CARDINAL UHP

AMETEK®
THERMAL PROCESS MANAGEMENT

From concept to reality

Cardinal UHP has been supplying a variety of industries with specialty piping components and services for over 20 years. We introduced multiple best practice methods that are now recognized as industry standards.

Cardinal continues to supply the finest in ultra high purity fittings and piping components to manufacturers and industries requiring critically pure production systems. We also supply a wide range of tubing and specialty services for other markets including medical, food processing, biotechnology, pharmaceutical, semiconductor, and telecommunication.

Our ISO 9001 quality system begins with the specifications for raw materials and continues through to packaging, delivery and support of the finished product.

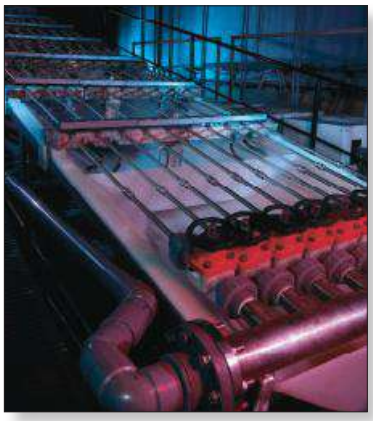
Quality starts with a finished product specification. To meet customer needs Cardinal UHP offers products to a variety of material and finish specifications with various levels of documentation.

Raw material specifications are developed to provide the lowest cost product that meets or exceeds the finish and elemental specification. Extensive inspection of the raw material insures a finished product that meets the specified requirements.

Mechanically polishing fittings after bending and welding provides an excellent base for the final electropolishing and passivation steps.

Controlled electropolishing and passivation provide a smooth, clean and chromium enriched corrosion resistant surface. The finished product is cleaned one last time in our ISO Class 4 clean room, tested and packaged according to specification before it is ready to ship.

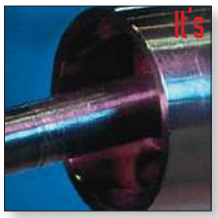
It is our consistent attention to detail at all phases from commercial review to manufacturing and sales support that turn a concept of quality into reality.



the raw material

Although traditional tubing materials like copper are adequate for some high purity applications, the material of choice in the semiconductor and biopharmaceutical markets is 316L stainless steel.

Readily available, 316L is a low carbon steel alloy, attractive because of its good weldability and inherent corrosion resistance. However, commercially available 316L may contain impurities in the form of trapped gases and non-metallic inclusions. To prevent this from becoming a problem for our customer, we select only specific grades of 316L and purchase materials to our own specifications. Cardinal UHP produces ultra high purity tubing from many materials



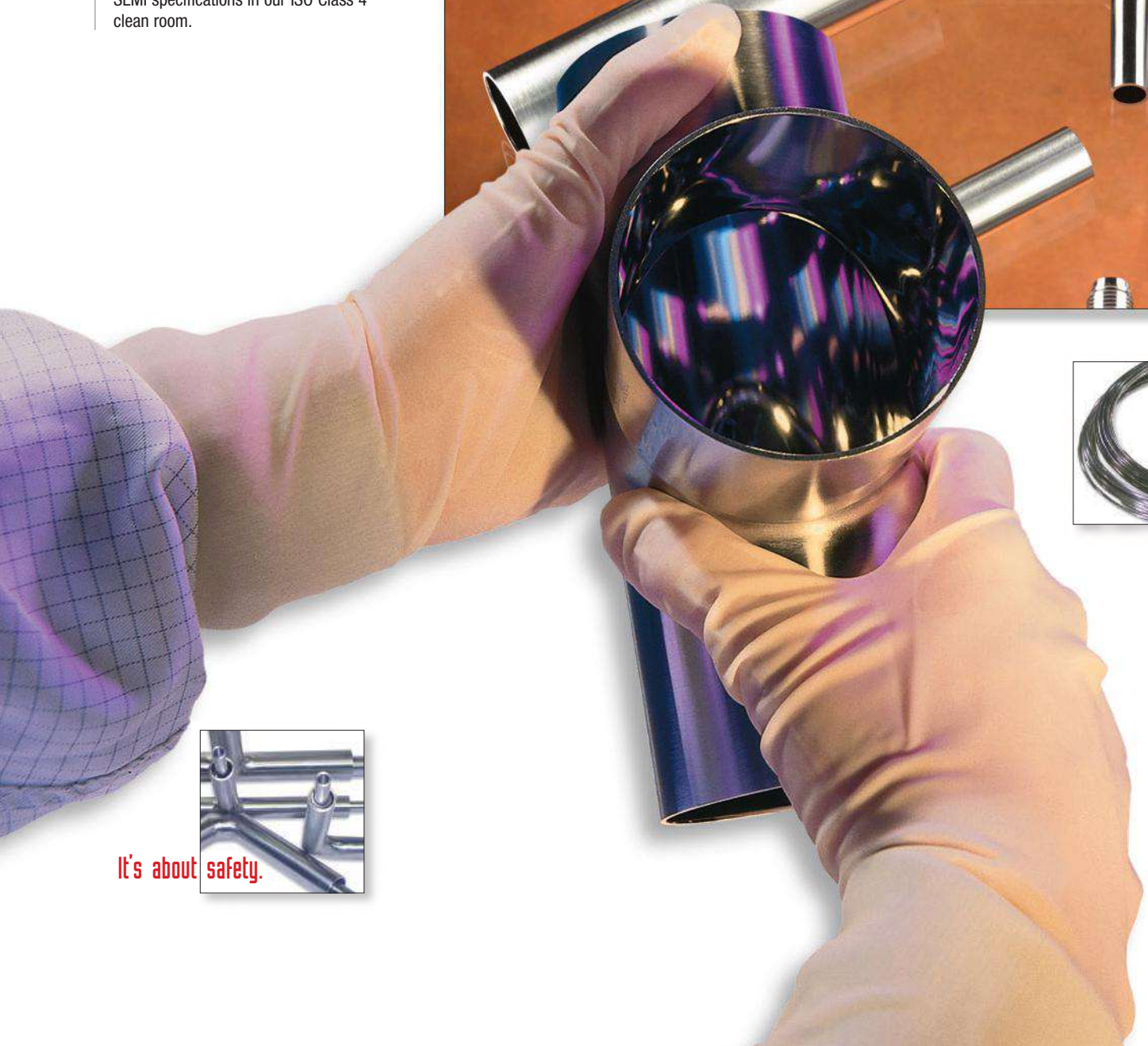
It's about reliability.

