OMEGACLAD® SHEATH SELECTION GUIDE

APPLICATIONS

- **Heat Treating Metal Parts**
- **Gas or Oil Fired Furnaces**
- **Fuel Fired Heat Exchangers**
- **Ceramic Materials Firing**
- **Powder Metal Sintering**
- **Steel Carburizing Furnaces**
- **Vacuum/Atmosphere Melting & Annealing**
- **Solid Waste Incinerators**
- **Heat Process Fluidized Beds**
- **R&D Tube or Box Furnaces**

The metallic sheath on the outside of an OMEGACLAD® probe is used to protect the internal thermocouple wires from chemically active atmospheres. In some cases, even hot air can damage thermocouple wires and cause them to permanently lose calibration. Selection of the best type of metal sheath to employ is based on our customers' intended use, the industry in which they work, and the country where they are located. For instance, the most common OMEGA® metal sheaths are 304 stainless steel and Inconel 600. These are accepted in most industries, including food processing. Stainless steel 304 is a common alloy, readily available and low in the cost of both materials and manufacture. Some industries, however, such as petroleum, medical, nuclear, aircraft, and power generation, have their own standards and may require more complicated and expensive alloys.

Listed below are the sheath materials that OMEGA Engineering uses to make OMEGACLAD®. Any materials not on this list must be customized; direct inquiries will have to made to OMEGA South for pricing, availability and size limitations.

304 Stainless Steel

OMEGA Engineering uses a low-carbon version of 304 stainless, called 304L, mainly because it is easier to weld. In general, it is interchangeable with plain 304.

Applications:
Food & beverage processing
Chemical processing
Dairy
Hospital equipment
Pharmaceutical equipment
Nuclear reactor equipment
Containers for mild corrosives

Temperature limitations: up to 1,600°F for cyclic processes. Use Inconel 600 for extended use around or above 1,650°F

Inconel 600

This high nickel and chromium content alloy is more expensive than most stainless steels. It is good for extended use at high temperatures and resists corrosion by most simple acids and very pure water.

Applications:
Furnace components
Chemical & food processing
Nuclear power generation
Caustic chemicals

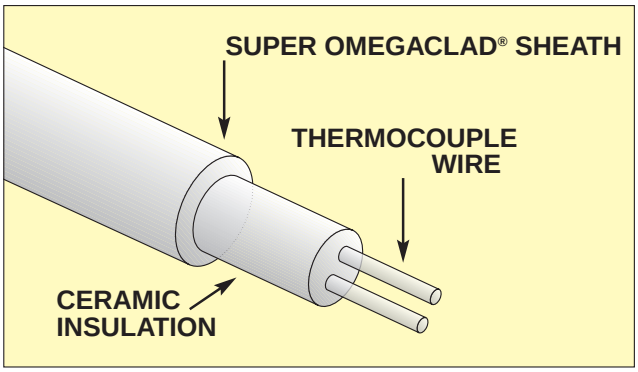
Temperature limitations:
up to 2,100°F

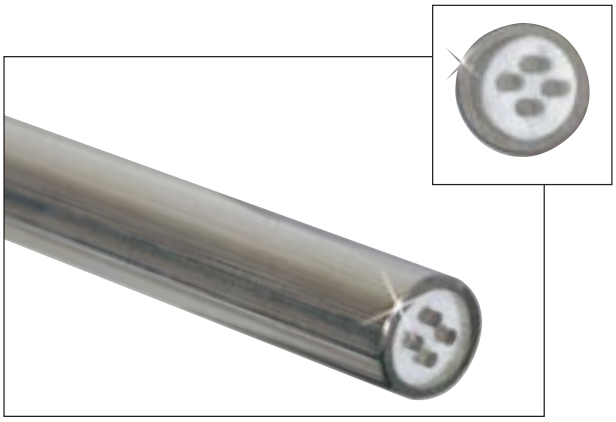
OMEGA SUPERCLAD™

This alloy has excellent resistance to air at high temperatures. It has an aluminum oxide layer on the surface that prevents further oxidation. This oxidation resistance allows thermocouple probes to operate for extended periods before EMF drift "decalibrates" the thermocouple. It is also popular for its resistance to hydrogen gas and its high strength at high temperatures. Because of form limitations and difficulty in processing, it is more expensive than any of the alloys discussed above.

