

TABLE OF CONTENTS

OPTICAL SUBSTRATES

LENSES

PRISMS

DIELECTRIC
COATED OPTICSMETALLIC
COATED OPTICS

FILTERS

METAL MIRRORS

VARIABLE
REFLECTIVITY MIRRORSNON POLARIZING
BEAMSPLITTER CUBES

POLARIZING OPTICS

COATINGS SECTION

Optical Substrates

2

Optical Substrates 2

Lenses

3

Plano-Convex Lenses 3

Plano-Concave Lenses 5

Double-Convex Lenses 6

Double-Concave Lenses 7

Positive Cylindrical Lenses 8

Negative Cylindrical Lenses 9

Meniscus Lenses 10

Achromatic Lenses 11

Aspherical Lenses 12

Plano-Convex Axicons 13

Plano-Concave Axicons 14

Double Convex Axicons 15

Prisms

16

Right-Angle Prisms 16

Dispersing Prisms 16

Right-Angle Prisms – Retroreflectors 17

Penta Prisms 18

Corner Cube Retroreflectors 18

Dove Prisms 19

Anamorphic Prisms 19

Wedge Prisms 20

Littrow Prisms 21

Dielectric Coated Optics

22

HR Laser Line Mirrors 22

HR Broad Band Mirrors 23

Partial Reflecting Mirrors 24

Wavelength Separators 26

Dual Laser Line Reflecting Mirrors 27

AR Coated Windows 28

Broad Band AR Coated Windows 30

Dual AR Coated Windows 31

Metallic Coated Optics

32

Metallic Coated Optics 32

Filters

34

Color Glass Filters 34

Interference Filters 36

Neutral Density Absorption Type Filters 37

Circular Variable Neutral Density Filters 38

Metal Mirrors

39

Metal Mirrors 39

Opto-Mechanical Products



Opto-Mechanical Products can be found in separate catalogue.

Variable Reflectivity Mirrors

40

Variable Reflectivity Mirrors 40

Non Polarizing Beamsplitter Cubes

41

Non Polarizing Beamsplitter Cubes 41

Polarizing Optics

42

Waveplates – Brief Overview 42

Crystalline Quartz Waveplates 43

Achromatic (broadband) Waveplates 44

Mid-IR Waveplates 45

Brewster Thin Film Polarizers 46

Broadband (ultrafast) Thin Film Polarizers 47

Polarizing Beamsplitter Cubes 48

Fresnel Rhomb Retarders (achromatic) 49

Glan Taylor Polarizing Prisms 50

High Power Glan Polarizing Prisms 50

Glan Thompson Polarizing Prisms 51

Beam Displacers 52

Wollaston Polarizing Prisms 52

Rochon Polarizing Prisms 53

Coatings Section

54

Dielectric Coatings 54

HR Laser Line Coatings 55

Partial Reflecting Coatings 56

HR Broad Band Coatings 56

Wavelength Separating Coatings 57

Laser Line Anti-Reflection Coatings 58

Dual Laser Line Reflecting Coatings 58

Broad Band Anti-Reflection Coatings 59

Metallic Coatings 60

Dual Anti-Reflection Coatings 60



e-mail: sales@standa.lt

http://www.standa.lt



Phone: +370-5-2651 474

Fax: +370-5-2651 483



Svirigailos 21, LT-00262 Vilnius, LITHUANIA



OPTICAL SUBSTRATES

LENSES

PRISMS

DIELECTRIC
COATED OPTICS

METALLIC
COATED OPTICS

FILTERS

METAL MIRRORS

VARIABLE
REFLECTIVITY MIRRORS

NON POLARIZING
BEAMSPLITTER CUBES

POLARIZING OPTICS

COATINGS SECTION

OPTICAL SUBSTRATES

14S Optical Substrates



FEATURES

- Ideal for beamsplitters, windows, partial reflecting mirrors etc.
- UVFS substrates are recommended for the UV and very high energy applications
- Windows up to 500 mm diameter are available
- Various dielectric coatings can be deposited on substrates

STANDARD SPECIFICATIONS

Material	BK7, UVFS, IRFS, CaF ₂ , ZnSe, Sapphire, MgF ₂
Shape	Round, Rectangular
Surface Quality	20–10 scratch & dig (BK7, UVFS); 40–20 scratch & dig (ZnSe, Sapphire, CaF ₂ , MgF ₂)
Surface Figure	$\lambda/10 - \lambda/8$ per 1 inch diam (BK7, UVFS) $\lambda/2 - \lambda/4$ per 1 inch diam (ZnSe)
Dimension Tolerances	Diameter: +0.0, -0.1 mm Thickness: ± 0.1 mm
Coatings	None. Please refer to the <i>Coating Section</i>

CODE EXAMPLE FOR ORDERING

14S-1-1-XXX

Dimensions

Substrate material

Coating type
(optional)

Various dimensions substrates made from BK7, UVFS, IRFS, CaF₂, ZnSe, Sapphire, MgF₂.

Standard substrates are laser grade polished on both surfaces. These substrates are ideal for beamsplitters, windows, partial reflecting mirrors etc.

Laser components require highly polished substrates as well as high performance coatings. Scattering, laser damage of laser light can occur if the substrate is made of inferior material or if it is inadequately polished. For UV, very high power applications and ultrashort pulses we recommend using UVFS substrates. BK7 substrates are economical solution for laser components used in many applications in laboratory as well as in many devices and instruments.

Standa provides various dielectric and metallic coatings on optical substrates.

STANDARD PRODUCTS

Material	Dimensions, mm	Parallelism Error	Ordering Code
BK7	12.7×3	<1 arcmin	14S-05-1
	12.5×5	<1 arcmin	14S-4-1
	12.7×6	<1 arcmin	14S-5-1
	20×40×3	<20 arcsec	14S-6-1
	25.4×3	<1 arcmin	14S-7-1
	25.4×5	1 deg ± 5 arcmin	14S-8-1
	25.4×6	<1 arcmin	14S-1-1
	30×6	<1 arcmin	14S-9-1
	38.1×5	<1 arcmin	14S-10-1
	50.8×8	<1 arcmin	14S-2-1
UVFS	76.2×8	<1 arcmin	14S-3-1
	12.7×2	<1 arcmin	14S-11-2
	12.7×6	<1 arcmin	14S-5-2
	20×40×3	<20 arcsec	14S-6-2
	20×60×2	<20 arcsec	14S-14-2
	25.4×3	<1 arcmin	14S-7-2
	25.4×5	<1 arcmin	14S-8-2
	25.4×3	1 deg ± 5 arcmin	14S-16-2
	30×5	<1 arcmin	14S-17-2
	30×30×5	<1 arcmin	14S-18-2
	38.1×5	<1 arcmin	14S-10-2
	50.8×6	<1 arcmin	14S-20-2
	76.2×6	<1 arcmin	14S-21-2
IRFS	12.7×6	<1 arcmin	14S-5-3
	25.4×3	<1 arcmin	14S-7-3
ZnSe	25.4×3	<1 arcmin	14S-7-4
CaF ₂	25.4×3	<1 arcmin	14S-7-5
MgF ₂	25.4×3	<1 arcmin	14S-7-6
Sapphire	25.4×3	<1 arcmin	14S-7-7

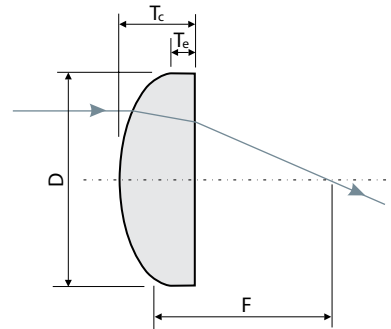
LENSES

14PCX Plano-Convex Lenses

Positive focal length lenses have flat surface on one side and spherical surface on the other. They are used for focusing beams in telescopes, collimators or condenser systems, optical transceivers or other applications. PCX lens up to 500 mm diameter are available. Under customers request lens are anti-reflection coated (please refer to the *Coatings section*).

STANDARD SPECIFICATIONS

Material	BK7, FS, UVFS, CaF ₂ , ZnSe, Si, Ge
Diameter Tolerance	+0.0, -0.15 mm
Focal Length Tolerance	±3%
Centration	<3 arc minutes
Clear Aperture	>90%
Chamfer	0.25 mm @ 45°
Surface Figure	$\lambda/4$ @ 632.8 nm
Surface Quality	40-20 scratch & dig
Design Wavelength	632.8 nm
AR Coatings	None. Please refer to the <i>Coatings Section</i>



FEATURES

- Converges incident light
- Other dimensions are available in small and mass production quantities
- Various AR coatings are available for all these lenses. Please refer to the *Coatings Section*

BK7 PLANO-CONVEX LENSES

Diameter D, mm	Focal Length F, mm	Edge Thickness Te, mm	Ordering Code
12.7	+20	2.5	14PCX20-05-1
12.7	+25	2.5	14PCX25-05-1
12.7	+40	2.5	14PCX40-05-1
12.7	+50	2.5	14PCX50-05-1
12.7	+60	2.5	14PCX60-05-1
12.7	+75	2.5	14PCX75-05-1
12.7	+100	2.5	14PCX100-05-1
12.7	+150	2.5	14PCX150-05-1
12.7	+200	2.0	14PCX200-05-1
12.7	+250	2.0	14PCX250-05-1
12.7	+300	2.0	14PCX300-05-1
12.7	+500	2.0	14PCX500-05-1
12.7	+1000	2.0	14PCX1000-05-1
12.7	+1500	2.0	14PCX1500-05-1
25.4	+35	2.0	14PCX35-1-1
25.4	+50	2.0	14PCX50-1-1
25.4	+60	2.0	14PCX60-1-1
25.4	+75	2.0	14PCX75-1-1
25.4	+100	2.0	14PCX100-1-1
25.4	+125	2.0	14PCX125-1-1
25.4	+150	2.0	14PCX150-1-1

Diameter D, mm	Focal Length F, mm	Edge Thickness Te, mm	Ordering Code
25.4	+200	2.0	14PCX200-1-1
25.4	+250	2.0	14PCX250-1-1
25.4	+300	2.0	14PCX300-1-1
25.4	+400	2.0	14PCX400-1-1
25.4	+500	2.0	14PCX500-1-1
25.4	+750	2.0	14PCX750-1-1
25.4	+1000	2.5	14PCX1000-1-1
25.4	+1200	2.5	14PCX1200-1-1
25.4	+1500	2.5	14PCX1500-1-1
25.4	+2000	3.0	14PCX2000-1-1
25.4	+2500	3.0	14PCX2500-1-1
25.4	+3000	3.0	14PCX3000-1-1
25.4	+4000	3.0	14PCX4000-1-1
25.4	+5000	3.0	14PCX5000-1-1
25.4	+10000	3.0	14PCX10000-1-1
50.8	+200	3.0	14PCX200-2-1
50.8	+300	3.0	14PCX300-2-1
50.8	+350	3.0	14PCX350-2-1
50.8	+500	3.0	14PCX500-2-1
50.8	+1000	3.0	14PCX1000-2-1
50.8	+2000	3.0	14PCX2000-2-1

OPTICAL SUBSTRATES

LENSES

PRISMS

DIELECTRIC
COATED OPTICSMETALLIC
COATED OPTICS

FILTERS

METAL MIRRORS

VARIABLE
REFLECTIVITY MIRRORSNON POLARIZING
BEAMSPLITTER CUBES

POLARIZING OPTICS

COATINGS SECTION

OPTICAL SUBSTRATES

LENSES

PRISMS

DIELECTRIC
COATED OPTICS

METALLIC
COATED OPTICS

FILTERS

METAL MIRRORS

VARIABLE
REFLECTIVITY MIRRORS

NON POLARIZING
BEAMSPLITTER CUBES

POLARIZING OPTICS

COATINGS SECTION

UVFS PLANO-CONVEX LENSES

Diameter D, mm	Focal Length F, mm	Edge Thickness T _e , mm	Ordering Code
12.7	+20	2.5	14PCX20-05-2
12.7	+25	2.5	14PCX25-05-2
12.7	+40	2.5	14PCX40-05-2
12.7	+50	2.5	14PCX50-05-2
12.7	+60	2.5	14PCX60-05-2
12.7	+75	2.5	14PCX75-05-2
12.7	+100	2.5	14PCX100-05-2
12.7	+150	2.5	14PCX150-05-2
12.7	+200	2.0	14PCX200-05-2
12.7	+250	2.0	14PCX250-05-2
12.7	+300	2.0	14PCX300-05-2
12.7	+500	2.0	14PCX500-05-2
12.7	+1000	2.0	14PCX1000-05-2
12.7	+1500	2.0	14PCX1500-05-2
25.4	+35	2.0	14PCX35-1-2
25.4	+50	2.0	14PCX50-1-2
25.4	+60	2.0	14PCX60-1-2
25.4	+75	2.0	14PCX75-1-2
25.4	+100	2.0	14PCX100-1-2
25.4	+125	2.0	14PCX125-1-2
25.4	+150	2.0	14PCX150-1-2

Diameter D, mm	Focal Length F, mm	Edge Thickness T _e , mm	Ordering Code
25.4	+200	2.0	14PCX200-1-2
25.4	+250	2.0	14PCX250-1-2
25.4	+300	2.0	14PCX300-1-2
25.4	+400	2.0	14PCX400-1-2
25.4	+500	2.0	14PCX500-1-2
25.4	+750	2.0	14PCX750-1-2
25.4	+1000	2.5	14PCX1000-1-2
25.4	+1200	2.5	14PCX1200-1-2
25.4	+1500	2.5	14PCX1500-1-2
25.4	+2000	3.0	14PCX2000-1-2
25.4	+2500	3.0	14PCX2500-1-2
25.4	+3000	3.0	14PCX3000-1-2
25.4	+4000	3.0	14PCX4000-1-2
25.4	+5000	3.0	14PCX5000-1-2
25.4	+10000	3.0	14PCX10000-1-2
50.8	+200	3.0	14PCX200-2-2
50.8	+300	3.0	14PCX300-2-2
50.8	+350	3.0	14PCX3500-2-2
50.8	+500	3.0	14PCX500-2-2
50.8	+1000	3.0	14PCX1000-2-2
50.8	+2000	3.0	14PCX2000-2-2



e-mail: sales@standa.lt

http://www.standa.lt



Phone: +370-5-2651474

Fax: +370-5-2651483



Svirigalios 21, LT-00262 Vilnius, LITHUANIA



CODE EXAMPLE FOR ORDERING

14PCX100-1-2

Focal length

Diameter
05 – 12.7 mm
1 – 25.4 mm
2 – 50.8 mm

Material

1 – BK7
2 – UVFS
3 – CaF₂
4 – ZnSe

RELATED PRODUCTS AND ACCESSORIES

- **4SCML-2** – Self-Centering Lens/Optics Mount
- **5TLM-1** – Y-Z Positioner for Lens, Pinholes and Objectives


CaF₂ PLANO-CONVEX LENSES

Diameter D, mm	Focal Length F, mm	Edge Thickness T _e , mm	Ordering Code
25.4	+100	3.0	14PCX-100-1-3
25.4	+200	3.0	14PCX-200-1-3
25.4	+500	3.0	14PCX-500-1-3
25.4	+1000	3.0	14PCX-1000-1-3

ZnSe PLANO-CONVEX LENSES

Diameter D, mm	Focal Length F, mm	Edge Thickness T _e , mm	Ordering Code
12.7	+25	3.0	14PCX-25-05-4
12.7	+30	3.0	14PCX-30-05-4
12.7	+50	2.5	14PCX-50-05-4
12.7	+100	2.5	14PCX-100-05-4
12.7	+200	2.5	14PCX-200-05-4
12.7	+300	2.5	14PCX-300-05-4
12.7	+500	2.5	14PCX-500-05-4
25.4	+100	2.5	14PCX-100-1-4
25.4	+200	2.5	14PCX-200-1-4
25.4	+300	2.5	14PCX-300-1-4
25.4	+500	2.5	14PCX-500-1-4

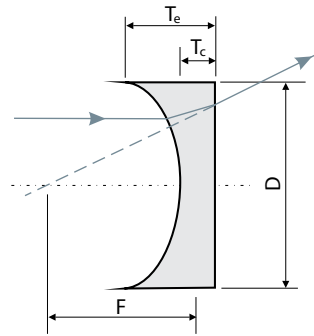
14PCV

Plano-Concave Lenses

These negative focus length lenses have flat surface on one side and spherical surface on the other. They are used to expand beams or to increase focal lengths in optical systems or other similar applications. PCV lens up to 500 mm diameter are available. Under customers request lens are anti-reflection coated (please refer to the *Coatings section*).

STANDARD SPECIFICATIONS

Material	BK7, FS, UVFS, CaF ₂ , ZnSe, Si, Ge
Diameter Tolerance	+0.0, -0.15 mm
Focal Length Tolerance	±3%
Centration	<3 arc minutes
Clear Aperture	>90%
Chamfer	0.25 mm @ 45°
Surface Figure	$\lambda/4$ @ 632.8 nm
Surface Quality	40-20 scratch & dig
Design Wavelength	632.8 nm
AR coatings	None. Please refer to the <i>Coatings Section</i>



FEATURES

- Diverges incident light
- Other dimensions are available in small and mass production quantities
- Various AR coatings are available for all these lenses. Please refer to the *Coatings Section*

OPTICAL SUBSTRATES

LENSES

PRISMS

DIELECTRIC
COATED OPTICSMETALLIC
COATED OPTICS

FILTERS

METAL MIRRORS

VARIABLE
REFLECTIVITY MIRRORSNON POLARIZING
BEAMSPLITTER CUBES

POLARIZING OPTICS

COATINGS SECTION

BK7 PLANO-CONCAVE LENSES

Diameter D, mm	Focal Length F, mm	Edge Thickness Te, mm	Ordering Code
12.7	-20	4.0	14PCV20-05-1
12.7	-30	3.5	14PCV30-05-1
12.7	-50	3.5	14PCV50-05-1
12.7	-75	3.5	14PCV75-05-1
12.7	-100	3.5	14PCV100-05-1
12.7	-150	3.5	14PCV150-05-1
12.7	-200	3.5	14PCV200-05-1
12.7	-250	3.5	14PCV250-05-1
12.7	-500	3.5	14PCV500-05-1
12.7	-1000	3.5	14PCV1000-05-1
25.4	-40	6.0	14PCV40-1-1
25.4	-50	5.5	14PCV50-1-1
25.4	-75	5.0	14PCV75-1-1
25.4	-100	4.0	14PCV100-1-1
25.4	-150	3.5	14PCV150-1-1
25.4	-200	3.5	14PCV200-1-1
25.4	-250	3.5	14PCV250-1-1
25.4	-300	3.5	14PCV300-1-1
25.4	-400	3.5	14PCV400-1-1
25.4	-500	3.5	14PCV500-1-1
25.4	-1000	3.5	14PCV1000-1-1
25.4	-2000	3.5	14PCV2000-1-1
25.4	-3000	3.5	14PCV3000-1-1
25.4	-10000	3.5	14PCV10000-1-1
50.8	-500	4.0	14PCV500-2-1
50.8	-900	4.0	14PCV900-2-1
50.8	-1000	4.0	14PCV1000-2-1
50.8	-1200	4.0	14PCV1200-2-1
50.8	-1500	4.0	14PCV1500-2-1
50.8	-2000	4.0	14PCV2000-2-1
50.8	-8000	4.0	14PCV8000-2-1

UVFS PLANO-CONCAVE LENSES

Diameter D, mm	Focal Length F, mm	Edge Thickness Te, mm	Ordering Code
12.7	-20	4.0	14PCV20-05-2
12.7	-30	3.5	14PCV30-05-2
12.7	-50	3.5	14PCV50-05-2
12.7	-75	3.5	14PCV75-05-2
12.7	-100	3.5	14PCV100-05-2
12.7	-150	3.5	14PCV150-05-2
12.7	-200	3.5	14PCV200-05-2
12.7	-250	3.5	14PCV250-05-2
12.7	-500	3.5	14PCV500-05-2
12.7	-1000	3.5	14PCV1000-05-2
25.4	-40	6.0	14PCV40-1-2
25.4	-50	5.5	14PCV50-1-2
25.4	-75	5.0	14PCV75-1-2
25.4	-100	4.0	14PCV100-1-2
25.4	-150	3.5	14PCV150-1-2
25.4	-200	3.5	14PCV200-1-2
25.4	-250	3.5	14PCV250-1-2
25.4	-300	3.5	14PCV300-1-2
25.4	-400	3.5	14PCV400-1-2
25.4	-500	3.5	14PCV500-1-2
25.4	-1000	3.5	14PCV1000-1-2
25.4	-2000	3.5	14PCV2000-1-2
25.4	-3000	3.5	14PCV3000-1-2
25.4	-10000	3.5	14PCV10000-1-2
50.8	-500	4.0	14PCV500-2-2
50.8	-900	4.0	14PCV900-2-2
50.8	-1000	4.0	14PCV1000-2-2
50.8	-1200	4.0	14PCV1200-2-2
50.8	-1500	4.0	14PCV1500-2-2
50.8	-2000	4.0	14PCV2000-2-2
50.8	-8000	4.0	14PCV8000-2-2

OPTICAL SUBSTRATES

LENSES

PRISMS

DIELECTRIC
COATED OPTICS

METALLIC
COATED OPTICS

FILTERS

METAL MIRRORS

VARIABLE
REFLECTIVITY MIRRORS

NON POLARIZING
BEAMSPLITTER CUBES

POLARIZING OPTICS

COATINGS SECTION

CODE EXAMPLE FOR ORDERING

14PCV100-1-1

Focal length

Diameter
05 – 12.7 mm
1 – 25.4 mm
2 – 50.8 mm

Material
1 – BK7
2 – UVFS
3 – CaF₂
4 – ZnSe

RELATED PRODUCTS

- **5ZYP-2-B1** –
Y-Z Positioner for
Lens, Pinholes and
Objectives



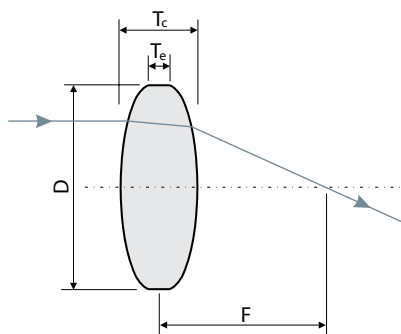
CaF₂ PLANO-CONCAVE LENSES

Diameter D, mm	Focal Length F, mm	Edge Thickness T _e , mm	Ordering Code
25.4	-100	3.0	14PCV100-1-3
25.4	-200	3.0	14PCV200-1-3
25.4	-500	3.0	14PCV500-1-3
25.4	-1000	3.0	14PCV1000-1-3

ZnSe PLANO-CONCAVE LENSES

Diameter D, mm	Focal Length F, mm	Edge Thickness T _e , mm	Ordering Code
12.7	-50	3.0	14PCV50-05-4
12.7	-100	3.0	14PCV100-05-4
12.7	-500	2.5	14PCV500-05-4
25.4	-50	3.5	14PCV50-1-4
25.4	-100	3.0	14PCV100-1-4
25.4	-200	2.5	14PCV200-1-4
25.4	-300	2.5	14PCV300-1-4

14BCX Double-Convex Lenses



FEATURES

- Converges incident light
- Lower spherical aberrations than for Plano-Convex lenses
- Other dimensions are available in small and mass production quantities
- Various AR coatings are available for all these lenses. Please refer to the *Coatings Section*

Double convex lenses are symmetrical therefore have equal radius of curvature on both sides. Biconvex lenses are used as magnifiers, objectives, condensing systems. Since both surfaces contribute to the power of biconvex lenses, they have shorter focal length than PCX lenses of equal diameter and surface radius. Lenses can be anti-reflection coated (please refer to the *Coatings section*).

STANDARD SPECIFICATIONS

Material	BK7, FS, UVFS, CaF ₂ , ZnSe, Si, Ge
Diameter Tolerance	+0.0, -0.15 mm
Focal Length Tolerance	±3%
Centration	<3 arc minutes
Clear Aperture	>90%
Chamfer	0.25 mm @ 45°
Surface Figure	λ/4 @ 632.8 nm
Surface Quality	40-20 scratch & dig
Design Wavelength	632.8 nm
AR coatings	None. Please refer to the <i>Coatings Section</i>

CODE EXAMPLE FOR ORDERING

14BCX50-1-2

Focal length

Diameter
05 – 12.7 mm
1 – 25.4 mm

Material
1 – BK7
2 – UVFS

RELATED PRODUCTS AND ACCESSORIES

- **4LM13-40** –
Self-Centering
Lens/Optics
Mount



- **4LM149-10** –
Universal
Adjustable Lens/
Optics Mount



DOUBLE-CONVEX LENSES

Material	Diameter D, mm	Focal Length F, mm	Edge Thickness T _e , mm	Ordering Code
BK7	12.7	+12	2.0	14BCX12-05-1
	12.7	+15	2.0	14BCX15-05-1
	12.7	+20	2.0	14BCX20-05-1
	25.4	+25	2.0	14BCX25-1-1
	25.4	+30	2.0	14BCX30-1-1
	25.4	+35	2.0	14BCX35-1-1
UVFS	25.4	+50	2.0	14BCX50-1-1
	12.7	+15	2.0	14BCX15-05-2
	12.7	+20	2.0	14BCX20-05-2
	12.7	+25	2.0	14BCX25-05-2
	25.4	+30	2.0	14BCX30-1-2
	25.4	+40	2.0	14BCX40-1-2
	25.4	+50	2.0	14BCX50-1-2



14BCV

Double-Concave Lenses

Double concave lenses are symmetrical with equal radius of curvature on both sides.

The biconcave lenses are used in optical systems in combination with other lenses. These lenses also work as beamexpanders, optical character readers, viewers and projection systems. Lenses can be anti-reflection coated (please refer to the *Coatings Section*).

STANDARD SPECIFICATIONS

Material	BK7, FS, UVFS, CaF ₂ , ZnSe, Si, Ge
Diameter Tolerance	+0.0, -0.15 mm
Focal Length Tolerance	±3%
Centration	<3 arc minutes
Clear Aperture	>90%
Chamfer	0.25 mm @ 45°
Surface Figure	λ/4 @ 632.8 nm
Surface Quality	40-20 scratch & dig
Design Wavelength	632.8 nm
AR coatings	None. Please refer to the <i>Coatings Section</i>

DOUBLE-CONCAVE LENSES

Material	Diameter D, mm	Focal Length F, mm	Edge Thickness T _e , mm	Ordering Code
BK7	12.7	-12	5.0	14BCV12-05-1
	12.7	-15	5.0	14BCV15-05-1
	12.7	-20	4.5	14BCV20-05-1
	25.4	-25	8.0	14BCV25-1-1
	25.4	-30	8.0	14BCV30-1-1
	25.4	-35	7.0	14BCV35-1-1
	25.4	-50	7.0	14BCV50-1-1
UVFS	12.7	-15	5.0	14BCV15-05-2
	12.7	-20	5.0	14BCV20-05-2
	12.7	-25	4.5	14BCV25-05-2
	25.4	-30	8.0	14BCV30-1-2
	25.4	-40	8.0	14BCV40-1-2
	25.4	-50	7.0	14BCV50-1-2

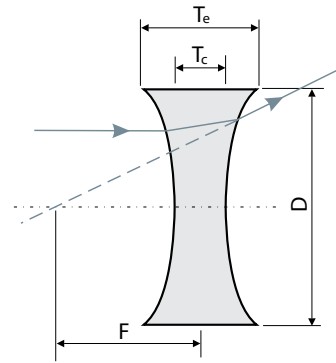
CODE EXAMPLE FOR ORDERING

14BCV20-05-1

Focal length

Diameter
05 – 12.7 mm
1 – 25.4 mm

Material
1 – BK7
2 – UVFS



FEATURES

- Diverges incident light
- Lower spherical aberrations than for Plano-Concave lenses
- Other dimensions are available in small and mass production quantities
- Various AR coatings are available for all these lenses. Please refer to the *Coatings Section*

RELATED PRODUCTS

- 4SCML-4 – Self-Centering Lens/Optics Mounts



- 4OCM-25 – Optical Component Mount



OPTICAL SUBSTRATES

LENSES

PRISMS

DIELECTRIC COATED OPTICS

METALLIC COATED OPTICS

FILTERS

METAL MIRRORS

VARIABLE REFLECTIVITY MIRRORS

NON POLARIZING BEAMSPLITTER CUBES

POLARIZING OPTICS

COATINGS SECTION



e-mail: sales@standa.lt

http://www.standa.lt



Phone: +370-5-2651474

Fax: +370-5-2651483



Svirigailios 21, LT-00262 Vilnius, LITHUANIA



OPTICAL SUBSTRATES

LENSES

PRISMS

DIELECTRIC
COATED OPTICS

METALLIC
COATED OPTICS

FILTERS

METAL MIRRORS

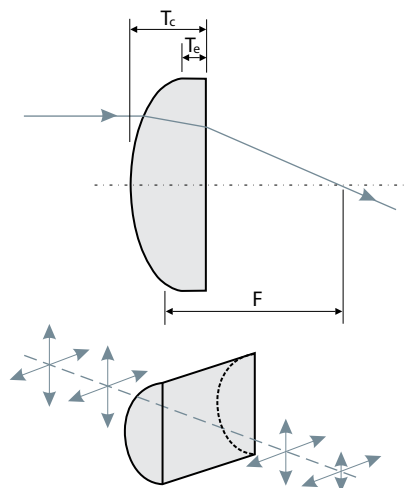
VARIABLE
REFLECTIVITY MIRRORS

NON POLARIZING
BEAMSPLITTER CUBES

POLARIZING OPTICS

COATINGS SECTION

14PCL Positive Cylindrical Lenses



FEATURES

- Rectangular and Round shape are available
- Focus light in one dimension only
- Other dimensions are available in small and mass production quantities
- Various AR coatings are available for all these lenses. Please refer to the *Coatings Section*

CODE EXAMPLE FOR ORDERING

14PCL100-2-1

Focal length

Dimensions
1 – 10×10 mm
2 – 20×20 mm
3 – 30×30 mm
4 – custom

Material
1 – BK7
2 – UVFS

RELATED PRODUCTS

- **4PH132** – Universal Plate Holder



- **5OM37-20** – Two Angular Fine Adjustment Mounts



Cylindrical lenses with positive focal length condense light in one dimension only. They are used to focus light to a thin line for effective harmonic generation in nonlinear crystals, in laser scanners, spectroscopy, dye lasers, acousto-optics or other applications. They are also irreplaceable for circularization of diode laser outputs, energy collection for linear detectors or for coupling to a slit input.

