

EN 10297-1					
Steel name	E355*				
Chemical composition*	C	Mn	Si	P	S
	≤ 0.22	≤ 1.60	≤ 0.55	≤ 0.030	≤ 0.035
*Additions of Nb,V,Ti are permitted at the discretion of the manufacturer, the content of these elements shall be reported.					
MECHANICAL PROPERTIES					
Tensile strength (R _m) (Mpa) min	thickness (mm)				
	£ 16	> 16 £ 40	> 40 £ 65	> 65 £ 100	
490	490	490	470		
Yield strength (R _{eH}) (Mpa) min	thickness (mm)				
	£ 16	> 16 £ 40	> 40 £ 65	> 65 £ 80	> 80 £ 100
355	345	335	315	295	
Elongation %	longitudinal		transverse		
	20		18		
TOLERANCES					
Outside diameter D(mm)	D £ 219.1		+/- 1% o 0.5 mm whichever is the greater		
	D > 219.1		+/- 1%		
Wall thickness Wt(mm)	Wt/D ratio				
	< 0.025	> 0.025 ≤ 0.050	> 0.050		
	D £ 219.1		+/-12.5% o 0.4 mm whichever is the greater		
	D > 219.1		+/- 20%	+/- 15%	+/- 12.5%
Length L(mm)	L		Limit deviation (mm)		
	≤ 6000		+10	- 0	
	6000 < L ≤ 12000		+15	- 0	
		> 12000		0/+ by agreement	
STRAIGHTNESS					
D ≥ 33.7 mm			D < 33.7 mm		
0.0015 L (L=length of the tube)			not specified		
INSPECTION DOCUMENTS (in accordance with EN 10204)					
Certificate of compliance	2.1	with non-specific inspection and testing			
	2.2	inspection document type 2.2			
Inspection Certificate	3.1.B	with specific inspection and testing – standard Dalmine			
	3.1.A	The purchaser shall notify the manufacturer of the name and address of the organisation or person who carry out the inspection and produce the inspection document.			
	3.2				
FREQUENCY OF TESTS					
Outside diameter OD(mm)	D £ 114.3		1 each 400 pieces		
	114.3 < D £ 323.9		1 each 200 pieces		
	D > 323.9		1 each 100 pieces		
MARKING**					
marked by suitable and durable methods					
the manufacturer's name or trademark	the number of this Part of this European Standard (EN 10297-1)		the steel name (E355)		
the symbol for the delivery condition	the symbol +H and the cast number for tubes supplied against a hardenability requirement		the mark of the inspection representative and an identification number which permits the correlation of the product to related document		

UNI 7729					
Steel name	FE 510				
Chemical composition	C	Mn	Si	P	S
	≤ 0.20*	≤ 1.50	≤ 0.50	≤ 0.040	≤ 0.040
* For tubes with wall thicknesses over 16mm, C=0.22% max					
MECHANICAL PROPERTIES					
Tensile strength (R _m) (Mpa) min	da 510 a 660				
	Yield strength (R _{eH}) (Mpa) min	thickness (mm)			
£ 16		> 16 £ 40	> 40		
345	345	agreed at the time of ordering			
Elongation %	20				
TOLERANCES					
Outside diameter D(mm)	+/- 1% o 0.5 mm whichever is the greater				
Wall thickness Wt(mm)	Wt/D ratio				
	< 3%	< 3% £ 10%	> 10%		
	+/- 15%	+/- 12.5%	D £ 168.3	+/- 12.5%	
			D > 168.3	+/- 10%	
Length L(mm)	L		Limit deviation (mm)		
	< 6 m		+10	- 0	
	≥ 6 m		+15	- 0	
STRAIGHTNESS					
≤ 1.5 ‰ L (L=length of the tube)					
INSPECTION DOCUMENTS (in accordance with UNI EU 21)					
Order with non-specific inspection and testing			Order with specific inspection and testing		
1. Certificate of compliance with the order 2. Test report			1. Inspection certificate 2. inspection report		
FREQUENCY OF TESTS					
Outside diameter D(mm)	D < 101.6		1 sample tube from each batch (400 pieces)		
	D ≥ 101.6		1 sample tube from each batch (200 pieces)		
	Batches amounting to less than, 400 and 200 pieces, count as one batch				
MARKING*					
manufacturer's mark	steel grade		the number of this Norm (UNI 7729)		
* Marking shall generally be applied by stamping. A different marking method is also permitted for tubes with small outside diameters and/or small wall thicknesses					

DIN 1629					
Steel name	St 52.0*				
Chemical composition	C	P	S	N fixing elements	
	≤ 0.22	≤ 0.040	≤ 0.035	(es. Al _{total}) ≥ 0.020	
*The content shall not exceed 0.55% Si and 1.60% Mn in the cast analysis					
MECHANICAL PROPERTIES					
Carico di rottura (Mpa) min	da 500* a 650				
	*For cold finished tubes in the NBK condition, minimum values of tensile strength lower than these values by 10 Mpa are permitted				
Yield strength (R _{eH}) (Mpa) min	thickness (mm)				
	£ 16	> 16 £ 40	> 40 £ 65		
355	345	335			
Elongation %	longitudinal		transverse		
	21		19		
TOLERANCES					
Outside diameter D(mm)			Tube barrel and tube ends	At tube ends, subject to particular agreement	
	D £ 100		+/- 1% D (but ± 0.5mm is permitted)	+/- 0.4 mm	
	100 < D £ 200		+/- 1% D	+/- 0.5 mm D	
Wall thickness Wt(mm)	D > 200		+/- 1% D	+/- 0.6 mm D	
	D £ 130	Wt £ 2*s _n		+ 15% -10%	
		2*s _n < Wt £ 4*s _n		+12.5% -10%	
		Wt > 4*s _n		+/- 9%	
	130 < D £ 320	Wt £ 0.05 D		+ 17.5% -12.5%	
		0.05 D < Wt £ 0.11 D		+/- 12.5%	
320 < D £ 660	Wt > 0.11 D		+/- 10%		
	Wt £ 0.05 D		+ 20% -15%		
	0.05 D < Wt £ 0.09 D		+ 15% -12.5%		
		Wt > 0.09 D		+ 12.5% -10%	
s _n is the standard wall thickness as specified in DIN 2448					
Length L(mm)	Manufacturing length		agreed at the time of ordering		
	Specified length		+/- 500		
	Exact length		£ 6 m	+10 0	
		6 m < L £ 12 m	+15 0		
		> 12 m	by agreement		
STRAIGHTNESS					
The tubes shall be straight to the eye. Particular requirements regarding straightness may be agreed					
INSPECTION DOCUMENTS (in accordance with EN 10204)					
The type of document required and the test house concerned where acceptance inspection is to be carried out by a third party shall be specified in the order					
Certificate of compliance	2.2				
Inspection Certificate	3.1A				
	3.1B				
	3.1C				
FREQUENCY OF TESTS					
Outside diameter D(mm)	D £ 500		1 sample tube from each batch (100 pieces)		
	D > 500		1 sample tube from each batch (50 pieces)		
Remainders of up to 50% of the batches may be distributed uniformly across the batches. Number of tubes and remainders amounting to more than 50% and supplies of less than 50% of a batch count as one complete batch					
MARKING*					
manufacturer's mark	steel grade		symbol S indicating that the tube is of the seamless type		inspector's mark
* Marking shall generally be applied by stamping. A different marking method is also permitted for tubes with small outside diameters and/or small wall thicknesses					