kuraray

Radiation Shielding Material

KYOWAGLAS-XA™

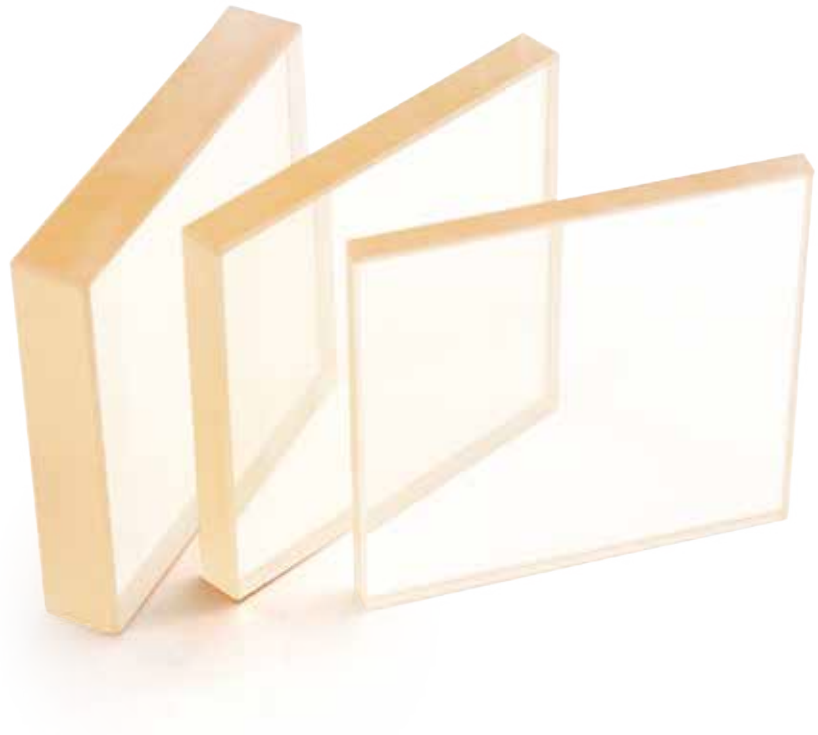
Transparent Lead-Acrylic Sheet

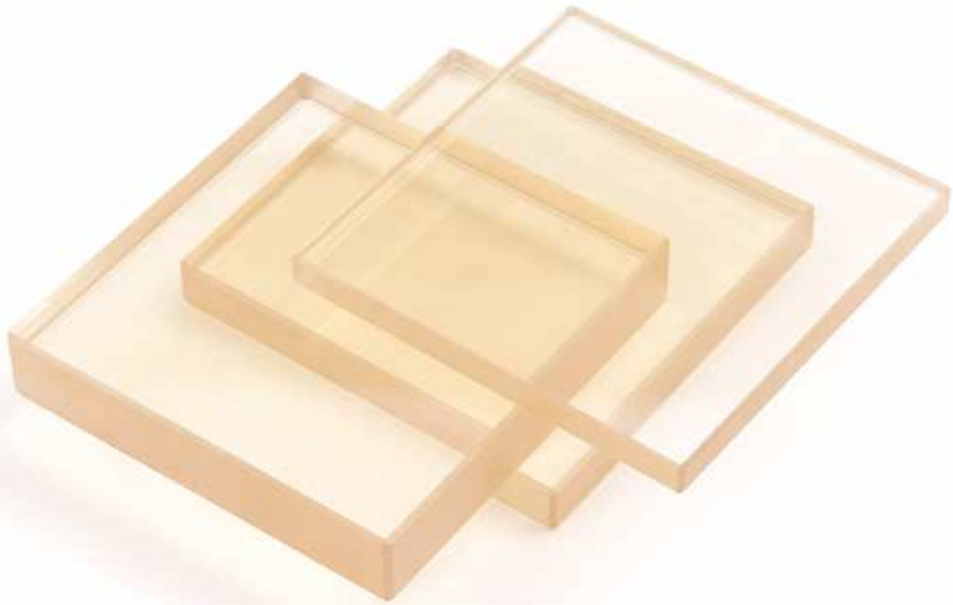
KYOWAGLAS-XA™

KYOWAGLAS-XA™ is a transparent lead-containing plastic sheet manufactured by chemically introducing lead into the resin by co-polymerization. This is a radiation shielding material developed by Kuraray Co., Ltd., by its own technology, for the first time in the world. KYOWAGLAS-XA™ has been used in such wide fields as medical, dental, atomic power, etc. by its “easy handling” characteristic and excellent radiation shielding ability.

