



# General Information Data Sheet

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Optical engineers are looking for polarizers that will keep pace with brighter systems and shrinking microdisplays. MOXTEK's ProFlux™ polarizer is the most reliable available for any light engine.

## Durability

ProFlux™ polarizers stand out from the competition in many ways, but the most apparent benefit is their ability to withstand high-intensity optical conditions which destroy or impair other polarizers. Its inorganic composition (glass and Al wires) enables ProFlux™ to withstand high temperature and high brightness better than the competition.

## Reliability Program

ProFlux™ polarizers pass rigorous test conditions without significant change in performance.

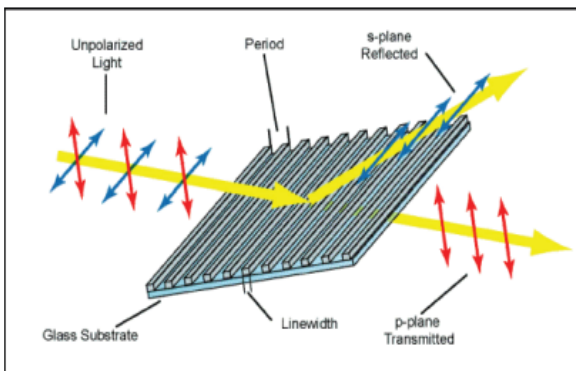
High-Temperature Static Life - 200°C for 5000 hours

Low-Temperature Static Life - -40°C for 1000 hours

Temperature Cycle - -40°C to 60°C with 85%RH for 50 cycles. Each cycle is 3 hours in length and is noncondensing.

Temperature/Humidity - 60°C temperature and 85% Relative Humidity for 500 hours. Test conditions are noncondensing.

Aluminum Wire Adhesion - Adhesion Test Mil Std C-48497A(3) using pressure sensitive adhesive tape.

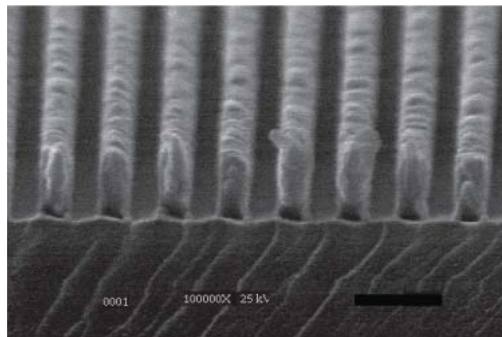


## Wire Grid Polarizer Theory

The wire grid creates a birefringent structure in that the s-polarization sees a mirror and is reflected while the p-polarization sees a dielectric film and is transmitted. This birefringent nature takes every ray of light, no matter the incident angle, and delivers a nearly perfect polarization state.

## NP Protection

The NP environmental protection coating is standard on ALL ProFlux™ products. This treatment allows ProFlux™ to pass aggressive reliability tests with no change in performance. Optical engineers can design systems using ProFlux™ polarizers without concern for reliability.





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## ProFlux™ Substrates

The substrate material is not unique. ProFlux™ can be made on several different substrates. Standard ProFlux™ parts are currently made on two types of substrates, Corning 1737F (PPL and PBS types) and Schott Borofloat glass (PBF type only).

<u>Corning 1737F Industrial Grade</u>		<u>Scott BoroFloat</u>	
Thickness:	0.7 ± 0.07mm	Thickness:	1.6 ± 0.1mm
Index of Refraction:	1.5255 @ 430nm 1.5056 @ 1000nm	Index of Refraction:	1.472 @ 588nm
Thermal Expansion	37.6x10 <sup>-7</sup> /°C (0 - 300°C)	Thermal Expansion:	37.6x10 <sup>-7</sup> /°C (20 - 300°C)

