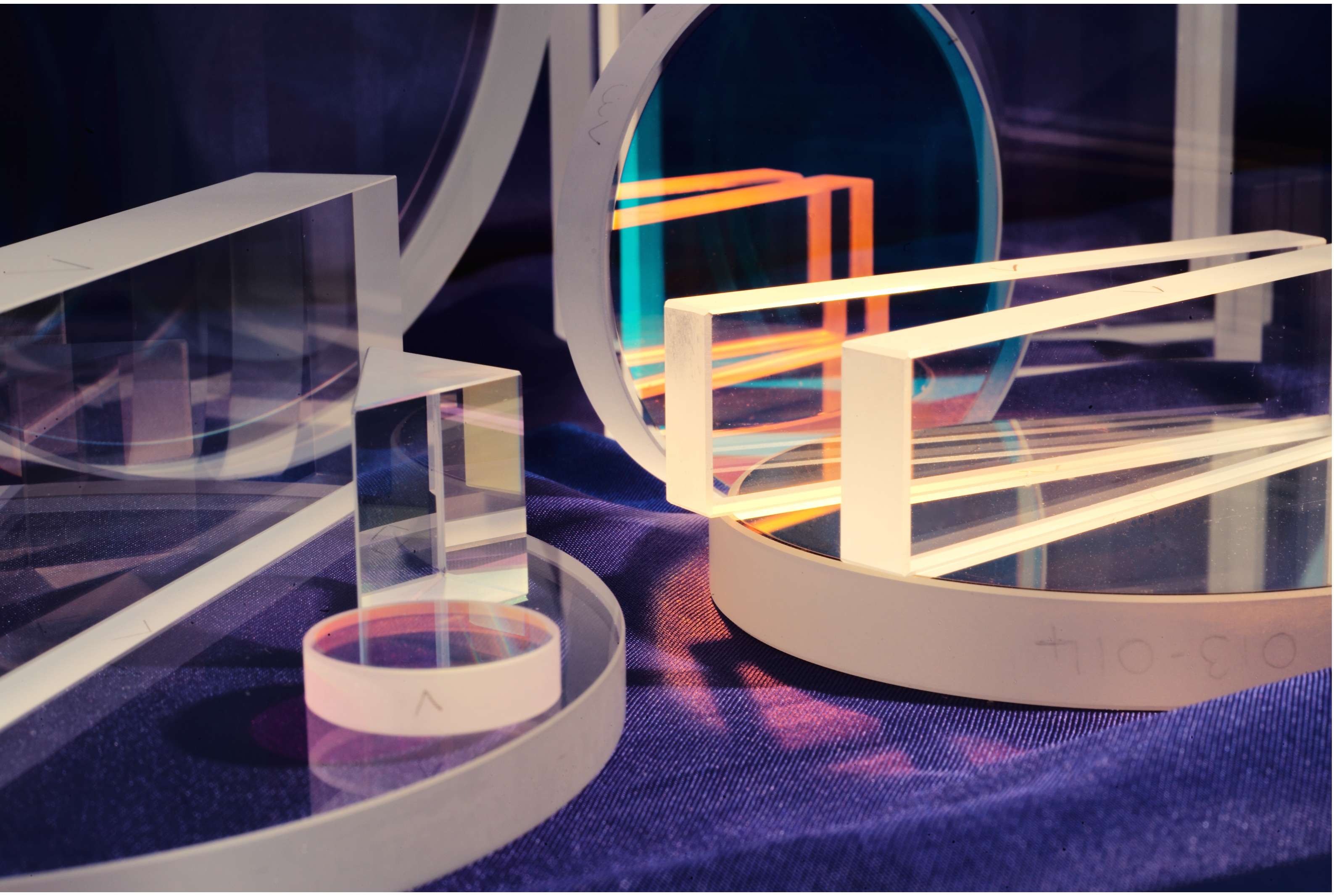
Manx Precision Optics



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Manx Precision Optics

ABOUT US

Manx Precision Optics Ltd. ('MPO') is a family owned manufacturer of high precision optics.

Based in the Isle of Man, the company was founded in 2013. MPO's ISO 9001:2008 certified manufacturing process covers the full range of optical manufacture from grinding and polishing to coating (e-beam and sputtering) and assembly.

The company's modern manufacturing facility is based in a high-tech industrial park that is owned by the Isle of Man Government.

Its highly experienced workforce enables MPO to offer tailor made solutions to a wide range of applications along its wide range of off the shelf products.

HOW TO CONTACT US

Registered Office and Administration:

Manx Precision Optics Ltd.
4 Albert Street
Douglas
Isle of Man IM1 2QA
British Isles

Manufacturing Facility:

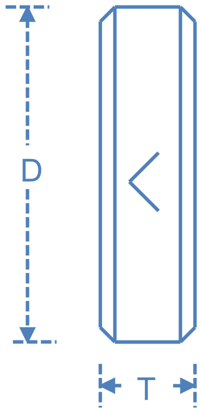
Manx Precision Optics Ltd.
Units 11 & 12
The Freeport
Ballasalla
Isle of Man IM9 2AP
British Isles

Official Distributor BeNeLux

Te Lintelo Systems BV

www.tlsbv.nl | contact@tlsbv.nl | +31 316 340804

BK7 SUBSTRATES



Mirror specifications:
Diameter Tolerance: +0/-0.25mm Thickness Tolerance: +/-0.25mm, front surface: λ/10 flatness, 10-5 scratch-dig, rear surface: inspection polish, better than 5 arc min parallel,

Window specifications:
Diameter Tolerance: +0/-0.25mm Thickness Tolerance: +/-0.25mm, λ/10 transmitted wavefront distortion, both sides 10-5 scratch-dig, better than 10 arc sec parallel

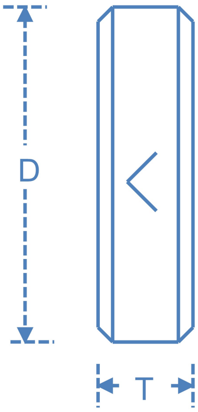
Wedged Optics have a 30arc min (+/-5 arc min), thickness specified for thick side

BK7 MIRROR SUBSTRATES	DIAMETER (D)	THICKNESS (T)
BK7-FMR-12.7-6.35	12.7mm	6.35mm
BK7-FMR-25.4-6.35	25.4mm	6.35mm
BK7-FMR-38.1-9.52	38.1mm	9.52mm
BK7-FMR-50.8-9.52	50.8mm	9.52mm
BK7-FMR-76.2-12.7	76.2mm	12.7mm
BK7-FMR-101.6-12.7	101.6mm	12.7mm
BK7-FMR-152.4-25.4	152.4mm	25.4mm
BK7-WMR-25.4-6.35-30MIN	25.4mm	6.35mm
BK7-WMR-50.8-9.52-30MIN	50.8mm	9.52mm

BK7 WINDOW SUBSTRATES	DIAMETER (D)	THICKNESS (T)
BK7-FWD-12.7-6.35	12.7mm	6.35mm
BK7-FWD-25.4-6.35	25.4mm	6.35mm
BK7-FWD-38.1-9.52	38.1mm	9.52mm
BK7-FWD-50.8-9.52	50.8mm	9.52mm
BK7-FWD-76.2-12.7	76.2mm	12.7mm
BK7-FWD-101.6-12.7	101.6mm	12.7mm
BK7-FWD-152.4-25.4	152.4mm	25.4mm
BK7-WWD-25.4-6.35-30MIN	25.4mm	6.35mm
BK7-WWD-50.8-9.52-30MIN	50.8mm	9.52mm

Other sizes and specifications are available on request - please contact us.

FUSED SILICA SUBSTRATES



Mirror specifications:
Diameter Tolerance: +0/-0.25mm Thickness Tolerance: +/-0.25mm, front surface: λ/10 flatness, 10-5 scratch-dig, rear surface: inspection polish, better than 5 arc min parallel,

Window specifications:
Diameter Tolerance: +0/-0.25mm Thickness Tolerance: +/-0.25mm, λ/10 transmitted wavefront distortion, both sides 10-5 scratch-dig, better than 10 arc sec parallel

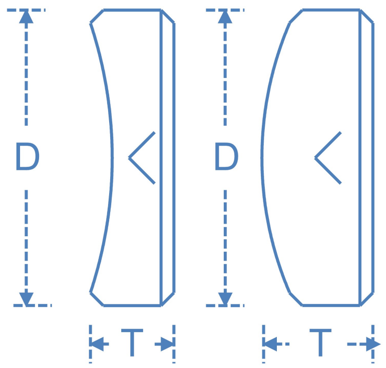
Wedged Optics have a 30arc min (+/-5 arc min), thickness specified for thick side

FUSED SILICA MIRROR SUBSTRATES	DIAMETER (D)	THICKNESS (T)
FS-FMR-12.7-6.35	12.7mm	6.35mm
FS-FMR-25.4-6.35	25.4mm	6.35mm
FS-FMR-38.1-9.52	38.1mm	9.52mm
FS-FMR-50.8-9.52	50.8mm	9.52mm
FS-FMR-76.2-12.7	76.2mm	12.7mm
FS-FMR-101.6-12.7	101.6mm	12.7mm
FS-FMR-152.4-25.4	152.4mm	25.4mm
FS-WMR-25.4-6.35-30MIN	25.4mm	6.35mm
FS-WMR-50.8-9.52-30MIN	50.8mm	9.52mm

FUSED SILICA WINDOW SUBSTRATES	DIAMETER (D)	THICKNESS (T)
FS-FWD-12.7-6.35	12.7mm	6.35mm
FS-FWD-25.4-6.35	25.4mm	6.35mm
FS-FWD-38.1-9.52	38.1mm	9.52mm
FS-FWD-50.8-9.52	50.8mm	9.52mm
FS-FWD-76.2-12.7	76.2mm	12.7mm
FS-FWD-101.6-12.7	101.6mm	12.7mm
FS-FWD-152.4-25.4	152.4mm	25.4mm
FS-WWD-25.4-6.35-30MIN	25.4mm	6.35mm
FS-WWD-50.8-9.52-30MIN	50.8mm	9.52mm

Other sizes and specifications are available on request - please contact us.

