 MP	9.5
	160Kg/cm ²	18	27	32	14	14.5	31	26	M22x1.5	LSMS 18 MP	13.2
		22	32	36	16	16.5	33	32	M26x1.5	LSMS 22 MP	18.8
	100Kg/cm ²	28	41	41	18	17.5	34	39	M33x2	LSMS 28 MP	25.9
		35	50	50	20	17.5	39	49	M42x2	LSMS 35 MP	42.2
42		55	60	22	19	42	55	M48x2	LSMS 42 MP	57.0	
S H E A V Y	630Kg/cm ²	6	17	17	12	13	28	17	M12x1.5	SSMS 06 MP	4.7
		8	19	19	12	15	30	18	M14x1.5	SSMS 08 MP	6.5
		10	22	22	12	15	31.5	22	M16x1.5	SSMS 10 MP	8.6
		12	24	24	12	17	33.5	24	M18x1.5	SSMS 12 MP	10.9
		14	27	27	14	19	37	26	M20x1.5	SSMS 14 MP	14.8
	400Kg/cm ²	16	27	30	14	18.5	37	26	M22x1.5	SSMS 16 MP	16.1
		20	32	36	16	20.5	43	32	M27x2	SSMS 20 MP	25.3
		25	41	46	18	23	47	39	M33x2	SSMS 25 MP	46.5
	250Kg/cm ²	30	50	50	20	23.5	50	49	M42x2	SSMS 30 MP	63.5
		38	55	60	22	26	57	55	M48x2	SSMS 38 MP	87.0

PART NUMBER CODE



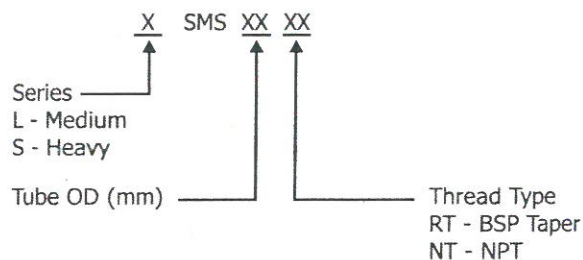


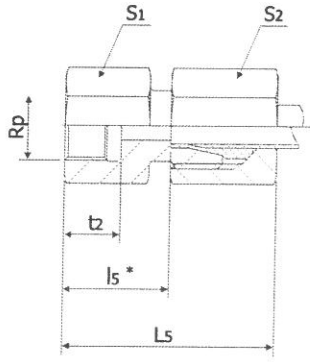
* refers to tube end

STRAIGHT MALE STUD BSPT / NPT - TAPER

SIZES	NOMINAL WORKING PRESSURE	TUBE O.D.	S1	S2	L1	L1	BSPT THD.		PART NUMBER	NPT THD.		PART NUMBER	WT. Kg/100 Pieces		
							R	i		N	i		R	N	
L M E D I U M	250Kg/cm ²	6	14	14	8	23	1/8"	8	LSMS 06 RT	1/8"	9.9	LSMS 06 NT	2.5	2.6	
		8	17	17	8	23	1/4"	12	LSMS 08 RT	1/4"	15.1	LSMS 08 NT	4.0	4.5	
		10	17	19	9	24	1/4"	12	LSMS 10 RT	1/4"	15.1	LSMS 10 NT	4.7	4.8	
		12	19	22	10	25	3/8"	14	LSMS 12 RT	3/8"	15.2	LSMS 12 NT	6.5	7.0	
	160Kg/cm ²	15	24	27	11	26	1/2"	16	LSMS 15 RT	1/2"	19.8	LSMS 15 NT	11.5	11.0	
		18	27	32	12	28	1/2"	16	LSMS 18 RT	1/2"	19.8	LSMS 18 NT	13.2	13.5	
	100Kg/cm ²	22	32	36	14	30	3/4"	19	LSMS 22 RT	3/4"	20.1	LSMS 22 NT	18.5	19.0	
		28	41	41	14.5	31	1"	22	LSMS 28 RT	1"	25	LSMS 28 NT	25.9	27.5	
		35	46	50	15	36	1 1/4"	20	LSMS 35 RT	1 1/4"	25.6	LSMS 35 NT	40.5	42.2	
		42	55	60	16	39	1 1/2"	22	LSMS 42 RT	1 1/2"	26	LSMS 42 NT	56.9	57.0	
	S H E A V Y	630Kg/cm ²	6	17	17	13	28	1/4"	14	SSMS 06 RT	1/4"	15.1	SSMS 06 NT	5.0	5.0
			8	17	19	13	28	1/4"	14	SSMS 08 RT	1/4"	15.1	SSMS 08 NT	5.5	5.5
10			19	22	12.5	29	3/8"	14	SSMS 10 RT	3/8"	15.2	SSMS 10 NT	8.0	8.8	
12			22	24	14.5	31	3/8"	14	SSMS 12 RT	3/8"	15.2	SSMS 12 NT	10.0	10.0	
14			24	27	16	34	1/2"	16	SSMS 14 RT	1/2"	19.8	SSMS 14 NT	14.8	15.5	
400Kg/cm ²		16	27	30	16	34	1/2"	16	SSMS 16 RT	1/2"	19.8	SSMS 16 NT	16.0	16.1	
		20	32	36	17.5	40	3/4"	19	SSMS 20 RT	3/4"	20.1	SSMS 20 NT	25.0	25.3	
		25	41	46	20	44	1"	22	SSMS 25 RT	1"	25	SSMS 25 NT	46.5	47.5	
250Kg/cm ²		30	46	50	21	47.5	1 1/4"	20	SSMS 30 RT	1 1/4"	25.6	SSMS 30 NT	62.0	63.5	
		38	55	60	23	54	1 1/2"	22	SSMS 38 RT	1 1/2"	26	SSMS 38 NT	89.0	89.0	

PART NUMBER CODE



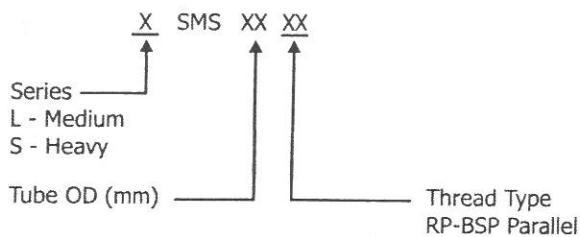


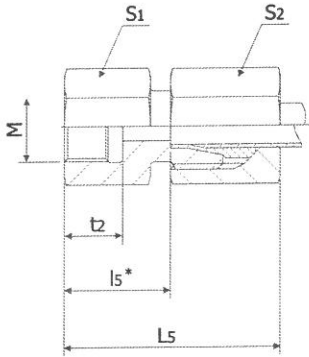
* refers to tube end

STRAIGHT FEMALE STUD BSP-PARALLEL

Series	NOMINAL WORKING PRESSURE	TUBE O.D.	S1	S2	t2	l5	L5	BSP FEMALE THD Rp	PART NUMBER	WT. Kg/100 Pieces
L M E D I U M	250Kg/cm ²	6	14	14	8	15	30	1/8"	LSFS 06 RP	2.5
		8	19	17	12	19	34	1/4"	LSFS 08 RP	4.5
		10	19	19	12	20	35	1/4"	LSFS 10 RP	5.5
		12	22	22	12	21	36	3/8"	LSFS 12 RP	9.0
	160Kg/cm ²	15	27	27	14	24	39	1/2"	LSFS 15 RP	13.0
		18	27	32	14	23.5	40	1/2"	LSFS 18 RP	15.0
	100Kg/cm ²	22	32	36	16	28.5	45	3/4"	LSFS 22 RP	25.5
		28	41	41	18	30.5	47	1"	LSFS 28 RP	30.0
		35	50	50	20	32.5	54	1 1/4"	LSFS 35 RP	42.0
		42	55	60	22	34	57	1 1/2"	LSFS 42 RP	60.5
S H E A V Y	630Kg/cm ²	6	19	17	12	21	36	1/4"	SSFS 06 RP	6.0
		8	19	19	12	21	36	1/4"	SSFS 08 RP	6.5
		10	24	22	12	21.5	38	3/8"	SSFS 10 RP	9.0
		12	24	24	12	21.5	38	3/8"	SSFS 12 RP	10.5
	400Kg/cm ²	14	27	27	14	26	44	1/2"	SSFS 14 RP	13.0
		16	27	30	14	25.5	44	1/2"	SSFS 16 RP	16.0
		20	36	36	16	28.5	50	3/4"	SSFS 20 RP	26.0
	250Kg/cm ²	25	41	46	18	31	55	1"	SSFS 25 RP	40.0
		30	55	50	20	35.5	62	1 1/4"	SSFS 30 RP	72.0
		38	60	60	22	37	68	1 1/2"	SSFS 38 RP	85.5

PART NUMBER CODE



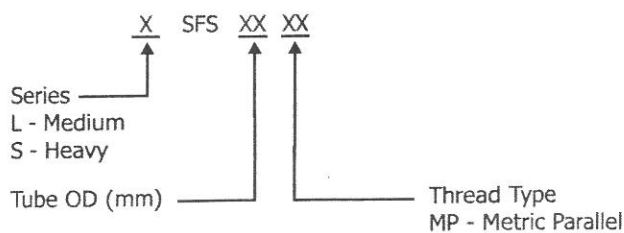


* refers to tube end

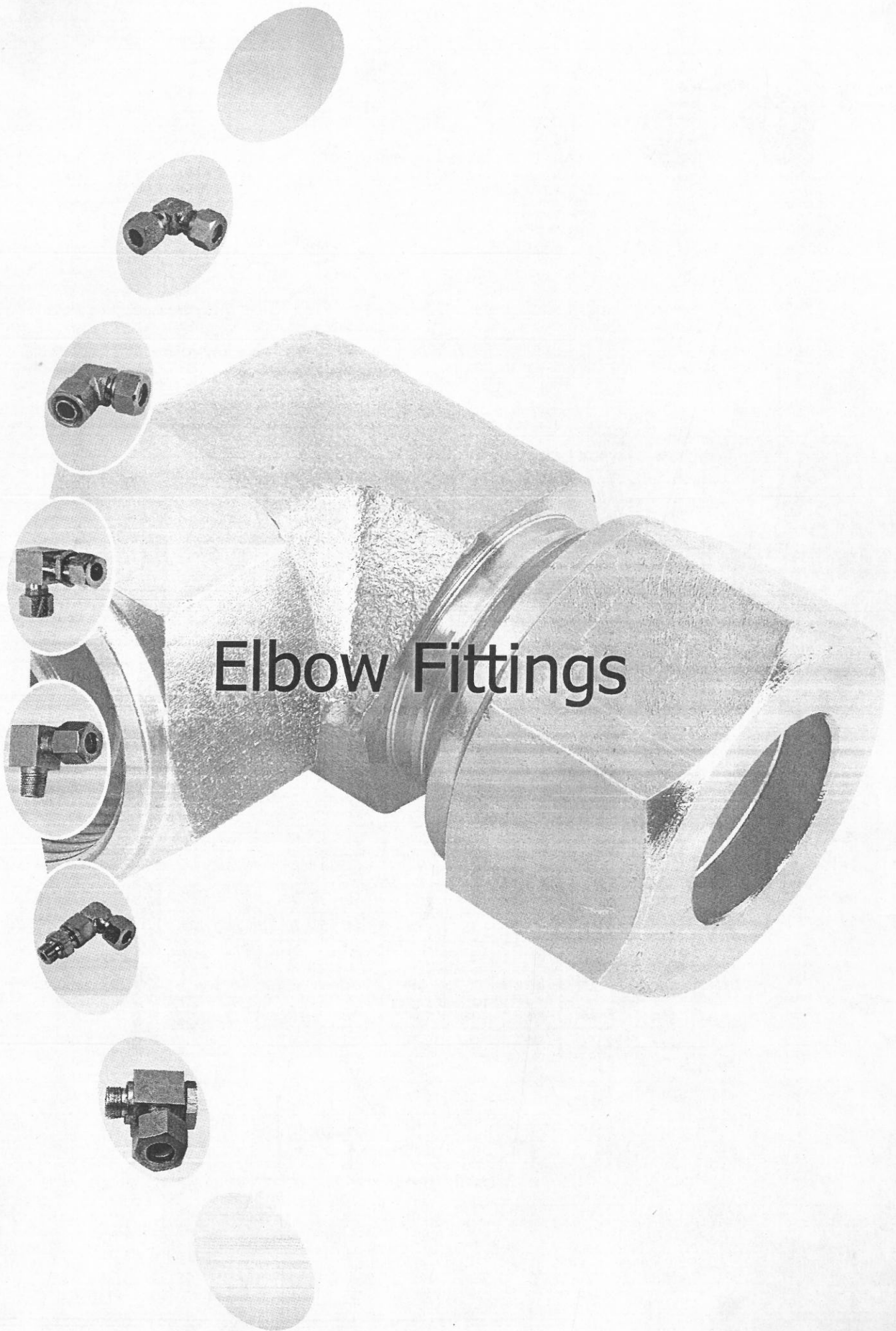
STRAIGHT FEMALE STUD METRIC-PARALLEL

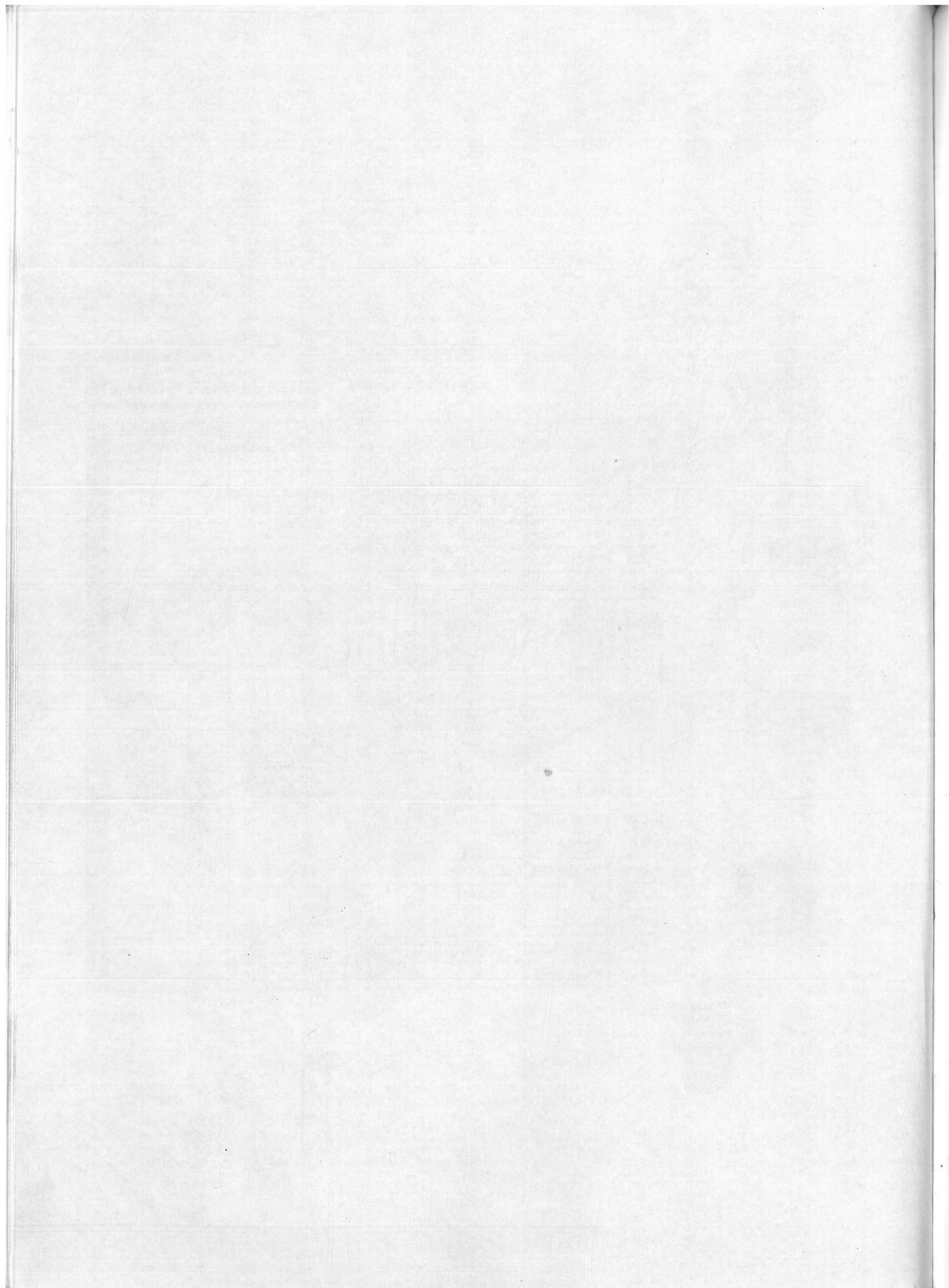
Series	NOMINAL WORKING PRESSURE	TUBE O.D.	S1	S2	t2	l5	L5	Metric FEMALE THD. M	PART NUMBER	WT. Kg/100 Pieces
L M E D I U M	250Kg/cm ²	6	14	14	8	15	30	M10x1	LSFS 06 MP	2.5
		8	19	17	12	19	34	M12x1.5	LSFS 08 MP	4.0
		10	19	19	12	20	35	M14x1.5	LSFS 10 MP	5.0
		12	22	22	12	21	36	M16x1.5	LSFS 12 MP	8.0
		15	27	27	14	24	39	M18x1.5	LSFS 15 MP	10.0
	160Kg/cm ²	18	27	32	14	23.5	40	M22x1.5	LSFS 18 MP	17.0
		22	32	36	16	28.5	45	M26x1.5	LSFS 22 MP	18.0
	100Kg/cm ²	28	41	41	18	30.5	47	M33x2	LSFS 28 MP	26.5
		35	50	50	20	32.5	54	M42x2	LSFS 35 MP	41.5
		42	55	60	22	34	57	M48x2	LSFS 42 MP	60.0
S H E A V Y	630Kg/cm ²	6	19	17	12	21	36	M12x1.5	SSFS 06 MP	4.5
		8	19	19	12	21	36	M14x1.5	SSFS 08 MP	6.2
		10	24	22	12	21.5	38	M16x1.5	SSFS 10 MP	8.0
		12	24	24	12	21.5	38	M18x1.5	SSFS 12 MP	10.5
		14	27	27	14	26	44	M20x1.5	SSFS 14 MP	13.5
	400Kg/cm ²	16	27	30	14	25.5	44	M22x1.5	SSFS 16 MP	18.5
		20	36	36	16	28.5	50	M27x2	SSFS 20 MP	25.5
		25	41	46	18	31	55	M33x2	SSFS 25 MP	43.0
	250Kg/cm ²	30	55	50	20	35.5	62	M42x2	SSFS 30 MP	71.5
		38	60	60	22	37	68	M48x2	SSFS 38 MP	82.0

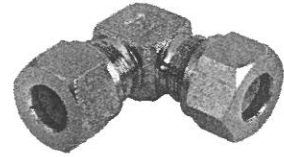
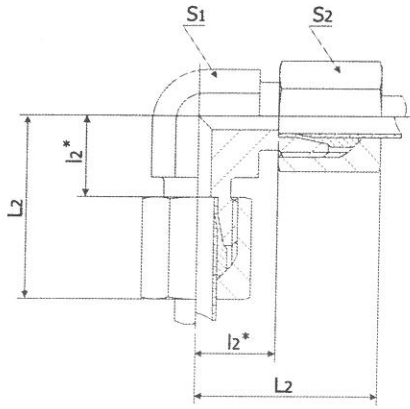
PART NUMBER CODE



Elbow Fittings





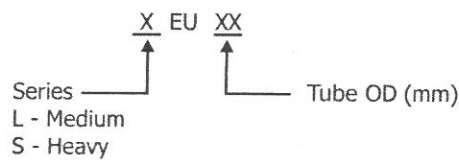


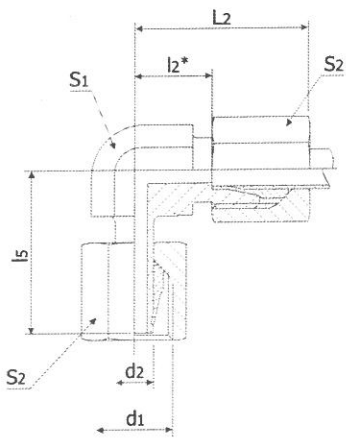
* refers to tube end

ELBOW UNION

	NOMINAL WORKING PRESSURE	TUBE O.D.	S1	S2	l2	L2	PART NUMBER	WT. Kg/100 Pieces
L M E D I U M	250Kg/cm ²	6	12	14	12	27	LEU 06	5.9
		8	14	17	14	29	LEU 08	9.1
		10	17	19	15	30	LEU 10	11.5
		12	19	22	17	32	LEU 12	16.2
		15	22	27	21	36	LEU 15	19.0
	160Kg/cm ²	18	27	32	23.5	40	LEU 18	28.7
		22	30	36	27.5	44	LEU 22	38.0
		28	36	41	30.5	47	LEU 28	50.4
	100Kg/cm ²	35	46	50	34.5	56	LEU 35	91.0
		42	55	60	40	63	LEU 42	129.4
		630Kg/cm ²	6	14	17	16	31	SEU 06
	8		17	19	17	32	SEU 08	14.0
10	19		22	17.5	34	SEU 10	19.3	
12	22		24	21.5	38	SEU 12	24.6	
14	22		27	22	40	SEU 14	24.8	
400Kg/cm ²	16	24	30	24.5	43	SEU 16	30.0	
	20	30	36	26.5	48	SEU 20	48.8	
	25	36	46	30	54	SEU 25	93.1	
S H E A V Y	250Kg/cm ²	30	44	50	35.5	62	SEU 30	116.9
		38	55	60	41	72	SEU 38	158.2

