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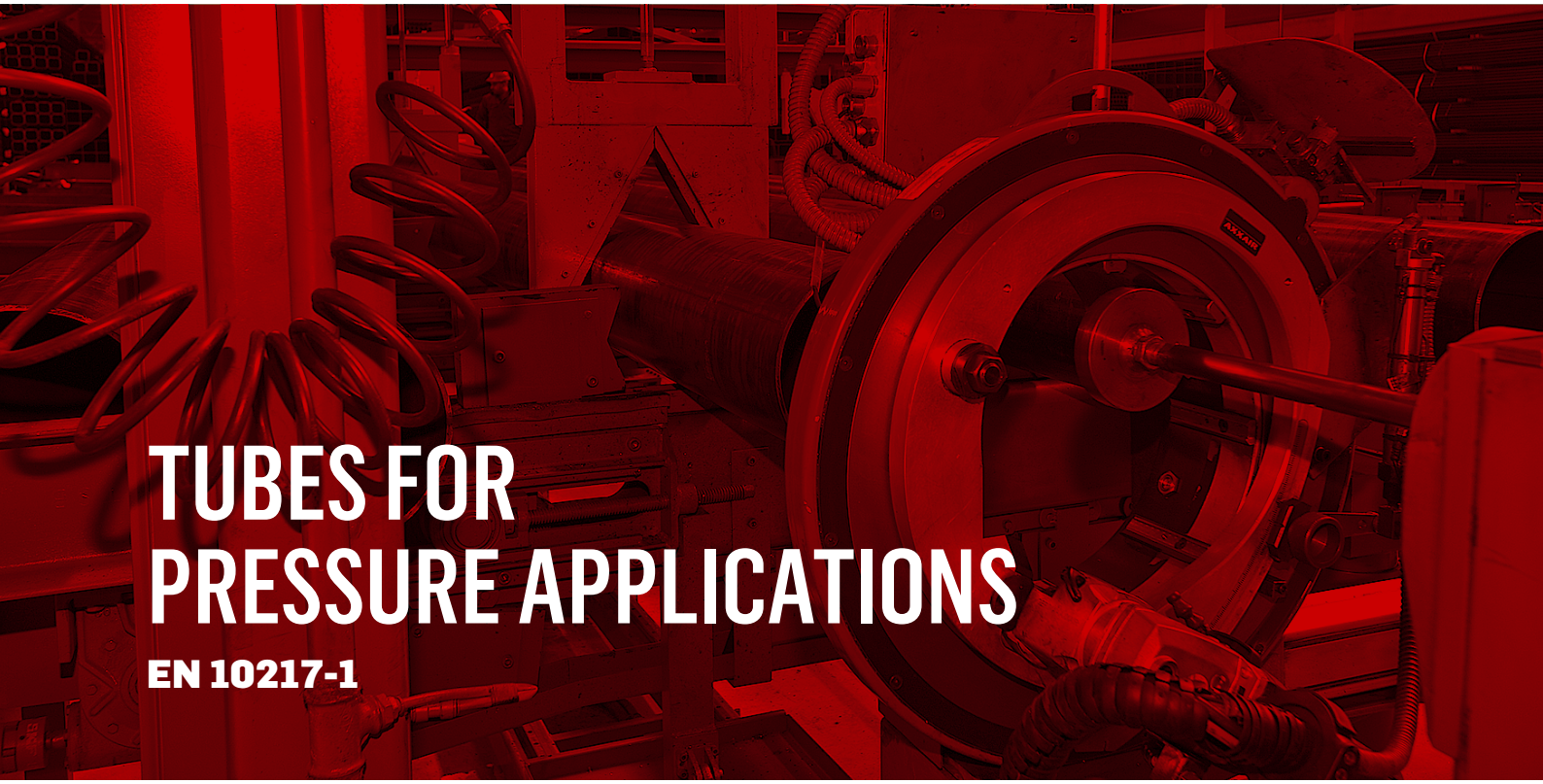


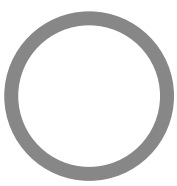
TUBES FOR PRESSURE APPLICATIONS

EN 10217-1

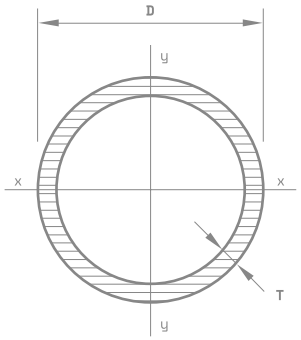
The European standard EN 10217-1 defines the requirements for welded round tubes, made of unalloyed carbon steel and suitable for use, under pressure, at room temperature.

Recognized for their robustness and reliability, FERPINTA pressure tubes are used in domestic and industrial fluid conduction networks, ventilation and heating systems, irrigation systems, industrial pressure systems, and fire protection systems.
These tubes, according to their use, may be available with smooth, threaded or grooved ends, rough rolled or hot-dip galvanized.

DIMENSIONAL RANGE



DIMENSIONAL PROPERTIES



Outside dimensions

(D)

Ø ≤ 219,1

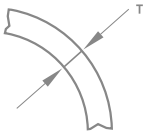
± 1% c/ mín. ± 0,5mm

Ø > 219,1

± 0,75%	± 6,0%

Wall thickness

(T)



D ≤ 406,4mm

T ≤ 5,0mm: ±10% ou ±0,3mm (the larger of the two values)

T > 5,0mm: ±8%

Ovalization

(O)

$$(O) = 100 \frac{(D_{máx.} - D_{mín.})}{D}$$

Linear mass

(M)

According to EN 10220

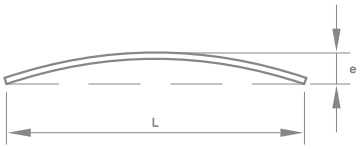
Exact length

(L)

Length L (mm)	Tolerance (mm)
L ≤ 6000	+ 10mm
6000 < L ≤ 12000	+ 15mm
L > 12000	By agreement

Straightness

(e)



e ≤ 0,15% of total length

Inner cord height

Máx. 1,5mm

TABLE OF DIMENSIONS

Round tubes

EN 10217 - 1

Ø	**Thickness** (mm)	**Weight** (Kg/m)	**Tubes per tie**	**Weight per tie** (Kg)	**Section** (cm^2)	**I - Moment of inertia** (cm^4)	**W - Elastic bending moment** (cm^3)	**i - Radius of gyration** (cm)
16	1,50	0,536	469	1508	0,683	0,182	0,227	0,515
16	2,00	0,691	469	1944	0,880	0,220	0,275	0,500
17,2	1,50	0,581	397	1384	0,740	0,230	0,267	0,558
17,2	1,80	0,684	100	410	0,871	0,262	0,304	0,548
17,2	2,00	0,750	397	1787	0,955	0,281	0,326	0,542
19	1,50	0,647	331	1285	0,825	0,318	0,335	0,621
19	2,00	0,838	331	1664	1,068	0,391	0,412	0,605
20	1,50	0,684	331	1358	0,872	0,375	0,375	0,656
20	2,00	0,888	331	1764	1,131	0,464	0,464	0,640
21,3	1,50	0,732	331	1454	0,933	0,460	0,432	0,702
21,3	2,0	0,952	331	1891	1,213	0,571	0,536	0,686
21,3	2,5	1,159	331	2302	1,477	0,664	0,623	0,671
22	1,5	0,758	331	1505	0,966	0,510	0,464	0,727
22	2,0	0,986	331	1958	1,257	0,635	0,577	0,711
23,5	1,5	0,814	271	1324	1,037	0,630	0,536	0,780
23,5	2,0	1,060	271	1724	1,351	0,787	0,670	0,763
25	1,5	0,869	271	1413	1,107	0,768	0,614	0,833
25	2,0	1,134	271	1844	1,445	0,963	0,770	0,816
25	2,3	1,288	271	2094	1,640	1,067	0,854	0,807
25	2,6	1,436	271	2335	1,830	1,163	0,930	0,797
25	2,9	1,581	271	2571	2,013	1,250	1,000	0,788
26,9	1,5	0,940	271	1528	1,197	0,969	0,720	0,900

