

## Special Metals INCONEL® alloy MA758 Ni-Cr Superalloy

Category : Metal , Nonferrous Metal , Nickel Alloy , Superalloy

### Material Notes:

INCONEL® alloy MA 758 is an oxide-dispersion-strengthened (ODS) nickel-chromium superalloy, made by mechanical alloying. It is a development of the well-established aerospace superalloy, INCONEL alloy MA 754, with its chromium content increased to 30%, to improve its performance in corrosive environments at high temperatures. The alloy's high-temperature strength is enhanced by the use of yttrium oxide for dispersion strengthening. It is used in a range of applications including furnace skid rails, hearth rollers, jigs, tools, and other fabrications for supporting workpieces through heat-treatment processes. It has been specified for a fuel atomizer application in diesel engines. Information Provided by Special Metals Corporation

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[http://www.lookpolymers.com/polymer\\_Special-Metals-INCONEL-alloy-MA758-Ni-Cr-Superalloy.php](http://www.lookpolymers.com/polymer_Special-Metals-INCONEL-alloy-MA758-Ni-Cr-Superalloy.php)

Physical Properties	Metric	English	Comments
Density	8.14 g/cc	0.294 lb/in <sup>3</sup>	

Mechanical Properties	Metric	English	Comments
Tensile Strength at Break	173 MPa	25100 psi	Bar
	@Temperature 1000 °C	@Temperature 1830 °F	
	180 MPa	26100 psi	Plate; Longitudinal
	@Temperature 1093 °C	@Temperature 1999 °F	
	190 MPa	27600 psi	Plate; Transverse
	@Temperature 1093 °C	@Temperature 1999 °F	
	240 MPa	34800 psi	Plate; Longitudinal
	@Temperature 982 °C	@Temperature 1800 °F	
	250 MPa	36300 psi	Plate; Transverse
	@Temperature 982 °C	@Temperature 1800 °F	
	546 MPa	79200 psi	Bar
	@Temperature 700 °C	@Temperature 1290 °F	
	853 MPa	124000 psi	Bar
	@Temperature 200 °C	@Temperature 392 °F	
	949 MPa	138000 psi	

Mechanical Properties	Metric @ Temperature 20.0 Â°C	English @ Temperature 68.0 Â°F	Bar Comments
	960 MPa @Temperature 20.0 Â°C	139000 psi @Temperature 68.0 Â°F	Plate; Transverse
	1030 MPa @Temperature 20.0 Â°C	149000 psi @Temperature 68.0 Â°F	Plate; Longitudinal
Tensile Strength, Yield	151 MPa @Strain 0.200 %, Temperature 1000 Â°C	21900 psi @Strain 0.200 %, Temperature 1830 Â°F	Bar
	160 MPa @Strain 0.200 %, Temperature 1093 Â°C	23200 psi @Strain 0.200 %, Temperature 1999 Â°F	Transverse
	170 MPa @Strain 0.200 %, Temperature 1093 Â°C	24700 psi @Strain 0.200 %, Temperature 1999 Â°F	Longitudinal
	220 MPa @Strain 0.200 %, Temperature 982 Â°C	31900 psi @Strain 0.200 %, Temperature 1800 Â°F	Longitudinal
	220 MPa @Strain 0.200 %, Temperature 982 Â°C	31900 psi @Strain 0.200 %, Temperature 1800 Â°F	Transverse
	371 MPa @Strain 0.200 %, Temperature 700 Â°C	53800 psi @Strain 0.200 %, Temperature 1290 Â°F	Bar
	495 MPa @Strain 0.200 %, Temperature 200 Â°C	71800 psi @Strain 0.200 %, Temperature 392 Â°F	Bar
	560 MPa @Strain 0.200 %, Temperature 20.0 Â°C	81200 psi @Strain 0.200 %, Temperature 68.0 Â°F	Bar
	680 MPa @Strain 0.200 %, Temperature 20.0 Â°C	98600 psi @Strain 0.200 %, Temperature 68.0 Â°F	Longitudinal
	690 MPa @Strain 0.200 %, Temperature 20.0 Â°C	100000 psi @Strain 0.200 %, Temperature 68.0 Â°F	Transverse

Mechanical Properties	Metric	English	Comments
Elongation at Break	@Temperature 1093 °C	@Temperature 1999 °F	Plate; Longitudinal
	4.0 %	4.0 %	Plate; Longitudinal
	@Temperature 982 °C	@Temperature 1800 °F	
	5.0 %	5.0 %	Plate; Transverse
	@Temperature 1093 °C	@Temperature 1999 °F	
	6.0 %	6.0 %	Plate; Transverse
	@Temperature 982 °C	@Temperature 1800 °F	
	14 %	14 %	Plate; Longitudinal
	@Temperature 20.0 °C	@Temperature 68.0 °F	
	22 %	22 %	Plate; Transverse
	@Temperature 20.0 °C	@Temperature 68.0 °F	
	22 %	22 %	Bar
	@Temperature 200 °C	@Temperature 392 °F	
	27 %	27 %	Bar
@Temperature 20.0 °C	@Temperature 68.0 °F		
29 %	29 %	Bar	
@Temperature 700 °C	@Temperature 1290 °F		
29 %	29 %	Bar	
@Temperature 1000 °C	@Temperature 1830 °F		

Thermal Properties	Metric	English	Comments
CTE, linear	12.47 µm/m-°C	6.928 µin/in-°F	@Temperature 200 °C @Temperature 392 °F
	@Temperature 200 °C	@Temperature 392 °F	
	13.39 µm/m-°C	7.439 µin/in-°F	@Temperature 600 °C @Temperature 1110 °F
	14.24 µm/m-°C	7.911 µin/in-°F	

Thermal Properties	Metric @Temperature 1000 Â°C	English @Temperature 1830 Â°F	Comments
	15.03 Âµm/m-Â°C	8.350 Âµin/in-Â°F	
	@Temperature 1400 Â°C	@Temperature 2550 Â°F	
Melting Point	1375 Â°C	2507 Â°F	

Component Elements Properties	Metric	English	Comments
Aluminum, Al	0.30 %	0.30 %	
Carbon, C	0.050 %	0.050 %	
Chromium, Cr	30 %	30 %	
Iron, Fe	1.0 %	1.0 %	
Nickel, Ni	67.55 %	67.55 %	Remainder
Titanium, Ti	0.50 %	0.50 %	
Y2O3	0.60 %	0.60 %	

Electrical Properties	Metric	English	Comments
Electrical Resistivity	0.0001137 ohm-cm	0.0001137 ohm-cm	
	@Temperature 22.0 Â°C	@Temperature 71.6 Â°F	
	0.000115 ohm-cm	0.000115 ohm-cm	
	@Temperature 93.0 Â°C	@Temperature 199 Â°F	
	0.0001203 ohm-cm	0.0001203 ohm-cm	
	@Temperature 538 Â°C	@Temperature 1000 Â°F	
	0.0001204 ohm-cm	0.0001204 ohm-cm	
	@Temperature 982 Â°C	@Temperature 1800 Â°F	

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