PART NUMBER CODE



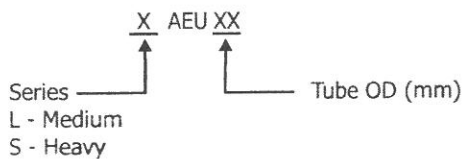


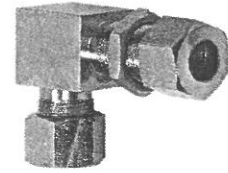
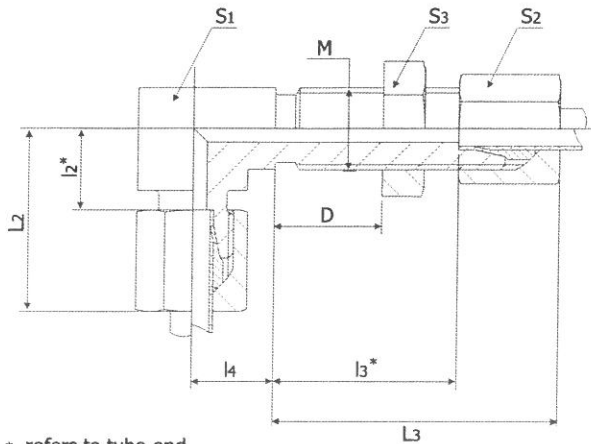
* refers to tube end

ADJUSTABLE ELBOW UNION

Series	NOMINAL WORKING PRESSURE	TUBE O.D.	S1	S2	d1	l2	L2	l5	d2	PART NUMBER	WT. Kg/100 Pieces
L M E D I U M	250Kg/cm ²	6	12	14	M12x1.5	12	27	26	6	LAEU 06	4.3
		8	14	17	M14x1.5	14	29	27	8	LAEU 08	6.0
		10	17	19	M16x1.5	15	30	28.5	10	LAEU 10	8.2
		12	19	22	M18x1.5	17	32	29	12	LAEU 12	10.8
		15	22	27	M22x1.5	21	36	32	15	LAEU 15	18.4
	160Kg/cm ²	18	27	32	M26x1.5	23.5	40	35	18	LAEU 18	27.1
		22	30	36	M30x2	27.5	44	38	22	LAEU 22	36.5
	100Kg/cm ²	28	36	41	M36x2	30.5	47	41.5	28	LAEU 28	51.0
		35	46	50	M45x2	34.5	56	51	35	LAEU 35	77.6
		42	55	60	M52x2	40	63	56	42	LAEU 42	119.6
S H E A V Y	630Kg/cm ²	6	14	17	M14x1.5	16	31	27	6	SAEU 06	6.8
		8	17	19	M16x1.5	17	32	27	8	SAEU 08	8.4
		10	19	22	M18x1.5	17.5	34	29.5	10	SAEU 10	13.3
		12	22	24	M20x1.5	21.5	38	30.5	12	SAEU 12	16.6
		14	22	27	M22x1.5	22	40	34.5	14	SAEU 14	22.7
	400Kg/cm ²	16	24	30	M24x1.5	24.5	43	36	16	SAEU 16	28.6
		20	30	36	M30x2	26.5	48	44	20	SAEU 20	43.3
		25	36	46	M36x2	30	54	49.5	25	SAEU 25	86.5
	250Kg/cm ²	30	46	50	M42x2	35.5	62	55	30	SAEU 30	115.7
		38	55	60	M52x2	41	72	63	38	SAEU 38	116.0

PART NUMBER CODE





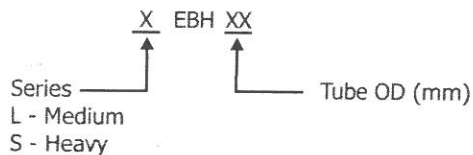
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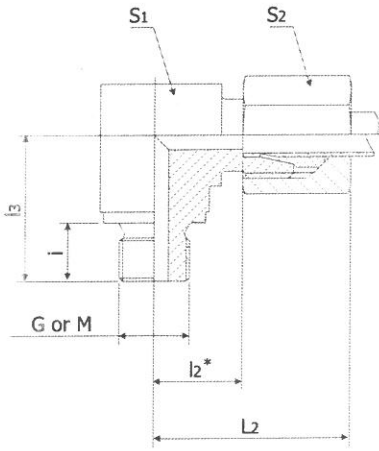
D = 16 mm - max

ELBOW BULKHEAD

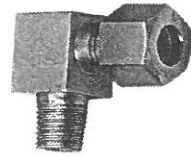
S E R I E S	NOMINAL WORKING PRESSURE	TUBE O.D.	S1	S2	S3	L2	l2	L3	l3	l4	METRIC THREAD M	PART NUMBER	WT. Kg/100 Pieces	
L M E D I U M	250Kg/cm ²	6	17	14	17	27	12	42	27	14	M12x1.5	LEBH 06	9.0	
		8	19	17	19	29	14	42	27	17	M14x1.5	LEBH 08	11.9	
		10	22	19	22	30	15	43	28	18	M16x1.5	LEBH 10	14.4	
		12	24	22	24	32	17	44	29	20	M18x1.5	LEBH 12	18.0	
		15	27	27	30	36	21	46	31	23	M22x1.5	LEBH 15	30.0	
	160Kg/cm ²	18	32	32	36	40	23.5	49	32.5	24	M26x1.5	LEBH 18	42.6	
		22	36	36	41	44	27.5	51	34.5	30	M30x2	LEBH 22	55.8	
		100Kg/cm ²	28	41	41	46	47	30.5	52	35.5	34	M36x2	LEBH 28	76.8
			35	50	50	55	56	34.5	58	36.5	39	M45x2	LEBH 35	119.3
			42	60	60	65	63	40	59	36	43	M52x2	LEBH 42	178.8
S H E A V Y	630Kg/cm ²	6	19	17	19	31	16	44	29	17	M14x1.5	SEBH 06	12.6	
		8	22	19	22	32	17	44	29	18	M16x1.5	SEBH 08	16.8	
		10	24	22	24	34	17.5	46	29.5	20	M18x1.5	SEBH 10	22.8	
		12	27	24	27	38	21.5	47	30.5	21	M20x1.5	SEBH 12	27.0	
		14	27	27	30	40	22	50	32	23	M22x1.5	SEBH 14	36.0	
	400Kg/cm ²	16	30	30	32	43	24.5	50	31.5	24	M24x1.5	SEBH 16	43.8	
		20	36	36	41	48	26.5	56	33.5	30	M30x2	SEBH 20	69.6	
		25	41	46	46	54	30	59	35	34	M36x2	SEBH 25	120.0	
		250Kg/cm ²	30	50	50	50	62	35.5	64	37.5	39	M42x2	SEBH 30	156.0
			38	60	60	65	72	41	68	37	43	M52x2	SEBH 38	236.4

PART NUMBER CODE





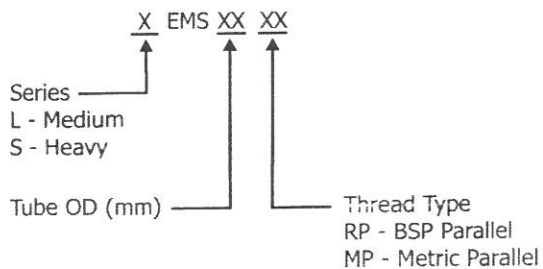
* refers to tube end

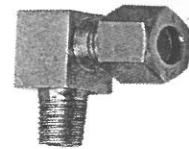
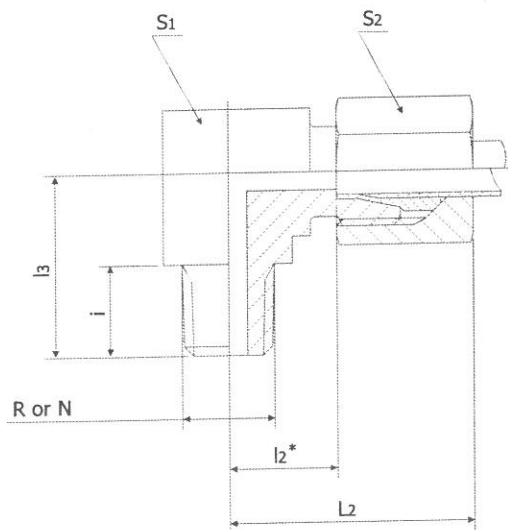


ELBOW MALE STUD BSP / METRIC - PARALLEL

Series	NOMINAL WORKING PRESSURE	TUBE O.D.	S1	S2	l ₂ *	L ₂	l ₃	i	BSP THD.		METRIC THD.		WT. Kg/100 Pieces
									G	PART NUMBER	M	PART NUMBER	
L M E D I U M	160Kg/cm ²	22	32	36	27.5	44	42	16	3/4"	LEMS 22 RP	M26x1.5	LEMS 22 MP	29.5
	100Kg/cm ²	28	41	41	30.5	47	48	18	1"	LEMS 28 RP	M33x2	LEMS 28 MP	46.0
		35	50	50	34.5	56	54	20	1 1/4"	LEMS 35 RP	M42x2	LEMS 35 MP	73.5
		42	55	60	40	63	61	22	1 1/2"	LEMS 42 RP	M48x2	LEMS 42 MP	96.7
S H E A V Y	400Kg/cm ²	20	32	36	26.5	48	42	16	3/4"	SEMS 20 RP	M27x2	SEMS 20 MP	36.4
	250Kg/cm ²	25	41	46	30	54	48	18	1"	SEMS 25 RP	M33x2	SEMS 25 MP	69.0
		30	50	50	35.5	62	54	20	1 1/4"	SEMS 30 RP	M42x2	SEMS 30 MP	89.3
		38	55	60	41	72	61	22	1 1/2"	SEMS 38 RP	M48x2	SEMS 38 MP	137.0

PART NUMBER CODE



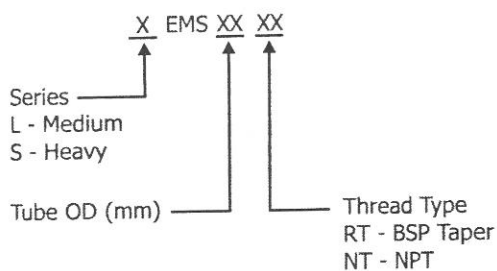


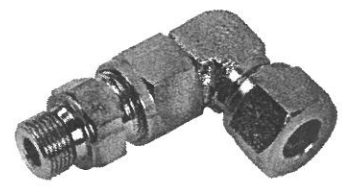
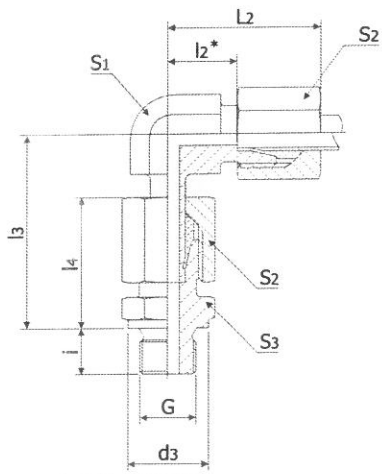
* refers to tube end

ELBOW MALE STUD BSPT/ NPT - TAPER

Series	NOMINAL WORKING PRESSURE	TUBE O.D.	S1	S2	L2	l2	BSPT THD.			NPT THD.			WT. Kg/100 Pieces			
							R	i	l3	PART NUMBER	N	i	l3	PART NUMBER	R	N
L M E D I U M	250Kg/cm ²	6	12	14	27	12	1/8"	10	20	LEMS 06 RT	1/8"	9.9	20	LEMS 06 NT	4.8	4.8
		8	14	17	29	14	1/4"	14	26	LEMS 08 RT	1/4"	15.1	26	LEMS 08 NT	7.9	7.6
		10	14	19	30	15	1/4"	14	27	LEMS 10 RT	1/4"	15.1	27	LEMS 10 NT	10.0	9.8
		12	17	22	32	17	3/8"	14	28	LEMS 12 RT	3/8"	15.2	28	LEMS 12 NT	14.1	14.3
		15	22	27	36	21	1/2"	16	34	LEMS 15 RT	1/2"	19.8	34	LEMS 15 NT	15.6	16.8
	160Kg/cm ²	18	27	32	40	23.5	1/2"	16	36	LEMS 18 RT	1/2"	19.8	36	LEMS 18 NT	19.9	19.8
S H E A V Y	630Kg/cm ²	6	14	17	31	16	1/4"	14	26	SEMS 06 RT	1/4"	15.1	26	SEMS 06 NT	8.6	8.3
		8	17	19	32	17	1/4"	14	27	SEMS 08 RT	1/4"	15.1	27	SEMS 08 NT	10.6	11.4
		10	19	22	34	17.5	3/8"	14	28	SEMS 10 RT	3/8"	15.2	28	SEMS 10 NT	16.0	16.0
		12	22	24	38	21.5	3/8"	14	28	SEMS 12 RT	3/8"	15.2	28	SEMS 12 NT	19.8	20.2
		14	22	27	40	22	1/2"	16	32	SEMS 14 RT	1/2"	19.8	34	SEMS 14 NT	20.4	20.9
	400Kg/cm ²	16	24	30	43	24.5	1/2"	16	32	SEMS 16 RT	1/2"	19.8	36	SEMS 16 NT	21.5	22.3

PART NUMBER CODE

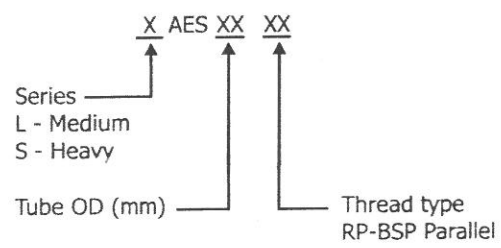


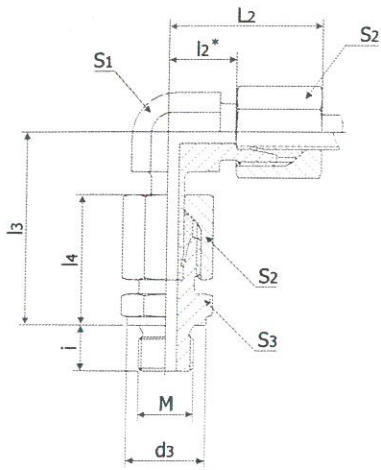


ADJUSTABLE ELBOW STUD BSP - PARALLEL

SERIES	NOMINAL WORKING PRESSURE	TUBE O.D.	S1	S2	l2	L2	S3	l3	l4	i	d3	BSP THD G	PART NUMBER	WT. Kg/100 Pieces
L M E D I U M	250Kg/cm ²	6	12	14	12	27	14	34.5	23	8	14	1/8"	LAES 06 RP	6.0
		8	14	17	14	29	19	37	25	12	18	1/4"	LAES 08 RP	9.5
		10	17	19	15	30	19	39.5	26	12	18	1/4"	LAES 10 RP	11.0
		12	19	22	17	32	22	41.5	27	12	22	3/8"	LAES 12 RP	15.0
		15	22	27	21	36	27	46	29	14	26	1/2"	LAES 15 RP	44.9
	160Kg/cm ²	18	27	32	23.5	40	27	49.5	31	14	26	1/2"	LAES 18 RP	35.4
		22	30	36	27.5	44	32	54.5	33	16	32	3/4"	LAES 22 RP	47.3
	100Kg/cm ²	28	36	41	30.5	47	41	59	34	18	39	1"	LAES 28 RP	69.6
		35	46	50	34.5	56	50	68.5	39	20	49	1 1/4"	LAES 35 RP	108.8
		42	55	60	40	63	55	75	42	22	55	1 1/2"	LAES 42 RP	146.6
S H E A V Y	630Kg/cm ²	6	14	17	16	31	19	40	28	12	18	1/4"	SAES 06 RP	10.9
		8	17	19	17	32	19	42	30	12	18	1/4"	SAES 08 RP	12.7
		10	19	22	17.5	34	22	44.5	31	12	22	3/8"	SAES 10 RP	19.3
		12	22	24	21.5	38	22	47.5	33	12	22	3/8"	SAES 12 RP	23.4
		14	22	27	22	40	27	53.5	37	14	26	1/2"	SAES 14 RP	34.1
	400Kg/cm ²	16	24	30	24.5	43	27	54.5	37	14	26	1/2"	SAES 16 RP	39.4
		20	30	36	26.5	48	32	64.5	42	16	32	3/4"	SAES 20 RP	61.3
	250Kg/cm ²	25	36	46	30	54	41	72.5	47	18	39	1"	SAES 25 RP	117.6
		30	46	50	35.5	62	50	78.5	50	20	49	1 1/4"	SAES 30 RP	165.5
		38	55	60	41	72	55	89	57	22	55	1 1/2"	SAES 38 RP	233.3

PART NUMBER CODE



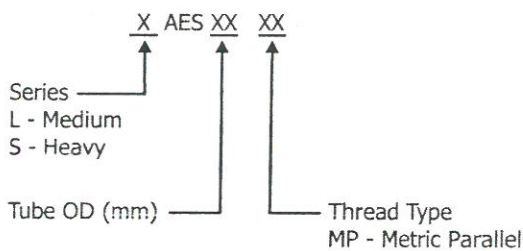


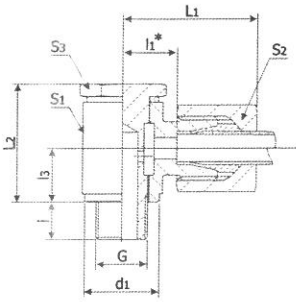
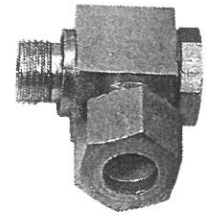
* refers to tube end

ADJUSTABLE ELBOW STUD METRIC - PARALLEL

Series	NOMINAL WORKING PRESSURE	TUBE O.D.	S1	S2	S3	l2	L2	l3	l4	i	d3	METRIC THD M	PART NUMBER	WT. Kg/100 Pieces
L M E D I U M	250Kg/cm ²	6	12	14	14	12	27	34.5	23	8	14	M10x1	LAES 06 MP	6.0
		8	14	17	17	14	29	37	25	12	17	M12x1.5	LAES 08 MP	9.5
		10	17	19	19	15	30	39.5	26	12	19	M14x1.5	LAES 10 MP	11.0
		12	19	22	22	17	32	41.5	27	12	21	M16x1.5	LAES 12 MP	15.0
		15	22	27	24	21	36	46	29	14	23	M18x1.5	LAES 15 MP	44.9
	160Kg/cm ²	18	27	32	27	23.5	40	49.5	31	14	27	M22x1.5	LAES 18 MP	35.4
		22	30	36	32	27.5	44	54.5	33	16	31	M26x1.5	LAES 22 MP	47.3
	100Kg/cm ²	28	36	41	41	30.5	47	59	34	18	39	M33x2	LAES 28 MP	69.6
		35	46	50	50	34.5	56	68.5	39	20	49	M42x2	LAES 35 MP	108.8
42		55	60	55	40	63	75	42	22	55	M48x2	LAES 42 MP	146.6	
S H E A V Y	630Kg/cm ²	6	14	17	17	16	31	40	28	12	17	M12x1.5	SAES 06 MP	10.9
		8	17	19	19	17	32	42	30	12	19	M14x1.5	SAES 08 MP	12.7
		10	19	22	22	17.5	34	44.5	31	12	21	M16x1.5	SAES 10 MP	19.3
		12	22	24	24	21.5	38	47.5	33	12	23	M18x1.5	SAES 12 MP	23.4
		14	22	27	27	22	40	53.5	37	14	25	M20x1.5	SAES 14 MP	34.1
	400Kg/cm ²	16	24	30	27	24.5	43	54.5	37	14	27	M22x1.5	SAES 16 MP	39.4
		20	30	36	32	26.5	48	64.5	42	16	32	M27x2	SAES 20 MP	61.3
		25	36	46	41	30	54	72.5	47	18	39	M33x2	SAES 25 MP	117.6
	250Kg/cm ²	30	46	50	50	35.5	62	78.5	50	20	49	M42x2	SAES 30 MP	165.5
38		55	60	55	41	72	89	57	22	55	M48x2	SAES 38 MP	233.3	

