

sicam[®]



**STRUCTURAL
TUBES AND
SHEETS**
STB

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TUBES FOR CONSTRUCTIONS

STEELS FEATURURES

MECHANICAL PROPERTIES

Steel grade	Delivery condition ¹	Yield strength min. ReH (N/mm ² =Mpa)						Tensile strength min./max. Rm (N/mm ² =Mpa)			Longitudinal elongation min. (%)				Longitudinal impact value (J min.)				
		For w.t. in mm														Test temperature (°C)			
		≤ 16	> 16 ≤ 40	> 40 ≤ 63	> 63 ≤ 80	> 80 ≤ 100	> 100 ≤ 120	≤ 3	> 3 ≤ 100	> 100 ≤ 120	≤ 40	> 40 ≤ 63	> 63 ≤ 100	> 100 ≤ 120	- 50	- 20	0	20	
S235JRH	+AR	235	225	215	215	215	195	360-510	360-510	350-500	26(24) ¹	25	24	22	-	-	-	27	
S275J0H	+AR	275	265	255	245	235	225	430-580	410-560	400-540	23(20) ¹	22	21	19	-	-	27	-	
S275J2H	+AR														-	27	-	-	
S355J0H	+AR	355	345	335	325	315	295	510-680	470-630	450-600	22(20) ¹	21	20	18	-	-	27	-	
S355J2H	+AR														-	27	-	-	
S355K2H	+AR														-	40	-	-	
		For w.t. in mm																	
		≤ 16	> 16 ≤ 40	> 40 ≤ 65	≤ 65			≤ 65											
S275NH	+N	275	265	255	370-510			24				-	40	-	-				
S275NLH												27	-	-	-				
S355NH	+N	355	345	335	470-630			22				-	40	-	-				
S355NLH												27	-	-	-				
S420NH	+N	420	400	390	520-680			19				-	40	-	-				
S420NLH												27	-	-	-				
S460NH	+N	460	440	430	540-720			17				-	40	-	-				
S460NLH												27	-	-	-				
		For w.t. in mm																	
		≤ 16	> 16 ≤ 40	-	≤ 40			≤ 40											
S275MH	+M	275	265	-	360-510			24				-	40	-	-				
S275MLH												27	-	-	-				
S355MH	+M	355	345	-	450-610			22				-	40	-	-				
S355MLH												27	-	-	-				
S420MH	+M	420	400	-	500-660			19				-	40	-	-				
S420MLH												27	-	-	-				
S460MH	+M	460	440	-	530-720			17				-	40	-	-				
S460MLH												27	-	-	-				

¹The delivery condition + M stands for thermomechanical rolling, in case of cold finished tubes, the heat treatments are effected on the base coil, not on the finished tube.

Impact test is optional for JR and J0 classes.

(¹) According to EN 10219.

 Steels for hot finished tubes  Steels for cold finished tubes  Steels for both hot and cold finished tubes



CHEMICAL ANALYSIS

Steelgrade	CHEMICAL ELEMENTS (% on mass)														
	C	Si	Mn		P	S	Nb	V	Al	Ti	Cr	Ni	Mo	Cu	N
	max.	max.	min.	max.	max.	max.	max.	max.	min.	max.	max.	max.	max.	max.	max.
S235JRH	0.17 (0.20) ²	-	-	1.40	0.040	0.040	-	-	-	-	-	-	-	-	0.009
S275J0H	0.20 (0.22) ²	-	-	1.50	0.035	0.035	-	-	-	-	-	-	-	-	0.009
S275J2H	0.20 (0.22) ²	-	-	1.50	0.030	0.030	-	-	-	-	-	-	-	-	-
S355J0H	0.22	0.55	-	1.60	0.035	0.035	-	-	-	-	-	-	-	-	0.009
S355J2H	0.22	0.55	-	1.60	0.030	0.030	-	-	-	-	-	-	-	-	-
S355K2H	0.22	0.55	-	1.60	0.030	0.030	-	-	-	-	-	-	-	-	-
S275NH	0.20	0.40	0.50	1.40	0.035	0.030	0.050	0.08	0.020	0.03	0.30	0.30	0.10	0.35	0.015
S275NLH					0.030	0.025									
S355NH	0.20	0.50	0.90	1.65	0.035	0.030	0.050	0.12	0.020	0.03	0.30	0.50	0.10	0.35	0.020
S355NLH					0.030	0.025									
S420NH	0.22	0.60	1.00	1.70	0.035	0.030	0.050	0.20	0.020	0.03	0.30	0.80	0.10	0.70	0.025
S420NLH					0.030	0.025									
S460NH	0.22	0.60	1.00	1.70	0.035	0.030	0.050	0.20	0.020	0.03	0.30	0.80	0.10	0.70	0.025
S460NLH					0.030	0.025									
S275MH	0.13	0.50	-	1.50	0.035	0.030	0.050	0.08	0.020	0.05	-	0.30	0.20	-	0.020
S275MLH					0.030	0.025									
S355MH	0.14	0.50	-	1.50	0.035	0.030	0.050	0.10	0.020	0.05	-	0.30	0.20	-	0.020
S355MLH					0.030	0.025									
S420MH	0.16	0.50	-	1.70	0.035	0.030	0.050	0.12	0.020	0.05	-	0.30	0.20	-	0.020
S420MLH					0.030	0.025									
S460MH	0.16	0.60	-	1.70	0.035	0.030	0.050	0.12	0.020	0.05	-	0.30	0.20	-	0.025
S460MLH					0.030	0.025									

(²) for w.t. in mm >40 e ≤ 120.