Round tubes

EN 10217 - 1

Ø	**Thickness** (mm)	**Weight** (Kg/m)	**Tubes per tie**	**Weight per tie** (Kg)	**Section** (cm^2)	**I - Moment of inertia** (cm^4)	**W - Elastic bending moment** (cm^3)	**i - Radius of gyration** (cm)
26,9	2,0	1,228	271	1997	1,565	1,220	0,907	0,883
26,9	2,3	1,395	271	2268	1,778	1,356	1,008	0,874
26,9	2,5	1,504	271	2446	1,916	1,441	1,071	0,867
26,9	2,6	1,558	271	2533	1,985	1,482	1,102	0,864
26,9	2,9	1,716	271	2790	2,187	1,597	1,188	0,855
26,9	3,0	1,768	271	2875	2,253	1,634	1,215	0,852
30	1,5	1,054	217	1372	1,343	1,367	0,912	1,009
30	2,0	1,381	217	1798	1,759	1,733	1,155	0,992
30	2,3	1,571	217	2045	2,002	1,933	1,289	0,983
30	2,6	1,757	217	2288	2,238	2,119	1,413	0,973
30	2,9	1,938	217	2523	2,469	2,293	1,528	0,964
30,0	3,0	1,998	217	2601	2,545	2,347	1,565	0,960
31,8	1,5	1,121	217	1460	1,428	1,643	1,033	1,073
31,8	2,0	1,470	217	1914	1,872	2,088	1,313	1,056
31,8	2,3	1,673	217	2178	2,132	2,333	1,467	1,046
31,8	2,6	1,872	217	2437	2,385	2,562	1,611	1,036
31,8	2,9	2,067	217	2691	2,633	2,777	1,746	1,027
32	1,5	1,128	217	1469	1,437	1,675	1,047	1,080
32	2,0	1,480	217	1927	1,885	2,130	1,331	1,063
32	2,3	1,685	217	2194	2,146	2,380	1,488	1,053
32	2,6	1,885	217	2454	2,401	2,615	1,634	1,044
32	2,9	2,081	217	2709	2,651	2,834	1,771	1,034
33,7	1,5	1,191	127	908	1,517	1,971	1,170	1,140
33,7	2,0	1,564	127	1192	1,992	2,512	1,491	1,123
33,7	2,3	1,781	127	1357	2,269	2,811	1,668	1,113
33,7	2,5	1,924	127	1466	2,450	3,001	1,781	1,107
33,7	2,6	1,994	127	1519	2,540	3,093	1,835	1,103
33,7	3,0	2,271	127	1731	2,893	3,441	2,042	1,091
33,7	3,2	2,407	127	1834	3,066	3,605	2,139	1,084
33,7	3,6	2,672	127	2036	3,404	3,910	2,321	1,072
33,7	4	2,930	127	2233	3,732	4,190	2,487	1,060
35	1,5	1,239	169	1256	1,579	2,219	1,268	1,186
35	2,0	1,628	169	1651	2,073	2,833	1,619	1,169
35	2,3	1,855	169	1881	2,363	3,174	1,814	1,159
35	2,6	2,077	169	2106	2,646	3,495	1,997	1,149
35	2,9	2,296	169	2328	2,925	3,798	2,170	1,140
35	3,2	2,510	169	2545	3,197	4,082	2,333	1,130
35	3,6	2,788	169	2827	3,551	4,434	2,534	1,117
35	4	3,058	169	3101	3,896	4,757	2,719	1,105

Round tubes

EN 10217 - 1

Ø	**Thickness** (mm)	**Weight** (Kg/m)	**Tubes per tie**	**Weight per tie** (Kg)	**Section** (cm^2)	**I - Moment of inertia** (cm^4)	**W - Elastic bending moment** (cm^3)	**i - Radius of gyration** (cm)
38	1,5	1,350	127	1029	1,720	2,869	1,510	1,292
38	2,0	1,776	127	1353	2,262	3,676	1,935	1,275
38	2,3	2,025	127	1543	2,580	4,127	2,172	1,265
38	2,6	2,270	127	1730	2,892	4,554	2,397	1,255
38	2,9	2,510	127	1913	3,198	4,958	2,610	1,245
38	3,2	2,746	127	2092	3,498	5,341	2,811	1,236
38	3,6	3,054	127	2327	3,891	5,818	3,062	1,223
38	4	3,354	127	2556	4,273	6,259	3,294	1,210
40	1,5	1,424	127	1085	1,814	3,367	1,683	1,362
40	2,0	1,874	127	1428	2,388	4,322	2,161	1,345
40	2,3	2,138	127	1629	2,724	4,858	2,429	1,335
40	2,6	2,398	127	1827	3,055	5,367	2,684	1,325
40	2,9	2,653	127	2022	3,380	5,851	2,925	1,316
40,0	3,0	2,737	127	2086	3,487	6,007	3,003	1,312
40	3,2	2,904	127	2213	3,700	6,310	3,155	1,306
40	3,6	3,232	127	2463	4,117	6,885	3,442	1,293
40	4,0	3,551	127	2706	4,524	7,419	3,710	1,281
42	1,5	1,498	91	818	1,909	3,918	1,866	1,433
42	2,0	1,973	91	1077	2,513	5,039	2,400	1,416
42	2,3	2,252	91	1230	2,869	5,670	2,700	1,406
42	2,5	2,435	91	1330	3,102	6,075	2,893	1,399
42	2,6	2,526	91	1379	3,218	6,272	2,987	1,396
42	3,0	2,885	91	1575	3,676	7,030	3,347	1,383
42	3,2	3,062	91	1672	3,901	7,390	3,519	1,376
42	3,6	3,409	91	1861	4,343	8,075	3,845	1,364
42	4,0	3,749	91	2047	4,775	8,715	4,150	1,351
42,4	1,5	1,513	91	826	1,927	4,036	1,904	1,447
42,4	2,0	1,993	91	1088	2,538	5,192	2,449	1,430
42,4	2,3	2,275	91	1242	2,897	5,843	2,756	1,420
42,4	2,5	2,460	91	1343	3,134	6,261	2,953	1,413
42,4	2,6	2,552	91	1393	3,251	6,464	3,049	1,410
42,4	3,0	2,915	91	1592	3,713	7,247	3,419	1,397
42,4	3,2	3,094	91	1689	3,941	7,620	3,594	1,391
42,4	3,6	3,445	91	1881	4,388	8,329	3,929	1,378
42,4	4,0	3,788	91	2068	4,825	8,991	4,241	1,365
44,5	1,5	1,591	91	869	2,026	4,689	2,107	1,521
44,5	2,0	2,096	91	1144	2,670	6,043	2,716	1,504
44,5	2,3	2,394	91	1307	3,049	6,808	3,060	1,494
44,5	2,6	2,687	91	1467	3,422	7,540	3,389	1,484