STANDARD SPECIFICATIONS

Material	BK7, FS, UVFS, CaF ₂ , ZnSe
Diameter Tolerance	+0.0, -0.15 mm
Focal Length Tolerance	±3%
Centration	<3 arc minutes
Clear Aperture	>90%
Chamfer	0.25 mm @ 45°
Surface Figure	λ/4 @ 632.8 nm
Surface Quality	40-20 scratch & dig
Design Wavelength	632.8 nm
AR coatings	None. Please refer to the <i>Coatings Section</i>

BK7 POSITIVE CYLINDRICAL LENSES

Size, mm	Focal length F, mm	Ordering Code
10×10	+50	14PCL50-1-1
	+100	14PCL100-1-1
	+175	14PCL175-1-1
	+200	14PCL200-1-1
	+500	14PCL500-1-1
	+1000	14PCL1000-1-1
20×20	+50	14PCL50-2-1
	+100	14PCL100-2-1
	+175	14PCL175-2-1
	+200	14PCL200-2-1
	+500	14PCL500-2-1
	+1000	14PCL1000-2-1
30×30	+200	14PCL200-3-1
	+500	14PCL500-3-1
	+1000	14PCL1000-3-1
	+3000	14PCL3000-3-1

UVFS POSITIVE CYLINDRICAL LENSES

Size, mm	Focal length F, mm	Ordering Code
10×10	+50	14PCL50-1-2
	+100	14PCL100-1-2
	+175	14PCL175-1-2
	+200	14PCL200-1-2
	+500	14PCL500-1-2
	+1000	14PCL1000-1-2
20×20	+50	14PCL50-2-2
	+100	14PCL100-2-2
	+175	14PCL175-2-2
	+200	14PCL200-2-2
	+500	14PCL500-2-2
	+1000	14PCL1000-2-2
30×30	+200	14PCL200-3-2
	+500	14PCL500-3-2
	+1000	14PCL1000-3-2
	+3000	14PCL3000-3-2

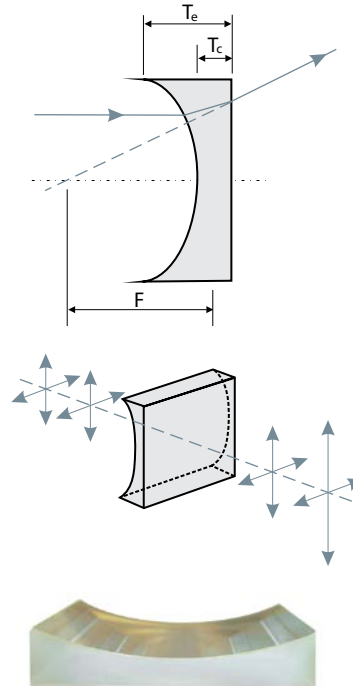


14NCL Negative Cylindrical Lenses

Cylindrical lens with negative focal length expand light in one dimension only. They are used in laser scanners, spectroscopy, dye lasers, acousto-optics, optical processors or other applications. They are also irreplaceable for circularization of diode laser outputs. Lenses can be anti-reflection coated (please refer to the *Coatings Section*).

STANDARD SPECIFICATIONS

Material	BK7, FS, UVFS, CaF ₂ , ZnSe
Diameter Tolerance	+0.0, -0.15 mm
Thickness Tolerance	±1.0 mm
Focal Length Tolerance	±3%
Centration	<3 arc minutes
Clear Aperture	>90%
Chamfer	0.25 mm @ 45°
Surface Figure	λ/4 @ 632.8 nm
Surface Quality	40-20 scratch & dig
Design Wavelength	632.8 nm
AR coatings	None. Please refer to the <i>Coatings Section</i>



BK7 NEGATIVE CYLINDRICAL LENSES

Size, mm	Focal length F, mm	Ordering Code
10×10	-50	14NCL50-1-1
	-100	14NCL100-1-1
	-180	14NCL180-1-1
	-200	14NCL200-1-1
	-400	14NCL400-1-1
	-500	14NCL500-1-1
	-600	14NCL600-1-1
20×20	-1000	14NCL1000-1-1
	-50	14NCL50-2-1
	-100	14NCL100-2-1
	-150	14NCL150-2-1
	-200	14NCL200-2-1
	-500	14NCL500-2-1
	-1000	14NCL1000-2-1
30×30	-2000	14NCL2000-2-1
	-200	14NCL200-3-1
	-500	14NCL500-3-1
	-1000	14NCL1000-3-1
	-3000	14NCL3000-3-1

UVFS NEGATIVE CYLINDRICAL LENSES

Size, mm	Focal length F, mm	Ordering Code
10×10	-50	14NCL50-1-2
	-100	14NCL100-1-2
	-175	14NCL175-1-2
	-200	14NCL200-1-2
	-500	14NCL500-1-2
	-1000	14NCL1000-1-2
20×20	-50	14NCL50-2-2
	-100	14NCL100-2-2
	-175	14NCL175-2-2
	-200	14NCL200-2-2
	-500	14NCL500-2-2
	-1000	14NCL1000-2-2
30×30	-2000	14NCL2000-2-2
	-200	14NCL200-3-2
	-500	14NCL500-3-2
	-1000	14NCL1000-3-2
	-3000	14NCL3000-3-2

FEATURES

- Rectangular and Round shape are available
- Diverges light in one dimension only
- Other dimensions are available in small and mass production quantities
- Various AR coatings are available for all these lenses. Please refer to the *Coatings Section*

CODE EXAMPLE FOR ORDERING

14NCL100-2-1

Focal length

Dimensions
1 – 10×10 mm
2 – 20×20 mm
3 – 30×30 mm
4 – custom

Material
1 – BK7
2 – UVFS

RELATED PRODUCTS

- 4H29 – Push Holder



OPTICAL SUBSTRATES

LENSES

PRISMS

DIELECTRIC COATED OPTICS

METALLIC COATED OPTICS

FILTERS

METAL MIRRORS

VARIABLE REFLECTIVITY MIRRORS

NON POLARIZING BEAMSPLITTER CUBES

POLARIZING OPTICS

COATINGS SECTION



e-mail: sales@standa.lt



http://www.standa.lt



Phone: +370-5-2651474



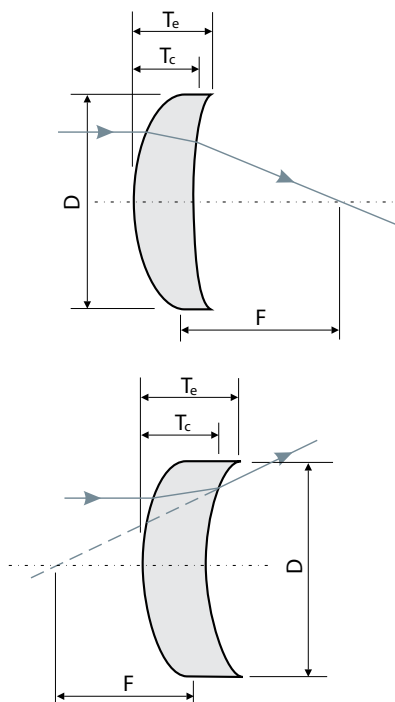
Fax: +370-5-2651483



Svirigailios 21, LT-00262 Vilnius, LITHUANIA



14MSL Meniscus Lenses



Positive and negative focal length lenses have different radii on both sides. Meniscus lenses are used in applications where distortion of the beam has to be reduced. They are used on focusing beams in telescopes, collimators or condenser systems, optical transceivers or other devices. Standa provides lens with anti-reflection coating (please refer to the *Coatings Section*).

FEATURES

- Used in applications to reduce beam distortion
- Other dimensions are available in small and mass production quantities
- Various AR coatings are available for all these lenses. Please refer to the *Coating Section*

STANDARD SPECIFICATIONS

Material	BK7, FS, UVFS, CaF ₂ , ZnSe
Diameter Tolerance	+0.0, -0.15 mm
Focal Length Tolerance	±3%
Centration	<3 arc minutes
Clear Aperture	>90%
Chamfer	0.25 mm @ 45°
Surface Figure	λ/4 @ 632.8 nm
Surface Quality	40-20 scratch & dig
Design wavelength	633 nm
AR coatings	None. Please refer to the <i>Coatings Section</i>

BK7 MENISCUS LENSES

Diameter, mm	ROC ₁ , mm	ROC ₂ , mm	Ordering Code
25.4	+50	-50	14MSL-1-50/50-1
	+100	-100	14MSL-1-100/100-1
	+150	-150	14MSL-1-150/150-1
	+200	-200	14MSL-1-200/200-1
	+250	-250	14MSL-1-250/250-1
	+300	-300	14MSL-1-300/300-1

UVFS MENISCUS LENSES

Diameter, mm	ROC ₁ , mm	ROC ₂ , mm	Ordering Code
25.4	+50	-50	14MSL-1-50/50-2
	+100	-100	14MSL-1-100/100-2
	+150	-150	14MSL-1-150/150-2
	+200	-200	14MSL-1-200/200-2
	+250	-250	14MSL-1-250/250-2
	+300	-300	14MSL-1-300/300-2

RELATED PRODUCTS

- 4SCML-2 – Self-Centering Lens/Optics Mount



CODE EXAMPLE FOR ORDERING

14MSL-1-50/50-1

Diameter
1 – 25.4 mm

ROC₁

ROC₂

Material
1 – BK7
2 – UVFS



14AL Achromatic Lenses

Compound lens system forms an image free from chromatic aberration. Cemented achromatic lenses significantly reduce coma and chromatic aberration. Best used to replace single components where performance must be improved.

FEATURES

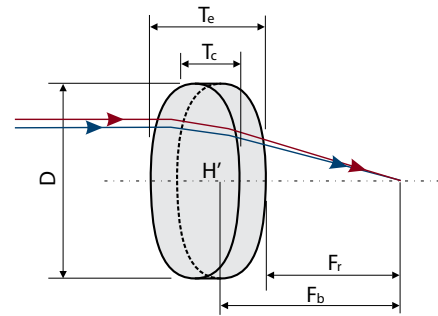
- Used in applications to reduce beam distortion
- Other dimensions are available in small and mass production quantities
- Various AR coatings are available for all these lenses. Please refer to the *Coatings Section*

STANDARD SPECIFICATIONS

Material	All type of material are available to design the optimal achromats
Dimensions Tolerance	+0.0, -0.15 mm
Focal Length	±3%
Centration	<3 arc minutes
Clear Aperture	>90%
Chamfer	0.25 mm @ 45°
Surface Figure	$\lambda/4$ @ 632.8 nm
Surface Quality	60-40 scratch & dig
Design Wavelength	632.8 nm
AR Coatings	VIS or NIR

VIS COATED ACHROMATIC LENSES

Optimal Wavelength Range, nm	Diameter D, mm	Focal Length F, mm	Ordering Code
400-700	12.7	+30	14ALP-05-30-BBAR1
	12.7	+50	14ALP-05-50-BBAR1
	12.7	+75	14ALP-05-75-BBAR1
	25.4	+100	14ALP-1-100-BBAR1
	25.4	+125	14ALP-1-125-BBAR1
	25.4	+150	14ALP-1-150-BBAR1
	25.4	+200	14ALP-1-200-BBAR1
	25.4	+250	14ALP-1-250-BBAR1
400-700	25.4	+300	14ALP-1-300-BBAR1
	12.7	-50	14ALN-05-50-BBAR1
	12.7	-75	14ALN-05-75-BBAR1
	12.7	-100	14ALN-05-100-BBAR1
	25.4	-150	14ALN-1-150-BBAR1
	25.4	-200	14ALN-1-200-BBAR1
	25.4	-250	14ALN-1-250-BBAR1



NIR COATED ACHROMATIC LENSES

Optimal Wavelength Range, nm	Diameter D, mm	Focal Length F, mm	Ordering Code
700-1050	12.7	+30	14ALP-05-30-BBAR5
	12.7	+50	14ALP-05-50-BBAR5
	12.7	+75	14ALP-05-75-BBAR5
	25.4	+100	14ALP-1-100-BBAR5
	25.4	+125	14ALP-1-125-BBAR5
	25.4	+150	14ALP-1-150-BBAR5
	25.4	+200	14ALP-1-200-BBAR5
	25.4	+250	14ALP-1-250-BBAR5
	25.4	+300	14ALP-1-300-BBAR5
700-1050	12.7	-50	14ALN-05-50-BBAR5
	12.7	-75	14ALN-05-75-BBAR5
	12.7	-100	14ALN-05-100-BBAR5
	25.4	-150	14ALN-1-150-BBAR5
	25.4	-200	14ALN-1-200-BBAR5
	25.4	-250	14ALN-1-250-BBAR5

CODE EXAMPLE FOR ORDERING

14ALP-1-150-BBAR1

P – positive lens
N – negative lens

Coating type

Focal length

Diameter
05 – 12.7 mm
1 – 25.4 mm

RELATED PRODUCTS AND ACCESSORIES

- **4SCML-12** – Self-Centering Lens/Optics Mounts



OPTICAL SUBSTRATES

LENSES

PRISMS

DIELECTRIC
COATED OPTICSMETALLIC
COATED OPTICS

FILTERS

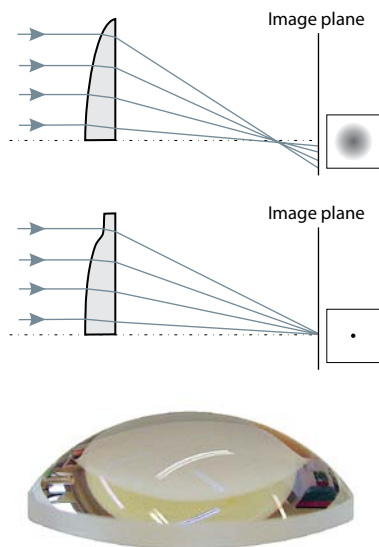
METAL MIRRORS

VARIABLE
REFLECTIVITY MIRRORSNON POLARIZING
BEAMSPLITTER CUBES

POLARIZING OPTICS

COATINGS SECTION

14ASL Aspherical Lenses



Aspherical lenses are effective in the elimination of not only spherical aberration, but also other forms of aberration generated by lenses. Standa provides computer calculations and designing of aspherical lenses without spherical aberrations as well as low cost production of aspherical lenses made of Fused Silica, BK7 glass or other material upon your request. Our long time experience in production of aspherical elements lead to the development of low-cost, high image quality and high performance products.

Aspherical lens is produced by exactly cutting away some part of a spherical surface. A standard spherical lens has the undesirable property (called spherical aberration) of causing a stronger diffraction of light rays the further it is from the optical axis of the lens. The spherical aberration causes a loss of image sharpness.

Properly designed aspherical lenses fully compensate spherical aberrations. Aspherical lenses are effective in the elimination of not only spherical aberration, but also other forms of aberration generated by lenses. Aspherical lenses are also used to compensate for distortion aberration.

FEATURES

- Used in applications to reduce beam distortion
- Other dimensions are available in small and mass production quantities
- Various AR coatings are available for all these lenses. Please refer to the *Coatings Section*
- Molded aspheric lenses are also available

STANDARD SPECIFICATIONS

Dimensions Tolerance	+0.0, -0.15 mm
Centration	<3 arc minutes
Chamfer	0.25 mm @ 45°
Surface Figure	$\lambda/4$ @ 632.8 nm
Surface Quality	60-40 scratch & dig
Design Wavelength	632.8 nm
AR coatings	BBAR coated. Please refer to the <i>Coatings Section</i> for details

ASPHERICAL LENSES

Diameter, mm	Effective Focal Length, mm	NA	Wavelength Range, nm	Ordering Code
6.33	4.00	0.60	400-700	14ASL-2-1-BBAR1
4.70	4.50	0.42	400-700	14ASL-1-2-BBAR1
7.20	6.24	0.40	400-700	14ASL-4-3-BBAR1
9.94	8.00	0.50	400-700	14ASL-5-4-BBAR1
7.20	11.00	0.25	400-700	14ASL-4-5-BBAR1
6.50	15.29	0.16	400-700	14ASL-3-6-BBAR1
6.50	18.40	0.15	400-700	14ASL-3-7-BBAR1
6.33	4.00	0.60	600-1050	14ASL-2-1-BBAR4
4.70	4.50	0.42	600-1050	14ASL-1-2-BBAR4
7.20	6.24	0.40	600-1050	14ASL-4-3-BBAR4
9.94	8.00	0.50	600-1050	14ASL-5-4-BBAR4
7.20	11.00	0.25	600-1050	14ASL-4-5-BBAR4
6.50	15.29	0.16	600-1050	14ASL-3-6-BBAR4
6.50	18.40	0.15	600-1050	14ASL-3-7-BBAR4

CODE EXAMPLE FOR ORDERING

14ASL-1-1-BBAR1

Diameter

- 1 – 4.70 mm
- 2 – 6.33 mm
- 3 – 6.50 mm
- 4 – 7.20 mm
- 5 – 9.94 mm

Coating type

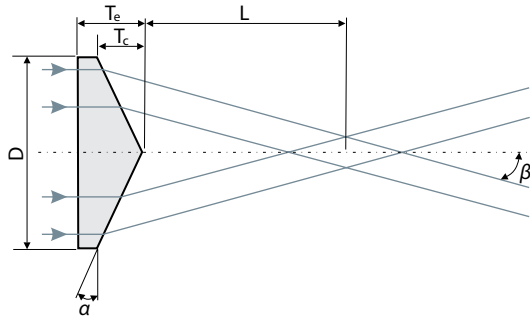
Effective Focal Length

- 1 – 4.00 mm
- 2 – 4.50 mm
- 3 – 6.24 mm
- 4 – 8.00 mm
- 5 – 11.00 mm
- 6 – 15.29 mm
- 7 – 18.40 mm



14APX

Plano-Convex Axicons



FEATURES

- Produces a line image along the axis from a point light source or non diffractive Bessel beam
- Available diameter up to 50 mm
- Plano Convex, Plano Concave and Double Convex available
- Various AR coatings are available for all these lenses. Please refer to the *Coatings Section*

Axicon lens are conical lens which, when followed by a conventional lens, can focus laser light to a ring shape.

An axicon will convert a parallel laser beam into a ring. Using axicon together with a spherical lens will produce an annular focus for a hole drilling application. An axicon will create a non diffractive Bessel beam. This feature offers enhanced optical guiding, which was previously limited to the Rayleigh range of the Gaussian beam. High-order Bessel beams offer distinct advantages over other hollow light beams for atom guiding.

STANDARD SPECIFICATIONS

Material	BK7, UVFS
Diameter Tolerance	+0.0, -0.15 mm
Thickness Tolerance	±0.1 mm
Edge Thickness	3.5 mm. Available down to 2 mm
Apex Angle	90 – 179.98°
Clear Aperture	>90%
Apex angle Tolerance	±0.5°. Available down to ±0.02°
Surface Figure	λ/4 @ 632.8 nm
Surface Quality	40–20 scratch & dig
Design Wavelength	632.8 nm
AR Coatings	None. Please refer to the Coatings Section

BK7 PLANO-CONVEX AXICONS

Diameter D, mm	Apex Angle α, deg	Ordering Code
25.4	90	14APX-1-90-1
25.4	130	14APX-1-130-1
25.4	140	14APX-1-140-1
25.4	160	14APX-1-160-1
25.4	170	14APX-1-170-1
25.4	175	14APX-1-175-1
25.4	176	14APX-1-176-1
25.4	178	14APX-1-178-1
25.4	179	14APX-1-179-1

UVFS PLANO-CONVEX AXICONS

Diameter D, mm	Apex Angle α, deg	Ordering Code
25.4	90	14APX-1-90-2
25.4	130	14APX-1-130-2
25.4	140	14APX-1-140-2
25.4	160	14APX-1-160-2
25.4	170	14APX-1-170-2
25.4	175	14APX-1-175-2
25.4	176	14APX-1-176-2
25.4	178	14APX-1-178-2
25.4	179	14APX-1-179-2

CODE EXAMPLE FOR ORDERING

14APX-1-90-1

Diameter
1 – 25.4 mm

Apex Angle

Material
1 – BK7
2 – UVFS

RELATED PRODUCTS AND ACCESSORIES

- 4SCML-2 – Self-Centering Lens/Optics Mount



- 5KOM4-1 – Four Axis Kinematic Optical Mount



OPTICAL SUBSTRATES

LENSES

PRISMS

DIELECTRIC
COATED OPTICSMETALLIC
COATED OPTICS

FILTERS

METAL MIRRORS

VARIABLE
REFLECTIVITY MIRRORSNON POLARIZING
BEAMSPLITTER CUBES

POLARIZING OPTICS

COATINGS SECTION



e-mail: sales@standa.lt

http://www.standa.lt



Phone: +370-5-2651474

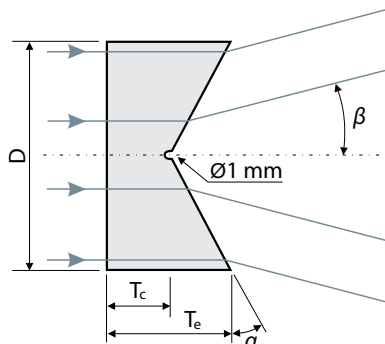
Fax: +370-5-2651483



Svirigailios 21, LT-00262 Vilnius, LITHUANIA



14APC Plano-Concave Axicons



FEATURES

- Produces a line image along the axis from a point light source or non diffractive Bessel beam
- Available diameter up to 50 mm
- Plano Convex, Plano Concave and Double Convex available
- Various AR coatings are available for all these lenses. Please refer to the *Coatings Section*

RELATED PRODUCTS AND ACCESSORIES

- **5TLM-1** – Y-Z Positioner for Lens, Pinholes and Objectives
- **4OCM-25** – Optical Component Mount



Standa is able to offer and Plano-Concave Axicons of various dimensions and Apex angles. Plano-concave axicons are made of a plano surface in combination with a concave conical surface. They are made of optically transparent or filter materials with polished opposite sides, grounded edges and chamfers. An axicon made up of conical and flat surface produces a line image along the axis from a point light source. Due to fabrications process, a central hole is needed for concave conical surface. Hole diameter is typically 1 mm. Different coatings can be applied on the polished sides of axicons. The concave conical surface can be used as a mirror axicon.

STANDARD SPECIFICATIONS

Material	BK7, UVFS
Diameter Tolerance	+0.0, -0.15 mm
Thickness Tolerance	±0.1 mm
Apex Angle	90 – 179.98°
Clear Aperture	>90%
Apex Angle Tolerance	±0.5°. Available down to ±0.02°
Surface Figure	λ/4 @ 632.8 nm
Surface Quality	40-20 scratch & dig
Design Wavelength	632.8 nm
AR Coatings	None. Please refer to the <i>Coatings Section</i>

BK7 PLANO-CONCAVE AXICONS

Diameter D, mm	Apex Angle α, deg	Ordering Code
25.4	90	14APC-1-90-1
25.4	130	14APC-1-130-1
25.4	140	14APC-1-140-1
25.4	160	14APC-1-160-1
25.4	170	14APC-1-170-1
25.4	175	14APC-1-175-1
25.4	176	14APC-1-176-1
25.4	178	14APC-1-178-1
25.4	179	14APC-1-179-1

UVFS PLANO-CONCAVE AXICONS

Diameter D, mm	Apex Angle α, deg	Ordering Code
25.4	90	14APC-1-90-2
25.4	130	14APC-1-130-2
25.4	140	14APC-1-140-2
25.4	160	14APC-1-160-2
25.4	170	14APC-1-170-2
25.4	175	14APC-1-175-2
25.4	176	14APC-1-176-2
25.4	178	14APC-1-178-2
25.4	179	14APC-1-179-2

CODE EXAMPLE FOR ORDERING

14APC-1-90-1

Diameter
1 – 25.4 mm

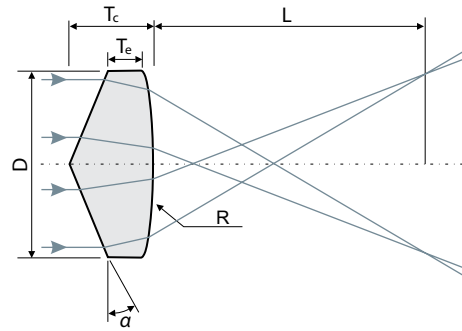
Apex Angle

Material
1 – BK7
2 – UVFS



14ABX Double Convex Axicons

Standa is able to offer and Double Convex Axicons of various dimensions and Apex angles. Double convex axicons stand for optical components with a convex conical surface in combination with a convex spherical surface. They are made of optically transparent or filter materials with polished opposite sides, grounded edges and chamfers.



STANDARD SPECIFICATIONS

Material	BK7, UVFS
Diameter Tolerance	+0.0, -0.15 mm
Thickness Tolerance	±0.1 mm
Edge Thickness	9 mm
Apex Angle	90 – 179.98°
Clear Aperture	>90%
Apex Angle Tolerance	±0.5°. Available down to ±0.02°
Surface Figure	λ/4 @ 632.8 nm
Surface Quality	40–20 scratch & dig
Design Wavelength	632.8 nm
Available Focal Length	20–10000 mm
Radius Tolerance	±3%
AR Coatings	None. Please refer to the <i>Coatings Section</i>

FEATURES

- Produces a line image along the axis from a point light source or non diffractive Bessel beam
- Available diameter up to 50 mm
- Plano Convex, Plano Concave and Double Convex available
- Various AR coatings are available for all these lenses. Please refer to the *Coatings Section*

BK7 DOUBLE CONVEX AXICONS

Diameter D, mm	Focal length range of the spherical face L, mm	Apex Angle α, deg	Ordering Code
25.4	50–2000	90	14ABX-1-90-1
25.4	50–2000	130	14ABX-1-130-1
25.4	50–2000	140	14ABX-1-140-1
25.4	50–2000	160	14ABX-1-160-1
25.4	50–2000	170	14ABX-1-170-1
25.4	50–2000	175	14ABX-1-175-1
25.4	50–2000	176	14ABX-1-176-1
25.4	50–2000	178	14ABX-1-178-1
25.4	50–2000	179	14ABX-1-179-1

UVFS DOUBLE CONVEX AXICONS

Diameter D, mm	Focal length range of the spherical face L, mm	Apex Angle α, deg	Ordering Code
25.4	50–2000	90	14ABX-1-90-2
25.4	50–2000	130	14ABX-1-130-2
25.4	50–2000	140	14ABX-1-140-2
25.4	50–2000	160	14ABX-1-160-2
25.4	50–2000	170	14ABX-1-170-2
25.4	50–2000	175	14ABX-1-175-2
25.4	50–2000	176	14ABX-1-176-2
25.4	50–2000	178	14ABX-1-178-2
25.4	50–2000	179	14ABX-1-179-2

CODE EXAMPLE FOR ORDERING

14ABX-1-90-1

Diameter
1 – 25.4 mm

Apex Angle

Material
1 – BK7
2 – UVFS

RELATED PRODUCTS AND ACCESSORIES

- **5KOM5-1** – Five Axis Kinematic Optical Mount



OPTICAL SUBSTRATES

LENSES

PRISMS

DIELECTRIC
COATED OPTICSMETALLIC
COATED OPTICS

FILTERS

METAL MIRRORS

VARIABLE
REFLECTIVITY MIRRORSNON POLARIZING
BEAMSPLITTER CUBES

POLARIZING OPTICS

COATINGS SECTION



e-mail: sales@standa.lt

http://www.standa.lt



Phone: +370-5-2651474

Fax: +370-5-2651483

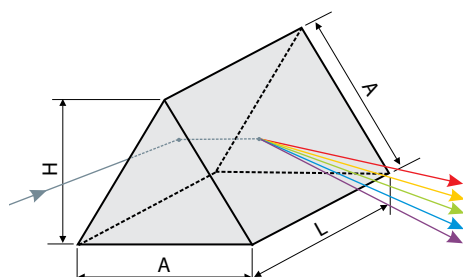


Svirigalios 21, LT-00262 Vilnius, LITHUANIA



PRISMS

14DP Dispersing Prisms



FEATURES

- Separates light by wavelength
- Various dielectric coatings can be deposited upon request

RELATED PRODUCTS AND ACCESSORIES

- **5OM37-20** – Two Angular Fine Adjustment Mounts



- **5PM131** – Prism/Optics Mount



Dispersing prisms are used for wavelength separation applications. A light ray is twice refracted passing through the prism. Deviation is a function of refractive index, and hence wavelength.

STANDARD SPECIFICATIONS

Material	BK7, UVFS, IRFS
Dimension Tolerances	+0.0, -0.2 mm
Surface Quality	40-20 scratch & dig
Flatness	$\lambda/4$ @ 632.8 nm
Angle Tolerance	± 2 arcmin
Design Wavelength	780 nm
Coatings	None. Please refer to <i>Coatings Section</i>

DISPERSING PRISMS

Material	Dimensions A x L, mm	Coating	Ordering Code
BK7	12.5 x 12.5	Uncoated	14DP-1-1
	25 x 25	Uncoated	14DP-2-1
UVFS	12.5 x 12.5	Uncoated	14DP-1-2
	25 x 25	Uncoated	14DP-2-2

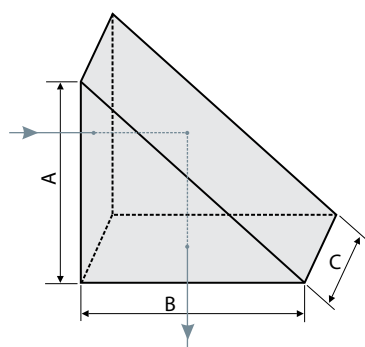
CODE EXAMPLE FOR ORDERING

14DP-1-1

Dimensions (A x L)
1 – 12.5 x 12.5 mm
2 – 25 x 25 mm

Material
1 – BK7
2 – UVFS

14RAP Right-Angle Prisms



These prisms are used to direct beams at 90 degrees by using hypotenuse face in total internal reflection (TIR). Right angle prisms are often preferable to an inclined mirror in applications involving severe acoustic or inertial loads, because they are easier to mount, and deform much less than mirror in response to external mechanical stress. As long as acceptance angle limitations for TIR from the roof faces are not exceeded, the right angle prisms can serve as a retro reflector, turning beams back to the original direction.

