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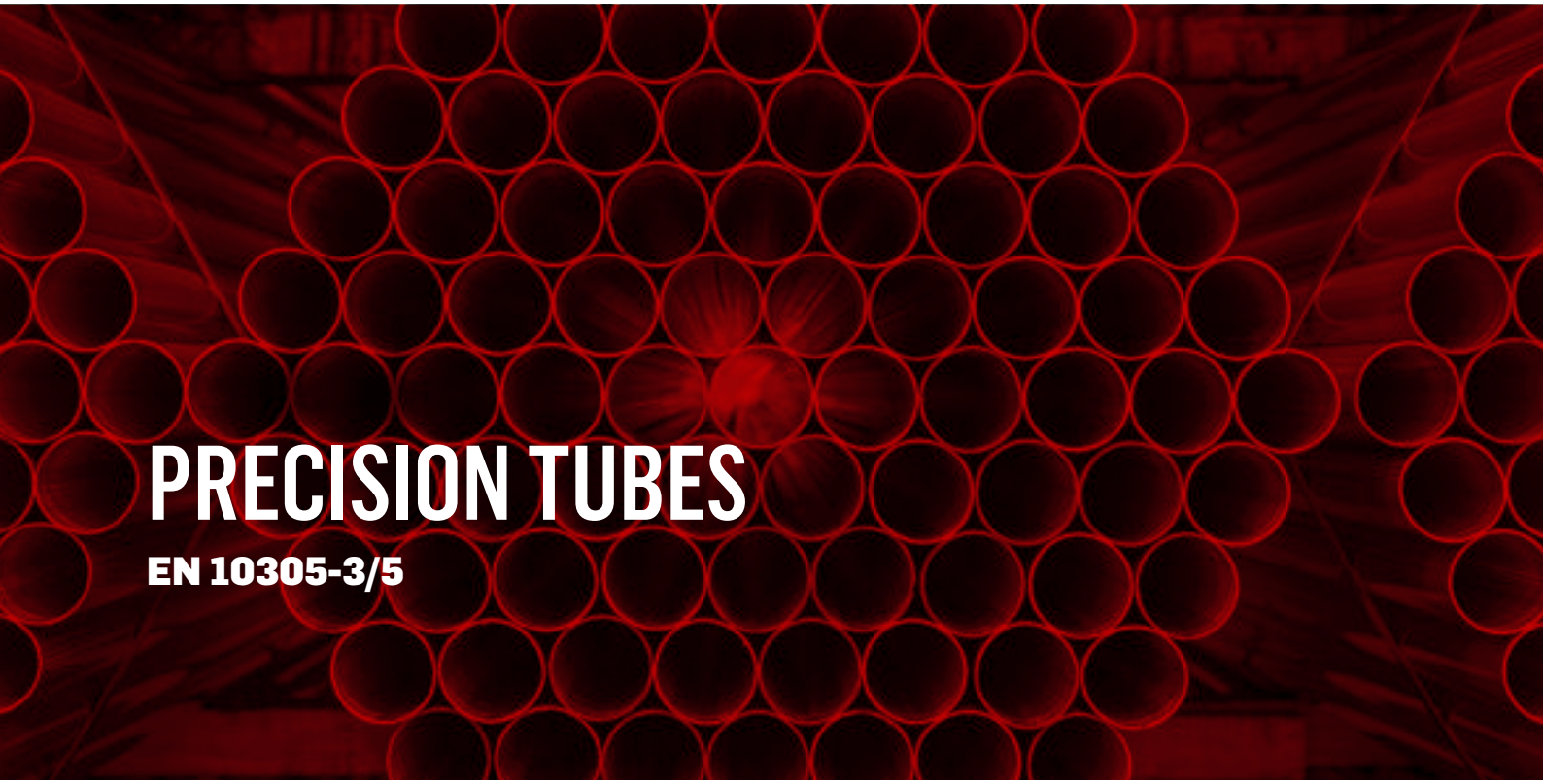


PRECISION TUBES

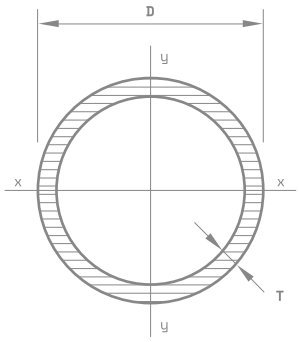
EN 10305-3/5

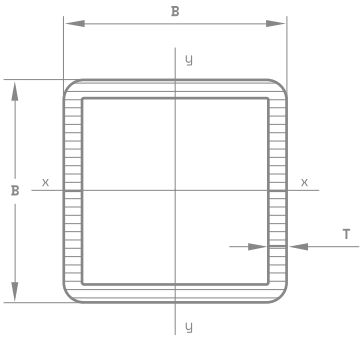
Tubes for precision applications are used wherever dimensional accuracy and good surface finish are preferred requirements.

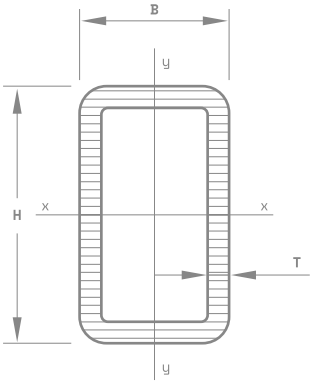
These tubes, due to their reliability and predictability, guarantee a variety of demanding applications, serving different purposes, such as: the automotive industry, bicycle and moped industry, agricultural equipment, metal furniture, agricultural facilities, shipbuilding, metal structures, among others.

DIMENSIONAL RANGE

DIMENSIONAL PROPERTIES







Outside dimensions

(D/B/H) ○ □

Outside diameter	
6 - 19mm	± 0,12
20 - 30mm	± 0,15
32 - 42,4mm	± 0,20
44 - 51mm	± 0,25
55 - 63,5mm	± 0,30
70 - 76mm	± 0,35
80 - 90mm	± 0,40
100 - 101,6mm	± 0,50
108 - 120mm	± 0,60
127 - 139,7mm	± 0,80
≥ 159mm	± 1,00

Side length		
H	B	tolerance
15mm	15mm	± 0,20
20mm	10 - 20mm	± 0,20
25mm	15 -25mm	± 0,25
30mm	10 - 30mm	± 0,25
34mm	20mm	± 0,25
35mm	20 - 35mm	± 0,25
40mm	20 - 40mm	± 0,30
45mm	45mm	± 0,30
50mm	20 - 50mm	± 0,30
60mm	20 - 60mm	± 0,35
70mm	40 - 70mm	± 0,40
80mm	20 - 80mm	± 0,50
90mm	90mm	± 0,60
100mm	40 - 100mm	± 0,65
120mm	40 – 60mm	± 0,70

Wall thickness

(T) ○ □

○ □

1,5mm < T ≤ 3,5mm: ± 10% de E

T >3,5mm: ± 0,35mm

T≤ 1,5mm: +/-0,15

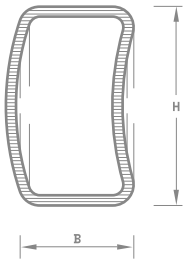
Ovalization

○

Diameter tolerances include ovalization.

Concavity/convexity

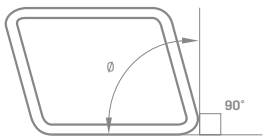
□



Included in the tolerances on B and H.

Squareness of the sides

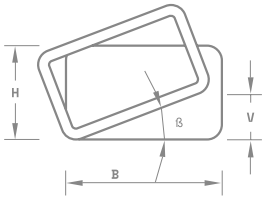
□



Measured with the difference between 90° and 0, not to exceed ±1°.

Torcion

□



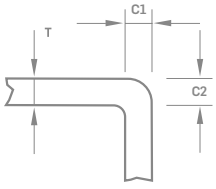
Máx:

a) ≤ 3mm to B or H ≤ 30mm

b) ≤ B/10 or ≤ H/10 to B or H > 30mm

Corner shape

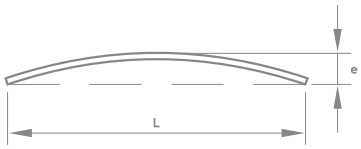
□



Thickness	C1 and C2 exterior corner
T ≤ 2,5mm	≤ 1,5 T
2,5mm < T ≤ 4mm	≤ 2,2 T

Straightness

○ □



○	□
Ø > 15mm	sides ≤ 30mm
e ≤ 0,002 L	e ≤ 0,0025 L
L = 1000mm	sides > 30mm
≤ 3mm	e ≤ 0,0015 L

Linear mass

○ □

Calculation formula:

M = 0,785 A (kg/m)

M is the mass per unit length

A is the cross sectional area

Exact length

(L) ○ □

Length L (mm)	Tolerance (mm)
L ≤ 500	by agreement
500 < L ≤ 2000	+3 0
2000 < L ≤ 5000	+5 0
5000 < L ≤ 8000	+10 0
L > 8000	by agreement

TABLE OF DIMENSIONS

Round tubes

EN 10305 - 3

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)
10	0,60	0,139	469	391	0,177	0,0196	0,039	0,333
10	0,80	0,182	469	512	0,231	0,0246	0,049	0,326
10	1,00	0,222	469	625	0,283	0,0290	0,058	0,320
10	1,25	0,27	469	760	0,344	0,0336	0,067	0,313
10	1,50	0,314	469	884	0,401	0,0373	0,075	0,305
12	0,60	0,169	547	555	0,215	0,0350	0,058	0,404
12	0,80	0,221	547	725	0,281	0,0444	0,074	0,397
12	1,00	0,271	547	889	0,346	0,0527	0,088	0,391
12	1,25	0,331	547	1 086	0,422	0,0618	0,103	0,383
12	1,50	0,388	547	1 273	0,495	0,0696	0,116	0,375
12,7	0,60	0,179	547	587	0,228	0,0418	0,066	0,428
12,7	0,80	0,235	547	771	0,299	0,0532	0,084	0,422
12,7	1,00	0,289	547	948	0,368	0,0634	0,100	0,415
12,7	1,25	0,353	547	1 159	0,450	0,0746	0,117	0,407
12,7	1,50	0,414	547	1 359	0,528	0,0842	0,133	0,400
13	0,60	0,183	547	601	0,234	0,0450	0,069	0,439
13	0,80	0,241	547	791	0,307	0,0573	0,088	0,432
13	1,00	0,296	547	971	0,377	0,0683	0,105	0,426
13	1,25	0,362	547	1 188	0,461	0,0805	0,124	0,418
13	1,50	0,425	547	1 395	0,542	0,0911	0,140	0,410
14	0,60	0,198	469	557	0,253	0,0568	0,081	0,474
14	0,80	0,26	469	732	0,332	0,0725	0,104	0,468

