Crucible Steel 17Cr-4Ni Precipitation Hardening Stainless Steel

Category : Metal , Ferrous Metal , Martensitic , Stainless Steel , Precipitation Hardening Stainless

Material Notes:

Crucible 17Cr-4Ni is a precipitation-hardening stainless steel which is capable of a high strength and hardness levels after a relatively simple heat-treatment procedure. This grade is martensitic and magnetic in both the solution-treated and precipitation-hardened conditions. It has high resistance to crack propagation, good transverse properties, and corrosion resistance is normally superior to the regular martensitic chromium-type of stainless steel. Because of the single low-temperature (900-1150°F) precipitation-hardening heat treatment of this grade, scaling and distortion are virtually eliminated. This enables materials to be finish machined to close tolerance prior to heat treatment. Information provided by Crucible Specialty Metals.

Order this product through the following link:
http://www.lookpolymers.com/polymer_Crucible-Steel-17Cr-4Ni-Precipitation-Hardening-Stainless-Steel.php

Physical Properties	Metric	English	Comments
Density	7.75 g/cc	0.280 lb/in³	A
	7.86 g/cc	0.284 lb/in³	H1150

Mechanical Properties	Metric	English	Comments
Hardness, Brinell	302	302	A
	332	332	H1100
	409	409	H925
Hardness, Rockwell C	27	27	H1150-M
	36	36	H1075
	44	44	H900
Tensile Strength, Ultimate	862 MPa	125000 psi	H1150-M
	1030 MPa	150000 psi	A
	1170 MPa	170000 psi	H1025
	662 MPa @Temperature 538 °C	96000 psi @Temperature 1000 °F	H1150
	820 MPa @Temperature 538 °C	119000 psi @Temperature 1000 °F	
	855 MPa @Temperature 316 °C	124000 psi @Temperature 600 °F	H1150

Mechanical Properties	Metric	English	Comments
	1190 MPa @Temperature 316 °C	173000 psi @Temperature 600 °F	H925
Tensile Strength, Yield	862 MPa @Strain 0.200 %	125000 psi @Strain 0.200 %	H1150
	1030 MPa @Strain 0.200 %	150000 psi @Strain 0.200 %	H1075
	1280 MPa @Strain 0.200 %	185000 psi @Strain 0.200 %	H900
	641 MPa @Strain 2.00 %, Temperature 538 °C	93000 psi @Strain 2.00 %, Temperature 1000 °F	H1150
	731 MPa @Strain 2.00 %, Temperature 538 °C	106000 psi @Strain 2.00 %, Temperature 1000 °F	H900
	827 MPa @Strain 2.00 %, Temperature 316 °C	120000 psi @Strain 2.00 %, Temperature 600 °F	H1150
	1030 MPa @Strain 2.00 %, Temperature 316 °C	150000 psi @Strain 2.00 %, Temperature 600 °F	H900
Elongation at Break	10 %	10 %	in 2", A
	15 %	15 %	in 2", H1025
	22 %	22 %	in 2", H1150-M
	10 % @Temperature 316 °C	10 % @Temperature 600 °F	in 2"; H900
	12 % @Temperature 316 °C	12 % @Temperature 600 °F	in 2", H1150
	15 % @Temperature 538 °C	15 % @Temperature 1000 °F	in 2"; H900
	15 % @Temperature 538 °C	15 % @Temperature 1000 °F	in 2", H1150
Reduction of Area	50 %	50 %	H900
	54 %	54 %	H925

Mechanical Properties	Metric	English	Comments
	31 % @Temperature 316 °C	31 % @Temperature 600 °F	H900
	46 % @Temperature 538 °C	46 % @Temperature 1000 °F	H900
	54 % @Temperature 316 °C	54 % @Temperature 600 °F	H1150
	55 % @Temperature 538 °C	55 % @Temperature 1000 °F	H1150
Rupture Strength	413.7 MPa @Temperature 32.2 °C, Time 3.60e+6 sec	60000 psi @Temperature 90.0 °F, Time 1000 hour	
	655.0 MPa @Temperature 482 °C, Time 360000 sec	95000 psi @Temperature 900 °F, Time 100 hour	
	1089 MPa @Temperature 316 °C, Time 3.60e+6 sec	158000 psi @Temperature 600 °F, Time 1000 hour	
	1131 MPa @Temperature 316 °C, Time 360000 sec	164000 psi @Temperature 600 °F, Time 100 hour	
Modulus of Elasticity	197 GPa	28500 ksi	Tension; H900
Fatigue Strength	531 MPa @# of Cycles 1.00e+8	77000 psi @# of Cycles 1.00e+8	
	621 MPa @# of Cycles 1.00e+7	90000 psi @# of Cycles 1.00e+7	
Shear Modulus	68.9 GPa	10000 ksi	H1075 and H1150
	77.2 GPa	11200 ksi	H900
Charpy Impact	23.0 J	17.0 ft-lb	H900
	36.6 J	27.0 ft-lb	H1150-M

Thermal Properties	Metric	English	Comments
	10.8 µm/m-°C	6.00 µin/in-°F	

Thermal Properties	Metric	English	Comments
CTE, linear	@Temperature 21.1 - 93.3 °C	@Temperature 70.0 - 200 °F	A and H900
	11.3 µm/m-°C @Temperature 21.1 - 93.3 °C	6.30 µin/in-°F @Temperature 70.0 - 200 °F	H1075
	11.3 µm/m-°C @Temperature 21.1 - 427 °C	6.30 µin/in-°F @Temperature 70.0 - 800 °F	A
	11.9 µm/m-°C @Temperature 21.1 - 93.3 °C	6.60 µin/in-°F @Temperature 70.0 - 200 °F	H1150
	13.0 µm/m-°C @Temperature 21.1 - 427 °C	7.20 µin/in-°F @Temperature 70.0 - 800 °F	H1150
Specific Heat Capacity	0.460 J/g-°C @Temperature 0.000 - 100 °C	0.110 BTU/lb-°F @Temperature 32.0 - 212 °F	
Thermal Conductivity	17.9 W/m-K @Temperature 149 °C	124 BTU-in/hr-ft²-°F @Temperature 300 °F	H900
	22.6 W/m-K @Temperature 482 °C	157 BTU-in/hr-ft²-°F @Temperature 900 °F	H900

Component Elements Properties	Metric	English	Comments
Carbon, C	<= 0.070 %	<= 0.070 %	
Chromium, Cr	15.5 - 17.5 %	15.5 - 17.5 %	
Copper, Cu	3.0 - 5.0 %	3.0 - 5.0 %	
Iron, Fe	>= 69.91 %	>= 69.91 %	As Remainder
Manganese, Mn	<= 1.0 %	<= 1.0 %	
Nb + Ta	0.15 - 0.45 %	0.15 - 0.45 %	
Nickel, Ni	3.0 - 5.0 %	3.0 - 5.0 %	
Phosphorous, P	<= 0.040 %	<= 0.040 %	
Silicon, Si	<= 1.0 %	<= 1.0 %	
Sulfur, S	<= 0.030 %	<= 0.030 %	

Electrical Properties	Metric	English	Comments
Electrical Resistivity	0.0000770 ohm-cm	0.0000770 ohm-cm	H900
	0.0000980 ohm-cm	0.0000980 ohm-cm	A

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