Round tubes

EN 10217 - 1

Ø	**Thickness** (mm)	**Weight** (Kg/m)	**Tubes per tie**	**Weight per tie** (Kg)	**Section** (cm^2)	**I - Moment of inertia** (cm^4)	**W - Elastic bending moment** (cm^3)	**i - Radius of gyration** (cm)
44,5	2,9	2,975	91	1624	3,790	8,238	3,703	1,474
44,5	3,2	3,259	91	1779	4,152	8,906	4,002	1,465
44,5	3,6	3,631	91	1983	4,626	9,747	4,381	1,452
44,5	4,0	3,995	91	2181	5,089	10,537	4,736	1,439
45	1,5	1,609	91	879	2,050	4,854	2,158	1,539
45	2,0	2,121	91	1158	2,702	6,258	2,781	1,522
45	2,3	2,422	91	1322	3,085	7,052	3,134	1,512
45	2,6	2,719	91	1485	3,463	7,812	3,472	1,502
45	2,9	3,011	91	1644	3,836	8,538	3,795	1,492
45,0	3,0	3,107	91	1696	3,958	8,773	3,899	1,489
45,0	3,2	3,299	91	1801	4,202	9,232	4,103	1,482
45,0	3,6	3,676	91	2007	4,682	10,107	4,492	1,469
45,0	4,0	4,044	91	2208	5,152	10,929	4,857	1,456
48,3	1,5	1,731	91	945	2,205	6,044	2,503	1,655
48,3	2,0	2,284	91	1247	2,909	7,810	3,234	1,638
48,3	2,3	2,609	91	1425	3,324	8,813	3,649	1,628
48,3	2,5	2,824	91	1542	3,597	9,460	3,917	1,622
48,3	2,6	2,930	91	1600	3,733	9,777	4,048	1,618
48,3	2,9	3,247	91	1773	4,136	10,700	4,431	1,608
48,3	3,0	3,351	91	1830	4,269	11,000	4,555	1,605
48,3	3,2	3,559	91	1943	4,534	11,586	4,797	1,599
48,3	3,6	3,969	91	2167	5,055	12,708	5,262	1,586
48,3	4,0	4,370	91	2386	5,567	13,768	5,701	1,573
48,3	4,5	4,861	91	2654	6,192	15,006	6,214	1,557
48,3	5,0	5,339	91	2915	6,802	16,153	6,689	1,541
50,0	1,5	1,794	91	980	2,286	6,727	2,691	1,716
50,0	2,0	2,368	91	1293	3,016	8,701	3,480	1,699
50,0	2,3	2,706	91	1477	3,447	9,825	3,930	1,688
50,0	2,6	3,039	91	1659	3,872	10,906	4,362	1,678
50,0	2,9	3,369	91	1839	4,291	11,944	4,778	1,668
50,0	3,0	3,477	91	1898	4,430	12,281	4,912	1,665
50,0	3,2	3,693	91	2016	4,705	12,941	5,176	1,658
50,0	3,6	4,119	91	2249	5,248	14,208	5,683	1,645
50,0	4,0	4,538	91	2478	5,781	15,405	6,162	1,632
50,8	1,5	1,824	91	996	2,323	7,065	2,781	1,744
50,8	2,0	2,407	91	1314	3,066	9,143	3,600	1,727
50,8	2,3	2,751	91	1502	3,504	10,327	4,066	1,717
50,8	2,6	3,091	91	1688	3,937	11,467	4,514	1,707
50,8	2,9	3,426	91	1871	4,364	12,562	4,946	1,697

Round tubes

EN 10217 - 1

Ø	**Thickness** (mm)	**Weight** (Kg/m)	**Tubes per tie**	**Weight per tie** (Kg)	**Section** (cm^2)	**I - Moment of inertia** (cm^4)	**W - Elastic bending moment** (cm^3)	**i - Radius of gyration** (cm)
50,8	3,2	3,756	91	2051	4,785	13,614	5,360	1,687
50,8	3,6	4,190	91	2288	5,338	14,952	5,887	1,674
50,8	4,0	4,617	91	2521	5,881	16,219	6,385	1,661
50,8	4,5	5,138	91	2805	6,546	17,705	6,971	1,645
50,8	5,0	5,647	91	3083	7,194	19,088	7,515	1,629
50,8	6,0	6,629	91	3619	8,445	21,566	8,490	1,598
55,0	1,5	1,979	61	724	2,521	9,027	3,283	1,892
55,0	2,0	2,614	61	957	3,330	11,709	4,258	1,875
55,0	2,3	2,989	61	1094	3,808	13,245	4,816	1,865
55,0	2,6	3,360	61	1230	4,280	14,726	5,355	1,855
55,0	2,9	3,726	61	1364	4,747	16,155	5,875	1,845
55,0	3,0	3,847	61	1408	4,901	16,620	6,044	1,842
55,0	3,2	4,088	61	1496	5,208	17,533	6,376	1,835
55,0	3,6	4,563	61	1670	5,813	19,292	7,015	1,822
55,0	4,0	5,031	61	1841	6,409	20,965	7,624	1,809
57,0	1,5	2,053	61	751	2,615	10,077	3,536	1,963
57,0	2,0	2,713	61	993	3,456	13,084	4,591	1,946
57,0	2,3	3,103	61	1136	3,952	14,809	5,196	1,936
57,0	2,6	3,488	61	1277	4,443	16,475	5,781	1,926
57,0	2,9	3,869	61	1416	4,929	18,084	6,345	1,915
57,0	3,0	3,995	61	1462	5,089	18,608	6,529	1,912
57,0	3,2	4,246	61	1554	5,409	19,638	6,890	1,905
57,0	3,6	4,741	61	1735	6,039	21,625	7,588	1,892
57,0	4,0	5,228	61	1913	6,660	23,519	8,252	1,879
60,3	1,5	2,175	61	796	2,771	11,983	3,974	2,080
60,3	2,0	2,876	61	1053	3,663	15,581	5,168	2,062
60,3	2,3	3,290	61	1204	4,191	17,650	5,854	2,052
60,3	2,5	3,564	61	1304	4,540	18,993	6,300	2,045
60,3	2,6	3,700	61	1354	4,713	19,654	6,519	2,042
60,3	2,9	4,105	61	1502	5,229	21,592	7,162	2,032
60,3	3,0	4,239	61	1551	5,400	22,225	7,371	2,029
60,3	3,2	4,506	61	1649	5,740	23,468	7,784	2,022
60,3	3,6	5,034	61	1842	6,413	25,874	8,582	2,009
60,3	4,0	5,554	61	2033	7,075	28,173	9,344	1,996
60,3	4,5	6,193	61	2267	7,889	30,902	10,250	1,979
60,3	5,0	6,819	61	2496	8,687	33,477	11,103	1,963
60,3	6,0	8,035	61	2941	10,235	38,184	12,665	1,931
60,3	6,3	8,390	61	3071	10,688	39,487	13,097	1,922
60,3	8,0	10,318	61	3776	13,144	45,994	15,255	1,871

