CERAMIC SHEATHS

To protect a temperature sensor within the process it is measuring, a ceramic sheath can be used. There is a small range of technical ceramics typically used to protect temperature sensors. These include Aluminous Porcelain, Recrystallised Alumina, Silicon Carbide and Sialon. These ceramics have different properties. You can choose the one best suited to your temperature and application.

Ceramic protection sheaths are a ceramic tube covering, used to shield a temperature sensor from attack. Ceramics are generally chosen to protect temperature sensors used at very high temperatures up to 1700°C. Some ceramic protection sheaths provide a very high electrical resistance so may be suitable for high voltage applications.

Ceramic is typically chosen over metal and other materials for its thermal stability in tough conditions.

Ceramic Type	Description	Example Application /Use	Max Temperature	Basic Composition	Density	Thermal Conductivity	Stock Tube Diameter Sizes Available
Aluminous Porcelain	Aluminous Porcelain is a ceramic material that can be used as a thermocouple protection sheath or insulator. Aluminous Porcelain is an alumino-silicate material containing >60% alumina. It is also non-porous. Aluminous Porcelain has very good thermal shock resistance, low thermal conductivity and low-cost. Also known as C610.	Kilns, Incinerators, Glass Bubblers, Heat Treatment	1400˚C	Al_2O3_3 60%	2.6 g/cm^3	2 W/m °C	Outer/Inner diameters 6mm/4mm 8mm/5mm 10mm/7mm 12mm/8mm 15mm/10mm 17mm/13mm 20mm/15mm Other diameters available on request
Recrystallised Alumina	This material is >99.7% alumina in composition and can work at temperatures up to 1700˚C. It is relatively strong and has excellent chemical resistance and wear resistance. It is higher cost than aluminous porcelain due to its composition and subsequent manufacture. Also known as C799.	Kilns, Incinerators, Furnaces, Chemical Plants, Heat Treatment	1700˚C	Al_2O_3 99.7%	3.9 g/cm^3	26 W/m °C	Outer/Inner diameters 6mm/4mm 8mm/5mm 10mm/6mm 10mm/7mm 12mm/8mm 15mm/10mm 17mm/13mm 20mm/15mm 24mm/18mm Other diameters available on request

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Silicon Carbide (Nitride Bonded)	Excellent thermal shock resistance. Tends to have a thick wall to improve strength. A porous material that usually has a lining refractory for platinum sensors. High thermal conductivity. Not suitable for highly oxidising atmospheres.	Non-ferrous metallurgy processes including Aluminium, Copper and Zinc.	1450°C	SiC 70%-90%	2.6 g/cm^3	28.0 w/m °C	Outer/Inner diameters 50mm/25mm 28mm/16mm 22mm/12mm Other diameters available on request
Silicon Carbide (Recrystallised)	Excellent thermal shock resistance. A porous material that usually has a lining refractory for Platinum sensors. High thermal conductivity.	Non-ferrous metallurgy processes including Aluminium, Copper and Zinc.	1600˚C in oxidising atmosphere, 2000˚C in protected atmosphere	SiC 99%	2.6 to 2.7 g/cm	30.0 w/m °C	Outer/Inner diameters 50mm/25mm Other diameters available on request
Sialon	A strong and thermal shock resisting material for use in molten metals with little wetting or dross build up. Good in molten aluminium or salt baths. Fairly expensive.	Non-ferrous metallurgy processes including Aluminium and Zinc.	1000˚C (1250˚C in controlled conditions)	Silicon Nitride, Aluminium Oxide	3.26 g/cm^3	16.7 w/m °C	Outer/Inner diameters 28mm/16mm 22mm/12mm 16mm/9mm Other diameters available on request

Other Sheath Materials

A temperature sensor can be manufactured with other sheath materials, including base metals and rare metals, depending on the temperature and environment the sensor is being immersed into.

If there is an alternative material you would like to use, or a maximum temperature the sensor needs to operate within, or you are unsure of the best material to use to protect the sensor, please speak to our technical team and they will support you.