

# Kovar Datasheet

Kovar is a precision alloy used in glass-to-metal sealing for electronics, aerospace, and medical applications.

<b>Alloy / Grade</b>	Kovar
<b>Common Forms</b>	Sheet, Strip, Plate, Rod, Wire , Tubing.
<b>Key Feature</b>	Matches CTE of Borosilicate Glass & Alumina.
<b>Service Focus</b>	Ensures vacuum-tight seals essential for vacuum tubes, X-ray tubes, and military electronics packages.

## 1. Product Overview

Kovar is a nominal 29% nickel, 17% cobalt, 54% iron controlled-expansion alloy. It is widely known for having a coefficient of thermal expansion that matches borosilicate (hard) glasses and alumina ceramics, making it the industry standard for reliable hermetic sealing.

Grade	Core Description	Typical Service Focus
Kovar	Kovar is a nominal 29% nickel, 17% cobalt, 54% iron controlled-expansion alloy. It is widely known for having a...	Most metals expand much faster than glass when heated. If you try to seal a copper pin into glass, the...
Supply Capability	Sheet, Strip, Plate, Rod, Wire , Tubing.	Standard mill forms, cut-to-size material and project supply
Technical Review	Confirm final values by product form, heat treatment and material certificate	Ensures vacuum-tight seals essential for vacuum tubes, X-ray tubes, and military electronics packages.

## 2. Key Features

- Most metals expand much faster than glass when heated. If you try to seal a copper pin into glass, the glass will shatter as it cools. Kovar solves...
- Ensures vacuum-tight seals essential for vacuum tubes, X-ray tubes, and military electronics packages.
- Precise chemistry controls ensure the alloy maintains its austenitic structure down to -80 deg C, preventing volume changes that could crack seals.
- Our Kovar is typically produced via Vacuum Arc Remelting (VAR) to minimize impurities, ensuring uniform etching and plating properties.

<b>Further information under:</b>	<a href="https://www.nickelcasting.com/nickel-alloys/kovar/">https://www.nickelcasting.com/nickel-alloys/kovar/</a>
<b>Home page:</b>	<a href="http://www.nickelcasting.com">www.nickelcasting.com</a>
<b>Email:</b>	<a href="mailto:ni@Nickelcasting.com">ni@Nickelcasting.com</a>

## 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)	29.0
Cobalt (Co)	17.0
Iron (Fe)	Balance
Carbon (C)	0.02 max
Manganese (Mn)	0.30
Silicon (Si)	0.20

### 4. Standard Specifications

Product Form	Standards (ASTM / AMS / MIL)
Bar, Rod, Wire	ASTM F15, AMS I-23011 Class 1, MIL-I-23011 Class 1
Sheet, Strip, Plate	ASTM F15, AMS I-23011 Class 1, MIL-I-23011 Class 1
Tubing	ASTM F15
DIN Standard	DIN 17745, W.Nr. 1.3981

### 5. Special Performance Data

Temperature Range	Average CTE ( $\mu\text{m/m}\cdot\text{deg C}$ )	Matches
30 - 200 deg C	5.2	Hard Glass (Borosilicate)
30 - 300 deg C	5.1	Alumina Ceramics (92% - 99%)
30 - 400 deg C	4.9	Sapphire / Ruby
30 - 450 deg C	5.3	Power Tube 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 Kovar products.

### 6. Typical Applications

Industry / Area	Typical Components
Industrial Service	Precision tubing utilized in the construction of high-power transmitting tubes, laser enclosures, and specialized medical equipment.
Chemical / Process Equipment	Transmitting tubes, traveling wave tubes (TWT), and X-ray tubes requiring vacuum integrity.
Oil, Gas & Marine	Transistor outlines (TO headers), hybrid circuit packages, and flat packs.
High-Temperature / Power	Feed-throughs for high-vacuum chambers and mass spectrometers.
Precision Components	Eyelets and lead wires for high-intensity incandescent lamps.

### 7. Available Supply Forms

Sheet	Strip	Plate
Rod	Wire	Tubing.
Forgings	Custom Cutting	Project Supply

### 8. Information to Include When Requesting a Quote

- Required grade: Kovar, 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	
Address	Shanghai, China
Email	ni@Nickelcasting.com
Home Page	www.nickelcasting.com
Product Page	<a href="https://www.nickelcasting.com/nickel-alloys/kovar/">https://www.nickelcasting.com/nickel-alloys/kovar/</a>

### 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.