FEATURES

- Can work as internal or external reflectors or as retro-reflectors
- Various dielectric coatings can be deposited upon request



RIGHT-ANGLE PRISMS

Material	Dimensions A × B × C, mm	Angle tolerance	Ordering Code
BK7	12.5 × 12.5 × 12.5	General type	14RAP-1-0-1
		Precision type	14RAP-1-1-1
	20.0 × 20.0 × 20.0	General type	14RAP-2-0-1
		Precision type	14RAP-2-1-1
	25.0 × 25.0 × 25.0	General type	14RAP-3-0-1
		Precision type	14RAP-3-1-1
UVFS	12.5 × 12.5 × 12.5	General type	14RAP-1-0-2
		Precision type	14RAP-1-1-2
	20.0 × 20.0 × 20.0	General type	14RAP-2-0-2
		Precision type	14RAP-2-1-2
	25.0 × 25.0 × 25.0	General type	14RAP-3-0-2
		Precision type	14RAP-3-1-2

CODE EXAMPLE FOR ORDERING

14RAP-1-0-1

Dimensions (A×B×C)
1 – 12.5×12.5×12.5 mm
2 – 20×20×20 mm
3 – 25×25×25 mm

Material
1 – BK7
2 – UVFS

Angle Tolerance
0 – General Type
1 – Precision Type

STANDARD SPECIFICATIONS

Material	BK7, IRFS, UVFS
Dimension Tolerances	+0.0, -0.2 mm
Surface Quality	40-20 scratch & dig
Clear Aperture	80% of the face size
Flatness	$\lambda/4$ @ 632.8 nm
90° Angle Tolerance	±2 arcmin (general type) ±5 arcsec (precision type)
Pyramidal Tolerance	±1 arcmin (general type) ±30 arcsec (precision type)
Coatings	None. Please refer to <i>Coatings Section</i>

RELATED PRODUCTS

- 5OM37-50 – Two Angular Fine Adjustment Mounts
- 5PM57 – Prism/Optics Mount



OPTICAL SUBSTRATES

LENSES

PRISMS

DIELECTRIC
COATED OPTICS

METALLIC
COATED OPTICS

FILTERS

METAL MIRRORS

VARIABLE
REFLECTIVITY MIRRORS

NON POLARIZING
BEAMSPLITTER CUBES

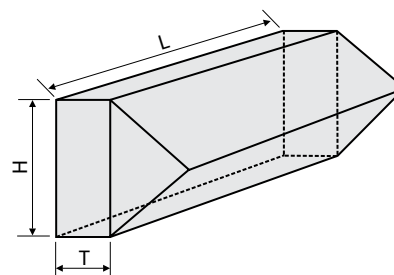
POLARIZING OPTICS

COATINGS SECTION

14RPR

Right-Angle Prisms – Retroreflectors

Right-angle prisms - retroreflectors are often preferable to an inclined mirror in applications involving severe acoustic or inertial loads, because they are easier to mount, and deform much less than mirror in response to external mechanical stress. As long as acceptance angle limitations for TIR from the roof faces are not exceeded, the right angle prisms are working as a retro reflector, turning beams back to the original direction.



STANDARD SPECIFICATIONS

Material	BK7
Dimension Tolerances	+0.0, -0.2 mm
Surface Quality	40-20 scratch & dig
Clear Aperture	80% of the face size
Flatness	$\lambda/4$ @ 632.8 nm
90° Angle Tolerance	±2 arcmin (general type)
Coatings	None. Please refer to the <i>Coatings Section</i>

BK7 RIGHT-ANGLE PRISMS – RETROREFLECTORS

Dimensions L × H × T, mm	Ordering Code
16 × 10 × 5	14RPR-1-1
18 × 8 × 4	14RPR-2-1
22 × 16 × 8	14RPR-3-1
25 × 10 × 4	14RPR-4-1
35 × 10 × 5	14RPR-5-1

FEATURES

- Working as internal or external reflectors or as retro-reflectors
- Various dielectric coatings can be deposited upon request

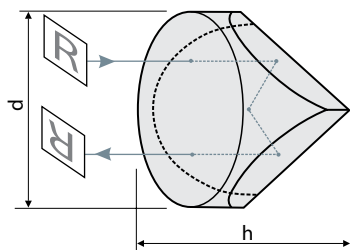
CODE EXAMPLE FOR ORDERING

14RPR-1-1

Dimensions (L×H×T)
1 – 16 × 10 × 5 mm
2 – 18 × 8 × 4 mm
3 – 22 × 16 × 8 mm
4 – 25 × 10 × 4 mm
5 – 35 × 10 × 5 mm

Material
1 – BK7

14CCR Corner Cube Retroreflectors



FEATURES

- Incident light deviates by 180 degrees independently of the angle of incidence
- Mainly used in high precision applications or with lasers over very long distances
- Various dielectric coatings can be deposited upon request

CODE EXAMPLE FOR ORDERING

14CCR-1-1

Dimensions (d×h)
1 – 25.4×19.0 mm
2 – 38.1×28.5 mm

Material
1 – BK7
2 – UVFS

BK7 or UVFS Corner cube retroreflectors designed to deviate incident light by 180 degrees independently of an angle of incidence. These prisms have 3 mirror surfaces making angles of 90 deg to each other, juxtaposed to form the corner of a cube with the entrance face perpendicular to cube diagonal. All beams, despite of incident direction, are reflected back to the original direction. Corner cubes are used in high precision applications or with lasers over very long distances.

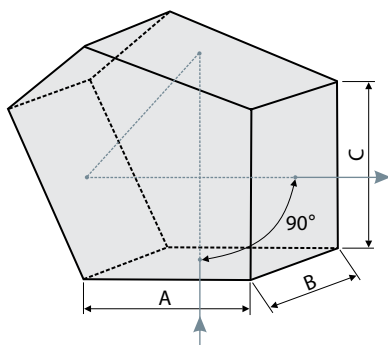
STANDARD SPECIFICATIONS

Material	BK7, UVFS
Dimension Tolerances	+0.0, -0.2 mm
Surface Quality	40-20 scratch & dig
Flatness	$\lambda/10$ @ 632.8 nm
Beam Deviation	$180^\circ \pm 30$ arcsec
Angular Deviation	± 5 arcsec

CORNER CUBE RETROREFLECTORS

Material	Dimensions d × h, mm	Coating	Ordering Code
BK7	25.4 × 19.0	Uncoated	14CCR-1-1
	38.1 × 28.5	Uncoated	14CCR-2-1
UVFS	25.4 × 19.0	Uncoated	14CCR-1-2

14PP Penta Prisms



FEATURES

- High precision
- Various dielectric coatings can be deposited upon request
- Custom size available

BK7 PENTA PRISMS

Dimensions A x B, mm	Coating	Ordering Code
7.0 x 7.0	Uncoated	1PP-1
12.7 x 12.7	Uncoated	1PP-2
25.4 x 25.4	Uncoated	1PP-3

Penta prism's function is to deviate the direction of the light beam by 90 degrees. Penta prism will neither invert nor reverse the image. Penta prisms are extremely useful in alignment systems as they define a right angle very precisely and independently of angle of incidence. Rays entering one face emerge from the adjacent face at precisely 90 deg after they have undergone two reflections inside the prism for a total of 270 deg. The penta prism acts as a turning mirror which is insensitive to alignment.

STANDARD SPECIFICATIONS

Material	BK7
Dimension Tolerances	+0.0, -0.2 mm
Surface Flatness	$< \lambda/4$ @ 632.8 nm
Surface Quality	40-20 scratch & dig
90° Deviation Tolerance	< 30 arcsec (down to 5 arcsec available!)

CODE EXAMPLE FOR ORDERING

14PP-1

Dimensions (A×B)
1 – 7.0×7.0 mm
2 – 12.7×12.7 mm
3 – 25.4×25.4 mm

14DOP

Dove Prisms

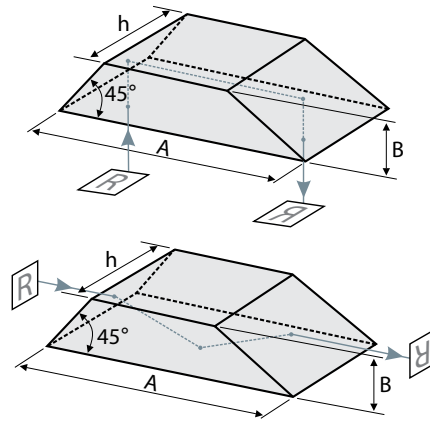
Dove prism is a type of reflective prism which is used to invert an image. Dove prisms are shaped from a truncated right-angle prism. A beam of light entering one of the sloped faces of the prism undergoes total internal reflection from the inside of the longest (bottom) face and emerges from the opposite sloped face. Images passing through the prism are flipped, and because only one reflection takes place, the image's handedness is changed to the opposite sense. Dove prisms have an interesting property that when they are rotated along their longitudinal axis, the transmitted image rotates at twice the rate of the prism. It is very important that the application must be used with parallel or collimated beam and the large square reflective surface should be kept very clean. Another application is used as a retroreflector. For this application it performs as a right-angle prism.

STANDARD SPECIFICATIONS

Material	BK7, UVFS
Dimension Tolerances	+0.0, -0.2 mm
Angle Tolerance	<3 arcmin
Surface Flatness	< $\lambda/2$ @ 632.8 nm
Surface Quality	60-40 scratch & dig
Dimension Tolerance	± 0.2 mm
Clear Aperture	>80%

DOVE PRISMS

Material	Dimensions A × B × h, mm	Coating	Ordering Code
BK7	21.1 × 5.0 × 5.0	Uncoated	14DOP-1-1
	42.3 × 10.0 × 10.0	Uncoated	14DOP-2-1
UVFS	21.1 × 5.0 × 5.0	Uncoated	14DOP-1-2



FEATURES

- Ideal for Image rotation
- Various dielectric coatings available upon request

CODE EXAMPLE FOR ORDERING

14DOP-1-1

Dimensions (A×B×h)
1 – 21.1×5.0×5.0 mm
2 – 42.3×10.0×10.0 mm

Material
1 – BK7
2 – UVFS

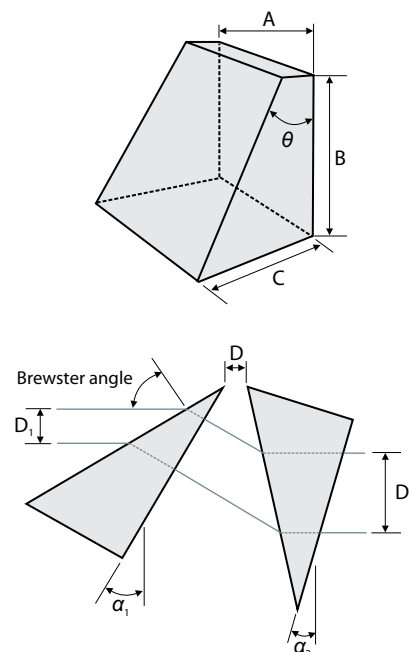
14AP

Anamorphic Prisms

Anamorphic prisms are used to change the dimension of a beam in one axis, the effect being analogous to that of a cylindrical lens. These two prisms can expand or contract the beam in one direction without any changes in the other direction. By adjusting the angles among the incident beam and two prisms, the shape of the beam can be changed. It is very easy to turn elliptical beam into circular beam. If beam shaping is required, a system using a pair of anamorphic prisms has several significant benefits.

FEATURES

- A pair of prisms can be designed into a much more compact package than a telescope using cylindrical optics
- The ability of adjusting the position of the prisms allows the user to compensate for variations from one light source to another
- The prisms are more cost effective than cylindrical lenses of comparable quality
- Mount for anamorphic prisms is available upon request



OPTICAL SUBSTRATES

LENSES

PRISMS

DIELECTRIC
COATED OPTICSMETALLIC
COATED OPTICS

FILTERS

METAL MIRRORS

VARIABLE
REFLECTIVITY MIRRORSNON POLARIZING
BEAMSPLITTER CUBES

POLARIZING OPTICS

COATINGS SECTION

OPTICAL SUBSTRATES

LENSES

PRISMS

DIELECTRIC
COATED OPTICS

METALLIC
COATED OPTICS

FILTERS

METAL MIRRORS

VARIABLE
REFLECTIVITY MIRRORS

NON POLARIZING
BEAMSPLITTER CUBES

POLARIZING OPTICS

COATINGS SECTION

CODE EXAMPLE FOR ORDERING

14AP-1-1

Dimensions (A×B×C)
1 – 12.0×12.0×8.5 mm

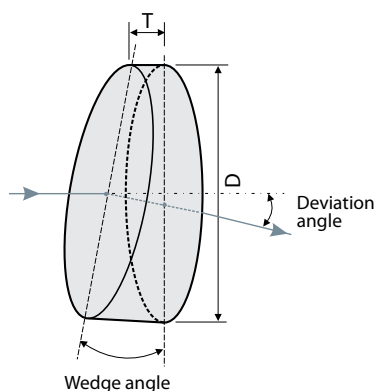
Coating
0 – Uncoated
1 – MgF₂ single layer

STANDARD SPECIFICATIONS

Material	SF11
Dimension Tolerances	+0.0, -0.2 mm
Surface Flatness	<λ/8 @ 632.8 nm
Surface Quality	60-40 scratch & dig
Theta Angle	29°27' ± 3"
Clear Aperture	> 85% in central circular dimension
Coating	MgF ₂ single layer on perpendicular surface

SF11 ANAMORPHIC PRISMS

Dimensions A x B x C, mm	Coating	Ordering Code
12.0 x 12.0 x 8.5	Uncoated	14AP-1-0
	MgF ₂ single layer on perpendicular surface	14AP-1-1

14WP Wedge Prisms


FEATURES

- Ideal for beam steering

Wedge prism is an optical element with plane-inclined surfaces; usually the faces are inclined toward one another at very small angles. It diverts light toward its thicker portion. By selecting the appropriate wedge it is simple to create a precise beam deviation without affecting other beam parameters. If two wedges are used together with the sloping surfaces in close proximity it is possible to produce a continuous variation of beam deviation by counter – rotating the wedges.

STANDARD SPECIFICATIONS

Material	BK7, UVFS
Dimensions D × T, mm	25.4 × 3
Dimension Tolerances	+0.0, -0.2 mm
Wedge Angle	0.5°, 1°, 3°
Surface Quality	40-20 scratch & dig
Clear Aperture	90% of the diameter
Wedge Tolerance	±3 arcmin
Flatness	λ/4 @ 632.8 nm
Bevel	0.25 mm × 45 deg

CODE EXAMPLE FOR ORDERING

14WP-1-1-1

Dimensions (D×T)
1 – 25.4×3.0 mm

Material
1 – BK7
2 – UVFS

Wedge Angle
05 – 0.5°
1 – 1°
3 – 3°

WEDGE PRISMS

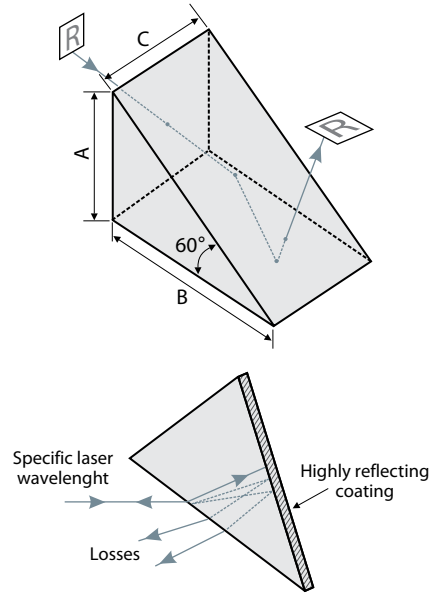
Material	Dimensions D × T, mm	Wedge angle, deg	Coating	Ordering Code
BK7	25.4 × 3	0.5	Uncoated	14WP-1-05-1
		1	Uncoated	14WP-1-1-1
		3	Uncoated	14WP-1-3-1
UFVS	25.4 × 3	0.5	Uncoated	14WP-1-05-2
		1	Uncoated	14WP-1-1-2
		3	Uncoated	14WP-1-3-2



14LP

Littrow Prisms

Littrow prisms usually are 30 – 60 – 90 deg prisms. The uncoated Littrow prism can disperse white light into its spectrum; the coated Littrow prism diverts the beam at a 60 deg angle without inverting or reversing the image. Littrow prisms can also be used as retro-reflecting Brewster prisms, as shown in the picture. They are positioned so that beam which enters front side of prism suffers Brewster angle and falls normal to the flat surface and is reflected back along the same path. They are useful in laser cavities where the wavelength of the return beam can be selected by tilting the prism slightly. In this way the gain of the cavity can be tuned to a specific laser line.



STANDARD SPECIFICATIONS

Material	BK7
Dimension Tolerances	+0.0, -0.2 mm
Surface Flatness	$<\lambda/4 @ 632.8 \text{ nm}$
Angle Tolerance	$\pm 10 \text{ arcmin}$
Bevel	0.4 mm $\times$ 45 deg
Surface Quality	40-20 scratch & dig

BK7 LITROW PRISMS

Dimensions A $\times$ B $\times$ C, mm	Coating	Ordering Code
12.70 $\times$ 21.90 $\times$ 12.70	Uncoated	14LP-1-0
	Al+SiO ₂ coated	14LP-1-1
22.00 $\times$ 37.90 $\times$ 22.00	Uncoated	14LP-2-0
	Al+SiO ₂ coated	14LP-2-1

CODE EXAMPLE FOR ORDERING

14LP-1-0

Dimensions (AxBxC)
1 – 12.7 $\times$ 12.9 $\times$ 12.7 mm
2 – 22.0 $\times$ 37.9 $\times$ 22.0 mm

Coating
0 – Uncoated
1 – Al+SiO₂ coated

FEATURES

- Uncoated prisms can be used to disperse the light into spectrum
- Aluminium coated (B face) prisms diverts the beam at a 60 deg angle without inverting or reverting the image

RELATED PRODUCTS AND ACCESSORIES

- 5PM131 – Prism/Optics Mount



- 5PMF57 – Universal Prism/Optics Mount



- 6PT169 – Three Angle Prism/Beamsplitter Table



- 6PT110 – Tilt/Rotation Stage



- 5OM37-50 – Two Angular Fine Adjustment Mounts



- 7FA3 – Roll & Pitch Tilt Platform



OPTICAL SUBSTRATES

LENSES

PRISMS

DIELECTRIC COATED OPTICS

METALLIC COATED OPTICS

FILTERS

METAL MIRRORS

VARIABLE REFLECTIVITY MIRRORS

NON POLARIZING BEAMSPLITTER CUBES

POLARIZING OPTICS

COATINGS SECTION

DIELECTRIC COATED OPTICS

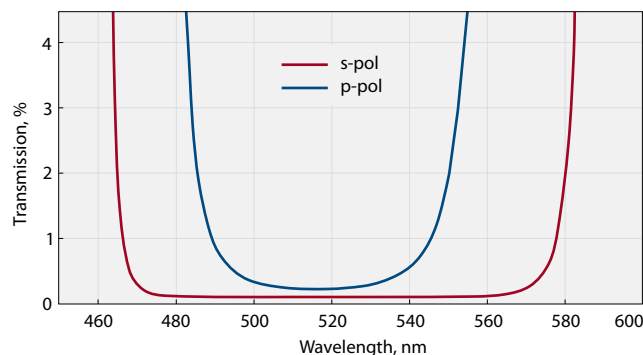
14DM-HR

HR Laser Line mirrors

FEATURES

- Provide an optimised performance at certain wavelength and certain angle of incidence (AOI)
- Coatings are provided by Ion Beam Sputtering (IBS) or Electron beam evaporation with/without Ion assistance coating techniques
- HR Laser Line coatings (HR) highly reflect wavelength range of <10% of the central wavelength (CWL). For instance, HR@800nm will reflect wavelength range of 760-840 nm
- If your application needs to reflect wider wavelength range please refer to – *Broad Band HR wavelength coatings*
- Our standard substrates can be coated with this type of coatings!

HR Laser Line mirrors (HR) provide an optimized performance at certain wavelength and certain angle of incidence (AOI). These multilayer coating stacks helps to achieve the highest possible reflectivity at specific laser line wavelengths at normal or 45 degrees incidence. Laser line HR coatings are used for external beam manipulation applications where even slight losses may be intolerable. Coatings are provided by Ion Beam Sputtering (IBS) or Electron beam evaporation with/without Ion assistance coating techniques. High reflectivity dielectric coatings in the range of 0.19 - 20 μm are available.



Measured transmission curve of the standard Coating Code HR5

STANDARD SPECIFICATIONS

Substrate Dimension Tolerance	+0.0, -0.1 mm
Substrate Wavefront Distortion	$<\lambda/8$ ($<\lambda/4$ for curved surfaces)
Substrate Surface Quality	20-10 S-D (40-20 S-D for curved surfaces)
Coating Adhesion and Durability	Per MIL-C-675A
Clear Aperture	>90% of diameter
Measured Reflectivity	$R > 99.5\%$ @ 0° , $R_s > 99.8\%$ and $R_p > 99.3\%$ @ 45°
Laser Damage Threshold	>5-7 J/cm ² for 10 ns pulses @ 1064 nm

HR LASER LINE MIRRORS

Wavelength, nm	Reflectivity (average), %	Substrate material	Ordering Code for AOI = 0°	Ordering Code for AOI = 45°	Ordering Code for AOI = 0°	Ordering Code for AOI = 45°
			Ø12.7 mm		Ø25.4 mm	
266	>99.0	UVFS	14DM-1-HR1-0-2	14DM-1-HR1-45-2	14DM-2-HR1-0-2	14DM-2-HR1-45-2
343-355	>99.5	UVFS	14DM-1-HR2-0-2	14DM-1-HR2-45-2	14DM-2-HR2-0-2	14DM-2-HR2-45-2
400	>99.5	UVFS	14DM-1-HR3-0-2	14DM-1-HR3-45-2	14DM-2-HR3-0-2	14DM-2-HR3-45-2
473-488	>99.5	BK7	14DM-1-HR4-0-1	14DM-1-HR4-45-1	14DM-2-HR4-0-1	14DM-2-HR4-45-1
515	>99.5	UVFS	14DM-1-HR5-0-2	14DM-1-HR5-45-2	14DM-2-HR5-0-2	14DM-2-HR5-45-2
527-532	>99.5	BK7	14DM-1-HR6-0-1	14DM-1-HR6-45-1	14DM-2-HR6-0-1	14DM-2-HR6-45-1
589	>99.5	BK7	14DM-1-HR7-0-1	14DM-1-HR7-45-1	14DM-2-HR7-0-1	14DM-2-HR7-45-1
633	>99.5	BK7	14DM-1-HR8-0-1	14DM-1-HR8-45-1	14DM-2-HR8-0-1	14DM-2-HR8-45-1
780	>99.5	UVFS	14DM-1-HR9-0-2	14DM-1-HR9-45-2	14DM-2-HR9-0-2	14DM-2-HR9-45-2
800	>99.5	UVFS	14DM-1-HR10-0-2	14DM-1-HR10-45-2	14DM-2-HR10-0-2	14DM-2-HR10-45-2
852	>99.5	BK7	14DM-1-HR11-0-1	14DM-1-HR11-45-1	14DM-2-HR11-0-1	14DM-2-HR11-45-1
946	>99.5	BK7	14DM-1-HR12-0-1	14DM-1-HR12-45-1	14DM-2-HR12-0-1	14DM-2-HR12-45-1
980	>99.5	BK7	14DM-1-HR13-0-1	14DM-1-HR13-45-1	14DM-2-HR13-0-1	14DM-2-HR13-45-1

Wavelength, nm	Reflectivity (average), %	Substrate material	Ordering Code for AOI = 0°	Ordering Code for AOI = 45°	Ordering Code for AOI = 0°	Ordering Code for AOI = 45°
			Ø12.7 mm		Ø25.4 mm	
1030	>99.5	UVFS	14DM-1-HR14-0-2	14DM-1-HR14-45-2	14DM-2-HR14-0-2	14DM-2-HR14-45-2
1047-1064	>99.5	BK7	14DM-1-HR15-0-1	14DM-1-HR15-45-1	14DM-2-HR15-0-1	14DM-2-HR15-45-1
1122	>99.5	BK7	14DM-1-HR16-0-1	14DM-1-HR16-45-1	14DM-2-HR16-0-1	14DM-2-HR16-45-1
1319	>99.5	BK7	14DM-1-HR17-0-1	14DM-1-HR17-45-1	14DM-2-HR17-0-1	14DM-2-HR17-45-1
1550	>99.5	BK7	14DM-1-HR18-0-1	14DM-1-HR18-45-1	14DM-2-HR18-0-1	14DM-2-HR18-45-1

PLEASE NOTE: thickness of UVFS Ø12.7 mm is 2 mm; thickness of BK7 Ø12.7 mm is 3 mm
thickness of UVFS Ø25.4 mm is 5 mm; thickness of BK7 Ø25.4 mm is 6 mm

RELATED PRODUCTS AND ACCESSORIES

- **5F21-1** – Flipping Mirror/ Beamsplitter Mount
- **5KVDOM-1** – Kinematic Vertical Drive Optical Mount
- **5MBM24-2-2SQ** – Kinematic Mirror/ Beamsplitter Mount



CODE EXAMPLE FOR ORDERING

14DM-1-HR1-0-1

Diameter
1 – 12.7 mm
2 – 25.4 mm

Material
1 – BK7
2 – UVFS

Coating type
see *HR Laser Line coatings*

Angle of Incidence, deg

OPTICAL SUBSTRATES

LENSES

PRISMS

DIELECTRIC COATED OPTICS

METALLIC COATED OPTICS

FILTERS

METAL MIRRORS

VARIABLE REFLECTIVITY MIRRORS

NON POLARIZING BEAMSPLITTER CUBES

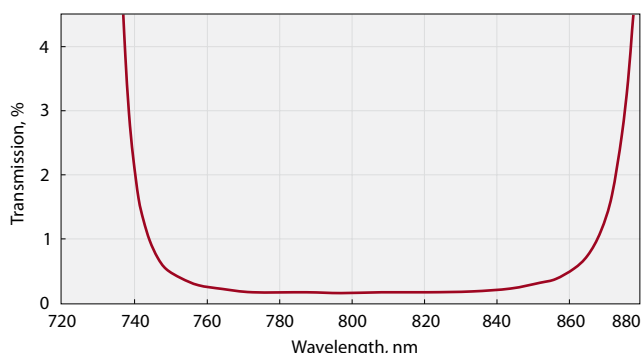
POLARIZING OPTICS

COATINGS SECTION

14DM-BBHR HR Broad Band mirrors

HR Broad Band mirrors (BBHR) provide an optimized performance at broad wavelength range. These multilayer coatings offer high reflectivity for broad spectrum. Therefore, it is the ideal for a wide range of multi-wavelength laser or white light applications. Coatings are provided by Ion Beam Sputtering (IBS) or Electron beam evaporation with/without Ion assistance coating techniques.

High reflectivity dielectric coatings in the range of 0.19 - 20 µm are available.



Measured transmission curve of the standard Coating Code **BBHR3**

FEATURES

- Provide an optimised performance over broad wavelength range
- Coatings are provided by Ion Beam Sputtering (IBS) or Electron beam evaporation with/without Ion assistance coating techniques
- If your application do not require such wide wavelength range to be reflected please refer to – *Laser Line HR wavelength coatings*
- Any other our standard substrate can be coated with this type of coatings!

STANDARD SPECIFICATIONS

Substrate Dimension Tolerance	+0.0, -0.1 mm
Substrate Wavefront Distortion	<λ/8 (<λ/4 for curved surfaces)
Substrate Surface Quality	20-10 S-D (40-20 S-D for curved surfaces)
Coating Adhesion and Durability	Per MIL-C-675A
Clear Aperture	>90% of diameter
Measured Reflectivity	R>99% @ 0°, R _{ave} >99% @ 45°
Laser Damage Threshold	>2-3 J/cm ² for 10 ns pulses @ 1064 nm

OPTICAL SUBSTRATES

LENSES

PRISMS

DIELECTRIC
COATED OPTICS

METALLIC
COATED OPTICS

FILTERS

METAL MIRRORS

VARIABLE
REFLECTIVITY MIRRORS

NON POLARIZING
BEAMSPLITTER CUBES

POLARIZING OPTICS

COATINGS SECTION

HR BROAD BAND MIRRORS

Wave-length range, nm	Reflec-tivity (average), %	Sub-strate material	Ordering Code for AOI = 0°	Ordering Code for AOI = 45°	Ordering Code for AOI = 0°	Ordering Code for AOI = 45°
			Ø12.7 × 3 mm		Ø25.4 × 6 mm	
400-700	>99.0	BK7	14DM-1-BBHR1-0-1	14DM-1-BBHR1-45-1	14DM-2-BBHR1-0-1	14DM-2-BBHR1-45-1
700-950	>99.0	BK7	14DM-1-BBHR2-0-1	14DM-1-BBHR2-45-1	14DM-2-BBHR2-0-1	14DM-2-BBHR2-45-1
750-850	>99.0	BK7	14DM-1-BBHR3-0-1	14DM-1-BBHR3-45-1	14DM-2-BBHR3-0-1	14DM-2-BBHR3-45-1
750-1000	>99.0	BK7	14DM-1-BBHR4-0-1	14DM-1-BBHR4-45-1	14DM-2-BBHR4-0-1	14DM-2-BBHR4-45-1
900-1200	>99.0	BK7	14DM-1-BBHR5-0-1	14DM-1-BBHR5-45-1	14DM-2-BBHR5-0-1	14DM-2-BBHR5-45-1

CODE EXAMPLE FOR ORDERING

14DM-1-BBHR1-0-1

Diameter
1 – 12.7 mm
2 – 25.4 mm

Angle of
Incidence,
deg

Coating type
see *HR Broad Band
coatings*

Material
1 – BK7

RELATED PRODUCTS AND ACCESSORIES

- **5F23-05** – Miniature Flipping Mirror/ Beamsplitter Mounts



- **5MBM23-05-3SH** – Miniature Kinematic Mirror/Beamsplitter Mount



14DM-PR

Partial Reflecting Mirrors

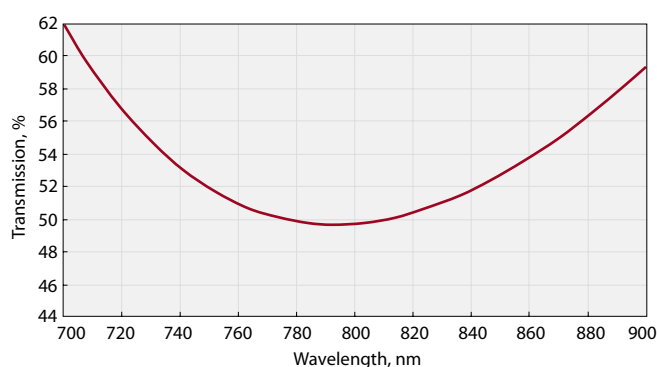
FEATURES

- Efficient beam splitting as well as output coupling in high power laser cavities
- Coatings are provided by Ion Beam Sputtering (IBS) or Electron beam evaporation with/without Ion assistance coating techniques
- Various wavelengths and Reflectivity values are available
- Any other our standard substrate can be coated with this type of coatings

STANDARD SPECIFICATIONS

Substrate Dimension Tolerance	+0.0, -0.1 mm
Substrate Wavefront Distortion	$<\lambda/8$ ($<\lambda/4$ for curved surfaces)
Substrate Surface Quality	20-10 S-D (40-20 S-D for curved surfaces)
Coating Adhesion and Durability	Per MIL-C-675A
Clear Aperture	>90% of diameter
Laser Damage Threshold	>5-6 J/cm ² for 10 ns pulses @ 1064 nm

Partial reflecting mirrors (PR) provide required percentage reflection/transmission at a specific angle of incidence for both single and broad band wavelengths. These coatings serve usually for the efficient beam splitting as well as output coupling in high power laser cavities.



