Special Metals UDIMET® alloy 520 Superalloy

Categories: Metal; Nonferrous Metal; Nickel Alloy; Superalloy

Material Notes: UDIMET® alloy 520 is a precipitation-hardenable nickel base superalloy with an exceptional combination of high-temperature mechanical properties, corrosion resistance and forgeability characteristics.

Developed for use in the 1400-1700°F (760-927°C) temperature range, the alloy has excellent structural stability and unusually good fabricability. The primary application for alloy 520 is blading for aircraft and land-based gas turbines.

Information Provided by Special Metals Corporation

Key Words: PDS 15125A1

Vendors: **Click here to view all available suppliers for this material.**

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Physical Properties	Metric	English	Comments
Density	8.21 g/cc	0.297 lb/in³	

Mechanical Properties	Metric	English	Comments
Tensile Strength at Break	350 MPa @Temperature 950 °C	50800 psi @Temperature 1740 °F	
	1150 MPa @Temperature 700 °C	167000 psi @Temperature 1290 °F	
	1250 MPa @Temperature 400 °C	181000 psi @Temperature 752 °F	
	1300 MPa @Temperature 50.0 °C	189000 psi @Temperature 122 °F	
Tensile Strength, Yield	500 MPa @Strain 0.200 %, Temperature 850 °C	72500 psi @Strain 0.200 %, Temperature 1560 °F	
	700 MPa @Strain 0.200 %, Temperature 700 °C	102000 psi @Strain 0.200 %, Temperature 1290 °F	
	850 MPa @Strain 0.200 %, Temperature 50.0 °C	123000 psi @Strain 0.200 %, Temperature 122 °F	
	850 MPa @Strain 0.200 %, Temperature 400 °C	123000 psi @Strain 0.200 %, Temperature 752 °F	
Elongation at Break	100 % @Temperature 50.0 °C	100 % @Temperature 122 °F	
	100 % @Temperature 400 °C	100 % @Temperature 752 °F	
	100 % @Temperature 700 °C	100 % @Temperature 1290 °F	
Rupture Strength	150 MPa @Temperature 871 °C, Time 3.60e+6 sec	21800 psi @Temperature 1600 °F, Time 1000 hour	
	230 MPa @Temperature 816 °C, Time 3.60e+6 sec	33400 psi @Temperature 1500 °F, Time 1000 hour	
	345 MPa @Temperature 760 °C, Time 3.60e+6 sec	50000 psi @Temperature 1400 °F, Time 1000 hour	
	475 MPa @Temperature 704 °C, Time 3.60e+6 sec	68900 psi @Temperature 1300 °F, Time 1000 hour	
	585 MPa @Temperature 649 °C, Time 3.60e+6 sec	84800 psi @Temperature 1200 °F, Time 1000 hour	

Thermal Properties	Metric	English	Comments
Melting Point	1260 - 1405 °C	2300 - 2561 °F	
Solidus	1260 °C	2300 °F	
Liquidus	1405 °C	2561 °F	

Component Elements Properties	Metric	English	Comments
Aluminum, Al	1.8 - 2.3 %	1.8 - 2.3 %	
Boron, B	0.0040 - 0.010 %	0.0040 - 0.010 %	
Carbon, C	0.020 - 0.060 %	0.020 - 0.060 %	
Chromium, Cr	18 - 20 %	18 - 20 %	

Cobalt, Co	11 - 14 %	11 - 14 %	
Molybdenum, Mo	5.5 - 7.0 %	5.5 - 7.0 %	
Nickel, Ni	52.18 - 59.976 %	52.18 - 59.976 %	Balance
Titanium, Ti	2.9 - 3.25 %	2.9 - 3.25 %	
Tungsten, W	0.80 - 1.2 %	0.80 - 1.2 %	