

## TUBES FOR CONSTRUCTIONS

### STEELS FEATURURES

#### MECHANICAL PROPERTIES

Steel grade	Delivery condition <sup>1</sup>	Yield strength min. ReH (N/mm <sup>2</sup> =Mpa)						Tensile strength min./max. Rm (N/mm <sup>2</sup> =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) <sup>1</sup>	25	24	22	-	-	-	27	
S275J0H	+AR	275	265	255	245	235	225	430-580	410-560	400-540	23(20) <sup>1</sup>	22	21	19	-	-	27	-	
S275J2H	+AR														-	27	-	-	
S355J0H	+AR	355	345	335	325	315	295	510-680	470-630	450-600	22(20) <sup>1</sup>	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	-	-		-										

<sup>1</sup> The 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.

(<sup>1</sup>) 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.
<b>S235JRH</b>	0.17 (0.20) <sup>2</sup>	-	-	1.40	0.040	0.040	-	-	-	-	-	-	-	-	0.009
<b>S275J0H</b>	0.20 (0.22) <sup>2</sup>	-	-	1.50	0.035	0.035	-	-	-	-	-	-	-	-	0.009
<b>S275J2H</b>	0.20 (0.22) <sup>2</sup>	-	-	1.50	0.030	0.030	-	-	-	-	-	-	-	-	-
<b>S355J0H</b>	0.22	0.55	-	1.60	0.035	0.035	-	-	-	-	-	-	-	-	0.009
<b>S355J2H</b>	0.22	0.55	-	1.60	0.030	0.030	-	-	-	-	-	-	-	-	-
<b>S355K2H</b>	0.22	0.55	-	1.60	0.030	0.030	-	-	-	-	-	-	-	-	-
<b>S275NH</b>	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
<b>S275NLH</b>					0.030	0.025									
<b>S355NH</b>	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
<b>S355NLH</b>					0.030	0.025									
<b>S420NH</b>	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
<b>S420NLH</b>					0.030	0.025									
<b>S460NH</b>	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
<b>S460NLH</b>					0.030	0.025									
<b>S275MH</b>	0.13	0.50	-	1.50	0.035	0.030	0.050	0.08	0.020	0.05	-	0.30	0.20	-	0.020
<b>S275MLH</b>					0.030	0.025									
<b>S355MH</b>	0.14	0.50	-	1.50	0.035	0.030	0.050	0.10	0.020	0.05	-	0.30	0.20	-	0.020
<b>S355MLH</b>					0.030	0.025									
<b>S420MH</b>	0.16	0.50	-	1.70	0.035	0.030	0.050	0.12	0.020	0.05	-	0.30	0.20	-	0.020
<b>S420MLH</b>					0.030	0.025									
<b>S460MH</b>	0.16	0.60	-	1.70	0.035	0.030	0.050	0.12	0.020	0.05	-	0.30	0.20	-	0.025
<b>S460MLH</b>					0.030	0.025									

(<sup>2</sup>) 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.**