SPHERICAL SUBSTRATES



Mirror specifications:
Diameter Tolerance: +0/-0.25mm Thickness Tolerance: +/-0.25mm, front surface: λ/10 surface figure, 10-5 scratch-dig, rear surface: inspection polish, ROC tolerance +/-1%

Lens specifications:
Diameter Tolerance: +0/-0.25mm Thickness Tolerance: +/-0.25mm, λ/10 surface figure, both sides 10-5 scratch-dig, focal length tolerance: +/-0.5%

Plano- Concave substrates:
25.4mm diameter: 6.35mm edge thickness

Plano- Convex substrates:
25.4mm diameter: 6.35mm centre thickness

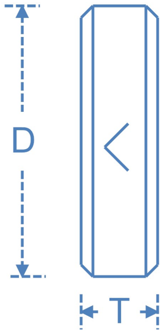
FUSED SILICA MIRROR SUBSTRATES	DIAMETER (D)	RADIUS OF CURVATURE
FS-SMR-25.4-6.35-1.0M-CC	25.4mm	1000mm concave
FS-SMR-25.4-6.35-1.5M-CC	25.4mm	1500mm concave
FS-SMR-25.4-6.35-3.0M-CC	25.4mm	3000mm concave
FS-SMR-25.4-6.35-5.0M-CC	25.4mm	5000mm concave

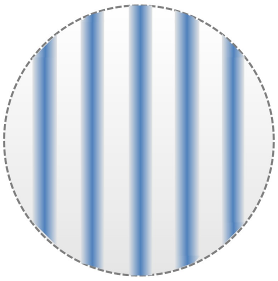
FUSED SILICA LENSES PLANO - CONVEX	DIAMETER (D)	NOMINAL FOCAL LENGTH AT 1064NM
FS-SPL-25.4-6.35-46.5-CX	25.4mm	100mm
FS-SPL-25.4-6.35-56.6-CX	25.4mm	125mm
FS-SPL-25.4-6.35-68.3-CX	25.4mm	150mm
FS-SPL-25.4-6.35-112.4-CX	25.4mm	250mm
FS-SPL-25.4-6.35-135.6-CX	25.4mm	300mm
FS-SPL-25.4-6.35-226.9-CX	25.4mm	500mm
FS-SPL-25.4-6.35-454.4-CX	25.4mm	1000mm

BK7 LENSES PLANO - CONVEX	DIAMETER (D)	NOMINAL FOCAL LENGTH AT 1064NM
BK7-SPL-25.4-6.35-46.5-CX	25.4mm	90mm
BK7-SPL-25.4-6.35-112.4-CX	25.4mm	220mm
BK7-SPL-25.4-6.35-226.9-CX	25.4mm	450mm
BK7-SPL-25.4-6.35-454.4-CX	25.4mm	900mm

Other sizes and specifications are available on request - please contact us.

REFERENCE FLATS

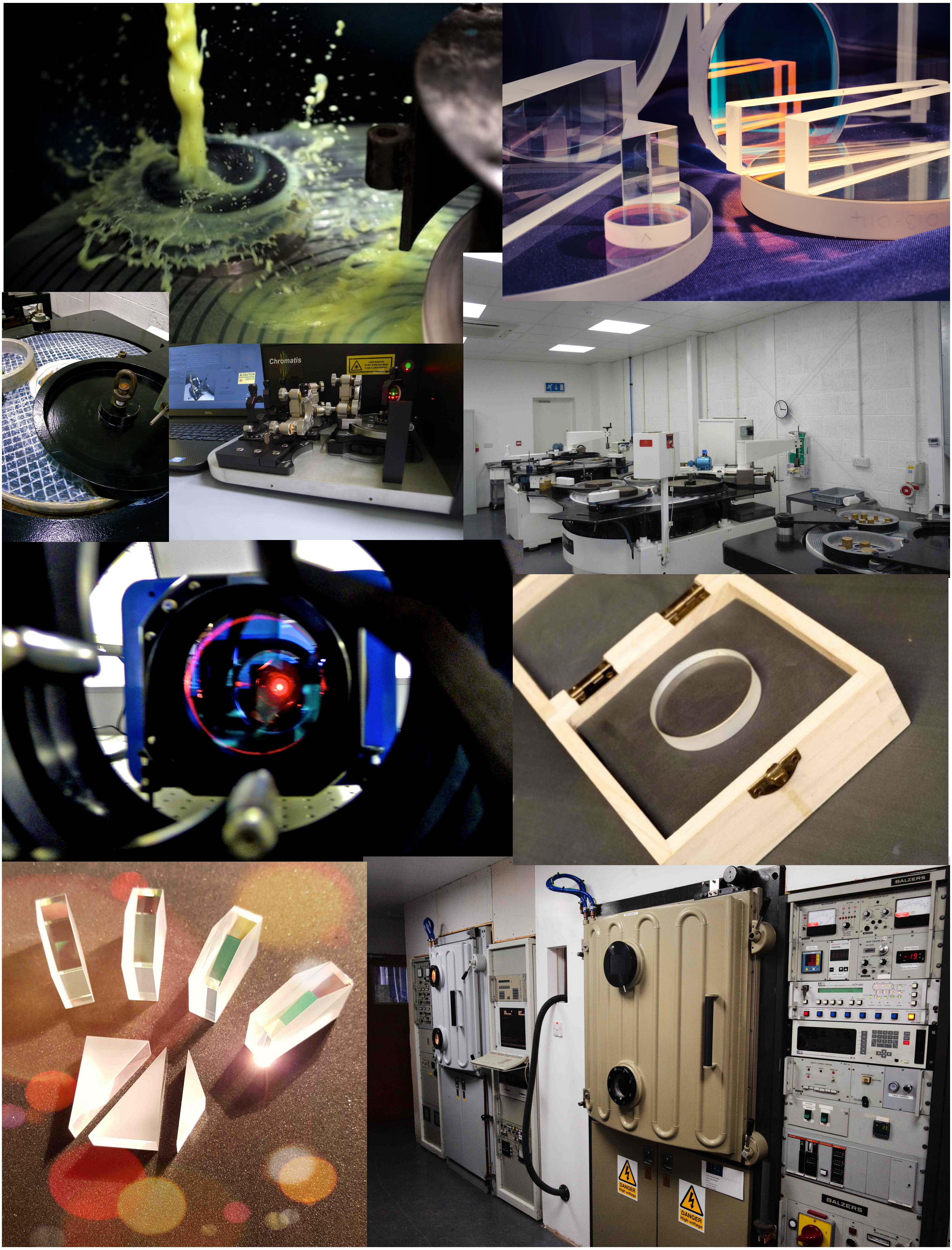




Specifications:
Diameter Tolerance: +0/-0.25mm Thickness Tolerance: +/-0.25mm, front surface: λ/20 flatness, 20-10 scratch-dig, rear surface: inspection polish, better than 5 arc min parallel, uncoated, supplied in wooden box

PART NUMBER	MATERIAL	DIAMETER (D)	THICKNESS (T)
ZER-REF1-25.0-12.0-L/20	Zerodur	25.0mm	12.0mm
ZER-REF1-50.0-15.0-L/20	Zerodur	50.0mm	15.0mm
ZER-REF1-100.0-19.0-L/20	Zerodur	100.0mm	19.0mm
FS-REF1-25.0-12.0-L/20	Fused Silica	25.0mm	12.0mm
FS-REF1-50.0-15.0-L/20	Fused Silica	50.0mm	15.0mm
FS-REF1-100.0-19.0-L/20	Fused Silica	100.0mm	19.0mm

Other sizes and specifications are available on request - please contact us.


Chromatis
BALZERS
DANGER
BALZERS

COATED SUBSTRATES-INTRODUCTION

The following pages list a large number of coated substrates that are available either from stock or at short notice. Items listed in the catalogue, however, only represent a small proportion of coated items that Manx Precision Optics Ltd. carries in stock. Therefore, if you cannot find what you are looking for, please do not hesitate to contact us. We can check the availability of any item via our ERP system while you wait.

Being a family-owned manufacturer, we treat all our customers as individuals and will always ensure that we find the best and most cost-efficient solution for your application.

To ensure consistent quality and being able to respond quickly to customer requirements, Manx Precision Optics Ltd. has a very high manufacturing depth, shaping, grinding, polishing, coating and assembling optics in-house. Our manufacturing process is fully ISO9001:2008 certified.