Measured transmission curve for PR coating code **PR6.50**



PARTIAL REFLECTING MIRRORS

Wave-length, nm	Sub-strate mate-rial	Reflec-tivity (average), %	Ordering Code for AOI = 0°	Ordering Code for AOI = 45°	Ordering Code for AOI = 0°	Ordering Code for AOI = 45°
			Ø12.7 mm		Ø25.4 mm	
266	UVFS	10±3	14DM-1-PR1.10-0-2	14DM-1-PR1.10-45-2	14DM-2-PR1.10-0-2	14DM-2-PR1.10-45-2
		50±2	14DM-1-PR1.50-0-2	14DM-1-PR1.50-45-2	14DM-1-PR1.50-0-2	14DM-1-PR1.50-45-2
		90±1	14DM-1-PR1.90-0-2	14DM-1-PR1.90-45-2	14DM-2-PR1.90-0-2	14DM-2-PR1.90-45-2
355	UVFS	10±3	14DM-1-PR2.10-0-2	14DM-1-PR2.10-45-2	14DM-2-PR2.10-0-2	14DM-2-PR2.10-45-2
		50±2	14DM-1-PR2.50-0-2	14DM-1-PR2.50-45-2	14DM-1-PR2.50-0-2	14DM-1-PR2.50-45-2
		90±1	14DM-1-PR2.90-0-2	14DM-1-PR2.90-45-2	14DM-2-PR2.90-0-2	14DM-2-PR2.90-45-2
400	UVFS	10±3	14DM-1-PR3.10-0-2	14DM-1-PR3.10-45-2	14DM-2-PR3.10-0-2	14DM-2-PR3.10-45-2
		50±2	14DM-1-PR3.50-0-2	14DM-1-PR3.50-45-2	14DM-1-PR3.50-0-2	14DM-1-PR3.50-45-2
		90±1	14DM-1-PR3.90-0-2	14DM-1-PR3.90-45-2	14DM-2-PR3.90-0-2	14DM-2-PR3.90-45-2
515-532	BK7	10±3	14DM-1-PR4.10-0-1	14DM-1-PR4.10-45-1	14DM-2-PR4.10-0-1	14DM-2-PR4.10-45-1
		50±2	14DM-1-PR4.50-0-1	14DM-1-PR4.50-45-1	14DM-1-PR4.50-0-1	14DM-1-PR4.50-45-1
		90±1	14DM-1-PR4.90-0-1	14DM-1-PR4.90-45-1	14DM-2-PR4.90-0-1	14DM-2-PR4.90-45-1
633	BK7	10±3	14DM-1-PR5.10-0-1	14DM-1-PR5.10-45-1	14DM-2-PR5.10-0-1	14DM-2-PR5.10-45-1
		50±2	14DM-1-PR5.50-0-1	14DM-1-PR5.50-45-1	14DM-1-PR5.50-0-1	14DM-1-PR5.50-45-1
		90±1	14DM-1-PR5.90-0-1	14DM-1-PR5.90-45-1	14DM-2-PR5.90-0-1	14DM-2-PR5.90-45-1
750-850	UVFS	10±3	14DM-1-PR6.10-0-2	14DM-1-PR6.10-45-2	14DM-2-PR6.10-0-2	14DM-2-PR6.10-45-2
		50±2	14DM-1-PR6.50-0-2	14DM-1-PR6.50-45-2	14DM-1-PR6.50-0-2	14DM-1-PR6.50-45-2
		90±1	14DM-1-PR6.90-0-2	14DM-1-PR6.90-45-2	14DM-2-PR6.90-0-2	14DM-2-PR6.90-45-2
946	BK7	10±3	14DM-1-PR7.10-0-1	14DM-1-PR7.10-45-1	14DM-2-PR7.10-0-1	14DM-2-PR7.10-45-1
		50±2	14DM-1-PR7.50-0-1	14DM-1-PR7.50-45-1	14DM-1-PR7.50-0-1	14DM-1-PR7.50-45-1
		90±1	14DM-1-PR7.90-0-1	14DM-1-PR7.90-45-1	14DM-2-PR7.90-0-1	14DM-2-PR7.90-45-1
1020-1100	BK7	10±3	14DM-1-PR8.10-0-1	14DM-1-PR8.10-45-1	14DM-2-PR8.10-0-1	14DM-2-PR8.10-45-1
		50±2	14DM-1-PR8.50-0-1	14DM-1-PR8.50-45-1	14DM-1-PR8.50-0-1	14DM-1-PR8.50-45-1
		90±1	14DM-1-PR8.90-0-1	14DM-1-PR8.90-45-1	14DM-2-PR8.90-0-1	14DM-2-PR8.90-45-1
1122	BK7	10±3	14DM-1-PR9.10-0-1	14DM-1-PR9.10-45-1	14DM-2-PR9.10-0-1	14DM-2-PR9.10-45-1
		50±2	14DM-1-PR9.50-0-1	14DM-1-PR9.50-45-1	14DM-1-PR9.50-0-1	14DM-1-PR9.50-45-1
		90±1	14DM-1-PR9.90-0-1	14DM-1-PR9.90-45-1	14DM-2-PR9.90-0-1	14DM-2-PR9.90-45-1
1319	BK7	10±3	14DM-1-PR10.10-0-1	14DM-1-PR10.10-45-1	14DM-2-PR10.10-0-1	14DM-2-PR10.10-45-1
		50±2	14DM-1-PR10.50-0-1	14DM-1-PR10.50-45-1	14DM-1-PR10.50-0-1	14DM-1-PR10.50-45-1
		90±1	14DM-1-PR10.90-0-1	14DM-1-PR10.90-45-1	14DM-2-PR10.90-0-1	14DM-2-PR10.90-45-1
1550	BK7	10±3	14DM-1-PR11.10-0-1	14DM-1-PR11.10-45-1	14DM-2-PR11.10-0-1	14DM-2-PR11.10-45-1
		50±2	14DM-1-PR11.50-0-1	14DM-1-PR11.50-45-1	14DM-1-PR11.50-0-1	14DM-1-PR11.50-45-1
		90±1	14DM-1-PR11.90-0-1	14DM-1-PR11.90-45-1	14DM-2-PR11.90-0-1	14DM-2-PR11.90-45-1

PLEASE NOTE: thickness of UVFS Ø12.7 mm is 2 mm; thickness of BK7 Ø12.7 mm is 3 mm
thickness of UVFS Ø25.4 mm is 5 mm; thickness of BK7 Ø25.4 mm is 6 mm

RELATED PRODUCTS AND ACCESSORIES

- **5OM10T** – Small Optical Mount of Side Drive with Mirror Adapter **5OM100A3**
- **5M111-0** – Mirror/Optics Mount
- **5BM57-2** – Stable Steel Mirror/Beamsplitter Mounts



CODE EXAMPLE FOR ORDERING

14DM-1-PR1.10-0-1

Diameter
1 – 12.7 mm
2 – 25.4 mm

Angle of Incidence, deg

Coating type
see *Partial reflecting coatings*

Material
1 – BK7
2 – UVFS

OPTICAL SUBSTRATES

LENSES

PRISMS

DIELECTRIC COATED OPTICS

METALLIC COATED OPTICS

FILTERS

METAL MIRRORS

VARIABLE REFLECTIVITY MIRRORS

NON POLARIZING BEAMSPLITTER CUBES

POLARIZING OPTICS

COATINGS SECTION

14DM-WS

Wavelength Separators

FEATURES

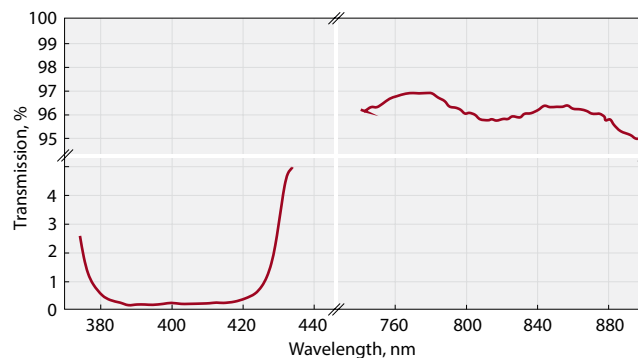
- Used to separate the spectral regions or specified wavelengths
- Coatings are provided by Ion Beam Sputtering (IBS) or Electron beam evaporation with/without Ion assistance coating techniques

STANDARD SPECIFICATIONS

Substrate Dimension Tolerance	+0.0, -0.1 mm
Substrate Wavefront Distortion	$<\lambda/8$ ($<\lambda/4$ for curved surfaces)
Substrate Surface Quality	20-10 S-D (40-20 S-D for curved surfaces)
Coating Adhesion and Durability	Per MIL-C-675A
Clear Aperture	>90% of diameter
Laser Damage Threshold	>5 J/cm ² for 10 ns pulses @ 1064 nm

Wavelength separators are used to separate the spectral regions or specified wavelengths (harmonic components) of the multi-frequency laser systems by selective spectral reflection, transmission and absorption.

These multilayer dielectric coatings separates various harmonic components of frequency doubled laser systems by selective spectral reflection and transmission. In all cases one wavelength is reflected while the others are transmitted.



Measured transmission curve for wavelength separator coating code WS4

WAVELENGTH SEPARATORS

Reflected Wavelength, nm	Transmitted Wavelength, nm	Material	Size	Ordering Code for AOI = 0°	Ordering Code for AOI = 45°
R>99% @ 266	T>90% @ 355+532+1064	UVFS	Ø12.7×2 mm	14DM-1-WS1-0-2	14DM-1-WS1-45-2
			Ø25.4×5 mm	14DM-2-WS1-0-2	14DM-2-WS1-45-2
R>99.5% @ 343	T>95% @ 515+1030	UVFS	Ø12.7×2 mm	14DM-1-WS2-0-2	14DM-1-WS2-45-2
			Ø25.4×5 mm	14DM-2-WS2-0-2	14DM-2-WS2-45-2
R>99.5% @ 355	T>95% @ 532+1064	BK7	Ø12.7×3 mm	14DM-3-WS3-0-1	14DM-3-WS3-45-1
			Ø25.4×6 mm	14DM-4-WS3-0-1	14DM-4-WS3-45-1
R>99.5% @ 400	T>95% @ 800	UVFS	Ø12.7×2 mm	14DM-1-WS4-0-2	14DM-1-WS4-45-2
			Ø25.4×5 mm	14DM-2-WS4-0-2	14DM-2-WS4-45-2
R>99.5% @ 515	T>95% @ 1030	UVFS	Ø12.7×2 mm	14DM-1-WS5-0-2	14DM-1-WS5-45-2
			Ø25.4×5 mm	14DM-2-WS5-0-2	14DM-2-WS5-45-2
R>99.5% @ 515	T>90% @ 630-1300 (AOI=0°), T>85% @ 630-1300 (AOI=45°)	UVFS	Ø12.7×2 mm	14DM-1-WS6-0-2	14DM-1-WS6-45-2
			Ø25.4×5 mm	14DM-2-WS6-0-2	14DM-2-WS6-45-2
R>99.5% @ 532	T>90% @ 266	UVFS	Ø12.7×2 mm	14DM-1-WS7-0-2	14DM-1-WS7-45-2
			Ø25.4×5 mm	14DM-2-WS7-0-2	14DM-2-WS7-45-2
R>99.5% @ 532	T>95% @ 1064	BK7	Ø12.7×3 mm	14DM-3-WS8-0-1	14DM-3-WS8-45-1
			Ø25.4×6 mm	14DM-4-WS8-0-1	14DM-4-WS8-45-1
R>99.5% @ (532+1064)	T>90% @ 355	UVFS	Ø12.7×2 mm	14DM-1-WS9-0-2	14DM-1-WS9-45-2
			Ø25.4×5 mm	14DM-2-WS9-0-2	14DM-2-WS9-45-2
R>99.5% @ (532+1064)	T>95% @ 808	BK7	Ø12.7×3 mm	14DM-3-WS10-0-1	14DM-3-WS10-45-1
			Ø25.4×6 mm	14DM-4-WS10-0-1	14DM-4-WS10-45-1
R>99.5% @ (750-850)	T>95% @ 532	UVFS	Ø12.7×2 mm	14DM-1-WS11-0-2	14DM-1-WS11-45-2
			Ø25.4×5 mm	14DM-2-WS11-0-2	14DM-2-WS11-45-2
R>99.5% @ 800	T>95% @ 400	UVFS	Ø12.7×2 mm	14DM-1-WS12-0-2	14DM-1-WS12-45-2
			Ø25.4×5 mm	14DM-2-WS12-0-2	14DM-2-WS12-45-2
R>99.5% @ 800	T>95% @ 1100-1600	UVFS	Ø12.7×2 mm	14DM-1-WS13-0-2	14DM-1-WS13-45-2
			Ø25.4×5 mm	14DM-2-WS13-0-2	14DM-2-WS13-45-2
R>99.5% @ 1030	T>95% @ 515	UVFS	Ø12.7×2 mm	14DM-1-WS14-0-2	14DM-1-WS14-45-2
			Ø25.4×5 mm	14DM-2-WS14-0-2	14DM-2-WS14-45-2
R>99.5% @ 1030	T>95% @ 940	BK7	Ø12.7×3 mm	14DM-3-WS15-0-1	14DM-3-WS15-45-1
			Ø25.4×6 mm	14DM-4-WS15-0-1	14DM-4-WS15-45-1
R>99.5% @ 1030	T>95% @ 976	UVFS	Ø12.7×2 mm	14DM-1-WS16-0-2	14DM-1-WS16-45-2
			Ø25.4×5 mm	14DM-2-WS16-0-2	14DM-2-WS16-45-2
R>99.5% @ 1064	T>95% @ 355	UVFS	Ø12.7×2 mm	14DM-1-WS17-0-2	14DM-1-WS17-45-2
			Ø25.4×5 mm	14DM-2-WS17-0-2	14DM-2-WS17-45-2

Reflected Wavelength, nm	Transmitted Wavelength, nm	Material	Size	Ordering Code for AOI = 0°	Ordering Code for AOI = 45°
R>99.5% @ 1064	T>95% @ 532	BK7	Ø12.7×3 mm	14DM-3-WS18-0-1	14DM-3-WS18-45-1
			Ø25.4×6 mm	14DM-4-WS18-0-1	14DM-4-WS18-45-1
R>99.5% @ 1064	T>95% @ 400-700	BK7	Ø12.7×3 mm	14DM-3-WS19-0-1	14DM-3-WS19-45-1
			Ø25.4×6 mm	14DM-4-WS19-0-1	14DM-4-WS19-45-1
R>99.5% @ 1064	T>95% @ 808	BK7	Ø12.7×3 mm	14DM-3-WS20-0-1	14DM-3-WS20-45-1
			Ø25.4×6 mm	14DM-4-WS20-0-1	14DM-4-WS20-45-1

CODE EXAMPLE FOR ORDERING

14DM-1-WS1-0-1

Size
1 – Ø12.7×2 mm
2 – Ø25.4×5 mm
3 – Ø12.7×3 mm
4 – Ø25.4×6 mm

Material
1 – BK7
2 – UVFS

Angle of Incidence, deg

Coating type
see *Wavelength Separating Coatings*

RELATED PRODUCTS

- 5APH79T-1 – Kinematic Double Optical Mount of Side Drive with Adjustable Polarizer Holder



OPTICAL SUBSTRATES

LENSES

PRISMS

DIELECTRIC COATED OPTICS

METALLIC COATED OPTICS

FILTERS

METAL MIRRORS

VARIABLE REFLECTIVITY MIRRORS

NON POLARIZING BEAMSPLITTER CUBES

POLARIZING OPTICS

COATINGS SECTION

14DM-DHR

Dual Laser Line reflecting mirrors

Dual Laser Line reflecting mirrors (DHR) provide an optimized performance at two certain wavelengths and certain angle of incidence (AOI).

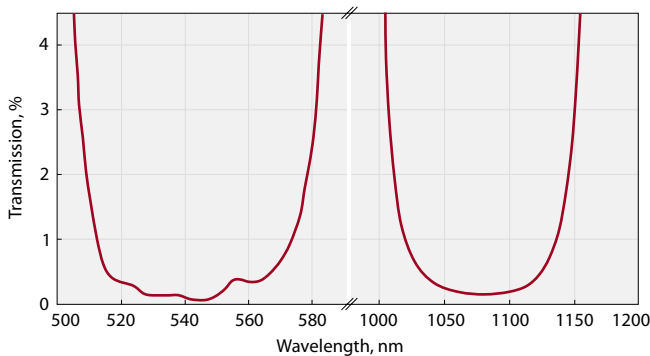
These multilayer coating stacks helps to achieve the highest possible reflectivity at two specific laser line wavelengths at normal or 45 degrees incidence. Laser line high reflectivity coatings are intended for external beam manipulation applications where even slight losses may be intolerable.

FEATURES

- The coatings are designed to achieve the highest possible reflectivity at two specific laser line wavelengths at normal or 45 degrees incidence
- Coatings are provided by Ion Beam Sputtering (IBS) or Electron beam evaporation with/without Ion assistance coating techniques
- Any other standard substrate can be coated with this type of coatings!

STANDARD SPECIFICATIONS

Substrate Dimension Tolerance	+0.0, -0.1 mm
Substrate Wavefront Distortion	<λ/8 (<λ/4 for curved surfaces)
Substrate Surface Quality	20-10 S-D (40-20 S-D for curved faces)
Coating Adhesion and Durability	Per MIL-C-675A
Clear Aperture	>90% of diameter
Measured Reflectivity	R>99.5% @ 0°, R _s >99.3% and R _p >98.5% @ 45°
Laser Damage Threshold	>3-5 J/cm ² for 10 ns pulses @ 1064 nm



Measured transmission curve for dual wavelength HR coating code **DHR9**

OPTICAL SUBSTRATES

LENSES

PRISMS

DIELECTRIC
COATED OPTICS

METALLIC
COATED OPTICS

FILTERS

METAL MIRRORS

VARIABLE
REFLECTIVITY MIRRORS

NON POLARIZING
BEAMSPLITTER CUBES

POLARIZING OPTICS

COATINGS SECTION

DUAL LASER LINE REFLECTING MIRRORS

Wavelength, nm	Substrate material	Ordering Code for AOI = 0°	Ordering Code for AOI = 45°	Ordering Code for AOI = 0°	Ordering Code for AOI = 45°
		Ø12.7 mm		Ø25.4 mm	
266+532	UVFS	14DM-1-DHR1-0-2	14DM-1-DHR1-45-2	14DM-2-DHR1-0-2	14DM-2-DHR1-45-2
343+1030	UVFS	14DM-1-DHR2-0-2	14DM-1-DHR2-45-2	14DM-2-DHR2-0-2	14DM-2-DHR2-45-2
355+532	UVFS	14DM-1-DHR3-0-2	14DM-1-DHR3-45-2	14DM-2-DHR3-0-2	14DM-2-DHR3-45-2
355+1064	UVFS	14DM-1-DHR4-0-2	14DM-1-DHR4-45-2	14DM-2-DHR4-0-2	14DM-2-DHR4-45-2
399+556	BK7	14DM-1-DHR5-0-1	14DM-1-DHR5-45-1	14DM-2-DHR5-0-1	14DM-2-DHR5-45-1
400+800	BK7	14DM-1-DHR6-0-1	14DM-1-DHR6-45-1	14DM-2-DHR6-0-1	14DM-2-DHR6-45-1
426+852	BK7	14DM-1-DHR7-0-1	14DM-1-DHR7-45-1	14DM-2-DHR7-0-1	14DM-2-DHR7-45-1
515+1030	BK7	14DM-1-DHR8-0-1	14DM-1-DHR8-45-1	14DM-2-DHR8-0-1	14DM-2-DHR8-45-1
532+1064	BK7	14DM-1-DHR9-0-1	14DM-1-DHR9-45-1	14DM-2-DHR9-0-1	14DM-2-DHR9-45-1
1064+1319	BK7	14DM-1-DHR10-0-1	14DM-1-DHR10-45-1	14DM-2-DHR10-0-1	14DM-2-DHR10-45-1

PLEASE NOTE: thickness of UVFS Ø12.7 mm is 2 mm; thickness of BK7 Ø12.7 mm is 3 mm
thickness of UVFS Ø25.4 mm is 5 mm; thickness of BK7 Ø25.4 mm is 6 mm

CODE EXAMPLE FOR ORDERING

14DM-1-DHR1-0-1

Diameter
1 – 12.7 mm
2 – 25.4 mm

Angle of
Incidence,
deg

Coating type
see *Dual Laser Line
reflecting coatings*

Material
1 – BK7
2 – UVFS

RELATED PRODUCTS AND ACCESSORIES

- **5BM69T-1** – Kinematic Optical Mount of Side Drive



- **5BM131** – Beamsplitter/Mirror Mount



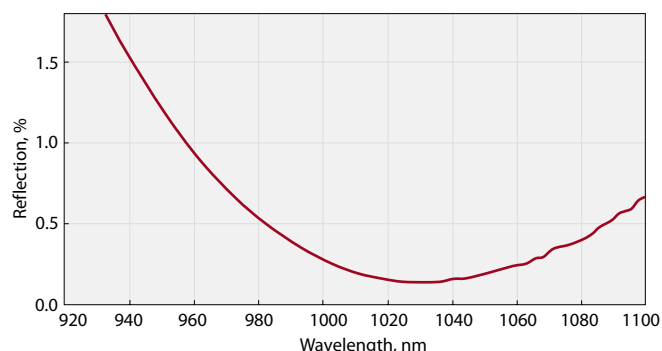
14DM-AR

AR coated windows

FEATURES

- Designed to reduce reflectivity of a optical component to near-zero for specific wavelength
- Laser Line Anti-Reflection Coatings in range 0.19 µm - 10.6 µm are available
- Coatings are provided by Ion Beam Sputtering (IBS) or Electron beam evaporation with/without Ion assistance coating techniques

Anti-reflecting coatings (AR) are designed to reduce reflectivity of a component to near-zero for specific wavelength.



Measured residual back reflection curve for AR coating code **AR14**

RELATED PRODUCTS

- **4H89** – Adjustable Height V-Mount



STANDARD SPECIFICATIONS

Substrate Dimension Tolerance	+0.0, -0.1 mm
Substrate Wavefront Distortion	<λ/8
Substrate Surface Quality	20-10 S-D (40-20 S-D for curved surfaces)
Coating Adhesion and Durability	Per MIL-C-675A
Clear Aperture	>90% of diameter
Measured Residual Reflectivity	R<0.2% @ 0° AOI, R<0.4% @ 45° AOI
Laser Damage Threshold	>8 J/cm² for 10 ns pulses @ 1064 nm



BK7 AR COATED WINDOWS

Wavelength, nm	Ordering Code for AOI = 0° (residual reflectivity <0.2%)	Ordering Code for AOI = 45° (residual reflectivity <0.35%)	Ordering Code for AOI = 0° (residual reflectivity <0.2%)	Ordering Code for AOI = 45° (residual reflectivity <0.35%)
	Ø12.7×3 mm		Ø25.4×6 mm	
473-488	14DM-1-AR4-0-1	14DM-1-AR4-45-1	14DM-2-AR4-0-1	14DM-2-AR4-45-1
515	14DM-1-AR5-0-1	14DM-1-AR5-45-1	14DM-2-AR5-0-1	14DM-2-AR5-45-1
527-532	14DM-1-AR6-0-1	14DM-1-AR6-45-1	14DM-2-AR6-0-1	14DM-2-AR6-45-1
589	14DM-1-AR7-0-1	14DM-1-AR7-45-1	14DM-2-AR7-0-1	14DM-2-AR7-45-1
633	14DM-1-AR8-0-1	14DM-1-AR8-45-1	14DM-2-AR8-0-1	14DM-2-AR8-45-1
780	14DM-1-AR9-0-1	14DM-1-AR9-45-1	14DM-2-AR9-0-1	14DM-2-AR9-45-1
800	14DM-1-AR10-0-1	14DM-1-AR10-45-1	14DM-2-AR10-0-1	14DM-2-AR10-45-1
852	14DM-1-AR11-0-1	14DM-1-AR11-45-1	14DM-2-AR11-0-1	14DM-2-AR11-45-1
946	14DM-1-AR12-0-1	14DM-1-AR12-45-1	14DM-2-AR12-0-1	14DM-2-AR12-45-1
980	14DM-1-AR13-0-1	14DM-1-AR13-45-1	14DM-2-AR13-0-1	14DM-2-AR13-45-1
1030	14DM-1-AR14-0-1	14DM-1-AR14-45-1	14DM-2-AR14-0-1	14DM-2-AR14-45-1
1047-1064	14DM-1-AR15-0-1	14DM-1-AR15-45-1	14DM-2-AR15-0-1	14DM-2-AR15-45-1
1122	14DM-1-AR16-0-1	14DM-1-AR16-45-1	14DM-2-AR16-0-1	14DM-2-AR16-45-1
1319	14DM-1-AR17-0-1	14DM-1-AR17-45-1	14DM-2-AR17-0-1	14DM-2-AR17-45-1
1550	14DM-1-AR18-0-1	14DM-1-AR18-45-1	14DM-2-AR18-0-1	14DM-2-AR18-45-1

UVFS AR COATED WINDOWS

Wavelength, nm	Ordering Code for AOI = 0° (residual reflectivity <0.2%)	Ordering Code for AOI = 45° (residual reflectivity <0.35%)	Ordering Code for AOI = 0° (residual reflectivity <0.2%)	Ordering Code for AOI = 45° (residual reflectivity <0.35%)
	Ø12.7×2mm		Ø25.4×5mm	
266	14DM-1-AR1-0-2	14DM-1-AR1-45-2	14DM-2-AR1-0-2	14DM-2-AR1-45-2
343-355	14DM-1-AR2-0-2	14DM-1-AR2-45-2	14DM-2-AR2-0-2	14DM-2-AR2-45-2
400	14DM-1-AR3-0-2	14DM-1-AR3-45-2	14DM-2-AR3-0-2	14DM-2-AR3-45-2
473-488	14DM-1-AR4-0-2	14DM-1-AR4-45-2	14DM-2-AR4-0-2	14DM-2-AR4-45-2
515	14DM-1-AR5-0-2	14DM-1-AR5-45-2	14DM-2-AR5-0-2	14DM-2-AR5-45-2
527-532	14DM-1-AR6-0-2	14DM-1-AR6-45-2	14DM-2-AR6-0-2	14DM-2-AR6-45-2
589	14DM-1-AR7-0-2	14DM-1-AR7-45-2	14DM-2-AR7-0-2	14DM-2-AR7-45-2
633	14DM-1-AR8-0-2	14DM-1-AR8-45-2	14DM-2-AR8-0-2	14DM-2-AR8-45-2
780	14DM-1-AR9-0-2	14DM-1-AR9-45-2	14DM-2-AR9-0-2	14DM-2-AR9-45-2
800	14DM-1-AR10-0-2	14DM-1-AR10-45-2	14DM-2-AR10-0-2	14DM-2-AR10-45-2
852	14DM-1-AR11-0-2	14DM-1-AR11-45-2	14DM-2-AR11-0-2	14DM-2-AR11-45-2
946	14DM-1-AR12-0-2	14DM-1-AR12-45-2	14DM-2-AR12-0-2	14DM-2-AR12-45-2
980	14DM-1-AR13-0-2	14DM-1-AR13-45-2	14DM-2-AR13-0-2	14DM-2-AR13-45-2
1030	14DM-1-AR14-0-2	14DM-1-AR14-45-2	14DM-2-AR14-0-2	14DM-2-AR14-45-2
1047-1064	14DM-1-AR15-0-2	14DM-1-AR15-45-2	14DM-2-AR15-0-2	14DM-2-AR15-45-2
1122	14DM-1-AR16-0-2	14DM-1-AR16-45-2	14DM-2-AR16-0-2	14DM-2-AR16-45-2
1319	14DM-1-AR17-0-2	14DM-1-AR17-45-2	14DM-2-AR17-0-2	14DM-2-AR17-45-2
1550	14DM-1-AR18-0-2	14DM-1-AR18-45-2	14DM-2-AR18-0-2	14DM-2-AR18-45-2

CODE EXAMPLE FOR ORDERING

14DM-1-AR1-0-1

Diameter
1 – 12.7 mm
2 – 25.4 mm

Material
1 – BK7
2 – UVFS

Coating type
see *Laser Line AR coatings*

Angle of Incidence,
deg

RELATED PRODUCTS

- 4FH56 – Multiple Filter Holder



OPTICAL SUBSTRATES

LENSES

PRISMS

DIELECTRIC
COATED OPTICS

METALLIC
COATED OPTICS

FILTERS

METAL MIRRORS

VARIABLE
REFLECTIVITY MIRRORS

NON POLARIZING
BEAMSPLITTER CUBES

POLARIZING OPTICS

COATINGS SECTION



e-mail: sales@standa.lt

http://www.standa.lt



Phone: +370-5-2651474

Fax: +370-5-2651483



Svirgailios 21, LT-00262 Vilnius, LITHUANIA



14DM-BBAR

Broad Band AR Coated Windows

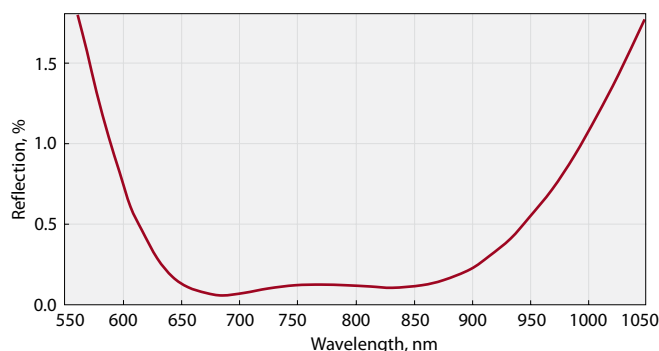
FEATURES

- These coatings are designed to increase the transmission over a broad spectrum
- Coatings are provided by Ion Beam Sputtering (IBS) or Electron beam evaporation with/without Ion assistance coating techniques
- Broad Band Anti-Reflection Coatings in the range 0.19–10.6 μm are available

STANDARD SPECIFICATIONS

Substrate Dimension Tolerance	+0.0, -0.1 mm
Substrate Wavefront Distortion	$<\lambda/8$
Substrate Surface Quality	20-10 S-D (40-20 S-D for curved surfaces)
Coating Adhesion and Durability	Per MIL-C-675A
Clear Aperture	>90% of diameter
Laser Damage Threshold	>4-5 J/cm ² for 10 ns pulses @ 1064 nm

Broad Band AR coatings designed to reduce the reflectivity of a component to near-zero for Broad band wavelength range. We supply standard Broad Band AR coatings in the range 0.19–10.6 μm . These multilayer broadband anti-reflective coating increases transmission of optical element for broad spectrum. Therefore, it is the ideal for a wide range of multi-wavelength laser and white light applications. The wavelength range and reflectivity of the coating depends on the angle of the incident beam.



