



STANDARD ASPHERES.

Docter Optics standard aspheres

What is a standard aspheric lens?

Over the years, we have accumulated a variety of molding and processing tools that allow us to offer a *standard* line of aspheric lenses with plano or spherical convex second surfaces, readily available in small and large volume quantities, to satisfy various industrial, medical, military and scientific applications in the fields such as, stage and theatrical lighting. The aspheric first surface of the lens is precision molded with a fire-polished surface quality. The plano, spherical concave or spherical convex second surface of the lens is precision ground and polished with an 80-60 scratch and dig surface quality.

Glass types

Aspheric lenses are manufactured primarily from Schott B270 Superwite® Crown (nd = 1.5230) glass.

If operating temperatures exceeding 300°C (572°F) is required, Borosilicate glass 33 (nd = 1.48) is used.

If a higher refractive index is required, Schott F2 (nd = 1.6200) glass is used.

Thermal hardening (Tempering)

The aspheric lenses can be provided thermal hardened (tempered) to place the surface in tension and serves to increase resistance to thermal shock and breakage at high operating temperatures exceeding 300C (572°F). Pricing is available on request.

Coatings

The plano, spherical concave and spherical convex second surfaces of the lens can be provided with single or multi-layer AR, UV, IR, as well as, a variety of other coatings if required. Pricing is available on request.

Pricing and Packaging

Our aspheric lens prices are “ex-works” (EXW) from Neustadt a. d. Orla, Germany and you would bear all expenses for customs, duty, insurance, taxes, freight charges and *packaging*. If you should require *special* packaging, pricing is available on request.

Quantities and payment terms

We require a minimum purchase order quantity for any of our aspheric lenses.

Our payment terms is net cash thirty (30) days from the date of any invoice, subject to credit approval.

Custom aspheric lenses

If none of the *standard* aspheric lens sizes, manufacturing tolerances or surface qualities listed in this brochure satisfy your requirements, we of course, can offer *custom* manufactured aspheric lenses in diameter sizes from 2mm to 100mm as per your technical drawing and/or written specifications provided.

Additional information

For a price quotation for *standard* or *custom* aspheric lenses, or for additional information concerning other types of lenses and glass materials offered, please contact Docter Optics GmbH.

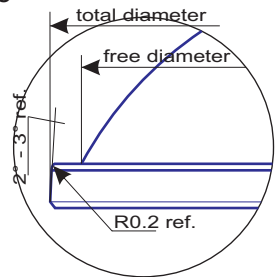
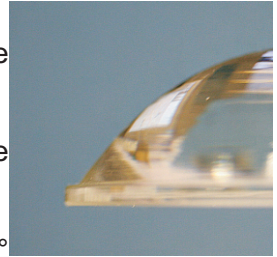
email to info@docteroptics.com or call +49 36481 27-0 or fax +49 36481 27-270

aspheres with flange

The aspheric lenses have a 2mm thick outer flange with about a 2mm radius at the asphere diameter.

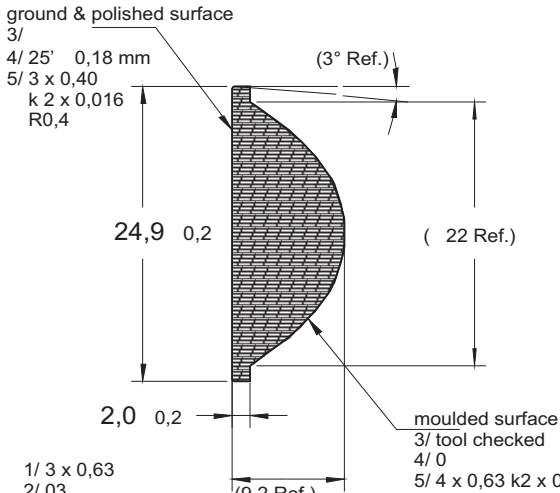
The clear aperture diameter of the lens has to be reduced accordingly.

The outer flange of the aspheric lens has about a 3° draft angle in order for the lens to release from the molding tool.



surface 1	diameter	surface 2	glass	fl mm
Asphere	24.9 mm	plan	B270	16.5 ref.
Asphere	27.0 mm	plan	B270	13 ref.
Asphere	40.0 mm	plan	B270	28.5 ref.
Asphere	50.0 mm	plan	B270	37 ref.
Asphere	52.0 mm	plan	B270	34 ref.
Asphere	67.0 mm	plan	B270	54.7 ref.
Asphere	80.0 mm	plan	B270	59.0 ref.

Asphere d24,9 plan B270

<p>ground & polished surface 3/ 4/ 25' 0,18 mm 5/ 3 x 0,40 k 2 x 0,016 R0,4</p>  <p>24,9 ± 0,2</p> <p>2,0 ± 0,2</p> <p>(3° Ref.)</p> <p>(22 Ref.)</p> <p>(9,2 Ref.)</p> <p>moulded surface 3/ tool checked 4/ 0 5/ 4 x 0,63 k2 x 0,016 R0,4</p>	<p>glass type B270</p>
	<p>ref.index 1.523</p>
	<p>chamfer 0 ... 0,4</p>
	<p>focal length (16,5 Ref.)</p> <p>bfl</p>
<p>remarks</p>	

All dimensions are in Millimeters

Notice: Specification, description and dimensional data are for information only, they are subject to correction or change without notice or incurring obligation.