DIMENSIONAL TOLERANCES

DIMENSIONAL TOLERANCES FOR "HOT FINISHED" SEAMLESS AND WELDED TUBES ACCORDING TO EN 10210-2

O.D.: ± 1%, with a min ± 0.5 mm and a max ± 10 mm.

W.T.: - 10%, in case of SEAMLESS TUBES a deviation of - 12.5 % is allowed, but it must not affect more than 25 % of the tube circumference.

Positive deviations from the nominal size are ruled by tolerances on mass.

OVALITY: for tubes with a O.D./W.T. ratio below 100, it must not exceed 2 %.

STRAIGHTNESS: GLOBAL DEVIATION: max 0.2 % on the total length of the tube.

LOCAL DEVIATION: max 3 mm on each meter length.

MASS: ± 6 % on the theoretical weight stated by the norm, to be checked on each single tube.

± 8% only for SEAMLESS tubes.

DIMENSIONAL TOLERANCES FOR "COLD FINISHED" WELDED TUBES ACCORDING TO EN 10219-2

O.D.: ± 1%, with a min ± 0.5 mm and a max ± 10 mm.

W.T.: For O.D. ≤ 406.4 mm

W.T. ≤ 5 mm tolerance ± 10 %

W.T. > 5 mm tolerance ± 0,5 mm.

For O.D. > 406.4 mm tolerance ± 10 % with ± 2 mm max.

OVALITY: for tubes with a O.D./W.T. ratio below 100, not over 2 %.

STRAIGHTNESS: GLOBAL DEVIATION: max 0.2 % on the total length of the tube.

LOCAL DEVIATION: max 3 mm on each meter length

MASS: ± 6 % on the theoretical weight stated by the norm, to be checked on each single tube.

Note: upon request it is possible to supply material with more restrictive tolerances than what stated by the norm.

TUBES FOR CONSTRUCTIONS

SEAMLESS TUBES

The round **SEAMLESS** tubes are hot rolled and satisfy the requirements of the norm EN 10210-1/2 for structural purposes, the norm EN 10297-1 for mechanical applications and the norm EN 10216-3 for pressure purposes as well (please also check our catalogue "Tubes for mechanical applications").

These tubes are made of fully killed steel and are suitable for all structural constructions; they can reach wall thicknesses up to 120 mm, which are impossible to be manufactured as welded tubes.

APPLICATIONS

These tubes are used for the manufacture of various kinds of construction components, mainly where heavy wall thicknesses are required.

NORMS

EN 10210-1/2 (structural applications)

EN 10297-1 (mechanical applications)

EN 10216-3 (pressure purposes)

CE MARK

The tubes available as standard stock belong to manufacturers fulfilling the requirements of the European Regulation 305/2011 for construction products, which Factory Production Control is certified by a third party notified body. Therefore the material is approved with the relevant CE mark and is accompanied with the Declaration of Performance of the manufacturer.

SICAM has also implemented a Factory Production Control on the cutting process, certified by a third party notified body according to the norm EN 1090-1. Upon request, the tubes cut to required length by band saw machines (with ends not finished for immediate welding) can be supplied in compliance with class EXC3 of the norm EN 10901-1 with a specific Declaration of Performance.





HOT FINISHED OR COLD FINISHED WELDED TUBES WITH WELDING BEAD TRIMMED

The round tubes are manufactured from a coil that is bent and electric resistance welded (ERW). The forming process can be according to EN 10210, which foresees hot forming or cold forming followed by heat treatment, or according to EN 10219, which foresees cold forming without following heat treatments. The finished product is fully killed and welding seam bead is inside and outside trimmed.

CE MARK

Also this kind of product belongs only to manufacturers with a Factory Production Control certified by notified third party bodies, according to European Regulation 305/2011. Therefore the produced tubes are delivered with CE mark and the Declaration of Performance of the producer. These tubes, upon request, can be supplied cut to fixlength by band saw (ends not finished for immediate welding), according to class EXC3 of the norm EN 1090-1.

APPLICATIONS

These products are used to manufacture both welded and bolted structures, in the field of constructions, engineering, industrial constructions, transports, automotive, agricultural machinery and earth moving machinery. The cold finished tubes are particularly suitable for structures at sight or for aesthetical uses, thanks to the surface aspect typical of cold forming.

