



# Excimer Laser Optics

## Beam-Turning and Cavity Optics

Our excimer laser mirrors are multi-layer dielectric coated mirrors designed for use with high energy excimer lasers. These coatings yield superior reflectance while meeting high damage threshold requirements. With nearly forty years experience designing and developing excimer coatings, Acton can design coatings to match your spectral, polarization and application requirements. We maintain a stock supply of these beam turning and normal incidence mirrors for fast delivery to your facility. Mirrors and coatings can be supplied on Acton mirror blanks or customer supplied material. Excimer optics can be produced and supplied in volume, keeping the price very competitive. We can also provide you with “ready to install” optical assemblies utilizing our highly trained technicians and clean room facility.

**Applications: Medical, Semiconductor, Micromachining, Materials Processing**

## Laser Damage Threshold

Many factors influence the damage resistance and lifetimes of excimer laser coatings.

From a design standpoint, understanding the application and laser power requirements are of utmost importance. These laser power specifications include fluence, rep rate, beam size, usage environment and physical damage resistance.

From a manufacturing standpoint, coating material selection, thin film coating design, coating process, quality control, and knowledge of material stress characteristics are crucial contributors to the performance of an optic.



Acton can optimize coatings for customer-specific applications by understanding how each unique excimer laser can differ with varied wavelengths, power, beam profile and lifetime requirements.

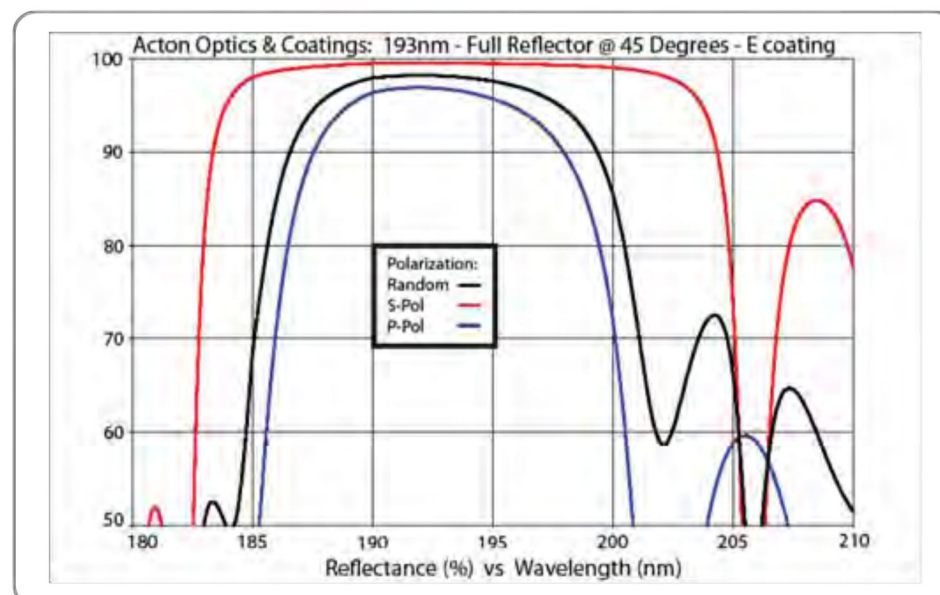
Please contact Acton Optics & Coatings for detailed laser damage threshold benchmarks for our standard coatings.



# Application Specific

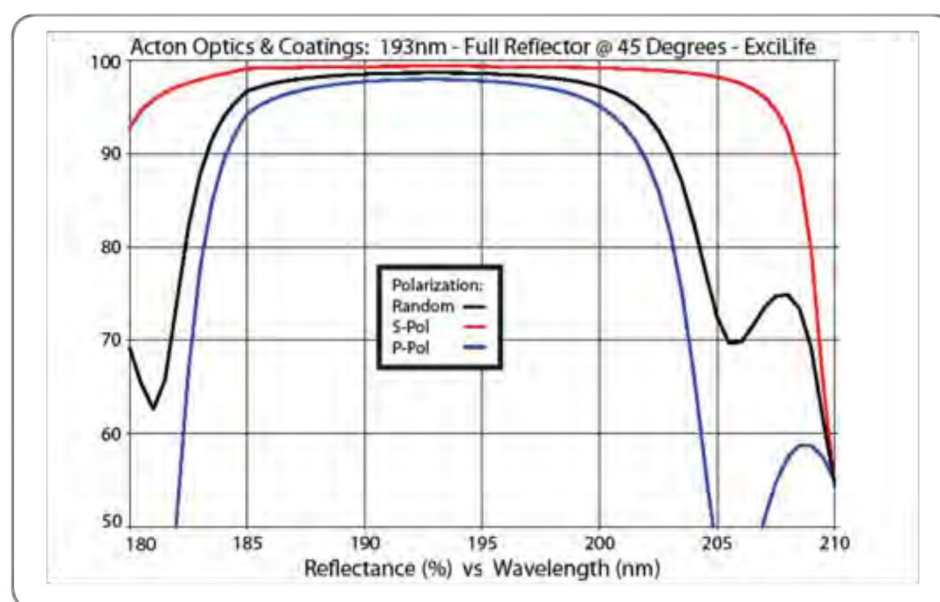
## 193nm e-Design Approach High Fluence - Low Rep. Rate

Designed for applications requiring rep. rates of approximately 200 Hz, the e-design (ref: 193-FR45e) takes electrical field intensity (EFI) -correction to the next level by positioning and distributing EFI peaks within several layers, thus reducing the intensity within any single layer in the stack. This approach diminishes the effect of EFI-related damage resulting in increased laser damage resistance and longer coating lifetimes.

