



# Inconel® 625 Stainless Steel

## General Description

Inconel® 625 stainless steel, with a chromium-nickel and low carbon content, is used for its outstanding corrosion resistance, especially at elevated temperatures. This alloy has similar physical properties and fabrication characteristics as Type 304 at room temperature. The unique chemistry of Inconel® 625 increases the corrosion resistance in saltwater applications and against high-temperature oxidation. In the medical field, it has served the MRI compatible market due to its high nickel content that keeps a low magnetic permeability even at high strengths. Inconel® 625 is more expensive than 304, but is readily available.

## Applications

- MRI compatible needles
- Aerospace micro piping
- High temperature sensor probes
- Nuclear reactors
- Heat exchangers

## Reference Standards

- AMS 5581
- AMS 5599
- ASTM B443

## Characteristics

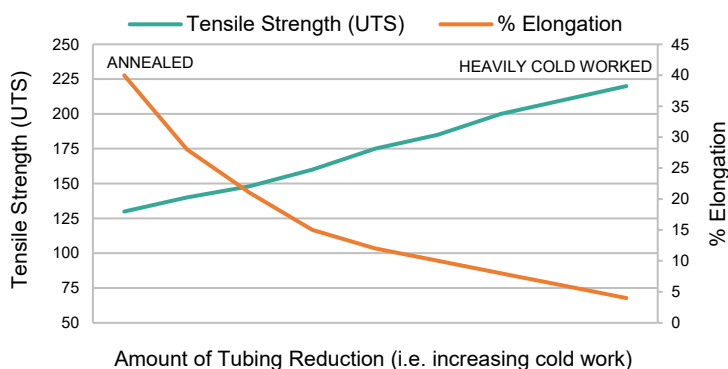
- Cold working will achieve higher tensile strengths even at elevated temperatures
- Little to no magnetism in annealed or cold worked condition - perfect for operating theatres or implants
- The properties can easily be manipulated to allow for forming of complex shapes
- High creep strength and oxidation resistance at elevated service temperatures
- Excellent general corrosion resistance

## Typical Chemistry

Element	Minimum	Maximum
Carbon		0.1%
Manganese		.5%
Phosphorous		0.015%
Sulfur		0.015%
Silicon		0.5%
Chromium	20.00%	23.00%
Nickel	58.00%	
Columbium (Nb) + Tantalum	3.15%	4.15%
Iron		5.0%
Aluminum		.4%
Titanium		.4%

## Possible Mechanical Properties

Attribute	Annealed	Typical As Drawn
Hardness	28 HRC	42 HRC
Tensile Strength	130 ksi	200 ksi
Elongation	40%	8%



## General Properties

Attribute	English
Density	.305 lb/in <sup>3</sup>
Elastic modulus	30,000 ksi
Shear modulus	11200 ksi
Mean specific heat (32-212F)	.098 Btu/lb/F
Thermal conductivity (32-212F)	112 BTU-in/hr-ft <sup>2</sup> - F
Mean CTE (70-1700F)	9.0x10 <sup>-6</sup> in/in/F
Electrical resistivity (68F)	126 microohm-cm
Magnetic Permeability (Annealed)	1.0006