NORMS

"HOT FINISHED" TUBES	EN 10210-1/2
"COLD FINISHED" TUBES	EN 10219-1/2
INSIDE TRIMMING	EN 10217



CONSTRUCTION TUBES

DIMENSIONAL TABLE FOR SEAMLESS TUBES SUITABLE FOR CONSTRUCTIONS

O.D. mm	W.T. mm															
	4,0	5,0	6,3	7,1	8,0	8,8	10,0	11,0	12,5	14,2	16,0	17,5	20,0	22,2	25,0	28,0
21,3	1,7	2,0	2,3													
26,9	2,3	2,7	3,2													
33,7	2,9	3,5	4,3	4,7	5,1	5,4	5,8									
38,0	3,4	4,1	4,9	5,4	5,9	6,3	6,9									
42,4	3,8	4,6	5,6	6,2	6,8	7,3	8,0									
44,5	4,0	4,9	5,9	6,5	7,2	7,7	8,5	9,0	9,9							
48,3	4,4	5,3	6,5	7,2	7,9	8,6	9,4	10,1	11,0							
51,0	4,6	5,7	6,9	7,7	8,4	9,1	10,1	10,9	11,9	12,9						
54,0	4,9	6,0	7,4	8,2	9,0	9,8	10,9	11,7	12,9	13,9						
57,0	5,2	6,4	7,9	8,8	9,6	10,4	11,6	12,5	13,8	15,0	16,2					
60,3	5,6	6,8	8,4	9,3	10,3	11,1	12,4	13,4	14,8	16,2	17,4	18,5				
63,5	5,9	7,2	8,9	9,9	10,9	11,8	13,2	14,3	15,8	17,3	18,7	19,9				
67,0	6,2	7,6	9,4	10,5	11,6	12,6	14,1	15,2	16,8	18,5	20,1	21,4	23,2			
70,0	6,5	8,0	9,9	11,0	12,2	13,2	14,8	16,0	17,8	19,6	21,2	22,6	24,7			
73,0	6,8	8,4	10,4	11,6	12,8	13,9	15,5	16,9	18,8	20,6	22,4	23,9	26,1			
76,1	7,1	8,8	10,9	12,1	13,4	14,6	16,3	17,7	19,7	21,7	23,7	25,3	27,7	27,7		
82,5	7,7	9,6	11,9	13,2	14,6	15,9	17,9	19,5	21,7	24,0	26,2	28,0	30,8	33,0	35,4	
88,9	8,4	10,3	12,9	14,4	15,9	17,3	19,5	21,2	23,7	26,2	28,7	30,7	34,0	36,5	39,4	
95,0	9,0	11,1	13,8	15,4	17,2	18,9	21,0	23,1	25,4	28,3	31,2	33,4	37,0	39,9	43,0	46,3
101,6	9,6	11,9	14,9	16,6	18,4	20,1	22,6	24,7	27,6	30,7	33,7	36,2	40,2	43,5	47,5	50,8
108,0	10,3	12,7	15,8	17,7	19,6	21,4	24,2	26,4	29,6	32,9	36,2	39,0	43,4	47,0	51,4	55,2
114,3	10,9	13,5	16,8	18,8	20,9	22,8	25,7	28,1	31,6	35,1	38,6	41,7	46,5	50,4	55,3	59,3
121,0	11,5	14,3	17,8	19,9	22,3	24,7	27,4	30,2	33,4	37,4	41,4	44,7	49,8	54,1	59,2	64,2
127,0	12,1	15,0	18,8	21,0	23,4	25,5	28,9	31,6	35,5	39,6	43,6	47,2	52,8	57,4	63,2	68,3
133,0	12,7	15,8	19,8	22,1	24,6	26,9	30,3	33,3	37,4	41,8	46,1	49,9	55,7	60,8	67,1	72,5
139,7	13,4	16,6	20,8	23,3	25,9	28,3	32,0	35,1	39,5	44,0	48,6	52,7	59,0	64,3	71,1	77,0
146,0		17,4	21,7	24,3	27,2	29,8	33,5	36,6	41,2	46,2	51,3	55,5	62,1	67,8	74,6	81,5
152,4		18,2	22,8	25,5	28,4	31,0	35,1	38,5	43,4	48,5	53,6	58,1	65,3	71,3	79,0	85,8
159,0		19,0	23,8	26,6	29,6	32,4	36,7	40,3	45,4	50,8	56,2	60,9	68,6	74,8	83,0	90,3
165,1		19,7	24,7	27,7	31,0	33,9	38,2	41,8	47,0	52,8	58,8	63,7	71,6	78,2	86,4	94,7
168,3		20,1	25,3	28,3	31,5	34,5	39,0	42,9	48,4	54,1	59,9	65,0	73,1	80,0	88,9	96,7
171,0		20,5	25,6	28,7	32,2	35,2	39,7	43,4	48,9	54,9	61,2	66,2	74,5	81,5	90,0	98,7
177,8		21,3	26,7	30,0	33,4	36,5	41,4	45,4	51,3	57,4	63,6	69,1	77,8	85,2	94,8	103,0
191,0			28,7	32,2	36,1	39,5	44,6	48,8	55,0	61,9	69,1	74,9	84,3	92,4	102,3	112,6
193,7			29,2	32,8	36,5	40,0	45,3	49,8	56,2	63,0	69,8	75,9	85,7	93,9	105,0	114,0
203,0			30,6	34,3	38,5	42,7	47,6	52,8	58,7	66,1	73,8	80,1	90,3	99,0	110,0	121,0
216,0			32,6	36,6	41,0	45,0	50,8	55,6	62,7	70,7	78,9	85,7	96,7	106,1	117,8	129,8