Round tubes

EN 10305 - 3

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)
14	1,00	0,321	469	903	0,408	0,0868	0,124	0,461
14	1,25	0,393	469	1 106	0,501	0,1027	0,147	0,453
14	1,50	0,462	469	1 300	0,589	0,1167	0,167	0,445
14	2,00	0,592	469	1 666	0,754	0,1395	0,199	0,430
15	0,60	0,213	469	599	0,271	0,0705	0,094	0,510
15	0,80	0,28	469	788	0,357	0,0902	0,120	0,503
15	1,00	0,345	469	971	0,440	0,1083	0,144	0,496
15	1,25	0,424	469	1 193	0,540	0,1287	0,172	0,488
15	1,50	0,499	469	1 404	0,636	0,1467	0,196	0,480
15	2,00	0,641	469	1 804	0,817	0,1766	0,236	0,465
16	0,60	0,228	469	642	0,290	0,0862	0,108	0,545
16	0,80	0,3	469	844	0,382	0,1106	0,138	0,538
16	1,00	0,37	469	1 041	0,471	0,1331	0,166	0,532
16	1,25	0,455	469	1 280	0,579	0,1587	0,198	0,523
16	1,50	0,536	469	1 508	0,683	0,1815	0,227	0,515
16	2,00	0,691	469	1 944	0,880	0,2199	0,275	0,500
17,2	0,60	0,246	397	586	0,313	0,1079	0,125	0,587
17,2	0,80	0,324	397	772	0,412	0,1389	0,162	0,581
17,2	1,00	0,4	397	953	0,509	0,1676	0,195	0,574
17,2	1,25	0,492	397	1 172	0,626	0,2004	0,233	0,566
17,2	1,50	0,581	397	1 384	0,740	0,2300	0,267	0,558
17,2	2,00	0,75	397	1 787	0,955	0,2806	0,326	0,542
18	0,60	0,257	397	612	0,328	0,1243	0,138	0,616
18	0,80	0,339	397	807	0,432	0,1602	0,178	0,609
18	1,00	0,419	397	998	0,534	0,1936	0,215	0,602
18	1,25	0,516	397	1 229	0,658	0,2320	0,258	0,594
18	1,50	0,61	397	1 453	0,778	0,2668	0,296	0,586
18	2,00	0,789	397	1 879	1,005	0,3267	0,363	0,570
19	0,60	0,272	331	540	0,347	0,1469	0,155	0,651
19	0,80	0,359	331	713	0,457	0,1898	0,200	0,644
19	1,00	0,444	331	882	0,565	0,2297	0,242	0,637
19	1,25	0,547	331	1 086	0,697	0,2759	0,290	0,629
19	1,50	0,647	331	1 285	0,825	0,3180	0,335	0,621
19	2,00	0,838	331	1 664	1,068	0,3912	0,412	0,605
20	0,60	0,287	331	570	0,366	0,1722	0,172	0,686
20	0,80	0,379	331	753	0,483	0,2227	0,223	0,679
20	1,00	0,469	331	931	0,597	0,2701	0,270	0,673
20	1,25	0,578	331	1 148	0,736	0,3250	0,325	0,664
20	1,50	0,684	331	1 358	0,872	0,3754	0,375	0,656

Round tubes

EN 10305 - 3

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)
20	2,00	0,888	331	1 764	1,131	0,4637	0,464	0,640
21	0,60	0,302	331	600	0,385	0,2002	0,191	0,722
21	0,80	0,399	331	792	0,508	0,2593	0,247	0,715
21	1,00	0,493	331	979	0,628	0,3149	0,300	0,708
21	1,25	0,609	331	1 209	0,776	0,3797	0,362	0,700
21	1,50	0,721	331	1 432	0,919	0,4394	0,418	0,691
21	2,00	0,937	331	1 861	1,194	0,5447	0,519	0,675
21	2,60	1,18	331	2 343	1,503	0,6487	0,618	0,657
22	0,60	0,317	331	630	0,403	0,2311	0,210	0,757
22	0,80	0,418	331	830	0,533	0,2998	0,273	0,750
22	1,00	0,518	331	1 029	0,660	0,3645	0,331	0,743
22	1,25	0,64	331	1 271	0,815	0,4401	0,400	0,735
22	1,50	0,758	331	1 505	0,966	0,5102	0,464	0,727
22	2,00	0,986	331	1 958	1,257	0,6346	0,577	0,711
22	2,50	1,202	331	2 387	1,532	0,7399	0,673	0,695
25	0,60	0,361	271	587	0,460	0,3425	0,274	0,863
25	0,80	0,477	271	776	0,608	0,4457	0,357	0,856
25	1,00	0,592	271	963	0,754	0,5438	0,435	0,849
25	1,25	0,732	271	1 190	0,933	0,6594	0,528	0,841
25	1,50	0,869	271	1 413	1,107	0,7676	0,614	0,833
25	2,00	1,134	271	1 844	1,445	0,9628	0,770	0,816
25	2,30	1,288	271	2 094	1,640	1,0673	0,854	0,807
25	2,60	1,436	271	2 335	1,830	1,1630	0,930	0,797
25	3,00	1,628	271	2 647	2,073	1,2778	1,022	0,785
25,4	0,80	0,485	271	789	0,618	0,4682	0,369	0,870
25,4	1,00	0,602	271	979	0,767	0,5714	0,450	0,863
25,4	1,25	0,744	271	1 210	0,948	0,6932	0,546	0,855
25,4	1,50	0,884	271	1 437	1,126	0,8073	0,636	0,847
25,4	2,00	1,154	271	1 876	1,470	1,0137	0,798	0,830
25,4	2,30	1,31	169	1 328	1,669	1,1244	0,885	0,821
25,4	2,60	1,462	169	1 482	1,862	1,2259	0,965	0,811
25,4	3,00	1,657	169	1 680	2,111	1,3479	1,061	0,799
26	0,60	0,376	271	611	0,479	0,3863	0,297	0,898
26	0,80	0,497	271	808	0,633	0,5033	0,387	0,891
26	1,00	0,617	271	1 003	0,785	0,6146	0,473	0,885
26	1,25	0,763	271	1 241	0,972	0,7461	0,574	0,876
26	1,50	0,906	271	1 473	1,155	0,8695	0,669	0,868
26	2,00	1,184	271	1 925	1,508	1,0933	0,841	0,851
26	2,30	1,344	169	1 363	1,712	1,2137	0,934	0,842

Round tubes

EN 10305 - 3

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	2,60	1,5	169	1 521	1,911	1,3244	1,019	0,832
26	3,00	1,702	169	1 726	2,168	1,4578	1,121	0,820
26,9	2,60	1,558	169	1 580	1,985	1,4818	1,102	0,864
27	0,80	0,517	271	841	0,658	0,5655	0,419	0,927
27	1,00	0,641	271	1 042	0,817	0,6912	0,512	0,920
27	1,25	0,794	271	1 291	1,011	0,8401	0,622	0,911
27	1,50	0,943	271	1 533	1,202	0,9801	0,726	0,903
27	2,00	1,233	271	2 005	1,571	1,2350	0,915	0,887
27	2,60	1,565	169	1 587	1,993	1,5001	1,111	0,868
27	3,00	1,776	169	1 801	2,262	1,6540	1,225	0,855
28	0,80	0,537	271	873	0,684	0,6327	0,452	0,962
28	1,00	0,666	271	1 083	0,848	0,7740	0,553	0,955
28	1,25	0,825	271	1 341	1,050	0,9416	0,673	0,947
28	1,50	0,98	271	1 593	1,249	1,0997	0,786	0,938
28	2,00	1,282	217	1 669	1,634	1,3886	0,992	0,922
28	2,60	1,629	169	1 652	2,075	1,6907	1,208	0,903
28	3,00	1,85	169	1 876	2,356	1,8673	1,334	0,890
29,1	1,00	0,693	217	902	0,883	0,8724	0,600	0,994
29,1	1,25	0,859	217	1 118	1,094	1,0625	0,730	0,986
29,1	1,50	1,021	217	1 329	1,301	1,2421	0,854	0,977
29,1	2,00	1,337	217	1 741	1,703	1,5717	1,080	0,961
29,1	2,60	1,699	169	1 723	2,165	1,9184	1,318	0,941
29,1	3,00	1,931	169	1 958	2,460	2,1223	1,459	0,929
30	0,80	0,576	217	750	0,734	0,7828	0,522	1,033
30	1,00	0,715	217	931	0,911	0,9589	0,639	1,026
30	1,25	0,886	217	1 154	1,129	1,1687	0,779	1,017
30	1,50	1,054	217	1 372	1,343	1,3674	0,912	1,009
30	2,00	1,381	217	1 798	1,759	1,7329	1,155	0,992
30	2,60	1,757	217	2 288	2,238	2,1192	1,413	0,973
30	3,00	1,998	217	2 601	2,545	2,3475	1,565	0,960
31,8	1,50	1,121	217	1 460	1,428	1,6426	1,033	1,073
31,8	2,00	1,47	217	1 914	1,872	2,0878	1,313	1,056
31,8	2,60	1,872	217	2 437	2,385	2,5622	1,611	1,036
31,8	3,00	2,131	217	2 775	2,714	2,8448	1,789	1,024
32	0,80	0,616	217	802	0,784	0,9548	0,597	1,103
32	1,00	0,765	217	996	0,974	1,1711	0,732	1,097
32	1,25	0,948	217	1 234	1,208	1,4296	0,894	1,088
32	1,50	1,128	217	1 469	1,437	1,6753	1,047	1,080
32	2,00	1,48	217	1 927	1,885	2,1300	1,331	1,063

