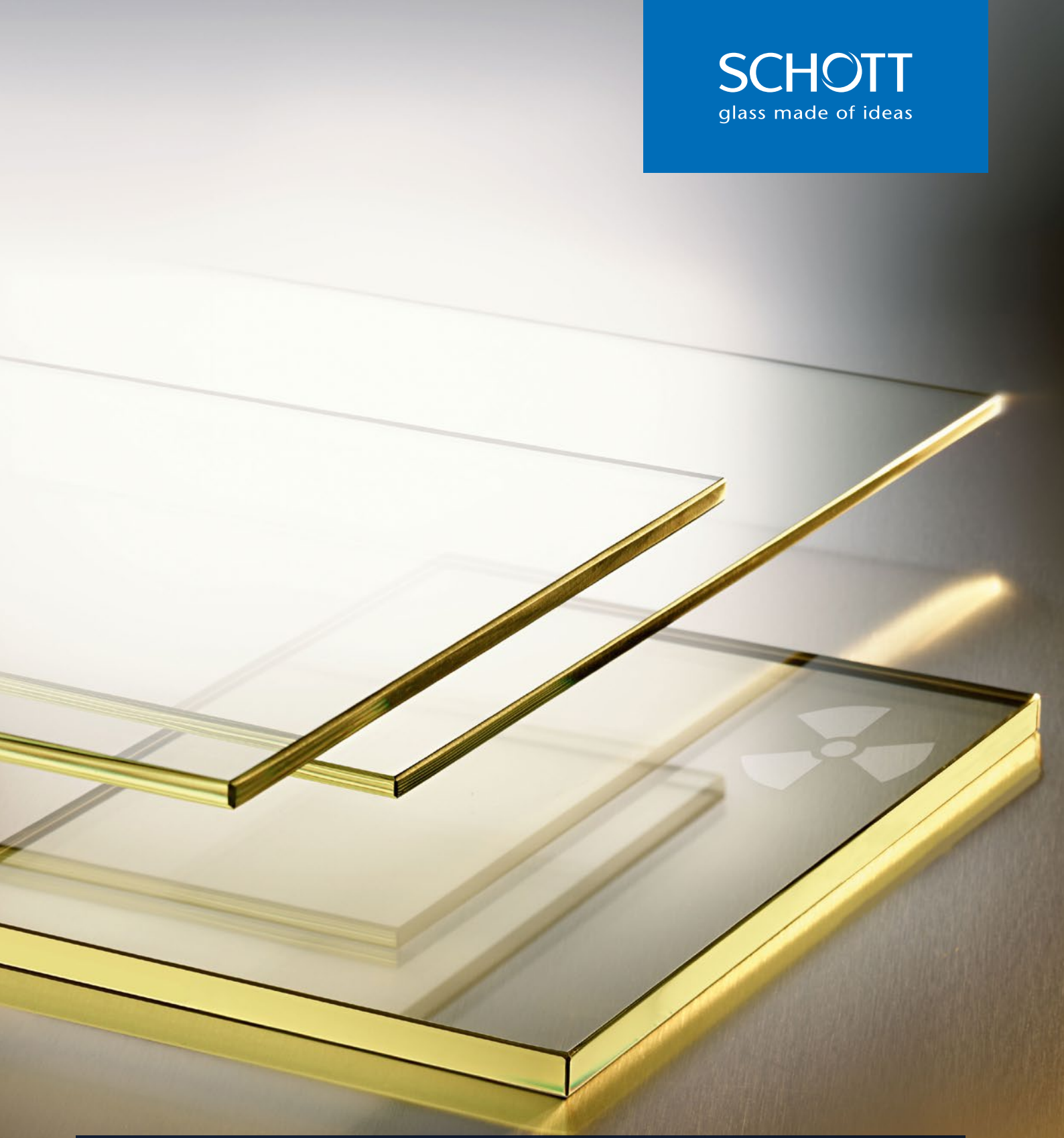
SCHOTT
glass made of ideas

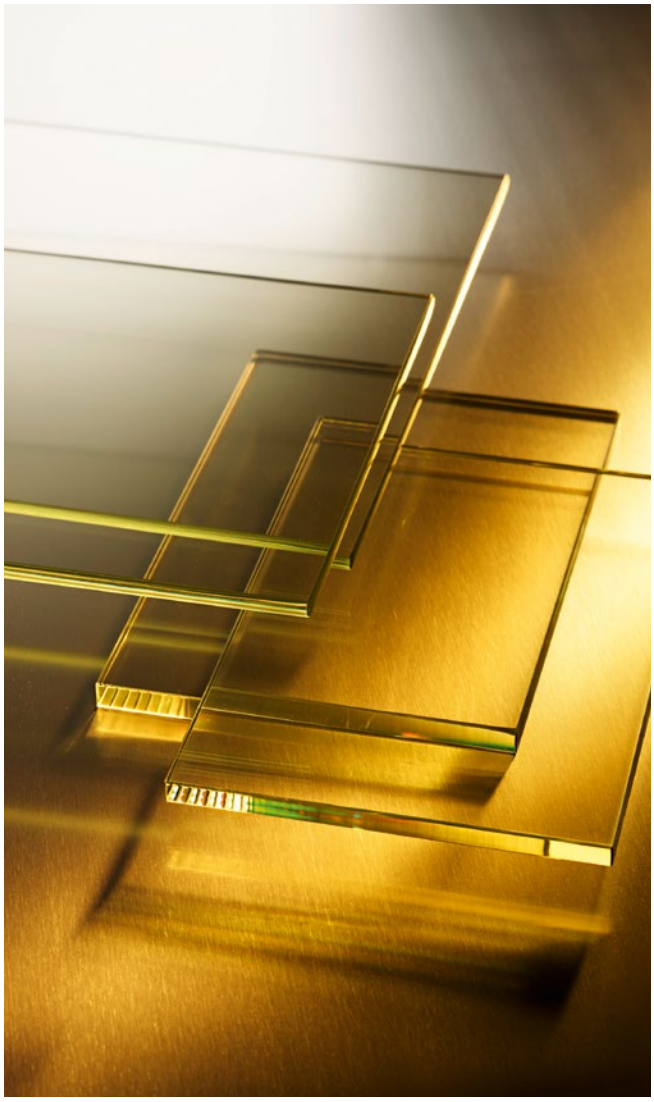


Radiation Shielding Glass

RD 30® | RD 50®

SCHOTT is a leading international technology group in the areas of specialty glass and glass-ceramics. With more than 130 years of outstanding development, materials and technology expertise we offer a broad portfolio of high-quality products and intelligent solutions that contribute to our customers' success.

Together with architects and designers, SCHOTT expands the boundaries of design and creates new opportunities for building culture. In terms of form and space, outside and indoors, aesthetics and function. This makes SCHOTT a qualified partner in the field of architecture.



Types of radiation – Protect yourself with Radiation Shielding Glass from SCHOTT

Radiation results from radioactive decay processes, and when atomic nuclei strike the Earth's upper atmosphere. It can escape from soil, or spring water, or be generated in vacuum tubes under high voltage. Radiation can be life-threatening or life-saving for human beings. The best-known types of radiation are alpha, beta and gamma radiation that are used in some medical therapy, as well as X-ray radiation, which is commonly used in diagnostics.

Radiation can speed up the healing process, and make it possible to provide more accurate and faster diagnoses. But, if rays penetrate human tissue, there is a danger that it will damage tissue and organs. The hazards vary depending on the type of radiation, and the dosage. Therefore, when using radiation, people must protect themselves against possible damage with RD 50® and RD 30® Radiation Shielding Glass from SCHOTT.

SCHOTT Radiation Shielding Glass provides protection in different versions, depending on needs.

Ensuring safety together in difficult situations.
Only the best planning and quality ensures the best results.

SCHOTT Radiation Shielding Glass provides excellent protection against gamma and X-rays. When it comes to shielding harmful radiation, no compromises are possible. This is why more and more customers in the fields of medicine, science, and industry are relying on radiation shielding glass from SCHOTT. Security made in Germany.