219,1			33,2	37,2	41,5	45,4	51,6	56,7	64,1	71,9	79,8	86,9	98,2	108,0	120,0	132,0
229,0			34,5	38,8	43,6	47,7	54,0	59,1	66,7	75,2	84,0	91,2	103,0	113,0	125,0	138,0
244,5			37,1	41,7	46,5	50,9	57,8	63,6	72,0	80,8	89,8	97,8	111,0	122,0	136,0	149,0
254,0			38,5	43,2	48,5	53,9	60,2	66,8	74,4	84,0	93,9	102,0	115,0	127,0	141,0	156,0
267,0			40,6	45,6	50,9	55,8	63,4	69,7	79,0	88,7	98,6	107,0	122,0	134,0	150,0	165,0
273,0			41,6	46,7	52,1	57,1	64,8	71,4	80,9	90,9	101,0	110,0	125,0	137,0	154,0	169,0
279,0			42,4	47,6	53,4	58,6	66,3	72,7	82,1	92,7	103,8	112,9	127,7	140,6	156,6	173,3
292,0			44,4	49,9	56,0	61,5	69,5	76,2	86,2	97,3	108,9	118,5	134,2	147,7	164,6	182,3
298,5				51,1	57,1	62,6	71,1	78,3	88,8	99,8	111,0	121,0	137,0	151,0	170,0	187,0
305,0				52,1	58,5	64,2	72,7	79,7	90,1	101,0	113,0	124,0	140,0	154,0	173,0	191,0
318,0				54,4	61,2	67,1	76,0	83,3	94,2	106,4	119,2	129,7	147,0	161,9	180,6	200,2
323,9				55,6	62,1	68,1	77,4	85,3	96,7	109,0	121,0	132,0	150,0	165,0	186,0	204,0
330,0					63,5	69,6	78,8	86,5	97,8	110,0	123,0	134,0	152,0	168,0	187,0	208,0
339,7					65,4	71,8	81,3	89,2	100,9	114,0	127,7	139,1	157,7	173,8	194,0	215,2
343,0					66,1	72,5	82,0	90,0	102,0	115,0	128,0	140,0	159,0	175,0	195,0	217,0
355,6					68,6	74,9	85,2	93,9	107,0	120,0	133,0	146,0	166,0	183,0	205,0	226,0
368,0					71,0	78,0	88,3	96,8	109,6	123,9	138,0	151,0	171,6	189,0	211,5	234,8
381,0					73,0	80,7	91,5	101,0	114,0	129,0	144,0	158,0	178,0	197,0	220,0	243,8
394,0					76,2	83,5	96,8	103,0	117,0	132,0	149,0	162,0	184,0	203,0	227,0	252,0
406,4					78,6	85,9	97,8	107,3	122,0	138,0	153,0	168,0	191,0	210,0	237,0	261,0
419,0					81,1	88,7	101,0	111,0	126,0	142,0	158,0	173,0	197,0	217,0	245,0	270,0
431,8							104,0	114,0	129,0	146,0	164,0	179,0	203,0	224,0	251,0	279,0
445,0							107,0	117,0	133,0	150,0	169,0	184,0	209,0	231,0	258,0	287,0
457,2					88,6	97,3	110,0	122,0	138,0	156,0	173,0	189,0	216,0	238,0	268,0	296,0
470,0					91,1	100,1	113,4	124,5	141,0	159,6	179,0	195,3	222,0	245,2	274,4	305,2
482,6								130,0	145,0	164,0	184,0	201,0	228,0	252,0	282,0	314,0
508,0						108,3	122,8	135,0	154,0	173,0	193,0	211,0	241,0	266,0	300,0	331,0
521,0						111,2	126,0	138,3	156,0	177,0	199,0	217,0	246,0	272,0	305,0	340,0
530,0								140,8	159,0	181,0	203,0	221,0	252,0	278,0	311,0	347,0
559,0							135,4	148,7	168,4	190,7	214,2	233,6	265,8	293,8	329,1	366,5
570,0										194,6	218,6	238,4	271,3	299,9	336,0	374,3
584,2									176,2	199,6	224,2	244,6	278,3	307,7	344,8	384,0
610,0							148,0	162,5	184,0	208,5	234,2	255,5	290,8	321,6	360,4	401,6
622,0										212,8	239,1	260,9	296,9	328,4	368,1	410,2
635,0										192,0	217,4	244,2	266,6	303,3	335,6	376,0
660,0							160,3	176,1	199,7	226,3	254,3	277,5	315,9	349,4	391,7	436,7
711,2								189,9	215,4	244,1	274,3	299,4	340,9	377,2	423,1	471,8
762,0													366,0	405,0	454,4	506,8
812,0													390,6	432,4	485,2	511,3

