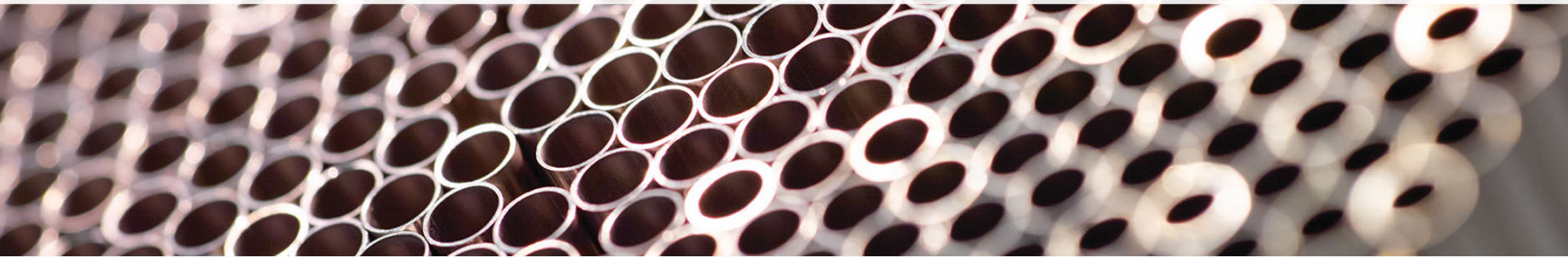
K-TUBE™ TECHNOLOGIES

MINIATURE TUBING ALLOY SPECIFIC DATA SHEET

17-7PH® Stainless Steel



General Description

17-7 PH® is a precipitation hardened (PH) stainless steel. It has the same easy-to-work characteristics of the 300 series alloys, yet it is capable of being hardened by a simple heat treatment. It has higher tensile strength/hardness compared to the 300 series when cold worked, and much higher tensile strength/hardness when heat treated. For miniature tubing, it's typically sold in Condition "C" (cold worked) or "CH900", (cold worked and then heat treated to 900F). Other conditions and heat treatments are available based on the desired properties.

Applications

- Biopsy Needles
- Cutting tools
- Catheters
- Punch tools
- Increased stiffness needles

Reference Standards

- AMS 5568
- ASTM A693
- ASTM F899

Characteristics

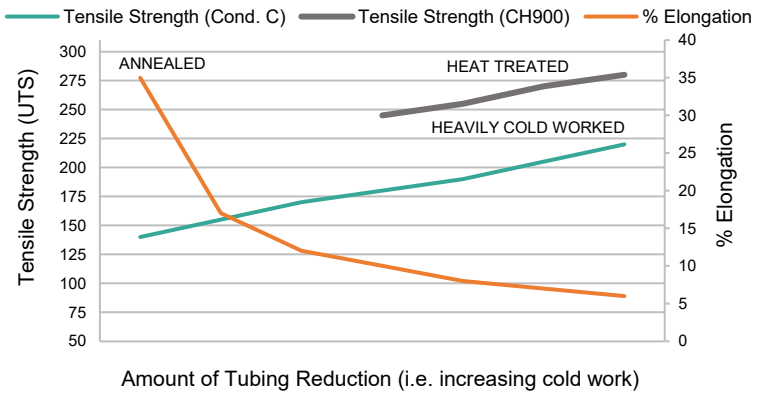
- Cold working will achieve higher tensile strengths as well as leaving the material slightly magnetic.
- Heat treating will result in additional strength and hardness—perfect for applications requiring high wear-resistance and/or stiffness.
- Ability to form at low yield strength and high elongations followed by a strengthening heat treat.
- Good general corrosion resistance

Typical Chemistry

Element	Minimum	Maximum
Carbon		0.09%
Manganese		1.00%
Phosphorus		0.04%
Sulfur		0.03%
Silicon		1.00%
Chromium	16.00%	18.00%
Nickel	6.50%	7.75%
Aluminum	0.75%	1.50%

Possible Mechanical Properties

Attribute	Annealed	Condition C	CH900
Hardness	25 HRC	44 HRC	50 HRC
Tensile Strength	140 ksi	200 ksi	260 ksi
Elongation	35%	5%	2%



General Properties

Attribute	English
Density (annealed)	.282 lb/in^3
Elastic modulus	29,000 ksi
Shear modulus	11,200 ksi
Mean specific heat (0-100C)	.120 Btu/lb/F
Mean CTE (70-200F)	8.5 x10-6 in/in/F
Electrical resistivity	80 micorohm-cm
Magnetic Permeability (Annealed)	1.4 – 3.6

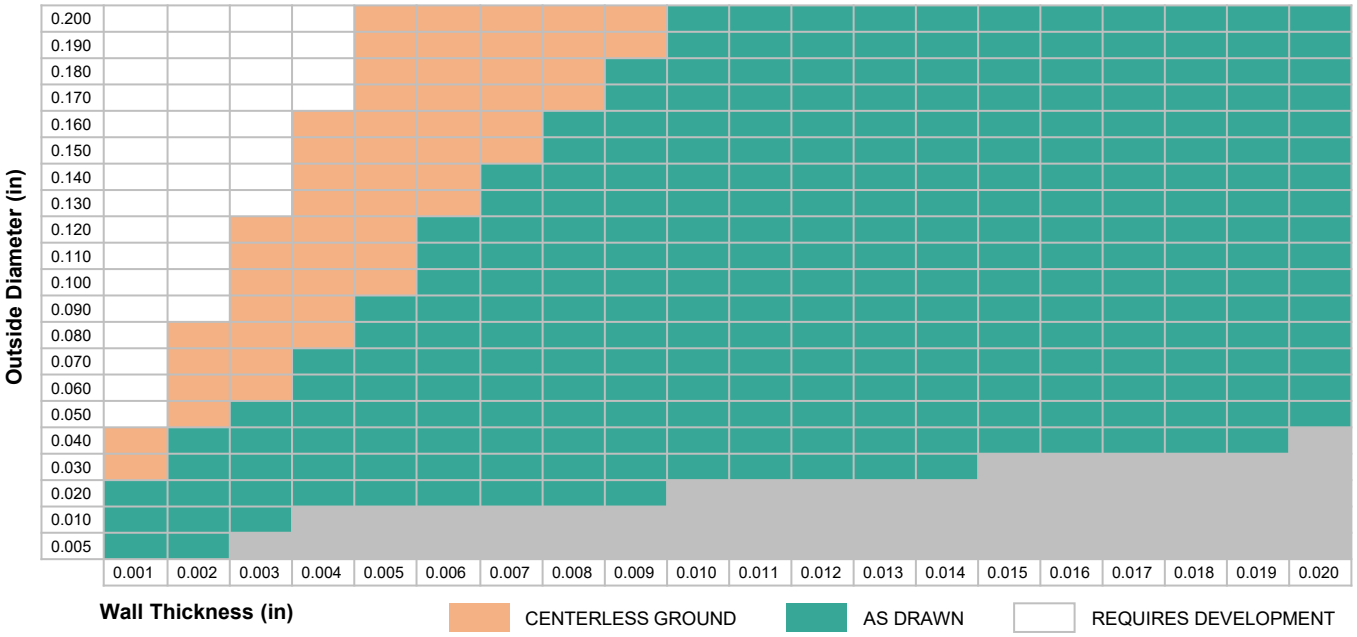
Tubing-specific Requirements

- **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 µin Rq.
- **ID Surface finish:** Depends on the reduction (drawing) method. Free sunk tubing has a typical ID surface finish <150 µin Rq. Plug drawn tubing can have an ID surface finish range with values as low as < 20 µin 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.

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