Always in contact with the customer

SCHOTT is the only company in **Germany** that manufactures radiation shielding glass, and processes it directly in an expert manner. This means maximum safety and quality for our customers. SCHOTT stands for comprehensive advice and great flexibility when it comes to meeting specific requirements and special requests, as well as excellent service. Thanks to thorough installation- and maintenance instructions, you are on the safe side with SCHOTT, even after you make your purchase.

You will benefit at every level from the synergy that comes from our consulting expertise and a broad range of products. SCHOTT has individual solutions for you. We are here to help you at all stages of your project. Be convinced of our products, our processing expertise, our fast delivery and our quality service. This makes us a competent partner for your projects.

Rely on quality and safety made in Germany.

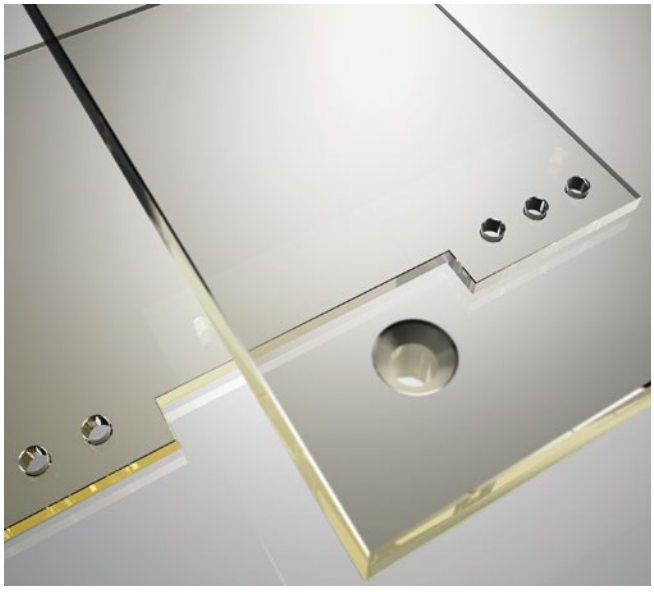
Versatile use in medicine, science, and industry

SCHOTT X-ray protection glasses are used in many areas of medicine, science, and industry, in particular in X-ray rooms, operating rooms, radiation stations, dental practices, radiology practices, laboratories, and in material testing – in “glove boxes”, for example. SCHOTT Radiation Shielding Glass can be used in viewing windows, doors, and panoramic glazing. Solutions based on SCHOTT Radiation Shielding Glass are the first choice for architects, planners, and designers in realizing their projects in the areas just mentioned. RD 50® meets the requirements of DIN EN 61331-2 and IEC 61331-2. RD 30® is often used in medical devices.

A mobile shield made of RD 30® glass, for example, allows you to be close to the patient during mammography. Design engineers choose it in apparatus engineering, which must meet specific requirements. SCHOTT supplies RD 30® and RD 50® in maximum dimensions in every geometric shape. Upon request, SCHOTT processes its radiation shielding glasses in different ways. Depending on the application, either RD 50® or RD 30® can be used. The value “50” stands for a density of at least 5.05 g/cm^3. The “30” stands for a density of at least 3.13 g/cm^3.

SCHOTT Radiation Shielding Glass RD 30®.

Working together with medical technology designers to realize ideas without any compromises.



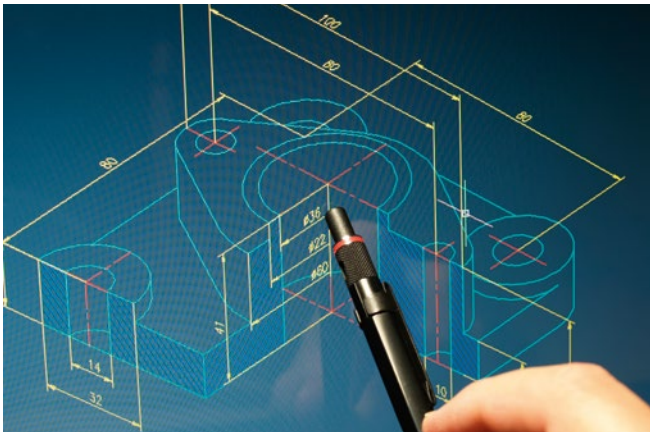
SCHOTT Radiation Shielding Glass: Bored holes and cut-outs in the sizes you need are also available.