Measured residual back reflection curve for BBAR coating code **BBAR4**

BK7 AR COATED WINDOWS

Wavelength, nm	Residual Reflectivity @ 0° AOI, %	Ordering Code for AOI = 0°	Ordering Code for AOI = 45°	Ordering Code for AOI = 0°	Ordering Code for AOI = 45°
		Ø12.7×3 mm		Ø25.4×6 mm	
400-700	<1.0	14DM-1-BBAR1-0-1	14DM-1-BBAR1-45-1	14DM-2-BBAR1-0-1	14DM-2-BBAR1-45-1
600-1050	<0.8	14DM-1-BBAR2-0-1	14DM-1-BBAR2-45-1	14DM-2-BBAR2-0-1	14DM-2-BBAR2-45-1
700-950	<0.4	14DM-1-BBAR3-0-1	14DM-1-BBAR3-45-1	14DM-2-BBAR3-0-1	14DM-2-BBAR3-45-1
750-850	<0.3	14DM-1-BBAR4-0-1	14DM-1-BBAR4-45-1	14DM-2-BBAR4-0-1	14DM-2-BBAR4-45-1
750-1000	<0.5	14DM-1-BBAR5-0-1	14DM-1-BBAR5-45-1	14DM-2-BBAR5-0-1	14DM-2-BBAR5-45-1
900-1200	<0.6	14DM-1-BBAR6-0-1	14DM-1-BBAR6-45-1	14DM-2-BBAR6-0-1	14DM-2-BBAR6-45-1
1200-1500	<0.6	14DM-1-BBAR7-0-1	14DM-1-BBAR7-45-1	14DM-2-BBAR7-0-1	14DM-2-BBAR7-45-1
1500-1900	<0.7	14DM-1-BBAR8-0-1	14DM-1-BBAR8-45-1	14DM-2-BBAR8-0-1	14DM-2-BBAR8-45-1

RELATED PRODUCTS

- **4PH132** – Universal Plate Holder



CODE EXAMPLE FOR ORDERING

14DM-1-BBAR1-0-1

Diameter
1 – 12.7 mm
2 – 25.4 mm

Angle of Incidence, deg

Coating type
see *Broad Band AR coatings*

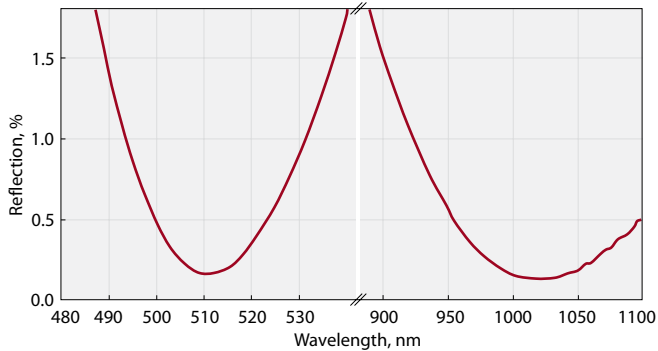
Material
1 – BK7

14DM-DAR

Dual AR Coated Windows

Dual AR coated windows designed to reduce the reflectivity of a component to near-zero for two certain wavelengths. Usually these windows are used in multi-frequency laser output systems (e.g. frequency doubling).

This type of coating provides very high transmission at two different wavelength. Typical wavelengths and reflection curves of an AR coating suitable for the standard laser system output at 1064 nm and 532 nm are shown below.



The measured residual back reflection curve for DAR coating code **DAR9**

FEATURES

- These coatings are designed to increase the transmission over a broad spectrum
- Coatings are provided by Ion Beam Sputtering (IBS) or Electron beam evaporation with/without Ion assistance coating techniques
- Broad Band Anti-Reflection Coatings in the range 0.19–10.6 μm are available

STANDARD SPECIFICATIONS

Substrate Dimension Tolerance	+0.0, -0.1 mm
Substrate Wavefront Distortion	$<\lambda/8$
Substrate Surface Quality	20-10 S-D (40-20 S-D for curved surfaces)
Coating Adhesion and Durability	Per MIL-C-675A
Residual Reflectivity	$<0.5\%$
Clear Aperture	$>90\%$ of diameter
Laser Damage Threshold	$>4-5 \text{ J/cm}^2$ for 10 ns pulses @1064 nm

DUAL AR COATED WINDOWS

Wavelength, nm	Substrate material	Ordering Code for AOI = 0°	Ordering Code for AOI = 45°	Ordering Code for AOI = 0°	Ordering Code for AOI = 45°
		Ø12.7×3 mm		Ø25.4×6 mm	
266+532	UVFS	14DM-1-DAR1-0-2	14DM-1-DAR1-45-2	14DM-2-DAR1-0-2	14DM-2-DAR1-45-2
343+1030	UVFS	14DM-1-DAR2-0-2	14DM-1-DAR2-45-2	14DM-2-DAR2-0-2	14DM-2-DAR2-45-2
355+532	UVFS	14DM-1-DAR3-0-2	14DM-1-DAR3-45-2	14DM-2-DAR3-0-2	14DM-2-DAR3-45-2
355+1064	UVFS	14DM-1-DAR4-0-2	14DM-1-DAR4-45-2	14DM-2-DAR4-0-2	14DM-2-DAR4-45-2
399+556	BK7	14DM-1-DAR5-0-1	14DM-1-DAR5-45-1	14DM-2-DAR5-0-1	14DM-2-DAR5-45-1
400+800	BK7	14DM-1-DAR6-0-1	14DM-1-DAR6-45-1	14DM-2-DAR6-0-1	14DM-2-DAR6-45-1
426+852	BK7	14DM-1-DAR7-0-1	14DM-1-DAR7-45-1	14DM-2-DAR7-0-1	14DM-2-DAR7-45-1
515+1030	BK7	14DM-1-DAR8-0-1	14DM-1-DAR8-45-1	14DM-2-DAR8-0-1	14DM-2-DAR8-45-1
532+1064	BK7	14DM-1-DAR9-0-1	14DM-1-DAR9-45-1	14DM-2-DAR9-0-1	14DM-2-DAR9-45-1
1064+1319	BK7	14DM-1-DAR10-0-1	14DM-1-DAR10-45-1	14DM-2-DAR10-0-1	14DM-2-DAR10-45-1

CODE EXAMPLE FOR ORDERING

14DM-1-DAR1-0-1

Diameter
1 – 12.7 mm
2 – 25.4 mm

Angle of Incidence, deg

Coating type see
Dual AR coatings

Material
1 – BK7
2 – UVFS

RELATED PRODUCTS

- 4H29 – Push Holder



OPTICAL SUBSTRATES

LENSES

PRISMS

DIELECTRIC COATED OPTICS

METALLIC COATED OPTICS

FILTERS

METAL MIRRORS

VARIABLE REFLECTIVITY MIRRORS

NON POLARIZING BEAMSPLITTER CUBES

POLARIZING OPTICS

COATINGS SECTION

METALLIC COATED OPTICS

14MCO Metallic Coated Optics

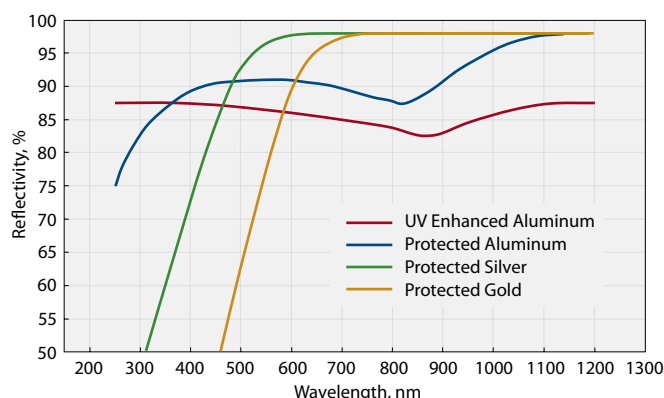


FEATURES

- Protected Gold provides excellent, broadband infrared high reflectance
- Protected Silver provides higher reflectance than aluminum throughout the visible and near IR
- Protected Aluminum is economical solution for VIS applications
- UV enhanced Aluminum provides good reflectance over a wide range and are mainly used in UV applications

Metallic coatings can be used at any angle of incidence because they have extremely broadband reflectance.

We offer Gold, Silver and Aluminum high reflection coatings formed by vacuum deposition. All metallic reflectors can be over-coated with dielectric film of MgF_2 or SiO_2 in order to prevent oxidation of the metallic surface and provide abrasion resistance.



STANDARD SPECIFICATIONS

Substrate Material	BK7, UVFS for UV enhanced mirrors
Substrate Dimension Tolerance	+0.0, -0.1 mm
Surface Quality (after coating)	40-20 scratch & dig
Surface Flatness (after coating)	$\lambda/4$
Clear Aperture	>90% of diameter
Laser Damage Threshold	>0.3 J/cm ² for 10 ns pulses @ 1064 nm (for Gold and Silver)

CODE EXAMPLE FOR ORDERING

14MCO-2-SM-FLAT

Diameter
1 – Ø12.7 mm
2 – Ø25.4 mm
3 – Ø50.8 mm
4 – Ø76.2 mm

Radius of
curvature
or FLAT

Coating type
EA – UV enhanced Aluminum
AL – Protected Aluminum
SM – Protected Silver
GM – Protected Gold

RELATED PRODUCTS

- 5BM121T – Beamsplitters/ Optics Mount
- 5OM10T – Small Optical Mount of Side Drive
- 5OM122T – Mirror Mounts/ Tilt Platforms of Side Drive



METALLIC COATED OPTICS

Coating type	Dimensions, mm	Type	Ordering Code
UV enhanced Aluminum R>87% @ 250-350 nm	Ø12.7×6	FLAT/FLAT	14MCO-1-EA-FLAT
	Ø25.4	FLAT/FLAT	14MCO-2-EA-FLAT
		Plano-Concave, ROC=-50 mm	14MCO-2-EA-50
		Plano-Concave, ROC=-100 mm	14MCO-2-EA-100
		Plano-Concave, ROC=-200 mm	14MCO-2-EA-200
		Plano-Concave, ROC=-500 mm	14MCO-2-EA-500
		Plano-Concave, ROC=-1000 mm	14MCO-2-EA-1000
	Ø50.8×6	FLAT/FLAT	14MCO-3-EA-FLAT
Protected Aluminum R>85% @ 350 nm – IR	Ø76.2×6	FLAT/FLAT	14MCO-4-EA-FLAT
	Ø12.7×6	FLAT/FLAT	14MCO-1-AL-FLAT
	Ø25.4	FLAT/FLAT	14MCO-2-AL-FLAT
		Plano-Concave, ROC=-50 mm	14MCO-2-AL-50
		Plano-Concave, ROC=-100 mm	14MCO-2-AL-100
		Plano-Concave, ROC=-200 mm	14MCO-2-AL-200
		Plano-Concave, ROC=-500 mm	14MCO-2-AL-500
		Plano-Concave, ROC=-1000 mm	14MCO-2-AL-1000
	Ø50.8×8	FLAT/FLAT	14MCO-3-AL-FLAT
Protected Silver R>96% @ 400 nm – IR	Ø76.2×8	FLAT/FLAT	14MCO-4-AL-FLAT
	Ø12.7×6	FLAT/FLAT	14MCO-1-SM-FLAT
	Ø25.4	FLAT/FLAT	14MCO-2-SM-FLAT
		Plano-Concave, ROC=-50 mm	14MCO-2-SM-50
		Plano-Concave, ROC=-100 mm	14MCO-2-SM-100
		Plano-Concave, ROC=-200 mm	14MCO-2-SM-200
		Plano-Concave, ROC=-500 mm	14MCO-2-SM-500
		Plano-Concave, ROC=-1000 mm	14MCO-2-SM-1000
	Ø50.8×8	FLAT/FLAT	14MCO-3-SM-FLAT
Protected Gold R>98% @ 900 nm – IR	Ø76.2×8	FLAT/FLAT	14MCO-4-SM-FLAT
	Ø12.7×6	FLAT/FLAT	14MCO-1-GM-FLAT
	Ø25.4	FLAT/FLAT	14MCO-2-GM-FLAT
		Plano-Concave, ROC=-50 mm	14MCO-2-GM-50
		Plano-Concave, ROC=-100 mm	14MCO-2-GM-100
		Plano-Concave, ROC=-200 mm	14MCO-2-GM-200
		Plano-Concave, ROC=-500 mm	14MCO-2-GM-500
		Plano-Concave, ROC=-1000 mm	14MCO-2-GM-1000
	Ø50.8×8	FLAT/FLAT	14MCO-3-GM-FLAT
	Ø76.2×8	FLAT/FLAT	14MCO-4-GM-FLAT

OPTICAL SUBSTRATES

LENSES

PRISMS

DIELECTRIC
COATED OPTICS

METALLIC
COATED OPTICS

FILTERS

METAL MIRRORS

VARIABLE
REFLECTIVITY MIRRORS

NON POLARIZING
BEAMSPLITTER CUBES

POLARIZING OPTICS

COATINGS SECTION

RELATED PRODUCTS

- **5BM141** –
Mirror
Optical
Mount

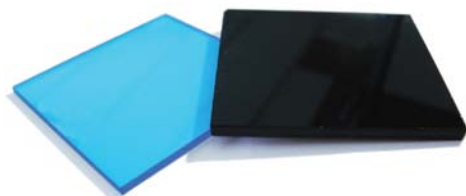


- **5MBM24-1-3** –
Kinematic
Mirror/
Beamsplitter
Mount



FILTERS

14CGF Color Glass Filters



FEATURES

- Color glass filter provides an economical filter for many various applications
- For your convenience, we have selected 45 pcs of the color and neutral glass filters for various applications in the laboratory! Filters are assembled in safe and compact wooden box

Standa provides color glass filters for laser pulse attenuation, filtering, etc.

Due to its selective absorption in visible wavelength range, color glass filter will exhibit various color depending the glass type. Color glass filter provides an economical filter for various applications.

Optical glass filters are widely used in safety glasses, industrial measurement, environment protection and many others.

STANDARD SPECIFICATIONS

Material	Schott glass or equivalent
Diameter Tolerance	+0.0, -0.2 mm
Clear Aperture	90%
Surface Quality	60-40 scratch & dig
Surface Flatness	$\lambda @ 632.8 \text{ nm}$
Parallelism	<3 arcmin
Uncoated, Unmounted	

COLOR GLASS FILTERS

Material	Ordering Code		
	Ø12.7×3 mm	Ø25.4×3 mm	50.8×50.8×3 mm
GG Series: Yellow glass			
GG10	14CGF-GG10-1	14CGF-GG10-2	14CGF-GG10-3
GG375	14CGF-GG375-1	14CGF-GG375-2	14CGF-GG375-3
GG400	14CGF-GG400-1	14CGF-GG400-2	14CGF-GG400-3
GG420	14CGF-GG420-1	14CGF-GG420-2	14CGF-GG420-3
GG455	14CGF-GG455-1	14CGF-GG455-2	14CGF-GG455-3
GG475	14CGF-GG475-1	14CGF-GG475-2	14CGF-GG475-3
GG495	14CGF-GG495-1	14CGF-GG495-2	14CGF-GG495-3
OG Series: Orange glass			
OG515	14CGF-OG515-1	14CGF-OG515-2	14CGF-OG515-3
OG530	14CGF-OG530-1	14CGF-OG530-2	14CGF-OG530-3
OG550	14CGF-OG550-1	14CGF-OG550-2	14CGF-OG550-3
OG570	14CGF-OG570-1	14CGF-OG570-2	14CGF-OG570-3
OG590	14CGF-OG590-1	14CGF-OG590-2	14CGF-OG590-3
RG Series: Red and black glass, IR transmitting			
RG6	14CGF-RG6-1	14CGF-RG6-2	14CGF-RG6-3
RG7	14CGF-RG7-1	14CGF-RG7-2	14CGF-RG7-3
RG610	14CGF-RG610-1	14CGF-RG610-2	14CGF-RG610-3
RG630	14CGF-RG630-1	14CGF-RG630-2	14CGF-RG630-3
RG645	14CGF-RG645-1	14CGF-RG645-2	14CGF-RG645-3
RG665	14CGF-RG665-1	14CGF-RG665-2	14CGF-RG665-3
RG695	14CGF-RG695-1	14CGF-RG695-2	14CGF-RG695-3
RG715	14CGF-RG715-1	14CGF-RG715-2	14CGF-RG715-3
RG780	14CGF-RG780-1	14CGF-RG780-2	14CGF-RG780-3
RG830	14CGF-RG830-1	14CGF-RG830-2	14CGF-RG830-3
RG850	14CGF-RG850-1	14CGF-RG850-2	14CGF-RG850-3
UG Series: Black blue glasses, ultraviolet transmitting			
UG1	14CGF-UG1-1	14CGF-UG1-2	14CGF-UG1-3
UG5	14CGF-UG5-1	14CGF-UG5-2	14CGF-UG5-3
UG11	14CGF-UG11-1	14CGF-UG11-2	14CGF-UG11-3



Material	Ordering Code		
	Ø12.7×3 mm	Ø25.4×3 mm	50.8×50.8×3 mm
KG Series: Colorless glass with high transmission in the visible and absorption in the IR range			
KG1	14CGF-KG1-1	14CGF-KG1-2	14CGF-KG1-3
KG2	14CGF-KG2-1	14CGF-KG2-2	14CGF-KG2-3
KG3	14CGF-KG3-1	14CGF-KG3-2	14CGF-KG3-3
VG Series: Green glass			
VG5	14CGF-VG5-1	14CGF-VG5-2	14CGF-VG5-3
VG8	14CGF-VG8-1	14CGF-VG8-2	14CGF-VG8-3
VG10	14CGF-VG10-1	14CGF-VG10-2	14CGF-VG10-3
BG Series: Blue, blue-green and multi-band glass			
BG3	14CGF-BG3-1	14CGF-BG3-2	14CGF-BG3-3
BG7	14CGF-BG7-1	14CGF-BG7-2	14CGF-BG7-3
BG12	14CGF-BG12-1	14CGF-BG12-2	14CGF-BG12-3
BG20	14CGF-BG20-1	14CGF-BG20-2	14CGF-BG20-3
BG25	14CGF-BG25-1	14CGF-BG25-2	14CGF-BG25-3
BG38	14CGF-BG38-1	14CGF-BG38-2	14CGF-BG38-3
Color and neutral filter set consisting of 45 mounted filters (Ø25.4 mm, CA18 mm)			
Universal Filter Set (45 pcs)		14UFS-1-S45	
Color Glass Filter Set consisting of 95 unmounted filters (40×40 mm)			
Color Glass Filter Set (95 pcs)		10CGF	

OPTICAL SUBSTRATES

LENSES

PRISMS

DIELECTRIC
COATED OPTICS

METALLIC
COATED OPTICS

FILTERS

METAL MIRRORS

VARIABLE
REFLECTIVITY MIRRORS

NON POLARIZING
BEAMSPLITTER CUBES

POLARIZING OPTICS

COATINGS SECTION



Universal Filter Set 14UFS-1-S45



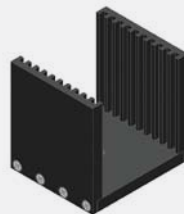
Color Glass Filter Set 10CGF

RELATED PRODUCTS AND ACCESSORIES

- 4PH132-3 – Universal Plate Holder



- 4OFH-10 – Multiple Filters Holder



OPTICAL SUBSTRATES

LENSES

PRISMS

DIELECTRIC
COATED OPTICS

METALLIC
COATED OPTICS

FILTERS

METAL MIRRORS

VARIABLE
REFLECTIVITY MIRRORS

NON POLARIZING
BEAMSPLITTER CUBES

POLARIZING OPTICS

COATINGS SECTION

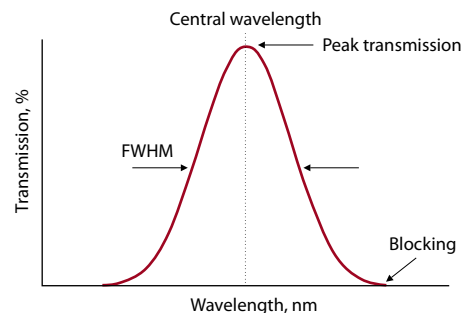
14IF Interference Filters



FEATURES

- In general interference filters are used as wavelength selectors in astrophysics, clinical chemistry, material analysis, quality control, and in general purpose laboratory colorimeters and other applications

Standa supplies high quality standard and custom-made interference filters within the spectral range from 250 nm to 5000 nm. We also offer biomedical bandpass filters, which are specially designed for biomedical instrumentation, including chemistry analyzers and microplate readers. These bandpass filters include standard or custom matched filters. Fluorescence filters, which we can supply includes such features as steep slopes, deep blocking (up to OD 6), minimal spectral crosstalk, high transmission and environmental durability.



UV BANDPASS INTERFERENCE FILTERS

Central wavelength, nm	Bandwidth (FWHM), nm	Peak Transmittance, %	Ordering Code
214	12	10	14IF-10-214-12
228	12	10	14IF-10-228-12
232	12	10	14IF-10-232-12
239	12	10	14IF-10-239-12
254	12	12	14IF-12-254-12
265	12	12	14IF-12-265-12
280	12	12	14IF-12-280-12
289	12	12	14IF-12-289-12
297	12	12	14IF-12-297-12
307	12	15	14IF-15-307-12
312	12	15	14IF-15-312-12
326	12	15	14IF-15-326-12
334	12	15	14IF-15-334-12
340	11	40	14IF-40-340-11
352	12	35	14IF-35-352-12
365	12	35	14IF-35-365-12
380	12	35	14IF-35-380-12

NIR NARROW BANDPASS INTERFERENCE FILTERS

Central wavelength, nm	Bandwidth (FWHM), nm	Peak Transmittance, %	Ordering Code
766	11	45	14IF-45-766-11
780	11	45	14IF-45-780-11
795	11	45	14IF-45-795-11
830	12	45	14IF-45-830-12
850	12	45	14IF-45-850-12
880	12	45	14IF-45-880-12
905	12	45	14IF-45-905-12
940	13	45	14IF-45-940-13
1060	10	45	14IF-45-1060-10
1064	10	45	14IF-45-1064-10
1152	11	45	14IF-45-766-11
1310	12	45	14IF-45-1310-12
1320	12	45	14IF-45-1320-12
1523	10	45	14IF-45-1523-10
1550	10	45	14IF-45-1550-10

STANDARD SPECIFICATIONS

Bandwidth Tolerance	±20% maximal
Blocking	<0.01%
Mount Diameter	25.4 mm
Clear Aperture	>18 mm
Temperature Limits	-50 °C to 80 °C

VIS NARROW BANDPASS INTERFERENCE FILTERS

Central wavelength, nm	Bandwidth (FWHM), nm	Peak Transmittance, %	Ordering Code
405	10	35	14IF-35-405-10
415	10	40	14IF-40-415-10
450	10	50	14IF-50-450-10
488	3	50	14IF-50-488-3
505	10	50	14IF-50-505-10
510	10	50	14IF-50-510-10
515	10	50	14IF-50-515-10
532	10	50	14IF-50-532-10
546	10	50	14IF-50-546-10
550	10	50	14IF-50-550-10
570	10	50	14IF-50-570-10
590	10	50	14IF-50-590-10
600	10	50	14IF-50-600-10
620	10	50	14IF-50-620-10
633	11	50	14IF-50-633-11
650	11	50	14IF-50-650-11
670	11	50	14IF-50-670-11
690	11	50	14IF-50-690-11

CODE EXAMPLE FOR ORDERING

14IF-35-352-12

Peak
Transmittance

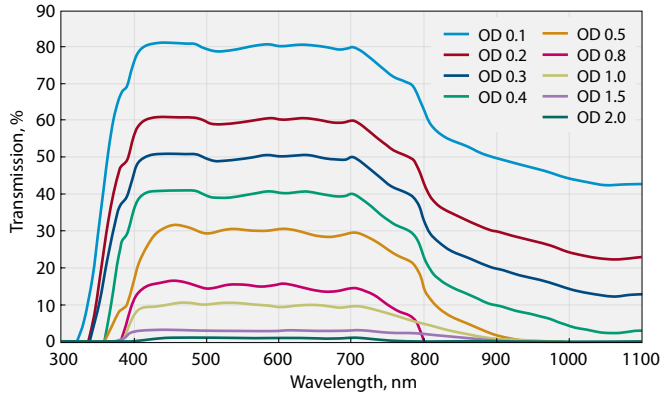
Aperture

Central
Wavelength


14NDF

Neutral Density Absorption Type Filters

Neutral density filters are ideal for overall light reduction in cases of extreme light intensity. Neutral density laser radiation filters with custom transmittance, dimensions and shape. Neutral density absorption type filters decrease intensity of light without altering relative spectral distribution of the energy. Attenuation is accomplished by using an absorbing type glass.



FEATURES

- Neutral Density filter is an economical solution to attenuate the light
- For your convenience, we have selected 11 pcs of the neutral glass filters for various applications in the laboratory! Filters are assembled in safe and compact wooden box

STANDARD SPECIFICATIONS

Material	Neutral density glass
Diameter Tolerance	+0.0, -0.2 mm
Clear Aperture	90%
Surface Quality	60-40 scratch & dig
Surface Flatness	λ @ 632.8 nm
Parallelism	<3 arcmin
Designed for VIS range (400-700 nm)	
Uncoated, Unmounted	

NEUTRAL DENSITY ABSORPTION TYPE FILTERS

Optical density	Average Transmission in VIS	Ordering Code		
		Ø12.7 mm	Ø25.4 mm	50.8×50.8 mm
0.1	80%	14NDF-80-1	14NDF-80-2	14NDF-80-3
0.2	60%	14NDF-60-1	14NDF-60-2	14NDF-60-3
0.3	50%	14NDF-50-1	14NDF-50-2	14NDF-50-3
0.4	40%	14NDF-40-1	14NDF-40-2	14NDF-40-3
0.5	30%	14NDF-30-1	14NDF-30-2	14NDF-30-3
0.8	15%	14NDF-15-1	14NDF-25-2	14NDF-35-3
1.0	10%	14NDF-10-1	14NDF-20-2	14NDF-30-3
1.5	3%	14NDF-3-1	14NDF-3-2	14NDF-3-3
2.0	1%	14NDF-1-1	14NDF-1-2	14NDF-1-3
3.0	0.1%	14NDF-01-1	14NDF-01-2	14NDF-01-3



Neutral density filter set 14NFS-1-S11

Color and neutral density filter set
consisting of 45 mounted filters
(Ø25.4 mm, CA18 mm)

Universal Filter Set (45 pcs) 14UFS-1-S45

Neutral density filter set
consisting of 11 mounted filters
(Ø25.4 mm, CA18 mm)

Neutral density filter set (11 pcs) 14NFS-1-S11

CODE EXAMPLE FOR ORDERING

14NDF-80-1

Transmittance, %

Size

- 1 – Ø12.7 mm
- 2 – Ø25.4 mm
- 3 – 50.8×50.78 mm

RELATED PRODUCTS

- 10WA168 & 10CWA168 – Variable Wheel Attenuators



OPTICAL SUBSTRATES

LENSES

PRISMS

DIELECTRIC
COATED OPTICSMETALLIC
COATED OPTICS

FILTERS

METAL MIRRORS

VARIABLE
REFLECTIVITY MIRRORSNON POLARIZING
BEAMSPLITTER CUBES

POLARIZING OPTICS

COATINGS SECTION

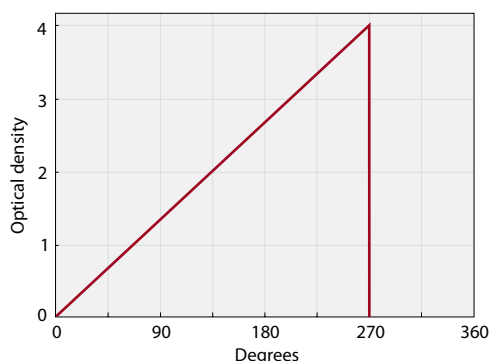
14CNDF

Circular Variable Neutral Density Filters



FEATURES

- Circular Variable Neutral Density filter is an economical solution to attenuate the light



Circular ND filters provide continuously variable, linear attenuation of light by rotating the filter around its center. Transmitted intensity varies as a function of the optical density range. The filter can be used for white light as well as for lasers. A large finite aperture can be attenuated by counter rotating two filters in series. Sizes are available from 25 mm to over 100 mm in diameter.