PART NUMBER CODE



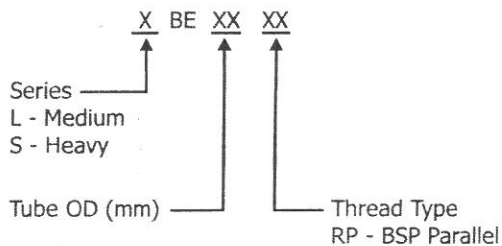


* refers to tube end

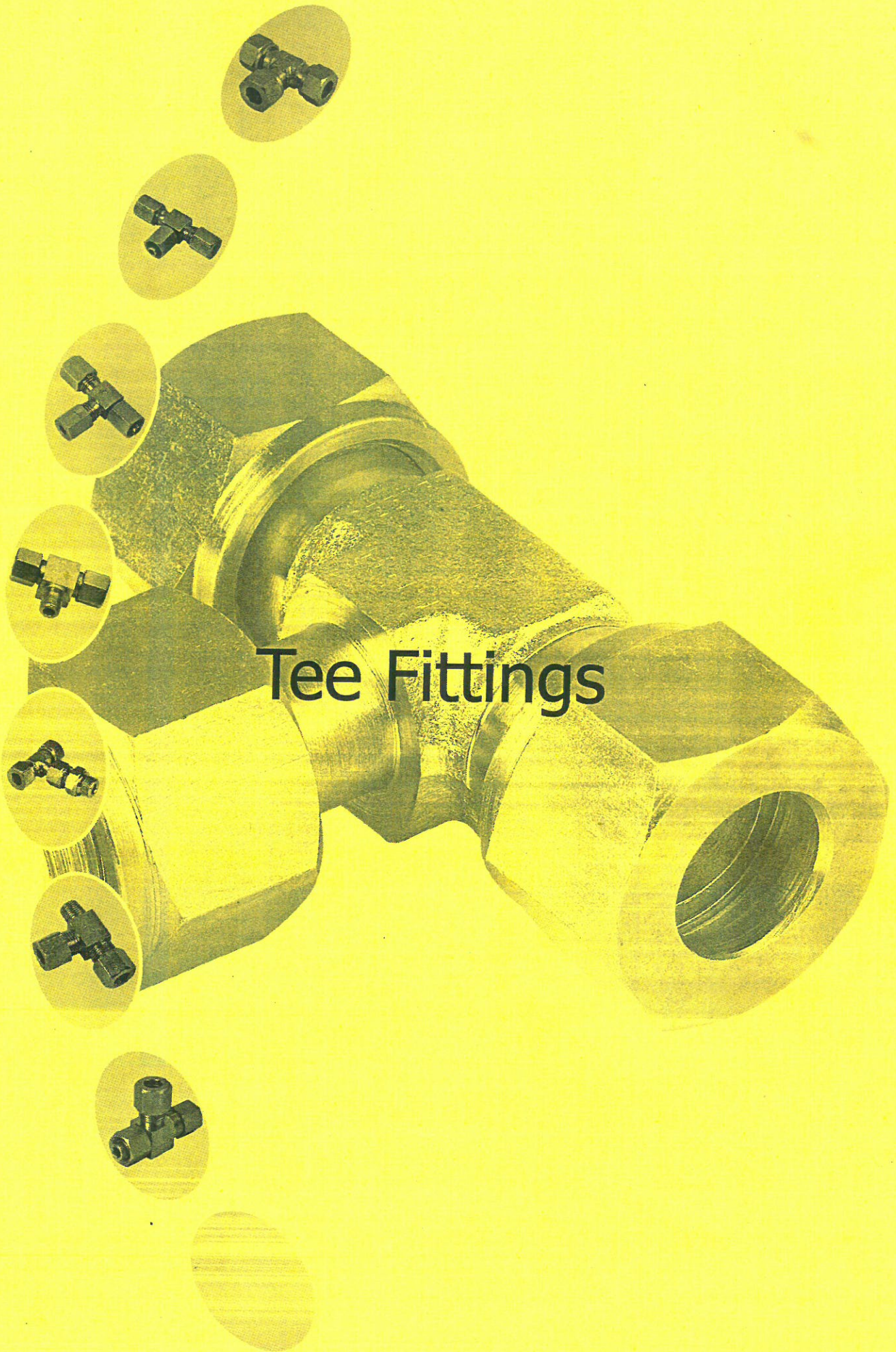
BANJO ELBOW

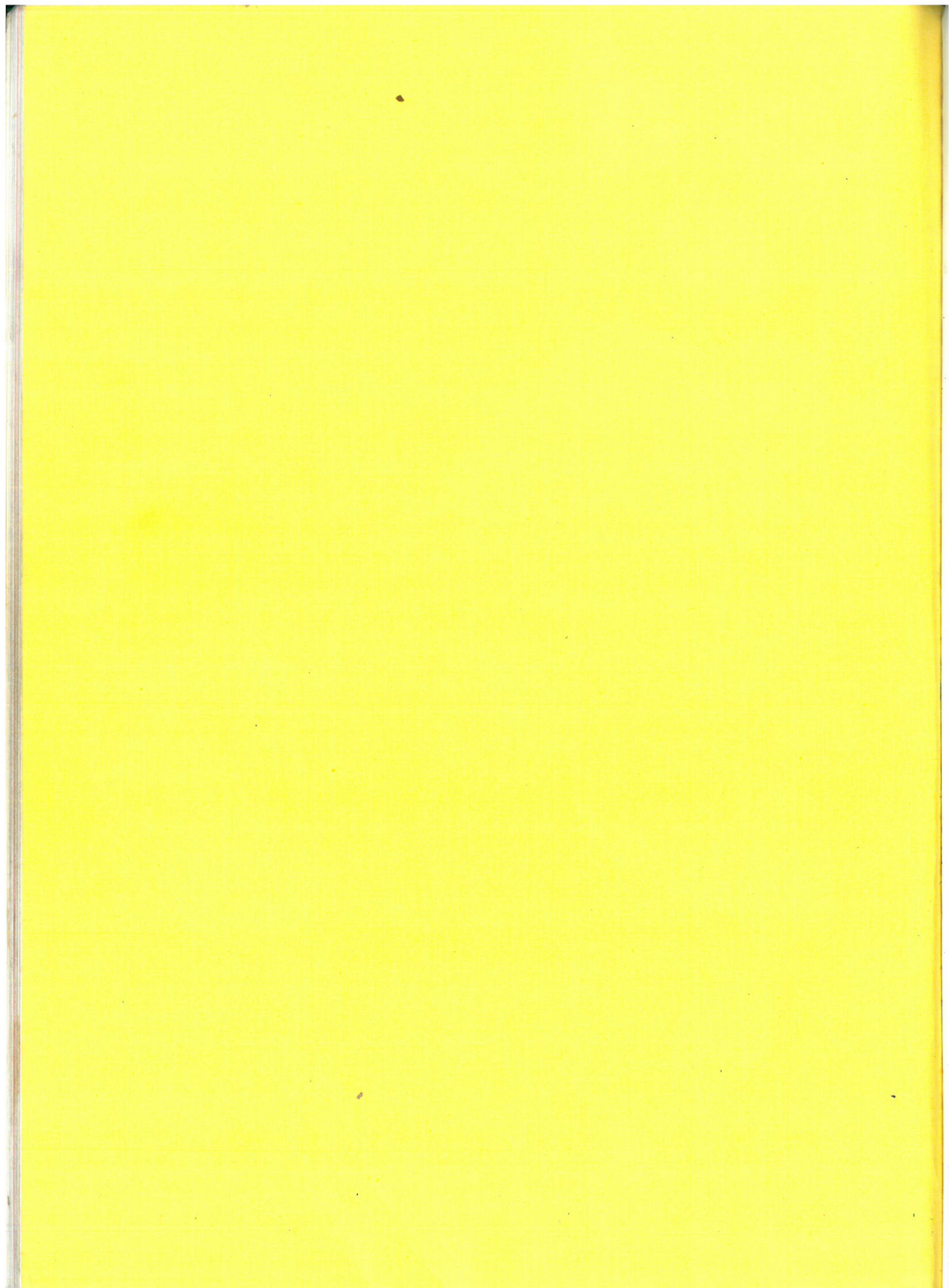
SERIES	NOMINAL WORKING PRESSURE	TUBE O.D.	S1	S2	S3	i	L2	l1	L1	l3	d1	BSP THD G	PART NUMBER	WT. Kg/100 Pieces
L MEDIUM	100Kg/cm ²	6	14	14	14	7	22	10	25	10	14	1/8"	LBE 06 RP	4.8
		8	19	17	19	9	25	12.5	27	11	18.5	1/4"	LBE 08 RP	9.24
		10	19	19	19	9	27	13.5	28	13	18.5	1/4"	LBE 10 RP	10.2
	64Kg/cm ²	12	22	22	22	10	31	15	30	15	22	3/8"	LBE 12 RP	17.0
		15	27	27	27	12	37	18.5	34	17	27	1/2"	LBE 15 RP	23.4
		18	30	32	27	11	41	19.5	36	20	27	1/2"	LBE 18 RP	24.6
S HEAVY	160Kg/cm ²	22	36	36	32	13	48	24.5	41	23.5	32	3/4"	LBE 22 RP	46.0
		6	19	17	19	9	25	14.5	29	11	18.5	1/4"	SBE 06 RP	9.6
		8	19	19	19	9	29	14.5	29	13	18.5	1/4"	SBE 08 RP	11.6
	64Kg/cm ²	10	22	22	22	10	31	15.5	32	15	22	3/8"	SBE 10 RP	14.4
		12	22	24	22	12	32	15.5	32	16	22	3/8"	SBE 12 RP	17.4
		14	27	27	27	11	37	19.5	37	18	27	1/2"	SBE 14 RP	25.8
64Kg/cm ²	16	30	30	27	11	40	21.5	40	20	27	1/2"	SBE 16 RP	33.2	
	20	36	36	32	13	48	23.5	46	23.5	32	3/4"	SBE 20 RP	51.0	

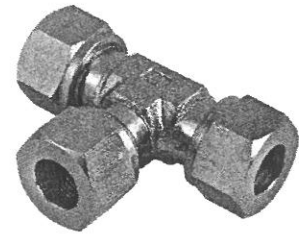
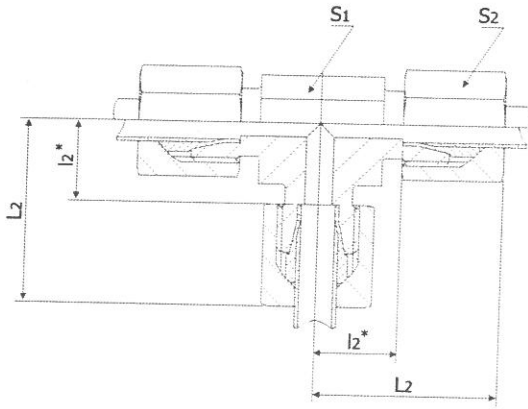
PART NUMBER CODE



Tee Fittings





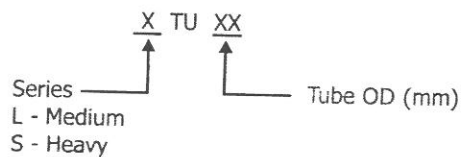


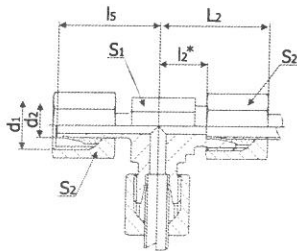
* refers to tube end

TEE UNION

SERIES	NOMINAL WORKING PRESSURE	TUBE O.D.	S1	S2	l2	L2	PART NUMBER	WT. Kg/100 Pieces	
L M E D I U M	250Kg/cm ²	6	12	14	12	27	LTU 06	8.5	
		8	14	17	14	29	LTU 08	12.1	
		10	17	19	15	30	LTU 10	15.6	
		12	19	22	17	32	LTU 12	21.2	
		15	22	27	21	36	LTU 15	27.8	
	160Kg/cm ²	18	27	32	23.5	40	LTU 18	42.5	
		22	30	36	27.5	44	LTU 22	53.2	
		100Kg/cm ²	28	36	41	30.5	47	LTU 28	73.3
	35		46	50	34.5	56	LTU 35	108.1	
	42		55	60	40	63	LTU 42	164.2	
	S H E A V Y	630Kg/cm ²	6	14	17	16	31	STU 06	14.4
			8	17	19	17	32	STU 08	18.8
10			19	22	17.5	34	STU 10	25.4	
12			22	24	21.5	38	STU 12	34.2	
14			22	27	22	40	STU 14	34.2	
400Kg/cm ²		16	24	30	24.5	43	STU 16	43.0	
		20	30	36	26.5	48	STU 20	67.0	
		25	36	46	30	54	STU 25	128.0	
250Kg/cm ²		30	44	50	35.5	62	STU 30	161.9	
		38	55	60	41	72	STU 38	242.6	

PART NUMBER CODE



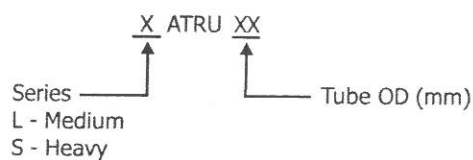


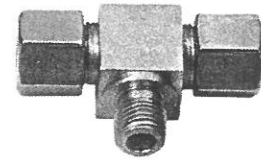
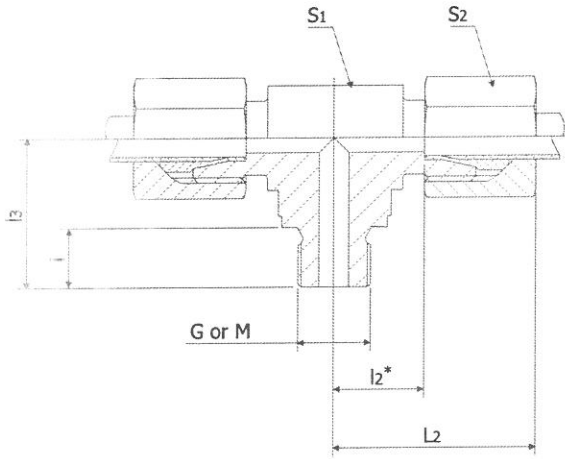
* refers to tube end

ADJUSTABLE TEE RUN UNION

Series	NOMINAL WORKING PRESSURE	TUBE O.D.	S1	S2	d1	l2	L2	l1	d2	PART NUMBER	WT. Kg/100 Pieces	
L M E D I U M	250Kg/cm ²	6	12	14	M12x1.5	12	27	26	6	LATRU 06	6.4	
		8	14	17	M14x1.5	14	29	27	8	LARTU 08	8.9	
		10	17	19	M16x1.5	15	30	28.5	10	LATRU 10	12.4	
		12	19	22	M18x1.5	17	32	29	12	LATRU 12	15.5	
		15	22	27	M22x1.5	21	36	32	15	LATRU 15	26.2	
	160Kg/cm ²	18	27	32	M26x1.5	23.5	40	35	18	LATRU 18	38.9	
		22	30	36	M30x2	27.5	44	38	22	LATRU 22	52	
	100Kg/cm ²	28	36	41				41.5	28	LATRU 28	68.8	
		35	46	50				51	35	LATRU 35	108.1	
		42	55	60				56	42	LATRU 42	162.4	
S H E A V Y	630Kg/cm ²	6	14	17				31	27	6	SATRU 06	10.2
		8	17	19	M16x1.5	17	32	27	8	SATRU 08	12.8	
		10	19	22	M18x1.5	17.5	34	29.5	10	SATRU 10	19.8	
		12	22	24	M20x1.5	21.5	38	30.5	12	SATRU 12	24.5	
		14	22	27	M22x1.5	22	40	34.5	14	SATRU 14	33.0	
	400Kg/cm ²	16	24	30	M24x1.5	24.5	43	36	16	SATRU 16	42.7	
		20	30	36	M30x2	26.5	48	44	20	SATRU 20	64.3	
		25	36	46	M36x2	30	54	49.5	25	SATRU 25	125.0	
	250Kg/cm ²	30	44.5	50	M42x2	35.5	62	55	30	SATRU 30	151.0	
		38	55	60	M52x2	41	72	63	38	SATRU 38	245.6	

PART NUMBER CODE



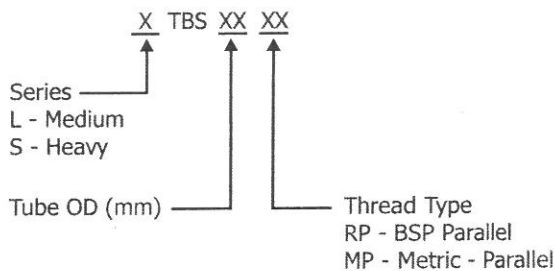


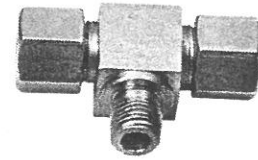
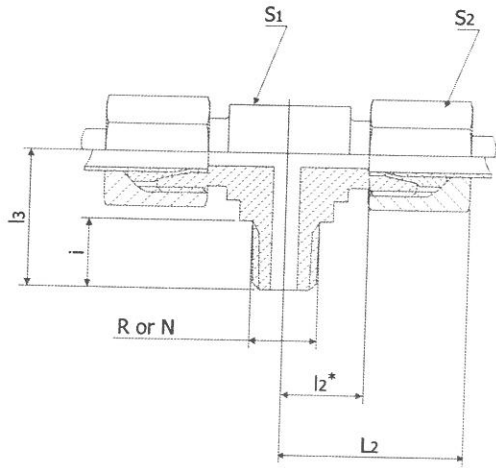
* refers to tube end

TEE BRANCH STUD BSP / METRIC - PARALLEL

SIZES	NOMINAL WORKING PRESSURE	TUBE O.D.	S1	S2	l2	L2	l3	i	BSP THD.		METRIC THD.		WT. Kg/100 Pieces
									G	PART NUMBER	M	PART NUMBER	
L MEDIUM	160Kg/cm ²	22	32	36	27.5	44	42	16	3/4"	LTBS 22 RP	M26x1.5	LTBS 22 MP	44.3
		28	41	41	30.5	47	48	18	1"	LTBS 28 RP	M33x2	LTBS 28 MP	66.0
	100Kg/cm ²	35	50	50	34.5	56	54	20	1 1/4"	LTBS 35 RP	M42x2	LTBS 35 MP	102.0
		42	55	60	40	63	61	22	1 1/2"	LTBS 42 RP	M48x2	LTBS 42 MP	170.5
S HEAVY	400Kg/cm ²	20	32	36	26.5	48	42	16	3/4"	STBS 20 RP	M27x2	STBS 20 MP	54.6
		25	41	46	30	54	48	18	1"	STBS 25 RP	M33x2	STBS 25 MP	105.0
	250Kg/cm ²	30	50	50	35.5	62	54	20	1 1/4"	STBS 30 RP	M42x2	STBS 30 MP	146.0
		38	55	60	41	72	61	22	1 1/2"	STBS 38 RP	M48x2	STBS 38 MP	209.0

PART NUMBER CODE



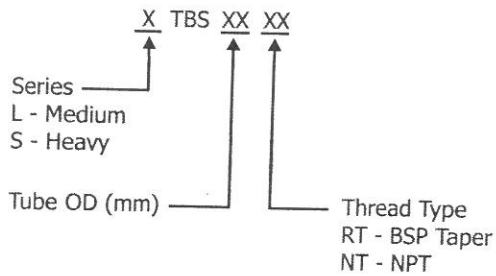


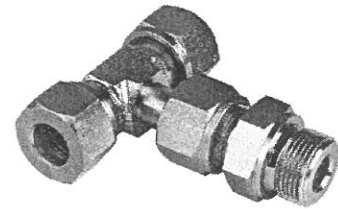
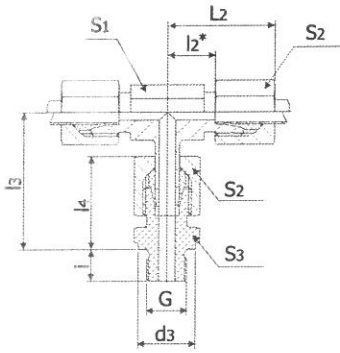
* refers to tube end

TEE BRANCH STUD BSPT / NPT - TAPER

Series	NOMINAL WORKING PRESSURE	TUBE O.D.	S1	S2	L2	l2	BSPT THD.			PART NUMBER	NPT THD.			PART NUMBER	WT. Kg/100 Pieces	
							R	i	l3		N	i	l3		R	N
L M E D I U M	250Kg/cm ²	6	12	14	27	12	1/8"	10	20	LTBS 06 RT	1/8"	9.97	20	LTBS 06 NT	7.2	7.2
		8	14	17	29	14	1/4"	14	26	LTBS 08 RT	1/4"	15.1	26	LTBS 08 NT	11.0	11.0
		10	14	19	30	15	1/4"	14	27	LTBS 10 RT	1/4"	15.1	27	LTBS 10 NT	14.0	14.0
		12	17	22	32	17	3/8"	14	28	LTBS 12 RT	3/8"	15.26	28	LTBS 12 NT	19.2	19.2
		15	22	27	36	21	1/2"	16	34	LTBS 15 RT	1/2"	19.85	34	LTBS 15 NT	24.4	24.4
	160Kg/cm ²	18	27	32	40	23.5	1/2"	16	36	LTBS 18 RT	1/2"	19.85	36	LTBS 18 NT	35.4	35.4
S H E A V Y	630Kg/cm ²	6	14	17	31	16	1/4"	14	26	STBS 06 RT	1/4"	15.1	26	STBS 06 NT	13.1	13.1
		8	17	19	32	17	1/4"	14	27	STBS 08 RT	1/4"	15.1	27	STBS 08 NT	16.8	16.8
		10	19	22	34	17.5	3/8"	14	28	STBS 10 RT	3/8"	15.26	28	STBS 10 NT	22.8	22.8
		12	22	24	38	21.5	3/8"	14	28	STBS 12 RT	3/8"	15.26	28	STBS 12 NT	29.4	29.4
		14	22	27	40	22	1/2"	16	32	STBS 14 RT	1/2"	19.85	34	STBS 14 NT	29.3	29.3
	400Kg/cm ²	16	24	30	43	24.5	1/2"	16	32	STBS 16 RT	1/2"	19.85	36	STBS 16 NT	34.1	34.1