Laser-induced Damage Threshold (LIDT)

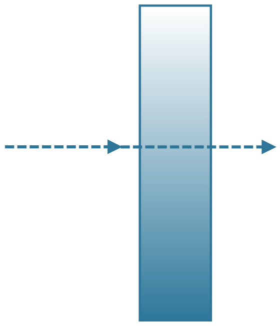
All optics in this catalogue are designed to withstand high laser power and are regularly used in some of the world's most powerful laser systems.

The achievable LIDT for optical components very much depends on the application and the technical details of the laser(s) used. Therefore it is very difficult and in many cases not helpful - scaling the LIDT for sub-nanosecond pulses, for example, follows different rules than scaling it for pulses with a duration from 1ns to 20ns for example.

The table below gives a brief overview of the LIDT we specify for some of the components listed in this catalogue. Please do not hesitate to contact us if you need any further information.

Part Number	Description	LIDT
FS-FMR-25.4-6.35-HR-532-0	Fused Silica mirror, 25.4mm diameter, 6.35mm thick, front surface: lambda/10, 10-5 scratch-dig, rear surface: inspection polish Coating side 1: >99.7%R @ 532nm /0°	>=5J/cm^2 in 1ns (2000-on-1)
FS-FMR-25.4-6.35-HR-1064-45	Fused Silica mirror, 25.4mm diameter, 6.35mm thick, front surface: lambda/10, 10-5 scratch-dig, rear surface: inspection polish Coating side 1: >99.3%R @ 1064nm /45° rand.-POL	>=8J/cm^2 in 1ns (2000-on-1)
FS-CPOL-25.4-1064	Fused Silica cube, optically contacted, 25.4mm x 25.4mm x 25.4mm, lambda/8 transmitted wavefront distortion, 10-5 scratch-dig Immersed Coating: >99.5%R s-POL & >95%T p-POL @ 1064nm /45° Outside faces: AR (<0.25%R) @ 1064nm /0°	>=6J/cm^2 in 1ns (2000-on-1)
FS-25.4-6.35-740-860-0	Fused Silica mirror, 25.4mm diameter, 6.35mm thick, front surface: lambda/10, 10-5 scratch-dig, rear surface: inspection polish Coating side 1: >99.3%R @ 740-860nm /0° low GDD coating	>=0.75J/cm^2 in 150fs (2000-on-1)

AR-COATED WINDOWS



Specifications:
UV Fused Silica, Diameter Tolerance: +0/-0.25mm ,Thickness Tolerance: +/-0.25mm, $\lambda/10$ transmitted wavefront distortion, both sides 10-5 scratch-dig, better than 10 arc sec parallel

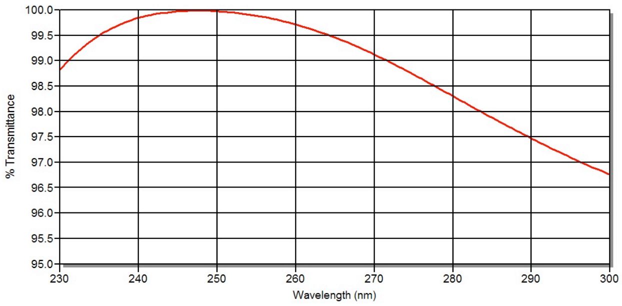
All single wavelength AR coatings give <0.25%R for the respective wavelength.
The broadband AR coatings for 245nm-410nm give (<1%R avg.) while all other listed broadband AR coatings give (<0.5%R avg.).

PART NUMBER	DIAMETER (D)	THICKNESS (T)	COATING WAVELENGTH
FS-FWD-25.4-6.35-AR/AR-248-0	25.4mm	6.35mm	248nm
FS-FWD-25.4-6.35-AR/AR-266-0	25.4mm	6.35mm	266nm
FS-FWD-25.4-6.35-AR/AR-355-0	25.4mm	6.35mm	355nm
FS-FWD-25.4-6.35-AR/AR-532-0	25.4mm	6.35mm	532nm
FS-FWD-50.8-9.52-AR/AR-532-0	50.8mm	9.52mm	532nm
FS-FWD-25.4-6.35-AR/AR-1030-0	25.4mm	6.35mm	1030nm
FS-FWD-50.8-9.52-AR/AR-1030-0	50.8mm	9.52mm	1030nm
FS-FWD-25.4-6.35-AR/AR-1064-0	25.4mm	6.35mm	1064nm
FS-FWD-50.8-9.52-AR/AR-1064-0	50.8mm	9.52mm	1064nm
FS-FWD-25.4-6.35-AR/AR-245-410-0	25.4mm	6.35mm	245nm-410nm
FS-FWD-50.8-9.52-AR/AR-245-410-0	50.8mm	9.52mm	245nm-410nm
FS-FWD-25.4-6.35-AR/AR-400-700-0	25.4mm	6.35mm	400nm-700nm
FS-FWD-50.8-9.52-AR/AR-400-700-0	50.8mm	9.52mm	400nm-700nm
FS-FWD-25.4-6.35-AR/AR-630-1100-0	25.4mm	6.35mm	630nm-1100nm
FS-FWD-50.8-9.52-AR/AR-630-1100-0	50.8mm	9.52mm	630nm-1100nm

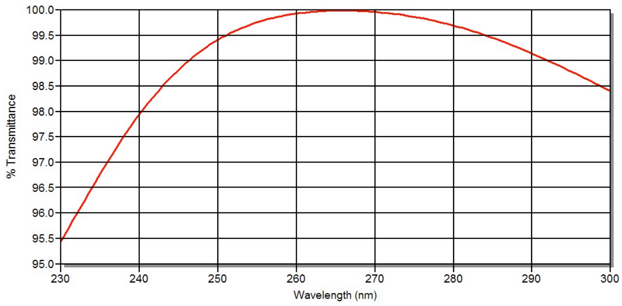
Other sizes and specifications are available on request - please contact us.

