

Invar 36

Invar 36 is an austenitic binary iron-nickel alloy with a particularly low coefficient of expansion. Control of carbon and manganese contents as well as impurities is important. It is ferromagnetic at temperatures below the Curie temperature 230°C and non-magnetic at temperatures above. It is characterized by:

- extremely low coefficient of thermal expansion between -250 and 200°C
- good ductility and toughness
- good fatigue and mechanical properties at cryogenic temperature

Chemical Composition, %

| element | Ni | Fe | Co | Cr | C | Mn | Si | P | S | Al | Ti | Mg | Zr |
|---------|----|----|-----|------|------|-----|-----|-------|-------|------|------|------|------|
| min. | 36 | 余 | | | | | | | | | | | |
| max. | | | 0.5 | 0.25 | 0.05 | 0.6 | 0.4 | 0.015 | 0.015 | 0.10 | 0.10 | 0.10 | 0.10 |

chemical Composition according to ASTM F1684, K93603. Some compositional limits of other specifications may vary slightly.

Designation and standards

| National Standards | Material designation | Chemical composition | Forgings | Rod and bar | Plate and sheet | Strip | Wire |
|--------------------|----------------------|----------------------|------------|-------------|-----------------|------------|------------|
| ASTM | UNS K93603 | ASTM F1684 | ASTM F1684 | ASTM F1684 | ASTM F1684 | ASTM F1684 | ASTM F1684 |
| DIN | 1.3912 Ni36 | DIN 17745 | DIN 17745 | DIN 17745 | DIN 17745 | DIN 17745 | DIN 17745 |
| GB/T | 4J36 | YB/T 5241 | YB/T 5241 | YB/T 5241 | YB/T 5241 | YB/T 5241 | YB/T 5241 |

Density 8.10g/cm³

Corrosion resistance

- corrosion resistant in dry atmospheres at room temperature
- Corrosion can occur in the form of rust in humid or moist atmospheres.

Applications

Typical applications are:

- production, storage and transportation of liquefied gases
- equipment to indicate and control temperatures below 200°C, i.e. thermostats
- molds for the production of carbon fiber reinforced plastic components
- frames for electronic control units for satellites and space crafts at temperatures down to -200°C
- Mountings for electromagnetic lens systems in laser control devices
- clock pendulums