



SWX-277 & 277Z-5 Neutron Shielding

Kretekast - High Temp Castable Shielding



SWX-277 Powder

- Contains more than two times as much hydrogen as ordinary concrete along with 1.6% to 5% boron additives
- Rugged "concrete-like" shielding is easily cast in the field
- Low cost material is completely non-combustible

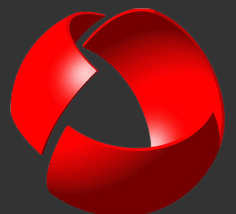


SWX-277 Cast

Power reactor and other industrial neutron shielding applications often require a material that exhibits a high temperature resistance. Kretekast is a refractory material that retains its shielding properties at temperatures up to 450°F (230 °C) and its physical integrity up to 1900°F (1038 °C). It is entirely non-combustible and is designed to be cast in the field.

SWX-277 and 277Z-5 are excellent high flux neutron shields due to the inclusion of temperature resistant additives that provide hydrogen for moderation and boron for thermal neutron absorption. It provides more than twice the hydrogen of ordinary concrete (equal to approximately $\frac{1}{2}$ that of pure water) along with a boron content of 1.6% and 5% respectively. SWX-277 is provided as a dry mix for casting in the field. It can be shaped using standard concrete cutting/drilling tools. Kretekast is typically provided in 300-lb fiber barrels.

Approximately 96-lbs. of dry mix are required to obtain one-cubic ft. of cast material. (1.54 kg of dry mix will give one liter). Detailed mixing instructions are provided with each order. Recommended shelf-life under dry storage conditions is twelve months.





SWX-277 & 277Z-5 Neutron Shielding

Specifications

Composition Data (as cast)	SWX-277	SWX-277Z-5
Hydrogen atom density/ cm ³ :	4.93 x 10 ²²	4.76 x 10 ²²
Hydrogen weight percent:	4.90 %	4.73 %
Boron atom density/ cm ³ :	1.53 x 10 ²¹	4.67 x 10 ²¹
Boron natural isotope distribution:	19.6% ¹⁰ B and 80.4% ¹¹ B	19.6% ¹⁰ B and 80.4% ¹¹ B
Boron weight percent:	1.63 %	4.99 %
Total Density	1.68 g / cm ³ (105 lbs / ft ³)	1.68 g / cm ³ (105 lbs / ft ³)
Radiation Properties		
Macroscopic thermal neutron cross section:	1.17 cm ⁻¹	3.54 cm ⁻¹
Gamma resistance:	1 x 10 ¹¹ rad	1 x 10 ¹¹ rad
Neutron resistance:	5 x 10 ¹⁹ n / cm ²	5 x 10 ¹⁹ n / cm ²
Physical Properties		
State:	Solid composite	Solid composite
Color:	Light gray	Light gray
Odor:	No odor	No odor
Machinability:	Fair: saw cut or drilled	Fair: saw cut or drilled
Tensile Strength (ASTM D368):	100 psi	100 psi
Compressive Strength:	1,000 psi	1,000 psi
Thermal Properties		
Recommended Temperature Limit:	350 °F	350 °F
Coefficient of Thermal Conductivity	1.24 x 10 ⁻³ cal-cm/sec-cm ² -°C (0.3 BTU -ft/hr-ft ² -°F)	1.24 x 10 ⁻³ cal-cm/sec-cm ² -°C (0.3 BTU-ft/hr-ft ² -°F)
Heat Capacity	0.22 cal./g °C	0.22 cal/g °C
Cubical Coefficient of Expansion:	8 x 10 ⁻⁶ cm ³ /cm ³ -°C (1.4 x 10 ⁻⁵ in ³ /in ³ -°F)	8 x 10 ⁻⁶ cm ³ /cm ³ -°C (1.4 x 10 ⁻⁵ in ³ /in ³ -°F)
Chemical Properties		
Chemical Name & Synonyms:	Borated hydrogenated mix	Borated hydrogenated mix
Trade Name & Synonyms:	SWX -277 Kretekast	SWX-277Z-5 Kretekast Plus
Chemical Family:	Calcium salts, boron, hydrogen compounds	Calcium salts, boron, hydrogen compounds
Solubility in Water:	Negligible	Negligible