Many reputable manufacturers in the field of mammography choose RD 30® from SCHOTT.

Radiation shielding glass for your specific application

SCHOTT supplies RD 30® in maximum dimensions in every geometric shape. A key feature of RD 30® is that it is the only monolithic X-ray protection glass with 0.5 mm Pb.* Upon request, SCHOTT processes radiation shielding glasses into various versions:

edge and bevel grinding, holes and cut-outs are just as possible as further processing into a glass composite that performs additional functions. Only RD 30® can also be bent and toughened into different versions. RD 30® can be further processed with cast resin, pvb-film laminates, insulating glass, and be designed using screen printing. As an extra service, SCHOTT will provide you with the contact details of suitable suppliers in your area – regardless of whether you need care products, sealing materials and profiles or other accessories. Please contact us.

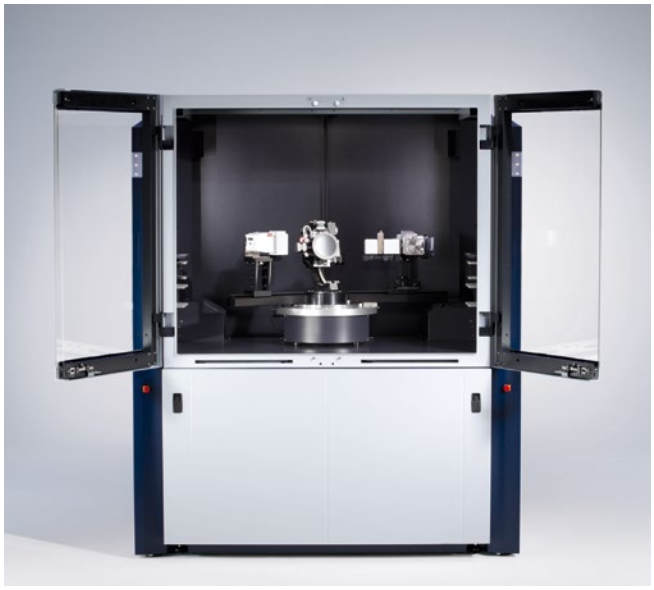


Benefit from the advantages that RD 30® offers already in the design phase.

Realize product innovations with RD 30®

RD 30® offers planners, equipment manufacturers, designers and accessory suppliers in the field of radiation shielding completely new possibilities and benefits for their developments. For instance, RD 30® is available in larger dimensions. Furthermore, it is non-flammable and more scratch resistant than acrylic. It is an ideal material that can be integrated perfectly into your designs.

* RD 30® with a thickness of 6 mm, status: October 2015



SCHOTT Radiation Shielding Glass in analytical apparatus.

This is unique to SCHOTT RD 30®:

- RD 30® is the only monolithic X-ray protection glass with 0.5 mm Pb.*
- RD 30® can be bent into different versions and is also available as toughened glass.

Other advantages of SCHOTT RD 30®

- RD 30® is available in large sizes.
- RD 30® is non-flammable.
- RD 30® is more scratch-resistant than acrylic.
- Higher lead equivalents can be achieved by using composites.
- RD 30® is available with holes and cut-outs in desired sizes needed.
- RD 30® can be processed into insulating glass in combination with e. g. soundcontrol or a heat protection function.