Round tubes

EN 10217 - 1

Ø	**Thickness** (mm)	**Weight** (Kg/m)	**Tubes per tie**	**Weight per tie** (Kg)	**Section** (cm^2)	**I - Moment of inertia** (cm^4)	**W - Elastic bending moment** (cm^3)	**i - Radius of gyration** (cm)
63,5	1,5	2,294	37	509	2,922	14,047	4,424	2,193
63,5	2,0	3,033	37	673	3,864	18,288	5,760	2,176
63,5	2,3	3,471	37	771	4,422	20,733	6,530	2,165
63,5	2,6	3,905	37	867	4,974	23,103	7,277	2,155
63,5	2,9	4,334	37	962	5,521	25,402	8,001	2,145
63,5	3,2	4,759	37	1056	6,062	27,630	8,702	2,135
63,5	3,6	5,318	37	1181	6,775	30,494	9,604	2,122
63,5	4,0	5,869	37	1303	7,477	33,238	10,469	2,108
63,5	4,5	6,548	37	1454	8,341	36,505	11,498	2,092
63,5	5,0	7,213	37	1601	9,189	39,597	12,471	2,076
63,5	6,0	8,508	37	1889	10,838	45,281	14,262	2,044
63,5	6,3	8,887	37	1973	11,321	46,862	14,760	2,035
63,5	8,0	10,950	37	2431	13,949	54,823	17,267	1,983
65,0	1,5	2,349	37	521	2,992	15,091	4,643	2,246
65,0	2,0	3,107	37	690	3,958	19,658	6,049	2,229
65,0	2,3	3,556	37	789	4,530	22,293	6,859	2,218
65,0	2,6	4,001	37	888	5,097	24,851	7,646	2,208
65,0	2,9	4,441	37	986	5,658	27,332	8,410	2,198
65,0	3,2	4,877	37	1083	6,213	29,740	9,151	2,188
65,0	3,6	5,451	37	1210	6,944	32,837	10,104	2,175
65,0	4,0	6,017	37	1336	7,665	35,807	11,018	2,161
65,0	4,5	6,714	37	1491	8,553	39,349	12,107	2,145
65,0	5,0	7,398	37	1642	9,425	42,706	13,140	2,129
65,0	6,0	8,730	37	1938	11,121	48,892	15,044	2,097
65,0	6,3	9,120	37	2025	11,618	50,616	15,574	2,087
65,0	8,0	11,246	37	2497	14,326	59,326	18,254	2,035
70,0	1,5	2,534	37	563	3,228	18,942	5,412	2,422
70,0	2,0	3,354	37	745	4,273	24,717	7,062	2,405
70,0	2,3	3,840	37	852	4,892	28,058	8,017	2,395
70,0	2,6	4,322	37	959	5,505	31,308	8,945	2,385
70,0	2,9	4,799	37	1065	6,113	34,470	9,848	2,375
70,0	3,0	4,957	37	1100	6,315	35,504	10,144	2,371
70,0	3,2	5,272	37	1170	6,715	37,543	10,727	2,364
70,0	3,6	5,895	37	1309	7,510	41,509	11,860	2,351
70,0	4,0	6,511	37	1445	8,294	45,326	12,950	2,338
70,0	4,5	7,269	37	1614	9,260	49,893	14,255	2,321
70,0	5,0	8,015	37	1779	10,210	54,242	15,498	2,305
70,0	6,0	9,470	37	2102	12,064	62,309	17,803	2,273
70,0	6,3	9,897	37	2197	12,608	64,572	18,449	2,263

Round tubes

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Ø	**Thickness** (mm)	**Weight** (Kg/m)	**Tubes per tie**	**Weight per tie** (Kg)	**Section** (cm^2)	**I - Moment of inertia** (cm^4)	**W - Elastic bending moment** (cm^3)	**i - Radius of gyration** (cm)
70,0	8,0	12,232	37	2716	15,582	76,120	21,748	2,210
76,1	1,5	2,760	37	613	3,515	24,465	6,430	2,638
76,1	2,0	3,655	37	811	4,656	31,979	8,404	2,621
76,1	2,3	4,186	37	929	5,333	36,339	9,550	2,610
76,1	2,5	4,538	37	1007	5,781	39,186	10,299	2,604
76,1	2,6	4,713	37	1046	6,004	40,592	10,668	2,600
76,1	2,9	5,235	37	1162	6,669	44,738	11,758	2,590
76,1	3,0	5,408	37	1201	6,890	46,096	12,115	2,587
76,1	3,2	5,753	37	1277	7,329	48,779	12,820	2,580
76,1	3,6	6,437	37	1429	8,200	54,006	14,194	2,566
76,1	4,0	7,112	37	1579	9,060	59,055	15,520	2,553
76,1	4,5	7,946	37	1764	10,122	65,121	17,115	2,536
76,1	5,0	8,767	37	1946	11,168	70,922	18,639	2,520
76,1	6,0	10,373	37	2303	13,214	81,759	21,487	2,487
76,1	6,3	10,845	37	2408	13,815	84,818	22,291	2,478
76,1	8	13,436	37	2983	17,115	100,587	26,436	2,424
80	1,5	2,904	37	645	3,699	28,505	7,126	2,776
80	2	3,847	37	854	4,901	37,296	9,324	2,759
80	2,3	4,407	37	978	5,614	42,406	10,602	2,748
80	2,6	4,963	37	1102	6,322	47,396	11,849	2,738
80	2,9	5,514	37	1224	7,024	52,268	13,067	2,728
80,0	3,0	5,697	37	1265	7,257	53,866	13,466	2,724
80,0	3,2	6,061	37	1346	7,721	57,023	14,256	2,718
80,0	3,6	6,783	37	1506	8,641	63,184	15,796	2,704
80,0	4,0	7,497	37	1664	9,550	69,145	17,286	2,691
82,5	1,5	2,996	37	665	3,817	31,315	7,592	2,864
82,5	2,0	3,971	37	882	5,058	40,996	9,939	2,847
82,5	2,3	4,549	37	1010	5,795	46,630	11,304	2,837
82,5	2,6	5,123	37	1137	6,526	52,135	12,639	2,826
82,5	2,9	5,693	37	1264	7,252	57,514	13,943	2,816
82,5	3,2	6,258	37	1389	7,972	62,768	15,216	2,806
82,5	3,6	7,005	37	1555	8,923	69,582	16,868	2,792
82,5	4,0	7,744	37	1719	9,865	76,182	18,468	2,779
83,0	1,5	3,015	37	669	3,841	31,899	7,686	2,882
83,0	2,0	3,995	37	887	5,089	41,765	10,064	2,865
83,0	2,3	4,577	37	1016	5,831	47,507	11,448	2,854
83,0	2,6	5,155	37	1144	6,567	53,120	12,800	2,844
83,0	2,9	5,729	37	1272	7,298	58,604	14,121	2,834
83,0	3,0	5,919	37	1314	7,540	60,403	14,555	2,830