CONSTRUCTION TUBES

DIMENSIONAL TABLE FOR SEAMLESS TUBES SUITABLE FOR CONSTRUCTIONS

W.T. mm															O.D. mm	
30,0	32,0	35,0	40,0	45,0	50,0	55,0	60,0	65,0	70,0	75,0	80,0	85,0	90,0	100,0	120,0	
																21,3
																26,9
																33,7
																38,0
																42,4
																44,5
																48,3
																51,0
																54,0
																57,0
																60,3
																63,5
																67,0
																70,0
																73,0
																76,1
																82,5
																88,9
48,1																95,0
52,9																101,6
57,7																108,0
62,3	64,9	68,5	73,3													114,3
67,3	70,2	74,2	79,9													121,0
71,7	75,0	79,3	85,8	91,0												127,0
76,3	79,7	84,5	91,7	97,7												133,0
81,1	85,0	90,3	98,3	105,0	110,6											139,7
85,8	90,0	95,7	104,5	112,0	118,4											146,0
90,5	95,0	101,0	112,0	119,2	126,3											152,4
95,3	100,2	106,0	119,0	126,5	134,4	141,1	146,5									159,0
100,0	105,0	112,3	123,4	133,3	141,9	149,3	155,5									165,1
102,0	107,6	115,0	126,0	136,8	145,8	153,7	160,3									168,3
104,3	109,7	117,4	129,2	139,8	149,2	157,3	164,2									171,0
109,0	115,1	123,0	136,0	147,3	157,5	166,6	174,3									177,8
119,1	125,5	134,6	149,0	162,0	173,9	184,5	193,8									191,0
121,0	127,6	136,0	151,0	167,0	179,0	188,1	197,8									193,7
128,0	134,9	144,0	161,0	178,0	191,0	200,7	211,6									203,0
137,6	145,2	156,2	173,6	189,8	204,7	218,4	230,8									216,0
140,0	147,6	158,0	176,0	196,0	211,0	222,6	235,0	247,0								219,1
140,0	155,5	167,0	186,0	204,0	220,0	236,0	250,0	262,9	274,5							229,0
147,0	167,7	180,0	201,0	224,0	243,0	257,0	273,0	287,7	301,2							244,5
159,0	175,2	188,0	211,0	232,0	251,5	270,0	287,0	303,0	317,6							254,0
166,0	185,5	200,0	223,0	250,0	271,0	287,6	306,0	323,8	340,0	355,1						267,0
175,0	190,2	205,0	229,0	256,0	275,0	296,0	315,0	33,4	350,4	366,2	380,8	394,1				273,0
180,0	194,9	210,6	235,8	259,7	282,4	303,8	324,0	343,0	360,8	377,3	392,6	406,7				279,0
184,2	205,2	164,6	182,3	193,8	221,8	321,5	343,3	363,9	383,2	401,4	418,2	433,9				292,0
193,8	210,3	227,0	255,0	285,0	306,0	330,3	353,0	374,3	394,5	413,4	431,0	447,5				298,5
198,0	215,4	232,0	261,0	288,0	314,0	338,0	362,0	384,7	405,7	425,4	444,0	461,2	477,2			305,0
213,1	225,7	244,3	274,2	303,0	330,5	356,7	381,8	405,5	428,1	449,4	469,5	488,4	506,0			318,0
217,0	230,4	249,0	280,0	313,0	338,0	370,0	390,0	415,0	438,3	460,4	481,2	500,8	519,1	552,2		323,9
221,0	235,2	254,0	285,0	316,0	345,0	372,0	399,0	425,0	449,0	471,6	493,2	513,6	532,7	567,2		330,0
229,1	242,8	263,0	295,6	327,0	357,2	386,2	413,9	440,3	465,6	489,6	512,4	533,9	554,2	591,1		339,7
231,0	245,4	265,0	298,0	330,0	361,0	390,0	418,0	446,0	471,0	496,0	518,9	540,8	561,5	599,3		343,0
241,0	255,4	276,0	311,0	349,0	377,0	413,0	437,0	466,0	493,0	519,0	543,7	567,2	589,5	630,3	697,2	355,6
250,0	265,2	287,0	323,0	358,5	392,0	424,5	455,7	485,0	514,0	541,9	568,2	593,2	617,0	660,9	733,9	368,0
259,7	275,4	298,0	336,4	372,9	408,0	442,0	475,0	506,0	537,0	566,0	593,8	620,5	645,9	693,0	772,4	381,0
269,0	285,7	309,0	349,0	387,0	423,0	459,0	493,0	527,0	559,0	590,0	619,5	647,7	674,7	725,0	810,9	394,0
278,0	295,5	320,0	361,0	406,0	439,0	483,0	513,0	547,0	581,0	613,0	644,0	673,7	702,3	756,0	847,5	406,4
288,0	305,4	331,0	373,0	421,0	455,0	500,0	531,0	567,0	603,0	636,3	669,0	700,0	730,2	786,7	884,8	419,0
298,0	315,5	343,0	387,0	430,0	471,0	512,0	551,0	588,0	625,0	660,0	694,1	727,0	758,6	818,3	922,7	431,8
306,0	329,9	353,0	399,0	443,0	486,0	528,0	569,0	609,0	647,0	684,0	720,0	754,6	787,9	850,8	961,9	445,0
316,0	335,5	364,0	411,0	464,0	502,0	553,0	587,7	628,7	668,4	707,0	744,0	780,2	815,0	881,0	997,9	457,2
325,5	345,6	375,5	424,2	471,7	517,9	562,9	606,7	649,2	690,5	730,6	769,4	807,0	843,4	912,5	1035,8	470,0
335,0	355,6	386,0	437,0	486,0	533,0	580,0	625,0	669,0	712,3	754,0	794,3	833,5	871,4	943,5	1073,0	482,6
353,0	375,6	408,0	461,0	521,0	565,0	614,0	663,0	710,0	756,0	801,0	844,0	886,7	927,8	1006,0	1148,2	508,0
363,0	385,6	419,0	474,0	527,0	580,0	631,0	681,0	731,0	778,0	825,0	870,0	914,0	956,6	1038,2	1186,7	521,0
370,0	393,0	427,0	483,0	538,0	592,0	644,0	695,0	745,0	794,0	842,0	887,8	932,8	976,6	1060,4	1213,3	530,0
391,2	415,9	452,1	511,8	570,2	627,3	693,3	738,0	791,6	843,8	894,8	944,6	993,2	1040,5	1131,5	1299,1	559,0
399,5	424,6	461,8	522,8	582,6	641,2	698,5	754,6	809,5	863,1	915,5	966,7	1016,6	1065,4	1159,1	1331,7	570,0
410,0	435,8	474,0	536,8	598,4	658,7	717,8	775,7	832,3	887,7	941,8	994,7	1046,4	1096,9	1194,0	1373,7	584,2
428,8	456,1	496,0	561,9	626,6	690,0	752,2	813,2	873,0	931,5	988,8	1044,9	1100,0	1153,0	1257,0	1450,1	610,0
438,0	465,6	506,7	574,1	640,3	705,3	769,1	831,6	892,8	952,9	1011,7	1069,3	1125,6	1180,8	1287,0	1485,6	622,0
447,6	475,9	518,0	587,0	654,8	721,3	786,7	850,8	913,7	975,4	1035,8	1095,0	1152,9	1209,6	1319,4	1524,0	635,0
466,4	495,6	539,8	612,0	683,0	752,7	821,2	888,4	954,4	1019,2	1082,8	1145,0	1206,0	1266,0	1382,0	1598,0	660,0
504,0	536,0	583,6	662,1	739,3	815,3	890,0	963,6	1035,8	1106,9	1176,7	1245,3	1312,6	1378,7	1507,3	1749,5	711,2
541,5	576,1	627,5	712,2	795,7	877,9	958,9	1038,7	1117,3	1194,6	1270,7	1345,5	1419,1	1491,5	1632,5	1899,9	762,0
578,5	615,5	670,7	761,5	851,2	939,6	1026,8	1112,7	1197,4	1280,9	1363,1	1444,1	1523,9	1602,5	1755,9	2047,8	812,0
30,0	32,0	35,0	40,0	45,0	50,0	55,0	60,0	65,0	70,0	75,0	80,0	85,0	90,0	100,0	120,0	

