Invar 36 Datasheet

Invar 36 offers exceptional low thermal expansion, perfect for applications in aerospace, electronics, and engineering.

Alloy / Grade	Invar 36
Common Forms	Plate, Round Bar , Sheet, Wire , Forgings .
Key Feature	Near-Zero Thermal Expansion at Room Temp.
Service Focus	The defining characteristic: prevents thermal distortion in sensitive instruments like optical measuring devices and laser benches.

1. Product Overview

Invar 36 is a 36% nickel-iron alloy notable for its uniquely low coefficient of thermal expansion which is roughly one-tenth that of carbon steel. It maintains nearly constant dimensions across the range of normal atmospheric temperatures up to 400 deg F (200 deg C).

Grade	Core Description	Typical Service Focus
Invar 36	Invar 36 is a 36% nickel-iron alloy notable for its uniquely low coefficient of thermal expansion which is...	Invar 36 is indispensable for applications where dimensional changes due to temperature fluctuation must be...
Supply Capability	Plate, Round Bar , Sheet, Wire , Forgings .	Standard mill forms, cut-to-size material and project supply
Technical Review	Confirm final values by product form, heat treatment and material certificate	The defining characteristic: prevents thermal distortion in sensitive instruments like optical measuring...

2. Key Features

- Invar 36 is indispensable for applications where dimensional changes due to temperature fluctuation must be minimized. From precision laser...
- The defining characteristic: prevents thermal distortion in sensitive instruments like optical measuring devices and laser benches.
- Its CTE closely matches that of carbon-fiber composites, making it the premier material for aerospace lay-up molds.
- Unlike many steels which become brittle, Invar 36 retains superior toughness and ductility at cryogenic temperatures (LNG/Liquid Oxygen).

Further information under:	https://www.nickelcasting.com/nickel-alloys/invar-metal-alloys/invar-36/
Home page:	www.nickelcasting.com
Email:	ni@Nickelcasting.com

Technical Data

The following values are provided as general reference data for engineering review and procurement planning. Confirm final values against the applicable specification, product form, heat treatment condition and material certificate.

3. Chemical Composition (%)

Element	Content (%)
Nickel (Ni)	35.0 - 37.0
Iron (Fe)	Balance
Carbon (C)	0.05 max
Manganese (Mn)	0.60 max
Silicon (Si)	0.40 max

4. Standard Specifications

Product Form	Standards (ASTM / AMS)
Plate, Sheet, Strip	ASTM F1684, ASTM B753, AMS I-23011 (Class 7)
Bar, Rod, Forging	ASTM F1684, AMS I-23011 (Class 7)
Aerospace Tooling	Boeing BMS 7-320 (Invar 36 Tooling Plate)

5. Special Performance Data

Temperature Range	CTE (μm/m· deg C)	CTE (μin/in· deg F)
30 - 100 deg C	1.3	0.7
30 - 200 deg C	2.7	1.5
30 - 300 deg C	5.3	2.9

Note: Values are typical or specification reference values. Purchase requirements should be confirmed against the required standard, drawing and material test report.

Applications and Ordering Information

Use this section to define inquiry requirements and accelerate technical confirmation for Invar 36 products.

6. Typical Applications

Industry / Area	Typical Components
Industrial Service	*Note: Above the Curie point (approx 280 deg C), expansion rates increase to match standard steels.
Chemical / Process Equipment	Molds and dies for curing carbon fiber aerospace parts (Boeing 787 wings, fuselages).
Oil, Gas & Marine	Transfer piping for Liquefied Natural Gas, preventing shrinkage and leakage at -162 deg C.
High-Temperature / Power	Laser housings, telescope supports, and seismic creep gauges requiring zero movement.
Precision Components	The low-expansion side of bimetallic strips used in thermal switches.

7. Available Supply Forms

Pipe & Tube	Plate & Sheet	Bar & Rod
Pipe Fittings	Flanges	Wire & Strip
Forgings	Custom Cutting	Project Supply

8. Information to Include When Requesting a Quote

- Required grade: Invar 36, with ASTM / ASME / AMS specification if applicable.
- Product form: pipe, tube, plate, sheet, bar, fittings, flanges, forgings or machined parts.
- Dimensions: outside diameter, wall thickness, length, width, thickness or drawing number.
- Quantity, delivery destination and required delivery schedule.
- Special requirements: cutting, machining, heat treatment, NDT, PMI, test report or material certificate.

Company Information	
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Home Page	www.nickelcasting.com
Product Page	https://www.nickelcasting.com/nickel-alloys/invar-metal-alloys/invar-36/

Disclaimer

This datasheet is provided for general reference only. Actual values may vary by product form, heat treatment, manufacturing condition and applicable specification. Please contact us for confirmed specifications, test reports and material certificates before ordering.