## AR Coating Specifications

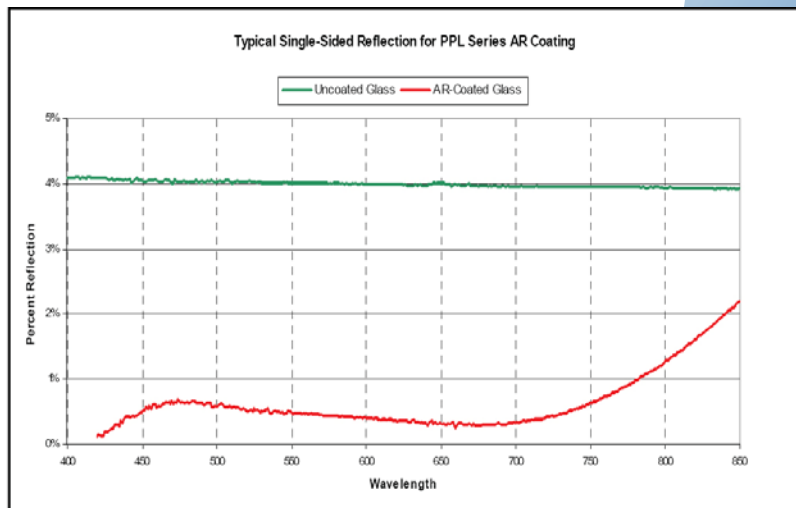
AR coating is available on ALL ProFlux™ products for the visible spectrum. There are two different AR Coating types available.

### PBS and PBF Series

Wavelength: 420nm-660nm  
 Incident Angles: 45° ± 10°  
 Reflectance: absolute (s- and p-)<0.8%  
 Reliability: Passes all standard ProFlux™ reliability tests

### PPL Series

Wavelength: 420nm-670nm  
 Incident Angles: 0° ± 20°  
 Reflectance: average (s- and p-)<0.4%  
 absolute (s- and p-)<1.0%  
 Reliability: Passes all standard ProFlux™ reliability tests





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## Ordering Information

When ordering ProFlux™, several pieces of information are necessary. To define a part we must know the orientation of the transmission axis, size of the part, type of material, visual quality grade, and AR coating. Performance data is available upon request.

### Polarizer Material Type

There are currently five material options, three designed for low incident angle applications and two for polarizing beamsplitters.

PPL03 General Purpose	PBS02 Polarizing
PPL04 High Contrast	Beamsplitter
PPL05 Very High Transmission	PBF02 Optically Flat PBS

### AR Coating

AR coating is available on the back (glass) surface of all the ProFlux™ products. It is standard on the ProFlux™ PPL series, but these may be ordered without AR coating. It is an option on both the PBS02 and PBF02 materials. Parts without AR coating are less expensive.

### Sizes

ProFlux™ polarizers are built on a 200mm diameter wafer. Parts may be as big as the wafer, and as small as 4mm x 4mm. Parts less than 10mm x 10mm will incur special handling charges. Any size within the wafer diameter can be arranged.

The standard dimensional tolerance is different for each of our standard substrates:

Corning 1737F (0.7mm thick): ± 0.2 mm  
Schott Borofloat (1.6mm thick): ± 0.4 mm

### Shapes

The ProFlux™ polarizer is available in many different shapes including rectangles, circles, etc. Special shapes are available upon request.

### Transmission Axis

The customer should always specify the orientation of the transmission axis. Requests to specify the wire grid orientation will be returned for clarification.

## Visual Quality Grade

### Grade 4

Pinholes:	Spots:
< 0.6mm - no limit	< 0.6mm - no limit
0.6-1.5mm - five	<1.5mm - five
> 1.5mm - none	> 1.5mm - none

### Grade 2

Pinholes:	Spots:
< 0.3mm - no limit	< 0.3mm - no limit
0.3mm-0.5mm - four	0.3-0.5mm - four
> 0.5mm - none	> 0.5mm - none

### Grade 1

Pinholes:	Spots:
< 0.15mm - no limit	< 0.15mm - no limit
0.15 - 0.5mm - four	0.15-0.3mm - six
> 0.3mm - none	> 0.3mm - none

### Grade 0

Pinholes:	Spots:
> 0.15mm - none	0.15-0.3mm - no limit
< 0.15mm - no limit	> 0.3mm - none

## Performance Data

Performance data for engineering samples of 25 parts or fewer is available for an additional charge. This should be requested as needed to help in engineering development. The data consists of the transmission (Tp), the crossed transmission (Tc), and Contrast Ratio. For polarizing beam splitters (PBS02 and PBF02) it is also possible to get performance information on both Rp and Rs.