PART NUMBER CODE



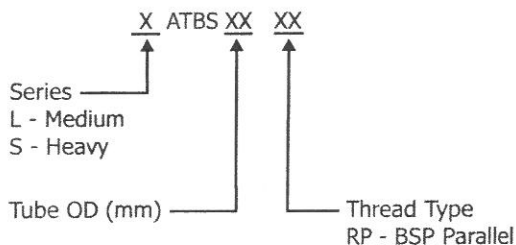


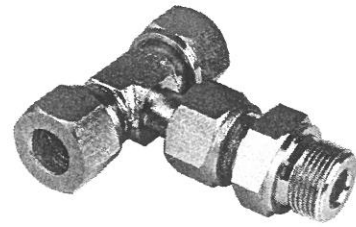
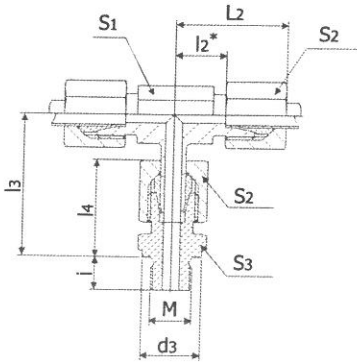
* refers to tube end

ADJUSTABLE TEE BRANCH STUD **BSP - PARALLEL**

SIZES	NOMINAL WORKING PRESSURE	TUBE O.D.	S1	S2	l2	L2	S3	l3	l4	i	d3	BSP THD G	PART NUMBER	WT. Kg/100 Pieces
L M E D I U M	250Kg/cm ²	6	12	14	12	27	14	34.5	23	8	14	1/8"	LATBS 06 RP	8.2
		8	14	17	14	29	19	37	25	12	18	1/4"	LATBS 08 RP	12.4
		10	17	19	15	30	19	39.5	26	12	18	1/4"	LATBS 10 RP	15.3
		12	19	22	17	32	22	41.5	27	12	22	3/8"	LATBS 12 RP	19.7
		15	22	27	21	36	27	46	29	14	26	1/2"	LATBS 15 RP	34.7
	160Kg/cm ²	18	27	32	23.5	40	27	49.5	31	14	26	1/2"	LATBS 18 RP	46.6
		22	30	36	27.5	44	32	54.5	33	16	32	3/4"	LATBS 22 RP	62.8
	100Kg/cm ²	28	36	41	30.5	47	41	59	34	18	39	1"	LATBS 28 RP	87.2
		35	46	50	34.5	56	50	68.5	39	20	49	1 1/4"	LATBS 35 RP	139.3
		42	55	60	40	63	55	75	42	22	55	1 1/2"	LATBS 42 RP	189.4
S H E A V Y	630Kg/cm ²	6	14	17	16	31	19	40	28	12	18	1/4"	SATBS 06 RP	14.2
		8	17	19	17	32	19	42	30	12	18	1/4"	SATBS 08 RP	17.2
		10	19	22	17.5	34	22	44.5	31	12	22	3/8"	SATBS 10 RP	25.7
		12	22	24	21.5	38	22	47.5	33	12	22	3/8"	SATBS 12 RP	31.3
		14	22	27	22	40	27	53.5	37	14	26	1/2"	SATBS 14 RP	43.8
	400Kg/cm ²	16	24	30	24.5	43	27	54.5	37	14	26	1/2"	SATBS 16 RP	53.5
		20	30	36	26.5	48	32	64.5	42	16	32	3/4"	SATBS 20 RP	82.2
		25	36	46	30	54	41	72.5	47	18	39	1"	SATBS 25 RP	156.1
	250Kg/cm ²	30	44.5	50	35.5	62	50	78.5	50	20	49	1 1/4"	SATBS 30 RP	209.6
		38	55	60	41	72	55	89	57	22	55	1 1/2"	SATBS 38 RP	312.8

PART NUMBER CODE



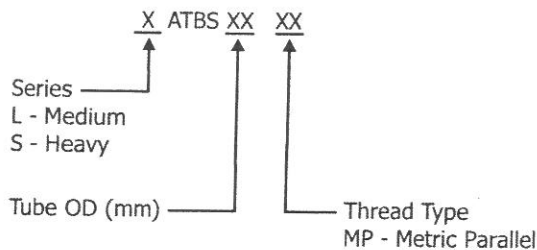


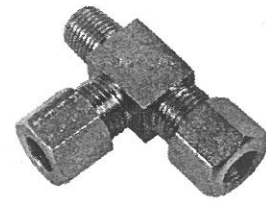
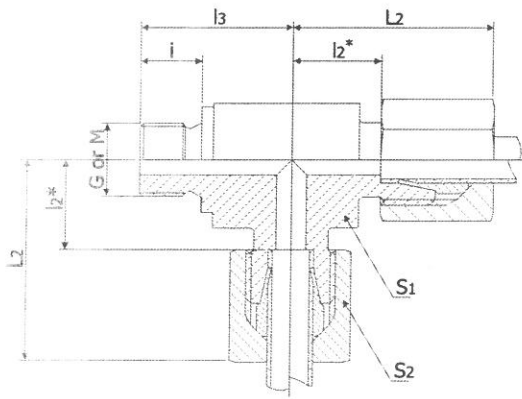
* refers to tube end

ADJUSTABLE TEE BRANCH STUD METRIC - PARALLEL

SERIES	NOMINAL WORKING PRESSURE	TUBE O.D.	S1	S2	l2	L2	S3	l3	l4	i	d3	METRIC THD M	PART NUMBER	WT. Kg/100 Pieces
L M E D I U M	250Kg/cm ²	6	12	14	12	27	14	34.5	23	8	14	M10x1	LATBS 06 MP	8.2
		8	14	17	14	29	17	37	25	12	17	M12x1.5	LATBS 08 MP	12.4
		10	17	19	15	30	19	39.5	26	12	19	M14x1.5	LATBS 10 MP	15.3
		12	19	22	17	32	22	41.5	27	12	21	M16x1.5	LATBS 12 MP	19.7
		15	22	27	21	36	24	46	29	14	23	M18x1.5	LATBS 15 MP	34.7
	160Kg/cm ²	18	27	32	23.5	40	27	49.5	31	14	27	M22x1.5	LATBS 18 MP	46.6
		22	30	36	27.5	44	32	54.5	33	16	31	M26x1.5	LATBS 22 MP	62.8
	100Kg/cm ²	28	36	41	30.5	47	41	59	34	18	39	M33x2	LATBS 28 MP	87.2
		35	46	50	34.5	56	50	68.5	39	20	49	M42x2	LATBS 35 MP	139.3
		42	55	60	40	63	55	75	42	22	55	M48x2	LATBS 42 MP	189.4
S H E A V Y	630Kg/cm ²	6	14	17	16	31	17	40	28	12	17	M12x1.5	SATBS 06 MP	14.2
		8	17	19	17	32	19	42	30	12	19	M14x1.5	SATBS 08 MP	17.2
		10	19	22	17.5	34	22	44.5	31	12	21	M16x1.5	SATBS 10 MP	25.7
		12	22	24	21.5	38	24	47.5	33	12	23	M18x1.5	SATBS 12 MP	31.3
		14	22	27	22	40	27	53.5	37	14	25	M20x1.5	SATBS 14 MP	43.8
	400Kg/cm ²	16	24	30	24.5	43	27	54.5	37	14	27	M22x1.5	SATBS 16 MP	53.5
		20	30	36	26.5	48	32	64.5	42	16	32	M27x2	SATBS 20 MP	82.2
		25	36	46	30	54	41	72.5	47	18	39	M33x2	SATBS 25 MP	156.1
	250Kg/cm ²	30	44.5	50	35.5	62	50	78.5	50	20	49	M42x2	SATBS 30 MP	209.6
		38	55	60	41	72	55	89	57	22	55	M48x2	SATBS 38 MP	312.8

PART NUMBER CODE



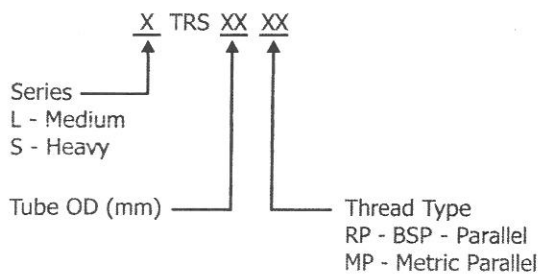


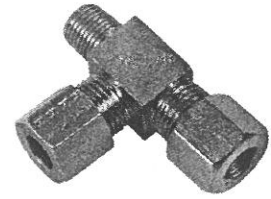
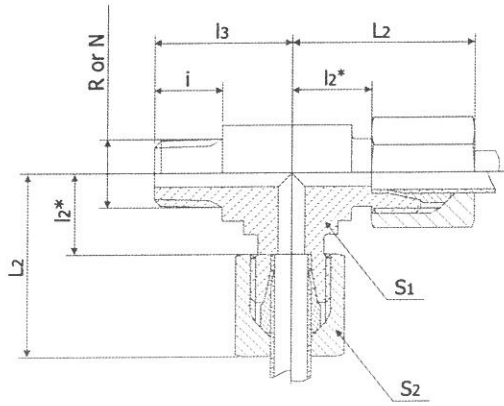
• refers to tube end

TEE RUN STUD BSP / METRIC - PARALLEL

Series	NOMINAL WORKING PRESSURE	TUBE O.D.	S1	S2	l2	L2	l3	i	BSP THD.		METRIC THD.		WT. Kg/100 Pieces
									G	PART NUMBER	M	PART NUMBER	
									L M E D I U M	160Kg/cm ²	22	32	
100Kg/cm ²	28	41	41	30.5	47	48	18	1"		LTRS 28 RP	M33x2	LTRS 28 MP	66.0
	35	50	50	34.5	56	54	20	1 1/4"		LTRS 35 RP	M42x2	LTRS 35 MP	102.0
	42	55	60	40	63	61	22	1 1/2"		LPRS 42 RP	M48x2	LTRS 42 MP	170.5
S H E A V Y	400Kg/cm ²	20	32	36	26.5	48	42	16	3/4"	STRS 20 RP	M27x2	STRS 20 MP	54.6
		25	41	46	30	54	48	18	1"	STRS 25 RP	M33x2	STRS 25 MP	105
	250Kg/cm ²	30	50	50	35.5	62	54	20	1 1/4"	STRS 30 RP	M42x2	STRS 30 MP	146
		38	55	60	41	72	61	22	1 1/2"	STRS 38 RP	M48x2	STRS 38 MP	209

PART NUMBER CODE



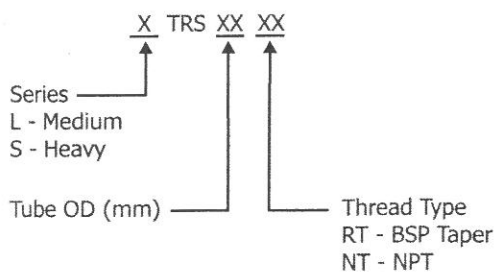


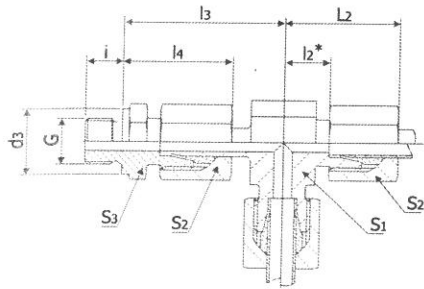
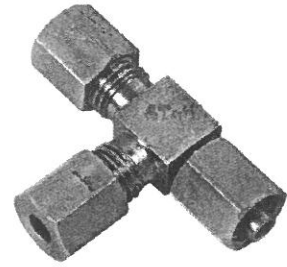
* refers to tube end

TEE RUN STUD BSPT / NPT - TAPER

SIZES	NOMINAL WORKING PRESSURE	TUBE O.D.	S1	S2	L2	l2	BSPT THD.			PART NUMBER	NPT THD.			PART NUMBER	WT. Kg/100 Pieces	
							R	i	l3		N	i	l3		R	N
L M E D I U M	250Kg/cm ²	6	12	14	27	12	1/8"	10	20	LTRS 06 RT	1/8"	9.97	20	LTRS 06 NT	7.2	7.2
		8	14	17	29	14	1/4"	14	26	LTRS 08 RT	1/4"	15.1	26	LTRS 08 NT	11.0	11.0
		10	14	19	30	15	1/4"	14	27	LTRS 10 RT	1/4"	15.1	27	LTRS 10 NT	14.0	14.0
		12	17	22	32	17	3/8"	14	28	LTRS 12 RT	3/8"	15.26	28	LTRS 12 NT	19.2	19.2
		15	22	27	36	21	1/2"	16	34	LTRS 15 RT	1/2"	19.85	34	LTRS 15 NT	24.4	24.4
	160Kg/cm ²	18	27	32	40	23.5	1/2"	16	36	LTRS 18 RT	1/2"	19.85	36	LTRS 18 NT	35.4	35.4
S H E A V Y	630Kg/cm ²	6	14	17	31	16	1/4"	14	26	STRS 06 RT	1/4"	15.1	26	STRS 06 NT	13.1	13.1
		8	17	19	32	17	1/4"	14	27	STRS 08 RT	1/4"	15.1	27	STRS 08 NT	16.8	16.8
		10	19	22	34	17.5	3/8"	14	28	STRS 10 RT	3/8"	15.26	28	STRS 10 NT	22.8	22.8
		12	22	24	38	21.5	3/8"	14	28	STRS 12 RT	3/8"	15.26	28	STRS 12 NT	29.4	29.4
		14	22	27	40	22	1/2"	16	32	STRS 14 RT	1/2"	19.85	34	STRS 14 NT	29.3	29.3
	400Kg/cm ²	16	24	30	43	24.5	1/2"	16	32	STRS 16 RT	1/2"	19.0	36	STRS 16 NT	34.1	34.1

PART NUMBER CODE



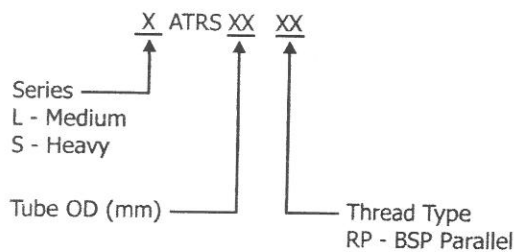


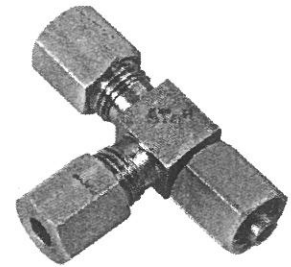
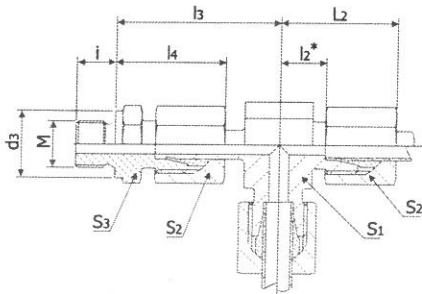
* refers to tube end

ADJUSTABLE TEE RUN STUD **BSP - PARALLEL**

	NOMINAL WORKING PRESSURE	TUBE O.D.	S1	S2	l2	L2	S3	l3	l4	i	d3	BSP THD G	PART NUMBER	WT. Kg/100 Pieces
L M E D I U M	250Kg/cm ²	6	12	14	12	27	14	34.5	23	8	14	1/8"	LATRS 06 RP	8.2
		8	14	17	14	29	19	37	25	12	18	1/4"	LATRS 08 RP	12.4
		10	17	19	15	30	19	39.5	26	12	18	1/4"	LATRS 10 RP	15.3
		12	19	22	17	32	22	41.5	27	12	22	3/8"	LATRS 12 RP	19.7
		15	22	27	21	36	27	46	29	14	26	1/2"	LATRS 15 RP	34.7
	160Kg/cm ²	18	27	32	23.5	40	27	49.5	31	14	26	1/2"	LATRS 18 RP	46.6
		22	30	36	27.5	44	32	54.5	33	16	32	3/4"	LATRS 22 RP	62.8
	100Kg/cm ²	28	36	41	30.5	47	41	59	34	18	39	1"	LATRS 28 RP	87.2
		35	46	50	34.5	56	50	68.5	39	20	49	1 1/4"	LATRS 35 RP	139.3
		42	55	60	40	63	55	75	42	22	55	1 1/2"	LATRS 42 RP	189.4
S H E A V Y	630Kg/cm ²	6	14	17	16	31	19	40	28	12	18	1/4"	SATRS 06 RP	14.2
		8	17	19	17	32	19	42	30	12	18	1/4"	SATRS 08 RP	17.2
		10	19	22	17.5	34	22	44.5	31	12	22	3/8"	SATRS 10 RP	25.7
		12	22	24	21.5	38	22	47.5	33	12	22	3/8"	SATRS 12 RP	31.3
		14	22	27	22	40	27	53.5	37	14	26	1/2"	SATRS 14 RP	43.8
	400Kg/cm ²	16	24	30	24.5	43	27	54.5	37	14	26	1/2"	SATRS 16 RP	53.5
		20	30	36	26.5	48	32	64.5	42	16	32	3/4"	SATRS 20 RP	82.2
		25	36	46	30	54	41	72.5	47	18	39	1"	SATRS 25 RP	156.1
	250Kg/cm ²	30	44.5	50	35.5	62	50	78.5	50	20	49	1 1/4"	SATRS 30 RP	209.8
		38	55	60	41	72	55	89	57	22	55	1 1/2"	SATRS 38 RP	312.8

PART NUMBER CODE



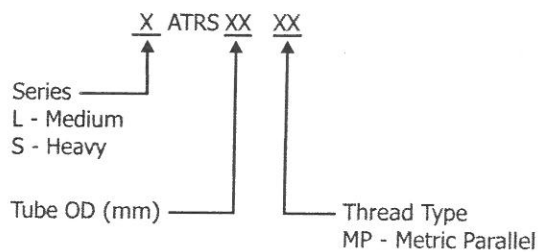


* refers to tube end

ADJUSTABLE TEE RUN STUD METRIC - PARALLEL

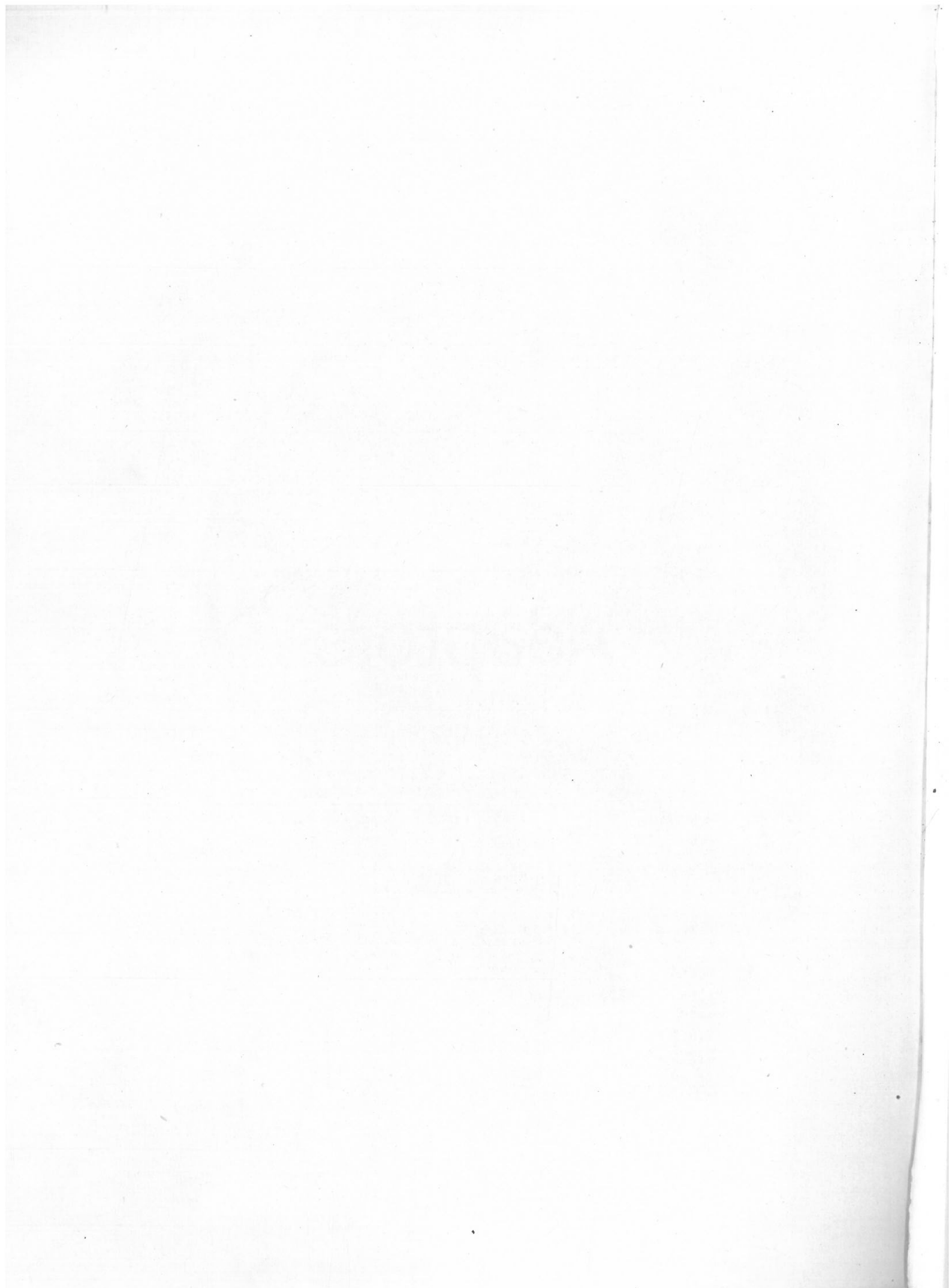
SERIES	NOMINAL WORKING PRESSURE	TUBE O.D.	S ₁	S ₂	l ₂	L ₂	S ₃	l ₃	l ₄	i	d ₃	METRIC THD M	PART NUMBER	WT. Kg/100 Pieces
L M E D I U M	250Kg/cm ²	6	12	14	12	27	14	34.5	23	8	14	M10x1	LATRS 06 MP	8.2
		8	14	17	14	29	17	37	25	12	17	M12x1.5	LATRS 08 MP	12.4
		10	17	19	15	30	19	39.5	26	12	19	M14x1.5	LATRS 10 MP	15.3
		12	19	22	17	32	22	41.5	27	12	21	M16x1.5	LATRS 12 MP	19.7
		15	22	27	21	36	24	46	29	14	23	M18x1.5	LATRS 15 MP	34.7
	160Kg/cm ²	18	27	32	23.5	40	27	49.5	31	14	27	M22x1.5	LATRS 18 MP	46.6
		22	30	36	27.5	44	32	54.5	33	16	31	M26x1.5	LATRS 22 MP	62.8
	100Kg/cm ²	28	36	41	30.5	47	41	59	34	18	39	M33x2	LATRS 28 MP	87.2
		35	46	50	34.5	56	50	68.5	39	20	49	M42x2	LATRS 35 MP	139.3
		42	55	60	40	63	55	75	42	22	55	M48x2	LATRS 42 MP	189.4
S H E A V Y	630Kg/cm ²	6	14	17	16	31	17	40	28	12	17	M12x1.5	SATRS 06 MP	14.2
		8	17	19	17	32	19	42	30	12	19	M14x1.5	SATRS 08 MP	17.2
		10	19	22	17.5	34	22	44.5	31	12	21	M16x1.5	SATRS 10 MP	25.7
		12	22	24	21.5	38	24	47.5	33	12	23	M18x1.5	SATRS 12 MP	31.3
		14	22	27	22	40	27	53.5	37	14	25	M20x1.5	SATRS 14 MP	43.8
	400Kg/cm ²	16	24	30	24.5	43	27	54.5	37	14	27	M22x1.5	SATRS 16 MP	53.5
		20	30	36	26.5	48	32	64.5	42	16	32	M27x2	SATRS 20 MP	82.2
		25	36	46	30	54	41	72.5	47	18	39	M33x2	SATRS 25 MP	156.1
	250Kg/cm ²	30	44.5	50	35.5	62	50	78.5	50	20	49	M42x2	SATRS 30 MP	209.8
		38	55	60	41	72	55	89	57	22	55	M48x2	SATRS 38 MP	312.8

