

## Nickel Alloy Technical Datasheet

# Invar 42 Plate, Bar, Coil, and Tube

## UNS K94100 / Invar Metal Alloys

Invar 42 is a nickel-iron controlled expansion alloy often used to match glass, ceramics, and electronic package materials.

<b>Grade</b>	Invar 42
<b>UNS / reference</b>	UNS K94100
<b>Alloy family</b>	Invar Metal Alloys
<b>Available forms</b>	plate, bar, coil, tube
<b>Primary use</b>	RFQ preparation, grade comparison, product-form selection, certificate planning
<b>Revision</b>	2026-06-11

## General Description

This document presents Invar 42 in a concise technical format for nickel alloy raw material buyers. It follows the style of established alloy data bulletins: grade identity first, followed by standards, composition review, supply forms, engineering reference tables, fabrication notes, and RFQ checkpoints.

- Controlled thermal expansion for sealing and packaging systems
- Good compatibility with selected glass and ceramic assemblies
- Commonly requested as strip, coil, sheet, and bar

## Standards and Specification References

Common references include ASTM F30, ASTM F1684, project electronic packaging standards, and customer precision material requirements.

Final chemistry, mechanical values, heat treatment, testing, and acceptance criteria must be confirmed against the active standard, mill certificate, and customer specification.

## Composition and Product Forms

# Chemical Review and Supply Matrix

## Principal Alloying Elements

Element	Level / role	Procurement meaning
Fe-Ni	Base system	Controlled thermal expansion behavior
Co	Kovar-specific	Glass-to-metal and ceramic-to-metal sealing behavior
C, Mn, Si	Controlled minor	Thermal expansion and processing control
S, P	Low residuals	Confirmed by applicable standard
Balance	Specification controlled	Use certified chemistry for design release

## Raw Material Form Matrix

Form	RFQ dimensions	Grade-specific review note
Plate	Thickness, width, length, surface, flatness, tolerance, piece quantity	Invar 42 plate and sheet inquiries are checked by thickness, surface, tolerance, and heat treatment condition.
Bar	Diameter/section, length, straightness, condition, bundle quantity	Invar 42 bar inquiries are checked by diameter or section size, delivery condition, and test certificate scope.
Coil	Thickness, width, edge, coil ID, coil weight, surface finish	Invar 42 coil and strip inquiries are checked by width, thickness, edge, coil ID, and surface finish.
Tube	OD, wall thickness, length, route, end condition, NDE/test scope	Invar 42 tube inquiries are checked by OD, wall thickness, length, standard, and test requirements.

## Documents to Confirm

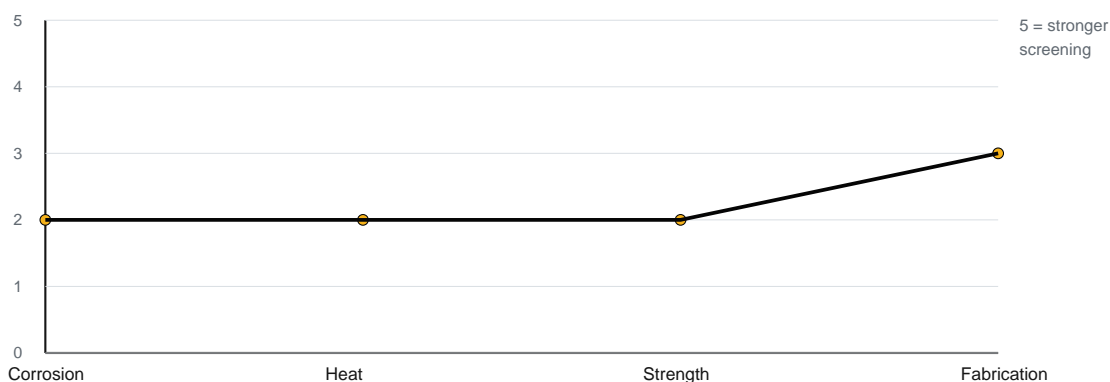
Item	Typical record
MTC	EN 10204 3.1 / mill certificate when required
Traceability	Heat number, lot, size, product form, quantity, condition
Dimensional report	Thickness, OD/WT, diameter, width, length, tolerance as applicable
Additional tests	PMI, NDE, hydro, hardness, corrosion test, third-party inspection when specified

## Engineering Reference

# Properties, Temperature, and Screening Notes

## Relative Property Profile

Figure 1 - Relative property profile for RFQ screening



Relative guide only; do not use as design allowable data.

## Modulus / Elevated Temperature Data Format

The table below shows the recommended format for reviewing modulus and temperature-dependent data. Use certified grade-specific data from standards, producer bulletins, or project specifications for design calculations.

