

AISI	316 L	DIN	1.4441 - 316 L medical				AFNOR	Z 2 CND 17 13	
<b>General characteristics</b>									
Austenitic stainless steel with similar composition as 316 L, but with restricted tolerance for impurities. This stainless steel presents a greater corrosion resistance as compared to 316 L and is particularly adapted for medical applications (e.g. Implants). This steel complies with the standard EN 1811 and can be used for products in direct and prolonged contact with skin. Though the tolerances of the critical impurities (carbone, sulphur, phosphorous etc.) is identical among the standards for implant material (ISO 5832-1, ASTM F 138), the specification of the main alloying constituents is slightly different. We here make reference to the DIN standard.							<b>Machinability</b>	- -	
							<b>Quench hardening</b>	no	
							<b>Polishing</b>	+	
							<b>Magnetic</b>	no	
							<b>Age hardening</b>	no	
							<b>Welding</b>		
							MIG, TIG, WIG	yes	
							Arc	yes	
							Resistance	yes	
Autogenous	yes								
Laser	yes								
<b>Chemical composition according to DIN (%)</b>									
<b>C</b>	<b>Si</b>	<b>Mn</b>	<b>P</b>	<b>S</b>	<b>Cr</b>	<b>Mo</b>	<b>Ni</b>	<b>others</b>	
< 0.03	< 1.0	< 2.0	< 0.025	< 0.010	17 - 19	2.5 - 3.2	13 - 15.5	N<0.1, Cu<0.5	
<b>Physical properties</b>									
<b>Density</b> $\rho$ [kg·m <sup>-3</sup> ]		<b>Electrical resistivity</b> $\rho$ [ $\mu\Omega\cdot m$ ]			<b>Specific heat</b> $C_p$ [J·kg <sup>-1</sup> ·K <sup>-1</sup> ]		<b>Thermal conductivity</b> $\lambda$ [W·m <sup>-1</sup> ·K <sup>-1</sup> ]		
7'980		0.75			500		15		
<b>Coefficient of thermal expansion</b> $\alpha$ [10 <sup>-6</sup> ·°C <sup>-1</sup> ] between 20°C and							<b>Elastic modulus</b> E [GPa]		
100 °C	200 °C	300 °C	400 °C	500 °C	600 °C	700 °C	200 at 20°C		
16.5	17.5	17.5	18.5	18.5	19	19.5	172 at 400°C		
<b>Mechanical properties</b>									
<b>State</b>	<b>Yield strength</b> Rp <sub>0.2</sub> [MPa]				<b>Tensile strength</b> Rm [MPa]	<b>Elongation</b> A <sub>5</sub> [%]	<b>Vickers Hardness</b> [HV]		
	20°C	100°C	200°C	300°C					
<b>Annealed</b>	190	166	137	118	460 - 680	≥45	160 - 200		
<b>Full hard</b>	1300				1400	5	430		
<b>Thermal treatments</b>									
<b>Type</b>	<b>Temperature</b> [°C]	<b>Time</b> [minutes]	<b>Protective atmosphere</b>			<b>Cooling</b>			
<b>Annealing</b>	1020 -1080	15 - 60	H <sub>2</sub> + N <sub>2</sub> or cracked NH <sub>3</sub>			Rapid			
<b>Surface treatments</b>									
<b>Type</b>	<b>Solution</b>				<b>Remarks</b>				
<b>Pickling</b>	6 - 25 % HNO <sub>3</sub> + 0.5 - 8 % HF				Only suitable in annealed condition, hot				
<b>Passivation</b>	20 - 50% HNO <sub>3</sub>				Hot				
<b>Fabrication characteristics</b>									
This steel can easily be cold rolled, drawn and stamped. However, suitable tooling is required because of its high work hardening rate. This alloy may become slightly magnetic with increasing cold working. This steel is difficult to machine. Special care during fabrication and a strict quality control must be adopted to obtain the "medical" label. Prescriptions differ among the various standards. Please contact us for further information.									
<b>Welding, brazing and soldering</b>									
This steel can easily be welded by any conventional joining technique, except the oxyacetylene torch. Depending on the welding conditions, some residual ferrite may form along the welding line. There is no need for any post-weld heat treatment. Welding electrodes: 1.4430, 1.4576. Special prescriptions must be full filled to respect standard (see "Fabrication characteristics")									
<b>Available products</b>									
Sheets, ribbons, wires, profiles, tubes, dimensions and tolerances on request.									

The indications are basically founded on our actual know-how. This technical data sheet is without commitment and not contracted.