

Plane Substrates

Substrates with plane surfaces are used, for example, as bending mirrors, dichroic mirrors, or windows. The finest polished optics with a planarity of $\lambda/10$ are normally used in laser applications.

The polish specification of substrates depends on the application. When used as mirrors, the glasses are finely polished on at least one side. When used in transmission, both sides of the substrate are polished to laser grade quality.

The plane substrates differ in the specification of the wedge angle and are available in different forms and sizes.

Note

The right selection of material is important in laser optics. Furthermore, the materials can be provided with different levels of quality.

Before coating, the typical surface quality of 1.0" substrates made of BK7 or fused silica is as follows:

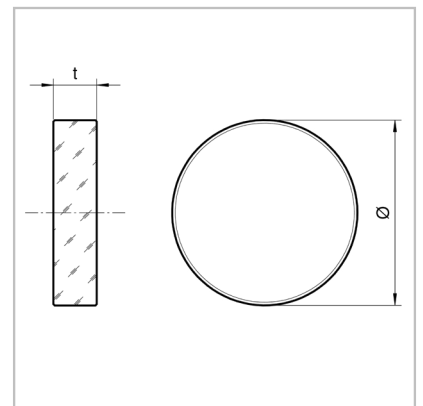
- Surface figure:
 - 3/0.2 (0.2/-) according to ISO 10110
 - $\lambda/10$ according to MIL-O-1380A
- Surface quality:
 - 5/4x0.025 according to ISO 10110
 - 10-5 according to MIL-O-1380A



Round Plane Substrates

Plane Windows – PW Series

The PW series (**Plane Window**) is the most commonly used optic. It is used where laser beams are transmitted, for example, as dichroic mirrors, end mirrors, beam splitters, or windows.



Specifications

Material	BK7, fused silica, CaF ₂ , sapphire
Diameter tolerance	+ 0.00 mm; - 0.20 mm
Thickness tolerance	± 0.20 mm
Surface quality	5/4 x 0.025 for 1.0" substrates according to ISO 10110 10-5 according to MIL-O-1380A
Wedge angle	< 5 arc minutes
Protective chamfer	0.2 – 0.4 mm x 45°
Clear aperture	85 % of diameter

Nomenclature

PW	05	12	UV
Product Code (Plane Window)	Diameter in inches x 10	Thickness in inches x 100	Material Code UV: Fused Silica C: BK7

Fused Silica / BK7 Plane Windows

Part No. Fused Silica	Part No. BK7	Diameter Ø	Thickness t	Surface Figure Fused Silica	Surface Figure BK7
PW0504UV	PW0504C	0.500"	1.00 mm	λ/4	λ/4
PW0508UV	PW0508C	0.500"	2.00 mm	λ/10	λ/10
PW0512UV	PW0512C	0.500"	0.125"	λ/10	λ/10
PW0525UV	PW0525C	0.500"	0.250"	λ/10	λ/10
PW0537UV	PW0537C	0.500"	0.375"	λ/10	λ/10
PW0604UV	PW0604C	15.00 mm	1.00 mm	λ/4	λ/4
PW06308UV	PW06308C	16.00 mm	2.00 mm	λ/10	λ/4
PW0712UV	PW0712C	0.750"	0.125"	λ/10	λ/10
PW0725UV	PW0725C	0.750"	0.250"	λ/10	λ/10
PW0737UV	PW0737C	0.750"	0.375"	λ/10	λ/10
PW1012UV	PW1012C	1.000"	0.125"	λ/10	λ/4
PW1025UV	PW1025C	1.000"	0.250"	λ/10	λ/10
PW1037UV	PW1037C	1.000"	0.375"	λ/10	λ/10
PW1512UV	PW1512C	1.500"	0.125"	λ/4	λ/4
PW1525UV	PW1525C	1.500"	0.250"	λ/10	λ/10

Most items are available from stock. Other sizes and materials are available upon request.