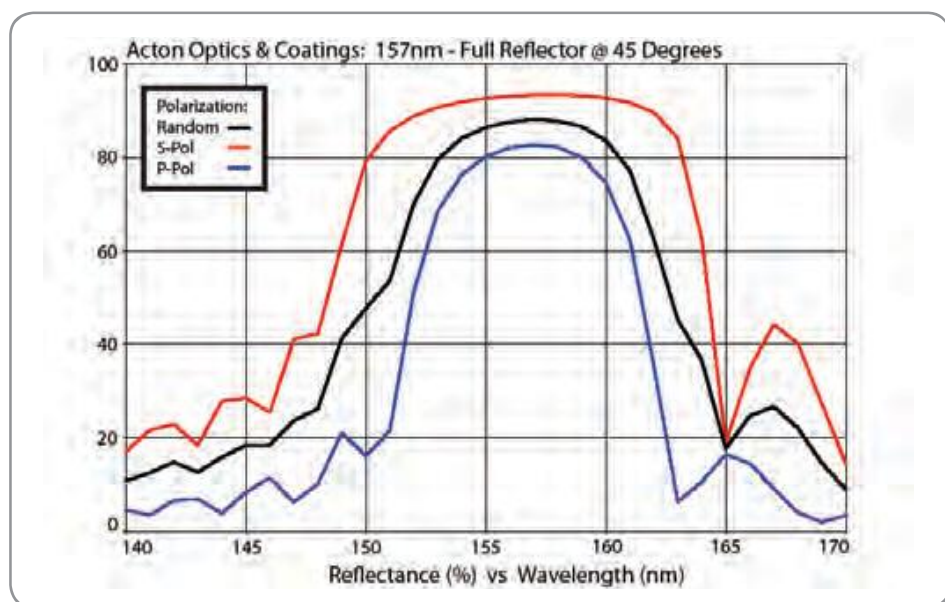
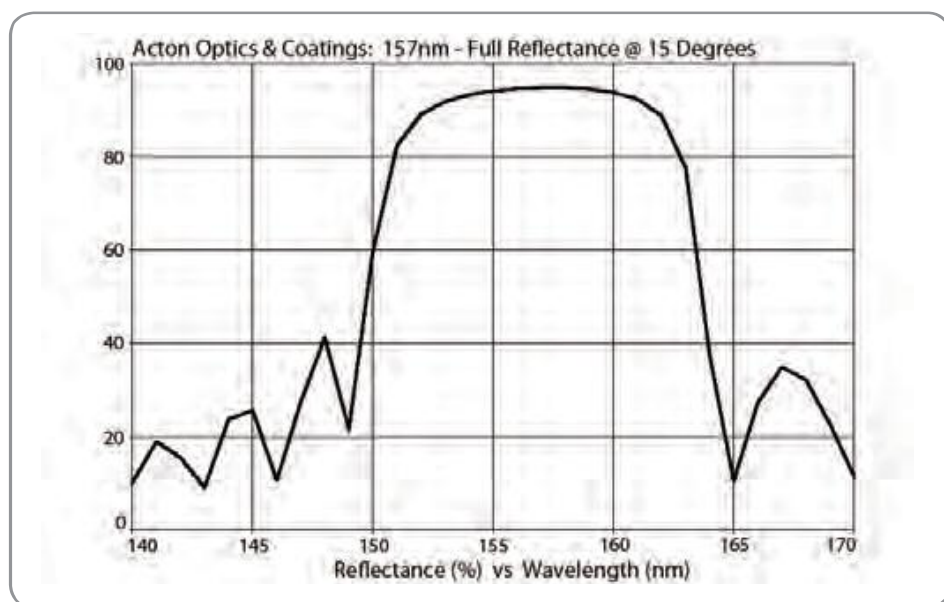
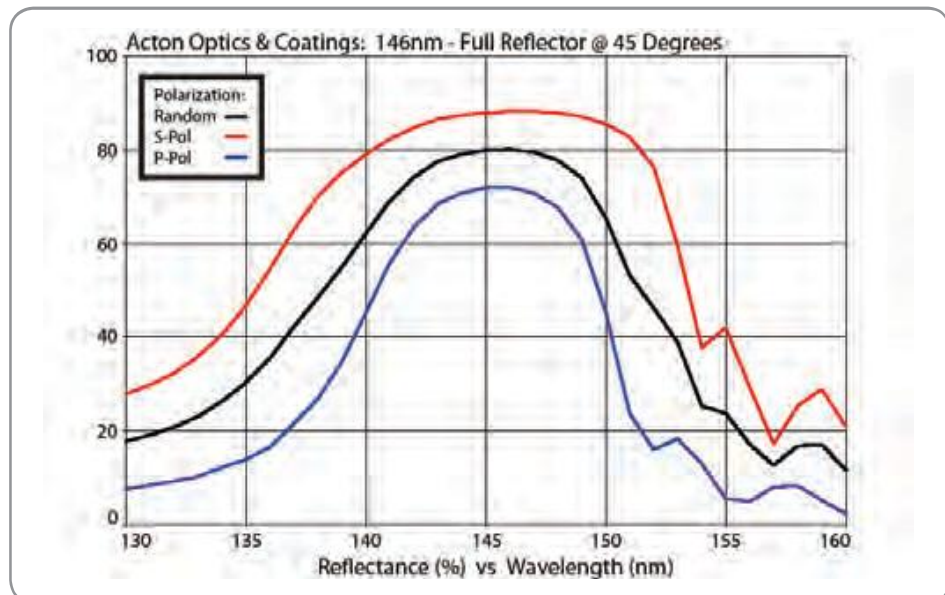