Applications:
Furnace components
Gas turbine industry
Catalytic converter components
Aerospace jet & rocket engines
Refractory anchors
Waste incinerators

Temperature limitations:
Approx. 2,220°F
Also is acceptable in heated hydrogen, ≈ 2000°F





310 Stainless Steel

This is commonly used at higher temperatures because it resists scaling up to 1,900°F. It is stronger and resists air attack better than 304SS at these higher temperatures. Also good in fossil fuel gases at elevated temperatures.

Applications: (Higher temperatures)
- Air heaters
- Baking equipment
- Chemical processing equipment
- Furnace parts
- Heat exchangers and electric power equipment (that does not come in contact with sulphur)
- Petroleum refining

Temperature limitations:
up to 1,900°F

316 (& 316L) Stainless Steel

Better corrosion resistance to most chemicals, salts, and acids than most stainless steels due to the addition of molybdenum. It has good resistance to sulphur- or chlorine-bearing liquids.

Applications:
- Marine trim exteriors
- Chemical and food processing
- Petroleum refining equipment
- Pharmaceutical equipment
- Paper & pulp
- Textile finishing

Temperature limitations:
up to 1,600°F continuously in air or in cyclic corrosive environments, slightly higher in air.

321 Stainless Steel

This alloy is similar to 304 stainless except that it incorporates titanium. It is intended for welded components that are exposed to high temperatures, and is especially well suited to long exposure to air and combustion atmospheres of around 800°F.

Applications:
- Aircraft exhausts & manifolds
- Jet engine parts
- Stack liners
- Welded equipment
- Chemical processing equipment

Temperature limitations:
up to 1,600°F

Hastelloy-X

This alloy is expensive due to the addition of iron, chromium and molybdenum. It has very good high temperature strength and good oxidation resistance. It is a relatively old alloy, less costly and with better performance than some newer alloys.

Applications:
- Gas Turbines for power generation
- Aerospace applications
- Industrial furnaces
- Boiler & pressure vessels

Temperature limitations:
up to 2,150°F

Thermocouple Wire Stripper for OMEGACLAD® wire. See PST Series Strippers in Section H.

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• Flow and Level

Air Velocity Indicators, Doppler Flowmeters, Level Measurement, Magnetic Flowmeters, Mass Flowmeters, Pitot Tubes, Pumps, Rotameters, Turbine and Paddle Wheel Flowmeters, Ultrasonic Flowmeters, Valves, Variable Area Flowmeters, Vortex Shedding Flowmeters

• pH and Conductivity

Conductivity Instrumentation, Dissolved Oxygen Instrumentation, Environmental Instrumentation, pH Electrodes and Instruments, Water and Soil Analysis Instrumentation

• Data Acquisition

Auto-Dialers and Alarm Monitoring Systems, Communication Products and Converters, Data Acquisition and Analysis Software, Data Loggers Plug-in Cards, Signal Conditioners, USB, RS232, RS485 and Parallel Port Data Acquisition Systems, Wireless Transmitters and Receivers

• Pressure, Strain and Force

Displacement Transducers, Dynamic Measurement Force Sensors, Instrumentation for Pressure and Strain Measurements, Load Cells, Pressure Gauges, Pressure Reference Section, Pressure Switches, Pressure Transducers, Proximity Transducers, Regulators, Strain Gages, Torque Transducers, Valves

• Heaters

Band Heaters, Cartridge Heaters, Circulation Heaters, Comfort Heaters, Controllers, Meters and Switching Devices, Flexible Heaters, General Test and Measurement Instruments, Heater Hook-up Wire, Heating Cable Systems, Immersion Heaters, Process Air and Duct, Heaters, Radiant Heaters, Strip Heaters, Tubular Heaters

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