

SWX-213 (Pure Poly) Properties and Radiation Thickness Calculator

SWX-213 (Pure Poly) Properties

Applications: Thermalize Fast Neutrons

Typical Uses: Moderator Material

Shielding Effectiveness Against Various Types of Radiation:

Thermal Neutrons - poor
Fast Neutrons - excellent
Gammas - poor
Capture Gammas - poor

Temperature Limit: 180°F (82°C)

Machinability: Excellent

Forms and Sizes of Shielding:

Bricks - 2" (51 mm) x 4" (102 mm) x 8" (203 mm)
Sheets - 1" (25 mm) , 2" (51 mm) , 4" (102 mm) thicknesses
& 2' x 2' , 4' x 4' , 4' x 8' , 3' x 4'
Rods - 12" length & nominal diameters 1",2",3",4",5",6",7",8"
Rods supplied 1/4" oversize to permit machining
to exact size
Pellets - approx. 1/8" (3.2 mm) size & density ~0.48 g / cm³

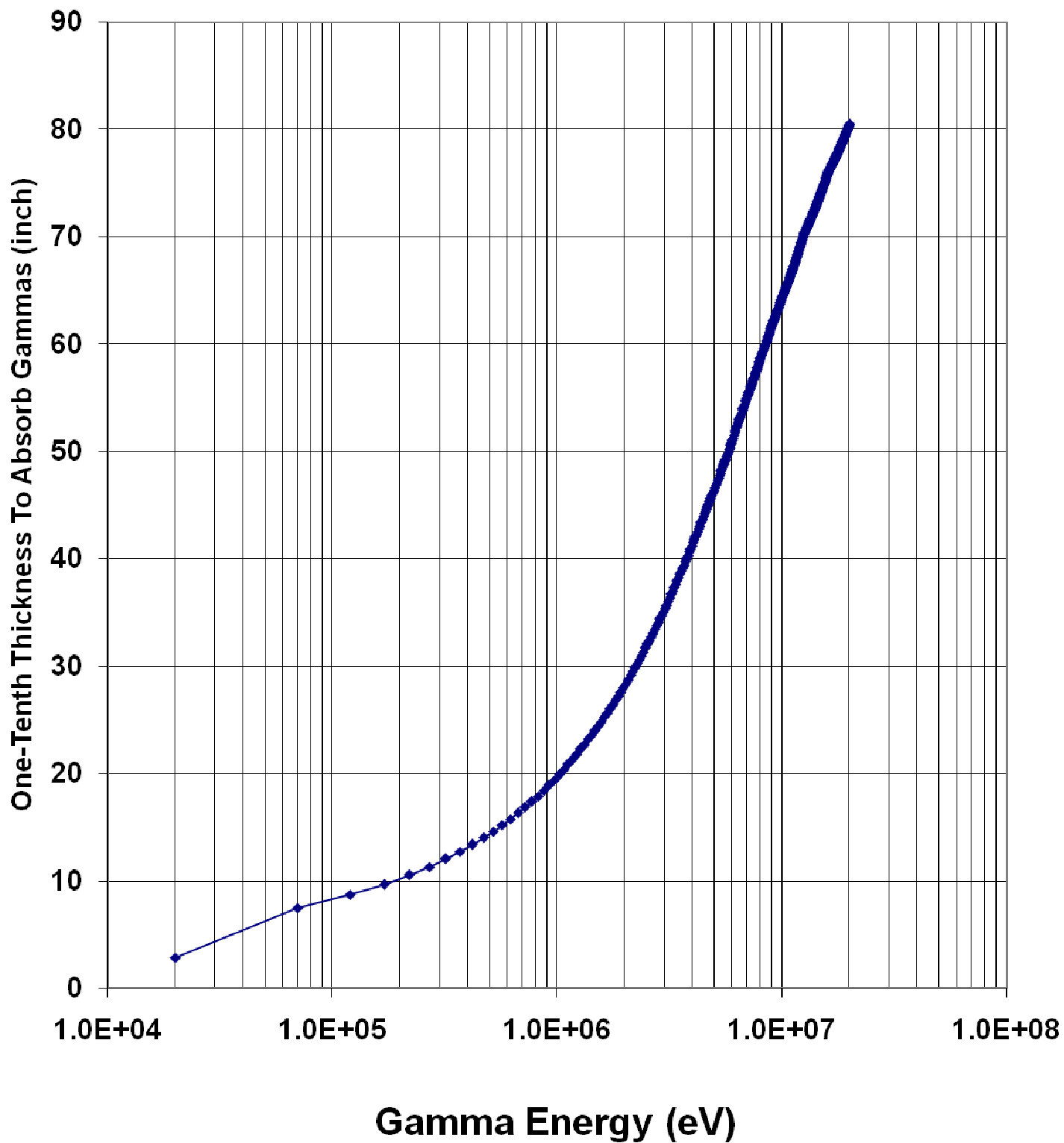
Radiation Resistance (structural and shielding integrity):

Accumulated Gamma Radiation Exposure Limit: 5.0 x 10⁸ Rad
Accumulated Neutron Radiation Exposure Limit: 2.5 x 10¹⁷ n / cm²