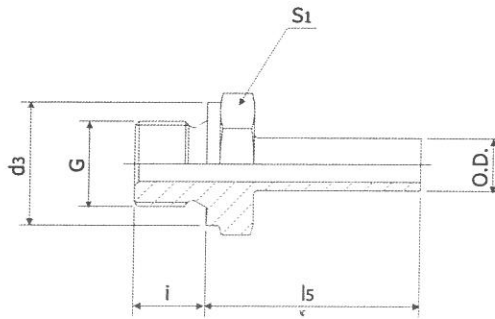
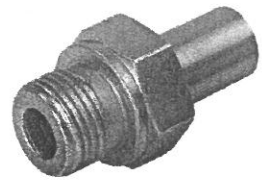
PART NUMBER CODE



Adaptors



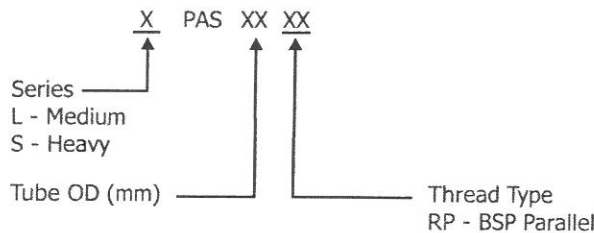


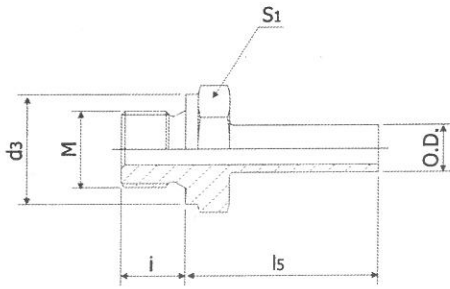


PIPE ADAPTOR STUD BSP - PARALLEL

SERIES	NOMINAL WORKING PRESSURE	TUBE O.D.	l5	i	S1	d3	BSP THREAD G	PART NUMBER	WT. Kg/100 PIECES
L M E D I U M	250Kg/cm ²	6	24.5	8	14	14	1/8"	LPAS 06 RP	2.5
		8	29.5	12	19	19	1/4"	LPAS 08 RP	4.5
		10	27.5	12	19	19	1/4"	LPAS 10 RP	4.7
		12	30	12	22	22	3/8"	LPAS 12 RP	6.3
		15	32	14	27	27	1/2"	LPAS 15 RP	11.5
	160Kg/cm ²	18	32	14	27	27	1/2"	LPAS 18 RP	12.9
		22	32.5	16	32	32	3/4"	LPAS 22 RP	17.6
	100Kg/cm ²	28	35	18	41	40	1"	LPAS 28 RP	24.7
		35	42.5	20	50	50	1 1/4"	LPAS 35 RP	40.7
		42	46.5	22	55	55	1 1/2"	LPAS 42 RP	45.6
S H E A V Y	630Kg/cm ²	6	27	12	19	19	1/4"	SPAS 06 RP	5.0
		8	29.5	12	19	19	1/4"	SPAS 08 RP	5.5
		10	32	12	22	22	3/8"	SPAS 10 RP	8.2
		12	34	12	22	22	3/8"	SPAS 12 RP	10.5
		14	36.5	14	27	27	1/2"	SPAS 14 RP	14.8
	400Kg/cm ²	16	37	14	27	27	1/2"	SPAS 16 RP	15.4
		20	43	16	32	32	3/4"	SPAS 20 RP	25.3
		25	48	18	41	40	1"	SPAS 25 RP	46.5
	250Kg/cm ²	30	51	20	50	50	1 1/4"	SPAS 30 RP	64.4
		38	60	22	55	55	1 1/2"	SPAS 38 RP	88.9

PART NUMBER CODE

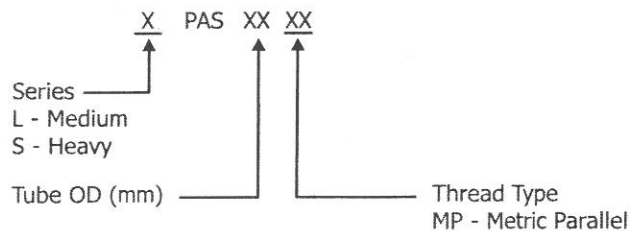


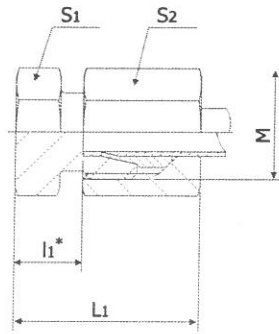


PIPE ADAPTOR STUD METRIC - PARALLEL

Series	NOMINAL WORKING PRESSURE	TUBE O.D.	l5	i	S1	d3	METRIC THREAD M	PART NUMBER	WT. Kg/100 PIECES
L M E D I U M	250Kg/cm ²	6	24.5	8	14	14	M10x1	LPAS 06 MP	2.5
		8	29.5	12	19	17	M12x1.5	LPAS 08 MP	4.0
		10	27.5	12	19	19	M14x1.5	LPAS 10 MP	4.7
		12	30	12	22	22	M16x1.5	LPAS 12 MP	6.3
		15	32	14	27	24	M18x1.5	LPAS 15 MP	9.5
	160Kg/cm ²	18	32	14	27	27	M22x1.5	LPAS 18 MP	12.9
		22	32.5	16	32	32	M26x1.5	LPAS 22 MP	17.6
	100Kg/cm ²	28	35	18	41	40	M33x2	LPAS 28 MP	24.7
		35	42.5	20	50	50	M42x2	LPAS 35 MP	40.7
		42	46.5	22	55	55	M48x2	LPAS 42 MP	45.6
S H E A V Y	630Kg/cm ²	6	27	12	19	17	M12x1.5	SPAS 06 MP	4.5
		8	29.5	12	19	19	M14x1.5	SPAS 08 MP	5.5
		10	32	12	22	22	M16x1.5	SPAS 10 MP	8.2
		12	34	12	22	24	M18x1.5	SPAS 12 MP	9.5
		14	36.5	14	27	26	M20x1.5	SPAS 14 MP	14.8
	400Kg/cm ²	16	37	14	27	27	M22x1.5	SPAS 16 MP	15.4
		20	43	16	32	32	M27x2	SPAS 20 MP	25.3
		25	48	18	41	40	M33x2	SPAS 25 MP	46.5
	250Kg/cm ²	30	51	20	50	50	M42x2	SPAS 30 MP	64.4
		38	60	22	55	55	M48x2	SPAS 38 MP	88.9

PART NUMBER CODE



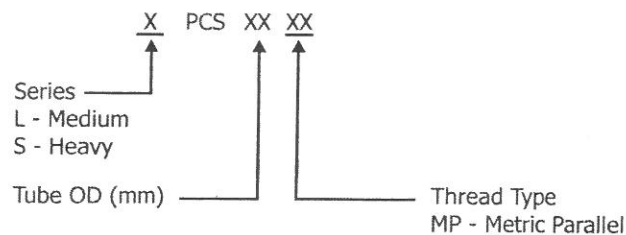


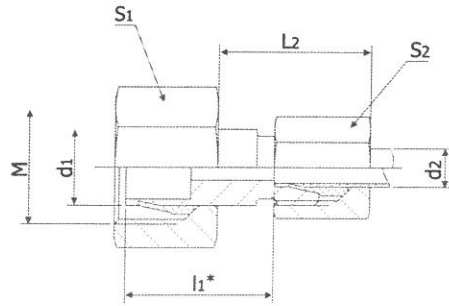
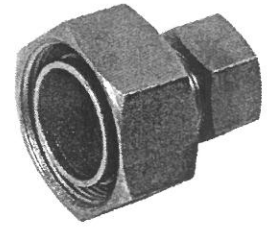
* refers to tube end

PIPE CLOSURE STUD METRIC - PARALLEL

SERIES	NOMINAL WORKING PRESSURE	TUBE O.D.	M	S1	S2	l1	L1	PART NUMBER	WT. Kg/100 PIECES
L M E D I U M	250Kg/cm ²	6	M12x1.5	14	14	8.5	23	LPCS 06 MP	1.8
		8	M14x1.5	19	17	10	25	LPCS 08 MP	25
		10	M16x1.5	19	19	11	26	LPCS 10 MP	3.5
		12	M18x1.5	22	22	12.5	27.5	LPCS 12 MP	4.3
		15	M22x1.5	27	27	14	29	LPCS 15 MP	7.0
	160Kg/cm ²	18	M26x1.5	27	32	14.5	31	LPCS 18 MP	9.75
		22	M30x2	32	36	16.5	33	LPCS 22 MP	13.1
	100Kg/cm ²	28	M36x2	41	41	17.5	34	LPCS 28 MP	15.8
		35	M45x2	50	50	17.5	39	LPCS 35 MP	24.7
		42	M52x2	55	60	19	42	LPCS 42 MP	36.4
S H E A V Y	630Kg/cm ²	6	M14x1.5	19	17	13	28	SPCS 06 MP	2.9
		8	M16x1.5	19	19	15	30	SPCS 08 MP	3.9
		10	M18x1.5	22	22	15	31.5	SPCS 10 MP	5.5
		12	M20x1.5	22	24	17	33.5	SPCS 12 MP	6.8
		14	M22x1.5	27	27	19	37	SPCS 14 MP	9.0
	400Kg/cm ²	16	M24x1.5	27	30	18.5	37	SPCS 16 MP	11.2
		20	M30x2	32	36	20.5	43	SPCS 20 MP	17.3
		25	M36x2	41	46	23	47	SPCS 25 MP	33.5
	250Kg/cm ²	30	M42x2	50	50	23.5	50	SPCS 30 MP	40.5
		38	M52x2	55	60	26	57	SPCS 38 MP	50.7

PART NUMBER CODE



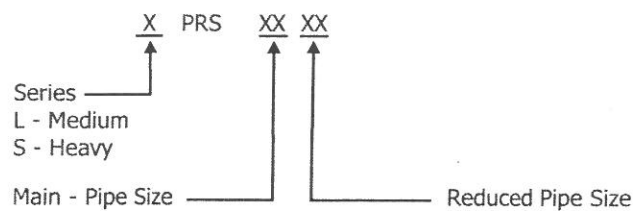


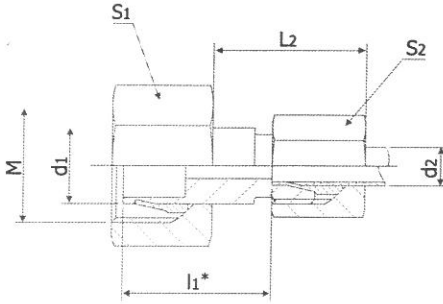
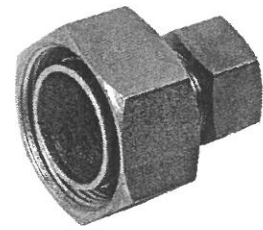
* refers to tube end

PIPE REDUCTION SLEEVE

Series	TUBE O.D.		M	L ₂	l ₁	S ₁	S ₂	PART NUMBER	WT. Kg/100 PIECES
	d1	d2							
L M E D I U M	8	6	M14x1.5	24	23.5	17	14	LPRS 08 06	4.0
	10	6	M16x1.5	24	23.5	19	14	LPRS 10 06	4.7
	10	8	M16x1.5	24	23.5	19	17	LPRS 10 08	5.2
	12	6	M18x1.5	24	23.5	22	14	LPRS 12 06	5.9
	12	8	M18x1.5	24	23.5	22	17	LPRS 12 08	6.3
	12	10	M18x1.5	25	24.5	22	19	LPRS 12 10	6.9
	15	6	M22x1.5	23	23.5	27	14	LPRS 15 06	8.2
	15	8	M22x1.5	23	23.5	27	17	LPRS 15 08	8.9
	15	10	M22x1.5	24	24.5	27	19	LPRS 15 10	9.3
	15	12	M22x1.5	24	24.5	27	22	LPRS 15 12	10.0
	18	6	M26x1.5	23	24.5	32	14	LPRS 18 06	10.8
	18	8	M26x1.5	23	24.5	32	17	LPRS 18 08	11.0
	18	10	M26x1.5	24	25.5	32	19	LPRS 18 10	11.7
	18	12	M26x1.5	24	25.5	32	22	LPRS 18 12	12.5
	18	15	M26x1.5	26	26.5	32	27	LPRS 18 15	14.9
	22	6	M30x2	24	25.5	36	14	LPRS 22 06	14.1
	22	8	M30x2	24	25.5	36	17	LPRS 22 08	14.9
	22	10	M30x2	25	26.5	36	19	LPRS 22 10	15.1
22	12	M30x2	25	26.5	36	22	LPRS 22 12	16.0	
22	15	M30x2	27	27.5	36	27	LPRS 22 15	18.0	
22	18	M30x2	27	27	36	32	LPRS 22 18	19.8	

PART NUMBER CODE



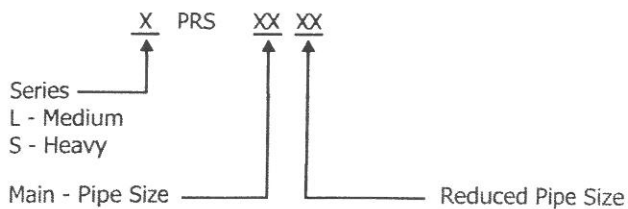


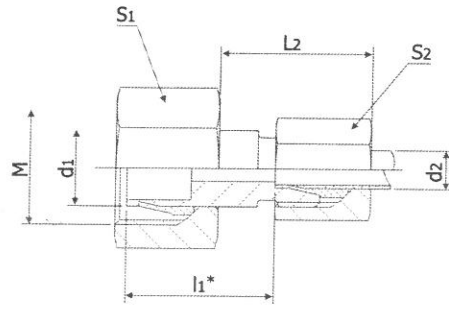
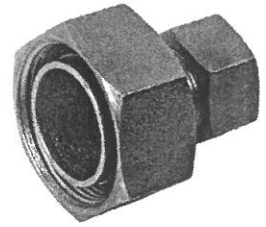
* refers to tube end

PIPE REDUCTION SLEEVE

S.P. → O.D.	TUBE O.D.		M	L2	l1	S1	S2	PART NUMBER	WT. Kg/100 PIECES	
	d1	d2								
L	28	6	M36x2	25	26.5	41	14	LPRS 28 06	18.5	
	28	8	M36x2	25	26.5	41	17	LPRS 28 08	19.3	
	28	10	M36x2	26	27.5	41	19	LPRS 28 10	20.0	
	28	12	M36x2	26	27.5	41	22	LPRS 28 12	20.5	
	28	15	M36x2	27	28.5	41	27	LPRS 28 15	22.5	
	28	18	M36x2	28	28	41	32	LPRS 28 18	24.5	
	28	22	M36x2	30	30	41	36	LPRS 28 22	26.8	
	M	35	6	M45x2	25	31.5	50	14	LPRS 35 06	30.8
		35	8	M45x2	25	31.5	50	17	LPRS 35 08	31.2
		35	10	M45x2	26	32.5	50	19	LPRS 35 10	32.0
		35	12	M45x2	26	32.5	50	22	LPRS 35 12	32.0
		35	15	M45x2	27	33.5	50	27	LPRS 35 15	34.8
35		18	M45x2	28	33	50	32	LPRS 35 18	36.2	
35		22	M45x2	30	35	50	36	LPRS 35 22	37.8	
D		35	28	M45x2	30	35	50	41	LPRS 35 28	39.5
		42	6	M52x2	25	32.5	60	14	LPRS 42 06	-
		42	8	M52x2	25	32.5	60	17	LPRS 42 08	-
	42	10	M52x2	26	33.5	60	19	LPRS 42 10	45.0	
	42	12	M52x2	26	33.5	60	22	LPRS 42 12	45.9	
	42	15	M52x2	27	34.5	60	27	LPRS 42 15	47.0	
	42	18	M52x2	28	34	60	32	LPRS 42 18	48.9	
	42	22	M52x2	30	36	60	36	LPRS 42 22	51.0	
	42	28	M52x2	30	36	60	41	LPRS 42 28	53.0	
	42	35	M52x2	34	35	60	50	LPRS 42 35	58.3	

PART NUMBER CODE



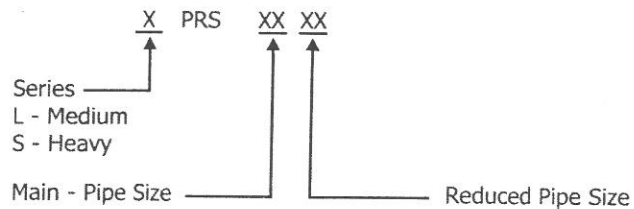


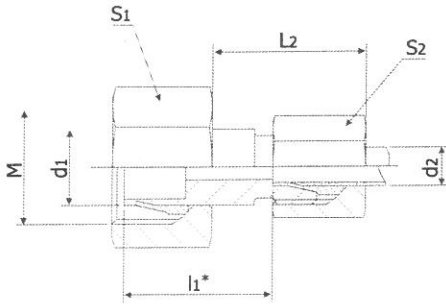
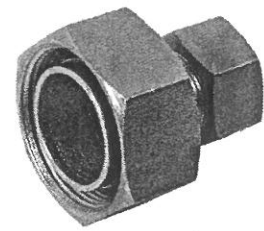
* refers to tube end

PIPE REDUCTION SLEEVE

S	TUBE O.D.		M	L2	l1	S1	S2	PART NUMBER	WT. Kg/100 PIECES
	d1	d2							
S H E A V Y	8	6	M16x1.5	25	25	19	17	SPRS 08 06	6.5
	10	6	M18x1.5	25	26	22	17	SPRS 10 06	7.0
	10	8	M18x1.5	25	26	22	19	SPRS 10 08	7.5
	12	6	M20x1.5	26	27	24	17	SPRS 12 06	8.0
	12	8	M20x1.5	26	27	24	19	SPRS 12 08	8.5
	12	10	M20x1.5	27	26.5	24	22	SPRS 12 10	9.9
	14	6	M22x1.5	26	29	27	17	SPRS 14 06	10.4
	14	8	M22x1.5	26	29	27	19	SPRS 14 08	10.9
	14	10	M22x1.5	27	28.5	27	22	SPRS 14 10	12.1
	14	12	M22x1.5	27	28.5	27	24	SPRS 14 12	12.6
	16	6	M24x1.5	26	29	30	17	SPRS 16 06	12.1
	16	8	M24x1.5	26	29	30	19	SPRS 16 08	12.6
	16	10	M24x1.5	27	28.5	30	22	SPRS 16 10	14.0
	16	12	M24x1.5	27	28.5	30	24	SPRS 16 12	14.5
	16	14	M24x1.5	30	30	30	27	SPRS 16 14	16.1
	20	6	M30x2	27	34	36	17	SPRS 20 06	17.9
	20	8	M30x2	27	34	36	19	SPRS 20 08	18.4
	20	10	M30x2	28	33.5	36	22	SPRS 20 10	19.5
	20	12	M30x2	28	33.5	36	24	SPRS 20 12	20.4
	20	14	M30x2	31	35	36	27	SPRS 20 14	22.5
20	16	M30x2	31	34.5	36	30	SPRS 20 16	23.9	

