



TMK-ARTROM S.A.

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 EUID: ROONRC.J28/9/1991; J28/9/31.01.1991
 VAT No. RO 1510210/1992
 Subscribed and Paid Share Capital: 291.587.538,34 lei

MECHANICAL TUBES

1. Standards

DIN 1629 (has been partially replaced by EN 10297-1);
 DIN 1630 (has been partially replaced by EN 10297-1);
 DIN 17124 (has been partially replaced by EN 10297-1);
 DIN 17204 (has been partially replaced by EN 10297-1);
 DIN 17121 (has been with EN 10210);
 EN 10297-1;
 EN 10210-1, 2;
 EN 10216-1, 3;
 ASTM A519;
 ASTM A105.

2. Used for

- Mechanical application;
- General engineering purposes.

3. Dimensions

- Cold rolled tubes acc. DIN/EN - Tab.1;
- Hot rolled tubes acc. DIN/EN - Tab.2.1; Tab. 2.2;
- Hot rolled tubes acc. ASTM A519 - Tab.3;
- Cold rolled tubes acc. ISO 2938 - Tab.4;
- Hot rolled tubes acc. ISO 2938 - Tab.5

4. Tolerances

Standard	Outside Diameter	Tolerances	Wall Thickness	Tolerances	Weight
DIN 1629, DIN 1630	<u>OD≤130</u>	<u>±1% (but ± 0.5mm is permitted)</u>	<u>WT≤ 2Sn</u>	<u>+15/-10%</u>	+12/-8% for each tube +10/-5% for lots over 10t
			<u>2Sn<WT≤4Sn</u>	<u>+12.5/-10%</u>	
	<u>WT>4Sn</u>		<u>±9%</u>		
	<u>WT≤0.05OD</u>		<u>+17.5/-12.5%</u>		
	<u>130<OD≤244.5</u>		<u>0.05OD < WT ≤ 0.11OD</u>	<u>±12.5%</u>	
			<u>WT > 0.11OD</u>	<u>±10%</u>	
EN 10210-1,2		±1% or ±0.5mm (which is higher)		-10%	+8% / -6%
EN 10297-1, EN 10216-1		±1% or ±0.5mm (which is higher)		±12.5% or ±0.4mm (which is higher)	-
EN 10297-1(S690G2QL1, S770QL, S890QL1)		OD =+ / - 0.8%		WT = + / - 10 %	
EN 10216-3- hot rolled		±1% or ±0.5mm (which is higher)		±12.5% or ±0.4mm (which is higher)	-



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Standard	Outside Diameter	Tolerances	Wall Thickness	Tolerances	Weight
EN 10216-3- cold rolled		±0.5% or ±0.3mm (which is higher)		±10% or ±0.2mm (which is higher)	-
ASTM A519, hot rolled	OD<76.17	±0.51 mm	WT<15 WT≥15	±12.5% ±10%	
	76.2<OD<114.27	±0.64 mm	WT<15 WT≥15	±10% ±7.5%	
	114.3<OD<152.37	±0.79 mm			
	152.4<OD<190.47	±0.94 mm	WT<15 WT≥15	±10% ±10%	
	190.5<OD<228.57	±1.14 mm			
ASTM A519, cold rolled	OD≤53.31	OD: +0.30mm ID: -0.30mm	WT≤25%OD & ID<38.1	±10%	
	53.31<OD≤63.47	OD: +0.35mm ID: -0.35mm	WT≤25%OD & ID>=38.1	±7.5%	
	63.47<OD≤73.63	OD: +0.40mm ID: -0.40mm	WT>25%OD & ID<38.1	±12.5%	
	73.63<OD≤83.79	OD: +0.45mm ID: -0.45mm	WT>25%OD & ID>=38.1	±10%	
	83.79<OD≤93.95	OD: +0.55mm ID: -0.55mm			
	93.95<OD≤104.11	OD: +0.65mm ID: -0.65mm			
	104.11<OD≤114.27	OD: +0.75mm ID: -0.75mm			