Round tubes

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Ø	**Thickness** (mm)	**Weight** (Kg/m)	**Tubes per tie**	**Weight per tie** (Kg)	**Section** (cm^2)	**I - Moment of inertia** (cm^4)	**W - Elastic bending moment** (cm^3)	**i - Radius of gyration** (cm)
83,0	3,2	6,298	37	1398	8,022	63,961	15,412	2,824
83,0	3,6	7,049	37	1565	8,980	70,911	17,087	2,810
83,0	4,0	7,793	37	1730	9,927	77,645	18,710	2,797
83,0	4,0	7,793	37	1730	9,927	77,645	18,710	2,797
88,9	1,5	3,233	37	718	4,119	39,338	8,850	3,091
88,9	2,0	4,286	37	951	5,460	51,568	11,601	3,073
88,9	2,3	4,912	37	1090	6,257	58,701	13,206	3,063
88,9	2,5	5,327	37	1183	6,786	63,373	14,257	3,056
88,9	2,6	5,534	37	1229	7,049	65,684	14,777	3,053
88,9	2,9	6,151	37	1366	7,835	72,518	16,315	3,042
88,9	3,0	6,355	37	1411	8,096	74,764	16,820	3,039
88,9	3,2	6,763	37	1501	8,616	79,206	17,819	3,032
88,9	3,6	7,573	37	1681	9,647	87,899	19,775	3,018
88,9	4,0	8,375	37	1859	10,669	96,340	21,674	3,005
88,9	4,5	9,366	37	2079	11,932	106,545	23,970	2,988
88,9	5,0	10,346	37	2297	13,179	116,374	26,181	2,972
88,9	6,0	12,267	37	2723	15,626	134,941	30,358	2,939
88,9	6,3	12,833	37	2849	16,348	140,236	31,549	2,929
88,9	8	15,961	37	3543	20,332	167,966	37,788	2,874
90,0	3,0	6,437	37	1429	8,200	77,670	17,260	3,078
90,0	4,0	8,484	37	1883	10,807	100,128	22,251	3,044
95,0	1,5	3,459	37	768	4,406	48,161	10,139	3,306
95,0	2,0	4,587	37	1018	5,843	63,203	13,306	3,289
95,0	2,3	5,258	37	1167	6,698	71,994	15,157	3,278
95,0	2,6	5,925	37	1315	7,547	80,611	16,971	3,268
95,0	2,9	6,587	37	1462	8,391	89,057	18,749	3,258
95,0	3,0	6,807	37	1511	8,671	91,835	19,334	3,254
95,0	3,2	7,245	37	1608	9,229	97,334	20,491	3,248
95,0	3,6	8,115	37	1802	10,337	108,112	22,760	3,234
95,0	4,0	8,977	37	1993	11,435	118,599	24,968	3,220
100,0	1,5	3,644	19	415	4,642	56,307	11,261	3,483
100,0	2,0	4,834	19	551	6,158	73,952	14,790	3,466
100,0	2,3	5,542	19	632	7,059	84,278	16,856	3,455
100,0	2,6	6,245	19	712	7,956	94,410	18,882	3,445
100,0	2,9	6,944	19	792	8,846	104,352	20,870	3,435
100,0	3,0	7,176	19	818	9,142	107,625	21,525	3,431
100,0	3,2	7,639	19	871	9,731	114,106	22,821	3,424
100,0	3,6	8,559	19	976	10,903	126,823	25,365	3,411
100,0	4,0	9,470	19	1080	12,064	139,215	27,843	3,397

Round tubes

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Ø	**Thickness** (mm)	**Weight** (Kg/m)	**Tubes per tie**	**Weight per tie** (Kg)	**Section** (cm^2)	**I - Moment of inertia** (cm^4)	**W - Elastic bending moment** (cm^3)	**i - Radius of gyration** (cm)
100,0	4,5	10,598	19	1208	13,501	154,257	30,851	3,380
100,0	5,0	11,714	19	1335	14,923	168,812	33,762	3,363
100,0	6,0	13,909	19	1586	17,719	196,499	39,300	3,330
100,0	6,3	14,558	19	1660	18,545	204,446	40,889	3,320
100,0	7,0	16,055	19	1830	20,452	222,362	44,472	3,297
100,0	8,0	18,151	19	2069	23,122	246,482	49,296	3,265
101,6	1,5	3,703	19	422	4,717	59,095	11,633	3,539
101,6	2,0	4,913	19	560	6,258	77,632	15,282	3,522
101,6	2,3	5,632	19	642	7,175	88,485	17,418	3,512
101,6	2,5	6,110	19	697	7,783	95,609	18,821	3,505
101,6	2,6	6,348	19	724	8,086	99,138	19,515	3,501
101,6	2,9	7,059	19	805	8,992	109,593	21,573	3,491
101,6	3,0	7,295	19	832	9,293	113,035	22,251	3,488
101,6	3,2	7,765	19	885	9,892	119,854	23,593	3,481
101,6	3,6	8,701	19	992	11,084	133,237	26,228	3,467
101,6	4,0	9,628	19	1098	12,265	146,284	28,796	3,454
101,6	4,5	10,776	19	1228	13,727	162,129	31,915	3,437
101,6	5,0	11,912	19	1358	15,174	177,469	34,935	3,420
101,6	6,0	14,146	19	1613	18,020	206,677	40,684	3,387
101,6	6,3	14,807	19	1688	18,862	215,067	42,336	3,377
101,6	8,0	18,467	19	2105	23,524	259,501	51,083	3,321
108,0	2,0	5,228	19	596	6,660	93,575	17,329	3,748
108,0	2,3	5,995	19	683	7,638	106,713	19,762	3,738
108,0	2,6	6,758	19	770	8,609	119,624	22,153	3,728
108,0	2,9	7,517	19	857	9,575	132,311	24,502	3,717
108,0	3,0	7,768	19	886	9,896	136,491	25,276	3,714
108,0	3,2	8,270	19	943	10,536	144,777	26,810	3,707
108,0	3,6	9,269	19	1057	11,807	161,057	29,825	3,693
108,0	4,0	10,259	19	1170	13,069	176,955	32,769	3,680
108,0	4,5	11,486	19	1309	14,632	196,297	36,351	3,663
108,0	5,0	12,701	19	1448	16,179	215,062	39,826	3,646
108,0	6,0	15,093	19	1721	19,227	250,906	46,464	3,612
108,0	6,3	15,801	19	1801	20,128	261,232	48,376	3,603
108,0	8,0	19,729	19	2249	25,133	316,170	58,550	3,547
114,3	2,0	5,539	19	631	7,056	111,267	19,469	3,971
114,3	2,3	6,353	19	724	8,093	126,948	22,213	3,961
114,3	2,5	6,893	19	786	8,781	137,259	24,017	3,954
114,3	2,6	7,162	19	816	9,124	142,373	24,912	3,950
114,3	2,9	7,967	19	908	10,149	157,546	27,567	3,940

Round tubes

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Ø	**Thickness** (mm)	**Weight** (Kg/m)	**Tubes per tie**	**Weight per tie** (Kg)	**Section** (cm^2)	**I - Moment of inertia** (cm^4)	**W - Elastic bending moment** (cm^3)	**i - Radius of gyration** (cm)
114,3	3,0	8,234	19	939	10,490	162,548	28,442	3,936
114,3	3,2	8,768	19	1000	11,169	172,469	30,178	3,930
114,3	3,6	9,828	19	1120	12,520	191,984	33,593	3,916
114,3	4,0	10,881	19	1240	13,861	211,065	36,932	3,902
114,3	4,5	12,185	19	1389	15,523	234,319	41,001	3,885
114,3	5,0	13,478	19	1536	17,169	256,920	44,955	3,868
114,3	6,0	16,025	19	1827	20,414	300,212	52,530	3,835
114,3	6,3	16,780	19	1913	21,375	312,714	54,718	3,825
114,3	7,0	18,523	19	2112	23,597	341,037	59,674	3,802
114,3	8,0	20,972	19	2391	26,716	379,492	66,403	3,769
114,3	10,0	25,722	19	2932	32,767	449,663	78,681	3,704
120,0	2,0	5,820	19	663	7,414	129,081	21,513	4,173
120,0	2,3	6,676	19	761	8,505	147,327	24,555	4,162
120,0	2,6	7,528	19	858	9,589	165,291	27,549	4,152
120,0	2,9	8,375	19	955	10,669	182,976	30,496	4,141
120,0	3,0	8,656	19	987	11,027	188,810	31,468	4,138
120,0	3,2	9,217	19	1051	11,742	200,385	33,397	4,131
120,0	3,6	10,334	19	1178	13,165	223,170	37,195	4,117
120,0	4,0	11,443	19	1305	14,577	245,477	40,913	4,104
120,0	4,5	12,818	19	1461	16,328	272,695	45,449	4,087
120,0	5,0	14,180	19	1617	18,064	299,188	49,865	4,070
120,0	6,0	16,868	19	1923	21,488	350,048	58,341	4,036
120,0	6,3	17,665	19	2014	22,504	364,765	60,794	4,026
120,0	8,0	22,097	19	2519	28,149	443,623	73,937	3,970
120,0	10,0	27,128	19	3093	34,558	527,002	87,834	3,905
125,0	2,9	8,732	23	1205	11,124	207,420	33,187	4,318
125,0	3,0	9,026	23	1246	11,498	214,054	34,249	4,315
125,0	3,2	9,612	23	1326	12,245	227,223	36,356	4,308
125,0	3,6	10,778	23	1487	13,730	253,163	40,506	4,294
125,0	4,0	11,936	23	1647	15,205	278,580	44,573	4,280
125,0	4,5	13,373	23	1845	17,035	309,627	49,540	4,263
125,0	5,0	14,797	23	2042	18,850	339,881	54,381	4,246
125,0	6,0	17,608	19	2007	22,431	398,066	63,691	4,213
125,0	6,3	18,442	19	2102	23,493	414,929	66,389	4,203
125,0	7,0	20,370	19	2322	25,950	453,241	72,519	4,179
125,0	8,0	23,083	19	2631	29,405	505,514	80,882	4,146
125,0	10,0	28,361	10	1702	36,128	601,762	96,282	4,081
127,0	2,0	6,165	14	518	7,854	153,437	24,163	4,420
127,0	2,3	7,073	14	594	9,010	175,200	27,591	4,410

