

High Power Partially Reflective Coatings

Partially reflective mirrors with a dielectric coating can be manufactured on a standard basis for the wavelength range from 193 nm to 5 μm . An angle of incidence of 0° makes it an output coupler; an angle of incidence of 45° makes it a beam splitter. Additional angles of incidence can also be produced.



Nomenclature

Output Couplers; Angle of incidence 0°

PR	1064	/80	/AR	SM07-1.00C
Partially Reflective coating	Wavelength in nm	Reflection in %	AR coating on the rear side (if desired)	Substrate

Beam Splitters; Angle of Incidence 45°

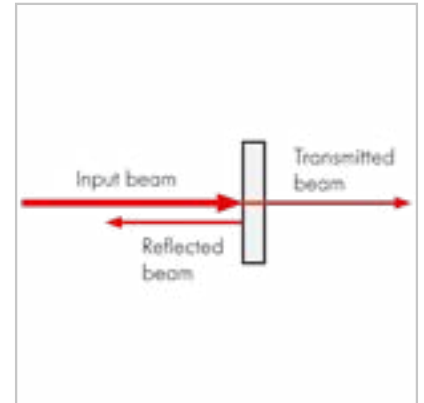
BS	1064	/45	U60	/AR	PW1025UV
Beam Splitter coating	Wavelength in nm	Angle of incidence in degree	Reflection in % for the specified polarization (u-, s-, or p-pol)	AR coating on the rear side (if desired)	Substrate

High Power Output Couplers

Output couplers are mainly used inside resonators to extract the laser beam. Through a suitable choice of the degree of reflection the quality of the laser resonator is optimized.

Output couplers are also commonly used in attenuation.

The back side of output couplers is typically equipped with an AR coating to minimize the loss of the transmitted beam.



Output coupler with 0° AOI

Specifications

Standard tolerance	$\pm 2\%$ for $R < 10\%$ $\pm 3\%$ for $R = 10$ to 40% $\pm 5\%$ for $R = 40$ to 60% $\pm 3\%$ for $R = 60$ to 90% $< 1\%$ for $R > 90\%$
Exception 193 nm – 308 nm	$< 1\%$ for $R < 10\%$ $\pm 2\%$ for $R = 10$ to 20% $\pm 5\%$ for $R = 20$ to 80% $\pm 2\%$ for $R = 80$ to 95% $< 1\%$ for $R > 95\%$ (except for 193 nm)

Output Coupler for Excimer Lasers

For output couplers that are used outside of the excimer laser resonator, the coating is usually applied to fused silica substrates.

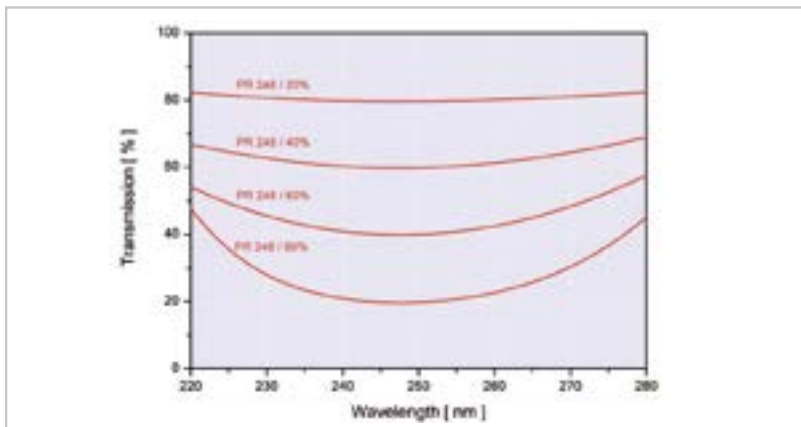
If the mirrors are used inside the resonator, the coatings have to be chlorine or fluorine resistant because they are exposed to the aggressive laser gas. In such a case, CaF_2 or MgF_2 as substrate material must be used. Please inform us in this case!

These fluorine and chlorine resistant coatings meet specification requirements similar to those of a standard coating, a simulation of which is shown in the following.

