AK Steel 13-4 SR® Ferritic Stainless Steel

Category : Metal , Ferrous Metal , Stainless Steel

Material Notes:

AK Steel 13-4 SR Stainless Steel is a ductile weldable ferritic with 13% Cr and 3.75% Al. The high aluminum content results in a base alloy with high electrical resistivity. It is intended for use where electrical energy needs to be dissipated or heat is generated. Good oxidation resistance to 1800 °F (982 °C) permits applications at elevated temperatures. The alloy's wet corrosion resistance is comparable to ferritic alloys Type 409 or Type 430.Information provided by AK Steel.

Order this product through the following link:
http://www.lookpolymers.com/polymer_AK-Steel-13-4-SR-Ferritic-Stainless-Steel.php

Physical Properties	Metric	English	Comments
Density	6.95 g/cc @Temperature 1230 °C	0.251 lb/in³ @Temperature 2250 °F	
	7.00 g/cc @Temperature 1090 °C	0.253 lb/in³ @Temperature 2000 °F	
	7.05 g/cc @Temperature 954 °C	0.255 lb/in³ @Temperature 1750 °F	
	7.105 g/cc @Temperature 816 °C	0.2567 lb/in³ @Temperature 1500 °F	
	7.15 g/cc @Temperature 677 °C	0.258 lb/in³ @Temperature 1250 °F	
	7.195 g/cc @Temperature 538 °C	0.2599 lb/in³ @Temperature 1000 °F	
	7.24 g/cc @Temperature 399 °C	0.262 lb/in³ @Temperature 750 °F	
	7.285 g/cc @Temperature 260 °C	0.2632 lb/in³ @Temperature 500 °F	
	7.33 g/cc @Temperature 121 °C	0.265 lb/in³ @Temperature 250 °F	
	7.36 g/cc @Temperature -17.8 °C	0.266 lb/in³ @Temperature 0.000 °F	

Mechanical Properties	Metric	English	Comments

Mechanical Properties	Metric	English	Comments
Hardness, Rockwell B	86	86	
Tensile Strength, Ultimate	558 MPa	80900 psi	Longitudinal Orientation, True Stress/True Strain
	586 MPa	85000 psi	Transverse Orientation, True Stress/True Strain
Tensile Strength, Yield	421 MPa @Strain 0.200 %	61100 psi @Strain 0.200 %	Longitudinal Orientation, True Stress/True Strain
	448 MPa @Strain 0.200 %	65000 psi @Strain 0.200 %	Transverse Orientation, True Stress/True Strain
Elongation at Break	22 %	22 %	Transverse Orientation, In 2", True Stress/True Strain
	28 %	28 %	Longitudinal Orientation, In 2", True Stress/True Strain
Modulus of Rupture	0.00370 GPa @Temperature 871 °C, Time 3.60e+6 sec	0.537 ksi @Temperature 1600 °F, Time 1000 hour	Stress Rupture Strength
	0.00630 GPa @Temperature 871 °C, Time 360000 sec	0.914 ksi @Temperature 1600 °F, Time 100 hour	Stress Rupture Strength
	0.00830 GPa @Temperature 760 °C, Time 3.60e+6 sec	1.20 ksi @Temperature 1400 °F, Time 1000 hour	Stress Rupture Strength
	0.0159 GPa @Temperature 760 °C, Time 360000 sec	2.31 ksi @Temperature 1400 °F, Time 100 hour	Stress Rupture Strength
	0.0310 GPa @Temperature 649 °C, Time 3.60e+6 sec	4.50 ksi @Temperature 1200 °F, Time 1000 hour	Stress Rupture Strength
	0.0465 GPa @Temperature 649 °C, Time 360000 sec	6.74 ksi @Temperature 1200 °F, Time 100 hour	Stress Rupture Strength

Thermal Properties	Metric	English	Comments
CTE, linear	17.6 µm/m-°C @Temperature 100 °C	9.79 µin/in-°F @Temperature 212 °F	
	19.1 µm/m-°C @Temperature 200 °C	10.6 µin/in-°F @Temperature 392 °F	

