

## CHRONIFER<sup>®</sup> Supra

EDELSTÄHLE UND METALLE FINE STEEL AND METALS

## 1.4301-1.4306-1.4307/AISI 304-304L - 18/8 Austenitic Stainless Steel

**Features and Particularities** The composition of this austenitic stainless steel satisfies simultaneously the composition requirements of the 1.4301 and 1.4306-1.4307 grades. Its low C-content reduces significantly its sensitization risk in the 450-800°C temperature range with formation of grain boundaries precipitates leading to intergranular corrosion reactions. This stainless steel grade forms  $\partial$  (Delta) ferrite during solidification. Its relative magnetic permeability  $\mu$ r in the annealed condition is up to <1.02. However, its austenitic matrix transforms progressively into a ferromagnetic martensitic microstructure during cold working. Thereby, its relative magnetic permeability  $\mu$ r can rapidly increase to high values, like 2 or more. Its corrosion resistance in chloride free salt solutions is satisfactory. This steel can continuously be used up to 400°C.

**Uses** This steel grade it's the most used stainless steel. Its typical uses are the production, stocking and transportation in the beverage, nutritional and chemical industries. However, its corrosion resistance depends partly on its strength, surface condition, cleanliness and roughness.

Standards	Material Number ISO EN/DIN AFNOR AISI/SAE ASTM UNS JIS			1.4301 / 1.4306 / 1.4307 X5CrNi 18-10 / X2CrNi 19-11 / X2CrNi 18-9 X5CrNi 18-10 / X5CrNi 19-11 / X2CrNi 18-9 X10CrNi 18-10 (former Z 7 CN 18-09) ≈ 304 / 304L F899 S30400 SUS 304 / JUS 304 L					
Chemical composition (‰ <sub>wt.</sub> )	C max. 0.03	Si max. 1.00	Mn max. 2.00	P max. 0.045	S max. 0.03	Cr 18.0 19.0	Ni 8.00 10.50	N max. 0.10	Fe Balance
Dimensions and tolerances	Standar Bars Bars Wires Out o Other to	d: Bars 3 Ø < 2.00 Ø ≥ 2.00 § Ø ≥ 0.80 f roundne lerances	m (+50/0 mm: mm: ) - max. 3. ess max.: on reques	mm), coil: 00 mm: :t	s for Escomatic ISO h8 (h7) ISO h6 ISO fg7, coils for Escomatic ½ diameter tolerance				
Mechanical properties	Diameter (mm) Mechanical strength UTS (M			MPa)	<13.0 700-950	≥13. 600-	:13.0 - ≤16.0 >16.0 600-950 500-700		0 700
Executions and Delivery conditions	<ul> <li>Standard: Bars 3 m (+50/0 mm), coils for Escomatic</li> <li>Bars Ø ≥ 2.00 mm: cold drawn, ground, polished, Ra max. 0.4 μm (N5) Bar ends: pointed and chamfered</li> <li>Bars &lt; 2.00 mm: Surface condition: cold drawn</li> <li>Other executions on request</li> </ul>								
Availability	Standard dimension on stock, see: Sale program								
Cutting conditions	<ul> <li>Machinability:</li> <li>Cutting speed:</li> <li>Lubricant-coolant fluid:</li> <li>The optimal cutting condit chip dimensions, the lubric the roughness to be achie</li> </ul>			relatively difficult $V_c \approx > 25-40$ m/min, annealed: Rm 500-700 MPa individual choice tions depend on the machine tool, the cutting tools, the cant-cooling fluid, as well as the tolerances and surface eved.					
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1.4301-1.4306-1.4307/AISI 304-304L - 18/8 Austenitic Stainless Steel

δ (Delta) Ferrite	This CHRONIFER <sup>®</sup> Supra stainless steel contains $\delta$ (Delta) Ferrite. Its Ferrite content can be determined graphically with the Schaeffler-De Long Diagram modified by Outokumpu, or computed with the aid of the Creq und Nieq equivalent contents: • $Cr_{eq} = 1.5Si + Cr + Mo + 2Ti + 0.5Nb$ • $Ni_{eq} = 30(C + N) + 0.5Mn + Ni + 0.5(Cu + Co)$ • Ferrite Number FN or $\%_{vol.} \delta$ (Delta) Ferrite FN = ([{1.375 (Cr <sub>ew</sub> - 16} + 10] - Ne <sub>ii</sub> ) 2.586 Negative values of FN indicate the absence of $\delta$ (Delta) Ferrite.							
PREN	<ul> <li>PREN = %Cr + 3.3%Mo + 18%N</li> <li>Computed basic parameters: min. ≥ 18 / max. 19.8</li> </ul>							
Forming	Warm: forging: 950 – 1150°C, rapid cooling <ul> <li>The temperature range 450-800°C should be avoided.</li> <li>Cold: no limitation</li> </ul>							
Annealing	Solution anneal:1010-1090°C, quenching, rapid coolingStress relieving anneal:T max. 420°C /< 5h							
Hardening Strengthening	<ul> <li>This steel cannot be hardened by heat treatment.</li> <li>This steel can be strengthened by cold deformation/straining.</li> </ul>							
Microstructures	For machining and polishing: annealed or cold deformed austenite							
Polishing	Mechanical or electrolytic: adapted • The presence of $\partial$ (Delta) Ferrite restricts its adequacy for mirror polishing.							
Welding	Good for welding							
Laser marking	The HAZ Zone (Heat Affected Zone) of the laser marking can influence negatively its local microstructure. More info							
Sensitization	• Sensitization in the 450-800°C temperature range should be avoided, to prevent any intergranular carbide precipitations which can lead to brittleness and a reduction of the corrosion resistance. <u>More info.</u>							
Sensitization TTS - curves								

Modifications will not be adjusted automatically. Last update 08/2017



EDELSTÄHLE UND METALLE

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