STANDARD SPECIFICATIONS

Material	B-270 optical crown; UV grade Fused Silica
Outside Diameter	25 mm; 50 mm; 100 mm
Inside Diameter	8.3 mm
Design Wavelength	400-700 nm
Operating Wavelength Range	380-2000 nm (B-270); 250-2500 nm (UV grade Fused silica)
Coated Area	0 to 270°
Parallelism	±3 arcmin

CIRCULAR VARIABLE NEUTRAL DENSITY FILTERS

Optical density range	Average Transmission in VIS	Substrate material	Operating range	Ordering Code		
				Ø25 mm	Ø50 mm	Ø100 mm
0.04 to 1.0	90% to 10%	B-270 optical crown	380-2000 nm	14CNDF-25-90/10-1	14CNDF-50-90/10-1	14CNDF-100-90/10-1
0.04 to 2.0	90% to 1%	B-270 optical crown	380-2000 nm	14CNDF-25-90/1-1	14CNDF-50-90/1-1	14CNDF-100-90/1-1
0.04 to 3.0	90% to 0,1%	B-270 optical crown	380-2000 nm	14CNDF-25-90/01-1	14CNDF-50-90/01-1	14CNDF-100-90/01-1
0.04 to 1.0	90% to 10%	UV grade Fused silica	250-2500 nm	14CNDF-25-90/10-2	14CNDF-50-90/10-2	14CNDF-100-90/10-2
0.04 to 2.0	90% to 1%	UV grade Fused silica	250-2500 nm	14CNDF-25-90/1-2	14CNDF-50-90/1-2	14CNDF-100-90/1-2
0.04 to 3.0	90% to 0,1%	UV grade Fused silica	250-2500 nm	14CNDF-25-90/01-2	14CNDF-50-90/01-2	14CNDF-100-90/01-2

- Rectangular shape variable neutral density filters available. Please request us for more information.

CODE EXAMPLE FOR ORDERING

14CNDF-25-90/1-1

Diameter, mm

Transmission Range

Material
1 – B-270 optical crown
2 – UV grade Fused silica

RELATED PRODUCTS

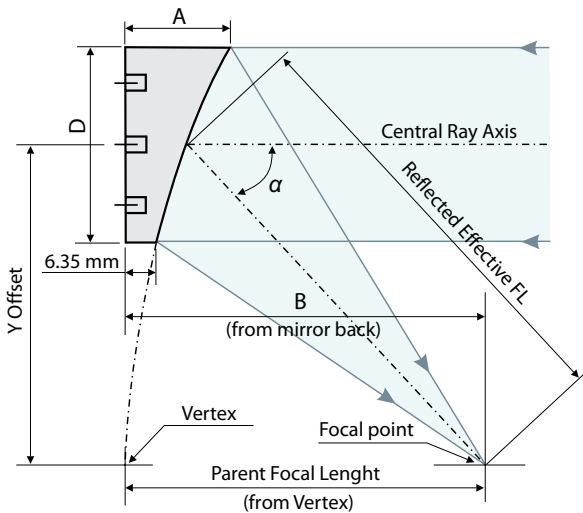
- **8MRU-1** – Universal Motorized Rotation Stage



METAL MIRRORS

14MM Metal Mirrors

Standa provides standard and special metal mirrors with parabolic surface contours for off-axis beam focusing performance. These mirrors are machined from solid bar stock to minimize surface figure deformation which is inherent to the thin walled replicated type. The metal mirrors are produced with advanced Diamond turning equipment.



FEATURES

- Aluminum Substrate Mirrors
- Available in 30°, 60°, or 90° Off-Axis
- Mounting Plates Also Available

STANDARD SPECIFICATIONS

Material	Aluminium
Diameter Tolerance	+0.0, -0.4 mm
Focal Length Tolerance	±1%
Surface Figure	1/4λ - 1λ RMS (depends on size)
Surface Roughness	< 100-175 Å RMS
Coating	Protected Aluminum or Protected Gold

CODE EXAMPLE FOR ORDERING

14MM-1-50-60-AL

Diameter
1 – Ø25.4 mm
2 – Ø50.8 mm

Coating type
AL – Protected Aluminum
GM – Protected Gold

Reflected Effective
Focal Length, mm

Angle, deg

METAL MIRRORS

Diameter D, mm	Parent Focal Length, mm	Reflected Effective FL, mm	Angle α, deg	Y Offset Axis, mm	Coating	Ordering Code
25.4	12.7	25	90	25.4	Protected Gold	14MM-1-25-90-GM
25.4	38.1	50	60	44.0	Protected Gold	14MM-1-50-60-GM
25.4	50.8	100	90	101.6	Protected Gold	14MM-1-100-90-GM
25.4	76.2	150	90	152.4	Protected Gold	14MM-1-150-90-GM
25.4	101.6	200	90	203.2	Protected Gold	14MM-1-200-90-GM
50.8	50.8	50	30	27.2	Protected Gold	14MM-2-50-30-GM
50.8	25.4	50	90	50.8	Protected Gold	14MM-2-50-90-GM
50.8	76.2	150	90	152.4	Protected Gold	14MM-2-150-90-GM
25.4	25.4	25	30	13.6	Protected Aluminum	14MM-1-25-30-AL
25.4	12.7	25	90	25.4	Protected Aluminum	14MM-1-25-90-AL
25.4	38.1	35	30	20.4	Protected Aluminum	14MM-1-35-30-AL
25.4	25.4	35	60	29.3	Protected Aluminum	14MM-1-35-60-AL
25.4	50.8	50	30	27.2	Protected Aluminum	14MM-1-50-30-AL
25.4	38.1	50	60	44.0	Protected Aluminum	14MM-1-50-60-AL
25.4	25.4	50	90	50.8	Protected Aluminum	14MM-1-50-90-AL
25.4	50.8	70	60	58.6	Protected Aluminum	14MM-1-70-60-AL
25.4	50.8	100	90	101.6	Protected Aluminum	14MM-1-100-90-AL
25.4	101.6	200	90	203.2	Protected Aluminum	14MM-1-200-90-AL
50.8	50.8	50	30	27.2	Protected Aluminum	14MM-2-50-30-AL
50.8	25.4	50	90	50.8	Protected Aluminum	14MM-2-50-90-AL
50.8	101.6	100	30	54.5	Protected Aluminum	14MM-2-100-30-AL
50.8	76.2	100	60	88.0	Protected Aluminum	14MM-2-100-60-AL
50.8	50.8	100	90	101.6	Protected Aluminum	14MM-2-100-90-AL
50.8	95.2	200	90	190.5	Protected Aluminum	14MM-2-200-90-AL

OPTICAL SUBSTRATES

LENSES

PRISMS

DIELECTRIC
COATED OPTICSMETALLIC
COATED OPTICS

FILTERS

METAL MIRRORS

VARIABLE
REFLECTIVITY MIRRORSNON POLARIZING
BEAMSPLITTER CUBES

POLARIZING OPTICS

COATINGS SECTION

VARIABLE REFLECTIVITY MIRRORS

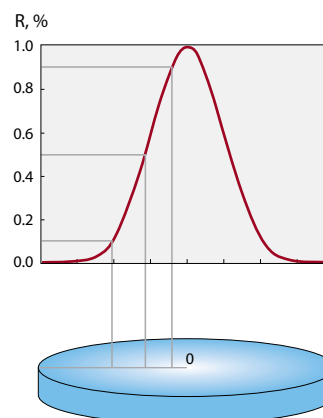
14VRM Variable Reflectivity Mirrors



FEATURES

- Improves beam shape and quality
- Variable/locally defined reflection
- Highest available central reflection value R_r (max) – 50%
- Custom design (substrate shape, wedge, AR coating) available

In order to have better beam quality, i.e. in non-stable resonators, variable reflection mirrors – variable reflectivity mirrors can be used. High intensity of the laser beam requires use of components with a high damage threshold. Dielectric coatings are best suited to meet these requirements. Standa offers variable reflectivity mirrors with dielectric coating, designed at wavelengths in a range from 266 to 2500 nm.



$$R_r = R_0 \times \exp\left[-\left(\frac{r}{w_m}\right)^{2k}\right]$$

Function of reflection.

Expression:

r - radius (variable), mm

R_r - Reflection (mean), %

R_0 - Reflection (center), %

w_m - coating $1/e^2$ -radius, mm

k - order

STANDARD SPECIFICATIONS

Material	UVFS
Types	Plano/Plano, PCV, PCX
Diameter Tolerance	+0.0, -0.15 mm
Thickness Tolerance	±0.1 mm
Flatness	$\lambda/10$
Surface Quality	20-10 scratch & dig
Parallellism error (PL/PL)	<10 arcsec
Clear Aperture	>90%
Coating Damage Threshold	>10 J/cm ² for 10 ns pulses @ 1064 nm

RELATED PRODUCTS AND ACCESSORIES

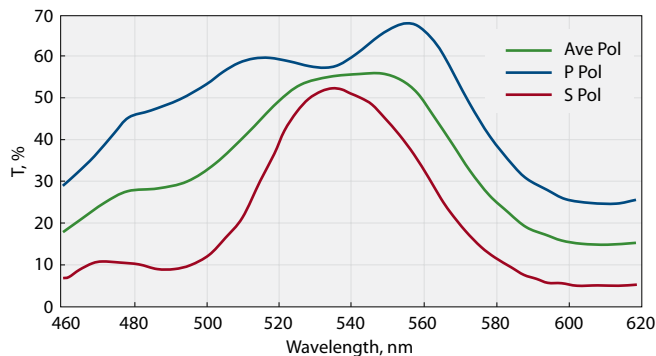
- **5TOM2-1** – Two Axis Translation Optical Mount



NON POLARIZING BEAMSPLITTER CUBES

14NBC Non Polarizing Beamsplitter Cubes

50/50 split ratio non-polarizing beamsplitter cubes are available in Standa! Cubes are constructed by cementing two precision right angle prisms together with metallic-dielectric coating on the hypotenuse surface. Absorption loss due to coating is around 10%, moreover these cubes do not affect polarization of the incident beam!



Typical performance of 14NBC-2-50/50-532 element

CODE EXAMPLE FOR ORDERING

14NBC-1-50/50-650/900

Cube size

- 1 – 5 × 5 × 5 mm
- 2 – 12.7 × 12.7 × 12.7 mm
- 3 – 15 × 15 × 15 mm

Splitting ratio

Wavelength, nm



FEATURES

- All faces are AntiReflection coated
- Low polarization dependence

STANDARD SPECIFICATIONS

Material	BK7 grade A, optical glass
Dimension Tolerance	±0.1 mm
Flatness	$\lambda/4$ @ 632.8 nm per 25 mm
Surface Quality	40-20 scratches and dig
Angle Tolerance	±2 arcmin
Clear Aperture	>85%
Bevel	0.3 mm × 45°
Coating Type	Hybrid
Absorption	<10%
(R _s -R _p)	<5%

NON POLARIZING BEAMSPLITTER CUBES

Beamsplitting ratio	Dimensions, mm	Wavelength, nm	Ordering Code
T _p = T _s = 45 ± 5%; R _p = R _s = 45 ± 5%	5 × 5 × 5	450-680	14NBC-1-50/50-450/680
		532	14NBC-1-50/50-532
		650-900	14NBC-1-50/50-650/900
		1064	14NBC-1-50/50-1064
	12.7 × 12.7 × 12.7	900-1200	14NBC-1-50/50-900/1200
		450-680	14NBC-2-50/50-450/680
		532	14NBC-2-50/50-532
		650-900	14NBC-2-50/50-650/900
		1064	14NBC-2-50/50-1064
	15 × 15 × 15	900-1200	14NBC-2-50/50-900/1200
		450-680	14NBC-3-50/50-450/680
		532	14NBC-3-50/50-532
		650-900	14NBC-3-50/50-650/900
		1064	14NBC-3-50/50-1064
		900-1200	14NBC-3-50/50-900/1200

RELATED PRODUCTS

- 5MO111 – Mirror/Optics Mount



- 10AFP3-1 – Variable Attenuator/Beamsplitter



OPTICAL SUBSTRATES

LENSES

PRISMS

DIELECTRIC
COATED OPTICSMETALLIC
COATED OPTICS

FILTERS

METAL MIRRORS

VARIABLE
REFLECTIVITY MIRRORSNON POLARIZING
BEAMSPLITTER CUBES

POLARIZING OPTICS

COATINGS SECTION

POLARIZING OPTICS

Waveplates – Brief Overview



FEATURES

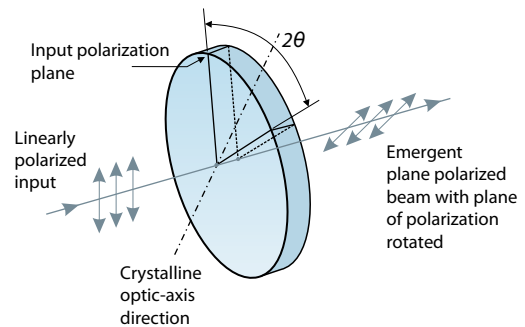
- Waveplates for any wavelength in 240-9000 nm range
- Air-spaced ZO waveplates for high energy applications
- Waveplates for many wavelengths are available from STOCK!!
- Custom design waveplate assemblies are available on request!

Zero Order (ZO) waveplates are generally preferred since they are least sensitive to variations in wavelength, angle of incidence and temperature. To suit different applications, air spaced or optically contacted (see drawings on next page) Zero Order compensated phase retardation plates are available from Standa. The air-spaced construction enables to use the waveplate for the high power laser applications. The damage threshold is more than 500 MW/cm².

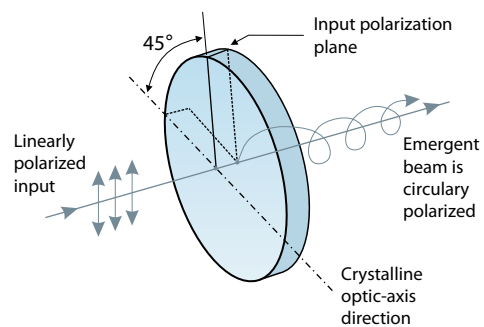
Standa is offering wide range of Zero Order (ZO), Low order (LO) half ($\lambda/2$) or quarter ($\lambda/4$) waveplates for UV, VIS, NIR and IR (for any wavelength in 240-9000 nm range)

Waveplates are made from materials which exhibit birefringence. The velocity of the extraordinary and ordinary rays through the birefringent material varies inversely with their refractive indices. This difference in velocities gives a rise to phase difference when two beams recombine. At any specific wavelength the phase difference is governed by the thickness of the retarder - waveplate. Half ($\lambda/2$) Waveplate. A linearly polarized beam incident on a half wave crystal quartz waveplate emerges as a linearly polarized beam but rotated such that its angle to the optical axis is twice that of the incident beam. Therefore, half-waveplates can be used as continuously adjustable polarization rotators. Half-waveplates are used to rotate the plane of polarization, electro-optic modulation and as a variable ratio beamsplitter when used in conjunction with a polarization cube.

Quarter ($\lambda/4$) Waveplate – thin-film compensator. If the angle between the electric field vector of the incident linearly polarized beam and the retarder principal plane of the quarter-waveplate is 45°, the emergent beam is circularly polarized. When a quarter waveplate is double passed, i.e. by mirror reflection, it acts as a half waveplates and rotates the plane of polarization to a certain angle. Quarter waveplate are used in creating circular polarization from linear or linear polarization from circular, ellipsometry, optical pumping, suppressing unwanted reflection and optical isolation.



Performance of Half ($\lambda/2$) Waveplate



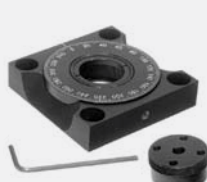
Performance of Quarter ($\lambda/4$) Waveplate

RELATED PRODUCTS

- **5PH50** – Polarizer Holder



- **5PHH50-1** – Polarizer Holder



14WPZO • 14WPLO**Crystalline quartz waveplates**

Standa is offering wide range of Zero Order (ZO), Low Order (LO) waveplates for UV, VIS, NIR range (for any wavelength in 240-2600 nm range). All our waveplates are made from excellent quality laser grade Crystalline quartz material.

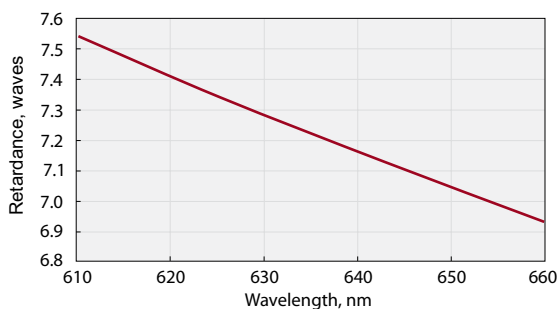
ZO waveplate is constructed by two quartz plates with their fast axis crossed. The difference in thickness between the two plates determines the retardance. ZO waveplates offer a substantially lower dependence on temperature, angle and wavelength change than conventional monolithic LO waveplates.

To suit different applications, air-spaced or optically contacted ZO compensated phase retardation waveplates are available.

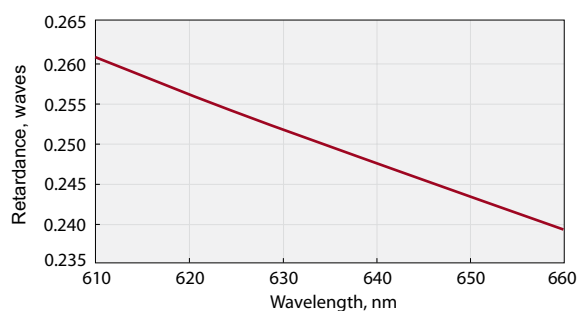
The air-spaced construction enables to use the waveplate for the high power laser applications. The damage threshold is more than 500 MW/cm².

FEATURES

- Waveplates are made from excellent quality laser grade Crystalline quartz material.
- We specialize in Air-spaced Zero-order Waveplates
- Dual wavelength waveplates are also available
- All waveplates are AR coated and mounted by default

RETARDATION VS. WAVELENGTH FOR ZO AND LO CRYSTALLINE QUARTZ WAVEPLATES

7.25 waves LO waveplate @ 633 nm



0.25 waves ZO waveplate @ 633 nm

DRAWING AND SELECTION GUIDE

ZO air-spaced	ZO optically contacted	LO waveplate
Broad wavelength dependence		Good for single wavelength use
Low Temperature dependence		Sensitive to Temperature changes
More expensive than LO waveplates		Low cost
High damage threshold (>500 MW/cm ²)	Higher transmission due to optical contact	

STANDARD SPECIFICATIONS

Material	Crystalline Quartz
AR Coatings	R < 0.2% at each surface
Retardation Tolerance	$\lambda/500$ @ 20 °C
Wavefront Distortion	$\lambda/10$
Surface Quality	20-10 scratch & dig
Surface Flatness	$\lambda/10$ @ 632.8 nm
Parallelism Error	< 3 arcsec
Laser Damage Threshold	5 J/cm ² 10 ns pulsed @ 1064 nm typical
Mounting	Mounted in 25.4 mm black anodized metal mount

RELATED PRODUCTS

- **7R150-1** – Rotation Stage



OPTICAL SUBSTRATES

LENSES

PRISMS

DIELECTRIC
COATED OPTICSMETALLIC
COATED OPTICS

FILTERS

METAL MIRRORS

VARIABLE
REFLECTIVITY MIRRORSNON POLARIZING
BEAMSPLITTER CUBES

POLARIZING OPTICS

COATINGS SECTION

OPTICAL SUBSTRATES

LENSES

PRISMS

DIELECTRIC
COATED OPTICS

METALLIC
COATED OPTICS

FILTERS

METAL MIRRORS

VARIABLE
REFLECTIVITY MIRRORS

NON POLARIZING
BEAMSPLITTER CUBES

POLARIZING OPTICS

COATINGS SECTION

ZO CRYSTALLINE QUARTZ WAVEPLATES

airspaced, clear aperture >18 mm
mounted in 25.4 mm metal mount

Wavelength, nm	Ordering Code	
	$\lambda/2$ Retardation	$\lambda/4$ Retardation
266	14WPZO.2-266-18	14WPZO.4-266-18
343	14WPZO.2-343-18	14WPZO.4-343-18
355	14WPZO.2-355-18	14WPZO.4-355-18
400	14WPZO.2-400-18	14WPZO.4-400-18
473	14WPZO.2-473-18	14WPZO.4-473-18
515	14WPZO.2-515-18	14WPZO.4-515-18
532	14WPZO.2-532-18	14WPZO.4-532-18
589	14WPZO.2-589-18	14WPZO.4-589-18
633	14WPZO.2-633-18	14WPZO.4-633-18
780	14WPZO.2-780-18	14WPZO.4-780-18
800	14WPZO.2-800-18	14WPZO.4-800-18
852	14WPZO.2-852-18	14WPZO.4-852-18
940	14WPZO.2-940-18	14WPZO.4-940-18
980	14WPZO.2-980-18	14WPZO.4-980-18
1030	14WPZO.2-1030-18	14WPZO.4-1030-18
1064	14WPZO.2-1064-18	14WPZO.4-1064-18
1122	14WPZO.2-1122-18	14WPZO.4-1122-18
1319	14WPZO.2-1319-18	14WPZO.4-1319-18
1550	14WPZO.2-1550-18	14WPZO.4-1550-18

LO CRYSTALLINE QUARTZ WAVEPLATES

clear aperture >18 mm
mounted in 25.4 mm metal mount

Wavelength, nm	Ordering Code	
	$\lambda/2$ Retardation	$\lambda/4$ Retardation
266	14WPLO.2-266-18	14WPLO.4-266-18
343	14WPLO.2-343-18	14WPLO.4-343-18
355	14WPLO.2-355-18	14WPLO.4-355-18
400	14WPLO.2-400-18	14WPLO.4-400-18
473	14WPLO.2-473-18	14WPLO.4-473-18
515	14WPLO.2-515-18	14WPLO.4-515-18
532	14WPLO.2-532-18	14WPLO.4-532-18
589	14WPLO.2-589-18	14WPLO.4-589-18
633	14WPLO.2-633-18	14WPLO.4-633-18
780	14WPLO.2-780-18	14WPLO.4-780-18
800	14WPLO.2-800-18	14WPLO.4-800-18
852	14WPLO.2-852-18	14WPLO.4-852-18
940	14WPLO.2-940-18	14WPLO.4-940-18
980	14WPLO.2-980-18	14WPLO.4-980-18
1030	14WPLO.2-1030-18	14WPLO.4-1030-18
1064	14WPLO.2-1064-18	14WPLO.4-1064-18
1122	14WPLO.2-1122-18	14WPLO.4-1122-18
1319	14WPLO.2-1319-18	14WPLO.4-1319-18
1550	14WPLO.2-1550-18	14WPLO.4-1550-18

RELATED PRODUCTS

- 10APF3-1 – Variable Attenuator/ Beamsplitter



CODE EXAMPLE FOR ORDERING

14WPZO.2-800-18

Waveplate type
ZO – Zero order
LO – Low order

Clear
aperture

Wavelength

Retardation
2 – $\lambda/2$
4 – $\lambda/4$

14WPA Achromatic (Broadband) Waveplates

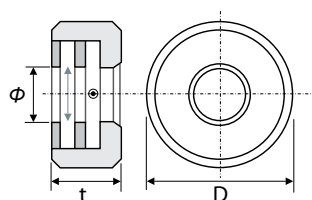
FEATURES

- Operates over Broad Bandwidth wavelength range
- We specialize in Air-spaced Achromatic Waveplates
- All waveplates are BBAR coated and mounted by default
- Custom design waveplates are available in small and mass production quantities

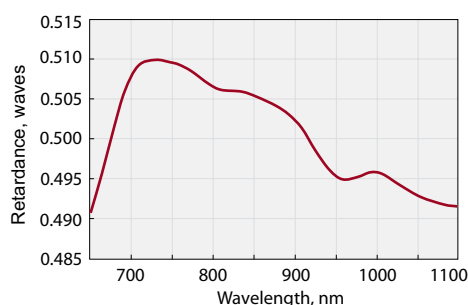
Achromatic waveplate (AWP) is a pair of crystal quartz and magnesium fluoride plates.

Because of difference in dispersion in these uniaxial positive crystals it is possible to calculate thickness of each plate so that birefringent phase shift in assembly changes very slowly over certain wavelength range. This is a way to obtain achromatic zero order waveplates. Such AWP's are necessary for various devices and may replace a number of ordinary quartz waveplates operating at single wavelength only. We can offer series of achromatic waveplates with phase shifts shown in graphs below.

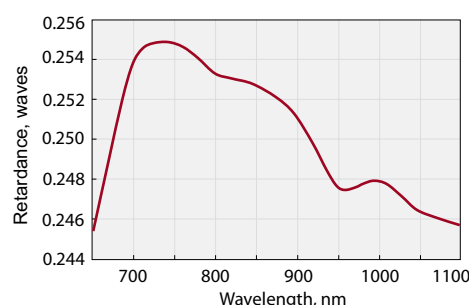
DRAWING OF ACHROMATIC WAVEPLATES



TYPICAL RETARDATION CURVES FOR 650–1100 nm ACHROMATIC WAVEPLATES



Retardance for 14WPA.2-650/1100-8



Retardance for 14WPA.4-650/1100-8



ACHROMATIC WAVEPLATES

Wavelength, nm	Ordering Code	
	$\lambda/2$ Retardation	$\lambda/4$ Retardation
Clear Aperture >8 mm		
450-650	14WPA.2-450/650-8	14WPA.4-450/650-8
550-750	14WPA.2-550/750-8	14WPA.4-550/750-8
650-1100	14WPA.2-650/1100-8	14WPA.4-650/1100-8
900-2100	14WPA.2-900/2100-8	14WPA.4-900/2100-8
Clear Aperture >12 mm		
450-650	14WPA.2-450/650-12	14WPA.4-450/650-12
550-750	14WPA.2-550/750-12	14WPA.4-550/750-12
650-1100	14WPA.2-650/1100-12	14WPA.4-650/1100-12
900-2100	14WPA.2-900/2100-12	14WPA.4-900/2100-12
Clear Aperture >18 mm		
450-650	14WPA.2-450/650-18	14WPA.4-450/650-18
550-750	14WPA.2-550/750-18	14WPA.4-550/750-18
650-1100	14WPA.2-650/1100-18	14WPA.4-650/1100-18
900-2100	14WPA.2-900/2100-18	14WPA.4-900/2100-18

RELATED PRODUCTS AND ACCESSORIES

- 5PH50 – Polarizer Holder



- 5APH59T-1 – Adjustable Polarizer Mount



STANDARD SPECIFICATIONS

Material	Quartz + MgF ₂
Dimension Tolerance	+0.0, -0.2 mm
Retardation Tolerance	$\lambda/100$
Clear Aperture	>90% central area
Wavefront Distortion	$\lambda/4$ @ 632.8 nm
Surface Quality	40-20 scratch & dig
Parallelism Error	<30 arcsec
Laser Damage Threshold	5 J/cm ² 10 ns pulsed @ 1064 nm typical
AR Coatings	BBAR coated by default
Mounting	Mounted in 25.4 mm black anodized metal mount

CODE EXAMPLE FOR ORDERING

14WPA.2-550/750-12

Retardation
2 – $\lambda/2$
4 – $\lambda/4$

Wavelength
range, nm

Clear
aperture

OPTICAL SUBSTRATES

LENSES

PRISMS

DIELECTRIC
COATED OPTICS

METALLIC
COATED OPTICS

FILTERS

METAL MIRRORS

VARIABLE
REFLECTIVITY MIRRORS

NON POLARIZING
BEAMSPLITTER CUBES

POLARIZING OPTICS

COATINGS SECTION

14WPIR Mid-IR Waveplates

Zero order half waveplates and quarter waveplates from cadmium thiogallate (CdGa_2S_4) with clear aperture from 10 mm up to 18 mm for the range 2.8 – 9.0 microns are now available. Dielectric AR coatings for the mid-IR range are also available in order to enhance the performance of the waveplates. Characteristic plates thickness is 0.5 – 0.9 mm. Generally, the waveplates are mounted into the metal holder for easier handling and adjustment.