Round tubes

EN 10305 - 3

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)
32	2,60	1,885	127	1 436	2,401	2,6149	1,634	1,044
32	3,00	2,146	127	1 635	2,733	2,9040	1,815	1,031
33,7	0,80	0,649	127	495	0,827	1,1194	0,664	1,164
33,7	1,00	0,806	127	614	1,027	1,3744	0,816	1,157
33,7	1,25	1	127	762	1,274	1,6798	0,997	1,148
33,7	1,50	1,191	127	908	1,517	1,9709	1,170	1,140
33,7	2,00	1,564	127	1 192	1,992	2,5118	1,491	1,123
33,7	2,60	1,994	127	1 519	2,540	3,0927	1,835	1,103
33,7	3,00	2,271	127	1 731	2,893	3,4413	2,042	1,091
33,7	4,00	2,93	91	1 600	3,732	4,1898	2,487	1,060
35	0,80	0,675	169	684	0,860	1,2574	0,719	1,209
35	1,00	0,838	169	850	1,068	1,5448	0,883	1,203
35	1,25	1,04	169	1 055	1,325	1,8897	1,080	1,194
35	1,50	1,239	169	1 256	1,579	2,2190	1,268	1,186
35	2,00	1,628	169	1 651	2,073	2,8329	1,619	1,169
35	3,00	2,368	127	1 804	3,016	3,8943	2,225	1,136
35	4,00	3,058	127	2 330	3,896	4,7575	2,719	1,105
38	0,80	0,734	127	559	0,935	1,6180	0,852	1,316
38	1,00	0,912	127	695	1,162	1,9906	1,048	1,309
38	1,25	1,133	127	863	1,443	2,4392	1,284	1,300
38	1,50	1,35	127	1 029	1,720	2,8692	1,510	1,292
38	2,00	1,776	127	1 353	2,262	3,6757	1,935	1,275
38	3,00	2,589	127	1 973	3,299	5,0882	2,678	1,242
38	4,00	3,354	91	1 831	4,273	6,2593	3,294	1,210
40	1,00	0,962	127	733	1,225	2,3310	1,165	1,379
40	1,25	1,195	127	911	1,522	2,8591	1,430	1,371
40	1,50	1,424	127	1 085	1,814	3,3666	1,683	1,362
40	2,00	1,874	127	1 428	2,388	4,3216	2,161	1,345
40	3,00	2,737	127	2 086	3,487	6,0066	3,003	1,312
40	4,00	3,551	91	1 939	4,524	7,4192	3,710	1,281
41	1,00	0,986	127	751	1,257	2,5148	1,227	1,415
41	1,25	1,225	127	933	1,561	3,0861	1,505	1,406
41	1,50	1,461	127	1 113	1,861	3,6355	1,773	1,398
41	2,00	1,924	127	1 466	2,450	4,6712	2,279	1,381
41	3,00	2,811	91	1 535	3,581	6,5047	3,173	1,348
41	4,00	3,65	91	1 993	4,650	8,0495	3,927	1,316
41,5	1,00	0,999	127	761	1,272	2,6103	1,258	1,432
41,5	1,25	1,241	127	946	1,581	3,2040	1,544	1,424
41,5	1,50	1,48	127	1 128	1,885	3,7752	1,819	1,415

Round tubes

EN 10305 - 3

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)
41,5	2,00	1,948	127	1 484	2,482	4,8528	2,339	1,398
41,5	3,00	2,848	91	1 555	3,629	6,7638	3,260	1,365
41,5	4,00	3,699	91	2 020	4,712	8,3777	4,037	1,333
42	1,00	1,011	127	770	1,288	2,7081	1,290	1,450
42	1,25	1,256	127	957	1,600	3,3248	1,583	1,441
42	1,50	1,498	127	1 141	1,909	3,9184	1,866	1,433
42	2,00	1,973	127	1 503	2,513	5,0391	2,400	1,416
42	3,00	2,885	127	2 198	3,676	7,0297	3,347	1,383
42	4,00	3,749	127	2 857	4,775	8,7148	4,150	1,351
42,4	2,00	1,993	127	1 519	2,538	5,1915	2,449	1,430
42,4	3,00	2,915	127	2 221	3,713	7,2474	3,419	1,397
42,4	4,00	3,788	127	2 886	4,825	8,9908	4,241	1,365
44,5	2,00	2,096	91	1 144	2,670	6,0425	2,716	1,504
44,5	3,00	3,07	91	1 676	3,911	8,4643	3,804	1,471
44,5	4,00	3,995	91	2 181	5,089	10,5366	4,736	1,439
45	1,00	1,085	91	592	1,382	3,3469	1,488	1,556
45	1,25	1,349	91	737	1,718	4,1139	1,828	1,547
45	1,50	1,609	91	879	2,050	4,8544	2,158	1,539
45	2,00	2,121	91	1 158	2,702	6,2580	2,781	1,522
45	3,00	3,107	91	1 696	3,958	8,7728	3,899	1,489
45	4,00	4,044	91	2 208	5,152	10,9291	4,857	1,456
48	1,00	1,159	91	633	1,477	4,0790	1,700	1,662
48	1,25	1,441	91	787	1,836	5,0191	2,091	1,653
48	1,50	1,72	91	939	2,191	5,9287	2,470	1,645
48	2,00	2,269	91	1 239	2,890	7,6592	3,191	1,628
48	3,00	3,329	91	1 818	4,241	10,7831	4,493	1,595
48	4,00	4,34	61	1 588	5,529	13,4913	5,621	1,562
48,3	2,00	2,284	91	1 247	2,909	7,8098	3,234	1,638
48,3	3,00	3,351	91	1 830	4,269	10,9996	4,555	1,605
48,3	4,00	4,37	61	1 599	5,567	13,7676	5,701	1,573
50	1,00	1,208	91	660	1,539	4,6220	1,849	1,733
50	1,25	1,503	91	821	1,914	5,6909	2,276	1,724
50	1,50	1,794	91	980	2,286	6,7265	2,691	1,716
50	2,00	2,368	91	1 293	3,016	8,7010	3,480	1,699
50	3,00	3,477	91	1 898	4,430	12,2812	4,912	1,665
50	4,00	4,538	61	1 661	5,781	15,4051	6,162	1,632
50,8	1,00	1,228	91	670	1,565	4,8520	1,910	1,761
50,8	1,25	1,527	91	834	1,946	5,9755	2,353	1,752
50,8	1,50	1,824	91	996	2,323	7,0647	2,781	1,744

Round tubes

EN 10305 - 3

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	2,00	2,407	91	1 314	3,066	9,1428	3,600	1,727
50,8	3,00	3,536	91	1 931	4,505	12,9173	5,086	1,693
50,8	4,00	4,617	61	1 690	5,881	16,2188	6,385	1,661
51	2,00	2,417	91	1 320	3,079	9,2555	3,630	1,734
51	3,00	3,551	91	1 939	4,524	13,0797	5,129	1,700
51	4,00	4,636	91	2 531	5,906	16,4266	6,442	1,668
55	1,25	1,657	61	606	2,111	7,6268	2,773	1,901
55	1,50	1,979	61	724	2,521	9,0272	3,283	1,892
55	2,00	2,614	61	957	3,330	11,7094	4,258	1,875
55	3,00	3,847	61	1 408	4,901	16,6201	6,044	1,842
55	4,00	5,031	61	1 841	6,409	20,9649	7,624	1,809
57	1,25	1,719	61	629	2,189	8,5099	2,986	1,972
57	1,50	2,053	61	751	2,615	10,0774	3,536	1,963
57	2,00	2,713	61	993	3,456	13,0843	4,591	1,946
57	3,00	3,995	61	1 462	5,089	18,6080	6,529	1,912
57	4,00	5,228	61	1 913	6,660	23,5187	8,252	1,879
60,3	1,25	1,82	61	666	2,319	10,1117	3,354	2,088
60,3	1,50	2,175	61	796	2,771	11,9830	3,974	2,080
60,3	2,00	2,876	61	1 053	3,663	15,5814	5,168	2,062
60,3	3,00	4,239	61	1 551	5,400	22,2246	7,371	2,029
60,3	4,00	5,554	61	2 033	7,075	28,1729	9,344	1,996
63,5	1,25	1,919	61	702	2,445	11,8458	3,731	2,201
63,5	1,50	2,294	61	840	2,922	14,0469	4,424	2,193
63,5	2,00	3,033	61	1 110	3,864	18,2883	5,760	2,176
63,5	3,00	4,476	61	1 638	5,702	26,1525	8,237	2,142
63,5	4,00	5,869	61	2 148	7,477	33,2376	10,469	2,108
65	1,25	1,965	37	436	2,503	12,7226	3,915	2,254
65	1,50	2,349	37	521	2,992	15,0909	4,643	2,246
65	2,00	3,107	37	690	3,958	19,6584	6,049	2,229
65	3,00	4,587	37	1 018	5,843	28,1431	8,659	2,195
65	4,00	6,017	37	1 336	7,665	35,8074	11,018	2,161
70	1,25	2,119	37	470	2,700	15,9563	4,559	2,431
70	1,50	2,534	37	563	3,228	18,9422	5,412	2,422
70	2,00	3,354	37	745	4,273	24,7168	7,062	2,405
70	3,00	4,957	37	1 100	6,315	35,5038	10,144	2,371
70	4,00	6,511	37	1 445	8,294	45,3256	12,950	2,338
75	1,50	2,719	37	604	3,464	23,3988	6,240	2,599
75	2,00	3,601	37	799	4,587	30,5763	8,154	2,582
75	3,00	5,327	37	1 183	6,786	44,0486	11,746	2,548

Round tubes

EN 10305 - 3

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)
75	4,00	7,004	37	1 555	8,922	56,3990	15,040	2,514
76,1	1,50	2,76	37	613	3,515	24,4649	6,430	2,638
76,1	2,00	3,655	37	811	4,656	31,9787	8,404	2,621
76,1	3,00	5,408	37	1 201	6,890	46,0961	12,115	2,587
76,1	4,00	7,112	37	1 579	9,060	59,0555	15,520	2,553
80	1,50	2,904	37	645	3,699	28,5048	7,126	2,776
80	2,00	3,847	37	854	4,901	37,2957	9,324	2,759
80	3,00	5,697	37	1 265	7,257	53,8657	13,466	2,724
80	4,00	7,497	37	1 664	9,550	69,1452	17,286	2,691
82,5	1,50	2,996	37	665	3,817	31,3152	7,592	2,864
82,5	2,00	3,971	37	882	5,058	40,9964	9,939	2,847
82,5	3,00	5,882	37	1 306	7,493	59,2790	14,371	2,813
82,5	4,00	7,744	37	1 719	9,865	76,1825	18,468	2,779
83	2,00	3,995	37	887	5,089	41,7647	10,064	2,865
83	3,00	5,919	37	1 314	7,540	60,4034	14,555	2,830
83	4,00	7,793	37	1 730	9,927	77,6449	18,710	2,797
88,9	1,50	3,233	37	718	4,119	39,3381	8,850	3,091
88,9	2,00	4,286	37	951	5,460	51,5679	11,601	3,073
88,9	3,00	6,355	37	1 411	8,096	74,7636	16,820	3,039
88,9	4,00	8,375	37	1 859	10,669	96,3398	21,674	3,005
95	1,50	3,459	37	768	4,406	48,1612	10,139	3,306
95	2,00	4,587	37	1 018	5,843	63,2033	13,306	3,289
95	3,00	6,807	37	1 511	8,671	91,8346	19,334	3,254
95	4,00	8,977	37	1 993	11,435	118,5994	24,968	3,220
100	1,50	3,644	19	415	4,642	56,3068	11,261	3,483
100	2,00	4,834	19	551	6,158	73,9518	14,790	3,466
100	3,00	7,176	19	818	9,142	107,6246	21,525	3,431
100	4,00	9,47	19	1 080	12,064	139,2153	27,843	3,397
101,6	1,50	3,703	19	422	4,717	59,0950	11,633	3,539
101,6	2,00	4,913	19	560	6,258	77,6324	15,282	3,522
101,6	3,00	7,295	19	832	9,293	113,0352	22,251	3,488
101,6	4,00	9,628	19	1 098	12,265	146,2845	28,796	3,454
108	2,00	5,228	19	596	6,660	93,5755	17,329	3,748
108	3,00	7,768	19	886	9,896	136,4908	25,276	3,714
108	4,00	10,259	19	1 170	13,069	176,9546	32,769	3,680
114,3	2,00	5,539	19	631	7,056	111,2671	19,469	3,971
114,3	3,00	8,234	19	939	10,490	162,5482	28,442	3,936
114,3	4,00	10,881	19	1 240	13,861	211,0655	36,932	3,902
120	2,00	5,82	19	663	7,414	129,0805	21,513	4,173

