

Kennametal Stellite Nucalloy® 488 High-Silicon Nickel-Base Hardfacing Alloy

Category : Metal , Nonferrous Metal , Nickel Alloy , Superalloy

Material Notes:

Nucalloy® alloys are unique, patented, high-silicon, nickel-base hardfacing alloys that are designed to have optimum combinations of hardness and toughness, similar to the cobalt base alloys . Because of the unique microstructure features, they are less crack sensitive than the conventional nickel-base hardfacing alloys, such as, NiCr-A and NiCr-B, during welding. The Nucalloy alloys have a matrix consisting of, essentially, nickel solid solution, a binary eutectic and ternary eutectic. The binary eutectic is composed of nickel solid solution and nickel silicide (Ni₃Si); whereas the ternary eutectic consists of nickel solid solution, nickel boride (Ni₃B) and nickel silicide (Ni₃Si). There are also carbide and boride particles dispersed in the matrix. The microstructures of these alloys differ from those of the conventional self-fluxing nickel alloys in that the brittle binary eutectic of nickel solid solution and nickel boride does not form because of the intentionally controlled high silicon to boron ratios. The high silicon and low boron in these alloys results in high fractions of nickel silicide, which is resistant to certain corrosive media due to the tendency to form a high-silicon film on the surface. Information provided by Deloro Stellite Inc. Product of former Deloro Stellite Inc.

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http://www.lookpolymers.com/polymer_Kennametal-Stellite-Nucalloy-488-High-Silicon-Nickel-Base-Hardfacing-Alloy.php

Physical Properties	Metric	English	Comments
Density	8.10 g/cc	0.293 lb/in ³	

Mechanical Properties	Metric	English	Comments
Hardness, Rockwell C	45	45	
Hardness, Vickers	502	502	
	401	401	
	@Temperature 700 °C	@Temperature 1290 °F	
	437	437	
	@Temperature 600 °C	@Temperature 1110 °F	
	440	440	
	@Temperature 500 °C	@Temperature 932 °F	
	448	448	
	@Temperature 400 °C	@Temperature 752 °F	
Tensile Strength, Ultimate	945 MPa	137000 psi	
	786 MPa	114000 psi	
	@Temperature 600 °C	@Temperature 1110 °F	

Mechanical Properties	Metric	English	Comments
	@Temperature 400 Â°C	@Temperature 752 Â°F	
Charpy Impact Unnotched	6.00 J/cmÂ²	28.6 ft-lb/inÂ²	
	@Temperature 20.0 Â°C	@Temperature 68.0 Â°F	
	6.00 J/cmÂ²	28.6 ft-lb/inÂ²	
	@Temperature 400 Â°C	@Temperature 752 Â°F	
	7.00 J/cmÂ²	33.3 ft-lb/inÂ²	
	@Temperature 600 Â°C	@Temperature 1110 Â°F	

Thermal Properties	Metric	English	Comments
CTE, linear	10.8 Âµm/m-Â°C	6.00 Âµin/in-Â°F	
	@Temperature 20.0 - 100 Â°C	@Temperature 68.0 - 212 Â°F	
	12.0 Âµm/m-Â°C	6.67 Âµin/in-Â°F	
	@Temperature 20.0 - 200 Â°C	@Temperature 68.0 - 392 Â°F	
	12.2 Âµm/m-Â°C	6.78 Âµin/in-Â°F	
	@Temperature 20.0 - 300 Â°C	@Temperature 68.0 - 572 Â°F	
	12.5 Âµm/m-Â°C	6.94 Âµin/in-Â°F	
	@Temperature 20.0 - 400 Â°C	@Temperature 68.0 - 752 Â°F	
	12.8 Âµm/m-Â°C	7.11 Âµin/in-Â°F	
	@Temperature 20.0 - 500 Â°C	@Temperature 68.0 - 932 Â°F	
	13.0 Âµm/m-Â°C	7.22 Âµin/in-Â°F	
	@Temperature 20.0 - 600 Â°C	@Temperature 68.0 - 1110 Â°F	
Melting Point	1070 - 1240 Â°C	1960 - 2260 Â°F	
Solidus	1070 Â°C	1960 Â°F	
Liquidus	1240 Â°C	2260 Â°F	

Component Elements Properties	Metric	English	Comments
Boron, B	1.0 %	1.0 %	

Component Elements Properties	Metric	English	Comments
Chromium, Cr	17.5 %	17.5 %	
Iron, Fe	5.5 %	5.5 %	
Nickel, Ni	67 %	67 %	As Remainder
Silicon, Si	6.8 %	6.8 %	
Tin, Sn	0.70 %	0.70 %	
Tungsten, W	1.0 %	1.0 %	

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