



ABOUT NATIONAL PHOTOCOLOR

National Photocolor Corporation is a manufacturer of off-the-shelf and custom pellicles. We offer a broad selection of pellicle beamsplitters, filters and windows for UV to IR applications. Many custom type coatings and specially sized mounts are available for shipment within days after receipt of an order. In addition to special pellicle membranes, frames and coatings we offer technical and prototype design assistance. As each application is different, we welcome your call, fax or email. We will help you design the right pellicle for your application.

Standard features:

- Eliminates secondary (ghost) reflections.
- Eliminates spherical and chromatic aberrations.
- Eliminates beam displacement.
- Eliminates refractive errors.

Special features:

- Sizes from 1/16" to 48" and larger, any shape.
- Critical reflection flatness specifications met, often with better than one wave flatness.
- For critical transmission applications; better than 1/10 wave and fractional fringe thickness uniformity.
- Special coatings available: minimal and no loss, IR, dielectric and dichroic.
- Absorbing type ND filters.
- Shipment from stock with over 1,000 in inventory.
- Quantity from prototypes to thousands with the best prices in the industry.

- 1) Frame
 - 1", 2", 3", 4", 5", 6", 5" x 7" (Rectangle)
- 2) Membrane Thickness
 - ST Standard Thickness--- $5\mu\text{m} \pm 10\%$ ($0.0002" \pm 10\%$)
 - ETP Extra Thin Pellicle--- $2\mu\text{m}, \pm 10\%$ ($0.00008" \pm 10\%$)
- 3) Membrane Uniformity
 - SQ Standard Quality---4 fringes (2waves) per inch
 - LQ Laser Quality---1 fringe (1/2 wave) per inch. All ETP are LQ
- 4) Coating
 - Uncoated - UNC
 - Standard Coated
 - NPX9 50/50 for HeNe
 - NPZ 33/67 for Visible
 - NP40 for visible
 - NPIN 30/30 for visible + IR
 - NPAL88/<01 for visible

TECHNICAL INFORMATION

GENERAL SPECIFICATIONS

Membrane material – Nitrocellulose
Temperature range – -40° C to 125° C
Index of Refraction – 1.5
Surface Quality – Better than 40/20
Average 8/92 R/T Uncoated
Transmitted wavefront – typical 0.5λ
Reflected wavefront – typically better than 1λ /inch

FILM SPECIFICATIONS

Standard Thickness/Standard Quality (ST-SQ)
 $5\mu\text{m}$ ($0.0002''$) $\pm 10\%$ uniformity < 4 fringes/inch (2 waves/inch)
Standard Thickness/Laser Quality (ST-LQ)
 $5\mu\text{m}$ ($0.0002''$) $\pm 10\%$ Uniformity < 1 fringe/inch (0.5 waves/inch)
Extra Thin Pellicles (ETP)
 $2\mu\text{m}$ ($0.00008''$) $\pm 10\%$ Uniformity < 1 fringe/inch (0.5 waves/inch)

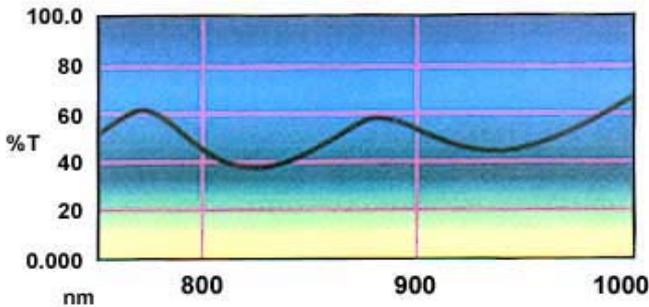
REFLECTION FLATNESS / TRANSMITTED WAVEFRONT

Using improved manufacturing techniques NPC now provides Ultraflat Pellicles with up to $1/10 \lambda$ reflection on central areas of smaller diameter pellicles. Better than 1λ reflection flatness can be obtained on larger diameter pellicles. The central 75% to 80% central area of a circular pellicle is normally specified as the best area for reflection flatness. Computer reduced interferometric documentation can be provided.

Specially manufactured pellicles with transmitted wavefronts of better than $1/10 \lambda$ are available. Thickness uniformity of one fringe over large areas are also available. Computer reduced interferometric documentation can be provided.