Round tubes

EN 10305 - 3

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)
120	3,00	8,656	19	987	11,027	188,8096	31,468	4,138
120	4,00	11,443	19	1 305	14,577	245,4765	40,913	4,104
125	2,00	6,067	19	692	7,728	146,1908	23,391	4,349
125	3,00	9,026	19	1 029	11,498	214,0539	34,249	4,315
125	4,00	11,936	19	1 361	15,205	278,5803	44,573	4,280
127	2,00	6,165	19	703	7,854	153,4373	24,163	4,420
127	3,00	9,174	19	1 046	11,687	224,7503	35,394	4,385
127	4,00	12,133	19	1 383	15,457	292,6134	46,081	4,351

Square tubes

EN 10305 - 5

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)
10	1,00	0,281	400	674	0,360	0,049	0,098	0,370
10	1,25	0,341	400	818	0,438	0,057	0,114	0,361
10	1,50	0,397	400	953	0,510	0,063	0,127	0,352
12	1,00	0,344	360	743	0,440	0,089	0,149	0,451
12	1,25	0,419	360	905	0,538	0,105	0,175	0,442
12	1,50	0,491	360	1 061	0,630	0,118	0,197	0,433
14	1,00	0,407	360	879	0,520	0,147	0,210	0,532
14	1,25	0,498	360	1 076	0,638	0,174	0,249	0,523
14	1,50	0,585	360	1 264	0,750	0,198	0,283	0,514
15	1,00	0,438	360	946	0,560	0,184	0,245	0,573
15	1,25	0,537	360	1 160	0,688	0,218	0,291	0,564
15	1,50	0,632	360	1 365	0,810	0,249	0,332	0,555
15	2,00	0,81	360	1 750	1,040	0,300	0,400	0,537
16	1,00	0,469	360	1 013	0,600	0,226	0,283	0,614
16	1,25	0,576	360	1 244	0,738	0,269	0,337	0,604
16	1,50	0,679	360	1 467	0,870	0,308	0,385	0,595
16	2,00	0,872	360	1 884	1,120	0,373	0,467	0,577
18	1,00	0,532	289	922	0,680	0,329	0,365	0,695
18	1,25	0,655	289	1 136	0,838	0,394	0,438	0,686
18	1,50	0,773	289	1 340	0,990	0,453	0,503	0,676
18	2,00	0,998	289	1 731	1,280	0,555	0,616	0,658

Square tubes

EN 10305 - 5

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)
19	1,00	0,564	225	761	0,720	0,390	0,411	0,736
19	1,25	0,694	225	937	0,888	0,468	0,493	0,726
19	1,50	0,82	225	1 107	1,050	0,540	0,568	0,717
19	2,00	1,061	225	1 432	1,360	0,664	0,699	0,699
20	0,80	0,481	225	649	0,614	0,378	0,378	0,785
20	1,00	0,595	225	803	0,760	0,459	0,459	0,777
20	1,25	0,733	225	990	0,938	0,552	0,552	0,767
20	1,50	0,868	225	1 172	1,110	0,637	0,637	0,758
20	2,00	1,124	225	1 517	1,440	0,787	0,787	0,739
22	1,00	0,658	196	774	0,840	0,619	0,563	0,858
22	1,25	0,812	196	955	1,038	0,747	0,679	0,849
22	1,50	0,962	196	1 131	1,230	0,866	0,787	0,839
22	2,00	1,249	196	1 469	1,600	1,077	0,979	0,821
25	1,00	0,752	196	884	0,960	0,923	0,739	0,981
25	1,25	0,93	196	1 094	1,188	1,119	0,896	0,971
25	1,50	1,103	196	1 297	1,410	1,303	1,042	0,961
25	2,00	1,438	196	1 691	1,840	1,635	1,308	0,943
25	3,00	1,921	169	1 948	2,640	2,169	1,735	0,906
30	1,00	0,909	169	922	1,160	1,628	1,085	1,185
30	1,25	1,126	169	1 142	1,438	1,984	1,323	1,175
30	1,50	1,339	169	1 358	1,710	2,321	1,548	1,165
30	2,00	1,752	169	1 777	2,240	2,942	1,961	1,146
30	3,00	2,392	121	1 737	3,240	3,985	2,657	1,109
35	1,00	1,066	121	774	1,360	2,623	1,499	1,389
35	1,25	1,322	121	960	1,688	3,208	1,833	1,379
35	1,50	1,574	121	1 143	2,010	3,767	2,153	1,369
35	2,00	2,066	121	1 500	2,640	4,809	2,748	1,350
35	3,00	2,863	121	2 079	3,840	6,611	3,778	1,312
40	1,00	1,223	121	888	1,560	3,957	1,979	1,593
40	1,25	1,518	121	1 102	1,938	4,854	2,427	1,583
40	1,50	1,81	121	1 314	2,310	5,715	2,858	1,573
40	2,00	2,38	121	1 728	3,040	7,337	3,668	1,553
40	3,00	3,334	121	2 420	4,440	10,197	5,099	1,515
45	1,25	1,715	100	1 029	2,188	6,984	3,104	1,787
45	1,50	2,045	100	1 227	2,610	8,241	3,663	1,777
45	2,00	2,694	100	1 616	3,440	10,624	4,722	1,757
45	3,00	3,805	100	2 283	5,040	14,893	6,619	1,719
50	1,25	1,911	81	929	2,438	9,661	3,864	1,991
50	1,50	2,281	81	1 109	2,910	11,419	4,568	1,981

Square tubes

EN 10305 - 5

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	2,00	3,008	81	1 462	3,840	14,771	5,908	1,961
50	3,00	4,276	81	2 078	5,640	20,849	8,340	1,923
60	1,25	2,303	64	884	2,938	16,906	5,635	2,399
60	1,50	2,752	64	1 057	3,510	20,033	6,678	2,389
60	2,00	3,636	64	1 396	4,640	26,046	8,682	2,369
60	3,00	5,218	64	2 004	6,840	37,141	12,380	2,330
70	1,50	3,223	49	948	4,110	32,157	9,188	2,797
70	2,00	4,264	49	1 254	5,440	41,961	11,989	2,777
70	3,00	6,16	49	1 811	8,040	60,273	17,221	2,738
80	1,50	3,694	36	798	4,710	48,391	12,098	3,205
80	2,00	4,892	36	1 057	6,240	63,315	15,829	3,185
80	3,00	7,102	36	1 534	9,240	91,445	22,861	3,146
90	2,00	5,52	36	1 192	7,040	90,910	20,202	3,594
90	3,00	8,044	36	1 738	10,440	131,857	29,302	3,554
100	2,00	6,148	25	922	7,840	125,545	25,109	4,002
100	3,00	8,986	25	1 348	11,640	182,709	36,542	3,962

Rectangular tubes

EN 10305 - 5

Dimensions			**Thickness** (mm)	**Linear Mass** (Kg/m)	**Tubes per tie**	**Weight per tie** (Kg)	**Section** (cm^2)	**Ixx** (cm^4)	**Wxx** (cm^3)	**ixx** (cm)	**Iyy** (cm^4)	**Wyy** (cm^3)	**iyy** (cm)
15	x	10	1,00	0,359	352	758	0,460	0,135	0,180	0,541	0,070	0,139	0,389
15	x	10	1,25	0,439	352	927	0,563	0,159	0,212	0,532	0,081	0,162	0,380
15	x	10	1,50	0,514	352	1 086	0,660	0,180	0,241	0,523	0,091	0,181	0,371
20	x	10	1,00	0,438	300	788	0,560	0,278	0,278	0,704	0,090	0,180	0,401
20	x	10	1,25	0,537	300	967	0,688	0,332	0,332	0,695	0,105	0,210	0,391
20	x	10	1,50	0,632	300	1 138	0,810	0,380	0,380	0,685	0,118	0,236	0,382
20	x	10	2,00	0,810	300	1 458	1,040	0,462	0,462	0,666	0,138	0,276	0,364
20	x	15	0,80	0,418	234	587	0,534	0,304	0,304	0,755	0,194	0,258	0,602
20	x	15	1,00	0,516	234	724	0,660	0,368	0,368	0,747	0,233	0,311	0,594
20	x	15	1,25	0,635	234	892	0,813	0,442	0,442	0,737	0,278	0,370	0,585
20	x	15	1,50	0,750	234	1 053	0,960	0,509	0,509	0,728	0,318	0,424	0,575
20	x	15	2,00	0,967	234	1 358	1,240	0,625	0,625	0,710	0,385	0,513	0,557
25	x	10	0,80	0,418	250	627	0,534	0,405	0,324	0,871	0,093	0,186	0,417
25	x	10	1,00	0,516	250	774	0,660	0,491	0,393	0,862	0,110	0,220	0,409

