

INVAR 32 – 5 – DATASHEET

SUMMARY PROPERTIES

Property	Value
Name	Alloy 32-5 / Super Invar
Type	Controlled Expansion Alloy
Chemical Sign	64 Fe – 31 Ni – 5 Co
Specific Gravity	8.15
Density (lb/cu in)	0.294
Density (kg/cu m)	8150
Electrical Resistivity (RT) microhm.cm	80
Modulus of Elasticity x 10(6) PSI	21
Modulus of Elasticity x 10(6) MPa	144
MS Temperature °C	-80
MS Temperature °F	-112
Poisson's Ratio	0.2
% Elongation in 2"	40

COMPOSITION - ALLOY 32-5 / SUPER INVAR

Substance	Symbol	%
Nickel	Ni	31.75
Cobalt	Co	5.36
Chromium	Cr	0.03
Manganese	Mn	0.39
Silicon	Si	0.09
Carbon	C	0.05
Aluminium	Al	0.07
Copper	Cu	0.08
Sulpur	S	0.01
Iron	Fe	Balance

## COEFFICIENT OF THERMAL EXPANSION - ALLOY 32-5 / SUPER INVAR

Temp Range	Value [ cm per cm. C X 10(-6) ]
-55 to 95 °C	0.63
-67 to 203 °F	0.35

## TENSILE STRENGTH & YIELD - ALLOY 32-5 / SUPER INVAR

Property	0.2% Yield Strength	Tensile Strength
KSI	40	70
MPa	276	483

## HARDNESS (Rockwell B) - ALLOY 32-5 / SUPER INVAR

Property	Value
Annealed	75
Cold Worked	90

## MACHINING - ALLOY 32-5 / SUPER INVAR

### Machinability

Super Invar 32-5 machines similar to, but not as well as , Type 316 austenitic stainless steel. Its machinability rating is approximately 25% that of AISI B1112. This alloy is somewhat difficult to machine because the machined chips are gummy and stringy. Work hardened bars can result in some improvement in machinability.

Tool geometries normally used for austenitic stainless steels are suitable for this alloy. All tools should be kept sharp with a fine finish, be as large as possible, and rigidly supported.

Recommended cutting fluids are 1 to 1 blend of sulfachlorinated petroleum oil containing 8 to 10% fatty oil and a paraffin blending oil, or a water emulsifiable cutting fluid with polar and extreme pressure additives.

Parts should be degreased and cleaned as soon after machining as possible to remove any residual sulfur which can cause grain boundary embrittlement.

When using carbide tools, surface speed feet/minute can be increased between 2 to 3 times over the high speed suggestions. Feeds can be increased between 50 to 100%.

On certain work, the nature of the part may require adjustment of speeds and feeds. Each job has to be developed for best production results with optimum tool life. Speeds and feeds should be increased or decreased in small steps.

### Forging

Suggested forging temperature is 2000/2150°F. Heat rapidly and avoid soaking in the forging furnace. Long soaking time may result in a checked surface due to oxygen and sulfur contamination.

### Grinding

A soft silicon carbide wheel which will wear without loading is recommended. For finishing grinding, a satisfactory wheel roughness to start with is No. 80 grit.

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