

Crucible Steel 431 Chromium Steel

Category : Metal , Ferrous Metal , Stainless Steel , T 400 Series Stainless Steel

Material Notes:

Crucible 431 is a nickel bearing chromium steel which can be treated to exceptionally high physical properties. In the heat treated conditions, its corrosion resistance is superior to similar martensitic types. This grade is ferro-magnetic when annealed or heat treated. Because it is characteristically a two phase alloy, the normal structure contains ferrite and martensite. However depending upon application, the chemistry can be balanced to provide an essentially ferrite-free structure and higher mechanical properties. Information provided by Crucible Specialty Metals.

Order this product through the following link:

http://www.lookpolymers.com/polymer_Crucible-Steel-431-Chromium-Steel.php

Physical Properties	Metric	English	Comments
Specific Gravity	7.77 g/cc	7.77 g/cc	
	7.77 g/cc	7.77 g/cc	

Mechanical Properties	Metric	English	Comments
Hardness, Brinell	260	260	
	260	260	
Tensile Strength, Ultimate	862 MPa	125000 psi	
	862 MPa	125000 psi	
Tensile Strength, Yield	655 MPa	95000 psi	
	@Strain 0.200 %	@Strain 0.200 %	
	655 MPa	95000 psi	
	@Strain 0.200 %	@Strain 0.200 %	
Elongation at Break	20 %	20 %	in 2"
	20 %	20 %	in 2"
Reduction of Area	55 %	55 %	
	55 %	55 %	
Modulus of Elasticity	200 GPa	29000 ksi	
	200 GPa	29000 ksi	
Izod Impact Unnotched	67.8 J	50.0 ft-lb	
	67.8 J	50.0 ft-lb	

Mechanical Properties	Metric	English	Comments
Thermal Properties	Metric	English	Comments
CTE, linear	11.7 $\mu\text{m}/\text{m}\cdot^\circ\text{C}$	6.50 $\mu\text{in}/\text{in}\cdot^\circ\text{F}$	
	@Temperature 0.000 - 100 $^\circ\text{C}$	@Temperature 32.0 - 212 $^\circ\text{F}$	
	12.1 $\mu\text{m}/\text{m}\cdot^\circ\text{C}$	6.70 $\mu\text{in}/\text{in}\cdot^\circ\text{F}$	
	@Temperature 0.000 - 316 $^\circ\text{C}$	@Temperature 32.0 - 600 $^\circ\text{F}$	
Specific Heat Capacity	0.460 J/g- $^\circ\text{C}$	0.110 BTU/lb- $^\circ\text{F}$	
	@Temperature 0.000 - 100 $^\circ\text{C}$	@Temperature 32.0 - 212 $^\circ\text{F}$	
	0.460 J/g- $^\circ\text{C}$	0.110 BTU/lb- $^\circ\text{F}$	
	@Temperature 0.000 - 100 $^\circ\text{C}$	@Temperature 32.0 - 212 $^\circ\text{F}$	
Thermal Conductivity	20.23 W/m-K	140.4 BTU-in/hr-ft 2 - $^\circ\text{F}$	
	@Temperature 93.3 $^\circ\text{C}$	@Temperature 200 $^\circ\text{F}$	
	20.23 W/m-K	140.4 BTU-in/hr-ft 2 - $^\circ\text{F}$	
	@Temperature 93.3 $^\circ\text{C}$	@Temperature 200 $^\circ\text{F}$	
Melting Point	1430 - 1480 $^\circ\text{C}$	2600 - 2700 $^\circ\text{F}$	
	1430 - 1480 $^\circ\text{C}$	2600 - 2700 $^\circ\text{F}$	
Solidus	1430 $^\circ\text{C}$	2600 $^\circ\text{F}$	
	1430 $^\circ\text{C}$	2600 $^\circ\text{F}$	
Liquidus	1480 $^\circ\text{C}$	2700 $^\circ\text{F}$	
	1480 $^\circ\text{C}$	2700 $^\circ\text{F}$	

Component Elements Properties	Metric	English	Comments
Carbon, C	$\leq 0.20\%$	$\leq 0.20\%$	
Chromium, Cr	15 - 17 %	15 - 17 %	
Iron, Fe	$\geq 78.23\%$	$\geq 78.23\%$	As Remainder
Manganese, Mn	$\leq 1.0\%$	$\leq 1.0\%$	
Nickel, Ni	1.25 - 2.5 %	1.25 - 2.5 %	
Phosphorous, P	$\leq 0.040\%$	$\leq 0.040\%$	

Component Elements Properties	Metric	English	Comments
Sulfur, S	<= 0.030 %	<= 0.030 %	

Electrical Properties	Metric	English	Comments
Electrical Resistivity	0.0000720 ohm-cm	0.0000720 ohm-cm	
	@Temperature 23.0 °C	@Temperature 73.4 °F	
	0.0000720 ohm-cm	0.0000720 ohm-cm	
	@Temperature 23.0 °C	@Temperature 73.4 °F	

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