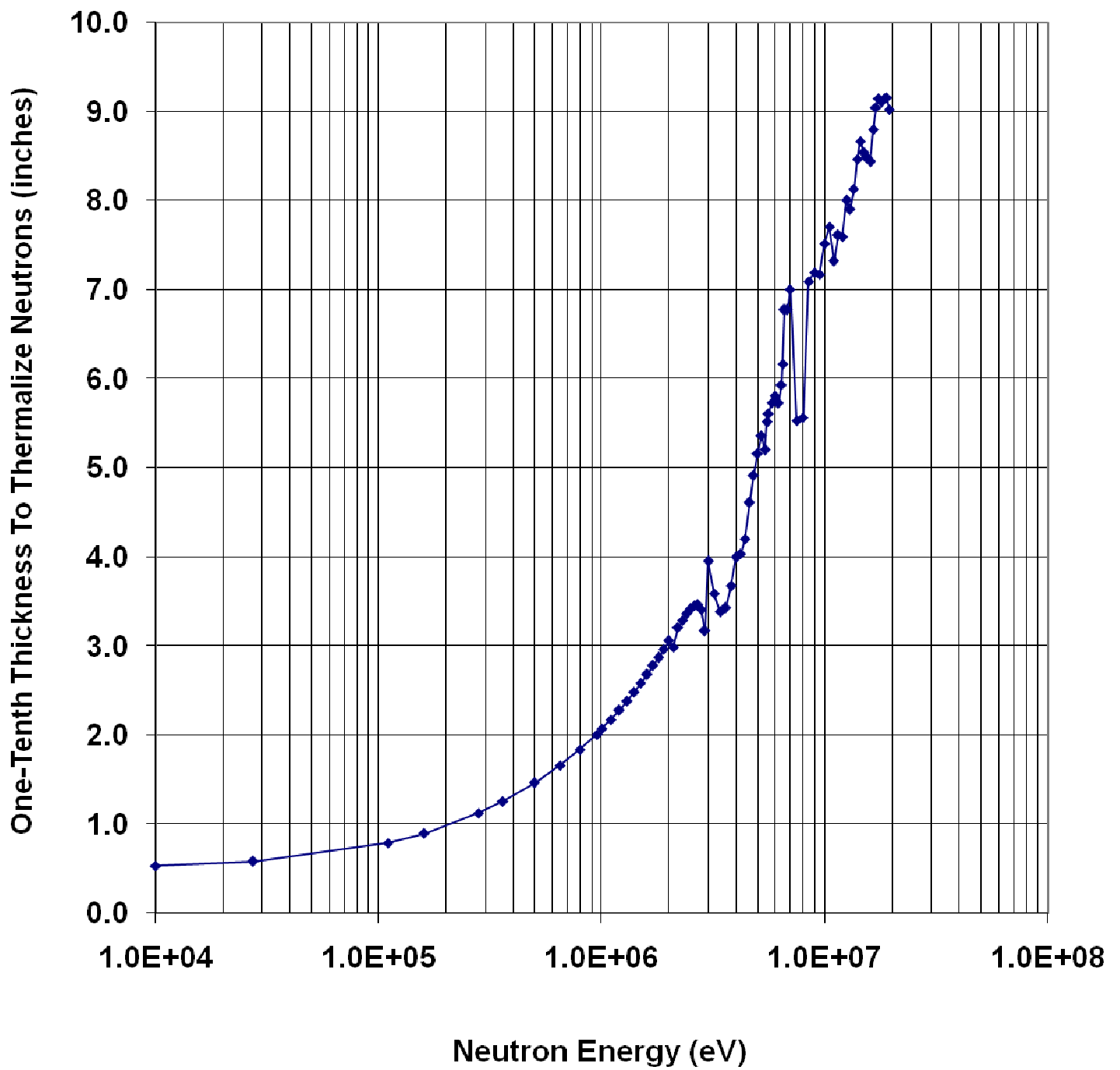
Density: 0.92 gram / cm³ (57 pounds / cubic foot)

Element Composition by Percent Weight:

<u>Element</u>	<u>Percent by Weight</u>	<u>Number of atoms / cm³</u>
hydrogen	14.37%	7.8 x 10 ²²
carbon	85.63%	3.9 x 10 ²²
	100.00%	



Gamma Absorption One-Tenth Thickness (inch)
8.718



Neutron Thermalization One-Tenth Thickness (inch)
33.12

For gamma and neutrons energies selected, thickness in INCHES of SWX-213 required to reduce incident radiation by a factor of 10 (exit radiation dose rate is 10% of incident radiation dose rate)

SWX-213 One-Tenth Thickness (inches) for Specified Gamma and Neutron Maximum Energies: 8.718

Total Thickness of SWX-213 Shielding Required to Achieve Specified Fraction of Allowed Transmitted Radiation

Note that from NRC Report No. 51:

Controlled Areas Allowable dose-limit rate is 2.5 millirem per hour
 Noncontrolled Areas Allowable dose-limit rate is 0.25 millirem per hour

Number of One-Tenth Thicknesses	4 Fraction of Incident Radiation Transmitted	34.871 Thickness of SWX-213 (inches)
1	1.0E-01	8.718
2	1.0E-02	17.436
3	1.0E-03	26.153
4	1.0E-04	34.871
5	1.0E-05	43.589
6	1.0E-06	52.307
7	1.0E-07	61.024
8	1.0E-08	69.742
9	1.0E-09	78.460
10	1.0E-10	87.178
11	1.0E-11	95.895
12	1.0E-12	104.613
13	1.0E-13	113.331
14	1.0E-14	122.049
15	1.0E-15	130.766
16	1.0E-16	139.484
17	1.0E-17	148.202
18	1.0E-18	156.920