## Price

The final cost of a ProFlux™ polarizer is determined by all the elements necessary to define a part. The price depends most heavily on the size of the part and visual criteria specification. Designing systems using the smallest part possible with the loosest specifications that meets the performance requirements will help keep material costs low. We encourage the designer to take advantage of the extraordinary durability of the ProFlux™ polarizer by using small polarizers at high light intensity to save cost.



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## Handling and Care

ProFlux™ is made of mirror quality aluminum patterned on glass wafers. The handling characteristics of the MicroWire™ film is the same as a front surface mirror or any other fine optic. To ensure consistent performance in any optical system, follow the simple handling and care information below.

### Handling

1. When handling polarizers, wear vinyl, polyethylene, latex, or low lint cotton gloves.
2. Avoid touching the aluminum-coated surface of the polarizer. When handling, grip the edges of the polarizer. To check which side has the MicroWire™ film, look at the edge of the part at a steep angle of incidence. If the edge is not visible, this is the aluminum side (Fig. 1). If the edge is visible, this is the glass side (Fig. 2).
3. Keep the polarizer free of particles.

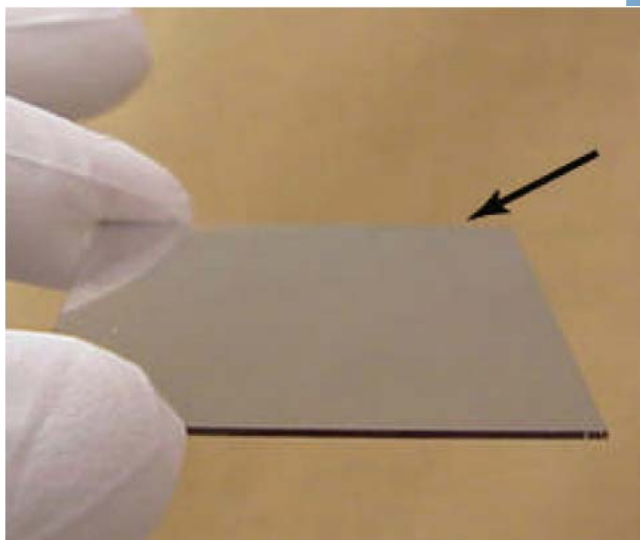


Fig. 1 Aluminum side on top

### Care

#### MicroWire™ Surface

When cleaning the MicroWire™ structure rinse with aluminum compatible solvent (like high grade methanol) and blow-dry with clean filtered low pressure dry gas (Ni, He, filtered air, etc). Experience will quickly show that drops of liquid on the surface will prefer to move in one direction rather than another. It is best to blow liquids off the surface in this preferred direction. The use of lens tissues or swabs is not recommended.

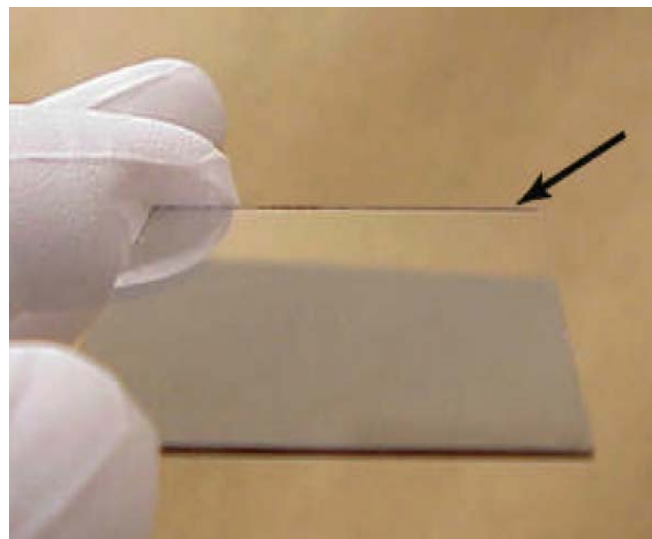


Fig. 2 Glass side on top

#### Back surface

The back surface of the polarizer can be cleaned like a lens or other fine optic. Care should be taken not to damage the MicroWire™ surface. Use a wipe and aluminum-compatible solvent.

#### Storage

When not using the polarizer, store it in a clean dry place. Use a container that is clean and particle free. It may rest in the container of a flat surface with the MicroWire™ side up or vertically with the polarizer being supported in slots.