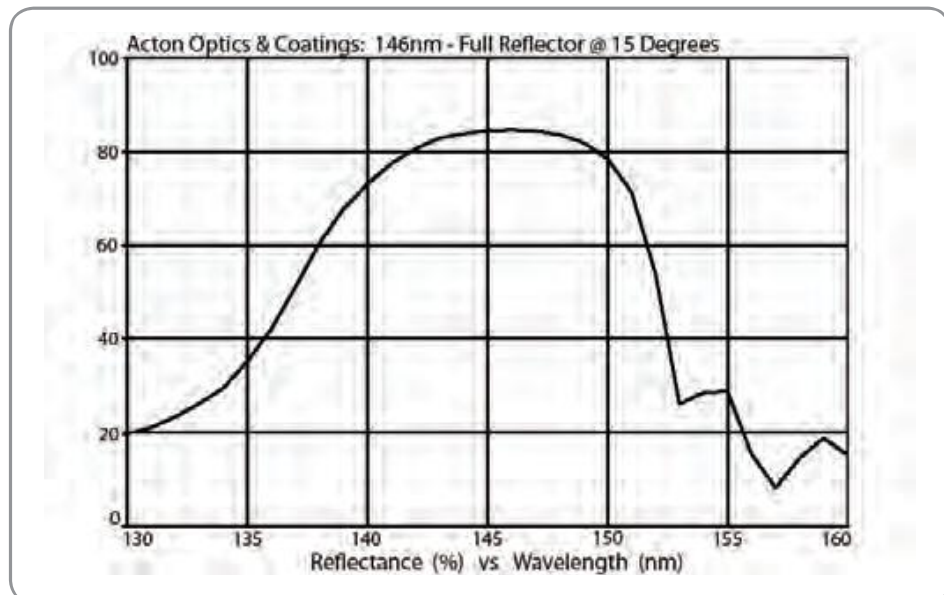
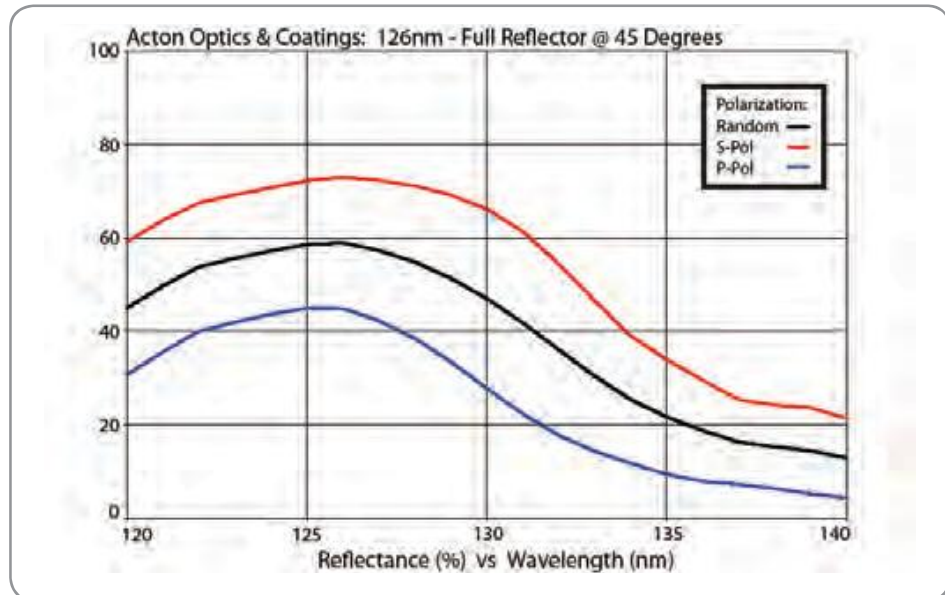
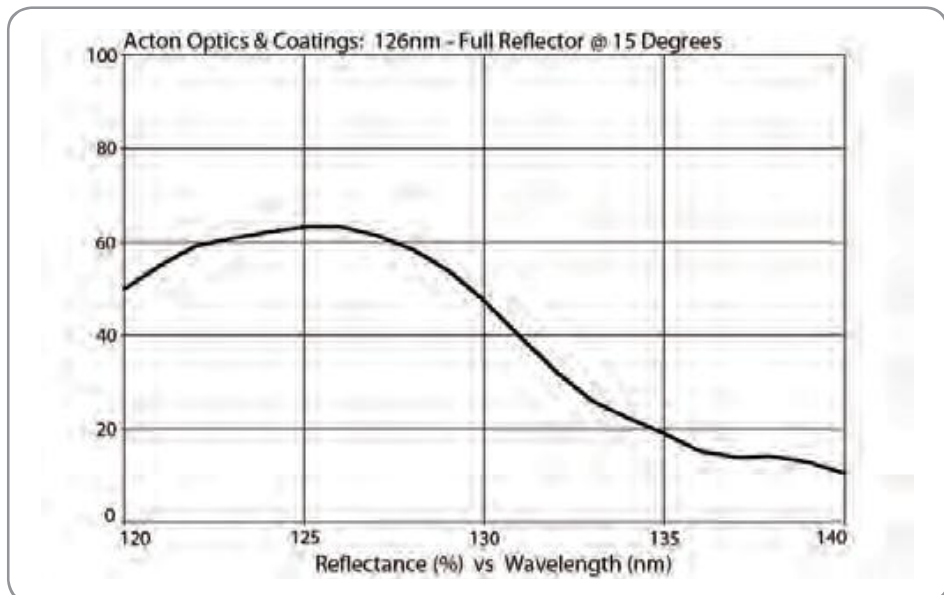