IR PELLICLE APPLICATIONS

Minimal loss (typical 50/50 R/T Ave.) beamsplitting pellicles are available for selected bandwidths within the 700nm to 5μ range. Coatings can be altered for different states of polarization as well as for single wavelength applications.

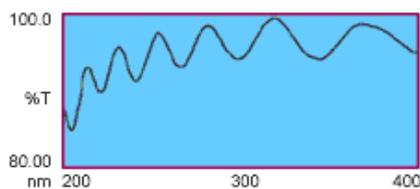


(Transmission Chart 700nm – 1000nm)

Sample IR 50/50 transmission scan. 45° Incidence. Unpolarized light.

Interference effects shown. R/T ratio will vary with wavelength and change of angle.

DEEP UV PELLICLE



NPC now has a new Pellicle film with excellent transmission properties in the 200nm to 400nm range.

This has opened a new area for Pellicle applications as windows and beamsamplers as well as possibilities for beamsplitting applications.

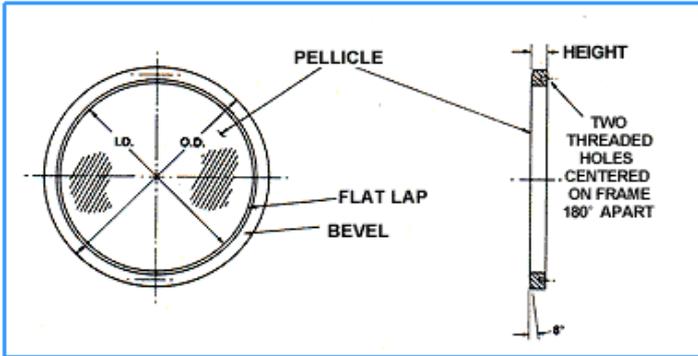
STANDARD and CUSTOM PELLICLE FRAMES

Standard Frames

NPC Standard Pellicle Frames are stocked in 1",2",3",4",5" and 6" circular rings, plus 5"x7" rectangles. Top surfaces are beveled. The frame is black anodized, then lapped to create a flat at the inner edge.

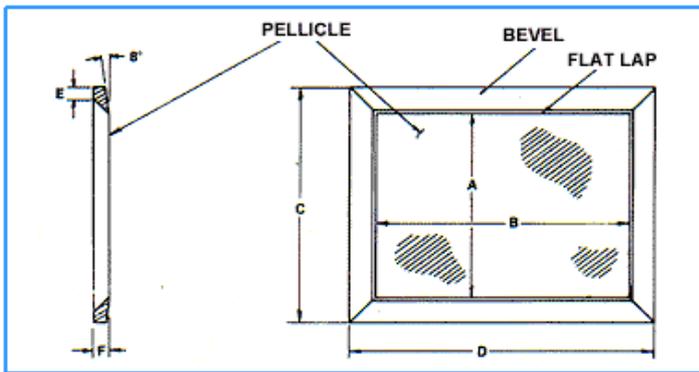
The membrane is then stretched over the flat and firmly adhered to the beveled area. The machined aluminum rings have two threaded mounting holes on the back.

Standard NPC Pellicle Rings



Size	I.D.	O.D.	Height	Mounting Holes
1"	1"(25.4mm)	1 3/8"(34.9mm)	3/16"(4.8mm)	#2-56thd.x1/8"dp.
2"	2"(50.8mm)	2 3/8"(60.3mm)	3/16"(4.8mm)	#2-56thd.x1/8"dp.
3"	3"(76.2mm)	3 1/2"(88.9mm)	1/4"(6.4mm)	#6-32thd.x1/8"dp.
4"	4"(101.6mm)	4 1/2"(114.3mm)	1/4"(6.4mm)	#6-32thd.x1/8"dp.
5"	5"(127.0mm)	5 1/2"(139.7mm)	5/16"(7.9mm)	#6-32thd.x1/8"dp.
6"	6"(152.4mm)	6 1/2"(165.1mm)	3/8"(9.5mm)	#6-32thd.x3/16"dp.