besides 316L. For example, we also use 304SS, Hastelloy, Monel, and copper. Prior to placing any material in production we test representative samples to determine their wall thickness, ovality, weldability and compatibility with our electropolishing process and desired RA finish.

tubing

Because of the high degree of purity and low surface roughness, Cardinal tubing is widely used in semiconductor, pharmaceutical, medical, food processing, biotechnology, and telecommunication industries. We produce tubing to eight different specifications providing economic solutions for everything from mission critical applications to instrumentation and bulk gas delivery systems.

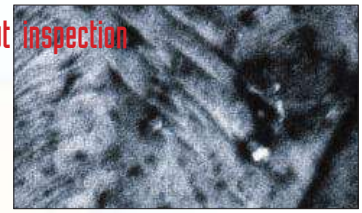
Standard sizes range from 1/8" through 6" (3mm - 150mm) single wall tubing with electropolished surface roughness as low as Ra 5µin / 0.13 µm. We produce tubing with the full range of cleanliness specifications from T/C cleaning to double bagging and capping tubing to SEMI specifications in our ISO Class 4 clean room.

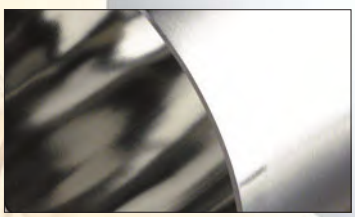


It's about quality

It's about safety.

It's about inspection





quality assurance

Cardinal UHP was the first company in the high purity tubing and fitting industry to adopt an internationally recognized ISO quality management program. Our unyielding commitment to quality is evident in every step of our manufacturing process. From the start of procurement we specify stringent material standards. When raw materials arrive at our loading dock they are quarantined until wall thickness, ovality, smoothness, surface morphology, and chemical composition have been verified to insure it will meet our rigorous electropolishing procedures.

All measuring instruments and analytical equipment are calibrated and traceable to NIST standards. Finally, every employee is empowered to declare piping and fittings unfit for sale if deviations from our standards are discovered.

Before packaging tubing and fittings are cleaned with 60°C

product specifications

tech 10 / tech 10CR

- Surface roughness of 32µin / 0.80µm max.
- Non-electropolished high quality 316L and 304L seamless and welded stainless steel.
- Solvent cleaned, purged with nitrogen, capped, and individually bagged.
- Passivated and rinsed with DI water.
- Used in analyzer sample lines, O_2 piping (CFOS), medical gas piping, and vent lines.

tech 20

- Surface roughness of 20µin / 0.50µm max.
- Non-electropolished high quality 316L seamless and welded stainless steel.
- Chemically passivated.
- Cleaned with 18 megohm-cm DI water and purged with filtered nitrogen.
- Used in general purity gas distribution systems, such as compressed dry air, nitrogen lines, argon and other bulk inert gas services.

Specifications subject to change without notice.

tech 50 / tech 50CR

- Electropolished to Ra 10µin /0.25µm max with 7µin / 0.18µm max option.
- Produced from high quality 316L seamless and welded stainless steel.
- Produced to meet current ASTM standards.
- Subject to numerous quality tests including SEM, ESCA, and optional Auger.
- Cleaned with 60°C DI water, purged with heated and filtered nitrogen, capped, individually double bagged and then bulk bagged in an ISO Class 4 clean room.

TG-22

- Surface roughness of 20µin / 0.50µm avg.
- Produced from Hastelloy C-22 to resist pitting and crevice corrosion.
- Chemically passivated in a nitric acid bath followed by a 60°C DI rinse.
- Nitrogen purged, dried, capped and bagged in an ISO Class 4 clean room.
- Used for the distribution and transfer of corrosive gases in high purity gas systems.

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