RD 30®: Lead equivalents in mm Pb and delivery dimensions

Thickness d mm	Attenuation equivalent in mm Pb at a tube voltage of:						Max. weight kg / m²	Max. dimensions mm × mm
	50 kV	56 kV	76 kV	80 kV	110 kV	150 kV		
6.0 ± 0.25	≥ 0.5	≥ 0.5	≥ 0.5	≥ 0.5	≥ 0.5	≥ 0.5	20	2,350 × 1,500

Technical data for RD 30®

Optical properties

Refractive index n_e at 20 °C (annealed at 40 °C/h)	1.579
Light transmittance (d = 6.0 mm)	90.5 %

Chemical properties

Hydrolytic class according to DIN ISO 719	HGB 3
Lead oxide content (PbO)	≥ 22 %
Total heavy metal content	≥ 23 %

Mechanical properties

Density in g/cm³ (as-delivered condition)	≥ 3.13

Other properties

Glass thickness	6.0 mm
Evaluated sound insulation value R_w	
Spectral adaptation values C and C_{tr}	
R_w (C; C_{tr}) =	34 (–2; –2) dB

SCHOTT Radiation Shielding Glass RD 50®.
Plan together with architects and find the ideal solutions.

Extensive use of SCHOTT Radiation Shielding Glass.

Crystal clear and effective
Thanks to its high density, RD 50® offers high X-ray absorption even with relatively thin glass, and meets the requirements of the German Institute for Standardization, European Standardization and the International Electrotechnical Commission.

Radiation Shielding Glass made to measure
Upon request, SCHOTT processes its Radiation Shielding Glasses into various versions: edge and bevel grinding, holes and cut-outs are just as possible as further processing into a glass composite that performs additional functions. Like RD 30®, RD 50® can also be processed with cast resin, pvb-film laminates, insulating glass, and be designed using screen printing. We deliver RD 50® in maximum dimensions in every geometric shape. SCHOTT can also provide you with the contact details of suitable suppliers in your area for RD 50®, regardless of whether you need care products, sealing materials and profiles or other accessories.

SCHOTT RD 50® for PET applications
Due to its special composition, RD 50® is also ideal for use in PET applications, and offers an excellent protective effect. RD 50® can thus be used in combination with PET and CT.

This is unique to SCHOTT RD 50®
- RD 50® is the monolithic X-ray shielding glass with the widest range of thicknesses.
- RD 50® provides high X-ray absorption even with thin glass.
- RD 50® can be supplied in different versions, including bent shapes, and as toughened glass.

Other advantages of SCHOTT RD 50®
- RD 50® is available in large sizes.
- RD 50® is non-flammable.
- RD 50® is more scratch-resistant than acrylic.
- Higher lead equivalents can be achieved by using composites.
- RD 50® is available with holes and cut-outs in the desired sizes.
- RD 50® can be processed into insulating glass in combination with soundcontrol or heat protection functions, for example.

RD 50®: Lead equivalents in mm Pb for X-ray quality and maximum delivery dimensions

Min. thickness d mm	Max. thickness d mm	Attenuation equivalent in mm Pb at a tube voltage of:					Max. weight kg / m²	Max. dimensions mm × mm
		80 kV	100 kV	110 kV*	150 kV	200 kV		
5.0	7.0	1.5	1.5	1.5	1.5	1.4	35	2,000 × 1,000
7.0	9.0	2.1	2.1	2.1	2.1	2.0	45	2,400 × 1,220
8.5	10.5	2.6	2.6	2.5	2.5	2.4	53	2,400 × 1,220
10.0	12.0	3.1	3.1	3.0	3.0	2.9	61	2,400 × 1,220
11.5	14.0	3.5	3.6	3.5	3.5	3.3	71	2,400 × 1,220
16.0	19.0	–	5.0	4.9	4.9	4.6	96	2,400 × 1,220
20.0	23.0	–	6.3	6.1	6.1	5.8	116	1,500 × 1,220

* no tube voltage acc. to DIN EN 61331-1; other tube voltages upon request.

RD 50®: Lead equivalents in mm Pb for radionuclides

Nuclide	Attenuation equivalent in mm Pb with a thickness d of:							
	4.0 mm	5.0 mm	7.0 mm	8.5 mm	10.0 mm	11.5 mm	16.0 mm	20.0 mm
C-11, N-13, O-15, F-18	1.4	1.8	2.6	3.1	3.7	4.2	5.9	7.4
Co-58	1.6	2.0	2.8	3.4	4.0	4.6	6.4	7.9
Co-60	1.7	2.2	3.1	3.7	4.4	5.1	7.1	8.9
Fe-59	1.7	2.2	3.1	3.7	4.4	5.1	7.0	8.8
Tc-99m	1.1	1.4	2.0	2.4	2.9	3.3	4.6	5.7