Features of KYOWAGLAS-XA™

1. **Variety of lead-equivalency** — Lead-equivalency is selectable for different uses.
2. **Durability** — Shatter-resistance is excellent.
3. **Fabrication** — Machining, bending and gluing are feasible.
4. **Transparency** — Light transmission is excellent with low reflection.
5. **Radiation-resitance** — Original physical property is almost thoroughly maintained after 1,000Gy exposure.





Grade	Lead-equivalency (mmPb※)	Light transmission (%)	Thickness (mm)	Maximum sizes (mm)
H-8	0.3 or over	80 or over	8.5±0.7	1830×2440
H-12	0.5 or over	75 or over	12.0±1.0	1830×2440
H-18	0.8 or over	70 or over	18.5±1.2	1830×2440
H-22	1.0 or over	65 or over	23.5±1.5	1830×2440
H-35	1.5 or over	75 or over	35.0±2.0	1830×2440
H-46	2.0 or over	70 or over	46.5±2.5	1830×2440
H-70	3.0 or over	65 or over	70.0±3.0	1220×2440

· If lead-equivalency under 0.3mmPb is required, please contact with us.
· Sizes up to the maximum can be supplied as your choice. Longer sizes than the maximum are also available on special order.
· Following fabrications are available on request.
Drilling and other machining (disc formation, glove port)
Polishing (edges)　Bending　Bonding
※ X-ray tube voltage 50～250kV

Applications

In medical and dental field

- Viewing window for X-ray room, CT room and cardiac catheterization room
- Mobile barrier for radiation shielding
- Fixed barrier for radiation shielding
- Face guard for radiation shielding
- Parts (shielding panel) for mammography and mobile X-ray equipment
- Radiation shielding booth and door for dental X-ray equipment
- X-ray compensation filter, etc.

In atomic energy field

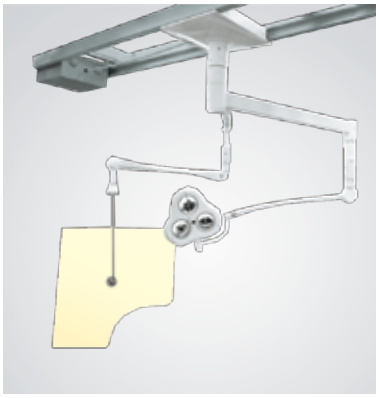
- Front panel of glove box
- Mobile barrier, etc.

In scientific field

- Parts (doors) for X-ray diffraction equipment, etc.

Viewing window for CT room

Front panel of glove box



Fixed barrier for X-ray radiation shielding system

FDG administration radiation shielding table

Mobile barriers for radiation shielding

PET counseling desk

Physical properties

Physical properties

	Unit	H-12	H-35
Tensile strength JIS K7162	[MPa]	53	40
Tensile modulus JIS K7162	[MPa]	2000	1600
Elongation ・ JIS K7162 (Yield point・Tensile strain at tensile strength)	[%]	6	37
Flexural strength JIS K7171	[MPa]	66	64
Flexural modulus JIS K7171	[MPa]	2100	1800
Rockwell hardness JIS K7202-2	[M-scale]	88	63
Izod impact strength(Notched) JIS K7110	[KJ/㎡]	2.6	3.7
Heat deflection temperature JIS K7191-2	[℃]	71	65
Coefficient of linear thermal expansion JIS K7197	[cm/ (cm・℃)]	1×10^{-4}	1×10^{-4}

All data presented herein is based on measurements performed by Kuraray Co., Ltd. and other reliable information. However, the measurements are not guaranteed as they vary depending upon actual usage and conditions.