Fused Silica / BK7 Plane Windows

Part No. Fused Silica	Part No. BK7	Diameter Ø	Thickness t	Surface Figure Fused Silica	Surface Figure BK7
PW1537UV	PW1537C	1.500"	0.375"	$\lambda/10$	$\lambda/10$
PW1619UV	PW1619C	40.00 mm	5.00 mm	$\lambda/10$	$\lambda/4$
PW2025UV	PW2025C	2.000"	0.250"	$\lambda/10$	$\lambda/4$
PW2037UV	PW2037C	2.000"	0.375"	$\lambda/10$	$\lambda/10$
PW2050UV	PW2050C	2.000"	0.500"	$\lambda/10$	$\lambda/10$
PW3037UV	PW3037C	3.000"	0.375"	$\lambda/10$	$\lambda/10$
PW3050UV	PW3050C	3.000"	0.500"	$\lambda/10$	$\lambda/10$
PW4037UV	PW4037C	4.000"	0.375"	$\lambda/10$	$\lambda/10$

Most items are available from stock. Other sizes and materials are available upon request.

Sapphire Plane Windows

Part No.	Diameter Ø	Thickness t	Surface Figure	Material
PW0511SA*	0.500"	3.00 mm	$\lambda/4$	Sapphire
PW0708SA*	0.750"	2.00 mm	$\lambda/4$	Sapphire
PW0711SA*	0.750"	3.00 mm	$\lambda/4$	Sapphire
PW1011SA*	1.000"	3.00 mm	$\lambda/2$	Sapphire
PW1524SA*	1.500"	6.00 mm	$\lambda/2$	Sapphire
PW2012SA*	2.000"	0.125"	λ	Sapphire

* Surface quality is 5/4x0.063, 20-10

Bold type indicates items available from stock. Other sizes are available upon request.

CaF₂ Plane Windows

Part No.	Diameter Ø	Thickness t	Surface Figure	Material
PW0511SA*	0.500"	3.00 mm	$\lambda/4$	Sapphire
PW0708SA*	0.750"	2.00 mm	$\lambda/4$	Sapphire
PW0711SA*	0.750"	3.00 mm	$\lambda/4$	Sapphire
PW1011SA*	1.000"	3.00 mm	$\lambda/2$	Sapphire
PW1524SA*	1.500"	6.00 mm	$\lambda/2$	Sapphire
PW2012SA*	2.000"	0.125"	λ	Sapphire

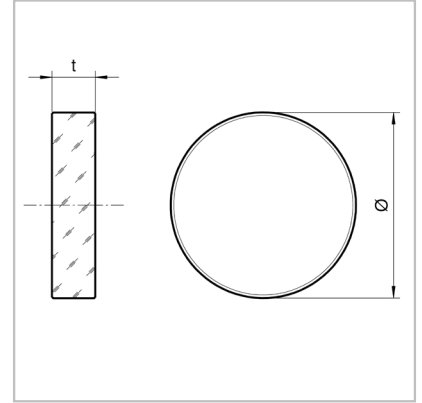
* Surface quality is 5/4x0.063, 20-10

Bold type indicates items available from stock. Other sizes are available upon request.

CaF₂ in UV quality is available upon request.

Plane Parallel Windows – PP Series

The PP series (**P**lane **P**arallel Window) features a low wedge angle. It is used where the angle of deflection of the transmitted beam is crucial – for example, in output couplers or beam splitters. The plane parallel windows can be exchanged without having to readjust the system.



Specifications

Material	BK7, fused silica
Diameter tolerance	+ 0.00 mm; – 0.20 mm
Thickness tolerance	± 0.20 mm
Surface quality	5/4 x 0.025 for 1.0" substrates according to ISO 10110 10-5 according to MIL-O-1380A
Wedge angle	< 20 arc seconds
Protective chamfer	0.2 – 0.4 mm x 45°
Clear aperture	85 % of diameter

Nomenclature

PP	05	12	UV
Product Code (Plane Parallel Window)	Diameter in inches x 10	Thickness in inches x 100	Material Code UV: Fused Silica C: BK7