Round tubes

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Ø	**Thickness** (mm)	**Weight** (Kg/m)	**Tubes per tie**	**Weight per tie** (Kg)	**Section** (cm^2)	**I - Moment of inertia** (cm^4)	**W - Elastic bending moment** (cm^3)	**i - Radius of gyration** (cm)
127,0	2,6	7,977	14	670	10,161	196,646	30,968	4,399
127,0	2,9	8,875	14	746	11,306	217,776	34,295	4,389
127,0	3,0	9,174	14	771	11,687	224,750	35,394	4,385
127,0	3,2	9,770	14	821	12,446	238,595	37,574	4,378
127,0	3,6	10,956	14	920	13,956	265,875	41,870	4,365
127,0	4,0	12,133	14	1019	15,457	292,613	46,081	4,351
127,0	4,5	13,595	14	1142	17,318	325,287	51,226	4,334
127,0	5,0	15,044	14	1264	19,164	357,140	56,242	4,317
127,0	6,0	17,904	14	1504	22,808	418,441	65,896	4,283
127,0	6,3	18,753	14	1575	23,889	436,218	68,696	4,273
127,0	8,0	23,478	14	1972	29,908	531,801	83,748	4,217
127,0	10,0	28,854	14	2424	36,757	633,547	99,771	4,152
133,0	2,9	9,305	19	1061	11,853	250,903	37,730	4,601
133,0	3,0	9,618	19	1096	12,252	258,966	38,942	4,597
133,0	3,2	10,243	19	1168	13,049	274,978	41,350	4,591
133,0	3,6	11,488	19	1310	14,635	306,550	46,098	4,577
133,0	4,0	12,725	19	1451	16,211	337,525	50,756	4,563
133,0	4,5	14,261	19	1626	18,166	375,417	56,454	4,546
133,0	5,0	15,783	19	1799	20,106	412,403	62,016	4,529
133,0	6,0	18,792	19	2142	23,939	483,716	72,739	4,495
133,0	6,3	19,685	19	2244	25,077	504,432	75,854	4,485
133,0	8,0	24,662	19	2811	31,416	616,106	92,647	4,428
133,0	10,0	30,334	19	3458	38,642	735,591	110,615	4,363
139,7	2,9	9,784	19	1115	12,463	291,683	41,758	4,838
139,7	3,0	10,114	19	1153	12,884	301,090	43,105	4,834
139,7	4,0	13,386	19	1526	17,053	392,859	56,243	4,800
139,7	4,5	15,004	19	1710	19,113	437,203	62,592	4,783
139,7	5,0	16,610	19	1894	21,159	480,541	68,796	4,766
139,7	6,0	19,783	19	2255	25,202	564,260	80,782	4,732
139,7	6,3	20,726	19	2363	26,403	588,621	84,269	4,722
139,7	7,0	22,908	19	2612	29,182	644,136	92,217	4,698
139,7	8,0	25,983	19	2962	33,100	720,289	103,119	4,665
139,7	10,0	31,986	19	3646	40,746	861,894	123,392	4,599
139,7	12,0	37,791	19	4308	48,142	989,993	141,731	4,535
139,7	12,5	39,212	19	4470	49,951	1 020,012	146,029	4,519
141,3	2,9	9,898	13	772	12,609	302,035	42,751	4,894
141,3	3,2	10,898	13	850	13,883	331,149	46,872	4,884
141,3	3,6	12,225	13	954	15,574	369,369	52,282	4,870
141,3	4,0	13,544	13	1056	17,254	406,911	57,595	4,856

Round tubes

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Ø	**Thickness** (mm)	**Weight** (Kg/m)	**Tubes per tie**	**Weight per tie** (Kg)	**Section** (cm^2)	**I - Moment of inertia** (cm^4)	**W - Elastic bending moment** (cm^3)	**i - Radius of gyration** (cm)
141,3	4,5	15,182	13	1184	19,340	452,898	64,104	4,839
141,3	5,0	16,807	13	1311	21,410	497,853	70,468	4,822
141,3	6,0	20,020	13	1562	25,503	584,733	82,765	4,788
141,3	6,3	20,975	13	1636	26,719	610,023	86,344	4,778
141,3	8,0	26,299	13	2051	33,502	746,796	105,704	4,721
141,3	10,0	32,381	13	2526	41,249	894,059	126,548	4,656
141,3	12,0	38,265	13	2985	48,745	1 027,452	145,428	4,591
141,3	12,5	39,705	13	3097	50,580	1 058,739	149,857	4,575
152,0	2,9	10,663	13	832	13,584	377,620	49,687	5,272
152,0	3,0	11,024	13	860	14,043	389,867	51,298	5,269
152,0	3,2	11,743	13	916	14,959	414,209	54,501	5,262
152,0	3,6	13,175	13	1028	16,784	462,295	60,828	5,248
152,0	4,0	14,600	13	1139	18,598	509,591	67,052	5,235
152,0	4,5	16,369	13	1277	20,852	567,613	74,686	5,217
152,0	5,0	18,126	13	1414	23,091	624,430	82,162	5,200
152,0	6,0	21,603	13	1685	27,520	734,518	96,647	5,166
152,0	6,3	22,637	13	1766	28,837	766,638	100,873	5,156
152,0	8,0	28,410	13	2216	36,191	940,970	123,812	5,099
152,0	10,0	35,019	13	2731	44,611	1 129,987	148,682	5,033
152,0	12,0	41,431	13	3232	52,779	1 302,580	171,392	4,968
152,0	12,5	43,003	13	3354	54,782	1 343,277	176,747	4,952
152,4	2,9	10,692	13	834	13,620	380,667	49,956	5,287
152,4	3,0	11,053	13	862	14,081	393,014	51,577	5,283
152,4	3,2	11,774	13	918	14,999	417,557	54,798	5,276
152,4	3,6	13,211	13	1030	16,829	466,042	61,160	5,262
152,4	4,0	14,639	13	1142	18,648	513,732	67,419	5,249
152,4	4,5	16,413	13	1280	20,909	572,241	75,097	5,231
152,4	5,0	18,176	13	1418	23,154	629,538	82,617	5,214
152,4	6,0	21,663	13	1690	27,596	740,565	97,187	5,180
152,4	6,3	22,699	13	1771	28,916	772,962	101,439	5,170
152,4	8,0	28,489	13	2222	36,292	948,817	124,517	5,113
152,4	10,0	35,118	13	2739	44,736	1 139,531	149,545	5,047
152,4	12,0	41,550	13	3241	52,930	1 313,722	172,404	4,982
152,4	12,5	43,127	13	3364	54,939	1 354,804	177,796	4,966
159,0	2,9	11,164	13	871	14,222	433,328	54,507	5,520
159,0	3,0	11,542	13	900	14,703	447,420	56,279	5,516
159,0	4,0	15,290	13	1193	19,478	585,334	73,627	5,482
159,0	4,5	17,146	13	1337	21,842	652,268	82,046	5,465
159,0	5,0	18,989	13	1481	24,190	717,876	90,299	5,448