Sn - Nominal wall thickness according to DIN 2448

5. Chemical Composition (%)

Steel group	C	Mn	P	S	N	Cr	Si	Mo	Al	Ni	V	Cu	Nb	Ti	W
	[%]														
St37.0, St37.4, S235, P195, P235, P275, E235, C10E, C15E, 1010	max. 0.17		max. 0.040	max. 0.040	max. 0.009										
St44.0, St44.4, S275, P265, E 275, 1020	max. 0.21		max. 0.040	max. 0.040	max. 0.009										
St52.0, St52.4, S355, E355, P265, P355, Fe510, OL52.3, 1022	max. 0.22	max. 1.70	max. 0.040	max. 0.035			max. 0.60		min. 0.020						
C45, C35E, , 1035, 1045	max. 0.50	max. 0.9	max. 0.040	max. 0.040			max. 0.40								
16MnCr5	0.14-0.19	1.0-1.3	max. 0.035	max. 0.035		0.8-1.1	max. 0.4								
4140, 42CrMo4	0.38-0.43	0.75-1.0	max. 0.040	max. 0.040		0.8-1.1	0.15-0.30	0.15-0.25							
4130	0.28-0.33	0.4-0.6	max. 0.040	max. 0.040		0.8-1.1	0.15-0.35	0.15-0.25							
20MnV6, E470	0.16-0.22	1.3-1.7	max. 0.03	max. 0.035	max. 0.02		0.1-0.50		min. 0.01						
S690G2QL1	0.14-0.18	1.20-0.70	max. 0.016	max. 0.005	max. 0.009	0.50-0.80	0.20-0.30	0.20-0.40	0.015-0.030	max. 0.25	0.06-0.12	max. 0.25	max. 0.05	max. 0.05	0.10-0.70
S770QL	0.14-0.18	1.40-1.70	max. 0.016	max. 0.005	max. 0.0090	0.50-0.70	0.20-0.30	0.20-0.40	0.020-0.030	0.20-0.25	0.06-0.12	max. 0.25	max. 0.05	max. 0.05	
S890QL1	0.14-0.21	max. 1.75	max. 0.020	max. 0.010	max. 0.020	max. 1.10	0.10-0.50	0.20-0.80	0.015-0.050	max. 1.70	max. 0.15	max. 0.35	max. 0.05	max. 0.05	max. 1.30



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6. Mechanical Properties

Steel group	Tensile Strength	Yield Limit	Elongation	Impact test
	[N/mm ²]	[N/mm ²]	min. [%]	Average on three sample min. [J]
St37.0, St37.4, S235, P195, P235, P275, E235, C10E, C15E, 1010	350÷480	min 235	25	
St44.0, St44.4, S275, P265, E 275, 1020	420÷550	min 275	21	
St52.0, St52.4, S355, E355, Tu52-b, P265, P355, Fe510, OL52.3,1022	500÷650	min 355	21	
C45, C35E, 1035, 1045	min 580	min 305	16	
16MnCr5	HB =max 207 (Delivery status: Annealed)			
4140, 42CrMo4	HRB =max 85 (Delivery status: Annealed)			
4130	HRB =max 81 (Delivery status: Annealed)			
20MnV6, E470	min 600	min 430	17	
S690G2QL1	WT≤40: 770-960 40<WT≤65: 700-880	WT≤40: min. 690 40<WT≤50: min. 650 50<WT≤65: min. 615	16 long/14 transv.	at T=-60°C WT≤20: 40 long/20 transv 20<WT≤40: 30 long/20 transv 40<WT≤65: 25 long.
S770QL	WT≤20: 820-1000 20<WT≤32: 770-980 32<WT≤40: 770-950 40<WT≤50: 720-950	WT≤20: min. 770 20<WT≤25: min. 740 25<WT≤32: min. 720 32<WT≤40: min. 700 40<WT≤50: min. 670	15 long/13 transv	at T=-60°C WT≤20: 40 long/27 transv 20<WT≤65: 30 long/27 transv
S890QL1	12≤WT≤20: 960-1100 20<WT≤40: 920-1070 40<WT≤50: 870-1040 50<WT≤65: 870-1040	12≤WT≤20: min. 890 20<WT≤40: min. 850 40<WT≤50: min. 820 50<WT≤65: min. 800	14 long/12 transv	at T=-45°C 12≤WT≤20: 45 long 20<WT≤65: 40 long

7. Lengths

- Random lengths: 4÷12m (13.12÷39.7 ft), acc. Tab 1÷5;
- Fixed lengths within the random lengths range.

8. Protection

- Unprotected;
- External varnished with black or clear lacquer;
- If required, the tubes can be delivered with plastic caps at both ends.

9. Marking

According to standard or per customer request.

10. Delivery

Bundles up to:

- 2000 kg (4400 lbs) cold drawn tubes;
- 4000 kg (8800 lbs) hot rolled tubes.

Quantity tolerances: ±5% per size or / and per total.

The bundles will have one tag applied at each end, marked according to standard or at customer's request.



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11. Mill test report

Mill test reports are issued to customer requirements. Usually they comply with DIN 50049, EN 10204.

12. Quality certified:

LR, ZUS, TUV, UHP, PED, CE, MLPTL, DNV, GL, CE.