

Invar 42 Datasheet

Invar 42 provides a stable and low coefficient of thermal expansion, ideal for advanced engineering and measurement tools.

Alloy / Grade	Invar 42
Common Forms	Sheet, Strip, Wire , Rod.
Key Feature	CTE matches Silicon and Ceramics (Alumina).
Service Focus	Forms a reliable, tight hermetic seal with hard and soft glasses, preventing gas leakage in light bulbs and vacuum tubes.

1. Product Overview

Invar 42 is a 42% nickel-iron controlled expansion alloy. It is specifically designed to have a coefficient of thermal expansion (CTE) that closely matches that of Silicon, 96% Alumina ceramics, and soft sealing glasses, making it critical for hermetic sealing in electronics.

Grade	Core Description	Typical Service Focus
Invar 42	Invar 42 is a 42% nickel-iron controlled expansion alloy. It is specifically designed to have a coefficient of...	While Invar 36 is designed for "zero" expansion, Invar 42 is designed for "matched" expansion. In...
Supply Capability	Sheet, Strip, Wire , Rod.	Standard mill forms, cut-to-size material and project supply
Technical Review	Confirm final values by product form, heat treatment and material certificate	Forms a reliable, tight hermetic seal with hard and soft glasses, preventing gas leakage in light bulbs and...

2. Key Features

- While Invar 36 is designed for "zero" expansion, Invar 42 is designed for "matched" expansion. In semiconductor packaging, if the metal frame...
- Forms a reliable, tight hermetic seal with hard and soft glasses, preventing gas leakage in light bulbs and vacuum tubes.
- The standard material for lead frames used in integrated circuits, matching the expansion of silicon chips and ceramic substrates.
- Used as the "passive" or low-expansion component in bi-metallic thermostat strips where higher temperatures (up to 300 deg C) are involved.

Further information under:	https://www.nickelcasting.com/nickel-alloys/invar-metal-alloys/invar-42/
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)	41.0 - 42.5
Iron (Fe)	Balance
Carbon (C)	0.05 max
Manganese (Mn)	0.80 max
Silicon (Si)	0.30 max

4. Standard Specifications

Product Form	Standards (ASTM / AMS)
Plate, Sheet, Strip	ASTM F30, AMS I-23011 (Class 5)
Bar, Rod, Wire	ASTM F29, ASTM F30
Sealing Alloy	DIN 17745, SEW 385

5. Special Performance Data

Temperature Range	CTE ($\mu\text{m/m} \cdot \text{deg C}$)	Comparable Material
30 - 300 deg C	4.0 - 5.0	Matches Silicon / Alumina (Ceramic)
30 - 450 deg C	6.0 - 7.0	Matches 1075 Glass

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 42 products.

6. Typical Applications

Industry / Area	Typical Components
Industrial Service	*Note: Expansion is consistent in the typical operating range of electronics.
Chemical / Process Equipment	The metal skeleton inside chip packages that connects the microchip to the circuit board.
Oil, Gas & Marine	Hermetic seals for high-reliability aerospace and military electronics.
High-Temperature / Power	Metal pins and feeds that must pass through glass walls without breaking the vacuum seal.
Precision Components	Headlight filaments and sealed beam units requiring high-temperature glass sealing.

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 42, 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-42/

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.