

## Crucible Steel 446 Chromium Steel

Category : Metal , Ferrous Metal , Stainless Steel

### Material Notes:

Crucible 446 is a non-hardenable chromium steel which has the highest corrosion and heat resisting properties of the straight chromium steels. This grade is magnetic at all times. Information provided by Crucible Specialty Metals.

Order this product through the following link:

[http://www.lookpolymers.com/polymer\\_Crucible-Steel-446-Chromium-Steel.php](http://www.lookpolymers.com/polymer_Crucible-Steel-446-Chromium-Steel.php)

Physical Properties	Metric	English	Comments
Specific Gravity	7.65 g/cc	7.65 g/cc	

Mechanical Properties	Metric	English	Comments
Hardness, Brinell	170	170	
Tensile Strength, Ultimate	552 MPa	80000 psi	
	17.2 MPa	2500 psi	
	@Temperature 1040 °C	@Temperature 1900 °F	
	117 MPa	17000 psi	
	@Temperature 704 °C	@Temperature 1300 °F	
Tensile Strength, Yield	345 MPa	50000 psi	
	@Strain 0.200 %	@Strain 0.200 %	
Elongation at Break	25 %	25 %	in 2"
Reduction of Area	45 %	45 %	
Creep Strength	2.068 MPa	299.9 psi	0.0001% per hour
	@Temperature 816 °C	@Temperature 1500 °F	
	41.37 MPa	6000 psi	
	@Temperature 538 °C, Time 3.60e+7 sec	@Temperature 1000 °F, Time 10000 hour	Creep rate: 0.0001% per hour
Rupture Strength	3.447 MPa	500.0 psi	
	@Temperature 871 °C, Time 3.60e+6 sec	@Temperature 1600 °F, Time 1000 hour	
	5.516 MPa	800.0 psi	
	@Temperature 871 °C, Time 3.60e+6 sec	@Temperature 1600 °F, Time 1000 hour	
	20.68 MPa	3000 psi	

Mechanical Properties	Metric	English	Comments
	@Temperature 593 °C, Time 3.60e+7 sec	@Temperature 1100 °F, Time 10000 hour	
	38.61 MPa	5600 psi	
	@Temperature 593 °C, Time 3.60e+6 sec	@Temperature 1100 °F, Time 1000 hour	
Modulus of Elasticity	200 GPa	29000 ksi	

Thermal Properties	Metric	English	Comments
CTE, linear	10.4 µm/m-°C	5.80 µin/in-°F	
	@Temperature 0.000 - 100 °C	@Temperature 32.0 - 212 °F	
	12.1 µm/m-°C	6.70 µin/in-°F	
	@Temperature 0.000 - 982 °C	@Temperature 32.0 - 1800 °F	
Specific Heat Capacity	0.502 J/g-°C	0.120 BTU/lb-°F	
	@Temperature 0.000 - 100 °C	@Temperature 32.0 - 212 °F	
Thermal Conductivity	20.92 W/m-K	145.2 BTU-in/hr-ft <sup>2</sup> -°F	
	@Temperature 93.3 °C	@Temperature 200 °F	
	24.38 W/m-K	169.2 BTU-in/hr-ft <sup>2</sup> -°F	
	@Temperature 538 °C	@Temperature 1000 °F	
Melting Point	1430 - 1510 °C	2600 - 2750 °F	
Solidus	1430 °C	2600 °F	
Liquidus	1510 °C	2750 °F	

Component Elements Properties	Metric	English	Comments
Carbon, C	<= 0.20 %	<= 0.20 %	
Chromium, Cr	23 - 27 %	23 - 27 %	
Iron, Fe	>= 69.98 %	>= 69.98 %	As Remainder
Manganese, Mn	<= 1.5 %	<= 1.5 %	
Nitrogen, N	<= 0.25 %	<= 0.25 %	
Phosphorous, P	<= 0.040 %	<= 0.040 %	
Silicon, Si	<= 1.0 %	<= 1.0 %	

Component Elements Properties	Metric	English	Comments
Electrical Properties	Metric	English	Comments
Electrical Resistivity	0.0000670 ohm-cm @Temperature 23.0 °C	0.0000670 ohm-cm @Temperature 73.4 °F	

## Contact Songhan Plastic Technology Co.,Ltd.

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