AR-COATED WINDOWS

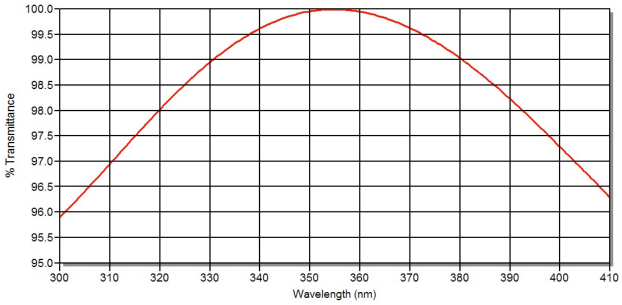
AR @ 248nm /0º



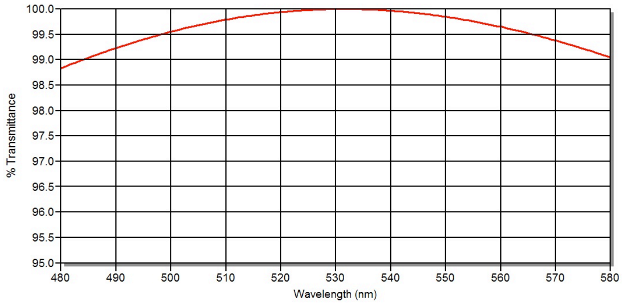
AR @ 266nm /0º



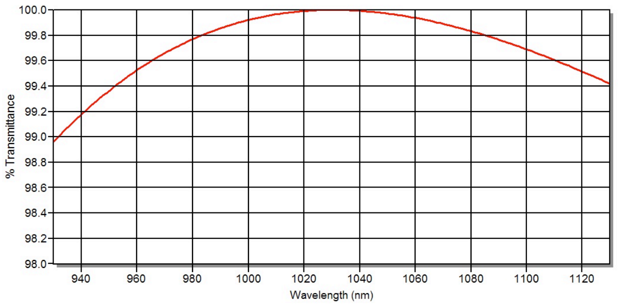
AR @ 355nm /0º



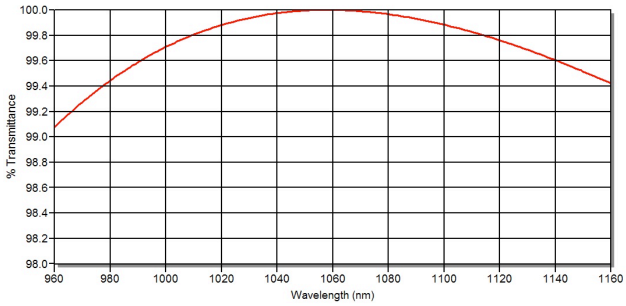
AR @ 532nm /0º



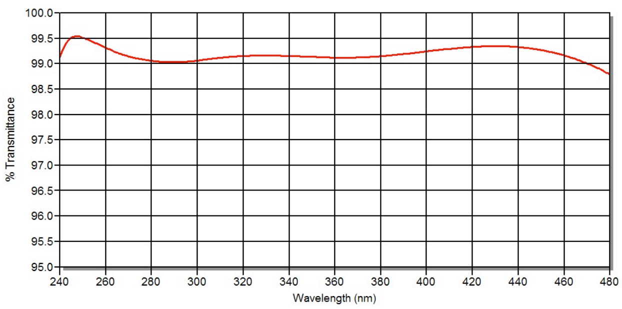
AR @ 1030nm /0º



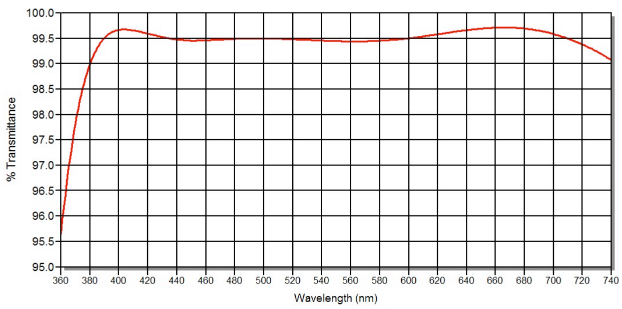
AR @ 1064nm /0º



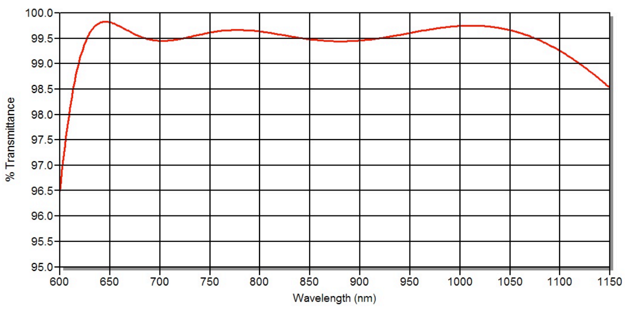
AR @ 245-440nm /0º



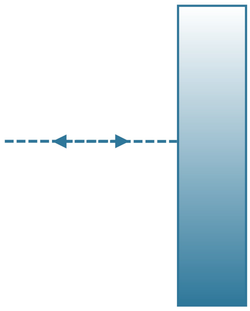
AR @ 400-700nm /0º



AR @ 630-1100nm /0º



LASER LINE MIRRORS 0° INCIDENCE



Specifications:
UV Fused Silica, Diameter Tolerance: +0/-0.25mm ,Thickness Tolerance: +/-0.25mm, front surface: λ/10 flatness, 10-5 scratch-dig, rear surface: inspection polish

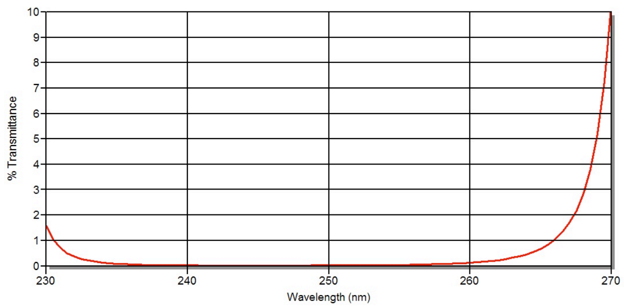
All coatings will give >99.7%R at the respective wavelength.

PART NUMBER	DIAMETER (D)	THICKNESS (T)	COATING WAVELENGTH
FS-FMR-25.4-6.35-HR-248-0	25.4mm	6.35mm	248nm
FS-FMR-50.8-9.52-HR-248-0	50.8mm	9.52mm	248nm
FS-FMR-101.6-12.7-HR-248-0	101.6mm	12.7mm	248nm
FS-FMR-25.4-6.35-HR-266-0	25.4mm	6.35mm	266nm
FS-FMR-50.8-9.52-HR-266-0	50.8mm	9.52mm	266nm
FS-FMR-101.6-12.7-HR-266-0	101.6mm	12.7mm	266nm
FS-FMR-25.4-6.35-HR-355-0	25.4mm	6.35mm	355nm
FS-FMR-50.8-9.52-HR-355-0	50.8mm	9.52mm	355nm
FS-FMR-101.6-12.7-HR-355-0	101.6mm	12.7mm	355nm
FS-FMR-25.4-6.35-HR-532-0	25.4mm	6.35mm	532nm
FS-FMR-50.8-9.52-HR-532-0	50.8mm	9.52mm	532nm
FS-FMR-101.6-12.7-HR-532-0	101.6mm	12.7mm	532nm
FS-FMR-25.4-6.35-HR-1030-0	25.4mm	6.35mm	1030nm
FS-FMR-50.8-9.52-HR-1030-0	50.8mm	9.52mm	1030nm
FS-FMR-101.6-12.7-HR-1030-0	101.6mm	12.7mm	1030nm
FS-FMR-25.4-6.35-HR-1064-0	25.4mm	6.35mm	1064nm
FS-FMR-50.8-9.52-HR-1064-0	50.8mm	9.52mm	1064nm
FS-FMR-101.6-12.7-HR-1064-0	101.6mm	12.7mm	1064nm

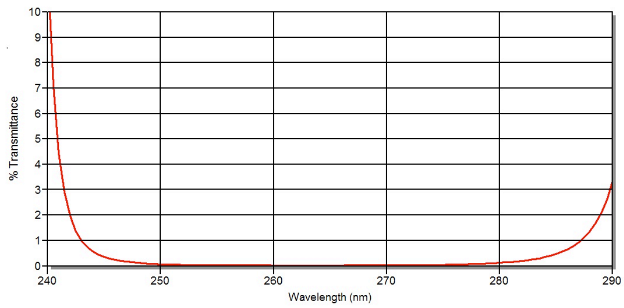
Other sizes and specifications are available on request - please contact us.

LASER LINE MIRRORS 0° INCIDENCE

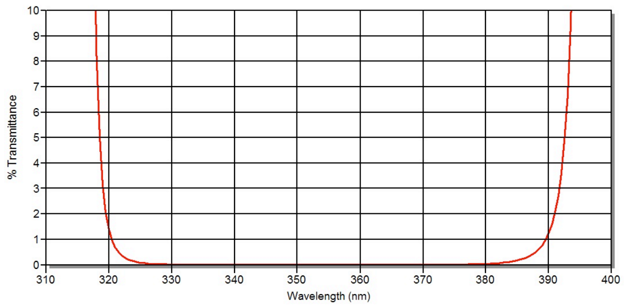
HR @ 248nm /0°



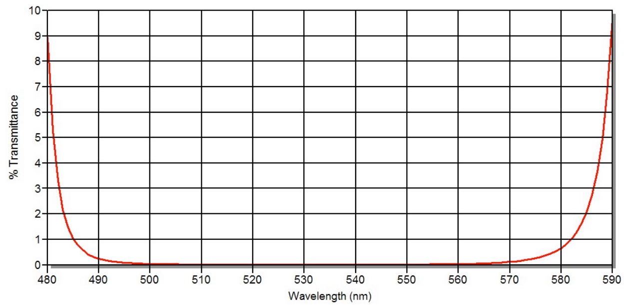
HR @ 266nm /0°



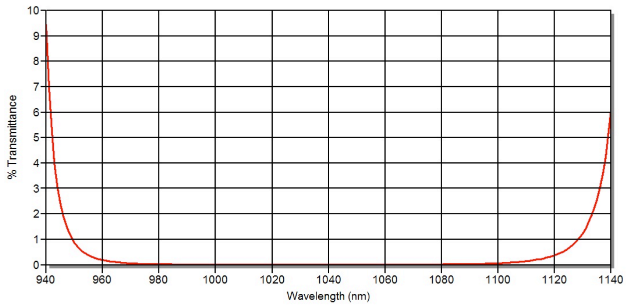
HR @ 355nm /0°



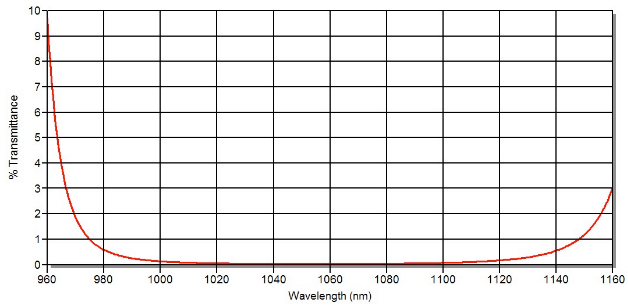
HR @ 532nm /0°



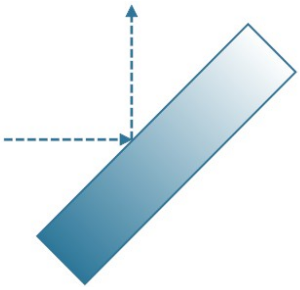
HR @ 1030nm /0°



HR @ 1064nm /0°



LASER LINE MIRRORS 45° INCIDENCE



Specifications:
UV Fused Silica, Diameter Tolerance: +0/-0.25mm ,Thickness Tolerance: +/-0.25mm, front surface: λ/10 flatness, 10-5 scratch-dig, rear surface: inspection polish

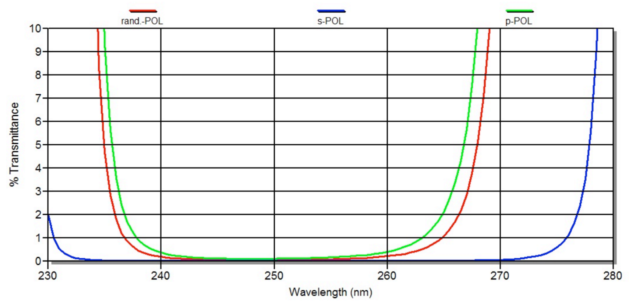
All coatings will give >99.3%R in rand.-POL at the respective wavelength.

