



"MP" Hydraulics Steel Pipe

"MP" 油壓鋼管

• CARBON STEEL TUBES ALLOWED ON ALL SERIES

- For carbon steel tubes we advise using calibrated seamless cold drawn tubes, normalised with inert gas, in E235 material according to EN 10305-4 (ST 37.4 according to DIN 1630 I DIN 2391).
- Maximum allowed hardness on the outside diameter of the tube is 75HRB.
- The pressures stated in the table below are generally intended at a constant rate and with temperatures ranging between -40°C and + 120°C.

ØTube mm	Tolerance EN 10305-4 mm	Thickness mm	Static DIN 2413-I pressure bar	Dynamic DIN 2413-III pressure bar	Weight Kg/m	ØTube mm	Tolerance EN 10305-4 mm	Thickness mm	Static DIN 2413-I pressure bar	Dynamic DIN 2413-III pressure bar	Weight Kg/m
4	±0,1	0,5	313	274	0,047	20	±0,08	2 ⁽²⁻³⁾	282	249	0,888
4		1	522	502	0,075	20		2,5	353	305	1,079
6		1	389	374	0,123	20		3	373	358	1,258
6	±0,1	1,5	549	528	0,166	20		3,5	426	410	1,424
6		2	692	665	0,197	20		4	478	460	1,578
8	±0,1	1	333	289	0,222	22	±0,08	1,5 ⁽²⁾	192	174	0,758
8		1,5	431	441	0,240	22		2 ⁽¹⁾	256	228	0,986
8		2	549	528	0,296	22		2,5	320	280	1,202
8		2,5	658	632	0,339	22		3	385	329	1,406
10		1	282	249	0,222	22		4 ⁽²⁾	441	424	1,766
10	±0,1	1,5	373	358	0,314	22	±0,08	5 ⁽³⁾	532	512	2,367
10		2	478	460	0,395	25		2 ⁽¹⁾	226	202	1,134
10		2,5	576	553	0,462	25		2,5	282	249	1,387
10		3	666	641	0,518	25		3	338	294	1,628
12	±0,08	1 ⁽¹⁾	235	210	0,271	25		4	394	379	2,072
12		1,5	353	305	0,388	25	±0,08	4,5	437	420	2,275
12		2	409	393	0,493	25		5 ⁽³⁾	478	460	2,466
12		2,5	495	476	0,586	28		2 ⁽¹⁾	201	182	1,282
12		3	576	553	0,666	28	±0,08	2,5	252	224	1,572
14	±0,08	1,5	302	265	0,462	28		3	302	265	1,850
14		2	403	343	0,592	28		4 ⁽³⁾	403	343	2,368
14		2,5	434	417	0,709	28		5 ⁽³⁾	434	417	2,836
14		3	507	487	0,814	30	±0,08	2 ⁽²⁻³⁾	168	171	1,381
14		3,5	576	553	0,906	30		2,5	235	210	1,695
15	±0,08	1,5	282	249	0,499	30		3	282	249	1,998
15		2	376	323	0,641	30		4	376	323	2,565
15		2,5 ⁽²⁾	409	393	0,771	30	±0,15	5 ⁽²⁾	409	393	3,083
15		3	478	460	0,888	32		3 ⁽²⁾	265	235	2,146
16	±0,08	1 ⁽²⁾	176	161	0,370	32		4 ⁽²⁾	353	305	2,762
16		1,5 ⁽²⁻³⁾	264	234	0,536	32		5 ⁽²⁾	387	372	3,329
16		2	353	305	0,691	35	±0,15	2 ⁽¹⁾	161	147	2,189
16		2,5	386	372	0,832	35		2,5	201	182	2,004
16		3	452	435	0,962	35		3	242	216	2,367
18	±0,08	1 ⁽²⁾	157	143	0,419	35		4	322	281	3,058
18		1,5 ⁽¹⁾	235	210	0,610	38	±0,15	3 ⁽²⁻³⁾	223	200	2,589
18		2	313	274	0,789	38		4	297	261	3,354
18		2,5	392	335	0,956	38		5	371	319	4,069
18		3	409	393	1,111	42	±0,2 ⁽⁴⁾	3	201	182	2,885
18		4 ⁽²⁾	522	502	1,381	42		4	269	238	3,749

(1) Tubes that require a support sleeve if used for DIN 2353 applications only

(2) Tubes to be used for 37° fittings compliant with ISO 8434-2/SAE J514

(3) Tubes to be used for ORFS fittings compliant with ISO 8434-3/SAE J1453

(4) Due to a technical choice, CAST S.p.A. builds the 042 tube housing with a tolerance of 811.

CALCULATION PRESSURES

The calculation of the pressure with static load is made to DIN 2413-1 with yield point K= 235N/mm².

For tubes with an external/internal diameter ratio >1.35, calculation is made to DIN 2413-III but with yield point K= 235N/mm².

The calculation of the pressure with dynamic stress is made to DIN 2413-III with permanent fatigue strength K= 226N/mm².