Rectangular tubes

EN 10305 - 5

Dimensions			Thickness (mm)	Linear Mass (Kg/m)	Tubes per tie	Weight per tie (Kg)	Section (cm^2)	Ixx (cm^4)	Wxx (cm^3)	ixx (cm)	Iyy (cm^4)	Wyy (cm^3)	iyy (cm)
25	x	10	1,25	0,635	250	953	0,813	0,590	0,472	0,852	0,129	0,258	0,399
25	x	10	1,50	0,750	250	1 125	0,960	0,681	0,545	0,842	0,145	0,291	0,389
25	x	10	2,00	0,967	250	1 451	1,240	0,839	0,671	0,823	0,171	0,341	0,371
25	x	13	1,00	0,564	209	707	0,720	0,577	0,462	0,896	0,203	0,312	0,530
25	x	13	1,25	0,694	209	870	0,888	0,696	0,557	0,886	0,241	0,370	0,521
25	x	13	1,50	0,820	209	1 028	1,050	0,805	0,644	0,876	0,274	0,422	0,511
25	x	13	2,00	1,061	209	1 330	1,360	0,998	0,799	0,857	0,330	0,508	0,493
25	x	15	0,80	0,481	209	603	0,614	0,522	0,418	0,922	0,234	0,312	0,617
25	x	15	1,00	0,595	209	746	0,760	0,635	0,508	0,914	0,282	0,376	0,609
25	x	15	1,25	0,733	209	919	0,938	0,767	0,613	0,904	0,337	0,449	0,599
25	x	15	1,50	0,868	209	1 088	1,110	0,888	0,711	0,895	0,386	0,515	0,590
25	x	15	2,00	1,124	209	1 409	1,440	1,104	0,883	0,876	0,470	0,627	0,571
25	x	20	1,00	0,673	200	808	0,860	0,779	0,623	0,952	0,549	0,549	0,799
25	x	20	1,25	0,831	200	997	1,063	0,943	0,754	0,942	0,662	0,662	0,789
25	x	20	1,50	0,985	200	1 182	1,260	1,096	0,877	0,933	0,766	0,766	0,780
25	x	20	2,00	1,281	200	1 537	1,640	1,369	1,095	0,914	0,950	0,950	0,761
30	x	10	0,80	0,481	225	649	0,614	0,647	0,431	1,026	0,110	0,219	0,423
30	x	10	1,00	0,595	225	803	0,760	0,787	0,524	1,017	0,131	0,261	0,414
30	x	10	1,25	0,733	225	990	0,938	0,950	0,633	1,007	0,153	0,307	0,404
30	x	10	1,50	0,868	225	1 172	1,110	1,102	0,735	0,996	0,173	0,346	0,395
30	x	10	2,00	1,124	225	1 517	1,440	1,371	0,914	0,976	0,203	0,406	0,376
30	x	15	1,00	0,673	200	808	0,860	0,997	0,665	1,077	0,331	0,441	0,620
30	x	15	1,25	0,831	200	997	1,063	1,209	0,806	1,067	0,396	0,528	0,611
30	x	15	1,50	0,985	200	1 182	1,260	1,407	0,938	1,057	0,455	0,607	0,601
30	x	15	2,00	1,281	200	1 537	1,640	1,764	1,176	1,037	0,555	0,740	0,582
30	x	20	0,80	0,607	180	656	0,774	0,988	0,658	1,129	0,526	0,526	0,824
30	x	20	1,00	0,752	180	812	0,960	1,207	0,805	1,121	0,639	0,639	0,816
30	x	20	1,25	0,930	180	1 004	1,188	1,467	0,978	1,112	0,772	0,772	0,806
30	x	20	1,50	1,103	180	1 191	1,410	1,712	1,141	1,102	0,895	0,895	0,797
30	x	20	2,00	1,438	180	1 553	1,840	2,157	1,438	1,083	1,113	1,113	0,778
30	x	20	3,00	1,921	180	2 075	2,640	2,887	1,925	1,046	1,451	1,451	0,741
30	x	25	1,00	0,830	168	837	1,060	1,418	0,945	1,156	1,067	0,854	1,003
30	x	25	1,25	1,028	168	1 036	1,313	1,726	1,150	1,147	1,296	1,037	0,994
30	x	25	1,50	1,221	168	1 231	1,560	2,016	1,344	1,137	1,510	1,208	0,984
30	x	25	2,00	1,595	168	1 608	2,040	2,549	1,699	1,118	1,900	1,520	0,965
32	x	13	1,00	0,673	200	808	0,860	1,075	0,672	1,118	0,253	0,389	0,543
32	x	13	1,25	0,831	200	997	1,063	1,304	0,815	1,108	0,301	0,464	0,533
32	x	13	1,50	0,985	200	1 182	1,260	1,517	0,948	1,097	0,344	0,530	0,523
32	x	13	2,00	1,281	200	1 537	1,640	1,903	1,190	1,077	0,416	0,640	0,504

Rectangular tubes

EN 10305 - 5

Dimensions			Thickness (mm)	Linear Mass (Kg/m)	Tubes per tie	Weight per tie (Kg)	Section (cm^2)	Ixx (cm^4)	Wxx (cm^3)	ixx (cm)	Iyy (cm^4)	Wyy (cm^3)	iyy (cm)
35	x	10	1,00	0,673	203	820	0,860	1,177	0,673	1,170	0,151	0,302	0,419
35	x	10	1,25	0,831	203	1 012	1,063	1,427	0,816	1,159	0,177	0,355	0,409
35	x	10	1,50	0,985	203	1 200	1,260	1,661	0,949	1,148	0,200	0,400	0,399
35	x	10	2,00	1,281	203	1 560	1,640	2,083	1,190	1,127	0,236	0,472	0,379
35	x	15	1,00	0,752	207	934	0,960	1,466	0,838	1,236	0,380	0,507	0,629
35	x	15	1,25	0,930	207	1 155	1,188	1,784	1,019	1,226	0,455	0,607	0,619
35	x	15	1,50	1,103	207	1 370	1,410	2,083	1,190	1,215	0,524	0,698	0,609
35	x	15	2,00	1,438	207	1 786	1,840	2,629	1,502	1,195	0,641	0,854	0,590
35	x	20	0,80	0,670	160	643	0,854	1,433	0,819	1,295	0,599	0,599	0,838
35	x	20	1,00	0,830	160	797	1,060	1,755	1,003	1,287	0,730	0,730	0,830
35	x	20	1,25	1,028	160	987	1,313	2,140	1,223	1,277	0,882	0,882	0,820
35	x	20	1,50	1,221	160	1 172	1,560	2,504	1,431	1,267	1,023	1,023	0,810
35	x	20	2,00	1,595	160	1 531	2,040	3,174	1,814	1,247	1,275	1,275	0,791
35	x	25	1,00	0,909	168	916	1,160	2,044	1,168	1,328	1,211	0,969	1,022
35	x	25	1,25	1,126	168	1 135	1,438	2,496	1,426	1,318	1,472	1,178	1,012
35	x	25	1,50	1,339	168	1 350	1,710	2,925	1,671	1,308	1,718	1,374	1,002
35	x	25	2,00	1,752	168	1 766	2,240	3,719	2,125	1,288	2,165	1,732	0,983
35	x	25	3,00	2,392	168	2 411	3,240	5,071	2,898	1,251	2,900	2,320	0,946
40	x	10	1,00	0,752	196	884	0,960	1,675	0,838	1,321	0,171	0,342	0,422
40	x	10	1,25	0,930	196	1 094	1,188	2,037	1,019	1,310	0,201	0,403	0,412
40	x	10	1,50	1,103	196	1 297	1,410	2,379	1,189	1,299	0,228	0,455	0,402
40	x	10	2,00	1,438	196	1 691	1,840	3,001	1,500	1,277	0,269	0,537	0,382
40	x	15	1,00	0,830	176	876	1,060	2,056	1,028	1,393	0,429	0,572	0,636
40	x	15	1,25	1,028	176	1 086	1,313	2,507	1,253	1,382	0,515	0,686	0,626
40	x	15	1,50	1,221	176	1 289	1,560	2,935	1,467	1,372	0,592	0,790	0,616
40	x	15	2,00	1,595	176	1 684	2,040	3,723	1,862	1,351	0,726	0,968	0,596
40	x	20	1,00	0,909	162	884	1,160	2,436	1,218	1,449	0,820	0,820	0,841
40	x	20	1,25	1,126	162	1 094	1,438	2,976	1,488	1,439	0,992	0,992	0,831
40	x	20	1,50	1,339	162	1 302	1,710	3,491	1,745	1,429	1,152	1,152	0,821
40	x	20	2,00	1,752	162	1 703	2,240	4,446	2,223	1,409	1,438	1,438	0,801
40	x	20	3,00	2,392	72	1 033	3,240	6,081	3,041	1,370	1,889	1,889	0,764
40	x	25	1,00	0,987	135	799	1,260	2,816	1,408	1,495	1,355	1,084	1,037
40	x	25	1,25	1,224	135	991	1,563	3,446	1,723	1,485	1,649	1,319	1,027
40	x	25	1,50	1,456	135	1 179	1,860	4,047	2,023	1,475	1,925	1,540	1,017
40	x	25	2,00	1,909	135	1 546	2,440	5,169	2,584	1,455	2,430	1,944	0,998
40	x	25	3,00	2,627	135	2 128	3,540	7,110	3,555	1,417	3,265	2,612	0,960
40	x	27	1,00	1,019	130	795	1,300	2,968	1,484	1,511	1,613	1,195	1,114
40	x	27	1,25	1,263	130	985	1,613	3,633	1,817	1,501	1,965	1,456	1,104
40	x	27	1,50	1,503	130	1 172	1,920	4,269	2,135	1,491	2,299	1,703	1,094