PART NUMBER	DIAMETER (D)	THICKNESS (T)	COATING WAVELENGTH
FS-FMR-25.4-6.35-HR-248-45	25.4mm	6.35mm	248nm
FS-FMR-50.8-9.52-HR-248-45	50.8mm	9.52mm	248nm
FS-FMR-101.6-12.7-HR-248-45	101.6mm	12.7mm	248nm
FS-FMR-25.4-6.35-HR-266-45	25.4mm	6.35mm	266nm
FS-FMR-50.8-9.52-HR-266-45	50.8mm	9.52mm	266nm
FS-FMR-101.6-12.7-HR-266-45	101.6mm	12.7mm	266nm
FS-FMR-25.4-6.35-HR-355-45	25.4mm	6.35mm	355nm
FS-FMR-50.8-9.52-HR-355-45	50.8mm	9.52mm	355nm
FS-FMR-101.6-12.7-HR-355-45	101.6mm	12.7mm	355nm
FS-FMR-25.4-6.35-HR-532-45	25.4mm	6.35mm	532nm
FS-FMR-50.8-9.52-HR-532-45	50.8mm	9.52mm	532nm
FS-FMR-101.6-12.7-HR-532-45	101.6mm	12.7mm	532nm
FS-FMR-25.4-6.35-HR-1030-45	25.4mm	6.35mm	1030nm
FS-FMR-50.8-9.52-HR-1030-45	50.8mm	9.52mm	1030nm
FS-FMR-101.6-12.7-HR-1030-45	101.6mm	12.7mm	1030nm
FS-FMR-25.4-6.35-HR-1064-45	25.4mm	6.35mm	1064nm
FS-FMR-50.8-9.52-HR-1064-45	50.8mm	9.52mm	1064nm
FS-FMR-101.6-12.7-HR-1064-45	101.6mm	12.7mm	1064nm

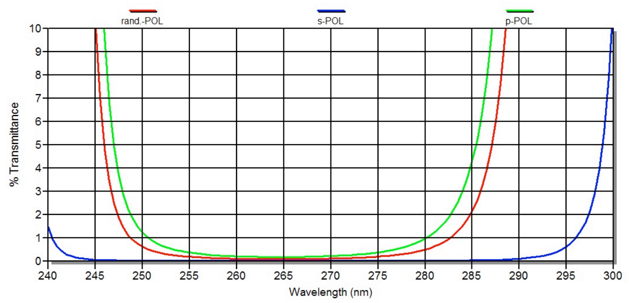
Other sizes and specifications are available on request - please contact us.

LASER LINE MIRRORS 45° INCIDENCE

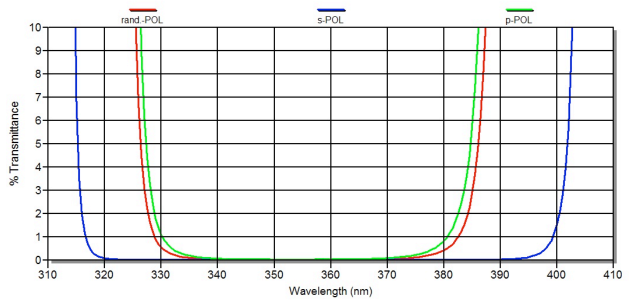
HR @ 248nm /45°



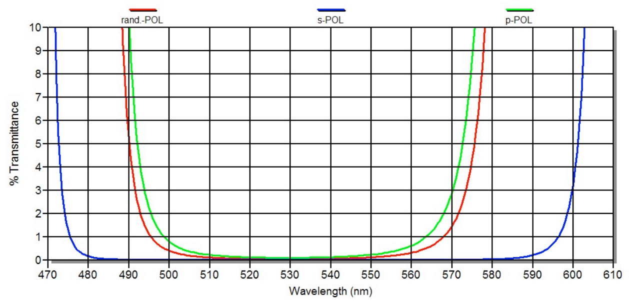
HR @ 266nm /45°



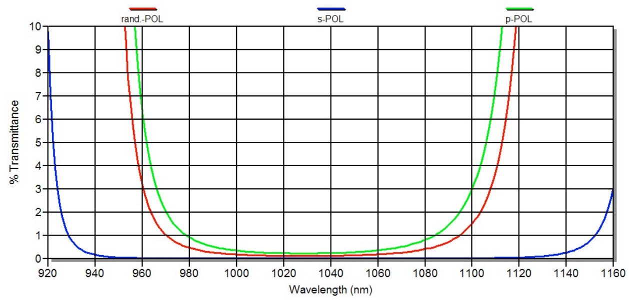
HR @ 355nm /45°



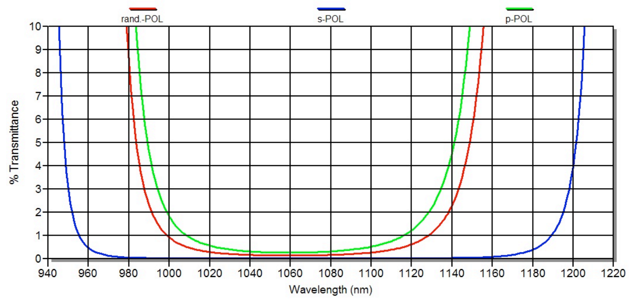
HR @ 532nm /45°



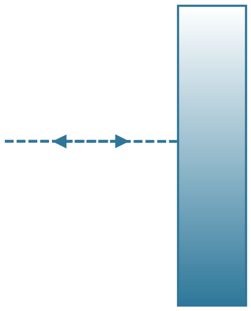
HR @ 1030nm /45°



HR @ 1064nm /45°



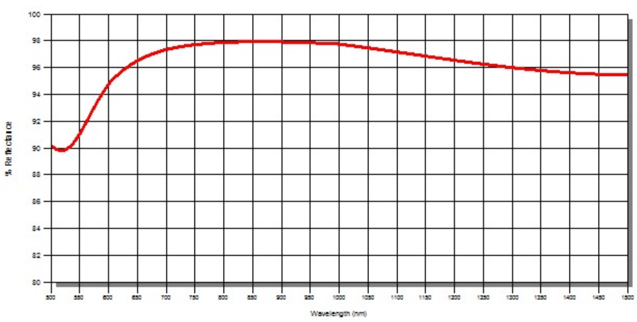
METAL COATED MIRRORS



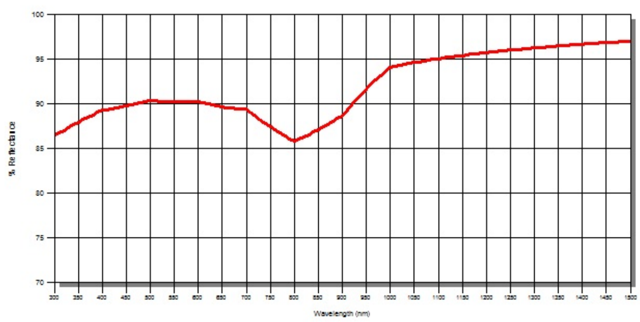
Specifications:
N-BK7, Diameter Tolerance: +0/-0.25mm ,Thickness Tolerance: +/-0.25mm, front surface: λ/10 flatness, 10-5 scratch-dig, rear surface: inspection polish

PART NUMBER	DIAMETER (D)	THICKNESS (T)	COATING MATERIAL
BK7-FMR-25.4-6.35-PAG	25.4mm	6.35mm	Protected Silver
BK7-FMR-50.8-9.52-PAG	50.8mm	9.52mm	Protected Silver
BK7-FMR-101.6-12.7-PAG	101.6mm	12.7mm	Protected Silver
BK7-FMR-25.4-6.35-PAL	25.4mm	6.35mm	Protected Aluminium
BK7-FMR-50.8-9.52-PAL	50.8mm	9.52mm	Protected Aluminium
BK7-FMR-101.6-12.7-PAL	101.6mm	12.7mm	Protected Aluminium

Protected Silver, 0°

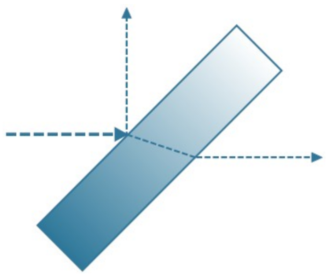


Protected Aluminium, 0 °



Other sizes and specifications are available on request - please contact us.

BEAMSPLITTER COATINGS



Please select the required beamsplitter coating from the table below, applicable to substrates up to 101.6mm (4”) in diameter.

If you need beamsplitters larger than 4” (101.6mm) in diameter or if you cannot find the coating you require in the the table, please do not hesitate to contact us for a quotation. We might have a suitable optic available from stock.

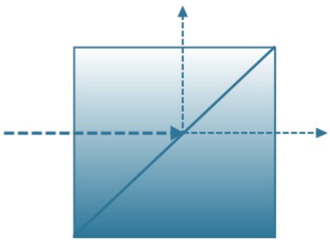
COATING TYPE	WAVELENGTH - 355 nm/ 532 nm / 633 nm / 800 nm / 1030 nm or 1064 nm
Partial reflector - splitting ratio 20% / 50% / 80% / 90% / 95% or 98% at 0° or 45° rand.-POL	Standard coating for 1” - 4” diameter substrate
Anti reflection (AR) coating for 0° or 45° rand.-POL	Standard coating for 1” - 4” diameter substrate

Partial reflectors reflectivity tolerance:

+/- 3% for 20%R and 50%R
+/- 2% for 80%R and 90%R
+/- 1% for 95%R
+/-0.75%R for 98%R

Anti-reflection coatings: <0.25%R for 0° and <1%R for 45° rand.-POL

HIGH LIDT CUBE POLARISERS



Specifications:
Fused Silica cube, optically contacted, Dimensional Tolerance:
+0/-0.25mm , λ/8 transmitted wavefront distortion, 10-5 scratch-dig

Polarising coating immersed to give >99.5%R s-POL & >95%T p-POL @ operational wavelength.