Fused Silica / BK7 Plane Parallel Windows

Part No. Fused Silica	Part No. BK7	Diameter Ø	Thickness t	Surface Figure Fused Silica	Surface Figure BK7
PP0512UV	PP0512C	0.500"	0.125"	$\lambda/10$	$\lambda/10$
PP0625UV	PP0625C	15.00 mm	0.250"	$\lambda/10$	$\lambda/10$
PP0725UV	PP0725C	0.750"	0.250"	$\lambda/10$	$\lambda/10$
PP0737UV	PP0737C	0.750"	0.375"	$\lambda/10$	$\lambda/10$
PP1012UV	PP1012C	1.000"	0.125"	$\lambda/10$	$\lambda/4$
PP1025UV	PP1025C	1.000"	0.250"	$\lambda/10$	$\lambda/10$
PP1037UV	PP1037C	1.000"	0.375"	$\lambda/10$	$\lambda/10$
PP1512UV	PP1512C	1.500"	0.125"	$\lambda/10$	$\lambda/4$
PP1537UV	PP1537C	1.500"	0.375"	$\lambda/10$	$\lambda/10$
PP2037UV	PP2037C	2.000"	0.375"	$\lambda/10$	$\lambda/10$
PP3037UV	PP3037C	3.000"	0.375"	$\lambda/10$	$\lambda/10$
PP3050UV	PP3050C	3.000"	0.500"	$\lambda/10$	$\lambda/10$
PP4037UV	PP4037C	4.000"	0.375"	$\lambda/10$	$\lambda/10$
PP4050UV	PP4050C	4.000"	0.500"	$\lambda/10$	$\lambda/10$

Most items are available from stock. Other sizes and materials are available upon request.

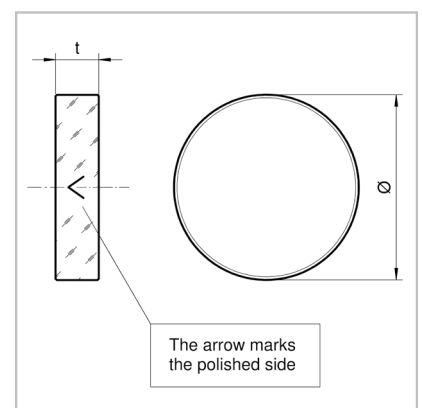
Plane Mirror Substrates – PS Series

The PS series (Plane Mirror Substrate) is used when only one high quality substrate surface is required. This surface has the standard specifications while the backside is commercially polished.

Reasonably-priced plane mirror substrates are generally used as end mirrors in resonators or as bending mirrors.

Note

- **Fine grind (matt) backside**
In special applications, it can become necessary for the backside of the substrate to be fine grind. LASER COMPONENTS has special substrates with the indication PU available for this purpose.
- **Type of substrate**
For the majority of applications, the substrate material BK7 is sufficient, mostly because the absorption of material is uncritical in mirrors. In some cases, however, it makes more sense to use fused silica.



Specifications

Material	BK7, fused silica
Diameter tolerance	+ 0.00 mm; - 0.20 mm
Thickness tolerance	± 0.20 mm
Wedge angle	< 5 arc minutes
Protective chamfer	0.2 – 0.4 mm x 45°
Clear aperture	85 % of diameter
Surface quality Front Side	5/4 x 0.025 for 1.0" substrates according to ISO 10110 10-5 according to MIL-O-1380A
Rear side	Commercial polish

Nomenclature

PS	05	25	UV
Product Code (Plane Mirror Substrate)	Diameter in inches x 10	Thickness in inches x 100	Material Code UV: Fused Silica C: BK7

Fused Silica / BK7 Plane Mirror Blanks

Part No. Fused Silica	Part No. BK7	Diameter Ø	Thickness t	Surface Figure Fused Silica	Surface Figure BK7
PS0525UV	PS0525C	0.500"	0.250"	λ/10	λ/10
PS0711UV	PS0711C	0.750"	3.00 mm	λ/10	λ/10
PS0725UV	PS0725C	0.750"	0.250"	λ/10	λ/10
PS0737UV	PS0737C	0.750"	0.375"	λ/10	λ/10
PS0911UV	PS0911C	25.00 mm	3.00 mm	λ/10	λ/4
PS1012UV	PS1012C	1.000"	0.125"	λ/10	λ/4
PS1025UV	PS1025C	1.000"	0.250"	λ/10	λ/10
PS1037UV	PS1037C	1.000"	0.375"	λ/10	λ/10
PS1537UV	PS1537C	1.500"	0.375"	λ/10	λ/10
PS2025UV	PS2025C	2.000"	0.250"	λ/10	λ/4
PS2037UV	PS2037C	2.000"	0.375"	λ/10	λ/10

Most items are available from stock. Other sizes and materials are available upon request.