Round tubes

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Ø	**Thickness** (mm)	**Weight** (Kg/m)	**Tubes per tie**	**Weight per tie** (Kg)	**Section** (cm^2)	**I - Moment of inertia** (cm^4)	**W - Elastic bending moment** (cm^3)	**i - Radius of gyration** (cm)
159,0	6,0	22,639	10	1358	28,840	845,187	106,313	5,414
159,0	6,3	23,725	10	1424	30,222	882,381	110,991	5,403
159,0	7,0	26,240	10	1574	33,427	967,406	121,686	5,380
159,0	8,0	29,791	10	1787	37,950	1 084,671	136,437	5,346
159,0	10,0	36,746	10	2205	46,810	1 304,880	164,136	5,280
159,0	12,0	43,503	10	2610	55,418	1 506,876	189,544	5,215
159,0	12,5	45,161	10	2710	57,530	1 554,652	195,554	5,198
165,1	2,9	11,600	10	696	14,777	486,126	58,889	5,736
165,1	3,2	12,777	10	767	16,276	533,482	64,625	5,725
165,1	3,6	14,338	10	860	18,265	595,793	72,174	5,711
165,1	4,0	15,892	10	954	20,244	657,165	79,608	5,698
165,1	4,5	17,823	10	1069	22,704	732,571	88,743	5,680
165,1	5,0	19,742	10	1185	25,148	806,543	97,704	5,663
165,1	6,0	23,542	10	1413	29,990	950,252	115,112	5,629
165,1	6,3	24,672	10	1480	31,430	992,282	120,204	5,619
165,1	8,0	30,995	10	1860	39,484	1 221,246	147,940	5,562
165,1	10,0	38,250	10	2295	48,726	1 471,285	178,230	5,495
165,1	12,0	45,308	10	2718	57,717	1 701,479	206,115	5,430
165,1	12,5	47,042	10	2823	59,926	1 756,054	212,726	5,413
168,3	2,9	11,829	10	710	15,069	515,463	61,255	5,849
168,3	3,0	12,230	10	734	15,579	532,283	63,254	5,845
168,3	4,0	16,208	10	972	20,647	697,092	82,839	5,811
168,3	4,5	18,178	10	1091	23,157	777,216	92,361	5,793
168,3	5,0	20,136	10	1208	25,651	855,846	101,705	5,776
168,3	6,0	24,015	10	1441	30,593	1 008,695	119,869	5,742
168,3	6,3	25,170	10	1510	32,063	1 053,421	125,184	5,732
168,3	7,0	27,845	10	1671	35,472	1 155,788	137,349	5,708
168,3	8,0	31,626	10	1898	40,288	1 297,271	154,162	5,675
168,3	10,0	39,039	10	2342	49,731	1 563,984	185,857	5,608
168,3	12,0	46,255	10	2775	58,924	1 809,966	215,088	5,542
168,3	12,5	48,028	10	2882	61,183	1 868,353	222,026	5,526
177,8	2,9	12,509	10	751	15,934	609,462	68,556	6,184
177,8	3,0	12,932	10	776	16,475	629,410	70,800	6,181
177,8	4,0	17,145	10	1029	21,840	825,086	92,811	6,146
177,8	4,5	19,232	10	1154	24,500	920,367	103,528	6,129
177,8	5,0	21,308	10	1278	27,143	1 013,969	114,057	6,112
177,8	6,0	25,421	10	1525	32,384	1 196,217	134,558	6,078
177,8	6,3	26,646	10	1599	33,943	1 249,621	140,565	6,068
177,8	7,0	29,485	7	1238	37,561	1 371,988	154,329	6,044

Round tubes

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Ø	**Thickness** (mm)	**Weight** (Kg/m)	**Tubes per tie**	**Weight per tie** (Kg)	**Section** (cm^2)	**I - Moment of inertia** (cm^4)	**W - Elastic bending moment** (cm^3)	**i - Radius of gyration** (cm)
177,8	8,0	33,500	7	1407	42,675	1 541,437	173,390	6,010
177,8	10,0	41,382	7	1738	52,716	1 861,982	209,447	5,943
177,8	12,0	49,067	7	2061	62,505	2 159,055	242,863	5,877
177,8	12,5	50,957	7	2140	64,913	2 229,795	250,821	5,861
193,7	2,9	13,646	7	573	17,383	791,213	81,695	6,747
193,7	3,0	14,109	7	593	17,973	817,223	84,380	6,743
193,7	4,0	18,713	7	786	23,838	1 072,791	110,768	6,708
193,7	4,5	20,997	7	882	26,748	1 197,516	123,646	6,691
193,7	5,0	23,268	7	977	29,641	1 320,232	136,317	6,674
193,7	6,0	27,774	7	1167	35,381	1 559,723	161,045	6,640
193,7	6,3	29,116	7	1223	37,090	1 630,046	168,306	6,629
193,7	7,0	32,230	7	1354	41,057	1 791,435	184,970	6,605
193,7	8,0	36,637	7	1539	46,672	2 015,537	208,109	6,572
193,7	10,0	45,303	7	1903	57,711	2 441,588	252,100	6,504
193,7	12,0	53,772	7	2258	68,499	2 839,200	293,154	6,438
193,7	12,5	55,858	7	2346	71,157	2 934,312	302,975	6,422
200,0	2,9	14,096	10	846	17,957	872,191	87,219	6,969
200,0	3,0	14,575	10	875	18,567	900,908	90,091	6,966
200,0	4,0	19,335	10	1160	24,630	1 183,229	118,323	6,931
200,0	4,5	21,696	7	911	27,638	1 321,121	132,112	6,914
200,0	5,0	24,045	7	1010	30,631	1 456,865	145,686	6,897
200,0	6,0	28,706	7	1206	36,568	1 721,994	172,199	6,862
200,0	7,0	33,318	7	1399	42,443	1 978,795	197,879	6,828
200,0	8,0	37,880	7	1591	48,255	2 227,444	222,744	6,794
200,0	10,0	46,857	7	1968	59,690	2 700,984	270,098	6,727
200,0	12,0	55,636	7	2337	70,874	3 143,985	314,399	6,660
200,0	12,5	57,800	7	2428	73,631	3 250,122	325,012	6,644
219,1	2,9	15,462	7	649	19,697	1 151,074	105,073	7,645
219,1	3,0	15,988	9	863	20,367	1 189,129	108,547	7,641
219,1	4,0	21,219	9	1146	27,030	1 563,836	142,751	7,606
219,1	4,5	23,816	9	1286	30,338	1 747,240	159,492	7,589
219,1	5,0	26,400	9	1426	33,631	1 928,043	175,997	7,572
219,1	6,0	31,532	9	1703	40,168	2 281,947	208,302	7,537
219,1	6,3	33,062	9	1785	42,117	2 386,139	217,813	7,527
219,1	7,0	36,615	9	1977	46,643	2 625,746	239,685	7,503
219,1	8,0	41,648	7	1749	53,055	2 959,633	270,163	7,469
219,1	10,0	51,567	7	2166	65,691	3 598,439	328,475	7,401
219,1	12,0	61,289	7	2574	78,075	4 199,882	383,376	7,334
219,1	12,5	63,688	7	2675	81,132	4 344,580	396,584	7,318

