

# X-RAY Windows

## DuraBeryllium™ X-ray Windows

MOXTEK DuraBeryllium windows are the highest performing beryllium windows available. DuraBeryllium windows have high x-ray transmission, are vacuum tight, and corrosion resistant. DuraBeryllium windows can be attached with a high temperature bond or using low outgas epoxy. MOXTEK Beryllium windows are used in a variety of applications including *microanalysis*, *EDXRF*, *WDXRF*, and *XRD*.



### Applications

- Microanalysis
- EDXRF
- WDXRF
- XRD

### Features

DuraCoat  
Thin DuraBeryllium  
Uniform Thickness  
Vacuum Tight

### Benefits

Corrosion resistance, hermetic seal  
High transmission of low energies  
Uniform transmission  
No gas diffusion

### Window Composition

DuraBeryllium windows include a proprietary coating process to make the window vacuum-tight and chemically resistant. This foil, protected with a refractory low-Z coating that makes it resistant to atmospheric moisture and chemicals.

Uncoated beryllium windows are also available.

### Mechanical Strength

DuraBerylliums have the same mechanical strength as uncoated beryllium

### Temperature Performance

Brazed windows can withstand temperatures up to 400°C in vacuum or 350°C in air. Epoxied windows can be exposed to temperatures <110 °C at a differential pressure of 1 atm on approved mount designs.

### Cleanability

DuraBeryllium windows can be cleaned with high purity solvents (methanol, isopropanol, or ethanol are recommended).

### Leak Tightness Specifications

MOXTEK DuraBeryllium windows are guaranteed to have a leak rate of less than  $3 \times 10^{-10}$  mbar L/sec of Helium

### Performance

Hardness: 2000 Vickers  
Electrical Resistivity:  $<4 \times 10^4$  ohm-cm

## Chemical Compatibility

DuraBeryllium windows are resistant to most solvents, acids, and bases while non-coated beryllium windows are not. DuraBeryllium has a thin layer of a refractory material called DuraCoat which is resistant to moisture and many chemicals, including Tetrachloroethylene (TCE). See the following table for a listing of some of the reactants and non-reactants of DuraBeryllium windows.

Etching Reagents <sup>+</sup>	Nominal pH	Etching Rates (nm/min @25°C)
HF	0.80	Negligible
H <sub>2</sub> SO <sub>4</sub>	1.38	Negligible
HNO <sub>3</sub>	1.17	1.09
Acetic Acid	1.80	Negligible
H <sub>3</sub> PO <sub>4</sub>	1.17	0.146
Aqua Regia <sup>++</sup>	1.00	0.14
NH <sub>4</sub> OH + H <sub>2</sub> O <sub>2</sub>	11.40	Negligible
NaOH Solution <sup>*</sup>	13.70	Negligible
Ferricyanide <sup>**</sup>	13.70	165
Permanganate <sup>#</sup>	13.70	900

<sup>+</sup> All solutions are concentrated unless otherwise indicated

<sup>++</sup> Solution is 1M HNO<sub>3</sub>, 3M HCl, 1M H<sub>2</sub>O

<sup>\*</sup> Solution is 0.5M NaOH, 0.6 H<sub>2</sub>O<sub>2</sub>

<sup>\*\*</sup> Solution is 0.6M K<sub>3</sub>Fe(CN)<sub>6</sub>, 0.5M NaOH, 0.02M oxalic acid

<sup>#</sup> Solution is 0.6M K<sub>2</sub>MnO<sub>4</sub>, 0.5M KOH

## Mounting

MOXTEK offers a mounting service for DuraBeryllium windows. The windows can be mounted with epoxy or braze material. Please contact MOXTEK to discuss requirements for active area, differential pressure, and x-ray transmission.

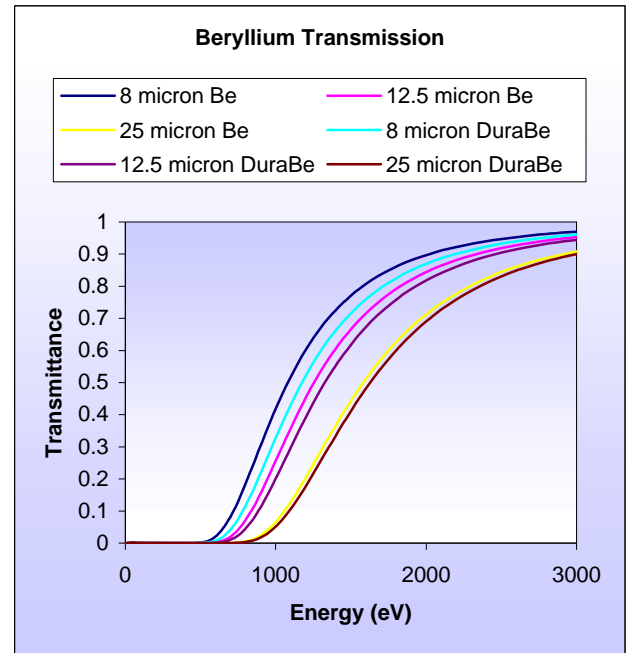
## Standard Foil Sizes

Thickness (µm)	Diameter (mm)
8.0	4.9
8.0	5.7
8.0	7.9
8.0	9.2
8.0	12.0
12.5	12.0
12.5	16.0
25.0	16.0

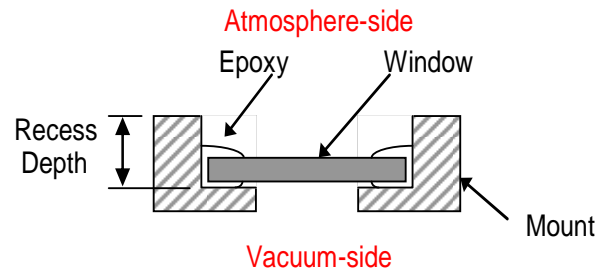
Please contact MOXTEK for custom sizes.

## Transmission Performance

The x-ray transmission of DuraBeryllium is virtually identical to that of bare beryllium. DuraCoat is a proprietary refractory coating material, consisting of elements lighter than sodium.



X-ray Transmission Chart



Typical Epoxy Attachment of Beryllium Window

## Warranty

The standard warranty is 1 year under normal operating conditions.

## Ordering Information

Please, contact MOXTEK for price and delivery information.



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