STANDARD SPECIFICATIONS

Material	Cadmium thiogallate (CdGa_2S_4)
Characteristic Thickness	0.5 - 0.9 mm
Clear Aperture	10 mm
Surface Flatness	$<\lambda/8$
Wedge Angle Between Faces	1.5-2.0 arcmin
Transparency Range	0.47 - 9.5 microns
Birefringence ($n_o - n_e$)	~ 0.005 at IR
Refractive Index	$n_o \sim 2.3$
Thermal Conductivity	$\sim 3 \text{ W/(m}\cdot\text{K)}$
Damage Threshold	$\sim 0.6 - 0.8 \text{ J/cm}^2$ at 20 ns pulses
Diameter of the Metal Holder	25.4 mm
AR Coatings	AR coated by default

CODE EXAMPLE FOR ORDERING

14WPIR.2-3000-10

Retardation
2 – $\lambda/2$
4 – $\lambda/4$

Wavelength, nm

Clear aperture

FEATURES

- ZO waveplates for mid-IR applications (2800 – 9000 nm)
- Custom size available

ZO mid-IR WAVEPLATES (clear aperture >10 mm)

Wavelength, nm	Ordering Code	
	$\lambda/2$ Retardation	$\lambda/4$ Retardation
2940	14WPIR.2-2940-10	14WPIR.4-2940-10
3000	14WPIR.2-3000-10	14WPIR.4-3000-10
3500	14WPIR.2-3500-10	14WPIR.4-3500-10
4000	14WPIR.2-4000-10	14WPIR.4-4000-10
4500	14WPIR.2-4500-10	14WPIR.4-4500-10
5000	14WPIR.2-5000-10	14WPIR.4-5000-10
5500	14WPIR.2-5500-10	14WPIR.4-5500-10
6000	14WPIR.2-6000-10	14WPIR.4-6000-10
6500	14WPIR.2-6500-10	14WPIR.4-6500-10
7000	14WPIR.2-7000-10	14WPIR.4-7000-10
7500	14WPIR.2-7500-10	14WPIR.4-7500-10
8000	14WPIR.2-8000-10	14WPIR.4-8000-10
9000	14WPIR.2-9000-10	14WPIR.4-9000-10

OPTICAL SUBSTRATES

LENSES

PRISMS

DIELECTRIC
COATED OPTICS

METALLIC
COATED OPTICS

FILTERS

METAL MIRRORS

VARIABLE
REFLECTIVITY MIRRORS

NON POLARIZING
BEAMSPLITTER CUBES

POLARIZING OPTICS

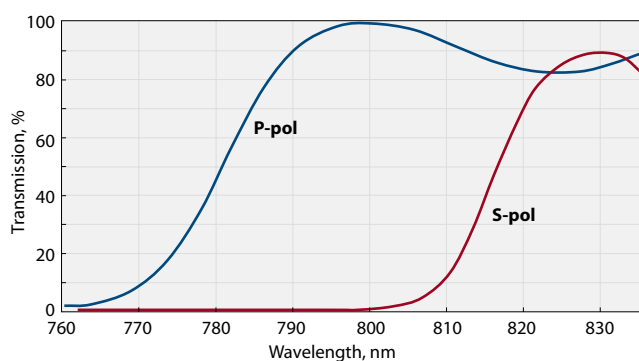
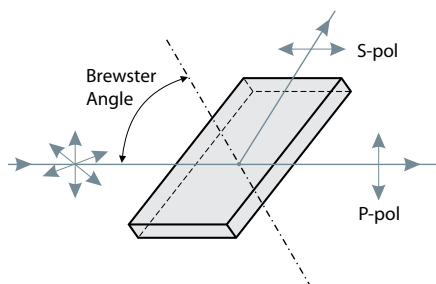
COATINGS SECTION

14PBT

BREWSTER THIN FILM POLARIZERS

FEATURES

- Efficiently separates the s- and p- polarization components
- Optimised for popular laser wavelengths
- Brewster Thin Film polarizers with dimensions up to 200×150 mm are available
- Standard Brewster Thin Film Polarizers available from stock



STANDARD SPECIFICATIONS

Material	BK7, UVFS
Diameter Tolerance	+0.0, -0.12 mm
Thickness Tolerance	±0.2 mm
Clear Aperture	>90%
Surface Quality	20-10 scratch & dig
Surface Flatness	$\lambda/10$ @ 632.8 nm
Parallelism	<30 arcsec
Extinction Ratio T_p/T_s	>200:1
Typical Transmission	$T_p > 95\%$
Typical Reflection	$R_s > 99.5\%$
Laser Damage Threshold	5 J/cm ² 10 ns pulses @ 1064 nm typical

CODE EXAMPLE FOR ORDERING

14PBT-1-266-1

Size

- 1 – Ø25.4×3 mm
- 2 – Ø50.8×6 mm
- 3 – Ø50.8×8 mm
- 4 – 20×40×3 mm

Material

- 1 – BK7
- 2 – UVFS

Wavelength, nm

Brewster Thin Film polarizers are used for high energy applications. They have high damage threshold reaching 10 J/cm² @ 1064 nm 8 ns. Brewster polarizers are used as an alternative to Glan-Taylor laser polarizing prisms or cube polarizing beamsplitters. Typically, BK7 or UVFS dielectric coated Brewster Thin film polarizers separate the s- and p-polarization components of high energy laser beams and are intended for intra and extra cavity usage. Typical polarization ratio T_p/T_s is 200:1 and it is achieved at 56° AOI (Brewster angle). For optimal transmission Brewster Thin Film Polarizer should be mounted in an appropriate holder for angular adjustment.

BREWSTER THIN FILM POLARIZERS

Wavelength, nm	Substrate Material	Dimensions, mm	Ordering Code
266	UVFS	Ø25.4×3	14PBT-1-266-2
		Ø50.8×6	14PBT-2-266-2
		20×40×3	14PBT-4-266-2
343	UVFS	Ø25.4×3	14PBT-1-343-2
		Ø50.8×6	14PBT-2-343-2
		20×40×3	14PBT-4-343-2
355	UVFS	Ø25.4×3	14PBT-1-355-2
		Ø50.8×6	14PBT-2-355-2
		20×40×3	14PBT-4-355-2
400	UVFS	Ø25.4×3	14PBT-1-400-2
		Ø50.8×6	14PBT-2-400-2
		20×40×3	14PBT-4-400-2
515	UVFS	Ø25.4×3	14PBT-1-515-2
		Ø50.8×6	14PBT-2-515-2
		20×40×3	14PBT-4-515-2
532	BK7	Ø25.4×3	14PBT-1-532-1
		Ø50.8×8	14PBT-3-532-1
		20×40×3	14PBT-4-532-1
780	UVFS	Ø25.4×3	14PBT-1-780-2
		Ø50.8×6	14PBT-2-780-2
		20×40×3	14PBT-4-780-2
780-820 (centered @ 800 nm)	UVFS	Ø25.4×3	14PBT-1-780/820-2
		Ø50.8×6	14PBT-2-780/820-2
		20×40×3	14PBT-4-780/820-2
795-805 (centered @ 800 nm)	UVFS	Ø25.4×3	14PBT-1-795/805-2
		Ø50.8×6	14PBT-2-795/805-2
		20×40×3	14PBT-4-795/805-2
940	BK7	Ø25.4×3	14PBT-1-940-1
		Ø50.8×8	14PBT-3-940-1
		20×40×3	14PBT-4-940-1
980	BK7	Ø25.4×3	14PBT-1-980-1
		Ø50.8×8	14PBT-3-980-1
		20×40×3	14PBT-4-980-1
1020-1040 (centered @ 1030 nm)	UVFS	Ø25.4×3	14PBT-1-1020/1040-2
		Ø50.8×6	14PBT-2-1020/1040-2
		20×40×3	14PBT-4-1020/1040-2
1064	BK7	Ø25.4×3	14PBT-1-1064-1
		Ø50.8×8	14PBT-3-1064-1
		20×40×3	14PBT-4-1064-1
1550	BK7	Ø25.4×3	14PBT-1-1550-1
		Ø50.8×8	14PBT-3-1550-1
		20×40×3	14PBT-4-1550-1

14PUF

BROADBAND (ultrafast) THIN FILM POLARIZERS

Broadband (Ultrafast) Thin Film Polarizers are used for femto-second lasers.

PLEASE NOTE: The optimal working angle is $AOI=72^\circ (\pm 2^\circ)$.

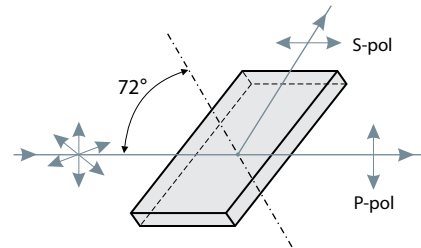
We are offering 4 types of Broadband (Ultrafast) Thin film polarizers. Polarizers work by transmitting p polarization and reflecting s polarization.

TRANSMISSION POLARIZERS – have polarizing coatings on both sides of polarizer. They can be optimized for highest transmission of p polarization $T_p > 94\%$ or best contrast of polarizations $T_p:T_s > 20:1$.

REFLECTION POLARIZERS – have polarizing coating on the input face while the output face is AR coated for both s and p polarizations. They can be optimized for highest reflection of s polarization $R_s > 98\%$ or best contrast of polarizations $R_s:R_p > 60:1$. Moreover AR coated side of polarizer can have wedge to minimize ghosting. Standard thin film polarizers are designed for optimum performance in the 750-850 nm or 980-1090 nm. Design of custom wavelength range is also available.

FEATURES

- Ideal for Femtosecond laser applications due to the low GVD
- Works over Broad wavelength range
- Separates the s- and p- polarization components
- Standard Thin Film Polarizers are available from stock



OPTICAL SUBSTRATES

LENSES

PRISMS

DIELECTRIC
COATED OPTICSMETALLIC
COATED OPTICS

FILTERS

METAL MIRRORS

VARIABLE
REFLECTIVITY MIRRORSNON POLARIZING
BEAMSPLITTER CUBES

POLARIZING OPTICS

COATINGS SECTION

STANDARD SPECIFICATIONS

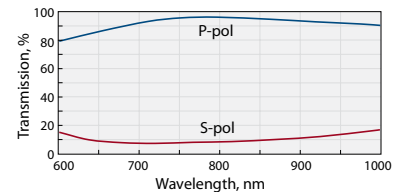
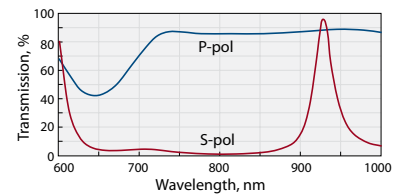
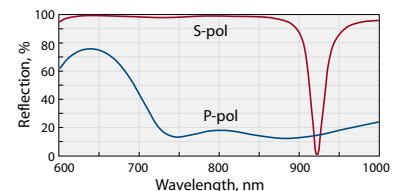
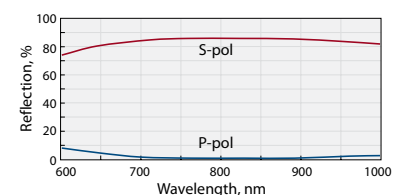
Substrate Material	UVFS
Diameter tolerance	+0.0, -0.12 mm
Thickness tolerance	± 0.2 mm
Clear aperture	>90%
Surface quality	20-10 scratch & dig
Surface flatness	$\lambda/6$ @ 632.8 nm
Angle of incidence	72°
Parallelism	<30 arcsec
Laser damage threshold	5 J/cm ² 10 ns pulses @ 1064 nm typical

TRANSMISSION OPTIMIZED Broadband (Ultrafast) Thin Film Polarizers

Wavelength, nm	Extinction ratio T_p/T_s	Transmission, %	Dimensions, mm	Ordering Code
750-850 (centered @ 800 nm) Contrast optimized	>20:1	$T_p > 85\%$ $T_s < 4\%$	$\varnothing 25.4 \times 3$	14PUF-800-1-T2
			20×60×2	14PUF-800-2-T2
			50×160×3	14PUF-800-3-T2
750-850 (centered @ 800 nm) T_p optimized	>9:1	$T_p > 94\%$ $T_s < 10\%$	$\varnothing 25.4 \times 3$	14PUF-800-1-T1
			20×60×2	14PUF-800-2-T1
			50×160×3	14PUF-800-3-T1
980-1090 (centered @ 1030 nm) Contrast optimized	>20:1	$T_p > 85\%$ $T_s < 4\%$	$\varnothing 25.4 \times 3$	14PUF-1030-1-T2
			20×60×2	14PUF-1030-2-T2
			50×160×3	14PUF-1030-3-T2
980-1090 (centered @ 1030 nm) T_p optimized	>9:1	$T_p > 94\%$ $T_s < 10\%$	$\varnothing 25.4 \times 3$	14PUF-1030-1-T1
			20×60×2	14PUF-1030-2-T1
			50×160×3	14PUF-1030-3-T1

REFLECTION OPTIMIZED Broadband (Ultrafast) Thin Film Polarizers

Wavelength, nm	Extinction ratio R_s/R_p	Reflection, %	Dimensions, mm	Ordering Code
750-850 (centered @ 800 nm) R_s optimized	>5:1	$R_s > 98\%$ $R_p < 20\%$	$\varnothing 25.4 \times 3$	14PUF-800-1-R1
			20×60×2	14PUF-800-2-R1
			50×160×3	14PUF-800-3-R1
750-850 (centered @ 800 nm) Contrast optimized	>60:1	$R_s > 85\%$ $R_p < 1\%$	$\varnothing 25.4 \times 3$	14PUF-800-1-R2
			20×60×2	14PUF-800-2-R2
			50×160×3	14PUF-800-3-R2
980-1090 (centered @ 1030 nm) R_s optimized	>5:1	$R_s > 98\%$ $R_p < 20\%$	$\varnothing 25.4 \times 3$	14PUF-1030-1-R1
			20×60×2	14PUF-1030-2-R1
			50×160×3	14PUF-1030-3-R1
980-1090 (centered @ 1030 nm) Contrast optimized	>60:1	$R_s > 85\%$ $R_p < 1\%$	$\varnothing 25.4 \times 3$	14PUF-1030-1-R2
			20×60×2	14PUF-1030-2-R2
			50×160×3	14PUF-1030-3-R2

Optimization
T1 @ 800 nmOptimization
T2 @ 800 nmOptimization
R1 @ 800 nmOptimization
R2 @ 800 nm

CODE EXAMPLE FOR ORDERING

14PUF-800-1-T2

Wavelength
800 – 750-850 nm
(centered
at 800 nm)
1030 – 980-1090 nm
(centered
at 1030 nm)

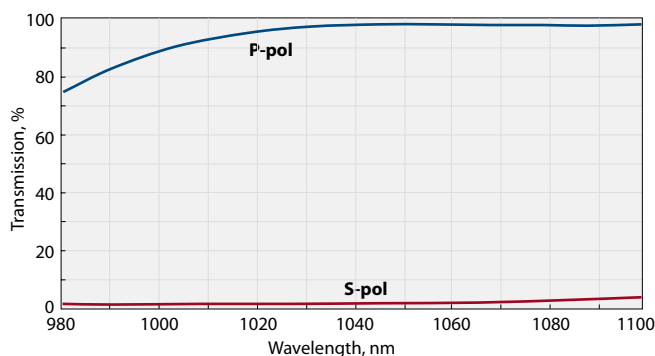
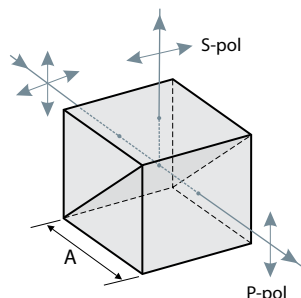
Size
1 – $\varnothing 25.4 \times 3$ mm
2 – 20×60×2 mm
3 – 50×160×3 mm

Optimization Type
T1 – Transmission
and T_p optimized
T2 – Transmission and
contrast optimized
R1 – Reflection
and R_s optimized
R2 – Reflection and
contrast optimized

14PBC Polarizing Beamsplitter Cubes

FEATURES

- Optimised for popular laser wavelengths
- Dual wavelength Polarizing cubes are also available
- All Cubes are AR coated
- Standard Polarizing cubes are available from stock



POLARIZING CUBES FOR MEDIUM POWER APPLICATIONS

Wave-length, nm	Side dimen-sions, mm	Reflec-tion s-pol, %	Trans-mission p-pol, %	Ordering Code
355	12.5	>99	>90	14PBC-355-12.5
	20	>99	>90	14PBC-355-20
400	12.5	>99	>90	14PBC-400-12.5
	20	>99	>90	14PBC-400-20
450-650	12.5	>99.5	>95	14PBC-450/650-12.5
	20	>99.5	>95	14PBC-450/650-20
532	12.5	>99.8	>97	14PBC-532-12.5
	20	>99.8	>97	14PBC-532-20
633	12.5	>99.8	>97	14PBC-633-12.5
	20	>99.8	>97	14PBC-633-20
700-900	12.5	>99.5	>95	14PBC-700/900-12.5
	15	>99.5	>95	14PBC-700/900-15
	20	>99.5	>95	14PBC-700/900-12.5
780	12.5	>99.8	>97	14PBC-780-12.5
	20	>99.8	>97	14PBC-780-20
850	12.5	>99.8	>97	14PBC-850-12.5
	20	>99.8	>97	14PBC-850-20
1020-1100	12.5	>99.5	>97	14PBC-1020/1100-12.5
	20	>99.5	>97	14PBC-1020/1100-20
1064	12.5	>99.8	>97	14PBC-1064-12.5
	20	>99.8	>97	14PBC-1064-20
1310	12.5	>99.8	>97	14PBC-1310-12.5
	20	>99.8	>97	14PBC-1310-20
1550	12.5	>99.8	>97	14PBC-1550-12.5
	20	>99.8	>97	14PBC-1550-200

Polarizing cubes for specified wavelength (250-2200 nm) AR coated on four input and output working surfaces. Polarizing Beamsplitter Cube split randomly polarized beams into two orthogonal, linearly polarized components: S polarized light is reflected at a 90° angle while P-polarized light is transmitted.

Polarizing Cubes for Medium Power Applications

Each beamsplitter consists of a pair of high precision tolerance right angle prisms cemented together with a dielectric coating on hypotenuse of one of the prisms. Typical damage threshold of these cubes is $>0.3 \text{ J/cm}^2 @ 1064 \text{ nm}$ 10 ns at 20 Hz.

Polarizing Cubes for High Power Applications

Optically contacted polarizing beamsplitter cubes used for high power applications can withstand energy fluencies up to $10 \text{ J/cm}^2 @ 1064 \text{ nm}$ 10 ns at 20 Hz.

STANDARD SPECIFICATIONS

Material	BK7, UVFS, SF glasses
Dimension Tolerances	+0/-0,3 mm
Clear Aperture	>90% of the face size
Surface Quality	40-20 scratch & dig
Surface Flatness	$\lambda/4$ at 632.8 nm
Beam Deviation	<3 arcmin
Laser Damage Threshold, (10 ns pulses @ 1064 nm)	$>0.3 \text{ J/cm}^2$ for cemented cubes $\sim 10 \text{ J/cm}^2$ for optically contacted cubes

OPTICALLY CONTACTED POLARIZING CUBES FOR HIGH POWER APPLICATIONS

Wavelength, nm	Side dimensions, mm	Reflec-tion s-pol, %	Trans-mission p-pol, %	Ordering Code
345-365 (centered @ 355 nm)	5	>99.5	>95	14PBCH-355-5
	10	>99.5	>95	14PBCH-355-10
	12.5	>99.5	>95	14PBCH-355-12.5
510-550 (centered @ 532 nm)	5	>99.5	>95	14PBCH-532-5
	10	>99.5	>95	14PBCH-532-10
	12.5	>99.5	>95	14PBCH-532-12.5
1020-1090 (centered @ 1064 nm)	5	>99.5	>95	14PBCH-1064-5
	10	>99.5	>95	14PBCH-1064-10
	12.5	>99.5	>95	14PBCH-1064-12.5
1510-1580 (centered @ 1550 nm)	5	>99.5	>95	14PBCH-1550-5
	10	>99.5	>95	14PBCH-1550-10
	12.5	>99.5	>95	14PBCH-1550-12.5

CODE EXAMPLE FOR ORDERING

14PBC-800-10

Cube Type
PBC – for medium power applications
PBCH – for high power applications

Cube side dimensions, mm

Wavelength, nm

RELATED PRODUCTS AND ACCESSORIES

- 5MO111 – Mirror/Optics Mount



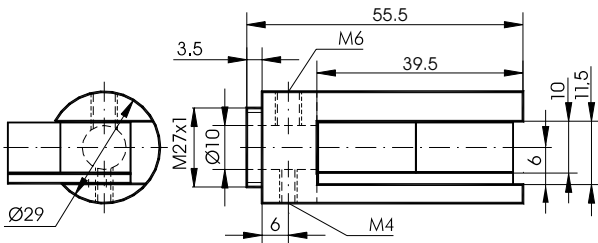
10FR

Fresnel Rhomb Retarders (Achromatic)

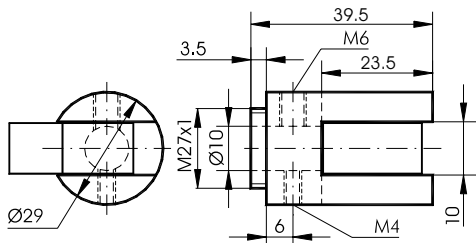
Standa manufactures Fresnel Rhombs and mounts for them. 10FR is a combination of a rhomb with a mount (see drawings). Fresnel Rhombs are made of BK7 crown glass or UV grade fused silica. A Single Fresnel Rhomb produces a phase shift of 90° ($\lambda/4$) due to total internal reflections at two surfaces. A Double Fresnel Rhomb produces a phase shift of 180° ($\lambda/2$) between the components of light polarised perpendicular and parallel to the plane of incidence. It consists of two optically contacted (or air spaced) single Fresnel $\lambda/4$ Rhombs. The retardation varies only slightly over a relatively wide range of wavelengths. Fresnel Rhombs mounts are cylindrical in shape. The end faces of a Fresnel retarder are adjusted orthogonally to the axis of rotation. The clear aperture of the mount is 10 mm.

There are several ways to mount the 10FR Fresnel rhomb retarder:

- on any adjustable unit (e.g. a stage) by the M6 and M4 tapped holes;
- to our Polarizer Holder as 5PH50, 5PH51 or other compatible unit using the M27×1 thread.



Achromatic $\lambda/2$
Fresnel Rhomb
Retarder 10FR2



Achromatic $\lambda/4$
Fresnel Rhomb
Retarder 10FR1



10FR with a protective cap

STANDARD SPECIFICATIONS

Material	BK7 or UVFS
Beam deviation	≤ 10 arcsec
Coating	AR coating
Available wavelength ranges:	
UV	260–400 nm
VIS	400–700 nm
NIR1	700–1300 nm
NIR2	1300–1600 nm

FRESNEL RHOMB RETARDERS

Ordering Code	Retardation	Wavelength range, nm
10FR1-UV-M27	single ($\lambda/4$)	260–400
10FR2-UV-M27	double ($\lambda/2$)	260–400
10FR1-VIS-M27	single ($\lambda/4$)	400–700
10FR2-VIS-M27	double ($\lambda/2$)	400–700
10FR1-NIR1-M27	single ($\lambda/4$)	700–1300
10FR2-NIR1-M27	double ($\lambda/2$)	700–1300
10FR1-NIR2-M27	single ($\lambda/4$)	1300–1600
10FR2-NIR2-M27	double ($\lambda/2$)	1300–1600

CODE EXAMPLE FOR ORDERING

10FR1-UV-M27

Retardation
1 – single ($\lambda/4$)
2 – double ($\lambda/2$)

Mounting
thread

Wavelength range
UV – 260–400 nm
VIS – 400–700 nm
NIR1 – 700–1300 nm
NIR2 – 1300–1600 nm

RELATED PRODUCTS AND ACCESSORIES

- 5PH50 – Polarizer Holder



- 5APH59T-1 – Adjustable Polarizer Mount



- 7R129 – Polarizer Holder



- 10BC68-1 – Beam Splitter Cube



OPTICAL SUBSTRATES

LENSES

PRISMS

DIELECTRIC
COATED OPTICSMETALLIC
COATED OPTICS

FILTERS

METAL MIRRORS

VARIABLE
REFLECTIVITY MIRRORSNON POLARIZING
BEAMSPLITTER CUBES

POLARIZING OPTICS

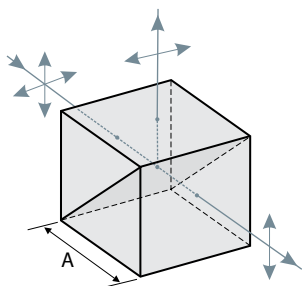
COATINGS SECTION

10GL • 10GLS

High Power Glan Polarizing Prisms

FEATURES

- Broadband high power polarizers for visible or near IR wavelengths
- Air-spaced
- Close to Brewster's Angle Cutting
- High Polarization Purity
- Short Length
- Double escape windows for intracavity use
- Prisms from α -BBO or YVO_4 are available upon request



CODE EXAMPLE FOR ORDERING

10GL-10-UV-HP

Side
size, mm

High power

Material
GL – calcite grade “extra”
GLS – calcite grade “unique”

High Power Glan Polarizing Prisms produces linear polarized light from unpolarized input and is made of a higher grade calcite. The prism has two escape windows to allow the rejected beams to escape. Its entrance and exit faces are polished using deep grinding and polishing technique to minimize scatter from surface.

STANDARD SPECIFICATIONS

Material Grade	Calcite Grade “Extra” or “Unique”
Wavelength Range	220–2300 nm. Transmittance in UV–VIS range depends on material quality
Size	10×10, 12×12, 14×14, 16×16, 19×19 mm
Beam Deviation	< 1 arcmin
Full Angle Field	8° (asymmetrical)
Extinction Ratio	0.5×10^{-5}
Surface Quality	Entrance and exit faces: 40–20 scratch and dig
Escape Windows	80–50 scratch and dig
Surface Flatness	Entrance and exit faces: $\lambda/4$ @ 633 nm
Escape Windows	λ @ 633 nm
Max. Power Handling	200 MW/cm ² , pulsed
Housing	Black anodized aluminum with two exit ports for the rejected beams

CALCITE HIGH POWER GLAN POLARIZING PRISMS

Calcite Grade	Side size A, mm	Ordering Code
Extra	10	10GL-10-UV-HP
	12	10GL-12-UV-HP
	14	10GL-14-UV-HP
	16	10GL-16-UV-HP
	19	10GL-19-UV-HP
Unique	10	10GLS-10-UV-HP
	12	10GLS-12-UV-HP
	14	10GLS-14-UV-HP
	16	10GLS-16-UV-HP
	19	10GLS-19-UV-HP

10GP

Glan Taylor Polarizing Prisms

FEATURES

- Air-spaced, medium power polarizers for visible or near IR wavelengths
- Rejected beam absorbed internally
- $<10^{-5}$ extinction ratio
- Close to Brewster's Angle Cutting
- High Polarization Purity
- Short Length
- Prisms from α -BBO or YVO_4 are available upon request
- Prisms with size greater than 19 mm are available on special request

The device produces linear polarized light from unpolarized input. Glan Taylor prism consists of two prisms separated by air gap. Transmitted extraordinary beam is used. Rejected ordinary beam is absorbed by black glass plates cemented to prisms.

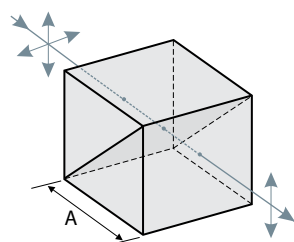
STANDARD SPECIFICATIONS

Material Grade	Calcite grade “First”
Wavelength Range	UV quality : 220–2300 nm
	VIS quality : 350–2300 nm
	IR quality : 600–2300 nm
Size	10×10, 12×12, 14×14, 16×16, 19×19 mm
Beam Deviation	< 1 arcmin
Length to Aperture Ratio	0.85
Full Angle Field	8° (asymmetrical)
Extinction Ratio	1.0×10^{-5}
Surface Quality	60–40 scratch and dig
Surface Flatness	$\lambda/4$ @ 633 nm
Max. Power Handling	2 W/cm ² , CW
Housing	Black anodized Aluminum Housing



GLAN TAYLOR POLARIZING PRISMS

Wavelength range, nm	Side size A, mm	Ordering Code
220–2300	10	10GP-10-UV
	12	10GP-12-UV
	14	10GP-14-UV
	16	10GP-16-UV
	19	10GP-19-UV
350–2300	10	10GP-10-VIS
	12	10GP-12-VIS
	14	10GP-14-VIS
	16	10GP-16-VIS
	19	10GP-19-VIS
600–2300	10	10GP-10-IR
	12	10GP-12-IR
	14	10GP-14-IR
	16	10GP-16-IR
	19	10GP-19-IR

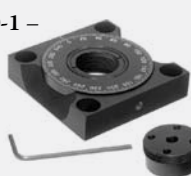


RELATED PRODUCTS

- **8MRU-1** – Universal Motorized Rotation Stage



- **5PHH50-1** – Polarizer Holder



CODE EXAMPLE FOR ORDERING

10GP-10-VIS

Side size, mm

Wavelength range
UV – 220-2300 nm
VIS – 350-2300 nm
IR – 600-2300 nm

10GT

Glan Thompson Polarizing Prisms

Glan Thompson prism is birefringent polarization element which consists of two calcite prisms cemented together.

Because of cement it has higher transmission than Glan Taylor type due to reduced reflection losses at the hypotenuse interface but limited useful UV spectral range. Transmitted extraordinary beam is used. Side faces are black painted to absorb rejected ordinary beam.

STANDARD SPECIFICATIONS

Material Grade	VIS quality grade calcite
Wavelength Range	350–2300 nm
Size	10×10 mm
Beam Deviation	< 1 arcmin
Length to Aperture Ratio	2.5
Full Angle Field	14° – 16° (asymmetrical)
Extinction Ratio	1.0×10 ⁻⁵
Surface Quality	60–40 scratch and dig
Surface Flatness	λ/4 @ 633 nm
Max. Power Handling	1 W/cm ² , CW
Housing	Black anodized aluminum housing

GLAN THOMPSON POLARIZING PRISM

Wavelength range, nm	Side size A, mm	Ordering Code
350–2300	10	10GT-10-VIS

RELATED PRODUCTS

- **5PH50** – Polarizer Holder

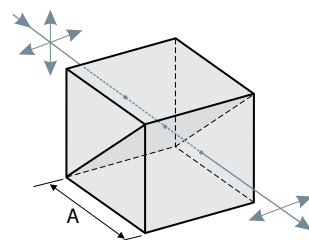


- **8MR151-1** – Motorized Rotation Stage



FEATURES

- Broadband low power polarizers for UV, visible or near IR wavelengths
- Large Acceptance Angle
- High Polarization Purity
- Prisms from α -BBO or YVO₄ are available upon request
- Prisms with size greater than **10 mm** are available on special request



OPTICAL SUBSTRATES

LENSES

PRISMS

DIELECTRIC COATED OPTICS

METALLIC COATED OPTICS

FILTERS

METAL MIRRORS

VARIABLE REFLECTIVITY MIRRORS

NON POLARIZING BEAMSPLITTER CUBES

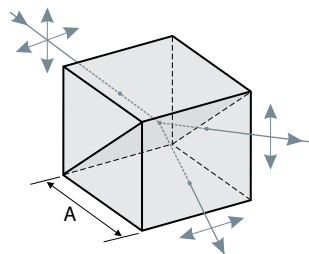
POLARIZING OPTICS

COATINGS SECTION

10WLP Wollaston Polarizing Prisms

FEATURES

- Wide Wavelength Range
- Low Power Application
- Broadband $10^5 : 1$ extinction ratio
- Prism with size **>19 mm** is available on special request



CODE EXAMPLE FOR ORDERING

10WLP-10-10

Side
size, mm

Deviation,
deg

Wollaston prism is an optical device that separates unpolarized light into two orthogonal, linearly polarized outgoing beams. The device consists of two birefringent prisms cemented. Wollaston polarizers deviate the two emerging beams by nearly equal amount in opposite directions.