Standard NPC 5"x7" Rectangular Pellicle Frame



Nominal Dimensions		
	Inches	Millimeters
A	5	127.0
B	7	177.8
C	6 5/8	168.3
D	8 3/8	212.7
E	5/16	7.9
F	7/16	11.1

Custom Frames

National Photocolor offers seven (7) standard frames and we routinely mount pellicles on custom frames. Frames, which should be designed in conjunction with NPC, may be supplied by the customer or National Photocolor. Frequently, a frame can be quickly and inexpensively supplied from our large inventory of special frames.

Custom pellicles have been made from 1/16" I.D. to 16" I.D. In addition to circles and rectangles, ellipses and truncated cylinders (tubes cut off at an angle) are used for their ability to pass a circular beam at 45 ° .

Design Considerations

Custom frame design is usually similar to standard design, although cross sections may be altered and the bevels varied or eliminated.

Though flatness of standard pellicles is suitable for most uses, some applications require unusual flatness. The flatness of the reflective surface is mainly dependent upon the flatness of the lapped area. Special frames may be manufactured for the most demanding applications. For best results, frames should generally be circular and slightly oversized to allow edge aberrations to "iron out" outside the critical central area.

Extra-flat frames may require larger cross-sections and may be machined of stainless steel ceramic, or other materials. In use, flat pellicles must be installed carefully to prevent distortion of the frame. Systems should be designed so that the more critical beam is transmitted, rather than reflected.

Uniformity of transmission and flatness on reflection can be documented on request.

STANDARD PELLICLE COATINGS



National Photocolor offers a wide variety of coated pellicles from our large inventory.

NPC Standard Uncoated Pellicles have an average R/T ratio of 8/92%, from 350nm to 2.5 μ m.

The following are Standard Coatings kept in our constantly updated inventory.

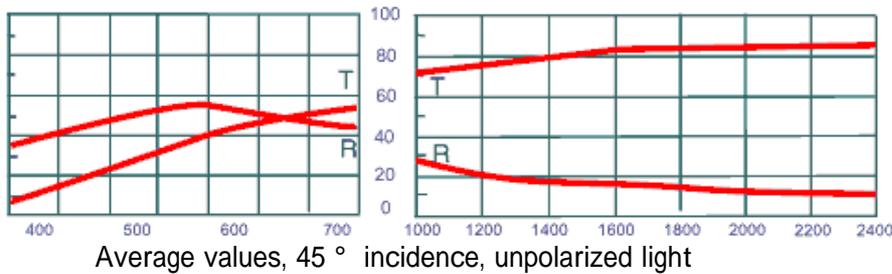
All R/T ratios may vary with wavelength and angle of incidence.

All illustrated curves are for unpolarized light at 45 ° angle of incidence.

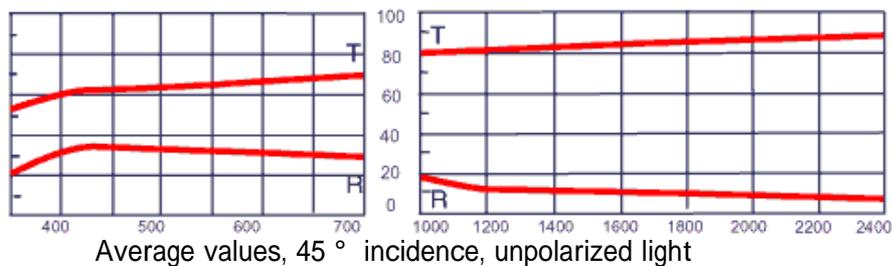
In general, a given coating will transmit more P polarized light than S polarized light; a coating will usually reflect more S polarized light than P polarized light. Coatings can be provided on a custom basis for your specific state of polarization.

Reflection/Transmission can be documented on request.