## 193nm XL-Design Approach Low Fluence - High Rep. Rate

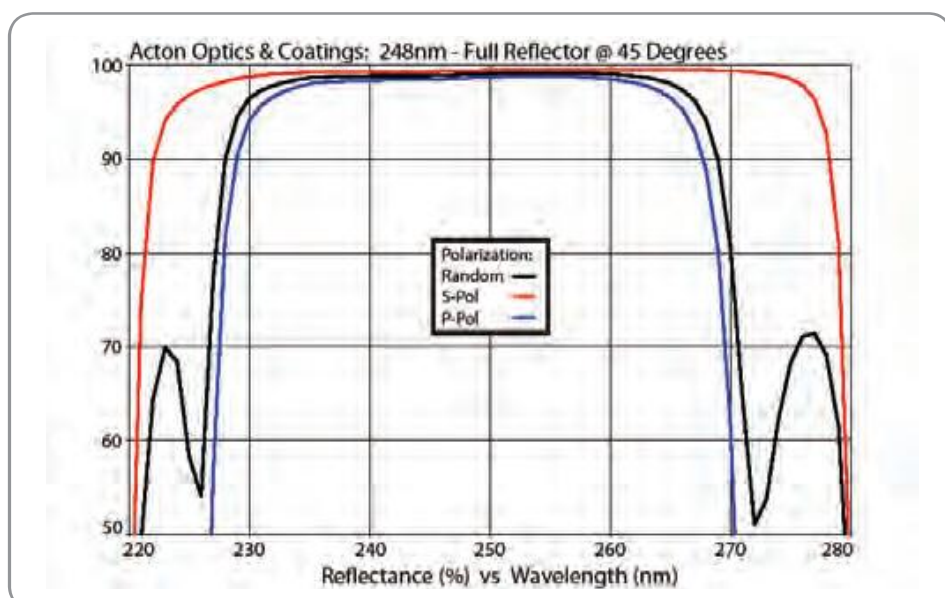
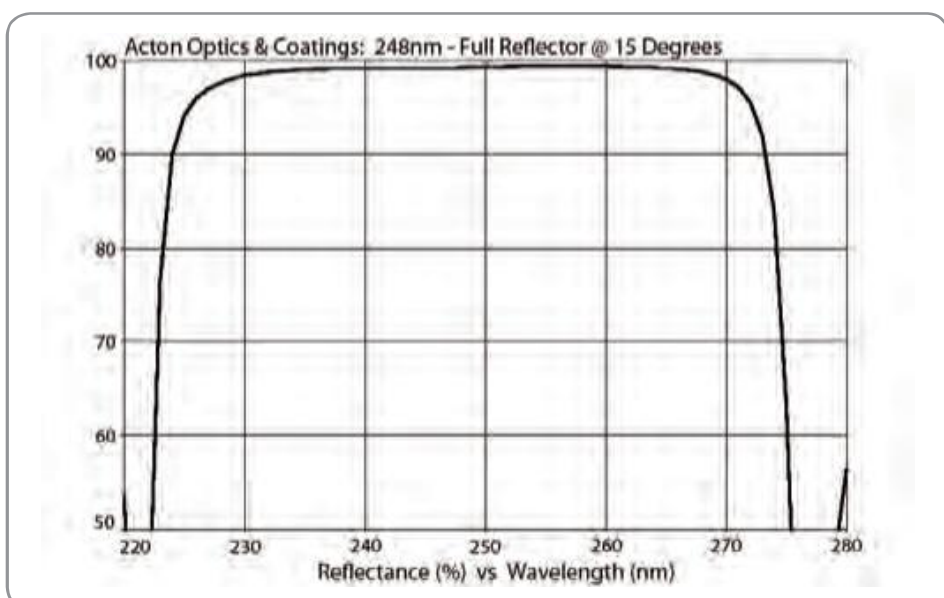
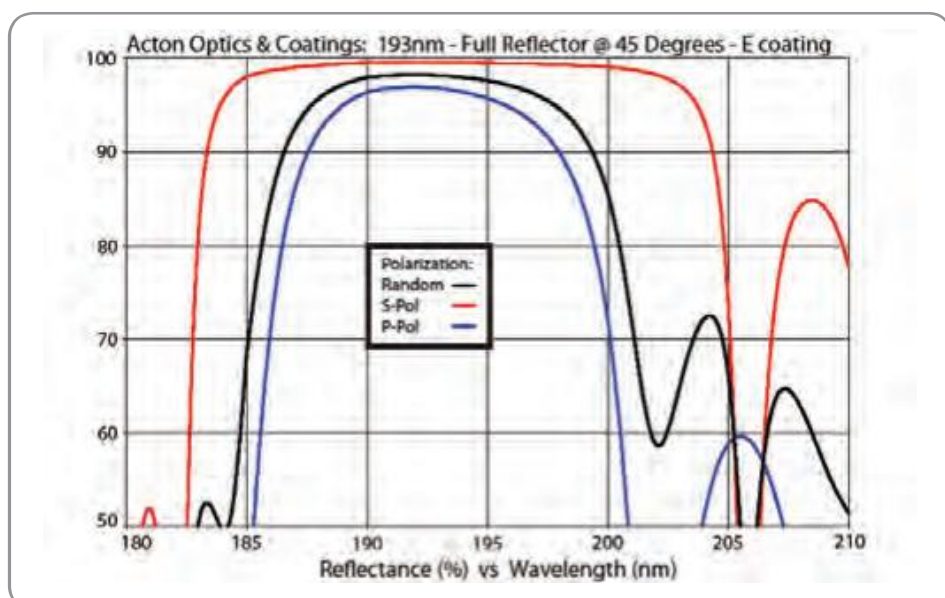
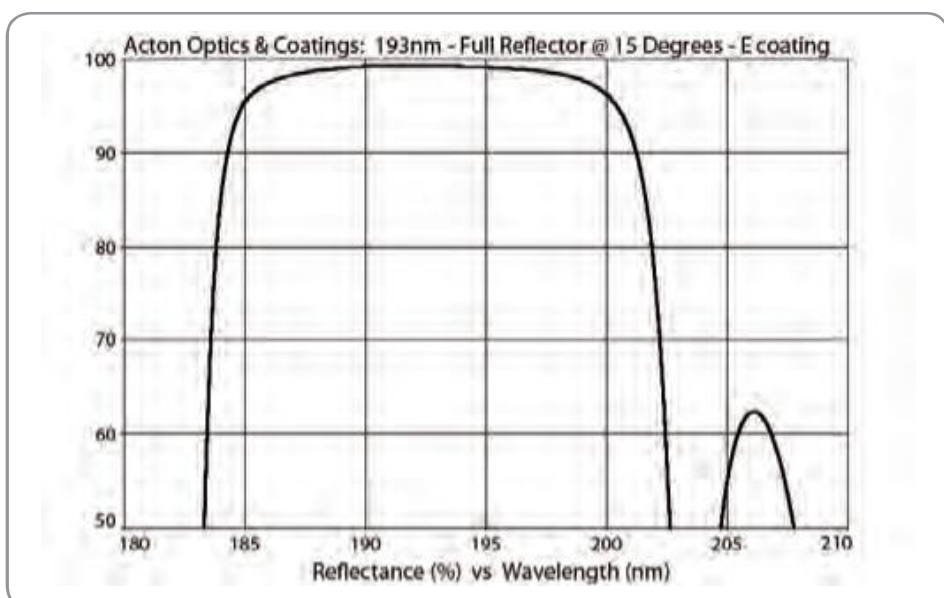
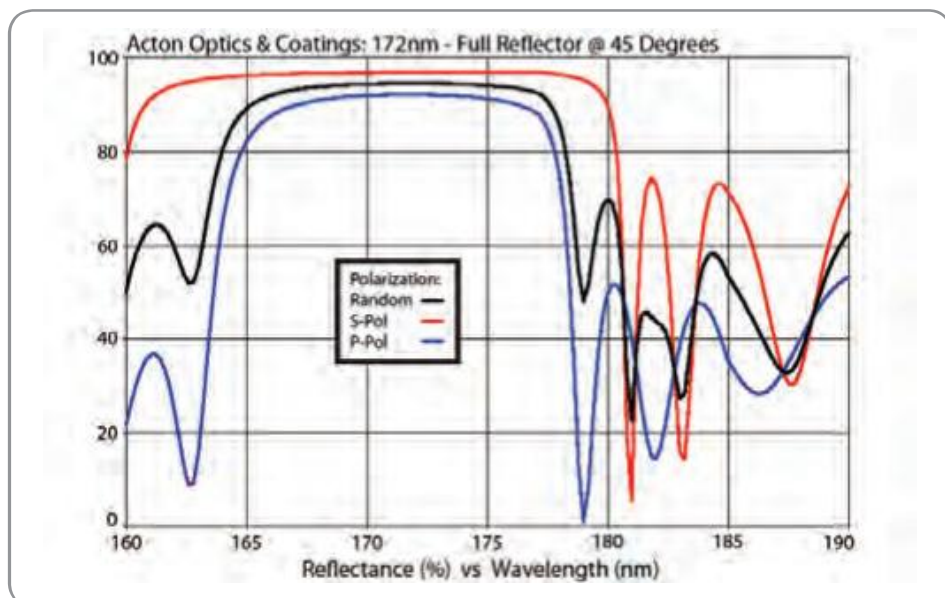
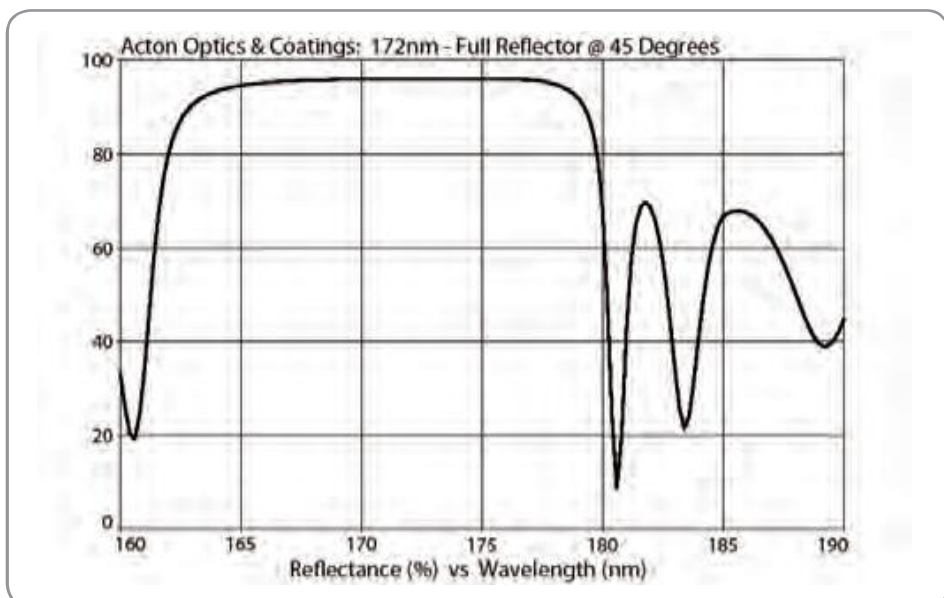
The XL-design (ref: 193-XL45) combines hybrid structure with balanced stress for applications requiring rep. rates of 4-5 kHz. This minimizes the possibility of catastrophic damage due to micro-defects and thermal stress fractures, as well as prevents dehydration effects from high-repetition-rate operation. Reflectance of 96-97% at 193nm and phase shift can be optimized to customer's request. This robust UV coating passes MIL-SPEC adhesion, abrasion and humidity tests.