STANDARD SPECIFICATIONS

Material Grade	VIS quality grade "First" calcite
Wavelength Range	350–2300 nm
Size	10×10, 14×14, 19×19 mm
Deviation	10°, 20°
Extinction Ratio	1×10^{-5}
Surface Quality	60–40 scratch and dig
Surface Flatness	$\lambda/4$ @ 633 nm
Max. Power Handling	1 W/cm ² , CW
Housing	Black Anodized Aluminum

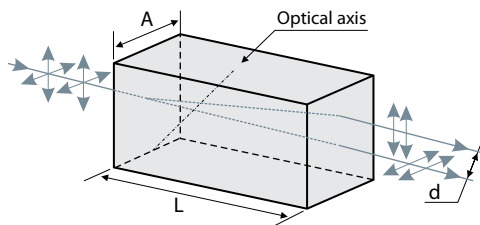
WOLLASTON POLARIZING PRISMS

Wavelength range, nm	Side size A, mm	Deviation, deg	Ordering Code
350–2300	10	10	10WLP-10-10
	10	20	10WLP-10-20
	14	10	10WLP-14-10
	14	20	10WLP-14-20
	19	10	10WLP-19-10
	19	20	10WLP-19-20

10BDP Beam Displacers

FEATURES

- Split a beam into two orthogonally polarized divergent beams
- Made from the finest optical grade natural calcite
- Beam Displacers with side size >20 mm are available on special request
- Beam Displacers can be made from crystal quartz and rutile as well
- Beam Displacers made from YVO₄ available on request



CODE EXAMPLE FOR ORDERING

10BDP-5-1

Side
size, mm

Beam
displacement, mm

The device produces two parallel orthogonally polarized beams from unpolarized input.

The displacement between ordinary and extraordinary beams can be found by approximate formula $d = 0.1 \times L$

STANDARD SPECIFICATIONS

Material	Calcite, grade "First"
Wavelength Range	220–2300 nm. Transmittance in UV–VIS range depends on material quality. Available in UV, VIS and IR quality
Size A	from 5×5 to 20×20 mm
Length L	from 5 to 20 mm
Tolerance Size A	+0.0/-0.1 mm
Length L	±0.1 mm
Ordinary Beam Deviation	< 3 arcmin
Surface Quality	60–40 scratch and dig
Surface Flatness	$\lambda/4$ @ 633 nm
Max. Power Handling	200 MW/cm ² , pulsed
Housing	Available on request

BEAM DISPLACERS

Beam displacement, mm	Side size A, mm	Ordering Code
1	5	10BDP-5-1
2	5	10BDP-5-2
3	5	10BDP-5-3
1	8	10BDP-8-1
2	8	10BDP-8-2
3	8	10BDP-8-3

10RHP

Rochon Polarizing Prisms

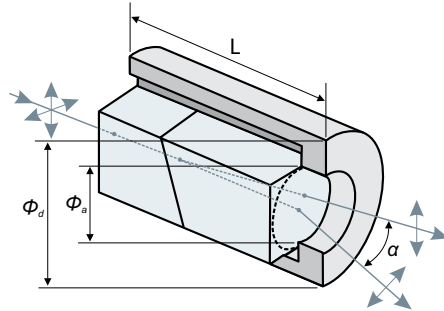
The device produces linear polarized light from unpolarized input. Alternative for other type of Glan type polarizers.

STANDARD SPECIFICATIONS

Material	Quartz or YVO ₄
Wavelength Range	Quartz: 200-2300 nm YVO ₄ : 500-4000 nm
Extinction Ratio	Quartz: $<5 \times 10^{-4}$ YVO ₄ : $<5 \times 10^{-5}$
Surface Quality	20-10 scratch and dig
Beam Deviation	< 3 arcmin
Wavefront Distortion	$\lambda/4$ @ 632.8 nm
Damage Threshold	>100 MW/cm ²
Coating	Single Layer MgF ₂
Mount	Black Anodized Aluminum

FEATURES

- Wide Wavelength Range
- High Extinction Ratio
- High UV Transmission
- Large Field Angle



QUARTZ ROCHON POLARIZING PRISMS

Wavelength, nm	Extinction ratio	Angular Field, deg	C.A. Øa, mm	O.D. Ød, mm	L±0.1, mm	Ordering Code
200-2300	$<5 \times 10^{-4}$	1.0 @ 980 nm	8.0	25.4	26.0	10RHP-8-1
			10.0	25.4	28.0	10RHP-10-1
			12.7	25.4	33.0	10RHP-12.7-1
			15.0	30.0	38.0	10RHP-15-1
			20.0	38.0	48.0	10RHP-20-1

YVO₄ ROCHON POLARIZING PRISMS

Wavelength, nm	Extinction ratio	Angular Field, deg	C.A. Øa, mm	O.D. Ød, mm	L±0.1, mm	Ordering Code
500-4000	$<5 \times 10^{-5}$	6.0 @ 1550 nm	8.0	25.4	17.0	10RHP-8-2
			10.0	25.4	19.0	10RHP-20-2
			12.7	25.4	21.0	10RHP-22.7-2
			15.0	30.0	23.0	10RHP-25-2
			20.0	38.0	29.0	10RHP-20-2

CODE EXAMPLE FOR ORDERING

10RHP-8-1

Aperture CA, mm

Material:
1 – Quartz (200–2300 nm)
2 – YVO₄ (500–4000 nm)

RELATED PRODUCTS

- **10APF3-1CVAF** – Variable Attenuator for Femtosecond Laser Pulses



OPTICAL SUBSTRATES

LENSES

PRISMS

DIELECTRIC COATED OPTICS

METALLIC COATED OPTICS

FILTERS

METAL MIRRORS

VARIABLE REFLECTIVITY MIRRORS

NON POLARIZING BEAMSPLITTER CUBES

POLARIZING OPTICS

COATINGS SECTION

COATINGS SECTION

Dielectric Coatings

Coatings consist of layers with different refractive indices. There are three major techniques used for dielectric coating: **electron-beam deposition (E-beam)**, **ion-assisted electron-beam (IAD)** and **ion beam sputtering (IBS)**. All of these processes are quite similar in their principle. They consist in evaporating some coating material on the substrate. The difference lies in the deposition energy.

Because of low energies involved when using electron-beam deposition, thin film material contains bubbles and micropores, like a sponge. These will eventually fill with water, which will change the refractive index of the coating and thus the properties of the optics. (This is known as *environmental shifting*). The presence of water also lowers the damage threshold of the optics: when submitted to an intense light, the water will tend to vaporise and scrap off bits of the coating. Finally, even in the absence of water, inhomogeneities of coating layers lower the theoretical damage threshold. The positive points about this technology is that it is cheap, widespread and very versatile. The coating itself is also slightly flexible, which makes the optic more resistant to mechanical stress. Some of the major optics manufacturer only have access to that type of coating at the moment and outsource IBS-coated optics.

Ion-assisted electron-beam is an intermediate technique, between ion-beam sputtering and e-beam. So are its results.



Ion beam sputtering involves energies 100 times higher than e-beams. As a result the molecules of the coating layers form covalent bound when deposited. The result is free from bubbles or pores, more homogenous, more durable, have higher damage threshold and is more repeatable and controllable. They also show lower scattering and absorption properties, and overall higher specifications (more broadband, steeper transitions when needed, better spectral stability...). This is high precision coating, and the surface roughness can be controlled at better than 1 Å RMS (!), that is $<\lambda/5000$. Of course, this comes at a higher cost (atom-by-atom removal is very slow), and even worse, it is limited in the types of coatings it can handle: most of the UV coatings for instance involve fluorides which dissociate when sputtered. In this case, e-beam is the only option.



RELATED PRODUCTS AND ACCESSORIES

- **10BE02** – Beam Expander



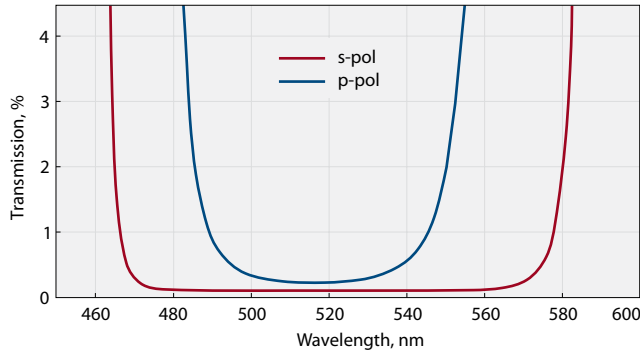
- **10BE03** – Beam Expander



HR

HR Laser Line Coatings

HR Laser Line coatings provide an optimized performance at certain wavelength and certain angle of incidence (AOI). These multilayer coating stacks helps to achieve the highest possible reflectivity at specific laser line wavelengths at normal or 45 degrees incidence. HR Laser Line coatings are used for external beam manipulation applications where even slight losses may be intolerable. Coatings are provided by Ion Beam Sputtering (IBS) or Electron beam evaporation with/without Ion assistance coating techniques. High reflectivity dielectric coatings in the range of 0.19 – 20 μm are available.



Measured transmission curve of the standard Coating Code **HR5**

HR LASER LINE COATINGS

Wavelength, nm	Reflectivity (average), %	Coating Code
266	>99.0	HR1
343 – 355	>99.5	HR2
400	>99.5	HR3
473 – 488	>99.5	HR4
515	>99.5	HR5
527 – 532	>99.5	HR6
589	>99.5	HR7
633	>99.5	HR8
780	>99.5	HR9
800	>99.5	HR10
852	>99.5	HR11
946	>99.5	HR12
980	>99.5	HR13
1030	>99.5	HR14
1047 – 1064	>99.5	HR15
1122	>99.5	HR16
1319	>99.5	HR17
1550	>99.5	HR18

FEATURES

- Provide an optimized performance at certain wavelength and certain angle of incidence (AOI)
- Coatings are provided by Ion Beam Sputtering (IBS) or Electron beam evaporation with/without Ion assistance coating techniques
- HR Laser Line coatings highly reflect wavelength range of <10% of the central wavelength (CWL). For instance, HR @ 800 nm will reflect wavelength range of 760 – 840 nm
- For wider wavelength range please refer to HR Broad Band wavelength (BBHR) coatings

STANDARD SPECIFICATIONS

Coating Adhesion and Durability	Per MIL-C-675A
Clear Aperture	>90% of diameter
Measured Reflectivity	$R_s > 99.5\%$ @ 0° ; $R_s > 99.8\%$ and $R_p > 99.3\%$ @ 45°
Laser Damage Threshold	>5–7 J/cm ² for 10 ns pulses @ 1064 nm

RELATED PRODUCTS

- **10BE01** – Beam Expander/ Collimator



OPTICAL SUBSTRATES

LENSES

PRISMS

DIELECTRIC COATED OPTICS

METALLIC COATED OPTICS

FILTERS

METAL MIRRORS

VARIABLE REFLECTIVITY MIRRORS

NON POLARIZING BEAMSPLITTER CUBES

POLARIZING OPTICS

COATINGS SECTION

OPTICAL SUBSTRATES

LENSES

PRISMS

DIELECTRIC
COATED OPTICS

METALLIC
COATED OPTICS

FILTERS

METAL MIRRORS

VARIABLE
REFLECTIVITY MIRRORS

NON POLARIZING
BEAMSPLITTER CUBES

POLARIZING OPTICS

COATINGS SECTION

BBHR

HR Broad Band Coatings

FEATURES

- Provide an optimized performance over broad wavelength range
- Coatings are provided by Ion Beam Sputtering (IBS) or Electron beam evaporation with/without Ion assistance coating techniques

STANDARD SPECIFICATIONS

Coating Adhesion and Durability	Per MIL-C-675A
Clear Aperture	>90% of diameter
Measured Reflectivity	R>99.5% @ 0°; R _{ave} >99% @ 45°
Laser Damage Threshold	>2–3 J/cm ² for 10 ns pulses @ 1064 nm

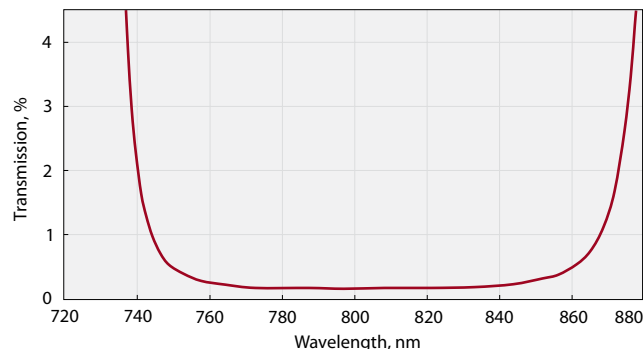
RELATED PRODUCTS

- 12HP02 – Fiber Collimator



HR Broad Band coatings provide an optimized performance at broad wavelength range. These multilayer coatings offer high reflectivity for broad spectrum. Therefore, it is the ideal for a wide range of multi-wavelength laser or white light applications. Coatings are provided by Ion Beam Sputtering (IBS) or Electron beam evaporation with/without Ion assistance coating techniques.

High reflectivity dielectric coatings in the range of 0.19–20 μm are available.



Measured transmission curve of the standard Coating Code **BBHR3**

HR BROAD BAND COATINGS

Wavelength range, nm	Reflectivity (average), %	Coating Code
400-700	>99.0	BBHR1
700-950	>99.0	BBHR2
750-850	>99.0	BBHR3
750-1000	>99.0	BBHR4
900-1200	>99.0	BBHR5

PR

Partial Reflecting Coatings

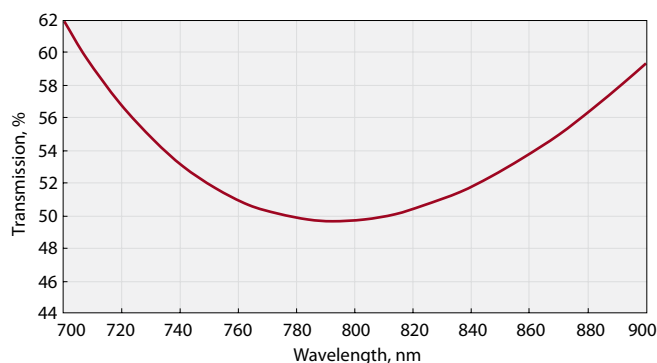
FEATURES

- Efficient beam splitting as well as output coupling in high power laser cavities
- Coatings are provided by Ion Beam Sputtering (IBS) or Electron beam evaporation with/without Ion assistance coating techniques

STANDARD SPECIFICATIONS

Coating Adhesion and Durability	Per MIL-C-675A
Clear Aperture	>90% of diameter
Laser Damage Threshold	>5–6 J/cm ² for 10 ns pulses @ 1064 nm

Partial reflecting coatings provide required percentage reflection/transmission at a specific angle of incidence both for both single and broad band wavelengths. These coatings serves usually for the efficient beam splitting as well as output coupling in high power laser cavities.



Measured transmission curve for PR coating code **PR6.50**



PARTIAL REFLECTING COATINGS

Wavelength, nm	Reflectivity (average), %	Coating Code
266	10±3	PR1.10
	50±2	PR1.50
	90±1	PR1.90
355	10±3	PR2.10
	50±2	PR2.50
	90±1	PR2.90
400	10±3	PR3.10
	50±2	PR3.50
	90±1	PR3.90
515 – 532	10±3	PR4.10
	50±2	PR4.50
	90±1	PR4.90
633	10±3	PR5.10
	50±2	PR5.50
	90±1	PR5.90
750 – 850	10±3	PR6.10
	50±2	PR6.50
	90±1	PR6.90

Wavelength, nm	Reflectivity (average), %	Coating Code
946	10±3	PR7.10
	50±2	PR7.50
	90±1	PR7.90
1020 – 1100	10±3	PR8.10
	50±2	PR8.50
	90±1	PR8.90
1122	10±3	PR9.10
	50±2	PR9.50
	90±1	PR9.90
1319	10±3	PR10.10
	50±2	PR10.50
	90±1	PR10.90
1550	10±3	PR11.10
	50±2	PR11.50
	90±1	PR11.90

OPTICAL SUBSTRATES

LENSES

PRISMS

DIELECTRIC
COATED OPTICS

METALLIC
COATED OPTICS

FILTERS

METAL MIRRORS

VARIABLE
REFLECTIVITY MIRRORS

NON POLARIZING
BEAMSPLITTER CUBES

POLARIZING OPTICS

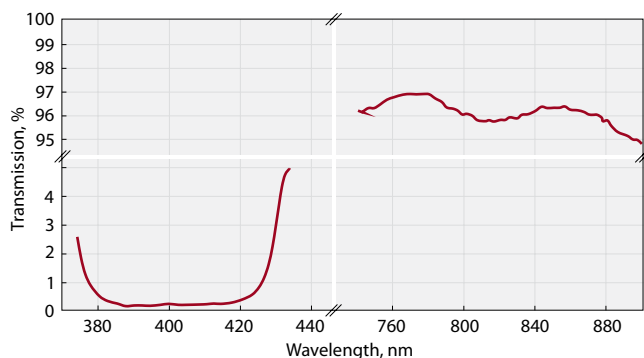
COATINGS SECTION

WS

Wavelength Separating Coatings

Wavelength separating coatings are used to separate the spectral regions or specified wavelengths (e.g. harmonic components) of the multi-frequency laser systems by selective spectral reflection, transmission and absorption.

These multilayer dielectric coatings are used to separate the various harmonic components of frequency doubled laser systems by selective spectral reflection and transmission. In all cases one wavelength is reflected while the others are transmitted.



Measured transmission curve for wavelength separator coating code **WS4**

FEATURES

- Used to separate the spectral regions or specified wavelengths
- Coatings are provided by Ion Beam Sputtering (IBS) or Electron beam evaporation with/without Ion assistance coating techniques

STANDARD SPECIFICATIONS

Coating Adhesion and Durability	Per MIL-C-675A
Clear Aperture	>90% of diameter
Laser Damage Threshold	>5 J/cm ² for 10 ns pulses @ 1064 nm

WAVELENGTH SEPARATING COATINGS

Reflected Wavelength, nm	Transmitted Wavelength, nm	Coating Code
R>99% @ 266	T>90% @ 355+532+1064	WS1
R>99.5% @ 343	T>95% @ 515+1030	WS2
R>99.5% @ 355	T>95% @ 532+1064	WS3
R>99.5% @ 400	T>95% @ 800	WS4
R>99.5% @ 515	T>95% @ 1030	WS5
R>99.5% @ 515	T>85% @ 630 – 1300, AOI=0° T>90% @ 630 – 1300, AOI=45°	WS6
R>99.5% @ 532	T>90% @ 266	WS7
R>99.5% @ 532	T>95% @ 1064	WS8
R>99.5% @ 532+1064	T>90% @ 355	WS9
R>99.5% @ 532+1064	T>95% @ 808	WS10

Reflected Wavelength, nm	Transmitted Wavelength, nm	Coating Code
R>99.5% @ 750 – 850	T>95% @ 532	WS11
R>99.5% @ 800	T>95% @ 400	WS12
R>99.5% @ 800	T>95% @ 1100 – 1600	WS13
R>99.5% @ 1030	T>95% @ 515	WS14
R>99.5% @ 1030	T>95% @ 940	WS15
R>99.5% @ 1030	T>95% @ 976	WS16
R>99.5% @ 1064	T>95% @ 355	WS17
R>99.5% @ 1064	T>95% @ 532	WS18
R>99.5% @ 1064	T>95% @ 400 – 700	WS19
R>99.5% @ 1064	T>95% @ 808	WS20

DHR

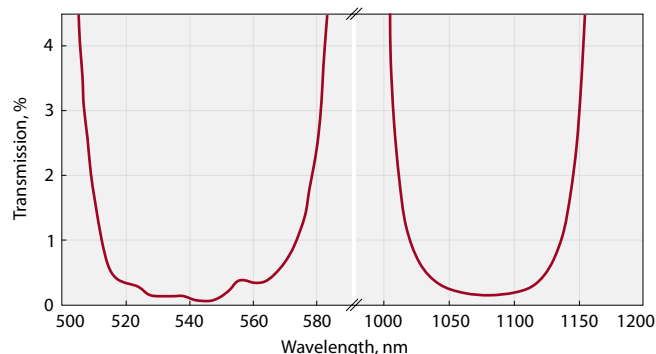
Dual Laser Line Reflecting Coatings

FEATURES

- The coatings are designed to achieve the highest possible reflectivity at two specific laser line wavelengths at normal or 45 degrees incidence
- Coatings are provided by Ion Beam Sputtering (IBS) or Electron beam evaporation with/without Ion assistance coating techniques

Dual Laser Line reflecting coatings provide an optimized performance at two certain wavelengths and certain angle of incidence (AOI).

These multilayer coating stacks help to achieve the highest possible reflectivity at two specific laser line wavelengths at normal or 45 degrees incidence. Laser line high reflectivity coatings are intended for external beam manipulation applications where even slight losses may be intolerable.



Measured transmission curve
for dual wavelength HR coating code **DHR9**

STANDARD SPECIFICATIONS

Coating Adhesion and Durability	Per MIL-C-675A
Clear Aperture	>90% of diameter
Measured Reflectivity	R _s >99.5% @ 0° R _p >99.3% and R _p >98.5% @ 45°
Laser Damage Threshold	>3–5 J/cm ² for 10 ns pulses @ 1064 nm

DUAL LASER LINE REFLECTING COATINGS

Wavelength, nm	Reflectivity at normal incidence, %	Coating Code
266+532	>99.0	DHR1
343+1030	>99.5	DHR2
355+532	>99.5	DHR3
355+1064	>99.5	DHR4
399+556	>99.5	DHR5
400+800	>99.5	DHR6
426+852	>99.5	DHR7
515+1030	>99.5	DHR8
532+1064	>99.5	DHR9
1064+1319	>99.5	DHR10

AR

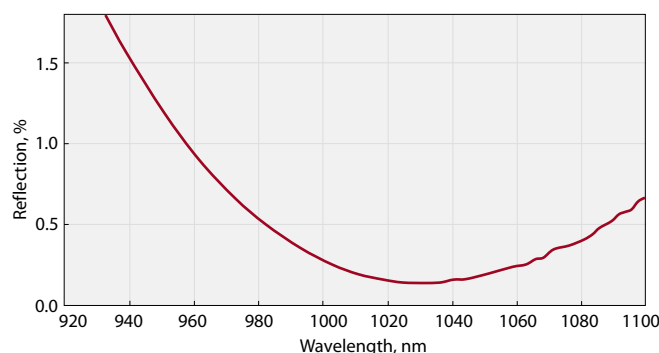
Laser Line Anti-Reflection Coatings

FEATURES

- Designed to reduce the reflectivity of a component to near-zero for specific wavelength
- Coatings are provided by Ion Beam Sputtering (IBS) or Electron beam evaporation with/without Ion assistance coating techniques
- Laser Line Anti-Reflection Coatings in the range 0.19 – 10.6 μm are available

AR coatings designed to reduce the reflectivity of a component to near-zero for specific wavelength.

We supply standard Laser Line Anti-Reflection Coatings in the range 0.19 – 10.6 μm.



Measured residual back reflection curve for AR coating code **AR14**

STANDARD SPECIFICATIONS

Coating Adhesion and Durability	Per MIL-C-675A
Clear Aperture	>90% of diameter
Measured Residual Reflectivity	R<0.2% @ 0° AOI R<0.4% @ 45° AOI
Laser Damage Threshold	>8 J/cm ² for 10 ns pulses @ 1064 nm



LASER LINE AR COATINGS

Wavelength, nm	Residual Reflectivity, %	Coating Code
266	<0.5	AR1
343 – 355	<0.25	AR2
400	<0.2	AR3
473 – 488	<0.2	AR4
515	<0.2	AR5
527 – 532	<0.2	AR6
589	<0.2	AR7
633	<0.2	AR8
780	<0.2	AR9

Wavelength, nm	Residual Reflectivity, %	Coating Code
800	<0.2	AR10
852	<0.2	AR11
946	<0.2	AR12
980	<0.2	AR13
1030	<0.2	AR14
1047 – 1064	<0.2	AR15
1122	<0.2	AR16
1319	<0.2	AR17
1550	<0.2	AR18

OPTICAL SUBSTRATES

LENSES

PRISMS

DIELECTRIC COATED OPTICS

METALLIC COATED OPTICS

FILTERS

METAL MIRRORS

VARIABLE REFLECTIVITY MIRRORS

NON POLARIZING BEAMSPLITTER CUBES

POLARIZING OPTICS

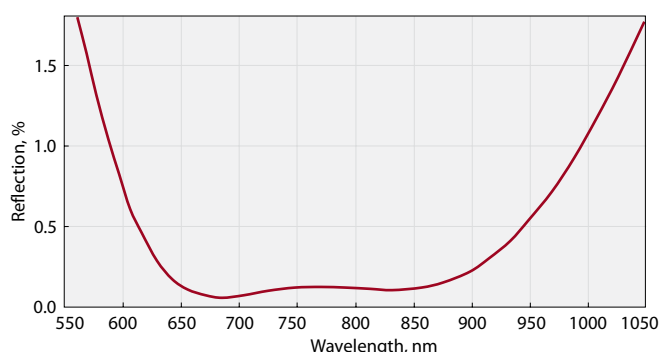
COATINGS SECTION

BBAR

Broad Band Anti-Reflection Coatings

Broad Band AR coatings designed to reduce the reflectivity of a component to near-zero for Broad band wavelength range.

We supply standard Broad Band AR coatings in the range 0.19 – 10.6 μm . These multilayer broadband anti-reflective coating can higher transmission access a broad spectrum. Therefore, it is the ideal for a wide range of multi-wavelength laser and white light applications. Please notified that the wavelength range and reflectivity of the coating changes according to the angle of the incident beam.



Measured residual back reflection curve for BBAR coating code **BBAR4**

FEATURES

- These coatings are designed to increase the transmission over a broad spectrum
- Coatings are provided by Ion Beam Sputtering (IBS) or Electron beam evaporation with/without Ion assistance coating techniques
- Broad Band Anti-Reflection Coatings in the range 0.19 – 10.6 μm are available

STANDARD SPECIFICATIONS

Coating Adhesion and Durability	Per MIL-C-675A
Clear Aperture	>90% of diameter
Laser Damage Threshold	>4–5 J/cm ² for 10 ns pulses @ 1064 nm

BROAD BAND AR COATINGS

Wavelength range, nm	Residual average Reflectivity @ 0° AOI, %	Coating Code
400 – 700	<1.0	BBAR1
600 – 1050	<0.8	BBAR2
700 – 950	<0.4	BBAR3
750 – 850	<0.3	BBAR4
750 – 1000	<0.5	BBAR5
900 – 1200	<0.6	BBAR6
1200 – 1500	<0.6	BBAR7
1500 – 1900	<0.7	BBAR8

RELATED PRODUCTS

- **10BE01-5X(ZYΘ)** – Beam Expander/ Collimator



OPTICAL SUBSTRATES

LENSES

PRISMS

DIELECTRIC
COATED OPTICS

METALLIC
COATED OPTICS

FILTERS

METAL MIRRORS

VARIABLE
REFLECTIVITY MIRRORS

NON POLARIZING
BEAMSPLITTER CUBES

POLARIZING OPTICS

COATINGS SECTION

DAR

Dual Anti-Reflection Coatings

FEATURES

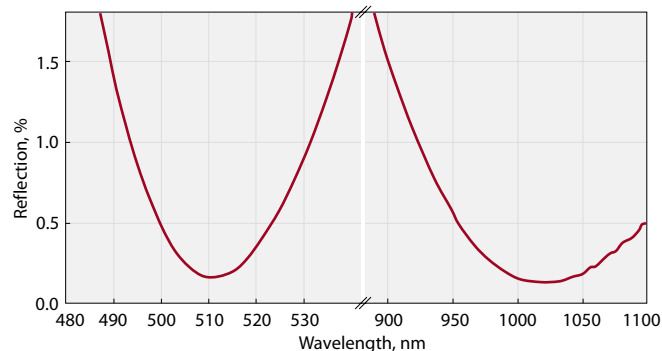
- Frequently used in multi-frequency laser output systems (e.g. frequency doubling)
- Coatings are provided by Ion Beam Sputtering (IBS) or Electron beam evaporation with/without Ion assistance coating techniques

STANDARD SPECIFICATIONS

Coating Adhesion and Durability	Per MIL-C-675A
Clear Aperture	>90% of diameter
Laser Damage Threshold	>6 J/cm ² for 10 ns pulses @ 1064 nm

Dual AR coatings designed to reduce the reflectivity of a component to near-zero for two certain wavelengths. Usually these coatings are used in multi-frequency laser output systems (e.g. frequency doubling).

This coating provides very high transmission at two different wavelengths. Typical wavelengths and reflection curves of an AR coating suitable for the prevalent laser system output at 1064 nm and 532 nm are shown below.



The measured residual back reflection curve for DAR coating code **DAR9**

DUAL AR COATINGS

Wavelength, nm	Residual average Reflectivity @ 0° AOI, %	Coating Code
266+532	<0.5	DAR1
343+1030	<0.3	DAR2
355+532	<0.3	DAR3
355+1064	<0.3	DAR4
399+556	<0.3	DAR5

Wavelength, nm	Residual average Reflectivity @ 0° AOI, %	Coating Code
400+800	<0.3	DAR6
426+852	<0.3	DAR7
515+1030	<0.25	DAR8
532+1064	<0.25	DAR9
1064+1319	<0.3	DAR10

AL • SM • GM

Metallic Coatings

FEATURES

- Protected Gold provides excellent, broadband infrared high reflectance
- Protected Silver provides higher reflectance than aluminum throughout the visible and near IR
- Protected Aluminum is economical solution for VIS applications
- UV enhanced Aluminum provides good reflectance over a wide range and are mainly used in UV applications

STANDARD SPECIFICATIONS

Clear Aperture	>90% of diameter
Laser Damage Threshold	>0.3 J/cm ² for 10 ns pulses @ 1064 nm (for Gold and Silver)

METALLIC COATINGS

Coating type	Reflectivity, %	Coating Code
UV enhanced Aluminum	>87% @ 250 – 350	EAL
Protected Aluminum	>85% @ 350 – IR	AL
Protected Silver	>96% @ 400 – IR	SM
Protected Gold	>98% @ 900 – IR	GM

Metallic coatings are convenient in that they are extremely broadband and can be used at any angle of incidence. We offer Gold, Silver and Aluminum high reflection coatings formed by vacuum deposition. All metallic reflectors can be over-coated with dielectric film of MgF₂ or SiO₂ in order to prevent oxidation of the metallic surface and provide abrasion resistance.