Technical data for RD 50®

Optical properties

Refractive index n_D at 20 °C	1.79
Light transmittance (d = 5.0 mm)	85 %

Chemical properties

Hydrolytic class according to DIN ISO 719	HGB 1
Lead oxide content (PbO)	≥ 65 %
Total heavy metal content	≥ 70 %

Mechanical properties

Density in g/cm³ (as-delivered condition)	≥ 5.05

Other properties

Glass thickness	8.1 mm*
Evaluated sound insulation value R_w	
Spectral adaptation values C and C_{tr}	
R_w (C; C_{tr}) =	41 (–3; –3) dB

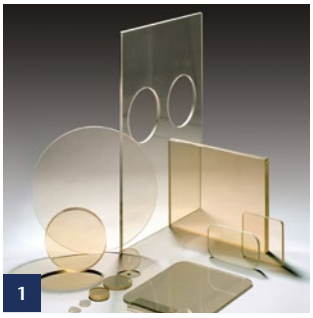
* Sound reduction values for other thicknesses upon request.

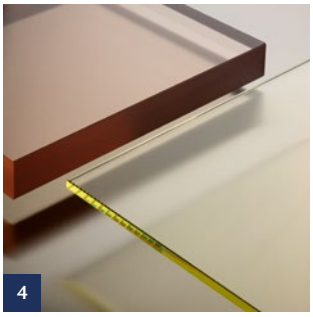
SCHOTT Radiation Shielding Glass RD 30® and RD 50®.
Let's use all of the possibilities of the material together.

Know what it takes
Take advantage of the characteristics of our outstanding X-ray shielding glasses, and combine their extraordinary product benefits to meet your wishes in order to achieve the best possible results.

Take advantage of the wide variety of processing possibilities

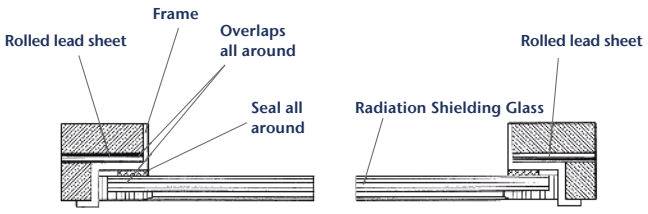
1 Make sure the next step gives your customer as little work as possible: bored holes and cut-outs available in the sizes you need.
2 RD glass comes in a curved shape upon request.
3 Screen printing application and sandblasting: Logos and important information can also be applied individually.
4 RD 50® is much thinner than acrylic glass yet has the same effect.



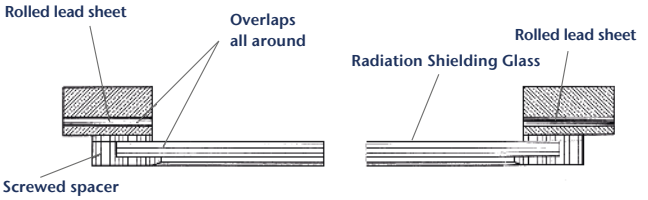


Disinfection of radiation shielding glass
- Only use water, a mild detergent and a soft cloth.
- RD 50® and RD 30® can be disinfected using commercially available disinfectants that Schott has approved. Disinfection using ultraviolet irradiation is also possible.
- Radiation shielding glass should never be exposed to moisture or temperature fluctuations in conjunction with moisture and acidic air.
- Only use a sealant that is free of acids and alkaline substances (e. g. acetic acid, ammonia) during installation. Adhesive labels can cause discoloration if the adhesive reacts with the glass surface.
- Do not remove the protective film from Radiation Shielding Glass RD 50® until immediately before installation. Do not use any sharp objects to remove it

Window or door installation with Radiation Shielding Glass
Please follow the on-site requirements of DIN 6812 when installing RD 50®. Sufficient radiation protection overlap must definitely be ensured during installation.



Version with a seal



Version without a seal (Diagnostic communication window)

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