Brewster Windows – BW Series Elliptical Windows – ELW Series

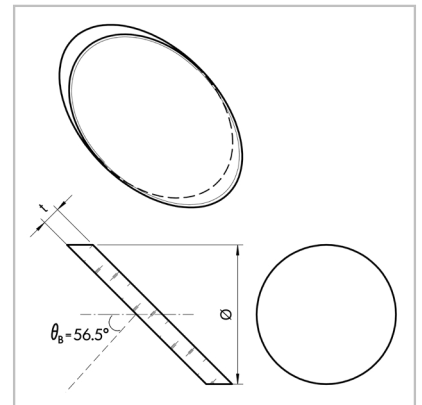
The BW series (**B**rewster **W**indow) is a series of plane parallel plates that are cut at the Brewster angle. The ELW series (**E**lliptical **W**indow) is cut at an angle of 45° . Especially Brewster windows feature the smallest wedge angles.

Specifications

Material	BK7, fused silica
Diameter tolerance	+ 0.00 mm; – 0.20 mm
Thickness tolerance	\pm 0.20 mm
Surface quality	5/4 x 0.025 for 1.0" substrates according to ISO 10110 10-5 according to MIL-O-1380A
Wedge angle BW-Series ELW-Series	< 10 arc seconds < 5 arc minutes
Protective chamfer	0.2 – 0.4 mm x 45°
Clear aperture	85 % of diameter

Brewster Windows

Normally, fused silica is used as substrate material for Brewster windows. The wavefront error in windows of the same thickness is less for fused silica than for BK7 substrates.

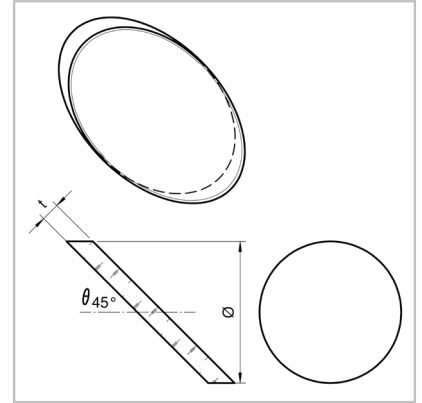


Nomenclature

BW	8.0	-2.0	UV
Product Code (Brewster W indow)	Diameter in mm	Thickness in mm	Material Code UV: Fused Silica

Elliptical Windows

Elliptical windows are produced from both BK7 and fused silica glass. These complex windows are used as bending mirrors.



Nomenclature

ELW

Product Code
(Elliptical Window)

25.4

Diameter
in mm

-6.35

Thickness
in mm

UV

Material Code
UV: Fused Silica
C: BK7

Germany & Other Countries

Laser Components Germany GmbH
Tel: +49 8142 2864 - 0
Fax: +49 8142 2864 - 11
info@lasercomponents.com
www.lasercomponents.com

France

Laser Components S.A.S.
Tel: +33 1 39 59 52 25
Fax: +33 1 39 59 53 50
info@lasercomponents.fr
www.lasercomponents.fr

United Kingdom

Laser Components (UK) Ltd.
Tel: +44 1245 491 499
Fax: +44 1245 491 801
info@lasercomponents.co.uk
www.lasercomponents.co.uk

Nordic Countries

Laser Components Nordic AB
Tel: +46 31 703 71 73
Fax: +46 31 703 71 01
info@lasercomponents.se
www.lasercomponents.se

USA

Laser Components USA, Inc.
Tel: +1 603 821 - 7040
Fax: +1 603 821 - 7041
info@laser-components.com
www.laser-components.com