



**MATERIAL No.: TP309/ S30900/ 1.4828**

**DESCRIPTION**

<b>EN symbol (short)</b>	X15CrNiSi20-12	<b>Density kg/dm<sup>3</sup></b>	7,9
<b>AISI</b>	AISI 309	<b>Hardness HB 30</b>	>=223
<b>UNS</b>	S 30900 Grade TP 309	<b>Composition</b>	chromium nickel steel
<b>AFNOR</b>	Z 9 CNS 24.13	<b>Category</b>	Heat resistant steels and alloys
<b>BS</b>	309 S - 24- EN 10088-1 (06/2005) (GB)	<b>Structure</b>	austenitic
<b>Registered work's label</b>	Thermax®4828	<b>Additional characteristics</b>	forge scale temperature 1832°F

**CHEMICAL COMPOSITION**

		C	Si	Mn	P	S	Cr	Ni	N
<b>1.4828</b>	<b>Min %</b>		1,50				19,00	11,00	
	<b>Max %</b>	0,20	2,50	2,00	0,045	0,015	21,00	13,00	0,11
(Key to steel 2010)									
<b>AISI 309</b> <b>S 30900</b>	<b>Min %</b>						22,00	12,00	
	<b>Max %</b>	0,15	0,75	2,00	0,040	0,030	24,00	15,00	
ASTM SA 249 (S 30900 ) - (AISI 309)									

**PHYSICAL PROPERTIES**

<b>Property</b>		<b>Value</b>			
<b>Density: kg/dm<sup>3</sup></b>		7,9			
<b>Hardness: HB 30</b>		>=223			
<b>magnetizable</b>		non			
<b>Temperature T</b> °C/F (°C/F)	<b>Specific heat</b> J / kgK (Btu / lb °F)	<b>Thermal conductivity</b> W/mK (Btu·in / ft <sup>2</sup> ·h·°F)	<b>Electric resistance</b> μΩ · cm (Ω circ mill / ft)	<b>Modulus of elasticity</b> kN/mm <sup>2</sup> (10 <sup>3</sup> ksi)	<b>Expansion rate from 70°F bis T</b> 10 <sup>-6</sup> / K (10 <sup>-6</sup> / °F)

20 / 68	500 (--)	157(--)		196/(--)	
200 / 392					16,5 (--)
400 / 752					17,5 (--)
500 / 932	500 /(--)	21/(--)			18,0 (--)
600 / 1112					18,5 (--)
800 / 1472					19,5 (--)
1000 / 1832					
<b>Temp.</b>	<b>Creep strain limit</b>	<b>Creep strain limit</b>	<b>Creep rupture strength</b>	<b>Creep rupture strength</b>	<b>Creep rupture strength</b>
°C/°F	<b>Rp 01 (10 000h)</b>		<b>10 000 h</b>	<b>100.000 h</b>	
°C/°F	<b>N/mm<sup>2</sup> /ksi</b>		<b>N/mm<sup>2</sup> /ksi</b>	<b>N/mm<sup>2</sup> ksi</b>	
100/ 212					
400 /752					
500 /932					
600 /1112	80 /11,6		120 /17,4	65 /9,4	
700 /1292	25 /3,6			16 / 2,3	
800 / 1472	10 /1,4		18 / 2,6	7,5 /1,0	
900	4 /0,6		5 / 0,7	3 / 0,4	

#### **MECHANICAL PROPERTIES (20°C / 68°F)**

<b>0,2% Yield strength (Mpa)</b>	230	
<b>Tensile strength Rm Mpa</b>	500-750	solution annealed
<b>Elongation A5 (%)</b>	>=30%	solution annealed

#### **TEMPERATURE INFORMATION**

<b>Application area</b>	
<b>Operation temperature</b>	1472 °F to 1832 °F
<b>Explanation report</b>	scaling resistance (air) up to 1832°F
<b>Solution heat treatment</b>	
<b>Working temperature</b>	1922 °F to 2102 °F
<b>Explanation report</b>	cooldown: air/water
<b>Solution heat treatment</b>	

<b>Working temperature</b>	2102 °F to 1472 °F
<b>Explanation report</b>	cooldown :air
<b>forging</b>	
<b>Working temperature</b>	2102 °F to 1472 °F
<b>Explanation report</b>	fast cooldown air/water

#### STANDARDS / INFORMATION

<b>Standards</b>	<b>Description</b>
<a href="#">ASTM A 276</a>	Rods and cross-sections made of stainless and heat-resistant steel
<a href="#">DIN EN 10088-1 (09/2005)</a>	Stainless steels Part 1: List of stainless steels
<a href="#">DIN EN 10095 (05/1999)</a>	heat resistant steel and nickel alloy
<a href="#">DIN EN 10296-2 (02/2006)</a>	Welded circular steel pipes for machine construction and general technical service stainless steel
SEW 310 (08/1992)	physical properties of steel
SEW 400 (1997-02)	Rolled and forged stainless steels
SEW 470 (02/1976)	heat-resisting rolled and forged steels

#### PROCESS INFORMATION

<b>Chip removing process</b>	Carbide formation may wear down cutting tools
<b>Welding</b>	
<b>- Material classification acc. CEN ISO/TR 15608</b>	<b>8,2</b>
<b>- Type</b>	well weldable WIG MAG solid wire manual arc welding (E) Laser welding
<b>- Add. material</b>	1.4829
<b>- Hints</b>	preheating not required

#### MAIN FIELDS OF APPLICATION

<b>Details of application</b>	higher mechanical strain in high temperatures scaling resistant in air up to approx.1832°F due to low corrosion resistance in reducing/sulfuric gases, only process material below 1202°F
<b>Certifications</b>	
<b>Apparatus engineering</b>	Apparatus in high temperatures
<b>industrial furnace</b>	

<b>engineering</b>	
<b>industrial furnace engineering</b>	annealing hood
<b>crude oil</b>	

**RANGE OF PRODUCTS**

<b>Product type</b>	<b>Product</b>
Processing / Construction	from bar steel (turning, milling)
Plates / Sheets	plates/sheets
Fittings	welded elbows welded reductions Welded T-pieces seamless elbows seamless reductions seamless T-pieces
Flanges / Collars / Flared tube ends	Various flanges (weld neck flange, blind flange etc.)
Bumped boiler ends / caps / round blanks	from sheets
Pipes / Tubes	welded pipes/tubes seamless pipes/tubes
Bar steel	section steel round bar steel
Equipment	screws, screw nuts, shims, straight turning parts, designed components

[Pipe/Tube/Fitting/Flange/Valve/Plate](#)

Stainless Steel/Nickel Alloy/Duplex