When adopting our products, review the viability of the materials by referring to our data.

Contents herein are created based on documents, information and data available at the time of publication and are subject to change according to new findings and data without notice.

If certification is required for nuclear application, please confer with us.

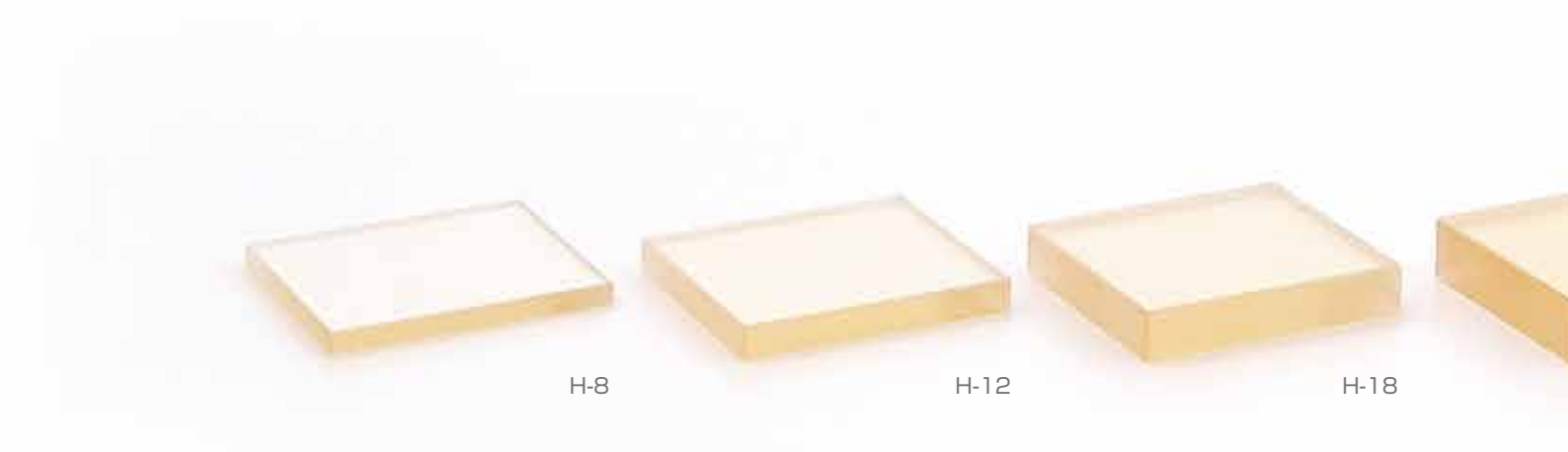
All data presented herein is based on Japanese Industrial Standards（JIS）.If you have any questions regarding other standards, please contact with us.

Optical properties

	Unit	H-12	H-35
Refractive index ・ JIS K7142	[—]	1.55	1.55
Surface reflectivity ・ JIS K7375	[%]	11.2	6.7

Retention of physical properties and discoloration after exposure

	Unit	Absorbed dose	H-12	H-35
Flexural strength JIS K7171	[MPa]	0Gy	66	64
		100Gy	77	73
		500Gy	75	82
		1000Gy	78	83
Flexural modulus JIS K7171	[MPa]	0Gy	2100	1800
		100Gy	2100	2000
		500Gy	2100	2300
		1000Gy	2200	2300
Izod impact strength JIS K7110	[KJ/㎡]	0Gy	2.6	3.7
		100Gy	2.8	3.6
		500Gy	2.5	3.8
		1000Gy	2.5	3.5
Discoloration (⊿E∗ab) (Hunter's color difference)		100Gy	0.6	2.5
		1000Gy	2.2	7.6



H-8　H-12　H-18

General Precautions

For the safe use of KYOWAGLAS-XA™, be sure to read the Safety Data Sheet (SDS) beforehand.

KYOWAGLAS-XA™ is made of metallic methacrylate resin. It is thermoplastic, combustible and a soluble resin that is part organic solvent. Observe the following precautions when handling.