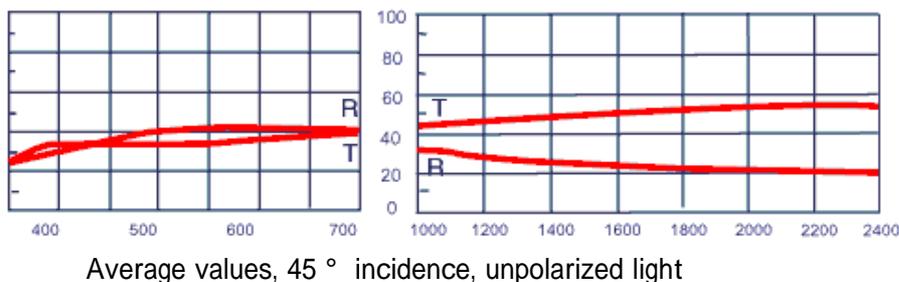
NPX9 50/50 @6328A for Helium Neon Lasers



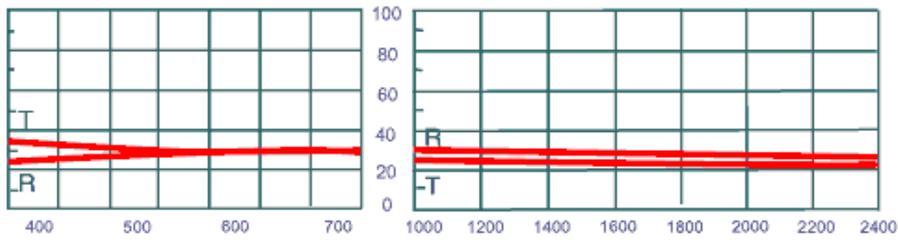
NPZ 33/67 for the visible and near IR region (R/T available from 10/90 to 33/67)



NP40 40/40 visually neutral, even split

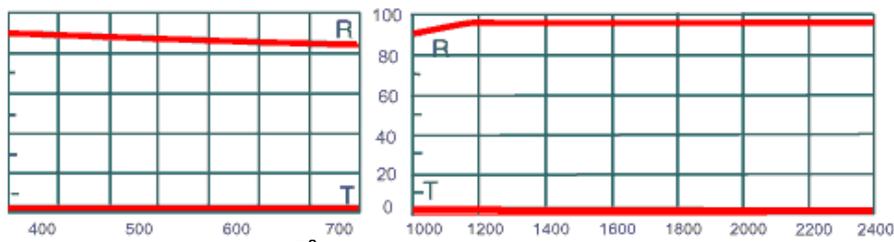


NPIN 30/30 metallic for the visible and near IR



Average values, 45° incidence, unpolarized light

NPAL 88/<01 aluminum, neutral over the visible range (R/T available from 52/20 to 88/<01)



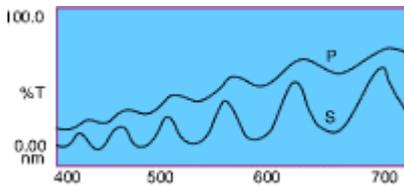
Average values, 45° incidence, unpolarized light

POLARIZATION:

In general, at angles greater than fifteen degrees, coated or uncoated pellicles will transmit more P polarized light than S polarized light: the coated or uncoated pellicle will reflect more S polarized light; than P polarized light. Pellicles, with or without coatings, can be manufactured to meet specifications for a given state of polarization.

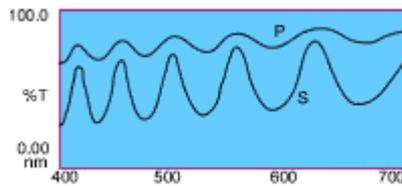
SAMPLE CURVES

NPX9 50/50 @6328Å for Helium Neon Lasers



45° incidence

NPZ 33/67 for the visible and near IR region (R/T available from 10/90 to 33/67)

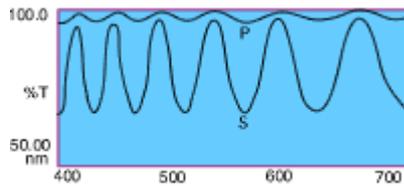


45° incidence

INTERFERENCE EFFECTS:

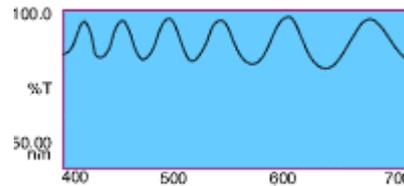
Sinusoidal thin film interference effects are shown on the transmission scans on this page. These effects can be used to maximize the transmission or reflection of the pellicle for specific wavelengths and incident angles.

Uncoated Pellicle - 2µm



45° incidence

Uncoated Pellicle - 2µm



Unpolarized 45° incidence