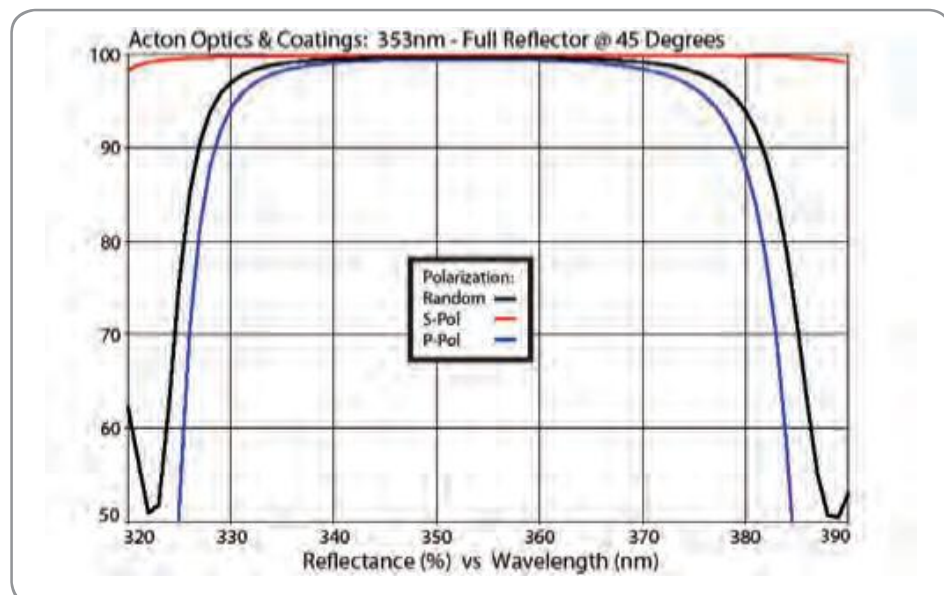
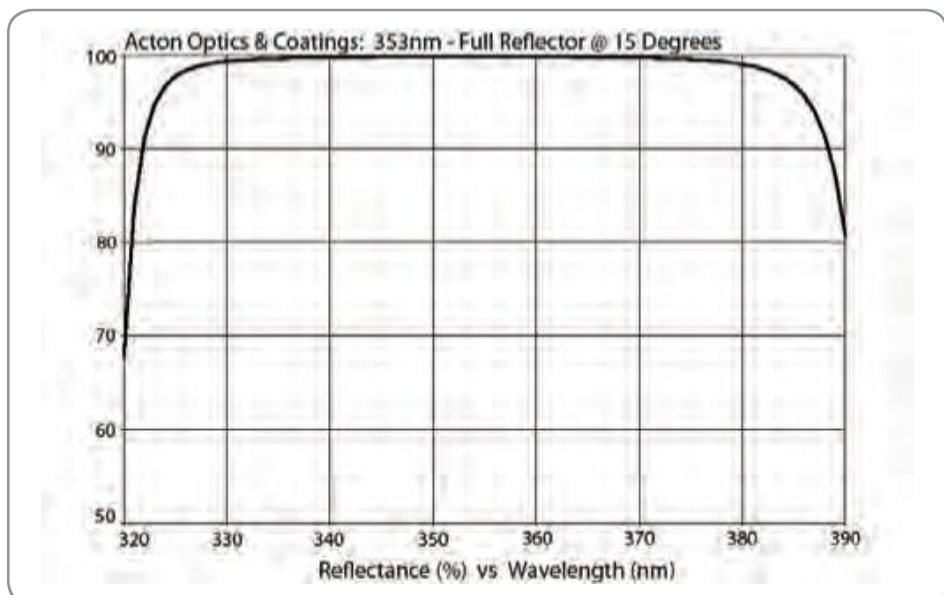
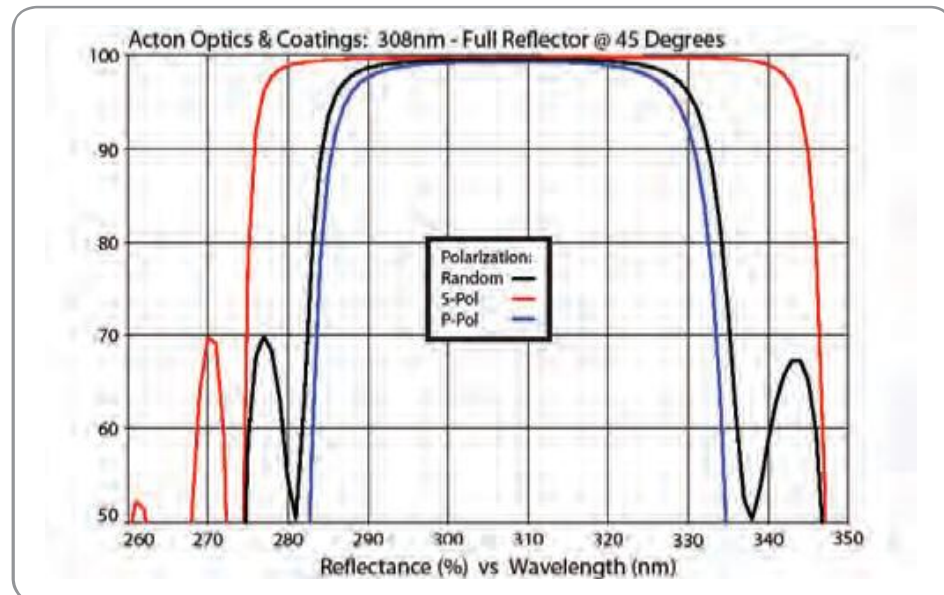
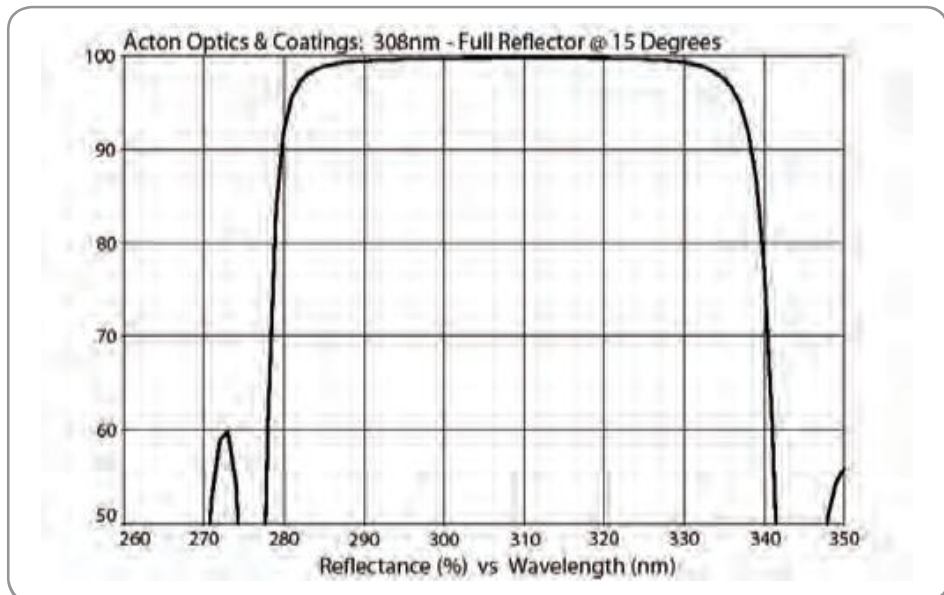
# Excimer Laser Mirror Coatings: 126-157nm