PR193 or PR248

Specifications

Degree of reflection	according to specification	
Back reflection	with AR-Coating	
	193 nm	R < 0.5 %
	248 nm	R < 0.3 %
Typ. damage threshold	193 nm	LDT ≈ 1 J/cm ² (10 ns)
	248 nm	LDT ≈ 2 J/cm ² (10 ns)
Typ. substrate material	selected UV-grade fused silica	

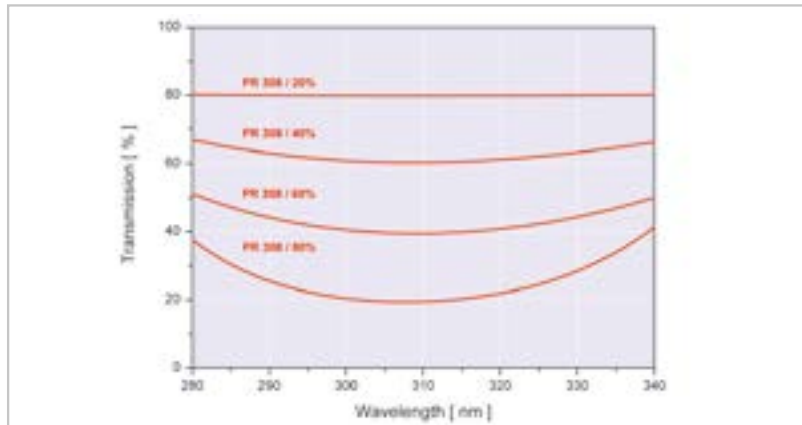


PR 248 nm / 0°

PR308

Specifications

Degree of reflection	according to specification	
Back reflection	with AR-Coating R < 0.3 %	
Typ. damage threshold	LDT ≈ 5 J/cm ² (10 ns)	
Typ. substrate material	UV-grade fused silica	



PR 308 nm / 0°

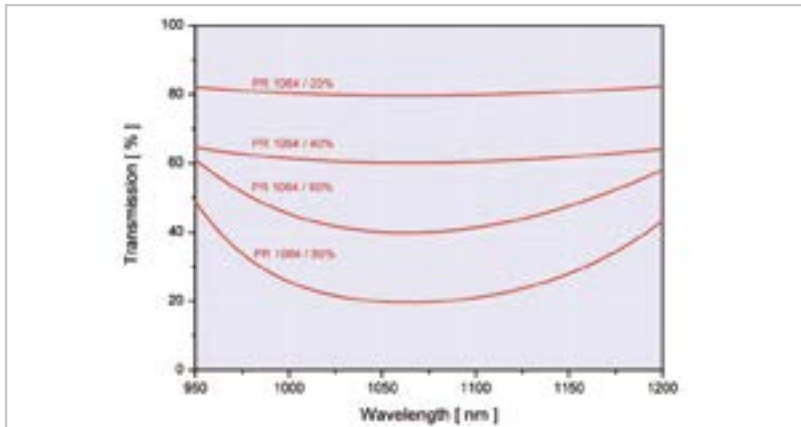
Output Couplers for Solid-state Lasers

The coatings for solid-state lasers are primarily applied to BK7 substrates. Fused silica substrates are used for lasers with high power densities or if the wavelength of the laser is less than 380 nm or more than 2000 nm. Sapphire is used for 2.94 μm lasers.

PR1064

Specifications

Degree of reflection	according to specification
Back reflection	with AR-Coating $R < 0.2 \%$
Typ. damage threshold	LDT $\approx 20 \text{ J/cm}^2$ (10 ns) LDT $\approx 2 \text{ MW/cm}^2$ (cw)
Typ. substrate material	BK7

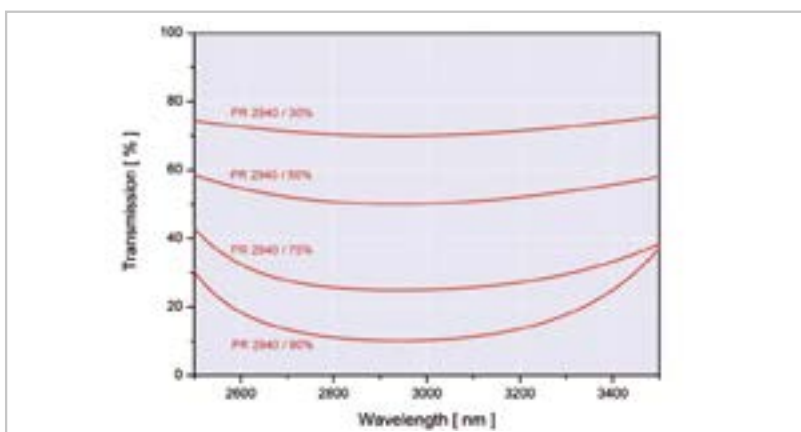


PR 1064 nm / 0°

PR2940

Specifications

Degree of reflection	according to specification
Back reflection	with AR-Coating R < 0.2 %
Typ. damage threshold	Please check LDT with sales department
Typ. substrate material	sapphire



PR 2940 nm / 0°