High Temp Metals Alloy 49 Iron-Nickel High Permeability Alloy, Bar, Cold Drawn

Category : Metal , Electronic/Magnetic Alloy , Superalloy , Iron Base

Material Notes:

High Permeability "49" alloy is a 48% nickel-iron alloy which has a saturation flux density of approximately 15,000 Gauss after hydrogen annealing. Hysteresis loss is very low in either DC or AC circuits in which the frequency is less than 400 cycles per second. Following a low temperature hydrogen anneal at 1300/1400Â°F (704/760Â°C), alloy 49 exhibits constant permeability characteristics. Its initial permeability is approximately 500 Gauss. High Permeability "49" alloy resists weather and moisture corrosion to a moderate extent.High permeability "49" alloy has been used in laminated cores for instrument transformers, magnetic shields and cores for certain electronic and communications devices in which extremely high permeability at low magnetizing forces greatly increases the efficiency and effectiveness of the equipment. Because of its high permeability, it has also been used in solenoid cores in light, sensitive relays that must operate and respond to weak currents that induce low magnetizing forces.If components are to machined in volume from bar stock, High Permeability "49"-FM, a free-machining grade, is recommended. The standard grade , High Permeability "49" alloy, machines somewhat like the austenitic stainless alloys. It develops gummy chips but does not work harden as rapidly as the stainless alloys. Sulfur-bearing cutting compounds are highly detrimental to the final magnetic properties. Animal lard oil should be used in drilling and machining operations which must be performed at low speeds. Work hardened bars offer the best machining characteristics. Parts should be degreased and cleaned as soon as possible.Information provided by High Temp Metals.

Order this product through the following link:
http://www.lookpolymers.com/polymer_High-Temp-Metals-Alloy-49-Iron-Nickel-High-Permeability-Alloy-Bar-Cold-Drawn.php

Physical Properties	Metric	English	Comments
Specific Gravity	8.18 g/cc	8.18 g/cc	

Mechanical Properties	Metric	English	Comments
Hardness, Rockwell B	98	98	
Tensile Strength, Ultimate	655 MPa	95000 psi	
Tensile Strength, Yield	552 MPa	80000 psi	
Elongation at Break	25 %	25 %	
Reduction of Area	62 %	62 %	
Modulus of Elasticity	166 GPa	24100 ksi	
Izod Impact	126 - 134 J	92.9 - 98.8 ft-lb	Notch Status Unknown

Thermal Properties	Metric	English	Comments
CTE, linear	8.28 Âµm/m-Â°C @Temperature 25.0 - 204 Â°C	4.60 Âµin/in-Â°F @Temperature 77.0 - 400 Â°F	

Thermal Properties	Metric	English	Comments
Specific Heat Capacity	0.502 J/g-Â°C	0.120 BTU/lb-Â°F	
Thermal Conductivity	13.0 W/m-K	90.2 BTU-in/hr-ftÂ²-Â°F	
Melting Point	1430 Â°C	2600 Â°F	

Component Elements Properties	Metric	English	Comments
Carbon, C	<= 0.020 %	<= 0.020 %	
Iron, Fe	>= 51 %	>= 51 %	As Balance
Manganese, Mn	<= 0.50 %	<= 0.50 %	
Nickel, Ni	<= 48 %	<= 48 %	
Silicon, Si	<= 0.35 %	<= 0.35 %	

Electrical Properties	Metric	English	Comments
Electrical Resistivity	0.0000480 ohm-cm	0.0000480 ohm-cm	Temperature coefficient = 0.0036/Â°C (-17.8 to 499Â°C)
Magnetic Permeability	6500	6500	Initial; B100; per ASTM A596, heat treatment unknown
	<= 75000	<= 75000	per ASTM A596; heat treatment unknown
Magnetic Coercive Force, Hc	0.040 - 0.070 Oe	0.040 - 0.070 Oe	from 10,000 Gauss; per ASTM A596, heat treatment unknown
Magnetic Saturation Flux Density, Bmax	15000 Gauss	15000 Gauss	H-100 Oersted; per ASTM A596; after hydrogen annealing
Magnetic Remanence, Br	9000 Gauss	9000 Gauss	per ASTM A596; heat treatment unknown
Curie Temperature	450 - 500 Â°C	842 - 932 Â°F	

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