Asphere d27 plan B270

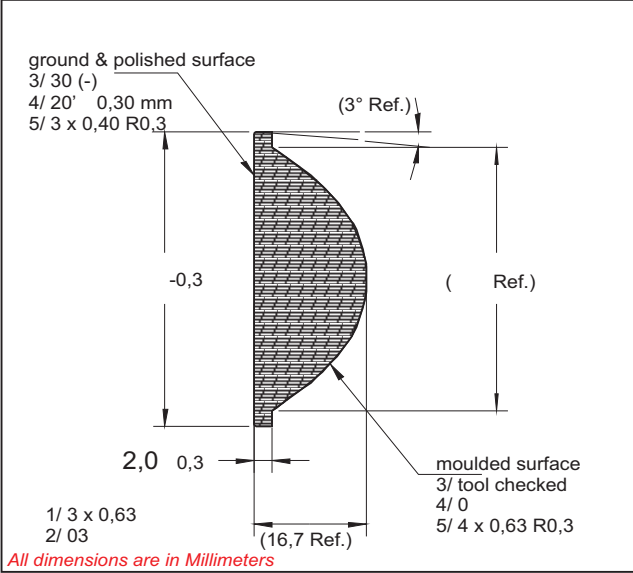
<p style="color: red; font-weight: bold;">All dimensions are in Millimeters</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 2px;"><i>glass type</i></td> <td style="padding: 2px;">B270</td> </tr> <tr> <td style="padding: 2px;"><i>ref.index</i></td> <td style="padding: 2px;">1.523</td> </tr> <tr> <td style="padding: 2px;"><i>chamfer</i></td> <td style="padding: 2px;">0 .. 0,4</td> </tr> <tr> <td style="padding: 2px;"><i>focal length</i></td> <td style="padding: 2px;">(13 Ref.)</td> </tr> <tr> <td style="padding: 2px;"><i>bfl</i></td> <td style="padding: 2px;"></td> </tr> <tr> <td colspan="2" style="padding: 2px;"><i>remarks</i></td> </tr> </table>	<i>glass type</i>	B270	<i>ref.index</i>	1.523	<i>chamfer</i>	0 .. 0,4	<i>focal length</i>	(13 Ref.)	<i>bfl</i>		<i>remarks</i>	
	<i>glass type</i>	B270											
	<i>ref.index</i>	1.523											
	<i>chamfer</i>	0 .. 0,4											
<i>focal length</i>	(13 Ref.)												
<i>bfl</i>													
<i>remarks</i>													

Asphere d40 plan B270

<p style="color: red; font-weight: bold;">All dimensions are in Millimeters</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 2px;"><i>glass type</i></td> <td style="padding: 2px;">B270</td> </tr> <tr> <td style="padding: 2px;"><i>ref.index</i></td> <td style="padding: 2px;">1.523</td> </tr> <tr> <td style="padding: 2px;"><i>chamfer</i></td> <td style="padding: 2px;">0 ... 0,5</td> </tr> <tr> <td style="padding: 2px;"><i>focal length</i></td> <td style="padding: 2px;">(28,5 Ref.)</td> </tr> <tr> <td style="padding: 2px;"><i>bfl</i></td> <td style="padding: 2px;">(18,65 Ref.)</td> </tr> <tr> <td colspan="2" style="padding: 2px;"><i>remarks</i></td> </tr> </table>	<i>glass type</i>	B270	<i>ref.index</i>	1.523	<i>chamfer</i>	0 ... 0,5	<i>focal length</i>	(28,5 Ref.)	<i>bfl</i>	(18,65 Ref.)	<i>remarks</i>	
	<i>glass type</i>	B270											
	<i>ref.index</i>	1.523											
	<i>chamfer</i>	0 ... 0,5											
<i>focal length</i>	(28,5 Ref.)												
<i>bfl</i>	(18,65 Ref.)												
<i>remarks</i>													

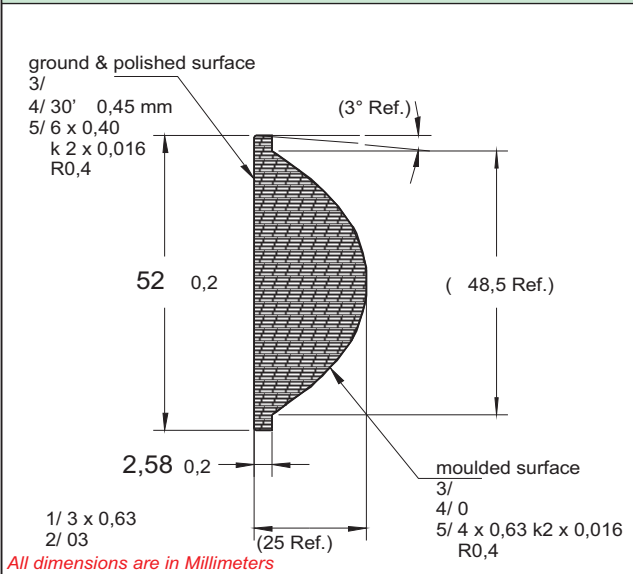
Notice: Specification, description and dimensional data are for information only, they are subject to correction or change without notice or incurring obligation.