DIMENSIONAL TABLE FOR HOT FINISHED AND COLD FINISHED WELDED TUBES WITH WELDING BEAD TRIMMED

O.D. mm	W.T. - mm																		
	2,3	2,6	2,9	3,2	3,6	4,0	5,0	6,3	7,0	8,0	8,8	10,0	11,0	12,5	14,2	16,0	17,5	20,0	
Mass - Kg/m																			
17,2	0,8	0,9	1,0																
21,3	1,0	1,1	1,3	1,4	1,5	1,7													
26,9	1,3	1,5	1,7	1,8	2,0	2,2	2,7	3,2											
33,7	1,7	1,9	2,2	2,4	2,6	2,9	3,5	4,2	4,6										
38,0		2,2	2,5	2,7	3,0	3,4	4,0	4,9	5,4										
42,4		2,5	2,8	3,0	3,4	3,8	4,6	5,6	6,1	6,7									
44,5		2,6	2,9	3,2	3,6	4,0	4,8	5,9	6,5	7,2									
48,3		2,9	3,2	3,5	3,9	4,4	5,3	6,5	7,2	7,9	8,6	9,4							
51,0		3,1	3,4	3,7	4,2	4,6	5,6	6,9	7,6	8,4	9,2	10,1							
54,0		3,2	3,6	4,0	4,4	4,9	6,0	7,4	8,2	9,0	9,8	10,8							
57,0		3,4	3,8	4,2	4,7	5,2	6,4	7,9	8,7	9,6	10,5	11,5							
60,3			4,1	4,5	5,0	5,6	6,8	8,4	9,3	10,3	11,2	12,4							
63,5			4,3	4,7	5,3	5,9	7,2	8,9	9,9	10,9	11,9	13,1							
70,0			4,7	5,2	5,8	6,5	8,0	9,9	11,0	12,2	13,3	14,7							
73,0			5,0	5,5	6,0	6,8	8,3	10,3	11,4	12,8	13,9	15,5	16,8	18,6					
76,1			5,2	5,7	6,4	7,2	8,7	10,9	12,1	13,4	14,6	16,3	17,6	19,6					
82,5				6,2	7,0	7,8	9,5	11,8	13,2	14,6	16,0	17,9	19,3	21,5					
88,9				6,7	7,5	8,4	10,3	12,8	14,4	15,9	17,4	19,5	21,1	23,5					
95,0				7,2	8,1	8,9	11,5	13,7	15,1	17,1	18,7	20,9	22,7	25,4					
101,6				7,8	8,7	9,7	11,9	14,8	16,6	18,4	20,1	22,6	24,5	27,4					
108,0				8,2	9,2	10,3	12,7	15,8	17,7	19,6	21,5	24,2	26,3	29,4					
114,3				8,8	9,8	11,0	13,5	16,8	18,5	20,9	22,9	25,7	28,0	31,3	35,0				
121,0				9,3	10,4	11,5	14,3	17,8	19,6	22,2	24,3	27,3	29,8	33,4	37,4				
127,0				9,7	10,9	12,1	15,0	18,7	20,7	23,4	25,7	28,8	31,4	35,2	39,5				
133,0					11,4	12,8	15,8	19,7	22,1	24,6	27,0	30,3	33,0	37,1	41,6				
139,7					12,1	13,5	16,6	20,7	23,3	25,9	28,4	32,0	34,9	39,2	43,9				
152,4					13,2	14,6	18,1	22,7	25,0	28,4	31,2	35,1	38,3	43,1	48,4				
159,0					13,8	15,4	19,0	23,7	26,6	29,6	32,6	36,7	40,1	45,1	50,7				
168,3					13,0	16,3	20,1	25,2	28,3	31,5	34,6	39,0	42,6	48,0	54,0				
177,8						17,1	21,3	26,6	29,5	33,4	36,7	41,3	45,2	50,9	57,3				
193,7						18,7	23,2	29,1	32,2	36,6	40,1	45,3	49,5	55,8	62,9				
203,0						19,6	24,4	30,5	33,8	38,4	42,1	47,5	52,0	58,7	66,1				
219,1						21,2	26,3	33,0	36,6	41,6	45,6	51,5	56,4	63,6	71,8				
244,5							29,5	37,0	40,9	46,7	51,2	57,8	63,3	71,5	80,6	90,2			
273,0							33,0	41,4	45,9	52,3	57,3	64,9	71,1	80,3	90,6	101,4			
323,9							39,3	49,3	54,7	62,3	68,4	77,4	84,9	95,9	108,4	121,5	132,2	149,9	
355,6							43,2	54,3	60,2	68,6	75,3	85,2	93,5	105,8	119,6	134,0	146,0	165,5	
406,4								62,2	68,9	78,6	86,3	97,8	107,3	121,4	137,3	154,0	167,8	190,6	
457,2								70,0	77,7	88,6	97,3	110,3	121,0	137,1	155,1	174,1	189,8	215,6	
508,0								77,9	86,5	98,6	108,3	122,8	134,8	152,8	172,9	194,1	211,7	240,7	
558,8								85,8	95,3	108,7	119,4	135,3	148,6	168,4	190,7	214,2	233,6	265,8	
609,6								93,7	104,0	118,7	130,4	147,9	162,4	184,1	208,5	234,2	255,5	290,8	



SOLID BARS

Round bars in steel grades for quenching and tempering or for structural applications, manufactured by hot rolling process up to diameter 280 mm and by forging starting from diameter 290 mm included. The product is supplied with raw hot rolled surface or roughly peeled.