PART NUMBER CODE



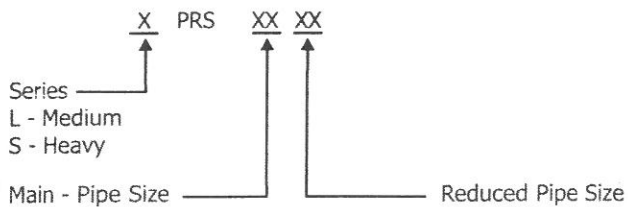


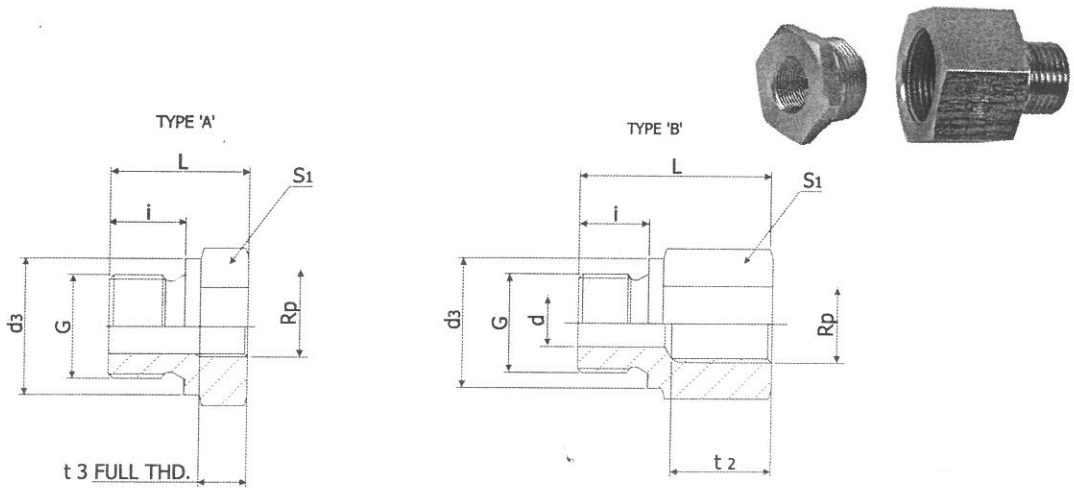
* refers to tube end

PIPE REDUCTION SLEEVE

S H E A V Y	TUBE O.D.		M	L2	l1	S1	S2	PART NUMBER	WT. Kg/100 PIECES
	d1	d2							
	25	6	M36x2	28	37	46	17	SPRS 25 06	31.3
	25	8	M36x2	28	37	46	19	SPRS 25 08	31.9
	25	10	M36x2	29	36.5	46	22	SPRS 25 10	33.0
	25	12	M36x2	29	36.5	46	24	SPRS 25 12	33.6
	25	14	M36x2	32	38	46	27	SPRS 25 14	36.0
	25	16	M36x2	32	37.5	46	30	SPRS 25 16	36.8
	25	20	M36x2	35	37.5	46	36	SPRS 25 20	40.8
	30	6	M42x2	27	39	50	17	SPRS 30 06	37.8
	30	8	M42x2	27	39	50	19	SPRS 30 08	38.8
	30	10	M42x2	28	38.5	50	22	SPRS 30 10	39.8
	30	12	M42x2	28	38.5	50	24	SPRS 30 12	40.4
	30	14	M42x2	31	40	50	27	SPRS 30 14	42.3
	30	16	M42x2	31	39.5	50	30	SPRS 30 16	43.4
	30	20	M42x2	35	39.5	50	36	SPRS 30 20	47.6
	30	25	M42x2	38	40	50	46	SPRS 30 25	50.1
	38	6	M52x2	27	43	60	17	SPRS 38 06	55.5
	38	8	M52x2	27	43	60	19	SPRS 38 08	55.7
	38	10	M52x2	28	42.5	60	22	SPRS 38 10	57.6
	38	12	M52x2	28	42.5	60	24	SPRS 38 12	58.0
	38	14	M52x2	31	44	60	27	SPRS 38 14	60.0
	38	16	M52x2	31	43.5	60	30	SPRS 38 16	61.3
	38	20	M52x2	35	43.5	60	36	SPRS 38 20	66.2
	38	25	M52x2	38	44	60	46	SPRS 38 25	76.9
	38	30	M52x2	41	44.5	60	50	SPRS 38 30	80.0

PART NUMBER CODE

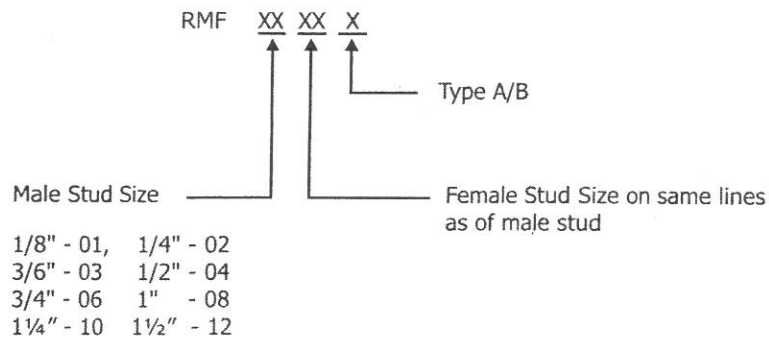


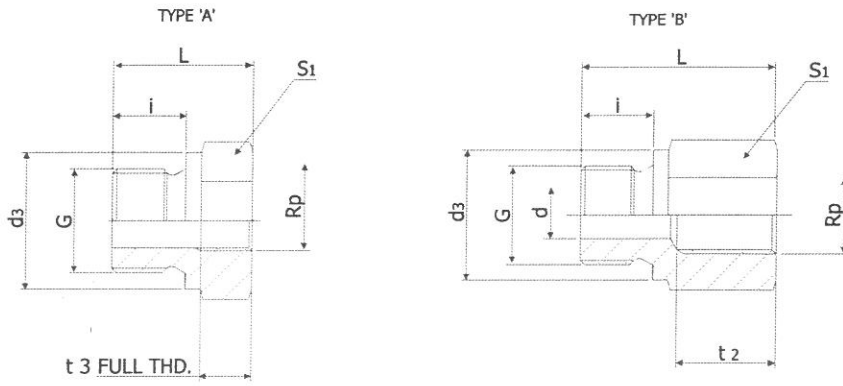
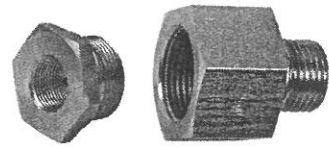


REDUCER MALE FEMALE

BSP Male G	BSP Female Rp	TYPE	L	i	S1	d	d3	t2	t3	PART NUMBER	WT. Kg/100 PIECES
1/8"	1/4"	B	31	8	19	4	14	17	-	RMF 01 02B	3.6
1/8"	3/8"	B	32	8	24	4	14	17	-	RMF 01 03B	4.5
1/4"	1/8"	B	28	12	19	5	18	12	-	RMF 02 01B	3.6
1/4"	3/8"	B	36	12	24	5	18	17	-	RMF 02 03B	6.6
1/4"	1/2"	B	40	12	30	5	18	20	-	RMF 02 04B	8.5
1/4"	3/4"	B	43	12	36	5	18	22	-	RMF 02 06B	17.3
3/8"	1/8"	A	22.5	12	22	-	22	-	8	RMF 03 01A	4.0
3/8"	1/4"	B	36	12	22	8	22	17	-	RMF 03 02B	3.0
3/8"	1/2"	B	41	12	30	8	22	20	-	RMF 03 04B	9.0
3/8"	3/4"	B	44	12	36	8	22	22	-	RMF 03 06B	17.5
1/2"	1/4"	A	24	14	27	-	26	-	12	RMF 04 02A	6.0
1/2"	3/8"	B	36	14	27	12	26	17	-	RMF 04 03B	9.5
1/2"	3/4"	B	46	14	36	12	26	22	-	RMF 04 06B	18.5
1/2"	1"	B	49	14	41	12	26	24.5	-	RMF 04 08B	22.5
1/2"	1 1/4"	B	53	14	55	12	26	26.5	-	RMF 04 10B	47.0
3/4"	1/4"	A	26	16	32	-	32	-	12	RMF 06 02A	9.5
3/4"	3/8"	A	26	16	32	-	32	-	12	RMF 06 03A	9.0
3/4"	1/2"	B	41	16	32	16	32	20	-	RMF 06 04B	15.0

PART NUMBER CODE

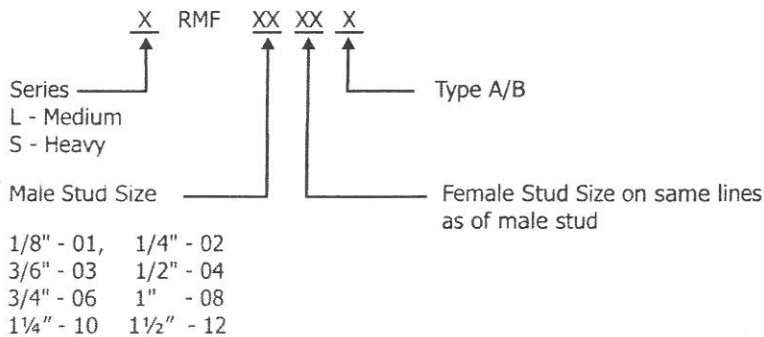


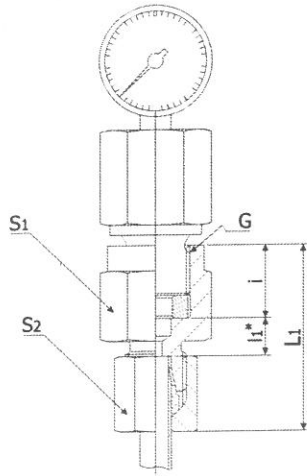


REDUCER MALE FEMALE

BSP Male G	BSP Female Rp	TYPE	L	i	S1	d	d3	t2	t3	PART NUMBER	WT. Kg/100 PIECES
3/4"	1"	B	51	16	41	16	32	24.5	-	RMF 06 08B	23.5
3/4"	1 1/4"	B	55	16	55	16	32	26.5	-	RMF 06 10B	48.3
3/4"	1 1/2"	B	57	16	60	16	32	28.5	-	RMF 06 12B	54.5
1"	1/4"	A	29	18	41	-	39	-	12	RMF 08 02A	20.0
1"	3/8"	A	29	18	41	-	39	-	12	RMF 08 03A	18.0
1"	1/2"	A	29	18	41	-	39	-	14	RMF 08 04A	16.0
1"	3/4"	B	47	18	41	20	39	22	-	RMF 08 06B	28.0
1"	1 1/4"	B	57	18	55	20	39	26.5	-	RMF 08 10B	51.0
1"	1 1/2"	B	59	18	60	20	39	28.5	-	RMF 08 12B	56.5
1 1/4"	1/2"	A	32	20	50	-	49	-	14	RMF 12 04A	31.0
1 1/4"	3/4"	A	32	20	50	-	49	-	16	RMF 12 06A	27.0
1 1/4"	1"	B	52	20	50	25	49	24.5	-	RMF 12 08B	45.5
1 1/4"	1 1/2"	B	60	20	60	25	49	28.5	-	RMF 10 12B	58.0
1 1/2"	1/2"	A	36	22	55	-	55	-	14	RMF 12 04A	47.0
1 1/2"	3/4"	A	36	22	55	-	55	-	16	RMF 12 06A	43.0
1 1/2"	1"	A	36	22	55	-	55	-	18	RMF 12 08A	34.5
1 1/2"	1 1/2"	B	58	22	55	32	55	26.5	-	RMF 12 10B	53.0

PART NUMBER CODE



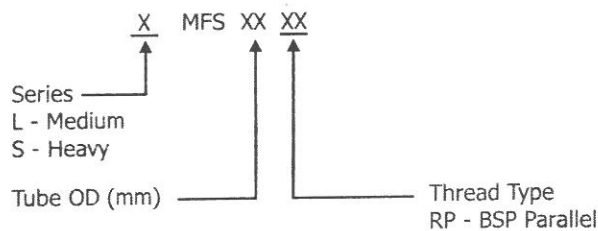


* refers to tube end

MANOMETER FEMALE STUD

Series	NOMINAL WORKING PRESSURE	TUBE O.D.	S1	S2	i	l ₁	L ₁	BSP THD. FEMALE G	PART NUMBER	WT. Kg/100 PIECES
L M E D I U M	250Kg/cm ²	6	19	14	14.5	7.5	37	1/4"	LMFS 06 RP	5.5
		8	19	17	14.5	7.5	37	1/4"	LMFS 08 RP	6.4
		10	19	19	14.5	8.5	38	1/4"	LMFS 10 RP	7.4
		12	19	22	14.5	8.5	38	1/4"	LMFS 12 RP	8.4
S H E A V Y	630Kg/cm ²	6	27	17	20	11	46	1/2"	SMFS 06 RP	12.6
		8	27	19	20	11	46	1/2"	SMFS 08 RP	12.8
		10	27	22	20	10.5	47	1/2"	SMFS 10 RP	15.0
		12	27	24	20	10.5	47	1/2"	SMFS 12 RP	16.0

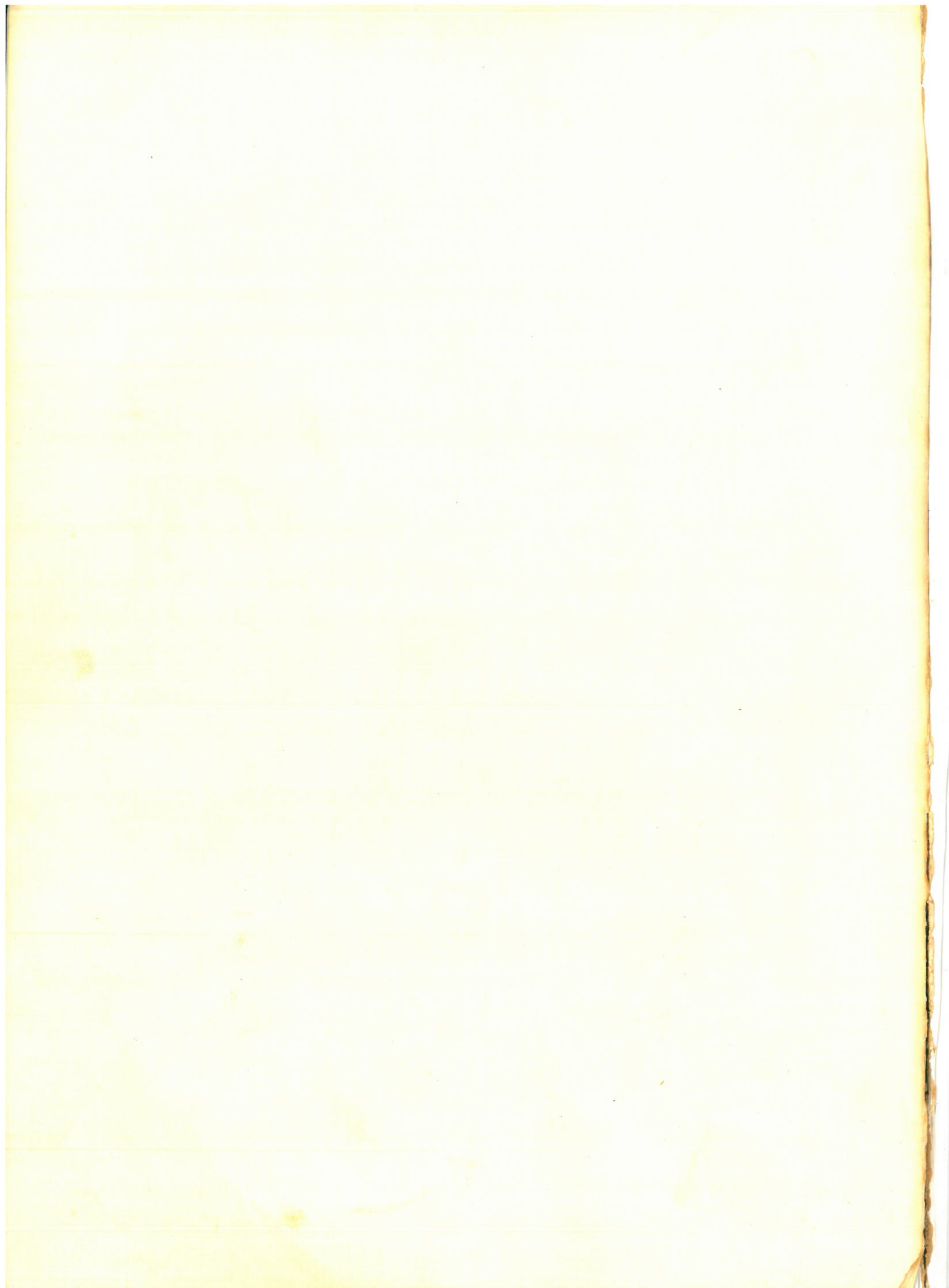
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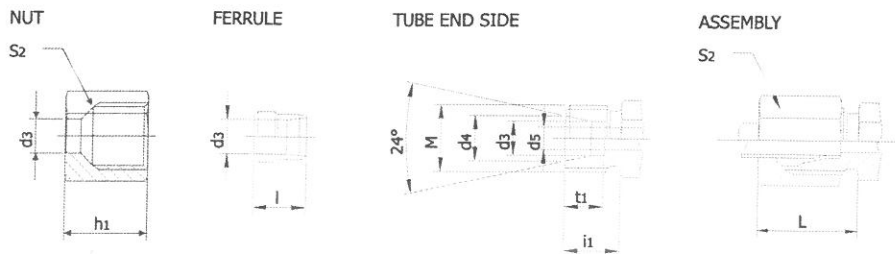


Note : Supply does not include washer.
To be ordered separately.



Nuts, Ferrules
&
Others

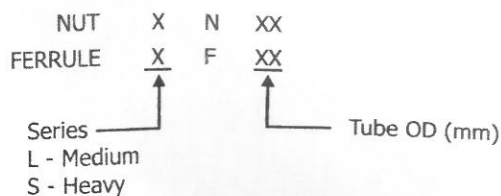


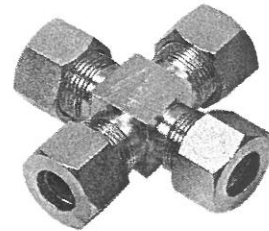
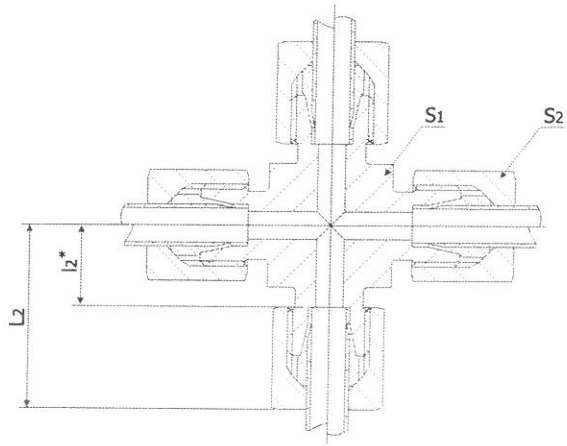


NUTS & FERRULES

SIZES	NOMINAL WORKING PRESSURE	TUBE O.D.	THREAD M	d_3	d_4	d_5	t_1	i_1	S_2	h_1	l	L	PART NUMBER NUT	PART NUMBER FERRULE	WT. Kg/100 PIECES	
															Nut	Ferrule
L M E D I U M	250Kg/cm ²	6	M12x1.5	6	8.1	4	7	10	14	15	9.5	18	LN 06	LF 06	0.9	0.15
		8	M14x1.5	8	10.1	6	7	10	17	15	9.5	18	LN 08	LF 08	1.4	0.20
		10	M16x1.5	10	12.3	8	7	11	19	16	10	19	LN 10	LF 10	2.0	0.29
		12	M18x1.5	12	14.3	10	7	11	22	16	10	19	LN 12	LF 12	2.5	0.35
		15	M22x1.5	15	17.3	12	7	12	27	17.5	10	20	LN 15	LF 15	4.0	0.42
	160Kg/cm ²	18	M26x1.5	18	20.3	15	7.5	12	32	18	10	21	LN 18	LF 18	6.0	0.5
		22	M30x2	22	24.3	19	7.5	14	36	20.5	10.5	23	LN 22	LF 22	8.0	0.62
	100Kg/cm ²	28	M36x2	28	30.3	24	7.5	14	41	21	10.5	23	LN 28	LF 28	8.5	0.78
		35	M45x2	35	38	30	10.5	16	50	24	13	27	LN 35	LF 35	13.0	1.75
42		M52x2	42	45	36	11	16	60	24	13.5	28	LN 42	LF 42	21.0	2.3	
S H E A V Y	630Kg/cm ²	6	M14x1.5	6	8.1	4	7	12	17	16	9.5	20	SN 06	SF 06	1.5	0.15
		8	M16x1.5	8	10.1	5	7	12	19	16	9.5	20	SN 08	SF 08	1.7	0.20
		10	M18x1.5	10	12.3	7	7.5	12	22	17.5	10	21	SN 10	SF 10	3.0	0.29
		12	M20x1.5	12	14.3	8	7.5	12	24	18	10	21	SN 12	SF 12	3.5	0.35
		14	M22x1.5	14	16.3	10	8	14	27	20	10	24	SN 14	SF 14	5.0	0.38
	400Kg/cm ²	16	M24x1.5	16	18.3	12	8.5	14	30	21	10.5	24	SN 16	SF 16	6.0	0.55
		20	M30x2	20	22.9	16	10.5	16	36	24	12.5	27	SN 20	SF 20	9.5	0.91
		25	M36x2	25	27.9	20	12	18	46	26.5	12.5	30	SN 25	SF 25	19.5	1.11
	250Kg/cm ²	30	M42x2	30	33	25	13.5	20	50	29.5	13	33	SN 30	SF 30	21.5	1.55
38		M52x2	38	41	32	16	22	60	32.5	13.5	37	SN 38	SF 38	31.0	2.09	