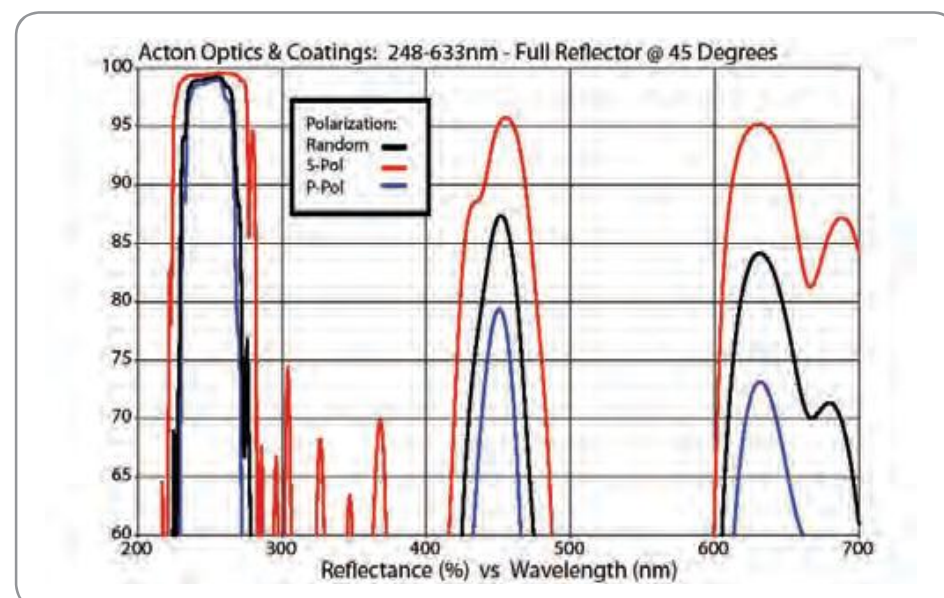
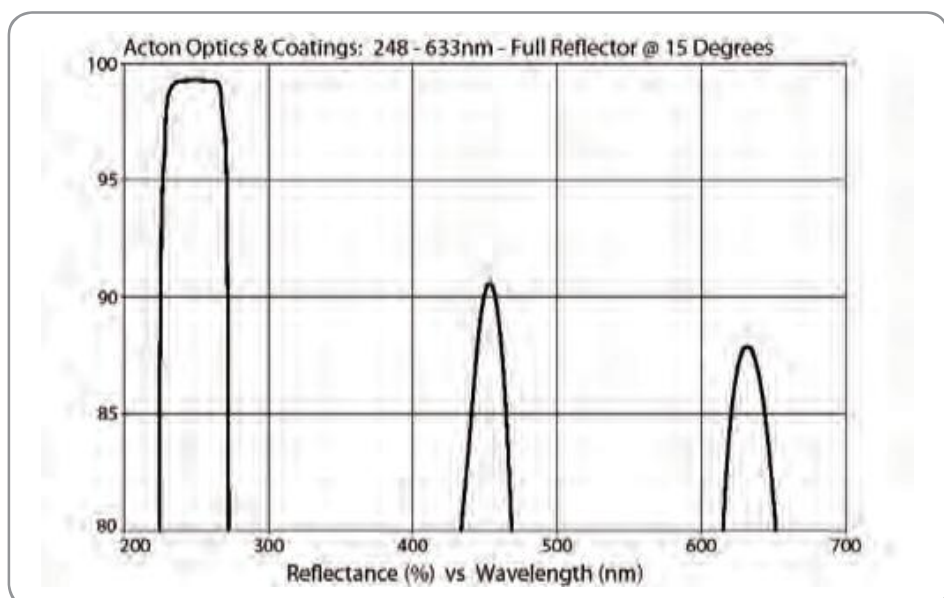
# Excimer Laser Mirror Coatings: 172-248nm



