

## GAMMA RAY SHIELDING GLASS

Pro-GR lead shielding glass was developed to protect against high radiation gamma rays used in PET scan facilities. An observation window of a PET scan facility requires higher radiation shielding performance than that of a conventional X-ray or CT room (0.511 MeV). Pro-GR is made of glass materials having a lead oxide content rate of roughly 70% that is equivalent to ultra-high lead content block glass for nuclear power facilities. Pro-GR has a radiation shielding capability higher than that of conventional LX-57B, x-ray shielding glass.



## APPLICATIONS

- PET treatment facilities

## PRODUCT DATA

	PRO-GR 14.7	PRO-GR 21.8
Thickness (mm)	14.7	21.8
Effective Dose Transmission Factor* (%)	52.6	36.0
Lead Equivalent (mmPb)	5.0	7.5
Maximum Size (mm)	1,000 x 1,500	1,000 x 1,500
Specific Gravity	Min. 5.20	Min. 5.20
Knoop Hardness	320	320
Visible Light Transmission	83%	83%

\*Values for effective dose transmission factor and lead equivalent are for gamma rays (0.511 MeV)

Note: "Seeds" or minute air bubbles exist inside Pro-GR as it is made of special glass materials. This, however, does not adversely affect its radiation shielding performance.

## SHIELDING PERFORMANCE AGAINST GAMMA RAYS

In calculating the shielding performance of Pro-GR against 0.511 MeV gamma rays, the Monte Carlo simulation is used to calculate the build-up factor of Pro-GR glass, and calculates the effective dose transmission factor in accordance with the *Manual for Shielding Calculation of Radiation Facilities*, 2000 (issued by the Nuclear Safety Technology Center). In calculating the lead equivalent of Pro-GR, the thickness of Pro-GR was designed so that the effective dose transmission factor is equivalent to the effective dose transmission factor of lead calculated by taking the build-up factor into account as shown in the following table.

## EFFECTIVE DOSE TRANSMISSION FACTOR OF LEAD FOR 0.511 MEV GAMMA RAYS AND THICKNESS OF PRO-GR CORRESPONDING TO EACH THICKNESS OF LEAD

LEAD		PRO-GR	
Thickness	Effective Dose Transmission Factor	Pro-GR Thickness Recommended (Corresponds to Lead Effective Dose Transmission)	Recommended Product
5.0 mm [1.21]	52.6	14.2 mm [1.33]	Pro-GR 14.7 mm
7.5 mm [1.25]	36.0	21.3 mm [1.45]	Pro-GR 21.8 mm

Note: Numbers in brackets [ ] are reference values and are the build-up factors of Lead and Pro-GR.

In the case of 0.2 MeV X-Rays, the effective dose transmission factor of lead at 5mm thickness is 0.48% and 7.5mm is .0.033%.