PART NUMBER CODE



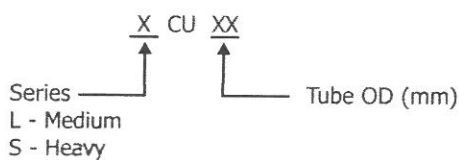


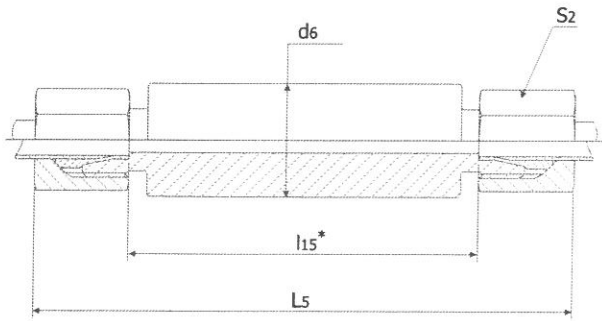
* refers to tube end

CROSS UNION

Series	NOMINAL WORKING PRESSURE	TUBE O.D.	S1	S2	l ₂	L ₂	PART NUMBER	WT. Kg/100 PIECES
L M E D I U M	250Kg/cm ²	6	12	14	12	27	LCU 06	9.2
		8	14	17	14	29	LCU 08	13.0
		10	17	19	15	30	LCU 10	18.6
		12	19	22	17	32	LCU 12	23.0
		15	22	27	21	36	LCU 15	37.2
	160Kg/cm ²	18	27	32	23.5	40	LCU 18	58.0
		22	30	36	27.5	44	LCU 22	86.8
	100Kg/cm ²	28	36	41	30.5	47	LCU 28	121.2
		35	46	50	34.5	56	LCU 35	147.3
		42	55	60	40	63	LCU 42	210.7
S H E A V Y	630Kg/cm ²	6	14	17	16	31	SCU 06	14.7
		8	17	19	17	32	SCU 08	17.7
		10	19	22	17.5	34	SCU 10	27.6
		12	22	24	21.5	38	SCU 12	33.8
		14	22	27	22	40	SCU 14	42.4
	400Kg/cm ²	16	24	30	24.5	43	SCU 16	54.1
		20	30	36	26.5	48	SCU 20	84.4
		25	36	46	30	54	SCU 25	150.8
	250Kg/cm ²	30	44	50	35.5	62	SCU 30	180.3
		38	55	60	41	72	SCU 38	246.1

PART NUMBER CODE



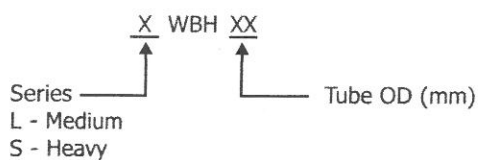


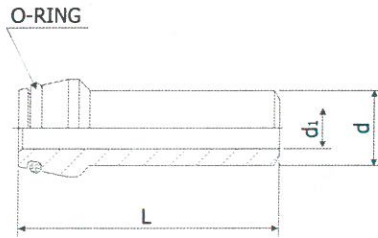
* refers to tube end

WELD BULKHEAD

Series	NOMINAL WORKING PRESSURE	TUBE O.D.	S ₂	l ₁₅	L ₅	d ₆	PART NUMBER	WT. Kg/100 PIECES	
L M E D I U M	250Kg/cm ²	6	14	56	86	18	LWBH 06	13.1	
		8	17	56	86	20	LWBH 08	16.2	
		10	19	58	88	22	LWBH 10	19.5	
		12	22	58	88	25	LWBH 12	24.1	
		15	27	70	100	28	LWBH 15	35.3	
	160Kg/cm ²	18	32	69	102	32	LWBH 18	46.9	
		22	36	73	106	36	LWBH 22	58.2	
		28	41	73	106	40	LWBH 28	66.0	
	100Kg/cm ²	35	50	71	114	50	LWBH 35	102.9	
		42	60	70	116	60	LWBH 42	148.1	
	S H E A V Y	630Kg/cm ²	6	17	60	90	20	SWBH 06	16.9
			8	19	60	90	22	SWBH 08	20.4
10			22	59	92	25	SWBH 10	27.0	
12			24	59	92	28	SWBH 12	33.1	
14			27	72	108	30	SWBH 14	44.7	
400Kg/cm ²		16	30	71	108	35	SWBH 16	57.8	
		20	36	71	114	38	SWBH 20	73.2	
		25	46	72	120	45	SWBH 25	114.6	
250Kg/cm ²		30	50	73	126	50	SWBH 30	134.4	
		38	60	72	134	60	SWBH 38	191.3	

PART NUMBER CODE



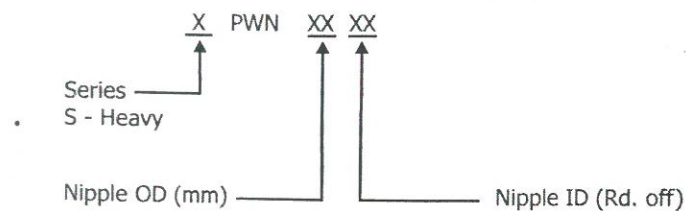


PIPE WELDING NIPPLE WITH O-RING

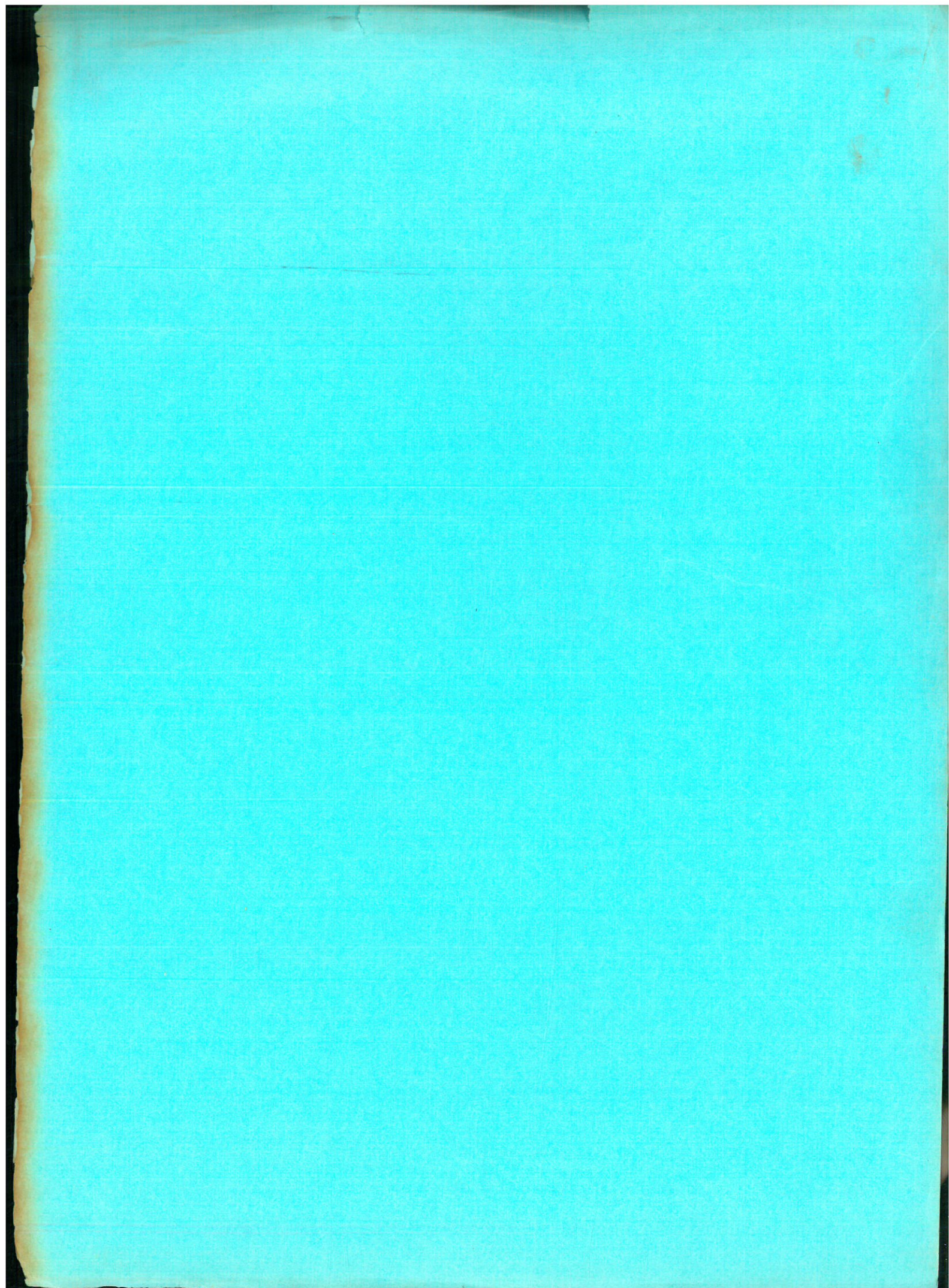
SERIES	TUBE OD X THK	O-RING	d	d1	L	PART NUMBER	W T Kg/100 pieces
'S'	10x1.5	8x1.5	10	5.5	35	SPWN 1006	1.65
	12x1.5	10x1.5	12	7	36	SPWN 1207	2.31
	12x2						
	14x2	11x2	14	8.5	40	SPWN 1409	3.34
	16x2	13x2	16	10	42	SPWN 1610	4.42
	16x2.5						
	20x2.5	16.3x2.4	20	13	48	SPWN 2013	7.47
	20x3						
	25x3	20.3x2.4	25	17	53	SPWN 2517	12.01
	25x4			15			
	30x3	25.3x2.4	30	22	64	SPWN 3022	16.32
	30x4						
	30x5						
38x4	33.3x2.4	38	28	73	SPWN 3828	32.48	
38x5							
38x6							26

Used with corresponding S-Series body & nut

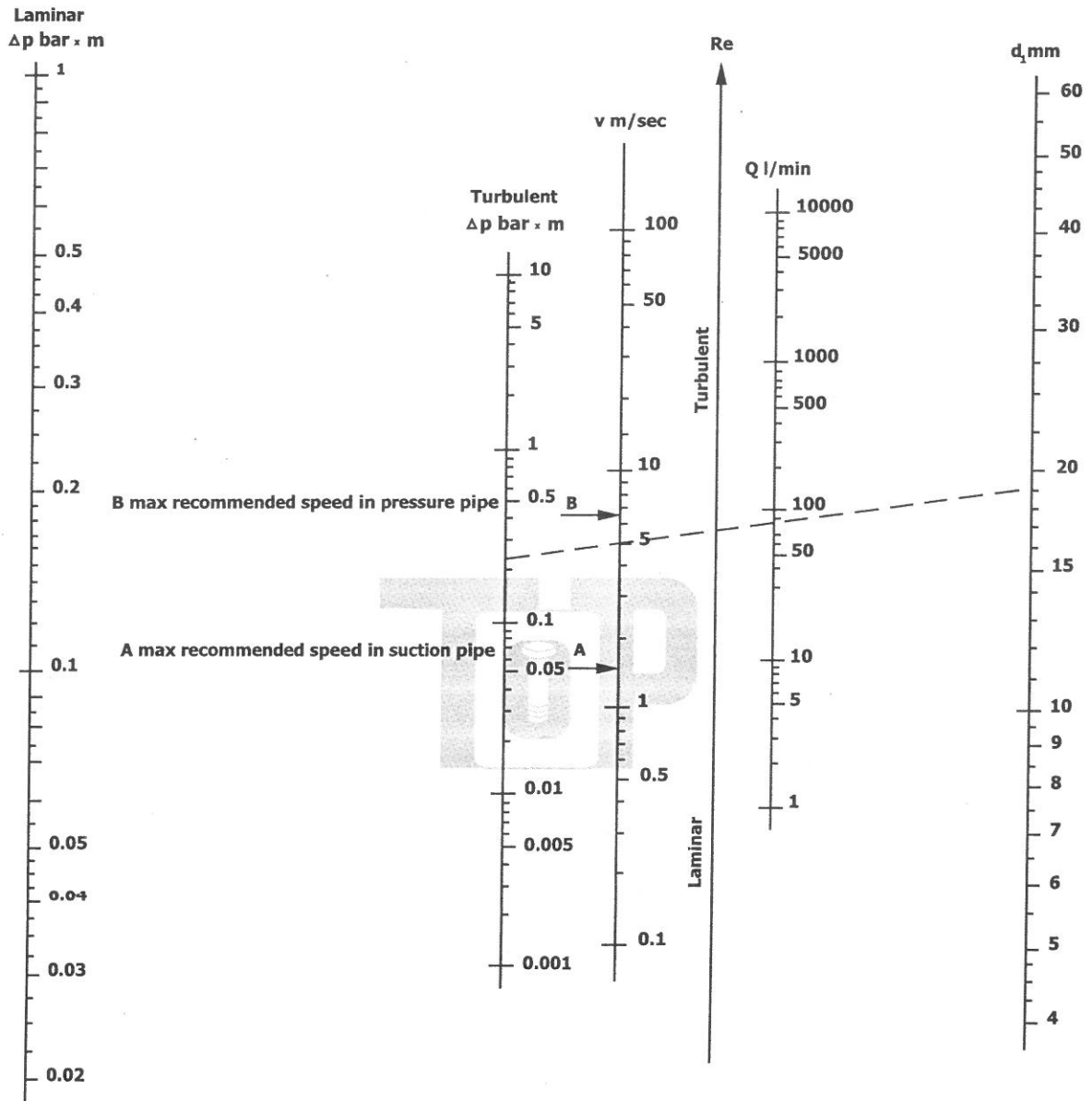
PART NUMBER CODE



General
Information



Pressure drop in pipes



Example:

$Q = 80$ l/min, pipe 22/19

Pressure drop per meter pipeline is to be calculated.

A line is drawn from $d_i = 19$ mm through $Q = 80$ l/min.

It crosses the Re -line in the turbulent area, and the result can be read on the turbulent scale.

$\Delta p = 0.23$ bar \times m.

(If the Re -line is in the laminar area, the result is to be read on the laminar scale).

The nomographic chart applies to the viscosity

25 cSt $\approx 3.5^{\circ}E$ and the density 900 kg/m³.

At another viscosity, a correction is to be made as follows:

Turbulent flow:

$$\Delta p \approx \sqrt{\frac{\nu}{\nu_{nomogr}}} \times \Delta p_{nomogr}$$

ν = oil viscosity in cSt.

At another density, a correction is to be made as follows:

$$\Delta p = \frac{\rho}{\rho_{nomogr}} \times \Delta p_{nomogr}$$

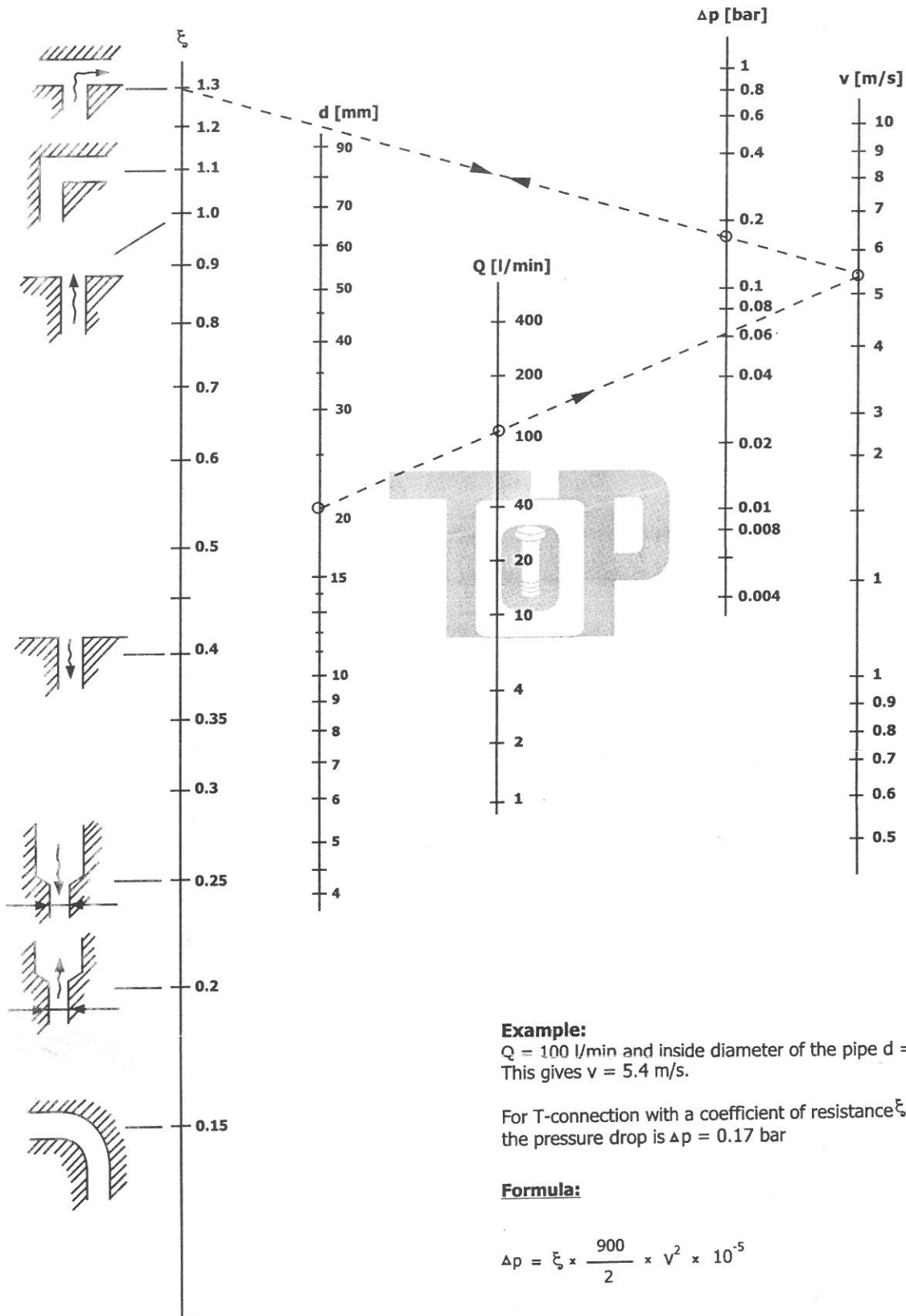
ρ = oil density in kg/m³.

Laminar flow:

$$\Delta p = \frac{\nu}{\nu_{nomogr}} \times \Delta p_{nomogr}$$

Pressure drop in couplings etc.

The nomographic chart applies to turbulent flow and an oil density of 900kg/m^3 .



Example:

$Q = 100$ l/min and inside diameter of the pipe $d = \varnothing 20$ mm.
This gives $v = 5.4$ m/s.

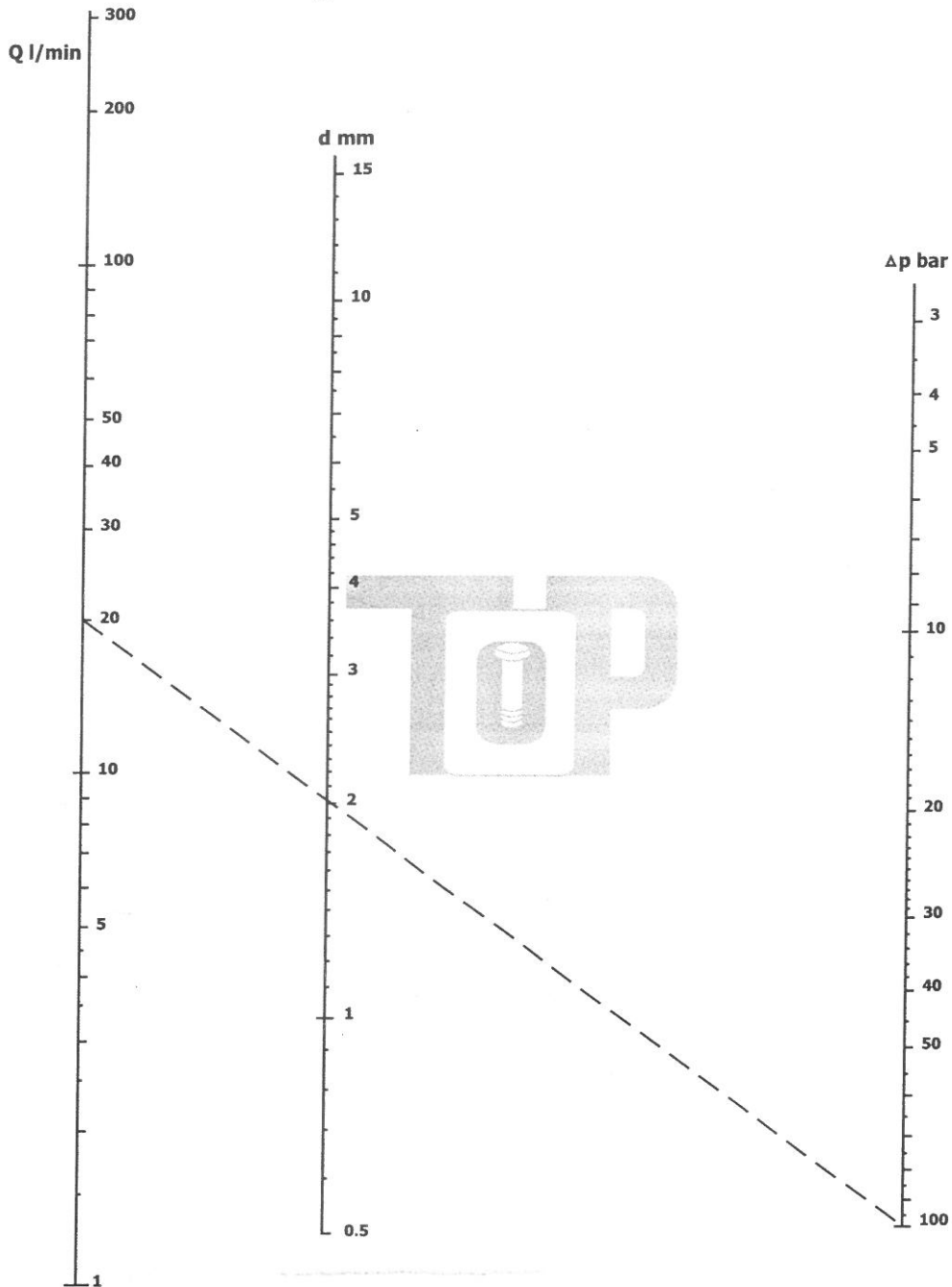
For T-connection with a coefficient of resistance $\xi = 1.3$,
the pressure drop is $\Delta p = 0.17$ bar

Formula:

$$\Delta p = \xi \times \frac{900}{2} \times v^2 \times 10^{-5}$$

Pressure drop in sharp-edged holes

The nomographic chart applies to holes with sharp edges or where the length of the hole is less than its diameter.



$$\Delta p = 4.0 \times \frac{Q^2}{d^4}$$

Where:

Δp = pressure drop in bar
 Q = flow in l/min
 d = the diam. of the hole in mm

Example:

If 20 l/min flows through a hole with a diameter of 2mm, there will be a pressure drop of 100 bar.