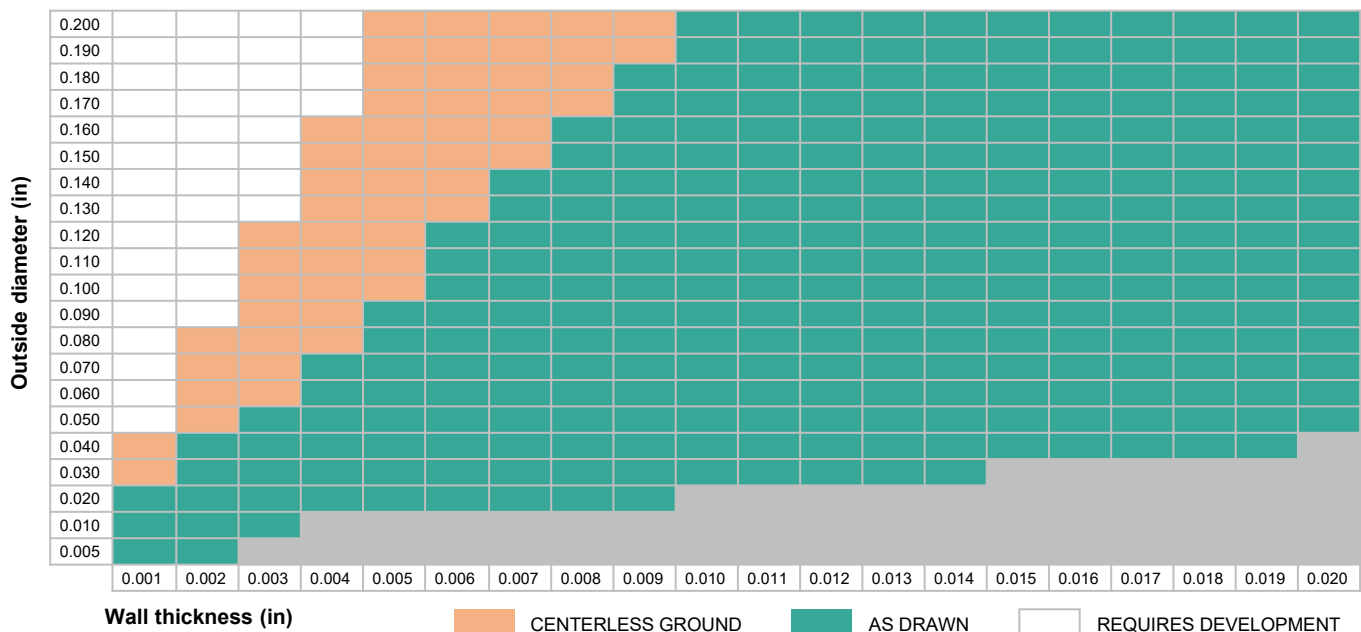
## Tubing-specific Requirements

- **Lengths:** Tubing is normally furnished in mill lengths of 5 ft, but it can be supplied in up to 20 ft lengths with a shear cut end.
- **Cut End Finish:** Precision cut-to-length pieces with burr-free ends can be furnished when specified.
- **Roundness:** Difference in minimum and maximum OD measurements must be equal or less than half the OD tolerance.
- **Surface Finish:** OD and ID surface finish (Rq or RMS) limits may be specified. ID and OD surface finish values are only reported for dimensions  $>0.020$ ".
- **Typical OD Surface:**  $< 20 \mu\text{in Rq}$ .
- **ID Surface finish:** Depends on the reduction (drawing) method. Free sunk tubing has a typical ID surface finish  $<150 \mu\text{in Rq}$ . Plug drawn tubing can have an ID surface finish range with values as low as  $< 20 \mu\text{in Rq}$ .
- **Straightness:** No deflection greater than 5% of the outside diameter for tubing with OD  $> 0.020$ " or  $0.001$ " maximum deflection for tubing with OD  $<0.020$ ". Any special straightness requirements shall be agreed upon between the purchaser and supplier. Tubing should not "wobble" as defined per ASTM F2819

Additional tubing specification information can be found in *K001-15a Standard Specification for Miniature Laser Welded and Drawn Stainless Steel and Nickel-Chromium Alloy Tubing for General Use* on the K-Tube's website at <https://www.k-tube.com/downloads-documents/>

## Available Dimensions

K-Tube has the capability to make tubing with the wall thickness and outside diameter combinations in the table below. Tubing with an OD/Wall ratio lower than 20:1 can be drawn to the final dimensions. Tubing with an OD/Wall ratio between 20:1 and 40:1 must be centerless ground to the final dimensions. K-Tube's capabilities are constantly improving, please inquire if your dimensions are outside of the listed dimensions.



## Contact Information

Our professional staff is available to assist you with custom projects and provide you with the direction you need to complete your project to specification and on time. We look forward to working with you.

**K-Tube Technologies**  
13400 Kirkham Way  
Poway, CA 92064 USA

**Toll free** | 800.394.0058  
**Local** | 858.513.9229  
**Fax** | 858.513.9459

**Hours** | 7:00 am-4:30 pm (PST)  
**General questions and inside sales** | [sales@k-tube.com](mailto:sales@k-tube.com)



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