

## Special Metals INCOLOY® alloy 908

Category : Metal , Superalloy , Iron Base , Nickel Base

### Material Notes:

INCOLOY® alloy 908 (UNS N09908) is an age-hardenable nickel-iron alloy which exhibits a low coefficient of thermal expansion, high tensile strength, high fracture and impact toughness, fatigue crack growth resistance, good ductility, metallurgical stability and weldability plus sufficient resistance to stress accelerated grain boundary oxygen embrittlement (SAGBO) to permit hot fabrication without cracking. This cobalt-free, low CTE alloy was designed to meet sheathing material requirements for internally cooled Nb3Sn superconductor magnets to be used in prototype fusion reactors at cryogenic operating temperatures of -452°F (-269°C). With low temperature properties it is excellent for cryogenic applications. Information Provided by Special Metals Corporation

Order this product through the following link:

[http://www.lookpolymers.com/polymer\\_Special-Metals-INCOLOY-alloy-908.php](http://www.lookpolymers.com/polymer_Special-Metals-INCOLOY-alloy-908.php)

Physical Properties	Metric	English	Comments
Density	8.17 g/cc	0.295 lb/in <sup>3</sup>	

Mechanical Properties	Metric	English	Comments
Hardness, Rockwell C	38 - 40	38 - 40	
Tensile Strength at Break	1172 MPa	170000 psi	
Tensile Strength, Yield	827 MPa @Strain 0.200 %	120000 psi @Strain 0.200 %	
Elongation at Break	12 %	12 %	
Modulus of Elasticity	163.3 GPa	23690 ksi	
Poissons Ratio	0.265	0.265	
Shear Modulus	64.6 GPa	9370 ksi	

Thermal Properties	Metric	English	Comments
CTE, linear	8.59 $\mu\text{m}/\text{m}\cdot\text{Å}^\circ\text{C}$ @Temperature 93.0 $\text{Å}^\circ\text{C}$	4.77 $\mu\text{in}/\text{in}\cdot\text{Å}^\circ\text{F}$ @Temperature 199 $\text{Å}^\circ\text{F}$	
	8.66 $\mu\text{m}/\text{m}\cdot\text{Å}^\circ\text{C}$ @Temperature 260 $\text{Å}^\circ\text{C}$	4.81 $\mu\text{in}/\text{in}\cdot\text{Å}^\circ\text{F}$ @Temperature 500 $\text{Å}^\circ\text{F}$	
	11.11 $\mu\text{m}/\text{m}\cdot\text{Å}^\circ\text{C}$ @Temperature 427 $\text{Å}^\circ\text{C}$	6.172 $\mu\text{in}/\text{in}\cdot\text{Å}^\circ\text{F}$ @Temperature 801 $\text{Å}^\circ\text{F}$	
	12.2 $\mu\text{m}/\text{m}\cdot\text{Å}^\circ\text{C}$	6.78 $\mu\text{in}/\text{in}\cdot\text{Å}^\circ\text{F}$	

Thermal Properties	Metric	English	Comments
	@Temperature 538 Â°C	@Temperature 1000 Â°F	
	13.18 Âµm/m-Â°C	7.322 Âµin/in-Â°F	
	@Temperature 649 Â°C	@Temperature 1200 Â°F	
	14.11 Âµm/m-Â°C	7.839 Âµin/in-Â°F	
	@Temperature 760 Â°C	@Temperature 1400 Â°F	
Specific Heat Capacity	0.439 J/g-Â°C	0.105 BTU/lb-Â°F	
Thermal Conductivity	11.05 W/m-K	76.69 BTU-in/hr-ftÂ²-Â°F	
Melting Point	1361 - 1410 Â°C	2482 - 2570 Â°F	
Solidus	1361 Â°C	2482 Â°F	
Liquidus	1410 Â°C	2570 Â°F	
Minimum Service Temperature, Air	<= -269 Â°C	<= -452 Â°F	

Component Elements Properties	Metric	English	Comments
Aluminum, Al	0.75 - 1.25 %	0.75 - 1.25 %	
Boron, B	<= 0.012 %	<= 0.012 %	
Carbon, C	<= 0.030 %	<= 0.030 %	
Chromium, Cr	3.75 - 4.5 %	3.75 - 4.5 %	
Cobalt, Co	<= 0.50 %	<= 0.50 %	
Copper, Cu	<= 0.50 %	<= 0.50 %	
Iron, Fe	35.588 - 44.6 %	35.588 - 44.6 %	Balance
Manganese, Mn	<= 1.0 %	<= 1.0 %	
Nickel, Ni	47 - 51 %	47 - 51 %	
Niobium, Nb (Columbium, Cb)	2.7 - 3.3 %	2.7 - 3.3 %	
Phosphorous, P	<= 0.015 %	<= 0.015 %	
Silicon, Si	<= 0.50 %	<= 0.50 %	
Sulfur, S	<= 0.0050 %	<= 0.0050 %	
Titanium, Ti	1.2 - 1.8 %	1.2 - 1.8 %	

Electrical Properties	Metric	English	Comments
Curie Temperature	282 Â°C	540 Â°F	

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