X-ray Windows

Ultra-thin AP3 X-ray Windows

Datasheet

Mounted AP3 X-ray Window

Applications

X-ray Detectors

- Silicon Drift Detectors (SDD)
- Si(Li) Detectors
- Si-PIN Detectors

AP3 ultra-thin polymer windows are the established standard for performing x-ray windows for low energy x-ray analysis. AP3 windows are ideal for applications that require maximum transmission of low energy x-rays, high mechanical strength, light rejection, vacuum tightness, and reliability. AP3 windows are used in applications where high temperature, light element detection is important and beryllium windows are ineffective (see Figure 1).

Features	Benefits
Ultra-thin polymer film	Maximum transmission of low energy x-rays
Thin aluminum coating	Charge dissipation
	UV, IR and visible light rejection
DuraCoat®	Corrosion resistant, hermetic seal
Silicon support structure	High mechanical strength, durable
High purity	Minimal spectral contamination
Uniform thickness	Consistent transmission across entire window

Window Specifications

Open Area: 77%

Helium Leak Rate: $<1x10^{-10}$ mbar • L/s†

Max. Temp. (1 atm Differential): 40°C

Max. Temp.(Zero Pressure Differential): 70°C

Front Pressure Limit (Atmosphere Side): 2atm

Back Pressure Limit (Vacuum Side): 1atm

† See "Light Rejection and Vacuum Tightness" section below

Light Rejection and Vacuum Tightness

AP3 windows provide good rejection of UV, IR, and visible light. AP3 windows also provide a hermetic barrier to gases. Every window is tested and is guaranteed to have a leak rate of less than 1×10^{-10} mbar • L/s of helium. Helium leak rate is tested by exposing the parts to a minimum of 0.5 SCFH helium sprayed immediately above and around the window on a calibrated helium leak detector for a minimum of 30 seconds. Depending on mount geometry test conditions may need to be adjusted.

Window Composition

AP3 windows are composed of ultra-thin layers of polymer, DuraCoat®, and aluminum. AP3 windows are supported by a silicon support structure designed to add support for the film at a minimal profile (open area = 77%). Moxtek® attaches each window to a mount using vacuum compatible epoxy adhesive.

MOXTEK®

Mechanical Strength

AP3 windows are supported by a rigid silicon grid with 77% open area. This patented window design enables the AP3 window to survive over 10,000 cycles at room temperature and a differential pressure of 1.2atm with no degradation in window performance.

Table 1 Elemental X-ray Transmission of AP3 Windows

Atomic Number	Element	Transmission (Kα) (% of maximum)	
		AP3	AP5
14	Si	74%	73%
13	Al	75%	75%
12	Mg	72%	73%
11	Na	69%	69%
9	F	54%	54%
8	O	47%	47%
7	N	31%	31%
6	C	47%	49%
5	B	29%	23%
4	Be	9%	7%

Table 1 Elemental X-ray Transmission (K**α**) of AP3 Windows

FIgure 1 X-ray Transmission, Film and Grid

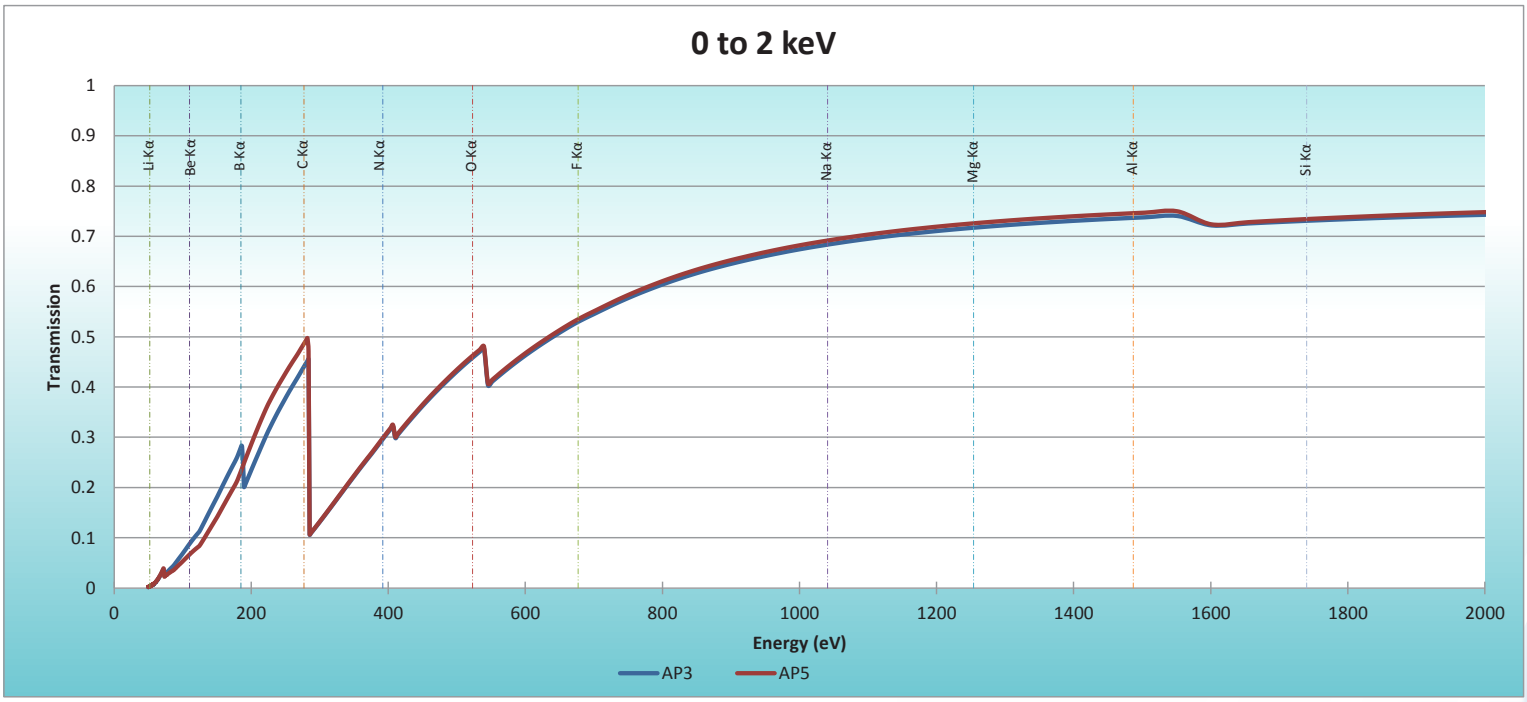

Figure 1 X-ray Transmisson of AP3 and AP5 Windows

Mount Design

Please refer to WIN-TECH-1003 for Ultra-thin AP3 X-ray Window Mount Design requirements, available at www.moxtek.com. Window support structure orientation with proper design is available upon request.

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