

Radiation Shielding Glasses

Product Information

SCHOTT offers a selection of specifically developed Radiation Shielding Glasses in the density range from 2.5 to 5.2 g/cm³ for applications in nuclear energy production and nuclear waste treatment. Two of these five glass types are doped with CeO₂ in order to avoid radiation-induced discoloration (“browning”).

The glasses are optimized in terms of high initial transmission, radiation, discharge resistance and different shielding behaviour. Customized radiation shielding windows for all kinds of nuclear installations can be designed covering a wide range of requirements.

SCHOTT employs the same production equipment and processes as used for the production of optical glasses assuring outstanding high quality standards.

Applications

Glass blocks and plates for radiation shielding windows to be used in:

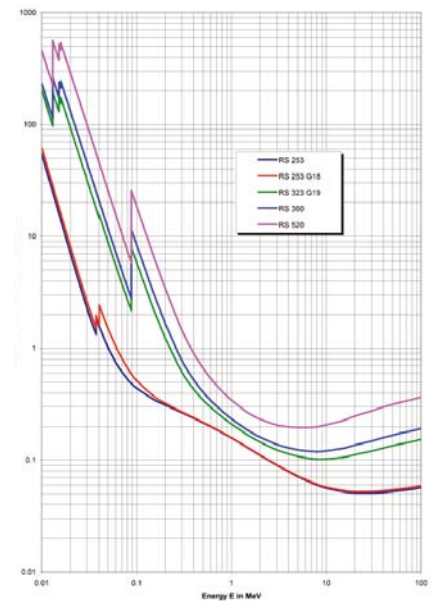
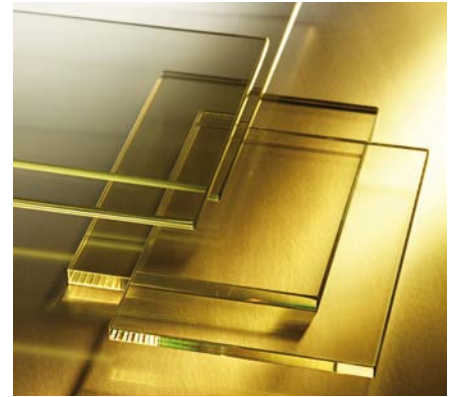
- Nuclear power plants
- Reprocessing plants
- Waste treatment facilities
- Nuclear research institutes
- Isotope production facilities
- Glove boxes

Supply Forms

Radiation Shielding Glasses are supplied as finished blocks and plates (window faces visual grade polished, lateral faces ground) ready for installation into shielding window frames.

Advantages

- Superior internal transmission
- Outstanding internal quality (bubbles/inclusions/striae)
- Different shielding behavior allows custom window design
- Enabling designs with very long service lifetime without failure due to discoloration or electrostatic discharge
- Improved neutron attenuation in case of shielding windows for concrete walls



Linear Attenuation Coefficients of SCHOTT Radiation Shielding Glasses



Characteristics of SCHOTT Radiation Shielding Glasses

General characteristics	RS 253	RS 253 G18	RS 323 G19	RS 360	RS 520
Minimum density ρ [g/cm ³]	2.50	2.52	3.26	3.60	5.18
PbO – content [weight-%], synthesis	0	0	33	45	71
CeO ₂ – content [weight-%], synthesis	0	1.8	1.8	0	0
Linear attenuation coefficients [cm ⁻¹]					
E = 0.2 MeV	0.32	0.33	1.25	1.72	3.54
E = 0.662 MeV (¹³⁷ Cs)	0.19	0.19	0.28	0.32	0.50
E = 1.25 MeV (⁶⁰ Co)	0.14	0.14	0.18	0.21	0.30
Pb – equivalents					
E = 0.2 MeV	0.03	0.03	0.11	0.16	0.32
E = 0.662 MeV (¹³⁷ Cs)	0.16	0.16	0.24	0.27	0.42
E = 1.25 MeV (⁶⁰ Co)	0.22	0.22	0.29	0.32	0.46
Application limits					
with respect to discoloration; total dose [Gy]	1 × 10 ³	1 × 10 ⁸	> 1 × 10 ⁸	1 × 10 ³	1 × 10 ³
with respect to discharge; discharge threshold (induced discharge), total dose [Gy]	–	> 1 × 10 ⁸	> 1 × 10 ⁸	–	–
Optical characteristics					
Refractive index n_d	1.52	1.52	1.59	1.62	1.81
Dispersion n_d	64.2	63.5	39.9	36.4	25.4
Residual reflection loss per surface [%]	4.25	4.25	5.1	5.6	8.3
Internal transmission τ_i (100 mm)					
for $\lambda = 546.1$ nm	0.987	0.895	0.880	0.992	0.984
for $\lambda = 589.3$ nm	0.985	0.925	0.925	0.993	0.985
for $\lambda = 632.8$ nm	0.981	0.941	0.940	0.990	0.981
Dimensions					
Max. glass size	1600 x 1100 mm ² or 1360 x 1360 mm ²				
Maximum weight [kg/slab]	1300	1300	1650	2000	2000
larger dimensions and weights upon request					