Round tubes

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Ø	**Thickness** (mm)	**Weight** (Kg/m)	**Tubes per tie**	**Weight per tie** (Kg)	**Section** (cm^2)	**I - Moment of inertia** (cm^4)	**W - Elastic bending moment** (cm^3)	**i - Radius of gyration** (cm)
244,5	3,6	21,387	7	898	27,245	1 976,832	161,704	8,518
244,5	4,0	23,724	7	996	30,222	2 185,673	178,787	8,504
244,5	4,5	26,634	7	1119	33,929	2 443,761	199,899	8,487
244,5	5,0	29,532	7	1240	37,621	2 698,582	220,743	8,469
244,5	6,0	35,291	5	1059	44,956	3 198,535	261,639	8,435
244,5	6,3	37,009	5	1110	47,145	3 346,027	273,704	8,425
244,5	7,0	41,000	5	1230	52,229	3 685,750	301,493	8,401
244,5	8,0	46,660	5	1400	59,439	4 160,447	340,323	8,366
244,5	10,0	57,831	4	1388	73,670	5 073,147	414,981	8,298
244,5	12,0	68,806	4	1651	87,650	5 938,344	485,754	8,231
244,5	12,5	71,518	4	1716	91,106	6 147,418	502,856	8,214
273,0	4,0	26,536	8	1274	33,804	3 058,248	224,047	9,512
273,0	4,6	30,448	5	913	38,787	3 493,758	255,953	9,491
273,0	5,0	33,046	8	1586	42,097	3 780,815	276,983	9,477
273,0	6,0	39,508	8	1896	50,328	4 487,084	328,724	9,442
273,0	6,3	41,437	5	1243	52,785	4 695,823	344,016	9,432
273,0	7,0	45,920	4	1102	58,496	5 177,302	379,290	9,408
273,0	8,0	52,282	4	1255	66,602	5 851,714	428,697	9,373
273,0	10,0	64,860	4	1557	82,624	7 154,093	524,109	9,305
273,0	12,0	77,240	4	1854	98,395	8 396,141	615,102	9,237
273,0	12,5	80,304	4	1927	102,298	8 697,449	637,176	9,221
285,0	4,0	27,720	4	665	35,312	3 485,996	244,631	9,936
285,0	4,5	31,129	4	747	39,655	3 901,061	273,759	9,918
285,0	5,0	34,526	4	829	43,982	4 311,640	302,571	9,901
285,0	6,0	41,283	4	991	52,590	5 119,465	359,261	9,866
285,0	6,3	43,301	4	1039	55,160	5 358,376	376,026	9,856
285,0	8,0	54,650	4	1312	69,618	6 682,689	468,961	9,798
285,0	10,0	67,819	4	1628	86,394	8 177,713	573,875	9,729
285,0	12,0	80,791	4	1939	102,919	9 606,548	674,144	9,661
285,0	12,5	84,003	4	2016	107,010	9 953,649	698,502	9,644
323,9	4,0	31,557	4	757	40,200	5 143,165	317,577	11,311
323,9	5,0	39,323	4	944	50,093	6 369,425	393,296	11,276
323,9	6,0	47,039	4	1129	59,923	7 572,467	467,581	11,241
323,9	6,3	49,345	4	1184	62,859	7 928,897	489,589	11,231
323,9	7,0	54,707	4	1313	69,690	8 752,588	540,450	11,207
323,9	8,0	62,325	4	1496	79,394	9 910,081	611,922	11,172
323,9	10,0	77,412	4	1858	98,615	12 158,342	750,747	11,104
323,9	12,0	92,303	4	2215	117,584	14 319,559	884,196	11,035
323,9	12,5	95,995	4	2304	122,286	14 846,530	916,735	11,019

STEEL GRADES

Steel grade	**Chemical properties** Nominal thickness % by mass													
	C % máx.	Si % máx.	Mn % máx.	P % máx.	S % máx.	Cr % máx.	Mo % máx.	Ni % máx.	Al_{total} % mín.	Cu % máx.	Nb % máx.	Ti % máx.	V % máx.	Cr+Cu+Mo+Ni % máx.
P195TR1	0,13	0,35	0,70	0,025	0,020	0,30	0,08	0,30		0,30	0,010	0,04	0,02	0,70
P235TR1	0,16	0,35	1,20	0,025	0,020	0,30	0,08	0,30		0,30	0,010	0,04	0,02	0,70
P265TR1	0,20	0,40	1,40	0,025	0,020	0,30	0,08	0,30		0,30	0,010	0,04	0,02	0,70
P355TR1	0,22	0,55	1,60	0,030	0,030									

Steel grade	**Mechanical properties**			
	R_{eH} (mín.) (MPa) Thickness (mm)	R_m (MPa)	A %	
	≤ 16	-	l (mín.)	t (mín.)
P195TR1	195	320-440	27	25
P235TR1	235	360-500	25	23
P265TR1	265	410-570	21	19
P355TR1				
	R_{eH} (mín.) (MPa) Thickness (mm)	R_m (MPa) Thickness (mm)		A % Thickness (mm)
	≤ 16	< 3	> 3 ≤ 40	≤ 40
P355TR1	355	510 a 680	470 a 630	20

SUPPLY CONDITIONS

PACKAGING

The material is available in geometric ties, strapped with steel bands, in hexagonal, square, and/or rectangular shapes. To facilitate handling (loading/unloading), all the ties are supplied with polyester straps suitable for the weight of the tie.

LABELING

Each tie is supplied with a label attached by a metal clip, ensuring the identification of the product and consequently its traceability.

SURFACE PROTECTION

During manufacture, all tubes are coated with a protective oil, which has a high hydrophobing power, to protect the surface against corrosion. Unless otherwise stated by the customer at the time of the order/inquiry.

CERTIFICATE

On shipment, all orders are accompanied by the respective inspection certificate according to EN 10204, in accordance with the product's applicable standard.

SUPPLY OPTIONS

DIP GALVANIZATION

Hot-dip galvanized tubes can be supplied, according to EN 10240 A.1/A.2 or ISO 1461, providing greater protection against corrosion.

SPECIAL TOLERANCES

Special tolerances must be requested when inquiring/ordering.

WELDING

Possibility of removing the internal welding bead. Possibility of defining the position of the weld bead, according to target value and/or face of the tube.

SUITABILITY FOR GALVANIZATION

Possibility of supplying tubes with chemical properties that guarantee their suitability for hot-dip galvanization.

CARBON EQUIVALENT VALUE (CEV)

Possibility to specify the CEV value at the time of inquiry/order.

LENGTH

Capacity to supply tubes with specific lengths, requested at the time of inquiry/order.

SPECIFIC (OR SPECIAL) DEFORMATION OPERATIONS

Tubes can be supplied, according to the most demanding deformation capabilities.

PACKAGING

The ties can be configured, according to the client's indications, at the time of the inquiry/order. Possibility of using packaging with anticorrosion protection (VCI).

LABORATORY TESTS

Possibility of requesting specific laboratory tests, not foreseen in the applicable standard (anisotropy, salt fog, metallography, thickness elongation, among others).

APPLICATION AREAS

INDUSTRY

CONSTRUCTION

ENERGY

ENGINEERING
AND ARCHITECTURE