Rectangular tubes

EN 10305 - 5

Dimensions			Thickness (mm)	Linear Mass (Kg/m)	Tubes per tie	Weight per tie (Kg)	Section (cm^2)	Ixx (cm^4)	Wxx (cm^3)	ixx (cm)	Iyy (cm^4)	Wyy (cm^3)	iyy (cm)
40	x	27	2,00	1,971	130	1 537	2,520	5,458	2,729	1,472	2,911	2,156	1,075
40	x	27	3,00	2,721	130	2 122	3,660	7,522	3,761	1,434	3,937	2,916	1,037
40	x	30	1,00	1,066	130	831	1,360	3,197	1,598	1,533	2,049	1,366	1,227
40	x	30	1,25	1,322	130	1 031	1,688	3,915	1,958	1,523	2,501	1,667	1,217
40	x	30	1,50	1,574	130	1 228	2,010	4,603	2,302	1,513	2,931	1,954	1,208
40	x	30	2,00	2,066	130	1 611	2,640	5,891	2,946	1,494	3,727	2,485	1,188
40	x	30	3,00	2,863	130	2 233	3,840	8,139	4,070	1,456	5,083	3,389	1,151
45	x	15	1,00	0,909	147	802	1,160	2,777	1,234	1,547	0,478	0,638	0,642
45	x	15	1,25	1,126	147	993	1,438	3,394	1,509	1,537	0,574	0,765	0,632
45	x	15	1,50	1,339	147	1 181	1,710	3,982	1,770	1,526	0,661	0,881	0,622
45	x	15	2,00	1,752	147	1 545	2,240	5,073	2,255	1,505	0,811	1,081	0,602
45	x	20	1,00	0,987	144	853	1,260	3,261	1,450	1,609	0,910	0,910	0,850
45	x	20	1,25	1,224	144	1 058	1,563	3,993	1,774	1,599	1,102	1,102	0,840
45	x	20	1,50	1,456	144	1 258	1,860	4,692	2,085	1,588	1,280	1,280	0,830
45	x	20	2,00	1,909	144	1 649	2,440	5,998	2,666	1,568	1,601	1,601	0,810
45	x	20	3,00	2,627	144	2 270	3,540	8,267	3,674	1,528	2,108	2,108	0,772
45	x	25	1,00	1,066	144	921	1,360	3,746	1,665	1,660	1,500	1,200	1,050
45	x	25	1,25	1,322	144	1 142	1,688	4,591	2,040	1,649	1,825	1,460	1,040
45	x	25	1,50	1,574	144	1 360	2,010	5,402	2,401	1,639	2,133	1,706	1,030
45	x	25	2,00	2,066	144	1 785	2,640	6,923	3,077	1,619	2,695	2,156	1,010
45	x	25	3,00	2,863	144	2 474	3,840	9,592	4,263	1,580	3,630	2,904	0,972
50	x	10	1,00	0,909	144	785	1,160	3,044	1,218	1,620	0,212	0,424	0,427
50	x	10	1,25	1,126	144	973	1,438	3,718	1,487	1,608	0,250	0,499	0,417
50	x	10	1,50	1,339	144	1 157	1,710	4,360	1,744	1,597	0,282	0,565	0,406
50	x	10	2,00	1,752	144	1 514	2,240	5,550	2,220	1,574	0,334	0,668	0,386
50	x	15	1,00	0,987	132	782	1,260	3,644	1,458	1,701	0,527	0,703	0,647
50	x	15	1,25	1,224	132	969	1,563	4,461	1,785	1,690	0,633	0,844	0,637
50	x	15	1,50	1,456	132	1 153	1,860	5,243	2,097	1,679	0,729	0,973	0,626
50	x	15	2,00	1,909	132	1 512	2,440	6,703	2,681	1,657	0,896	1,195	0,606
50	x	20	1,00	1,066	126	806	1,360	4,245	1,698	1,767	1,001	1,001	0,858
50	x	20	1,25	1,322	126	999	1,688	5,204	2,082	1,756	1,212	1,212	0,847
50	x	20	1,50	1,574	126	1 190	2,010	6,125	2,450	1,746	1,409	1,409	0,837
50	x	20	2,00	2,066	126	1 562	2,640	7,855	3,142	1,725	1,763	1,763	0,817
50	x	20	3,00	2,863	126	2 164	3,840	10,895	4,358	1,684	2,327	2,327	0,778
50	x	25	1,00	1,144	128	879	1,460	4,845	1,938	1,822	1,644	1,315	1,061
50	x	25	1,25	1,420	128	1 091	1,813	5,947	2,379	1,811	2,002	1,601	1,051
50	x	25	1,50	1,692	128	1 299	2,160	7,007	2,803	1,801	2,340	1,872	1,041
50	x	25	2,00	2,223	128	1 707	2,840	9,008	3,603	1,781	2,960	2,368	1,021
50	x	25	3,00	3,098	128	2 379	4,140	12,554	5,022	1,741	3,995	3,196	0,982

Rectangular tubes

EN 10305 - 5

Dimensions			Thickness (mm)	Linear Mass (Kg/m)	Tubes per tie	Weight per tie (Kg)	Section (cm^2)	Ixx (cm^4)	Wxx (cm^3)	ixx (cm)	Iyy (cm^4)	Wyy (cm^3)	iyy (cm)
50	x	27	1,00	1,176	128	903	1,500	5,085	2,034	1,841	1,951	1,445	1,141
50	x	27	1,25	1,459	128	1 121	1,863	6,244	2,498	1,831	2,380	1,763	1,130
50	x	27	1,50	1,739	128	1 336	2,220	7,360	2,944	1,821	2,787	2,064	1,120
50	x	27	2,00	2,285	128	1 755	2,920	9,469	3,788	1,801	3,537	2,620	1,101
50	x	27	3,00	3,192	128	2 451	4,260	13,218	5,287	1,761	4,806	3,560	1,062
50	x	30	1,00	1,223	120	881	1,560	5,445	2,178	1,868	2,469	1,646	1,258
50	x	30	1,25	1,518	120	1 093	1,938	6,690	2,676	1,858	3,018	2,012	1,248
50	x	30	1,50	1,810	120	1 303	2,310	7,890	3,156	1,848	3,541	2,361	1,238
50	x	30	2,00	2,380	120	1 714	3,040	10,161	4,064	1,828	4,513	3,008	1,218
50	x	30	3,00	3,334	120	2 400	4,440	14,213	5,685	1,789	6,181	4,121	1,180
50	x	30	4,00	4,252	120	3 061	5,760	17,667	7,067	1,751	7,523	5,015	1,143
50	x	35	1,25	1,616	108	1 047	2,063	7,433	2,973	1,898	4,276	2,444	1,440
50	x	35	1,50	1,927	108	1 249	2,460	8,772	3,509	1,888	5,030	2,875	1,430
50	x	35	2,00	2,537	108	1 644	3,240	11,313	4,525	1,869	6,445	3,683	1,410
50	x	35	3,00	3,569	108	2 313	4,740	15,872	6,349	1,830	8,922	5,098	1,372
50	x	40	1,25	1,715	99	1 019	2,188	8,175	3,270	1,933	5,793	2,896	1,627
50	x	40	1,50	2,045	99	1 215	2,610	9,655	3,862	1,923	6,828	3,414	1,617
50	x	40	2,00	2,694	99	1 600	3,440	12,466	4,986	1,904	8,782	4,391	1,598
50	x	40	3,00	3,805	99	2 260	5,040	17,531	7,012	1,865	12,255	6,128	1,559
50	x	40	4,00	4,880	99	2 899	6,560	21,910	8,764	1,828	15,198	7,599	1,522
55	x	35	1,25	1,715	96	988	2,188	9,336	3,395	2,066	4,632	2,647	1,455
55	x	35	1,50	2,045	96	1 178	2,610	11,031	4,011	2,056	5,452	3,115	1,445
55	x	35	2,00	2,694	96	1 552	3,440	14,258	5,185	2,036	6,990	3,994	1,425
55	x	35	3,00	3,805	96	2 192	5,040	20,094	7,307	1,997	9,692	5,538	1,387
55	x	35	4,00	4,880	96	2 811	6,560	25,166	9,151	1,959	11,942	6,824	1,349
55	x	45	1,25	1,911	99	1 135	2,438	11,142	4,051	2,138	8,181	3,636	1,832
55	x	45	1,50	2,281	99	1 355	2,910	13,178	4,792	2,128	9,661	4,294	1,822
55	x	45	2,00	3,008	99	1 787	3,840	17,068	6,207	2,108	12,474	5,544	1,802
55	x	45	3,00	4,276	99	2 540	5,640	24,155	8,784	2,069	17,544	7,797	1,764
55	x	45	4,00	5,508	99	3 272	7,360	30,379	11,047	2,032	21,927	9,745	1,726
60	x	10	1,00	1,066	100	640	1,360	4,993	1,664	1,916	0,253	0,505	0,431
60	x	10	1,25	1,322	100	793	1,688	6,118	2,039	1,904	0,298	0,596	0,420
60	x	10	1,50	1,574	100	944	2,010	7,197	2,399	1,892	0,337	0,674	0,410
60	x	10	2,00	2,066	100	1 240	2,640	9,219	3,073	1,869	0,399	0,798	0,389
60	x	15	1,00	1,144	100	686	1,460	5,863	1,954	2,004	0,626	0,834	0,655
60	x	15	1,25	1,420	100	852	1,813	7,197	2,399	1,993	0,752	1,002	0,644
60	x	15	1,50	1,692	100	1 015	2,160	8,481	2,827	1,981	0,867	1,156	0,633
60	x	15	2,00	2,223	100	1 334	2,840	10,902	3,634	1,959	1,066	1,422	0,613
60	x	15	3,00	3,098	100	1 859	4,140	15,190	5,063	1,915	1,359	1,813	0,573