Temp	Tension modulus	Shear modulus	Poisson ratio	Use note
Room	High / grade dependent	High / grade dependent	Verify	Baseline for procurement screening
Moderate	Reduced vs. room temp	Reduced vs. room temp	Verify	Check code allowables and condition
Elevated	Further reduction	Further reduction	Verify	Use design standard, not this guide

## Room-Temperature Mechanical Data Review

Data item	How it should be handled
Tensile strength	Confirm by form, size, condition, and applicable ASTM/ASME/EN/AMS standard
Yield strength	Confirm 0.2% offset or specified method in the purchase standard
Elongation	Confirm gauge length, test direction, and product form
Hardness	Use only when required by standard, order, or project inspection plan

## Fabrication and Corrosion Review

# Fabrication Notes and Service Screening

## Welding / Joint Preparation

Figure 2 - Typical weld preparation review points



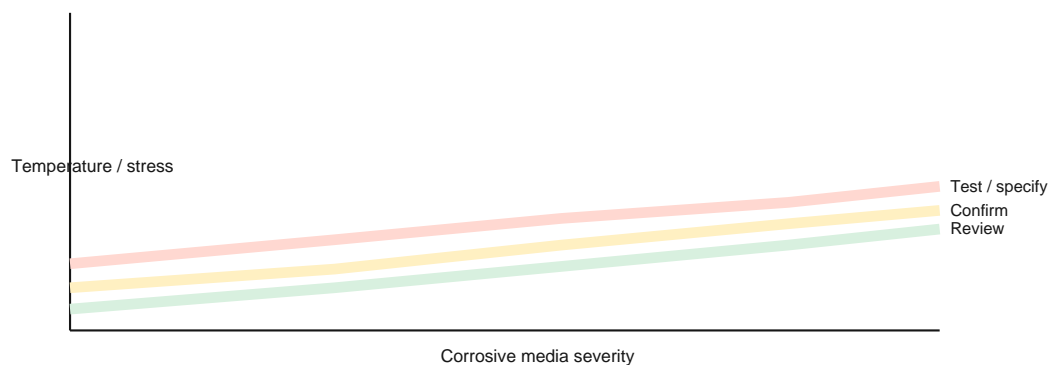
Joint design must follow qualified WPS/PQR, applicable code, and customer specification.

## Fabrication Notes

- Cleanliness, filler metal selection, heat input, interpass temperature, and post-weld requirements must be controlled by qualified procedure.
- Cold work, solution treatment, annealing, or age-hardening response depends on the exact alloy grade and product form.
- For plate, bar, coil, and tube RFQs, include surface condition, tolerance, straightness or flatness, and inspection scope.

## Corrosion Selection Map

Figure 3 - Corrosion service screening map



Use corrosion testing, published alloy data, and project media details for final selection.

## Applications and RFQ Checklist

# Invar 42 Application Review

## Common Application Areas

Application area	Typical material question
Electronic lead frames	Confirm grade, product form, standard, condition, dimensions, and document package.
Glass-to-metal seals	Confirm grade, product form, standard, condition, dimensions, and document package.
Precision package materials	Confirm grade, product form, standard, condition, dimensions, and document package.
Thermal expansion control components	Confirm grade, product form, standard, condition, dimensions, and document package.
Project-specific raw material procurement	Confirm grade, product form, standard, condition, dimensions, and document package.
Project-specific raw material procurement	Confirm grade, product form, standard, condition, dimensions, and document package.
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Project-specific raw material procurement	Confirm grade, product form, standard, condition, dimensions, and document package.

## RFQ Checklist

Step	RFQ field	Required detail
1	Alloy grade	Invar 42 plus UNS / ASTM / EN / AMS reference if available
2	Product form	Plate, bar, coil, tube, or another published product form
3	Dimensions	Thickness, width, length, diameter, OD, wall thickness, edge, tolerance
4	Condition	Annealed, solution treated, aged, cold worked, pickled, polished, or project-specific
5	Quantity and logistics	Pieces, weight, delivery term, destination, packaging, project schedule
6	Documents	MTC, inspection scope, third-party inspection, and customer specification

## Use Limitation

This datasheet is a sourcing and quotation aid. It is not a controlled design standard and does not replace producer data, engineering code requirements, customer specifications, or mill-issued certificates.

<b>Website</b>	<a href="http://www.nickelcasting.com">www.nickelcasting.com</a>
<b>Inquiry</b>	Send grade, form, dimensions, standard, quantity, destination, and certificate requirements.
<b>Grade URL</b>	<a href="/nickel-alloys/invar-metal-alloys/invar-42/">/nickel-alloys/invar-metal-alloys/invar-42/</a>