The nomographic chart applies to an oil density of 900 kg/m³.
 If oil of another density is used, a correction has to be made.

$$\Delta p = \frac{\rho}{\rho_{\text{nomogr}}} \times \Delta p_{\text{nomogr}}$$

ρ = oil density in kg/m³.

Guidelines for routing of pipes

Every hydraulic, pneumatic and lubrication system requires some form of routing and fitting installation for completion. Proper routing and installation are essential for the overall efficiency, leak free performance, and general appearance of any system.

Start by planning ahead. After sizing the pipes and selecting the appropriate style of fitting, consider the following in the design of your system:

1. Accessibility of joints
2. Proper routing of pipes
3. Adequate pipe supports
4. Available fabricating tools

Routing of Pipes

Routing of pipes is probably the most difficult yet most significant of these system design considerations. Proper routing involves getting a connecting pipe from one point to another through the most logical path.

Always try to leave fitting joints as accessible as possible. Hard to reach joints are hard to assemble and tighten properly. Inaccessible joints are also more difficult and time consuming to service.

The most logical path should have the following characteristics:

- **Avoid excessive strain on joint** - A strained joint will eventually leak. (See Figures 8 through 15.)

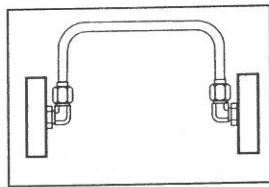


Fig. 8 - Correct Routing

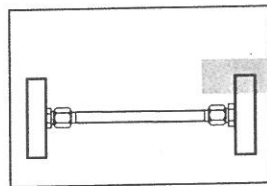


Fig. 9 - Incorrect Routing

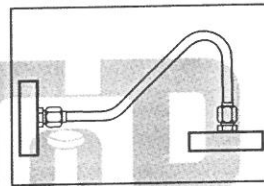


Fig. 10 - Correct Routing

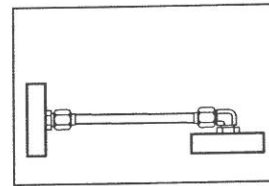


Fig. 11 - Incorrect Routing

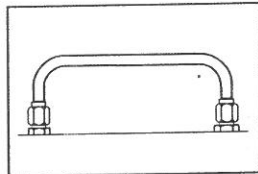


Fig. 12 - Correct Routing

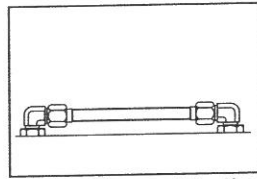


Fig. 13 - Incorrect Routing

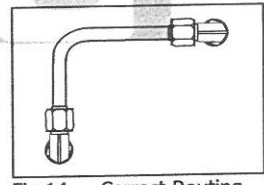


Fig. 14 - Correct Routing

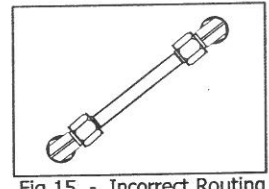


Fig. 15 - Incorrect Routing

- **Allow for expansion and contraction** - Use a "U" bend or a hose in long lines to allow for expansion and contraction. (See Figure 16.)

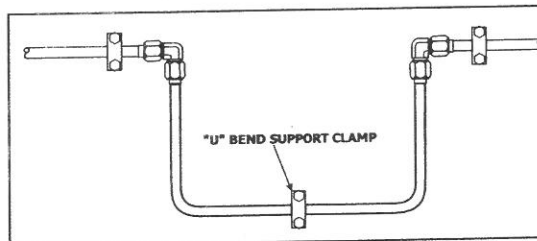


Fig. 16 - U-Bend Allowing Expansion and Contraction

- **Allow for motion under load** - Even some apparently rigid systems do move under load. (See Figure 17.)

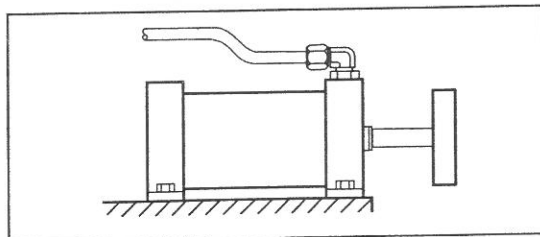


Fig. 17 - Bent Pipe Allowing for Motion Under Load

General Information

Survey of SI-units

THE SEVEN BASIC UNITS

Length	1m	(metre)
Mass	1kg	(kilogram)
Time	1s	(second)
Electric current	1A	(Ampere)
Temperature	1K	(Kelvin)
Luminance	1cd	(candela)
Particle amount	1mol	(mole)

TWO SUPPLEMENTARY UNITS

Plane angle	1rad	(radian)
Solid angle	1sr	(steradian)

FIFTEEN DERIVED UNITS WITH SPECIFIC NAMES

Frequency	1Hz (Hertz)	=1/s
Force	1 N (Newton)	=1 kg x m/s ²
Pressure	1 Pa (Pascal)	=1 N/m ²
Energy	1 J (Joule)	=1 Nm
Power	1 W (Watt)	=1 J/s
Electric charge	1 C (Coulomb)	=1 As
Electric potential	1 V (Volt)	=1 W/A
electric voltage		
Capacitance	1 F (Farad)	=1 C/V
Resistance	1Ω (ohm)	=1 V/A
Conductance	1 S (Siemens)	=1 A/V
Magnetic flux	1 Wb(Weber)	=1 Vs
Magnetic flux density	1 T (Tesla)	=1 Wb/m ²
Self inductance	1 H (Henry)	=1 Wb/A
Luminous flow	1 lm (lumen)	=1 cd x sr
Illumination	1 lx (lux)	=1 lm/m ²

ADDITIONAL UNITS

Except the fifteen derived units with specific names, some more currently used units have been permitted. Among those, the following can be mentioned.

$$\text{Plane angle } 1^{\circ} \text{ (degree)} = \frac{\pi}{180} \text{ rad} = 17.45 \times 10^{-3} \text{ rad}$$

$$1' \text{ (minute)} = \frac{1^{\circ}}{60} = 0.2909 \times 10^{-3} \text{ rad}$$

$$1'' \text{ (second)} = \frac{1'}{60} = 4.848 \times 10^{-6} \text{ rad}$$

$$1^g \text{ (gon)} = \frac{\pi}{200} \text{ rad} = 15.71 \times 10^{-3} \text{ rad}$$

Volume 1 l(litre) = 10⁻³ m³

Pressure 1 bar = 10⁵ Pa

MULTIPLE PREFIX

10 ¹²	T = tera	*10 ⁻²	C = centi
10 ⁹	G = giga	10 ⁻³	m = milli
10 ⁶	M = mega	10 ⁻⁶	μ = micro
10 ³	k = kilo	10 ⁻⁹	n = nano
*10 ²	h = hecto	10 ⁻¹²	p = pico
*10	da = deca	10 ⁻¹⁵	f = femto
*10 ⁻¹	d = deci	10 ⁻¹⁸	a = atto

* - Secondary usage

CONVERSION FACTORS

LENGTH

1 in	25.4 x 10 ⁻³ m	39.37 in
1 ft	0.3048 m	3.281 ft
1 yd	0.9144 m	1m 1.094 yd
1 mile	1.609 x 10 ³ m	0.6214 x 10 ⁻³ mile
1 nautic mile	1.852 x 10 ³ m	0.5400 x 10 ⁻³ nautic mile

AREA

1 in ²	0.6452 x 10 ⁻³ m ²	1.550 x 10 ³ in ²
1 ft ²	92.90 x 10 ⁻³ m ²	10.76 ft ²
1 yd ²	0.8361 m ²	1m ² 1.196 yd ²
1 acre	4.047 x 10 ³ m ²	0.2471 x 10 ⁻³ acre
1 square mile	2.590 x 10 ⁶ m ²	0.3861 x 10 ⁻⁶ sq. mile

VOLUME

1 in ³	16.39 x 10 ⁻⁶ m ³	61.02 x 10 ³ in ³
1 ft ³	28.32 x 10 ⁻³ m ³	35.31 ft ³
1 yd ³	0.7646 m ³	1m ³ 1.308 yd ³
1 gallon UK	4.546 x 10 ⁻³ m ³	220.0 gallon UK
1 gallon US	3.785 x 10 ⁻³ m ³	264.2 gallon US

1 l (litre) = 10⁻³ m³ 1 registerton = 2.832 m³ = 100ft³

SPEED

1 km/h	0.2778 m/s	3.6 km/h
1 ft/s	0.3048 m/s	1 m/s 3.281 ft/s
1 mile/h	0.4470 m/s	2.237 mile/h
1 knot	0.5144 m/s	1.944 knot

General Information

Survey of SI-units

CONVERSION FACTORS

FORCE

1 dyne	10×10^4 N	1 N	0.1×10^6 dyne
1 kp	9.807 N		0.1020 kp
1 lbf	4.448 N		0.2248 lbf

The unit kilopond (kp) has also been called kilogram force (kgf)

ENERGY

1 erg	0.1×10^{-6} J	1 J	10×10^6 erg
1 kWh	3.6×10^6 J		0.2778×10^6 kWh
1 eV	0.1602×10^{-18} J		6.242×10^{18} eV
1 kpm	9.807 J		0.1020 kpm
1 kcal	4.187×10^3 J		0.2388×10^3 Kcal
1 khk	2.648×10^6 J		0.3777×10^6 khk
1 ft x lbf	1.356 J		0.7376 ft x lbf
1 Btu	1.055×10^3 J		0.9478×10^3 Btu

POWER

1 kpm/s	9.807 W	1 W	0.1020 kpm/s
1 kcal/s	4.187×10^3 W		238.8×10^6 Kcal/s
1 kcal/h	1.163 W		0.860 Kcal/h
1 hk	735.5 W		1.360×10^{-3} hk
1 hp	745.7 W		1.341×10^{-3} hp
1 ft x lbf/s	1.356 W		0.7376 ft x lbf/s
1 Btu/h	0.2931 W		3.412 Btu/h

MASS

1 lb	0.4536 kg	1 kg	2.205 lb
1 slug	14.594 kg		68.52×10^{-3} slug
1 oz	28.35×10^{-3} kg		35.27 oz
1 cwt	50.80 kg		19.68×10^{-3} cwt
1 ton UK	1.016×10^3 kg		0.9842×10^{-3} ton
1 sh cwt US	45.36 kg		22.05×10^{-3} sh cwt
1 sh tn US	907.2 kg		1.102×10^{-3} sh tn

TORQUE

1 kpm	9.807 Nm	1 Nm	0.1020 kpm
1 lbf x in	0.1130 Nm		8.851 lbf x in
1 lbf x ft	1.356 Nm		0.7376 lbf x ft
1 ton x ft UK	3037 Nm		0.3293×10^{-3} ton x ft UK
1 ton x ft US	2711 Nm		0.3688×10^{-3} ton x ft US

CONVERSION FACTORS

PRESSURE

1 bar	100×10^3 Pa	10×10^{-6} bar
1 kp/cm ² = at	98.07×10^3 Pa	10.20×10^{-6} kp/cm ² = at
1 kp/mm	9.807×10^6 Pa	0.1020×10^{-6} kp/mm ²
1 psi	6.895×10^3 Pa	0.145×10^{-3} psi
1 torr	133.3 Pa	1 Pa 7.501×10^{-3} torr
1 atm	101.3×10^3 Pa	9.869×10^{-6} atm
1 lbf/in ²	6.895×10^3 Pa	0.1450×10^{-3} lbf/in ²
1 ton/in ² UK	15.44×10^6 Pa	64.6×10^{-9} ton/in ² UK
1 ton/in ² US	13.78×10^6 Pa	72.3×10^{-9} ton/in ² US

1 Pa	10^{-5} bar
1 kp/cm ² = at	0.9807 bar
1 psi	68.95×10^{-3} bar
1 torr	1.333×10^{-3} bar
1 atm	1.013 bar

10^5 Pa
1.02 kp/cm ²
1 bar
14.5 psi
750.1 torr
0.987 atm

1 torr = 1 mm Hg at 0°C and 9.81 m/s²; 1 dyne/cm² = 10^{-1} Pa;
1 mm water column = 9.81 Pa

DENSITY

1 g/cm ³	10^3 kg/m ³	1 kg/m ³	10^{-3} g/cm ³
kg/dm ³			kg/dm ³
1 lb/in ³	27.68×10^3 kg/m ³		36.13×10^{-6} lb/in ³
1 lb/ft ³	16.02 kg/m ³		62.43×10^{-3} lb/ft ³
1 lb/yd ³	0.5933 kg/m ³		1.686 lb/yd ³

m³/kg is called volymity or specific volume

HEAT CONDUCTIVITY

Thermal conductivity, co-efficient of thermal conductivity

1 kcal/mh°C	1.163 W/m K	0.8598 kcal/m h°C
1 cal/cms°C	418.7 W/m K	1 W/mK 2.388×10^{-3} cal/cm s°C
1 Btu/ft h°F	1.731 W/m K	0.5778 Btu/ft h°F
1 Btu in/ft ² h°F	0.1442 W/m K	6.933 Btu in/ft ² h°F

SURFACE COEFFICIENT OF HEAT TRANSFER AND THERMAL TRANSMITTANCE

1 kcal/m ² h°C*	1.163 W/m ² K	0.8598 kcal/m ² h K*
1 cal/cm ² s°C	41.87×10^3 W/m ² K	1 W/m ² K 23.88×10^{-6} cal/cm ² s K
1 Btu/ft ² h°F	5.678 W/m ² K	0.1761 Btu/ft ² h°F

* The numerical values have so far been called α -value and k-value.
1K = 1°C at temperature difference.

Get around obstructions without using excessive amount of 90° bends - Pressure drop due to one 90° bend is greater than that due to two 45° bends. (See figures 18 and 19)

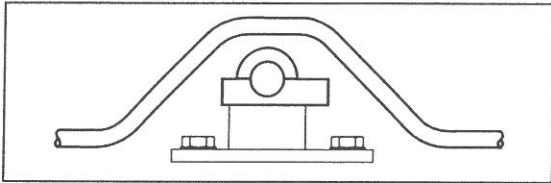


Fig.18 - Correct

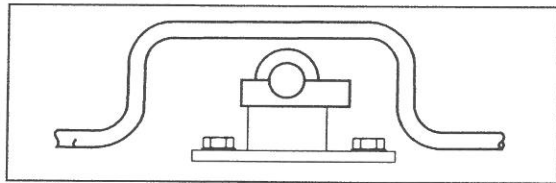


Fig.19 - Incorrect

Keep pipes away from components that require regular maintenance. (See figures 20 and 21)

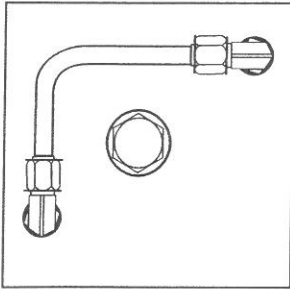


Fig.20 - Correct

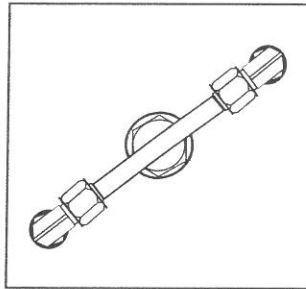


Fig.21 - Incorrect

Have a neat appearance and allow for easy trouble - shooting, maintenance and repair. (See Figures 22 and 23.)

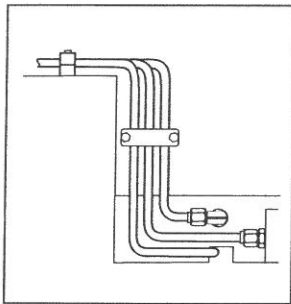


Fig.22 - Correct

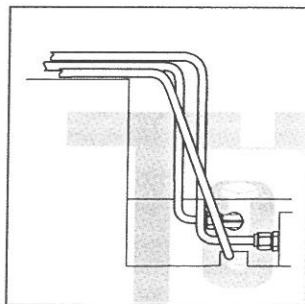


Fig.23 - Incorrect

Pipe Clamps

Pipe supports are mainly for dampening vibration. Fatigue failure due to mechanical vibration accounts for the majority of pipe failures. Use a clamping system and space the clamps according to Table 3 / fig. 24. Proper clamping of the pipe also reduces system noise.

Tube O.D.	A (mm.)	B (m.)	C (mm.)
6 8 10	50	1	100
12 16 18 / 20 22 25	100	1.5	200
32 38 50	150	2	300

Table 3 - Recommended Tube Clamp Spacing

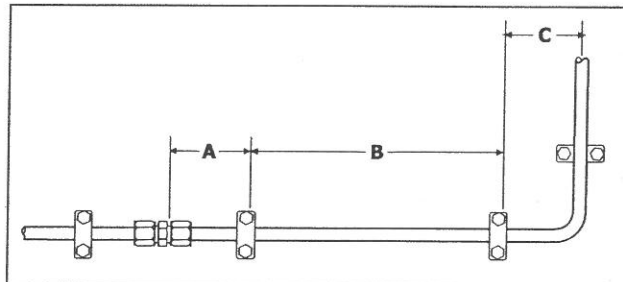


Fig.24 - Recommended Clamping for Dampening Vibration

Thread Designations and Standards

1. Straight Pipe :

- NPSC - American Standard Straight Pipe Threads in pipe couplings ANSI B1.20.1 / FED-STD-H28/7

2. Taper Pipe :

- NPT - American Standard Taper Pipe Threads for general use ANSI B1.20.1 / FED-STD-H28/7
- NPTF - Dryseal American Standard Taper Pipe Threads SAE J 476 / ANSI B1.20.3 / FED-STD-H28/8
- PTF - Dryseal SAE Short Taper Pipe Threads
(mainly used in low pressure pneumatic and fuel applications) SAE J 476 / ANSI B 1.20.3 / FED-STD-H28/8

3. Unified Threads :

- UN - Unified Constant Pitch Threads
(Standard Series 4, 6, 8, 12, 16, 20, 28, 32) ANSI B1.1/ FED- STD-H28/2
- UNC - Unified Coarse Threads ANSI B1.1 / FED-STD-H28/2

4. Metric Threads :

- M - Metric Screw Threads - M profile ISO 261 / ANSI B1.13 M / FED-STD-H28/21
- M-keg - Metric Taper Threads - (mainly used in Germany) DIN 158

5. British Standard Pipe Threads :

- R(BSPT) - British Standard Taper Pipe Threads, External BS21 / ISO 7/1
- Rc (BSPT) - British Standard Taper Pipe Threads, Internal BS21 / ISO 7/1
- Rp or G (BSPP) - British Standard Parallel Pipe Threads, Internal/External BS2779 / ISO228/1

6. Japanese Standard Pipe Threads :

- PF - JIS Parallel Pipe Threads JISB202 / ISO228/1
- PT - JIS Taper Pipe Threads JISB203 / ISO7/1
- PS - JIS Parallel Internal Pipe threads (to mate with PT Threads) JIS B203

PF and PT threads are functionally interchangeable with BSPP and BSPT threads, respectively. These being old designations, the same are being replaced with G (for PF) and R & Rc (for PT).



Credits

Technical Consultant

Mr. R. Shivkumar (M.Tech)

Design & layout

Team Design tells, Pune
designtells@vsnl.net

★ Applied for ISO9001:2000 Certification

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TOP HYDROFIT PVT. LTD.

J-156, MIDC, Bhosari Industrial Area, Pune-411 026, India.

Tel. : 00-91-20-56332482 Fax: 27125939

E-Mail: topgroup@vsnl.com