1. Fire

- KYOWAGLAS-XA™ is made of combustible thermoplastic resin.
- Ignition temperature is approximately 400 degrees centigrade. Treat with great care against fire as it will combust if it comes in to close proximity to an open flame or high temperature heat source.
- Combustion may produce toxic fumes such as carbon monoxide. Avoid inhalation.
- Foam, dry chemical and carbon dioxide extinguishers can be used to extinguish fire.

2. Safety

- Wear protective gear such as gloves and goggles when handling.
- Watch out for sharp edges.
- If damaged, take precaution against cuts and friction on sharp angles.

3. Handling

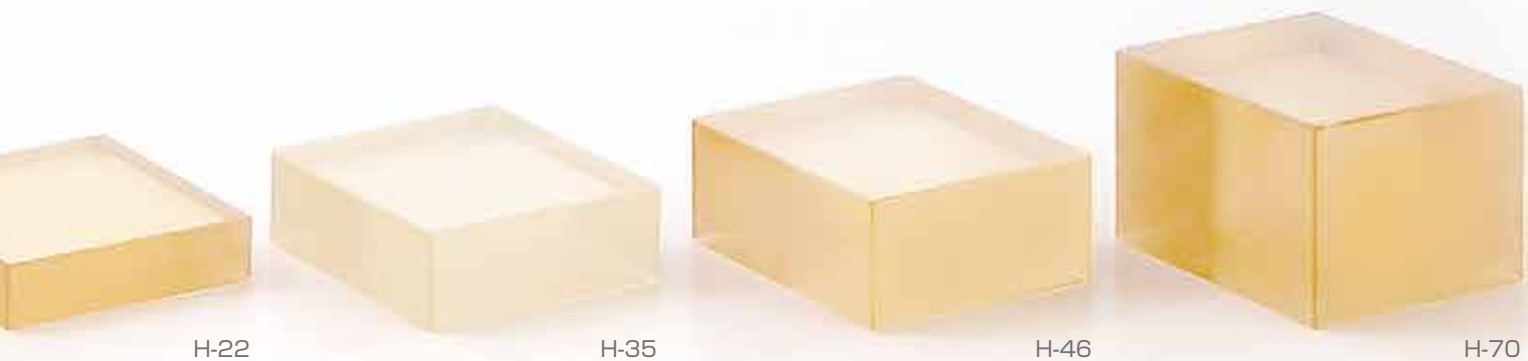
- KYOWAGLAS-XA™ will warp when exposed to temperatures over 70 degrees centigrade. Use and store at temperatures below 50 degrees centigrade.
- Both sides of KYOWAGLAS-XA™ panel are protected by masking paper. Do not remove this paper until the panel is mounted in its final position to prevent possible scratches and adhesion of dust. Wear protective gear (gloves, goggles, etc.) to protect the hands and the surface of KYOWAGLAS-XA™ when handling.
- Debris, dust and dirt on KYOWAGLAS-XA™ should be removed with a soft cloth moistened with a solution of water and 1% mild detergent or water.
- Damage such as clouding and minute cracks may appear on the surface of KYOWAGLAS-XA™ caused by solvents and coating. Do not store the panel in a place where there is solvent fume such as a paint storage room and keep it in a clean area.
- The color of KYOWAGLAS-XA™ H-35, H-46, and H-70 will become darker over time, but this will not affect the X-ray shielding performance.

4. Storage

- Store KYOWAGLAS-XA™ in a room with no direct sunlight at room temperature.
- Keep away from ignition source and damp. Extreme difference in temperature may cause a warp.
- To prevent warping while in storage, be sure the panels are stacked in order of size with the largest panel at the bottom when storing them horizontally and keep the stacking height to below 500mm.

5. Disposal

KYOWAGLAS-XA™ contains lead. When disposing, comply with the laws and regulations and delegate the disposal to an authorized industrial waste disposer or local authorities.



H-22 H-35 H-46 H-70

＊The photographs are for illustrative purposes only.

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