STEEL GRADES FOR QUENCHING AND TEMPERING

APPLICATIONS

Products suitable for production of mechanical parts by machining. Steel grades for quenching and tempering, thanks to their high Carbon content are suitable for heat treatments, with the purpose of increasing surface hardness of the metal. This materials are suitable for production of components such as gears, driving elements, rotating elements etc..

NORMS

Heat-treatable steels, alloy steels and free-cutting steels – Non-alloy steels for quenching and tempering
Dimensions and tolerances

EN ISO 683-1 (substitutes EN 10083-1/2)
EN 10060

CHEMICAL PROPERTIES OF STEEL GRADES FOR QUENCHING AND TEMPERING

Steel grade	Chemical elements (% on mass)												
	C		Si		Mn		P	S		Cr	Mo	Ni	Cu
	min.	max.	min.	max.	min.	max.	max.	min.	max.	max.	max.	max.	max.
C45	0.42	0.50	0.10	0.40	0.50	0.80	0.045	-	0.045	0.40	0.10	0.40	0.30
C45E							0.025	-	0.035				
C45R							0.020	0.040					

Cr + Mo + Ni ≤ 0.63%

MECHANICAL PROPERTIES OF STEEL GRADES FOR QUENCHING AND TEMPERING

Steel grade	Delivery condition	Yield strength min. ReH (N/mm ² =Mpa)			Tensile strength min./max. Rm (N/mm ² /Mpa)			Longitudinal elongation min. %		
		For wall thicknesses in mm								
		≤16	>16 ≤100	>100 ≤250	≤16	>16 ≤100	>100 ≤250	≤16	>16 ≤100	>100 ≤250
C45	+N	340	305	275	620	580	560	14	16	16
C45E										
C45R										
		For wall thicknesses in mm								
		≤16	>16 ≤40	>40 ≤100	≤16	>16 ≤40	>40 ≤100	≤16	>16 ≤40	>40 ≤100
C45	+QT	490	430	370	700-850	650-800	630-780	14	16	17
C45E										
C45R										

¹ Note: the product is supplied in untreated condition (+AR), while the results of the mechanical tests reported on the mill test certificate, according to the norm, are referred to tests performed on samples subjected to heat treatment.

Other steel grades foreseen by norms EN ISO 683-1/2 (EN 10083-2/3) can be supplied upon request with minimum quantities according to mill conditions.



STEEL GRADES FOR STRUCTURAL APPLICATIONS

APPLICATIONS

Product right for manufacturing of structural components of various typologies also by machining. This material is generally suitable for normalization, while the low carbon content improves weldability.

NORMS

Hot rolled products of structural steels: general features EN 10025-1
 Hot rolled products of structural steels: non-alloyed steel grades EN 10025-2
 Dimensions and tolerances EN 10060

CHEMICAL PROPERTIES OF STEEL GRADES FOR STRUCTURAL APPLICATIONS

Steel grades	Chemical elements (% on mass)							
	C max.			Si	Mn	P	S	Cu
	d≤16	16<d≤40	d>40	max.	max.	max.	max.	max.
S355J2	0.20	0.20	0.22	0.55	1.60	0.025	0.025	0.55

MECHANICAL PROPERTIES OF STEEL GRADES FOR STRUCTURAL APPLICATIONS

Steel grade	Delivery condition	Yield strength min. ReH (N/mm ² =Mpa)								Tensile strength min./max. Rm (N/mm ² =Mpa)				Longitudinal elongation min. %					Longitudinal impact properties (J min.)		
		For diameters in mm								For diameters in mm				For diameters in mm							
		<16	>16 ≤40	>40 ≤63	>63 ≤80	>80 ≤100	>100 ≤150	>150 ≤200	>200 ≤250	>250 ≤400	≥3 ≤100	>100 ≤150	>150 ≤250	>250 ≤400	≥3 ≤100	>40 ≤63	>63 ≤100	>100 ≤150		>150 ≤250	>250 ≤400
S355J2	+AR or +N	355	345	335	325	315	295	285	275	265	470 630	450 600	450 600	450 600	22	21	20	18	17	17	27 a -20°C

Note: detailed mechanical properties can be granted only for products in normalized delivery condition.

Other steel grades foreseen by EN 10025-2 can be supplied upon request with minimum quantities according to mill conditions.

TOLERANCES AND DIMENSIONAL RANGE

TOLERANCES ACCORDING TO EN 10060

DIAMETER:	see following table.
OVALITY:	not more than 75% of tolerance established for diameter.
STRAIGHTNESS:	for diameters ≤ 25 mm, tolerance to be agreed. $< 25 \geq 80$ mm, maximum tolerance 0.4% L $< 80 \geq 250$ mm, maximum tolerance 0.25% L > 250 mm, tolerance to be agreed.

The deviation from straightness must be measured on the whole length of the bar (L).

DIMENSIONAL RANGE

Diameter mm	Tolerance on diameter mm	Theoretical weight Kg/m
10	± 0.4	0.617
12		0.888
13		1.04
14		1.21
15	± 0.5	1.39
16		1.58
18		2.00
19		2.23
20		2.47
22		2.98
24		3.55
25	± 0.6	3.85
26		4.17
27		4.49
28		4.83
30		5.55
32		6.31
35		7.55

Diameter mm	Tolerance on diameter mm	Theoretical weight Kg/m
36	± 0.8	7.99
38		8.90
40		9.86
42		10.9
45		12.5
48	± 1.0	14.2
50		15.4
52		16.7
55		18.7
60		22.2
63		24.5
65		26.0
70	± 1.3	30.2
73		32.9
75		34.7
80		39.5
85		44.5
90	49.9	