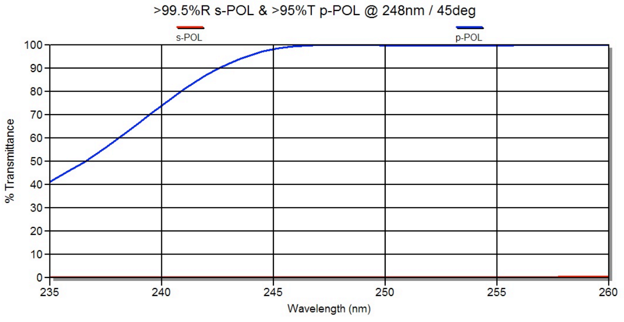
All outside faces AR (<0.25%R) coated at operational wavelength.

PART NUMBER	SIZE	COATING WAVELENGTH
FS-CPOL-25.4-248	25.4mm x 25.4mm x 25.4mm	248nm
FS-CPOL-25.4-266	25.4mm x 25.4mm x 25.4mm	266nm
FS-CPOL-25.4-355	25.4mm x 25.4mm x 25.4mm	355nm
FS-CPOL-25.4-532	25.4mm x 25.4mm x 25.4mm	532nm
FS-CPOL-25.4-1030	25.4mm x 25.4mm x 25.4mm	1030nm
FS-CPOL-25.4-1064	25.4mm x 25.4mm x 25.4mm	1064nm

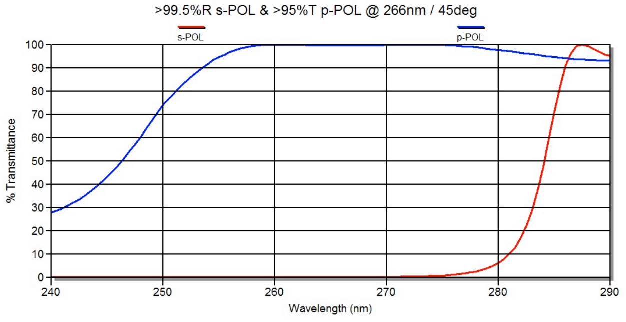
Other sizes and specifications are available on request - please contact us.

HIGH LIDT CUBE POLARISERS

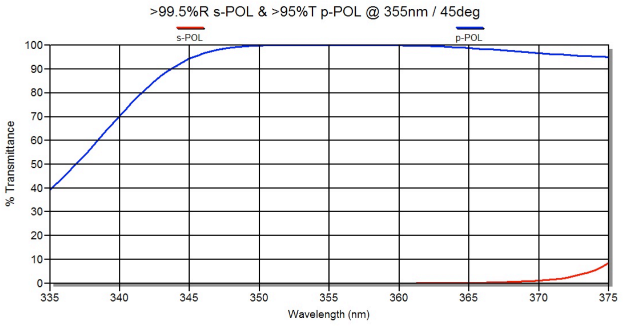
FS-CPOL-25.4-248



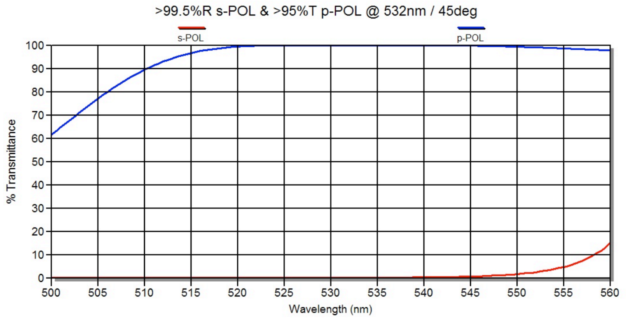
FS-CPOL-25.4-266



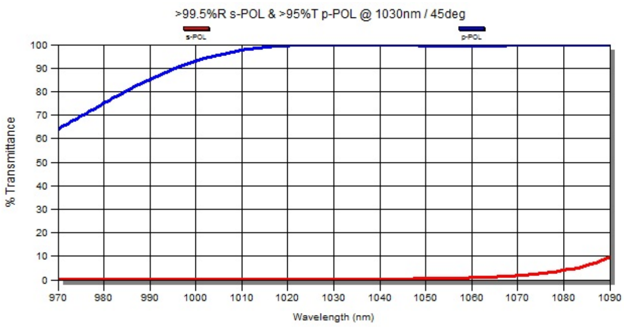
FS-CPOL-25.4-355



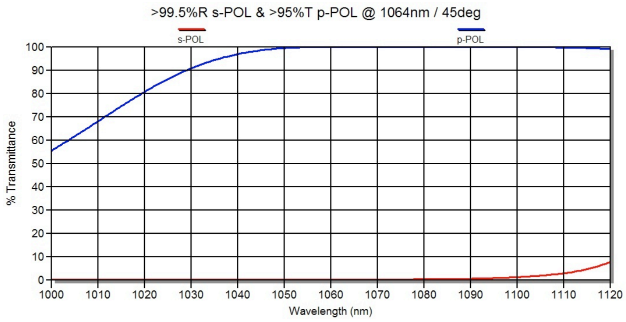
FS-CPOL-25.4-532



FS-CPOL-25.4-1030



FS-CPOL-25.4-1064



WAVEPLATES

Specifications:
Synthetic single crystal quartz, dimensional tolerance: +0/-0.25mm diameter, λ/10 transmitted wavefront distortion, 10-5 scratch-dig, better than 0.5 arc sec parallel, >85% clear aperture
retardation tolerance: λ/100 - λ/600 typical (dependent on wavelength)
unmounted

Both faces AR (<0.25%R) coated at operational wavelength.

The Manx Precision Optics part number for waveplates follows the following pattern:

	Z (for zero order)			2 (for half wave retardation)		Operational
CQWP-	or	- diameter in mm -		or	-	wavelength
	M (for multiple order)			4 (for quarter wave retardation)		in nm

For example: CQWP-Z-25.4-2-248 is a 25.4mm diameter, zero order, half wave retardation waveplate for 248nm.

STANDARD DIAMETERS

25.4mm (1”) 50.8mm (2”)

STANDARD OPERATIONAL WAVELENGTHS IN NM

248	257	266	308	355
400	405	488	514	532
633	670	694	780	800
810	1030	1047	1053	1064
1315	1319	1550		

All waveplates can also be mounted. When mounted, the 25.4mm diameter waveplates will have a minimum 22.1mm clear aperture and an outside mount diameter of 38.1mm, while the mounted 50.8mm diameter waveplates will have a minimum 44.2mm clear aperture and an outside mount diameter of 76.2mm.

Waveplates for other than standard operational wavelengths, different waveplate diameters and uncoated waveplates are also available - please contact us.

COMPONENTS FOR ULTRAFAST LASERS

FS-FMR-25.4-6.35-HR-740-860-0

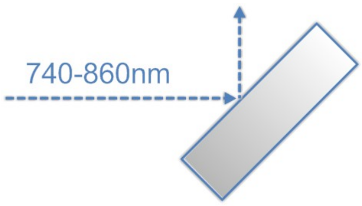
Fused Silica mirror, 25.4mm (+0/-0.25mm) diameter, 6.35mm (+/-0.25mm) thick, front surface: λ/10 flatness, 10-5 scratch-dig, rear surface: inspection polish
Coating side 1: >99.3%R @ 740-860nm / 0°
low GDD coating
Coating side 2: uncoated

FS-FMR-50.8-9.52-HR-740-860-0

Fused Silica mirror, 50.8mm (+0/-0.25mm) diameter, 9.52mm (+/-0.25mm) thick, front surface: λ/10 flatness, 10-5 scratch-dig, rear surface: inspection polish
Coating side 1: >99.3%R @ 740-860nm / 0°
low GDD coating
Coating side 2: uncoated

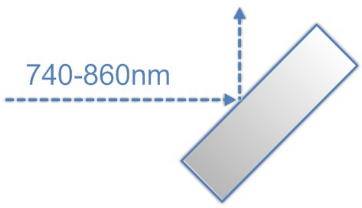
FS-FMR-101.6-12.7-HR-740-860-0

Fused Silica mirror, 101.6mm (+0/-0.25mm) diameter, 12.7mm (+/-0.25mm) thick, front surface: λ/10 flatness, 10-5 scratch-dig, rear surface: inspection polish
Coating side 1: >99.3%R @ 740-860nm / 0°
low GDD coating
Coating side 2: uncoated



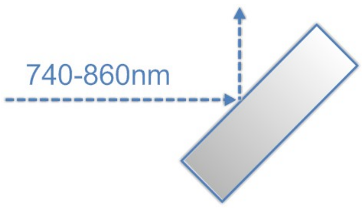
FS-FMR-25.4-6.35-HR-740-860-45P

Fused Silica mirror, 25.4mm (+0/-0.25mm) diameter, 6.35mm (+/-0.25mm) thick, front surface: λ/10 flatness, 10-5 scratch-dig, rear surface: inspection polish
Coating side 1: >99%R @ 740-860nm / 45° p-POL
low GDD coating
Coating side 2: uncoated



