

# SWX-277

## Field-Castable Heat Resistant Shielding



Power reactor and other industrial neutron shielding applications often require a material that exhibits a high temperature resistance. SWX-277 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 is an excellent high flux neutron shield 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 as ordinary concrete (equal to approximately ½ that of pure water) along with a boron content of 1.56%. SWX-277 is provided as a dry mix for casting in the field. It can be shaped using standard concrete cutting/drilling tools. SWX-277 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.



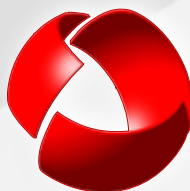
**Contains three times as much hydrogen as ordinary concrete along with 1.56% boron**



**Rugged “concrete-like” shielding is easily cast in the field**



**Low cost material is completely non-combustible**



# SWX-277

## Field-Castable Heat Resistant Shielding

# Specifications

### Composition Data

Hydrogen atom density/ cm <sup>3</sup> :	3.4 x 10 <sup>22</sup>
Natural isotope distribution:	99.98% <sup>1</sup> H
Boron atom density/ cm <sup>3</sup> :	1.43 x 10 <sup>21</sup>
Natural isotope distribution:	19.6% <sup>10</sup> B and 80.4% <sup>11</sup> B
Weight percent of all isotopes of boron:	1.56%
Total Density	1.68 g / cm <sup>3</sup> (105 lbs/ ft <sup>3</sup> )

### Radiation Properties

Macroscopic thermal neutron cross section:	1.1 cm <sup>-1</sup>
Gamma resistance:	1 x 10 <sup>11</sup> rad
Neutron resistance:	5 x 10 <sup>19</sup> n / cm <sup>2</sup>

### Physical Properties

State	Powder
Color	Light gray
Odor	no odor
Machinability:	Fair, can be saw cut or drilled
Tensile Strength (ASTM D368):	100 psi
Compressive Strength:	1,000 psi

### Thermal Properties

Recommended Temperature Limit:	350 °F
Coefficient of Thermal Conductivity:	1.24 x 10 <sup>-3</sup> cal-cm/sec-cm <sup>2</sup> -°C (0.3 BTU-ft/hr-ft <sup>2</sup> -°F)
Heat Capacity	0.22 cal./g°C
Cubical Coefficient of Expansion:	8 x 10 <sup>-6</sup> cm <sup>3</sup> /cm <sup>3</sup> -°C (1.4 x 10 <sup>-5</sup> in <sup>3</sup> /in <sup>3</sup> -°F)

### Chemical Properties

Chemical Name & Synonyms:	Borated hydrogenated mix
Trade Name & Synonyms:	SWX-277
Chemical Family:	Calcium salts, boron, hydrogen compounds
Solubility in Water:	Negligible



A Division of Bladewerx LLC

# shieldwerx<sup>TM</sup>

103 Rio Rancho Dr NE, #C4  
 Rio Rancho, New Mexico 87124  
 United States of America  
 Phone: +01.505.892.5144  
 Fax: +01.505.890.8319  
 Email: sales@shieldwerx.com

Data Sheet Revision: July 2007