Rectangular tubes

EN 10305 - 5

Dimensions			Thickness (mm)	Linear Mass (Kg/m)	Tubes per tie	Weight per tie (Kg)	Section (cm^2)	Ixx (cm^4)	Wxx (cm^3)	ixx (cm)	Iyy (cm^4)	Wyy (cm^3)	iyy (cm)
60	x	20	1,00	1,223	108	793	1,560	6,733	2,244	2,078	1,181	1,181	0,870
60	x	20	1,25	1,518	108	984	1,938	8,276	2,759	2,067	1,432	1,432	0,860
60	x	20	1,50	1,810	108	1 173	2,310	9,764	3,255	2,056	1,666	1,666	0,849
60	x	20	2,00	2,380	108	1 542	3,040	12,585	4,195	2,035	2,089	2,089	0,829
60	x	20	3,00	3,334	108	2 160	4,440	17,629	5,876	1,993	2,765	2,765	0,789
60	x	20	4,00	4,252	108	2 755	5,760	21,939	7,313	1,952	3,251	3,251	0,751
60	x	25	1,25	1,616	105	1 018	2,063	9,354	3,118	2,130	2,354	1,884	1,068
60	x	25	1,50	1,927	105	1 214	2,460	11,048	3,683	2,119	2,755	2,204	1,058
60	x	25	2,00	2,537	105	1 598	3,240	14,267	4,756	2,098	3,491	2,793	1,038
60	x	25	3,00	3,569	105	2 248	4,740	20,068	6,689	2,058	4,726	3,781	0,999
60	x	30	1,25	1,715	98	1 008	2,188	10,433	3,478	2,184	3,535	2,357	1,271
60	x	30	1,50	2,045	98	1 202	2,610	12,332	4,111	2,174	4,151	2,767	1,261
60	x	30	2,00	2,694	98	1 584	3,440	15,950	5,317	2,153	5,298	3,532	1,241
60	x	30	3,00	3,805	98	2 237	5,040	22,507	7,502	2,113	7,279	4,853	1,202
60	x	30	4,00	4,880	98	2 869	6,560	28,222	9,407	2,074	8,886	5,924	1,164
60	x	40	1,25	1,911	88	1 009	2,438	12,591	4,197	2,273	6,731	3,366	1,662
60	x	40	1,50	2,281	88	1 204	2,910	14,899	4,966	2,263	7,940	3,970	1,652
60	x	40	2,00	3,008	88	1 588	3,840	19,315	6,438	2,243	10,227	5,114	1,632
60	x	40	3,00	4,276	88	2 258	5,640	27,385	9,128	2,204	14,313	7,157	1,593
60	x	40	4,00	5,508	88	2 908	7,360	34,505	11,502	2,165	17,801	8,900	1,555
60	x	50	1,25	2,107	72	910	2,688	14,748	4,916	2,343	11,147	4,459	2,037
60	x	50	1,50	2,516	72	1 087	3,210	17,466	5,822	2,333	13,184	5,274	2,027
60	x	50	2,00	3,322	72	1 435	4,240	22,681	7,560	2,313	17,077	6,831	2,007
60	x	50	3,00	4,747	72	2 051	6,240	32,263	10,754	2,274	24,167	9,667	1,968
60	x	50	4,00	6,136	42	1 546	8,160	40,787	13,596	2,236	30,395	12,158	1,930
70	x	20	1,25	1,715	95	978	2,188	12,316	3,519	2,373	1,652	1,652	0,869
70	x	20	1,50	2,045	95	1 166	2,610	14,559	4,160	2,362	1,924	1,924	0,858
70	x	20	2,00	2,694	95	1 536	3,440	18,834	5,381	2,340	2,414	2,414	0,838
70	x	20	3,00	3,805	95	2 169	5,040	26,583	7,595	2,297	3,203	3,203	0,797
70	x	30	1,25	1,911	84	963	2,438	15,271	4,363	2,503	4,052	2,701	1,289
70	x	30	1,50	2,281	84	1 150	2,910	18,078	5,165	2,492	4,760	3,174	1,279
70	x	30	2,00	3,008	84	1 516	3,840	23,459	6,703	2,472	6,083	4,055	1,259
70	x	40	1,50	2,516	72	1 087	3,210	21,598	6,171	2,594	9,052	4,526	1,679
70	x	40	2,00	3,322	72	1 435	4,240	28,085	8,024	2,574	11,673	5,836	1,659
70	x	40	3,00	4,747	72	2 051	6,240	40,059	11,445	2,534	16,371	8,186	1,620
70	x	40	4,00	6,136	72	2 651	8,160	50,779	14,508	2,495	20,403	10,202	1,581
70	x	50	1,50	2,752	63	1 040	3,510	25,118	7,177	2,675	14,949	5,980	2,064
70	x	50	2,00	3,636	63	1 374	4,640	32,710	9,346	2,655	19,382	7,753	2,044
70	x	50	3,00	5,218	63	1 972	6,840	46,797	13,371	2,616	27,485	10,994	2,005

Rectangular tubes

EN 10305 - 5

Dimensions			Thickness (mm)	Linear Mass (Kg/m)	Tubes per tie	Weight per tie (Kg)	Section (cm^2)	Ixx (cm^4)	Wxx (cm^3)	ixx (cm)	Iyy (cm^4)	Wyy (cm^3)	iyy (cm)
70	x	50	4,00	6,764	50	2 029	8,960	59,502	17,001	2,577	34,638	13,855	1,966
70	x	60	1,50	2,987	50	896	3,810	28,638	8,182	2,742	22,601	7,534	2,436
70	x	60	2,00	3,950	50	1 185	5,040	37,335	10,667	2,722	29,411	9,804	2,416
70	x	60	3,00	5,689	50	1 707	7,440	53,535	15,296	2,682	42,019	14,006	2,376
70	x	60	4,00	7,392	40	1 774	9,760	68,225	19,493	2,644	53,353	17,784	2,338
80	x	20	1,25	1,911	68	780	2,438	17,450	4,363	2,676	1,872	1,872	0,876
80	x	20	1,50	2,281	68	931	2,910	20,658	5,164	2,664	2,181	2,181	0,866
80	x	20	2,00	3,008	68	1 227	3,840	26,803	6,701	2,642	2,739	2,739	0,845
80	x	20	3,00	4,276	68	1 745	5,640	38,057	9,514	2,598	3,641	3,641	0,803
80	x	20	4,00	5,508	68	2 247	7,360	48,009	12,002	2,554	4,297	4,297	0,764
80	x	30	1,25	2,107	70	885	2,688	21,326	5,332	2,817	4,569	3,046	1,304
80	x	30	1,50	2,516	70	1 057	3,210	25,280	6,320	2,806	5,370	3,580	1,293
80	x	30	2,00	3,322	70	1 395	4,240	32,889	8,222	2,785	6,869	4,579	1,273
80	x	30	3,00	4,747	70	1 994	6,240	46,955	11,739	2,743	9,475	6,317	1,232
80	x	30	4,00	6,136	50	1 841	8,160	59,571	14,893	2,702	11,611	7,741	1,193
80	x	40	1,50	2,752	72	1 189	3,510	29,902	7,476	2,919	10,164	5,082	1,702
80	x	40	2,00	3,636	72	1 571	4,640	38,974	9,743	2,898	13,118	6,559	1,681
80	x	40	3,00	5,218	72	2 254	6,840	55,853	13,963	2,858	18,429	9,215	1,641
80	x	40	4,00	6,764	50	2 029	8,960	71,134	17,783	2,818	23,006	11,503	1,602
80	x	50	1,50	2,987	60	1 075	3,810	34,525	8,631	3,010	16,714	6,685	2,094
80	x	50	2,00	3,950	60	1 422	5,040	45,059	11,265	2,990	21,687	8,675	2,074
80	x	50	3,00	5,689	60	2 048	7,440	64,751	16,188	2,950	30,803	12,321	2,035
80	x	50	4,00	7,392	60	2 661	9,760	82,697	20,674	2,911	38,881	15,552	1,996
80	x	60	1,50	3,223	42	812	4,110	39,147	9,787	3,086	25,168	8,389	2,475
80	x	60	2,00	4,264	42	1 075	5,440	51,145	12,786	3,066	32,777	10,926	2,455
80	x	60	3,00	6,160	42	1 552	8,040	73,649	18,412	3,027	46,897	15,632	2,415
80	x	60	4,00	8,020	42	2 021	10,560	94,259	23,565	2,988	59,635	19,878	2,376
90	x	40	1,50	2,987	50	896	3,810	39,962	8,880	3,239	11,277	5,638	1,720
90	x	40	2,00	3,950	50	1 185	5,040	52,183	11,596	3,218	14,563	7,282	1,700
90	x	40	3,00	5,689	50	1 707	7,440	75,067	16,682	3,176	20,487	10,244	1,659
90	x	40	4,00	7,392	50	2 218	9,760	95,969	21,326	3,136	25,609	12,804	1,620
90	x	50	1,50	3,223	45	870	4,110	45,836	10,186	3,340	18,478	7,391	2,120
90	x	50	2,00	4,264	45	1 151	5,440	59,929	13,317	3,319	23,993	9,597	2,100
90	x	50	3,00	6,160	45	1 663	8,040	86,425	19,206	3,279	34,121	13,648	2,060
90	x	50	4,00	8,020	40	1 925	10,560	110,771	24,616	3,239	43,123	17,249	2,021
95	x	25	1,50	2,752	60	991	3,510	35,860	7,550	3,196	4,206	3,365	1,095
95	x	25	2,00	3,636	60	1 309	4,640	46,745	9,841	3,174	5,347	4,277	1,073
95	x	25	3,00	5,218	60	1 878	6,840	67,000	14,105	3,130	7,283	5,826	1,032
95	x	25	4,00	6,764	48	1 948	8,960	85,332	17,965	3,086	8,808	7,046	0,991

Rectangular tubes

EN 10305 - 5

Dimensions			Thickness (mm)	Linear Mass (Kg/m)	Tubes per tie	Weight per tie (Kg)	Section (cm^2)	Ixx (cm^4)	Wxx (cm^3)	ixx (cm)	Iyy (cm^4)	Wyy (cm^3)	iyy (cm)
100	x	20	1,50	2,752	80	1 321	3,510	37,371	7,474	3,263	2,695	2,695	0,876
100	x	20	2,00	3,636	80	1 745	4,640	48,702	9,740	3,240	3,390	3,390	0,855
100	x	20	3,00	5,218	60	1 878	6,840	69,765	13,953	3,194	4,517	4,517	0,813
100	x	30	1,50	2,987	50	896	3,810	44,649	8,930	3,423	6,590	4,393	1,315
100	x	30	2,00	3,950	50	1 185	5,040	58,307	11,661	3,401	8,439	5,626	1,294
100	x	30	3,00	5,689	50	1 707	7,440	83,883	16,777	3,358	11,671	7,781	1,252
100	x	30	4,00	7,392	30	1 331	9,760	107,241	21,448	3,315	14,337	9,558	1,212
100	x	40	1,50	3,223	55	1 064	4,110	51,926	10,385	3,554	12,389	6,194	1,736
100	x	40	2,00	4,264	55	1 407	5,440	67,913	13,583	3,533	16,009	8,004	1,715
100	x	40	3,00	6,160	55	2 033	8,040	98,001	19,600	3,491	22,545	11,273	1,675
100	x	40	4,00	8,020	40	1 925	10,560	125,683	25,137	3,450	28,211	14,106	1,634
100	x	50	1,50	3,458	50	1 037	4,410	59,203	11,841	3,664	20,243	8,097	2,142
100	x	50	2,00	4,578	50	1 373	5,840	77,518	15,504	3,643	26,298	10,519	2,122
100	x	50	3,00	6,631	50	1 989	8,640	112,119	22,424	3,602	37,439	14,976	2,082
100	x	50	4,00	8,648	36	1 868	11,360	144,126	28,825	3,562	47,366	18,946	2,042
100	x	60	1,50	3,694	35	776	4,710	66,480	13,296	3,757	30,302	10,101	2,536
100	x	60	2,00	4,892	35	1 027	6,240	87,123	17,425	3,737	39,507	13,169	2,516
100	x	60	3,00	7,102	35	1 491	9,240	126,237	25,247	3,696	56,653	18,884	2,476
100	x	60	4,00	9,276	35	1 948	12,160	162,569	32,514	3,656	72,201	24,067	2,437
100	x	70	2,00	5,206	30	937	6,640	96,729	19,346	3,817	55,837	15,953	2,900
100	x	70	3,00	7,573	30	1 363	9,840	140,355	28,071	3,777	80,487	22,996	2,860
100	x	70	4,00	9,904	30	1 783	12,960	181,011	36,202	3,737	103,115	29,461	2,821
100	x	80	2,00	5,520	30	994	7,040	106,334	21,267	3,886	75,486	18,871	3,275
100	x	80	3,00	8,044	30	1 448	10,440	154,473	30,895	3,847	109,241	27,310	3,235
100	x	80	4,00	10,532	30	1 896	13,760	199,454	39,891	3,807	140,510	35,127	3,196
105	x	55	1,50	3,694	35	776	4,710	70,721	13,471	3,875	26,061	9,477	2,352
105	x	55	2,00	4,892	35	1 027	6,240	92,700	17,657	3,854	33,930	12,338	2,332
105	x	55	3,00	7,102	35	1 491	9,240	134,373	25,595	3,813	48,518	17,643	2,291
105	x	55	4,00	9,276	35	1 948	12,160	173,115	32,974	3,773	61,655	22,420	2,252
120	x	40	1,50	3,694	48	1 064	4,710	82,169	13,695	4,177	14,613	7,307	1,761
120	x	40	2,00	4,892	48	1 409	6,240	107,731	17,955	4,155	18,899	9,450	1,740
120	x	40	3,00	7,102	30	1 278	9,240	156,229	26,038	4,112	26,661	13,331	1,699
120	x	40	4,00	9,276	30	1 670	12,160	201,353	33,559	4,069	33,417	16,708	1,658
120	x	50	2,00	5,206	32	1 000	6,640	121,657	20,276	4,280	30,909	12,363	2,158
120	x	50	3,00	7,573	32	1 454	9,840	176,767	29,461	4,238	44,075	17,630	2,116
120	x	50	4,00	9,904	32	1 902	12,960	228,275	38,046	4,197	55,851	22,340	2,076
120	x	60	2,00	5,520	32	1 060	7,040	135,582	22,597	4,388	46,238	15,413	2,563
120	x	60	3,00	8,044	32	1 544	10,440	197,305	32,884	4,347	66,409	22,136	2,522
120	x	60	4,00	10,532	32	2 022	13,760	255,198	42,533	4,307	84,766	28,255	2,482