Diameter mm	Tolernace on diameter mm	Theoretical weight Kg/m
95	± 1.3	55.6
100		61.7
105	± 1.5	68.0
110		74.6
115		81.5
120		88.8
125	± 2.0	96.3
130		104
135		112
140		121
145		130
150		139
155		148
160	± 2.5	158
165		168
170		178
175		189

Diameter mm	Tolernace on diameter mm	Theoretical weight Kg/m
180	± 2.5	200
190		223
200		247
220	± 3.0	298
250	± 4.0	385
260	± 6.0	417
280		483
290		518
300		555
320		631
330		671
340		712
350		755
360		799
380		890
390	937	
400	986	



AD – PE “CONDUIT” WELDED PIPES

Electric resistance **WELDED** pipes, hot dip galvanized according to UNI 5745 and with tapered gas threading Gk, according to UNI 6125. The resistance to pressure of these pipes is granted by hydrostatic or equivalent test. These pipes are supplied in random lengths of about 6 m and with certification 2.2 according to EN 10204, all pipes are indelible marked.

APPLICATIONS

Tubes for safety electrical equipments and explosion proof equipments (AD – PE).

NORMS

UNI 7683

CHEMICAL ANALYSIS AND MECHANICAL PROPERTIES

Steelgrade	Chemical elements (% on mass)						Yield strength min. ReH (N/mm ² =Mpa)	Tensile strength min. Rm (N/mm ² =Mpa)	Longitudinal elongation min. %
	C	Mn		Si	P	S			
	max.	min.	max.	max.	max.	max.			
Fe 360	0.17	0.40	0.80	0.35	0.045	0.045	215	360-480	24



SIZES AND TOLERANCES

SIZES ACCORDING TO UNI 7683

O.D.		Threading	O.D. tolerance mm		W.T. mm	Mass Kg/m
mm	inches		min.	max.		
21.3	½	Gk ½	21.0	21.7	2.35	1.19
26.9	¾	Gk ¾	26.4	27.1	2.35	1.50
33.7	1	Gk 1	33.2	34.0	2.90	2.33
42.4	1 ¼	Gk 1 ¼	41.9	42.7	2.90	2.99
48.3	1 ½	Gk 1 ½	47.8	48.6	2.90	3.45
60,3	2	Gk 2	59.6	60.7	3.25	4.83
76,1	2 ½	Gk 2 ½	75.2	76.3	3.25	6.00
88,9	3	Gk 3	87.9	89.4	3.65	8.15
114,3	4	Gk 4	113.0	114.9	4.05	11.70

TOLERANCES

O.D. : see table above.

W.T: - 12.5 %; positive deviations are ruled by the tolerance on mass.

MASS: on the single tube $\pm 10\%$; $\pm 7.5\%$ for lots of at least 10 t.

LENGTHS: (welded tubes) 6 m + 100 / - 50 mm, it is possible to supply lengths starting from 4 m for max 3% of the supplied lot.



STOCK FACILITY

STEEL GRADES

TUBES FOR CONSTRUCTIONS: the seamless hot rolled tubes and the welded hollow sections, both cold finished and hot finished, are available as standard stock in the steel grade S355J2H.

SOLID BARS: the standard stock consists of C45 (C45 or C45E or C45R), as steel grade for quenching and tempering, and S355J2, as steel grade for structures.

AD-PE "CONDUIT" WELDED PIPES: the standard stock of this product consists of steel grade Fe360.

Other steel grades and/or delivery conditions detailed in this catalogue, or foreseen by the relevant product norms, can be supplied upon request for new production with a minimum quantity according to mill conditions.

SIZES

All diameters and wall thicknesses detailed in the relevant dimensional tables are to be considered as standard stock for the respective products.

The non-standard sizes could be supplied upon request; it is also possible to agree, upon specific production, stricter tolerances in comparison to what foreseen by the product norms.

CERTIFICATES AND MARKINGS

The material is supplied with certificates type 3.1 according to the norm EN 10204 (type 2.2 for tubes AD-PE "Conduit"). In order to grant the traceability, seamless tubes for structural applications, solid bars and AD-PE "Conduit" tubes are identified by paint marking or die-stamp of the manufacturer. The welded tubes for structures and all products cut to fixlengths are identified by suitable labels.

CE MARK

All tubes and bars intended for structural applications belong to manufacturers with a Factory Production Control according to European Regulation 305/2011 for construction products. Therefore the product is approved with the relevant CE mark and accompanied with the Declaration of Performance of the manufacturer.



CERTIFICATION ACCORDING TO EN 1090-1

The tubes and bars for structural applications can be supplied upon request with certification according to EN 1090-1 (class EXC3).

This certification is referred to products cut to fixlength by band saw (with ends not finished for immediate welding) and to products subject to laser cutting and/or drilling according to the provided drawings.



LENGTHS

SEAMLESS TUBES FOR STRUCTURAL APPLICATIONS:

from m 4 to m 13.5.

WELDED TUBES FOR STRUCTURAL APPLICATIONS:

m 6 or m 12.

SOLID BARS:

from m 3 to m 6.

AD-PE "CONDUIT" WELDED PIPES:

about m 6.

CUT TO FIXLENGTH AND TOLERANCES

All bars and tubes for structural applications can be supplied cut to the fixlength specified by the customer, with the following tolerances:

LENGTH: standard tolerance $-0/+5$ mm, stricter tolerances can be agreed at the moment of the order.

INCLINATION: $\pm 0.5^\circ$.

PACKING

The products, supplied both in random length and in fixlength, are bundled by iron strips or bands, according to weight and sizes.

For pieces cut to fixlength polyester strips can be applied in order to make handling easier. On request it is possible to arrange special packing: wooden boxes, pallets, etc.

DELIVERIES

Inland, through carriers.



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Edition
March 2020



STRUCTURAL TUBES AND BARS **STB**



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