

**General Recommendations for Tubes**

**Steel Type St 37.4**

Tensile Strength 340 N/mm<sup>2</sup>  
Yield point 235 N/mm<sup>2</sup>  
Condition Seamless, Cold drawn, normal annealed as per DIN 2391C, Part 2

**Stainless Steel 1.4571**

Tensile Strength 500 N/mm<sup>2</sup>  
Yield point 245 N/mm<sup>2</sup>  
Condition Seamless, Cold drawn, free of scale as per DIN 17458 tab.6

**Seamless Steel Tubes Material : St. 37.4**

**Tolerances DIN 2391, part 1**

Tube O.D (mm)	Tolerance	Wall Thickness (mm)	Tube I.D (mm)	Design Pressure (bar)		Burst Pressure (bar)	Weight kg/m
				DIN2413 I Static	DIN 2413 III Dynamic		
4	±0.08	0.50	3.0	313	273	1160	0.047
4		0.75	2.5	409	391	1820	0.063
4		1.00	2.0	522	500	2700	0.074
5	±0.08	1.00	3.0	432	416	2120	0.099
6	±0.08	0.75	4.5	333	288	1150	0.103
6		1.00	4.0	389	372	1650	0.123
6		1.50	3.0	549	526	2550	0.166
6		2.00	2.0	692	662	>3500	0.197
6		2.50	1.0	757	725	>3500	0.208
8	±0.08	1.00	6.0	333	288	1175	0.222
8		1.50	5.0	431	412	1925	0.240
8		2.00	4.0	549	526	2500	0.296
8		2.50	3.0	658	630	2650	0.339
10	±0.08	1.00	8.0	282	248	900	0.222
10		1.50	7.0	373	357	1450	0.314
10		2.00	6.0	478	458	2025	0.395
10		2.50	5.0	576	551	2675	0.462
10		3.00	4.0	666	638	>3500	0.518
12	±0.08	1.00	10.0	253	209	750	0.271
12		1.50	9.0	353	303	1150	0.388
12		2.00	8.0	409	391	1600	0.493
12		2.50	7.0	495	474	2025	0.586
12		3.00	6.0	576	551	2600	0.666
12		3.50	5.0	651	624	---	0.734
14	±0.08	1.50	11.0	302	264	975	0.462
14		2.00	10.0	357	342	1325	0.592
14		2.50	9.0	434	415	1650	0.709
14		3.00	8.0	507	485	2200	0.814
14		3.50	7.0	576	551	2625	0.906
15	±0.08	1.00	13.0	188	170	575	0.345
15		1.50	12.0	282	248	950	0.499
15		2.00	11.0	336	321	1275	0.641
15		3.00	9.0	478	458	2000	0.888
16	±0.08	1.50	13.0	264	233	850	0.536
16		2.00	12.0	353	303	1175	0.691
16		2.50	11.0	386	370	1500	0.832
16		3.00	10.0	452	433	1850	0.962
18	±0.08	1.00	16.0	157	143	450	0.419
18		1.50	15.0	235	209	700	0.610
18		2.00	14.0	313	273	975	0.789
18		2.50	13.0	348	333	1300	0.956
18		3.00	12.0	409	391	1575	1.111

**Seamless Steel Tubes (continued) Material : St. 37.4**

**Tolerances DIN 2391, part 1**

Tube O.D (mm)	Tolerance	Wall thickness (mm)	Tube I.D (mm)	Design Pressure (bar)		Burst Pressure (bar)	Weight kg/m
				DIN2413 1 Static	DIN 2413 III Dynamic		
20		1.50	17	212	190	675	0.648
20		2.00	16	282	248	900	0.888
20		2.50	15	353	303	1100	1.079
20		3.00	14	373	357	1400	1.258
20		3.50	13	426	408	1650	1.424
20	±0.08	4.00	12	478	458	2000	1.578
22		1.50	19	192	173	550	0.758
22		2.00	18	256	227	775	0.986
22		2.50	17	320	278	1025	1.202
22	±0.08	3.00	16	343	328	1175	1.406
25		2.00	21	226	201	725	1.134
25		2.50	20	282	248	850	1.387
25		3.00	19	338	292	1025	1.628
25		4.00	17	394	378	1500	2.072
25	±0.08	4.50	16	437	418	1625	2.275
28		1.50	25	151	138	425	0.98
28		2.00	24	201	181	600	1.282
28		2.50	23	252	223	750	1.572
28	±0.08	3.00	22	302	264	900	1.85
30	±0.08	2.00	26	188	170	575	1.381
30		2.50	25	235	209	725	1.695
30		3.00	24	282	248	850	1.998
30		4.00	22	336	321	1175	2.565
30		5.00	20	409	391	1600	3.083
35		2.00	31	161	147	450	1.628
35		2.50	30	201	181	600	2.004
35		3.00	29	242	215	700	2.367
35	±0.15	4.00	27	322	280	960	3.058
38		2.50	33	186	168	550	2.189
38		3.00	32	223	199	675	2.589
38		4.00	30	297	260	900	3.354
38		5.00	28	332	318	1150	4.069
38		6.00	26	390	373	---	4.735
38	±0.15	7.00	24	446	427	1700	5.325
42		2.00	38	134	123	375	1.973
42		3.00	36	201	181	575	2.885
42	±0.2	4.00	34	269	237	850	3.749
50	±0.2	6.00	38	338	292	---	6.511
65	±0.3	8.00	49	347	299	---	11.246

**Surface finish:**

Phosphated and Oiled.

