

STAINLESS STEEL TUBING FOR SURGICAL IMPLANTS AND DEVICES

316 L (ASTM F138), 316 Ti, 316 L, Material Data

316 L	316 Ti	316 L
1.4441	1.4571	1.4404
implantable Grade		

Chemical Composition

Carbon	max. 0,030 wt.-%	max. 0,08 wt.-%	max. 0,03 wt.-%
Silicon	max. 0,75 wt.-%	max. 0,75 wt.-%	max. 0,75 wt.-%
Manganese	max. 2,0 wt.-%	max. 2,0 wt.-%	max. 2,0 wt.-%
Phosphorus	max. 0,025 wt.-%	max. 0,045 wt.-%	max. 0,045 wt.-%
Sulfur	max. 0,010 wt.-%	max. 0,03 wt.-%	max. 0,03 wt.-%
Nitrogen	max. 0,10 wt.-%	max. 0,10 wt.-%	max. 0,10 wt.-%
Chromium	17,0 - 19,0 wt.-%	16,0 - 18,0 wt.-%	16,0 - 18,0 wt.-%
Molybdenum	2,25 - 3,0 wt.-%	2,0 - 3,0 wt.-%	-
Nickel	13,0 - 15,0 wt.-%	10,0 - 14,0 wt.-%	10,0 - 14,0 wt.-%
Titanium		5x %(C+N)-0,7	
Copper	max. 0,5 wt.-%	-	-
Iron	balance	balance	balance

Physical Properties

Melting Point	1750° C	1345° C	1371° C
Density	8,0 g/cm ³	8,0 g/cm ³	8,0 g/cm ³
Modulus of Elasticity	200 x 10 ³ MPa	193x10 ³ MPa	193x10 ³ MPa

Mechanical Properties

	cold-worked	annealed	annealed
Ultimate Tensile Strength	min. 860 MPa	min. 500 MPa	min. 500 MPa
Yield Strength	min. 690 MPa	min. 200 MPa	min. 200 MPa
Elongation	min. 7%	min. 40%	min. 40%

Microstructure in fully annealed condition

Austenitic Grain Size	min. 6	min. 8	min. 8
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Comments

Properties strongly depend on processing history and ambient temperature. Mechanical values listed above are typical for uniaxial tension. Upon request, we can also deliver this material with other properties.