Safety factor S= 1.5

Allowance factor c= 0.8 for 4mm Ø tube, c= 0.85 for 6-8mm Ø tube, c= 0.9 for >8mm Ø tube

Corrosion: no additional allowance is considered for pressure calculations.



"MP" Hydraulics Steel Pipe

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• STAINLESS STEEL TUBES ALLOWED ON ALL SERIES

- For stainless steel tubes we advise using calibrated and polished, seamless, cold drawn tubes in material 1.4571 as per UNI EN10216-5 or ASTM
- Maximum allowed duration on the outside diameter of the tube is 85 HRB.
- The pressures stated in the table below are generally intended at a constant rate and with temperatures ranging between -60°C and + 200°C.

ØTube mm	Tolerance EN 10305-4 mm	Thickness mm	Static DIN 2413-I pressure bar	Weight Kg/m
4	±0,1	0.5	326	0.048
4		1	544	0.076
6		1	406	0.125
6	±0,1	1.5	572	0.169
6		2	721	0.200
8		1	347	0.225
8	±0,1	1.5	449	0.244
8		2	572	0.301
8		2.5	686	0.344
10	±0,1	1	294	0.225
10		1.5	389	0.319
10		2	498	0.401
10	±0,1	2.5	601	0.469
10		3	694	0.526
12		1 (1)	245	0.275
12	±0,08	1.5	368	0.394
12		2	426	0.500
12		2.5	516	0.595
12		3	601	0.676
12		3.5	679	0.745
14	±0,08	1.5	315	0.469
14		2	420	0.601
14		2.5	452	0.720
14		3	529	0.826
14	±0,08	3.5	601	0.920
15	±0,08	1.5	294	0.507
15		2	392	0.651
15		2.5 (2)	426	0.782
15	±0,08	3	498	0.902
16	±0,08	1 (3)	183	0.373
16		1.5 (2-3)	275	0.544
16		2	368	0.702
16		2.5	402	0.845
16		3	471	0.977
18	±0,08	1 (3)	163	0.423
18		1.5 (1)	245	0.619
18		2	326	0.801
18		2.5	409	0.971
18		3	426	1.128
18		4 (3)	544	1.401

ØTube mm	Tolerance EN 10305-4 mm	Thickness mm	Static DIN 2413-I pressure bar	Weight Kg/m
20	±0,08	2 (2-3)	294	0.902
20		2.5	368	1.095
20		3	389	1.277
20		3.5	444	1.446
20	±0,08	4	498	1.602
22		1.5 (3)	200	0.764
22		2 (1)	267	1.001
22		2.5	334	1.220
22		3	401	1.427
22	±0,08	4 (3)	459	1.802
22		5 (3)	555	2.402
25		2 (1)	236	1.151
25		2.5	294	1.408
25		3	352	1.653
25	±0,08	4	411	2.104
25		4.5	456	2.310
25		5 (3)	498	2.490
28		2 (1)	210	1.301
28		2.5	263	1.596
28	±0,08	3	315	1.878
28		4 (3)	420	2.403
28		5 (3)	452	2.878
30		2 (2-3)	175	1.402
30	±0,08	2.5	245	1.721
30		3	294	2.028
30		4	392	2.604
30		5 (3)	426	3.110
32	±0,15	3 (3)	275	2.177
32		4 (3)	368	2.803
32		5 (3)	403	3.378
35	±0,15	2 (1)	168	2.222
35		2.5	210	2.034
35		3	252	2.403
35		4	336	3.104
38	±0,15	3 (2-3)	232	2.628
38		4	310	3.405
38		5	387	4.131
42	±0,2 (4)	3	210	2.929
42		4	280	3.806

(1) Tubes that require a support sleeve if used for DIN 2353 applications only

(2) Tubes to be used for 37° fittings compliant with ISO 8434-2/SAE J514

(3) Tubes to be used for ORFS fittings compliant with ISO 8434-3/SAE J453

(4) Due to a technical choice, CAST S.p.A. builds the 042 tube housing with a tolerance of 811.

CALCULATION PRESSURES

The calculation of the pressure with static load is made to DIN 2413-1 with yield point K= 245N/mm².

For tubes with an external/internal diameter ratio >1.35 calculation is made to DIN 2413-111 but with yield point K= 245N/mm².

Pressures with dynamic stress according to DIN 2413-111 are not listed because in EN 10216-5 the permanent fatigue stress K is also not listed. We recommend, for calculation in accordance to DIN 2413-111, to assume a value K= 190N/mm².

Safety factor S= 1.5

Allowance factor c= 0.9

Corrosion: no additional allowance is considered for pressure calculations.

• The insufficient thickness of the tube walls, or the too low longitudinal resistance of the tubes (particularly mild soft steel) may result in problems with the cutting, with relevant loss of seal and a drastic decrease in the safety factor. This aspect must be considered when choosing the tube. It is a good rule to pick tubes that make it so that the internal flare (decreasing of the internal