

### CERAMIC PROTECTION TUBE MATERIALS

Quartz	Fused Silicon Dioxide	2200° F 1215° C	Can be used in molten silver or gold. Excellent resistance to thermal shock.
Silica	Silica	2900° F 1600° C	Usually used for glass tank applications.
Mullite (Porcelain)	63% Al <sub>2</sub> O <sub>3</sub> , Balance Silica & traces of other materials	3100° F 1700° C	Good thermal shock resistance due to low rate of thermal expansion. Some possible contamination of platinum above 2400° F due to silica.
Alumina	> 99% Al <sub>2</sub> O <sub>3</sub>	3400° F 1870° C	Impervious to gases at high temperature - Fair resistance to thermal and mechanical shock.
Carbofrax *	90% Si-Carbide, 9% Si-Dioxide	3000° F 1650° C	Secondary protection for mullite or alumina tubes. Can take flame impingement. Fair thermal shock resistance.
Refrax *	Silicon Nitrate, Bonded Si-Carbide	3150° F 1730° C	Not wetted by molten aluminum. Better resistance to mechanical and thermal shock.
Beryllium Oxide	99% BeO	4200° F 2315° C	High thermal conductivity. Poor resistance to mechanical shock. Possible reaction with others oxides at high temperature. Should be used with caution as fumes and powders are toxic.

