

Special Metals UDIMET[®] alloy 188 Cobalt-base Alloy

Category : Metal , Nonferrous Metal , Cobalt Alloy

Material Notes:

UDIMET[®] alloy 188 (UNS R30188) is a cobalt-base alloy with excellent high-temperature strength and good oxidation resistance to 2000[°]F (1093[°]C). The high chromium level coupled with small additions of lanthanum produce an extremely tenacious and protective scale. The alloy also has good sulfidation resistance and excellent metallurgical stability as displayed by its good ductility after prolonged exposure to elevated temperatures. Good fabricability and weldability combine to make the alloy useful in gas turbine applications such as combustors, flame holders, liners and transition ducts. Information Provided by Special Metals Corporation

Order this product through the following link:

http://www.lookpolymers.com/polymer_Special-Metals-UDIMET-alloy-188-Cobalt-base-Alloy.php

Physical Properties	Metric	English	Comments
Density	9.14 g/cc	0.330 lb/in ³	

Mechanical Properties	Metric	English	Comments
Tensile Strength at Break	963 MPa	140000 psi	
	125 MPa @Temperature 1100 [°] C	18100 psi @Temperature 2010 [°] F	
	700 MPa @Temperature 650 [°] C	102000 psi @Temperature 1200 [°] F	
	850 MPa @Temperature 200 [°] C	123000 psi @Temperature 392 [°] F	
Tensile Strength, Yield	446 MPa	64700 psi	
	50.0 MPa @Strain 0.200 %, Temperature 1100 [°] C	7250 psi @Strain 0.200 %, Temperature 2010 [°] F	
	350 MPa @Strain 0.200 %, Temperature 650 [°] C	50800 psi @Strain 0.200 %, Temperature 1200 [°] F	
	425 MPa @Strain 0.200 %, Temperature 200 [°] C	61600 psi @Strain 0.200 %, Temperature 392 [°] F	
Elongation at Break	55 %	55 %	
	40 %	40 %	

Mechanical Properties	Metric @Temperature 1100 Â°C	English @Temperature 2010 Â°F	Comments
	60 %	60 %	
	@Temperature 200 Â°C	@Temperature 392 Â°F	
	60 %	60 %	
	@Temperature 650 Â°C	@Temperature 1200 Â°F	
Rupture Strength	9.00 MPa	1310 psi	
	@Temperature 1093 Â°C, Time 3.60e+6 sec	@Temperature 1999 Â°F, Time 1000 hour	Sheet
	15.0 MPa	2180 psi	
	@Temperature 1038 Â°C, Time 3.60e+6 sec	@Temperature 1900 Â°F, Time 1000 hour	Sheet
	25.0 MPa	3630 psi	
	@Temperature 982 Â°C, Time 3.60e+6 sec	@Temperature 1800 Â°F, Time 1000 hour	Sheet
	41.0 MPa	5950 psi	
	@Temperature 927 Â°C, Time 3.60e+6 sec	@Temperature 1700 Â°F, Time 1000 hour	Sheet
	69.0 MPa	10000 psi	
	@Temperature 871 Â°C, Time 3.60e+6 sec	@Temperature 1600 Â°F, Time 1000 hour	Sheet
110 MPa	16000 psi		
@Temperature 816 Â°C, Time 3.60e+6 sec	@Temperature 1500 Â°F, Time 1000 hour	Sheet	
165 MPa	23900 psi		
@Temperature 760 Â°C, Time 3.60e+6 sec	@Temperature 1400 Â°F, Time 1000 hour	Sheet	
240 MPa	34800 psi		
@Temperature 704 Â°C, Time 3.60e+6 sec	@Temperature 1300 Â°F, Time 1000 hour	Sheet	

Thermal Properties	Metric	English	Comments
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Thermal Properties	Metric	English	Comments
CTE, linear	11.9 $\mu\text{m}/\text{m}\cdot\text{Å}^\circ\text{C}$ @Temperature 93.0 $\text{Å}^\circ\text{C}$	21.4 $\text{in}/\text{in}\cdot\text{Å}^\circ\text{F}$ @Temperature 199 $\text{Å}^\circ\text{F}$	
Specific Heat Capacity	0.405 $\text{J}/\text{g}\cdot\text{Å}^\circ\text{C}$ @Temperature 21.0 $\text{Å}^\circ\text{C}$	0.0968 $\text{BTU}/\text{lb}\cdot\text{Å}^\circ\text{F}$ @Temperature 69.8 $\text{Å}^\circ\text{F}$	
Thermal Conductivity	12.1 $\text{W}/\text{m}\cdot\text{K}$	84.0 $\text{BTU}\cdot\text{in}/\text{hr}\cdot\text{ft}\cdot\text{Å}^\circ\text{F}$	
Melting Point	1300 - 1330 $\text{Å}^\circ\text{C}$	2370 - 2430 $\text{Å}^\circ\text{F}$	
Solidus	1300 $\text{Å}^\circ\text{C}$	2370 $\text{Å}^\circ\text{F}$	
Liquidus	1330 $\text{Å}^\circ\text{C}$	2430 $\text{Å}^\circ\text{F}$	

Component Elements Properties	Metric	English	Comments
Boron, B	$\leq 0.015\%$	$\leq 0.015\%$	
Carbon, C	0.050 - 0.15 %	0.050 - 0.15 %	
Chromium, Cr	20 - 24 %	20 - 24 %	
Cobalt, Co	30.965 - 46.73 %	30.965 - 46.73 %	Balance
Iron, Fe	$\leq 3.0\%$	$\leq 3.0\%$	
Lanthanum, La	0.020 - 0.12 %	0.020 - 0.12 %	
Manganese, Mn	$\leq 0.15\%$	$\leq 0.15\%$	
Nickel, Ni	20 - 24 %	20 - 24 %	
Silicon, Si	0.20 - 0.50 %	0.20 - 0.50 %	
Tungsten, W	13 - 16 %	13 - 16 %	

Electrical Properties	Metric	English	Comments
Electrical Resistivity	0.000102 ohm-cm	0.000102 ohm-cm	
Magnetic Permeability	1.0007	1.0007	at 200 oersted

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