Tubes with ID 1.5 to 5.0 mm, outside and inside oiled.

Tubes from 6mm ID, outside and inside, phosphated and oiled.

Zinc plated Yellow.

Coating thickness 8 to 12 microns.

**Seamless Stainless steel Tubes Material No. 1.4571/1.4541**

**Tolerances DIN 2391, part 1**

Tube OD (mm)	Tolerance	Wall thickness (mm)	Tube ID (mm)	1.4571 Design Pressure (bar) DIN 2413-1 Static	1.4571 Design Pressure (bar) DIN 2413-1 Static	1.4571 Burst Pressure (bar)	Weight kg/m
4	±0.08	1.0	2.0	600	539		0.075
6	±0.08	1.0	4.0	426	383	1850	0.125
6		1.5	3.0	600	539	2900	0.169
8	±0.08	1.0	6.0	368	297	1300	0.175
8		1.5	5.0	472	424	2050	0.244
10	±0.08	1.0	8.0	294	242	950	0.225
10		1.5	7.0	389	349	1750	0.319
10		2.0	6.0	498	447	2400	0.401
12	±0.08	1.0	10.0	245	205	850	0.275
12		1.5	9.0	368	297	1400	0.394
12		2.0	8.0	426	383	1900	0.501
14	±0.08	1.5	11.0	315	258	1200	0.469
14		2.0	10.0	420	334	1550	0.601
14		2.5	9.0	452	406	2100	0.720
15	±0.08	1.0	13.0	196	166	675	0.351
15		1.5	12.0	294	242	1100	0.507
15		2.0	11.0	392	314	1400	0.651
16	±0.08	1.5	13.0	276	228	950	0.545
16		2.0	12.0	368	297	1300	0.701
16		2.5	11.0	403	362	1850	0.845
16		3.0	10.0	472	424	2400	0.977
18	±0.08	1.5	15.0	245	205	800	0.620
18		2.0	14.0	327	267	1150	0.801
20	±0.08	2.0	16.0	294	242	1050	0.901
20		2.5	15.0	368	297	1400	1.095
20		3.0	14.0	389	349	1800	1.277
22	±0.08	1.5	19.0	200	170	650	0.770
22		2.0	18.0	267	222	900	1.002
25	±0.08	2.5	20.0	294	242	1050	1.408
25		3.0	19.0	353	286	1275	1.653
28	±0.08	1.5	25.0	158	135	550	0.995
28		2.0	24.0	210	177	700	1.302
30	±0.08	2.5	25.0	245	205	850	1.722
30		3.0	24.0	294	242	1150	2.028
30		4.0	22.0	392	314	1500	2.605
35	±0.15	2.0	31.0	168	143	550	1.653
38	±0.15	4.0	30.0	309	254	1150	3.405
42	±0.20	2.0	38.0	140	121	475	2.003
42		3.0	36.0	210	177	750	2.930

**Trouble Shooting**

<b>Problem</b>	<b>Probable Cause</b>	<b>Suggested solution</b>
Leak	Tightening of the joint is not adequate.	Tighten the nut according to the correct assembly procedure. Use suitable spanners and spanner extensions especially for larger sizes. Check visible collar after tightening.
	Tube not bottomed into fitting shoulder.	Cut tube to correct length. Observe min. straight length before tube bending. Deburr tube ends – No heavy chamfers are to be provided.
	Damaged fitting	Check for damage. Handle all parts carefully.
	Hidden cracks	Check for cracks, replace if necessary.
	Contaminations between sealing surfaces	Keep all components clean.
	Shallow bite	Inspect for the turned up ridge of the material. Failure to achieve this ridge can be traced either to the nut not being tightened enough or tube not being bottomed against the stop.
	Over set ferrule	Too much pressure or more than recommended turns from finger tight. This type of assembly should be scrapped.
	No bite	If all of the prior checks have been made and the ferrule still shows no sign of biting the tube, it may be that the Tube is too hard. This assembly should be scrapped.
Tube fractured behind the nut	Fatigue failure of tube under vibration	Verify assembly. Undertightening reduces vibration resistance. Use proper clamps at appropriate places.
Crack	Tightening of the joint is not adequate	Tighten the nut according to the correct assembly procedure. Use suitable spanners and spanner extensions especially for larger sizes Check visible collar after tightening.