STEEL GRADES

Steel grades are available in the following surface states:
Galvanized, cold rolled, hot rolled (rough rolled/pickled).

Steel grade	**Chemical properties** Nominal thickness % by mass						**Mechanical properties** +CR1		+CR2		
	C % máx.	Si % máx.	Mn % máx.	P % máx.	S % máx.	Al_{total} % mín.	R_m (MPa) mín.	A % mín.	R_m (MPa) mín.	R_{eH} (MPa) mín.	A % mín.
E155	0,11	0,35	0,70	0,025	0,025	0,015	290	15	-	-	-
E190	0,10						-	-	270	190	26
E195	0,15	0,35	0,70	0,025	0,025	0,015	330	8	-	-	-
E220	0,14						-	-	310	220	23
E235	0,17	0,35	1,20	0,025	0,025	0,015	390	7	-	-	-
E260	0,16						-	-	340	260	21
E275	0,21	0,35	1,40	0,025	0,025	0,015	440	6	-	-	-
E320	0,20						-	-	410	320	19
E355	0,22	0,55	1,60	0,025	0,025	0,020	540	5	-	-	-
E370	0,21						-	-	450	370	15
E420	0,16	0,55	1,70	0,025	0,025	0,020	-	-	490	420	12
E460	0,16						-	-	510	460	9
E500	0,16	0,55	1,70	0,025	0,025	0,020	-	-	540	500	8
E550	0,16	0,55	1,80	0,025	0,025	0,020	-	-	590	550	7
E600	0,16	0,60	1,80	0,025	0,025	0,020	-	-	640	600	6
E700	0,16	0,60	2,10	0,025	0,025	0,020	-	-	740	700	5

Steel grades are available in the following surface states:
Hot rolled (rough rolled/pickled).

Steel grade	**Chemical properties (% máx.)** Nominal thickness % by mass				**Mechanical properties** R_{eL} (MPa) Thickness (mm)		R_m Thickness (mm)	$L_0 = 80mm$ Thickness (mm)			$L_0 = 5{,}65\sqrt{S_0}$ Thickness (mm)
	C % máx.	Mn % máx.	P % máx.	S % máx.	1 ≤ ≤ 2	2 ≤ ≤ 11	máx. MPa	1 < 1,5	1,5 < 2	2 < 3	3 ≤ 11
DD11	0,12	0,60	0,045	0,045	170-360	170-340	440	22	23	24	28
DD12	0,10	0,45	0,035	0,035	170-340	170-320	420	24	25	26	30
DD13	0 08	0 40	0 030	0 030	170-330	170-310	400	27	28	29	33

Steel grades are available in the following surface states:
Hot rolled (rough rolled/pickled).

Steel grade	**Chemical properties** Nominal thickness < 16mm % by mass								**Mechanical properties** R_{eH} mín. Thickness (mm)	R_m Thickness (mm)		$L_0 = 80mm$ Thickness (mm)					$L_0 = 5,65$ Thickness (mm)
	C % máx.	Si % máx.	Mn % máx.	P % máx.	S % máx.	N % máx.	Cu % máx.	CEV % máx.	≤ 16	< 3	≥ 3 ≤ 100	≤ 1	> 1 ≤ 1,5	> 1,5 ≤ 2	> 2 ≤ 2,5	> 2,5 ≤ 3	> 3 ≤ 40
S235JR	0,19	-	1,50	0,045	0,045	0,014	0,60	0,35	235	360 a 510	360 a 510	17	18	19	20	21	26
S275JR	0,24	-	1,60	0,045	0,045	0,014	0,60	0,40	275	430 a 580	410 a 560	15	16	17	18	19	23
S355JR	0,27	0,60	1,70	0,045	0,045	0,014	0,60	0,45	355	510 a 680	470 a 630	14	15	16	17	18	22

Steel grades are available in the following surface states:
Galvanized.

Steel grade	**Coating type**	**Chemical properties** Nominal thickness % by mass								**Mechanical properties** Coating symbols	R_e (MPa)	R_m (MPa)	A_{80} min. %
		C % máx.	Si % máx.	Mn % máx.	P % máx.	S % máx.	Ti % máx. [a]	Al_{total} % mín.	Nb % máx.				
DX51D	+Z;+ZF;+ZA;+ZM;+AZ;+AS	0,18	0,50	1,20	0,12	0,045	0,30	-	-	+Z;+ZF;+ZA;+ZM;+AZ;+AS	-	270-500	22
DX52D	+Z;+ZF;+ZA;+ZM;+AZ;+AS	0,12	0,50	0,60	0,10	0,045	0,30	-	-	+Z;+ZF;+ZA;+ZM;+AZ;+AS	140-300	270-420	26
DX53D	+Z;+ZF;+ZA;+ZM;+AZ;+AS	0,12	0,50	0,60	0,10	0,045	0,30	-	-	+Z;+ZF;+ZA;+ZM;+AZ;+AS	140-260	270-380	30
											$R_{p\,0,2}$ min.	R_m min.	A_{80} min.
S220GD	+Z;+ZF;+ZA;+ZM;+AZ;	0,20	0,60	1,70	0,10	0,045	-	-	-	+Z;+ZF;+ZA;+ZM;+AZ;	220	300	20
S250GD	+Z;+ZF;+ZA;+ZM;+AZ;+AS	0,20	0,60	1,70	0,10	0,045	-	-	-	+Z;+ZF;+ZA;+ZM;+AZ;+AS	250	330	19
S280GD	+Z;+ZF;+ZA;+ZM;+AZ;+AS	0,20	0,60	1,70	0,10	0,045	-	-	-	+Z;+ZF;+ZA;+ZM;+AZ;+AS	280	360	18
S320GD	+Z;+ZF;+ZA;+ZM;+AZ;+AS	0,20	0,60	1,70	0,10	0,045	-	-	-	+Z;+ZF;+ZA;+ZM;+AZ;+AS	320	390	17
S350GD	+Z;+ZF;+ZA;+ZM;+AZ;+AS	0,20	0,60	1,70	0,10	0,045	-	-	-	+Z;+ZF;+ZA;+ZM;+AZ;+AS	350	420	16
											$R_{p\,0,2}$	R_m	A_{80} min.
HX260LAD	+Z;+ZF;+ZA;+ZM;+AZ;+AS	0,11	0,50	1,00	0,03	0,025	0,15	0,015	0,09		260-330	350-430	26
HX300LAD	+Z;+ZF;+ZA;+ZM;+AZ;+AS	0,12	0,50	1,40	0,03	0,025	0,15	0,015	0,09		300-380	380-480	23
HX340LAD	+Z;+ZF;+ZA;+ZM;+AZ;+AS	0,12	0,50	1,40	0,03	0,025	0,15	0,015	0,10		340-420	410-510	21

[a] By agreement upon inquiry and ordering, the Ti content for the steel grades mentioned in this table may be reduced to <0.05%, meaning that the steel grade is unalloyed.

Steel grades are available in the following surface states:
Cold rolled.

Steel grade	**Chemical properties** Nominal thickness % by mass				**Mechanical properties**				
					R_e (MPa) [a] máx.	R_m (MPa)	A_{80} [c] %	r_{90} [d] [e] mín.	n_{90} [d] mín.
	C % máx.	Mn % máx.	P % máx.	S % máx.					
DC01	0,12	0,60	0,045	0,045	-/280 [b]	270-410	28	-	-
DC03	0,10	0,45	0,035	0,035	-/240 [b]	270-370	34	1,3	-

[a] The yield strength values are the conventional 0.2% proportionality limit for products that do not have an elongation effect and the lower elongation limit (ReL) for others. In cases where the thickness is less than or equal to 0.7 mm, but greater than 0.5 mm, the maximum yield strength value is increased by 20 N/mm2. For thicknesses of 0.5 mm or less, the maximum yield strength value is increased by 40 MPa.
[b] For calculation purposes, the lower Re limit for grades DC01, DC03, DC04 and DC05 can be equal to 140 MPa.
[c] In cases where the thickness is less than or equal to 0.7 mm, but greater than 0.5 mm, the minimum value for elongation after breakage is decreased by 2 units. For thicknesses of 0.5 mm or less, the minimum value for elongation after breakage is decreased by 4 units.
[d] The r90 and n90 values are only applicable for thicknesses greater than or equal to 0.5 mm.
[e] In cases where the thickness is greater than 2 mm, the r90 value is decreased by 0.2.

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.

CORNER WELDABILITY

It is possible to supply tubes that meet the requirements compatible with weldability at the corners according to EC3.

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