Thermal Properties	Metric	English	Comments
	20.2 µm/m-°C	11.2 µin/in-°F	
	@Temperature 300 °C	@Temperature 572 °F	
	20.97 µm/m-°C	11.65 µin/in-°F	
	@Temperature 400 °C	@Temperature 752 °F	
	21.69 µm/m-°C	12.05 µin/in-°F	
	@Temperature 500 °C	@Temperature 932 °F	
	22.28 µm/m-°C	12.38 µin/in-°F	
	@Temperature 600.0 °C	@Temperature 1112 °F	
	22.7 µm/m-°C	12.6 µin/in-°F	
	@Temperature 700.0 °C	@Temperature 1292 °F	
	23.38 µm/m-°C	12.99 µin/in-°F	
	@Temperature 800.0 °C	@Temperature 1472 °F	
	24.05 µm/m-°C	13.36 µin/in-°F	
	@Temperature 900.0 °C	@Temperature 1652 °F	
	24.59 µm/m-°C	13.66 µin/in-°F	
	@Temperature 1000 °C	@Temperature 1832 °F	
Thermal Conductivity	13.7 W/m-K	95.1 BTU-in/hr-ft²-°F	
	@Temperature 22.8 °C	@Temperature 73.0 °F	
	14.2 W/m-K	98.5 BTU-in/hr-ft²-°F	
	@Temperature 50.0 °C	@Temperature 122 °F	
	15.0 W/m-K	104 BTU-in/hr-ft²-°F	
	@Temperature 100 °C	@Temperature 212 °F	
	16.6 W/m-K	115 BTU-in/hr-ft²-°F	
	@Temperature 200 °C	@Temperature 392 °F	
	18.2 W/m-K	126 BTU-in/hr-ft²-°F	
	@Temperature 300 °C	@Temperature 572 °F	
	19.8 W/m-K	137 BTU-in/hr-ft²-°F	
	@Temperature 400 °C	@Temperature 752 °F	
	20.5 W/m-K	142 BTU-in/hr-ft²-°F	
	@Temperature 700.0 °C	@Temperature 1292 °F	
	22.8 W/m-K	158 BTU-in/hr-ft²-°F	

Thermal Properties	Metric	English	Comments
	@Temperature 500 °C	@Temperature 932 °F	
	24.0 W/m-K	167 BTU-in/hr-ft²-°F	
	@Temperature 800.0 °C	@Temperature 1472 °F	
	24.8 W/m-K	172 BTU-in/hr-ft²-°F	
	@Temperature 900.0 °C	@Temperature 1652 °F	
	25.1 W/m-K	174 BTU-in/hr-ft²-°F	
	@Temperature 600.0 °C	@Temperature 1112 °F	
	26.2 W/m-K	182 BTU-in/hr-ft²-°F	
	@Temperature 1000 °C	@Temperature 1832 °F	

Component Elements Properties	Metric	English	Comments
Aluminum, Al	3.75 %	3.75 %	
Carbon, C	0.025 %	0.025 %	
Chromium, Cr	13 %	13 %	
Iron, Fe	82 - 82.375 %	82 - 82.375 %	Balance
Manganese, Mn	0.30 %	0.30 %	
Nickel, Ni	0.25 %	0.25 %	
Phosphorous, P	<= 0.045 %	<= 0.045 %	
Sulfur, S	<= 0.030 %	<= 0.030 %	
Titanium, Ti	0.30 %	0.30 %	

Descriptive Properties	Value	Comments
100 Hour Still Air Oxidation Resistance, Weight Gain (mg/cm2)	0.19	1600°F
	0.41	1800°F
	1.02	2000°F
	3.23	2200°F
Cyclic Oxidation Resistance 1550°-1600°F, Weight Change (mg/cm2)	0.12	100 cycles
	0.13	200 cycles
	0.17	300 cycles
	0.18	400 cycles

Descriptive Properties	Value	Comments
	0.18	500 cycles
n Value (10% -Ult)	0.147	Transverse Orientation,True Stress/True Strain
	0.167	Longitudinal Orientation, True Stress/True Strain

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