FS-FMR-50.8-9.52-HR-740-860-45P

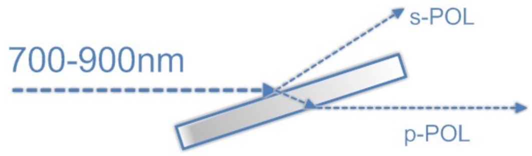
Fused Silica mirror, 50.8mm (+0/-0.25mm) diameter, 9.52mm (+/-0.25mm) thick, front surface: λ/10 flatness, 10-5 scratch-dig, rear surface: inspection polish
Coating side 1: >99%R @ 740-860nm / 45° p-POL
low GDD coating
Coating side 2: uncoated

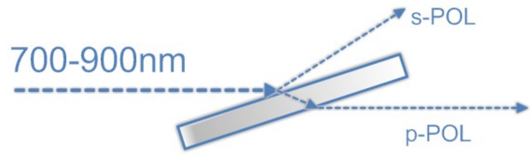


FS-FMR-101.6-12.7-HR-740-860-45P

Fused Silica mirror, 101.6mm (+0/-0.25mm) diameter, 12.7mm (+/-0.25mm) thick, front surface: λ/10 flatness, 10-5 scratch-dig, rear surface: inspection polish
Coating side 1: >99%R @ 740-860nm / 45° p-POL
low GDD coating
Coating side 2: uncoated

COMPONENTS FOR ULTRAFAST LASERS





FS-FWD-28.6-14.3-3.175-PPOL-700-900-72

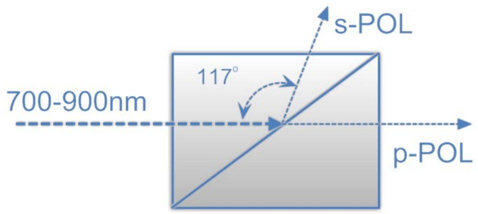
Fused Silica window, 28.6mm x 14.3mm (+0/-0.25mm), 3.175mm (+/-0.25mm) thick, λ/10 transmitted wavefront distortion, 10-5 scratch-dig

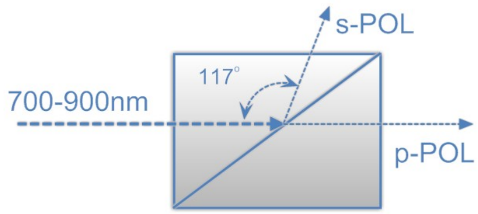
Coating side 1: >85%R (av.) s-POL & >85%T (av.) p-POL @ 700-900nm / 72°
Coating side 2: AR (<2%R avg.) @ 700-900m / 72° p-POL

FS-FWD-60.0-20.0-3.0-PPOL-700-900-72

Fused Silica window, 60.0mm x 20.0mm (+0/-0.25mm), 3.0mm (+/-0.25mm) thick, λ/4 transmitted wavefront distortion, 10-5 scratch-dig

Coating side 1: >85%R (av.) s-POL & >85%T (av.) p-POL @ 700-900nm / 72°
Coating side 2: AR (<2%R avg.) @ 700-900m / 72° p-POL





FS-ECPOL-25.4-700-900

Fused Silica cube polariser, optically contacted, 1" x 1" x 1.38" (25.4mm x 25.4mm x 35.0mm), λ/8 transmitted wavefront distortion, 10-5 scratch-dig, polarising coating immersed
Coating immersed: >99.5%R sPOL & >95%T p-POL @ 700-900nm / 0° low GDD coating
Coating side 2: AR (<0.5%R) @ 700-900nm / 0°

FS-ECPOL-50.8-700-900

Fused Silica cube polariser, optically contacted, 2" x 2" x 2.76" (50.8mm x 50.8mm x 70mm), λ/8 transmitted wavefront distortion, 10-5 scratch-dig, polarising coating immersed
Coating immersed: >99.5%R sPOL & >95%T p-POL @ 700-900nm / 0° low GDD coating
Coating side 2: AR (<0.5%R) @ 700-900nm / 0°

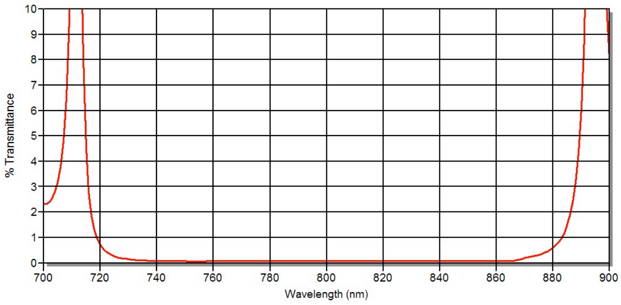
Table of Common/useful angles - Clear aperture 85% (n=1.5)

Diameter/mm	Thickness/mm	Angle of Incidence/°	Useful Aperture/mm
25.4	6.35	45	12.87
		56	9.72
		72	5.06
50.8	9.52	45	26.93
		56	20.62
		72	10.93
76.2	12.70	45	41.00
		56	31.51
		72	16.80
101.6	12.70	45	56.27
		56	43.58
		72	23.47

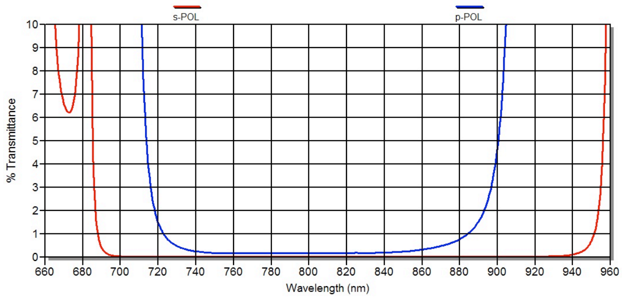
Other sizes and specifications are available on request - please contact us.

COMPONENTS FOR ULTRAFAST LASERS

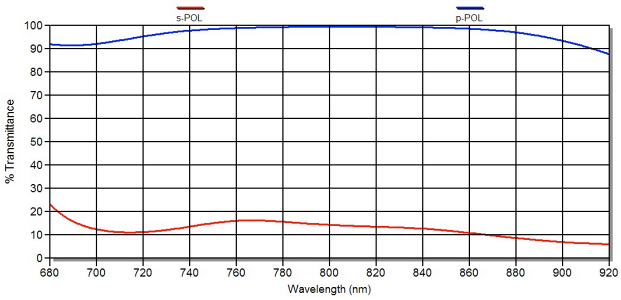
HR @ 740-860nm/0°



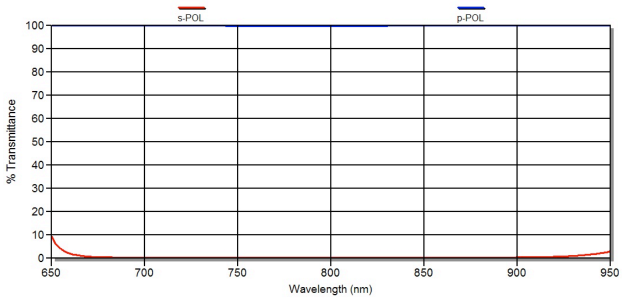
HR @ 740-860nm/45° p-POL



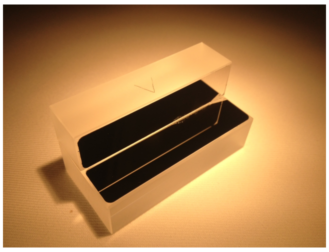
PPOL-700-900-72



FS-ECPOL-25.4-700-900



ROOF MIRRORS



All coatings can also be applied to optically contacted roof mirrors for beam delay lines. Due to the two reflecting mirrors being optically contacted together these mirrors are comparatively easy to mount and to adjust as the two reflecting mirrors maintain their angle and orientation towards each other.

Please contact us for further information.

ETALONS

SOLID ETALONS

Specifications:
UV Fused Silica, Diameter Tolerance: +0/-0.25mm, >=80% clear aperture, Thickness Tolerance: +/-5% of thickness (up to 2mm thickness), better than 1 arc sec parallel, $\lambda/20$ flatness, 10-5 scratch-dig

PART NUMBER	DIAMETER (D)	THICKNESS (T)
ET-FS-25.4-0.2	25.4mm	0.2mm
ET-FS-25.4-0.3	25.4mm	0.3mm
ET-FS-25.4-0.5	25.4mm	0.5mm
ET-FS-25.4-1.0	25.4mm	1.0mm
ET-FS-25.4-2.0	25.4mm	2.0mm

Other specifications are available. All Solid Etalons are also available with optical coatings. Please contact us for further details.

AIR-SPACED ETALONS

Please contact us for further details about air-spaced etalons. We can manufacture traditional air-spaced etalons (with three spacer legs) and ring-spaced etalons (for applications that require very rigid etalons. We hold stock of 30mm diameter (20mm clear aperture) etalon plates and also carry a vast selection of ready-made spacers in stock.

With our in-house software we can find the best specification for your application.

VIRTUALLY IMAGED PHASE ARRAY (VIPA) ETALONS

Manx Precision Optics manufactures a wide range of VIPA Etalons. Please contact us for further information.