## Excimer Laser Mirror Coatings: 308-353nm



## Excimer Laser Dual-Wavelengths 248-633nm





# Excimer Laser Optics

## Excimer Laser Mirrors - Part Numbers for Standard Optics



Wavelength	% R @ N.I.	Normal Incidence Part Number		% R @ 45°	45° AOI Part Number	
		1" Diameter	2" Diameter		1" Diameter	2" Diameter
126nm	≥ 55%	M126-FR-1D-MB	M126-FR-2D-MB	≥ 50%	M126-FR45-1D-MB	M126-FR45-2D-MB
147nm	≥ 75%	M147-FR-1D-MB	M147-FR-2D-MB	≥ 70%	M147-FR45-1D-MB	M147-FR45-2D-MB
157nm	≥ 89%	M157-FR-1D-MB	M157-FR-2D-MB	≥ 87%	M157-FR45-1D-MB	M157-FR45-2D-MB
172nm	≥ 93%	M172-FR-1D-MB	M172-FR-2D-MB	≥ 90%	M172-FR45-1D-MB	M157-FR45-2D-MB
193nm e*	≥ 98%	M193-FRe-1D-MB	M193-FRe-2D-MB	≥ 97%	M193-FR45e-1D-MB	M193-FR45e-2D-MB
193nm XL*	≥ 97%	M193-FRXL-1D-MB	M193-FRXL-2D-MB	≥ 96%	M193-FRXL45-1D-MB	M193-FRXL45-2D-MB
248nm	≥ 98%	M248-FR-1D-MB	M248-FR-2D-MB	≥ 97%	M248-FR45-1D-MB	M248-FR45-2D-MB
308nm	≥ 98%	M308-FR-1D-MB	M308-FR-2D-MB	≥ 97%	M308-FR45-1D-MB	M308-FR45-2D-MB
353nm	≥ 99%	M353-FR-1D-MB	M353-FR-2D-MB	≥ 98%	M353-FR45-1D-MB	M353-FR45-2D-MB

## Dual Wavelength Excimer Laser Mirrors - Part Numbers for Standard Optics

Wavelength Range	248nm % R @ N.I.	633nm % R @ N.I.	Normal Incidence Part Number	
			1" Diameter	2" Diameter
248/633nm	≥ 97%	≥ 80%	M248/633-FR-1D-MB	M248/633-FR-2D-MB

Wavelength Range	248nm % R @ 45°	633nm % R @ 45°	45° AOI Part Number	
			1" Diameter	2" Diameter
248/633nm	≥ 97%	≥ 80%	M248/633-FR45-1D-MB	M248/633-FR45-2D-MB

Refer to page 7 for comparison of "e" and "XL" coatings.

Coatings can be applied to Acton standard substrates (pgs: 32-33), custom substrates and customer supplied material (CSM). Please contact Acton Optics & Coatings for details.