INTERNATIONAL Syalons

ADVANCED SILICON NITRIDE & SIALON CERAMICS

Syalon Thermocouple Protection Sheaths

International Syalons manufacture a range of silicon nitride based thermocouple protection sheaths for use in the aluminium and non-ferrous metal industries. They offer outstanding performance for temperature control and are extremely cost effective compared to competitive materials such as cast iron, silicon carbide and alumina.

Syalons are alloys of silicon nitride and possess a unique combination of physical properties such as high strength, light weight, excellent thermal shock resistance and resistance to corrosion and erosion.

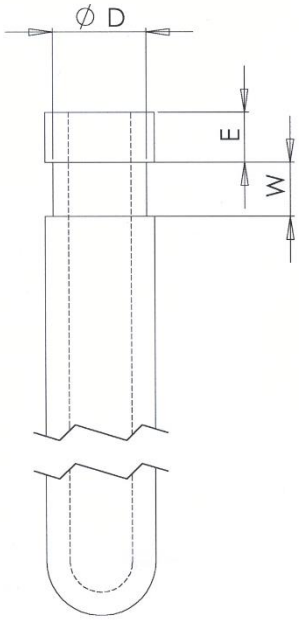
Syalon thermocouple sheaths are available in a range of standard sizes as shown in the table below. These are usually available ex-stock. Tubes outside these standard sizes are also available but with a longer lead time.

OD / mm	ID / mm	Maximum Length / mm
28.0 ±1.0	16.0 +1.0/-2.0	2000 ±3.0
22.0 ±1.0	12.0 +1.0/-2.0	2000 ±3.0
16.0 ±1.0	9.0 +1.0/-2.0	2000 ±3.0
12.5 ±0.75	6.5 ±1.0	1150 ±3.0
9.0 ±1.0	4.0 ±1.0	600 ±3.0

These tubes are available with or without a location groove. The table below shows our standard thermocouple sheath grooving.

Tube OD mm	D ±0.2	W ±0.5	E ±0.5
28	24	14	13
22	18	14	13
16	13	13	7
12.5	9.5	13	7

All dimensions in mm



Certificate No. 930359

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Syalon Materials

Syalon thermocouple sheaths are available in several grades. **Syalon 101** tubes are world renowned for their outstanding performance in contact with non-ferrous molten metals, particularly aluminium and it's alloys and zinc. They allow constant temperature monitoring of the melt resulting in improved quality of the finished casting. In addition to it's excellent physical properties Syalon 101 is also non-wetting to most non-ferrous alloys making it resistant to build up of dross and therefore low maintenance. Syalon 101 is generally suited to applications below 1200°C.

For high temperature applications above 1200°C **Syalon 050** is the preferred choice. Again offering outstanding physical properties Syalon 050 can be used at temperatures up to around 1400°C.

Syalon 110 is a composite grade of Syalon which is suited to specialized applications where temperatures could reach 1600°C. It is also an excellent choice for ferrous applications.

The table below shows the typical physical properties for these grades of Syalon.

Property	Syalon 101	Syalon 050	Syalon 110
3 point RT Modulus of Rupture / MPa	945	800	500
3 point Modulus of Rupture at 1400°C / MPa	-	450	-
Weibull Modulus	11	8-13	10
RT Unit Tensile Strength / MPa	450	450	250
RT Compressive Strength / MPa	>3500	-	-
RT Young's Modulus / GPa	288	306	139
RT Hardness (HRA)	92	94	88
RT Hardness (Vickers $Hv_{0.3}$ / kg/mm^2	1500	2000	1200
Fracture Toughness / $MPam^{½}$	7.7	6.5	3.5
Poisson's Ratio	0.23	0.27	0.19
Density / g/cc	3.23	3.23	2.65
Porosity / %	0	0	10
Thermal Expansion Coefficient (0-1200°C) / k^{-1}	$3.04x10^{-6}$	$3.2x10^{-6}$	$3.04x10^{-6}$
RT Thermal Conductivity / W/(mk)	28.0	20.0	27.0
Thermal Shock Resistance / ΔT°C	900	600	800
RT Electrical Resistivity / ohm m	10^{10}	10^{10}	10^{10}
Maximum Temperature Use / °C	1200	1400	1450

Technical Support

The successful integration of ceramics into industrial and engineering systems requires close collaboration between you, the end-user, and us, the material suppliers. Our Technical Specialists are available to discuss your requirements in detail and assist in exploiting the significant advantages which Syalon thermocouple protection sheaths have to offer. Should you feel Syalon may be of benefit to your molten metal handling applications please contact us.

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