Technical Information

Common Substrate Materials

	UV GRADE FUSED SILICA	IR GRADE FUSED SILICA (HERAEUS INFRASIL)	SCHOTT N-BK7	SCHOTT SF10	CAF_2	SAPPHIRE
Transparency Range	190nm-2000nm (some absorption bands within this range)	300nm - 3000nm	400nm - 1800nm	400nm - 2000nm	130nm - 7000nm	400nm - 4000nm
Refractive Index @						
200nm	1.550				1.495	
300nm	1.488	1.490			1.454	
400nm	1.470	1.470	1.531	1.778	1.442	1.786
500nm	1.462	1.462	1.521	1.742	1.436	1.775
1000nm	1.450	1.450	1.508	1.703	1.429	1.756
1500nm	1.444	1.444	1.501	1.694	1.426	1.747
3000nm		1.419			1.418	1.710
GDD fs^2/mm @						
400nm	98	98	120	640	68	150
800nm	36	36	45	160	28	58
1064nm	16	16	22	100	17	29
1500nm	-22	-22	-19	38	1.9	-25
TOD fs^2/mm @						
400nm	30	30	41	500	19	47
800nm	27	27	32	100	16	42
1064nm	44	44	49	100	21	65
1500nm	130	130	140	140	46	180

Please note that the above values are only approximate and that MPO cannot guarantee their accuracy.

Technical Information

Homogeneity, Striae, Bubble Content

INHOMOGENEITY CLASS (PER ISO 10110, PART 4)	MAX. VARIATION OF THE REFRACTIVE INDEX WITHIN A PART OF 10^{-6}
0	+/-50
1	+/-20
2	+/-5
3	+/-2
4	+/-1
5	+/-0.5

STRIAE CLASS (PER ISO 10110, PART 4)	DENSITY OF STRIAE CAUSING AN OPTICAL PATH DIFFERENCE OF AT LEAST 30NM IN %
1	<=10
2	<=5
3	<=2
4	<=10
5	Striae free - 30nm path difference rule does not apply

ISO 10110 Part 3 defines the bubble content of optical components. In drawings, it is denoted by code number 1 in the form of

1/NxA

where N is the number of of bubbles and inclusions of the maximum permitted size as defined in the ISO standard while A denotes the grade number measuring the size of the bubbles. A equals the square root of the projected area of the largest permissible bubble in mm. As long as the the sum of the projected area of all bubbles does not exceed NxA^2 (= maximum total area), a larger number of bubbles of a smaller size is allowed.

Care must be taken, as concentrations of bubbles with more than 20% of of the number of allowed bubbles in any one test region are not allowed. Where the total number of bubbles is less than 10, 2 or more bubbles within any 5% sub-area are also classed as a concentration and are therefore not permitted.

Please contact MPO for further information. We are happy to assist you in choosing the correct material quality for your application.

Technical Information
Surface Cleanliness

The industry standard for surface cleanliness is defined through either ISO or MIL specifications. While we can work to both standards, the surface cleanliness of our catalogue optics are defined by MIL specifications.

SCRATCH DENOMINATION	MAXIMUM WIDTH IN MM	MAXIMUM WIDTH IN INCHES
80	0.08	0.0031
60	0.06	0.0024
40	0.04	0.0016
20	0.02	0.0008
10	0.01	0.0004
5	0.005	0.0002

PLEASE NOTE: THE TOTAL LENGTH OF ALL SCRATCHES OF MAXIMUM SIZE MUST NOT EXCEED 25% OF THE DIAMETER OF THE CLEAR APERTURE

DIG DENOMINATION	MAXIMUM DIAMETER IN MM	MAXIMUM DIAMETER IN INCHES
50	0.50	0.020
40	0.40	0.016
30	0.30	0.012
20	0.20	0.008
10	0.10	0.004
5	0.05	0.002

PLEASE NOTE: THE SUM OF THE DIAMETER OF ALL DIGS MUST NOT BE GREATER THAN TWICE THE DIAMETER SIZE OF THE MAXIMUM DIG SIZE

Technical Information
Coatings

- In dielectric coatings it is always easier to reflect s-polarised light and transmit p-polarised light

- Using a coating designed for 0º under and angle of incidence of 45º will shift the centre of the coating down by approximately 10%.

- For pulse lengths down to 0.5s the LIDT scales with the square root. For example, if the LIDT for a 10ns pulse is known, divide it by the square root of (10/3) to work out the LID for a 3ns pulse.

- For pulse lengths shorter than 0.5ns the above rule of thumb does not work reliably. Please contact us for further information.

- Current research suggests that when working with short pulses (in the ps and fs regime), the LIDT depends very much on the electron band gap in the respective dielectric materials while the deposition technique does not play any significant role as far as the coating is cosmetically very good. If you would like to know more, please do not hesitate to contact MPO - we enjoy technical discussions.

- The table below lists a number of commonly used coating materials

MATERIAL	REFRACTIVE INDEX (AT 550NM)	TRANSMITTANCE RANGE
SiO_2	1.45	185nm - 9000nm
Al_2O_3	1.64	190nm - 7000nm
HfO_2	1.98	240nm - 8000nm
Ta_2O_5	2.1	350nm - 10000nm
TiO_2	2.25	400nm - 8000nm
Nb_2O_5	2.3	400nm - 8000nm
MgF_2	1.38	150nm - 8000nm

Please note that the above values are only approximate and that MPO cannot guarantee their accuracy.

Technical Information
Etalons

- Air-spaced etalons are more thermally stable than solid etalons

- The larger the free spectral range of an air-spaced etalon (i.e. the smaller the air-gap), the more mechanically stable it becomes. Air gaps as small as 20µm are feasible.

- Air-spaced etalons can be pressure- and angle-tuned.

- Solid etalons are more compact and mechanically stable than air-spaced ones, but air-spaced etalons generally have a better effective finesse.

- The range of achievable free spectral ranges for air-spaced etalons is wider than for solid ones.

- The two reflection coatings in air-spaced etalons are generally perfectly matched as both plates are coated together, while solid etalons require two different coatings runs, meaning a higher risk of coating mis-match, especially for broad-band coatings.

- Reflectivity Finesse F of an etalon:

$$F = \frac{\pi \sqrt{R}}{(1-R)}$$

R: Coating Reflectivity

- Free Spectral Range (FSR) of an etalon:

$$FSR = \frac{\lambda^2}{2nd}$$

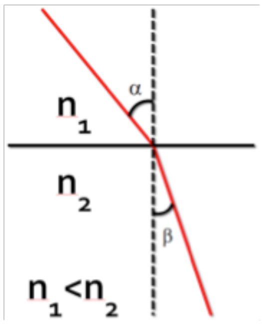
λ : wavelength
n: refractive index
d: spacing distance

- Full-width at half maximum (FWHM) of an etalon:

$$FWHM = \frac{FSR}{F}$$

Technical Information
Equations

Speed of Light: c = 299792458 km/s



Snell's Law:

$$\frac{\sin\alpha}{\sin\beta}=\frac{n_2}{n_1}$$

Focal length of a curved mirror:

$$f=\frac{r}{2}$$

r: radius of curvature

Lensmaker's Equation (approximate focal length of a thin lens):

$$\frac{1}{f}\approx(n-1)\left[\frac{1}{R_1}-\frac{1}{R_2}\right]$$

f: focal length, R_1, R_2: radii of curvature of the lens surfaces

Fresnel reflection of a surface at 0°:

$$R=\frac{n_2-n_1}{n_2+n_1}$$

Optical Density OD:

$$OD=\log_{10}\frac{1}{T}$$

T: Transmission

f-stop number N:

$$N=\frac{f}{D}$$

f: focal length
D: effective aperture

Manx Precision Optics – Quality Policy

Manx Precision Optics Ltd. operates to BS EN ISO 9001:2008 offering high quality optical components, systems and integrated solutions to customers within the photonics industry.

Manx Precision Optics Ltd. focuses on meeting customer requirements through the provision of sound advice. The company encourages all employees to participate in a process of continuous improvement and to adopt a systematic approach to processes in manufacturing and problem solving, working in partnership with its suppliers.

Manx Precision Optics Ltd. adopts the following principles for its operations:

– Creation and maintenance of trusted relationships with suppliers and customers

– Focus on customer requirements and meeting commitments made

– Encourage a work ethic that ensures all employees feel responsible for quality and maintain the highest level of craftsmanship

– Meeting legal and statutory requirements

– Adopting a proactive approach to continual improvement of its quality systems

– Setting a quality objectives program to encourage continuous improvement

Dr Helmut Kessler

Managing Director

14/01/2015

TE LINTELO SYSTEMS BV

photonics is our passion!

lasers

fiber optics

optical components

interferometry

opto-electronics equipment

light metrology

Te Lintelo Systems

Since 1985 Te Lintelo Systems represent prominent suppliers from all over the world for the Benelux countries with well-educated engineers, experience and knowledge.

Over the years we became the specialist in the field of Light metrology, opto-electronic equipment, Laser beam characterization and positioning, Optics, fiber optics and lasers.
Together with our high end suppliers we have the answer for you.

Te Lintelo Systems is your reliable source and long term partner. Service on all levels is for us our daily business. Our team is fully equipped to assist you with finding your best optical business solution. Let's get in touch!

+31 316 340804 | contact@tlsbv.nl | www.tlsbv.nl