Asphere d50 plan B270



glass type	B270
ref.index	1.523
chamfer	0 .. 0,3
focal length	(37 Ref.)
bfl	
remarks	standard hardening

Asphere d52 plan B270



glass type	B270
ref.index	1.523
chamfer	0 ... 0,5
focal length	(34,0 Ref.)
bfl	
remarks	standard hardening

Asphere d67 plan B270

glass type	B270
ref.index	1.523
chamfer	0,5 0,2
focal length	(54,7 Ref.)
bfl	
remarks	available with standard hardening and hardened

All dimensions are in Millimeters

Asphere d80 plan B270

glass type	B270
ref.index	1.523
chamfer	0,5 0,2
focal length	(59,0 Ref.)
bfl	
remarks	available with standard hardening and hardened

All dimensions are in Millimeters

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aspheres w/o flange

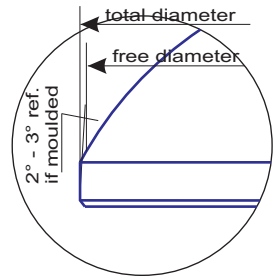
The asphere diameter of the lens directly merges into the edge diameter. Due to a small transition radius between asphere and edge diameters which is difficult to define, the clear aperture diameter of the lens has to be reduced a minimum of 1 mm.

If the edge diameter of the lens is molded, it has about a 3° draft angle, or machined (centered) there is no draft angle.

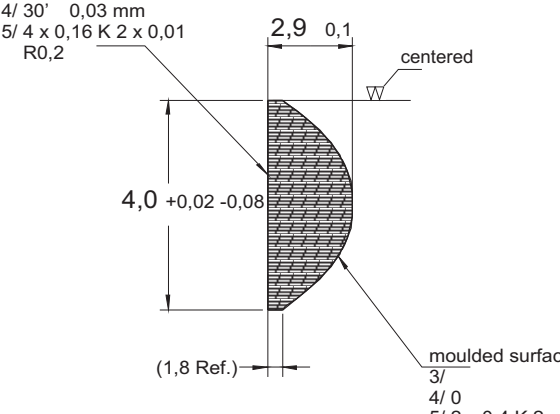


Notice: Specification, description and dimensional data are for information only, they are subject to correction or change without notice or incurring obligation.

surface 1	diameter	surface 2	glass	fl mm
Asphere	4.0 mm	plan	B270	3.94 ref.
Asphere	8.0 mm	plan	F2	7.337 ref.
Asphere	9.9 mm	plan	B270	8 ref.
Asphere	15.0 mm	plan	B270	12 ref.
Asphere	16.0 mm	plan	F2	11.1 ref.
Asphere	24.0 mm	plan	B270	18 ref.
Asphere	27.0 mm	plan	B270	43.75 ref.
Asphere	60.0 mm	plan	B270	49 ref.
Asphere	60.0 mm	plan	Boro33	49.75 ref.
Asphere	68.0 mm	plan	B270	55 ref.
Asphere	68.0 mm	plan	Boro33	49.75 ref.
Asphere	75.0 mm	plan	B270	50 ref.



Asphere d4 plan B270

<p>ground & polished surface 3/ 4/ 30' 0,03 mm 5/ 4 x 0,16 K 2 x 0,01 R0,2</p>  <p style="text-align: right;">moulded surface 3/ 4/ 0 5/ 2 x 0,4 K 2 x 0,01 R0,2</p> <p style="text-align: left;">1/ 2 x 0,4 2/ 03</p>	<i>glass type</i> B270
	<i>ref.index</i> 1.523
	<i>chamfer</i> (0,2 Ref.)
	<i>focal length</i> (3,94 Ref.)
	<i>bfl</i>
<i>remarks</i>	

All dimensions are in Millimeters

Asphere d8 plan F2

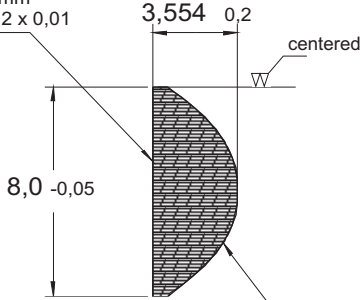
ground & polished surface

3/ 10 (2)

4/ 50° 0,10 mm

5/ 3 x 0,25 K 2 x 0,01

R0,2



moulded surface

3/

4/ 0

5/ 2 x 0,4 K 2 x 0,01

R0,2

1/ 2 x 0,4

2/ 03

All dimensions are in Millimeters

glass type F2

ref.index 1.620

chamfer (.. 0,3 Ref.)

focal length (7,337 Ref.)

bfl

remarks

Asphere d9,9 plan B270

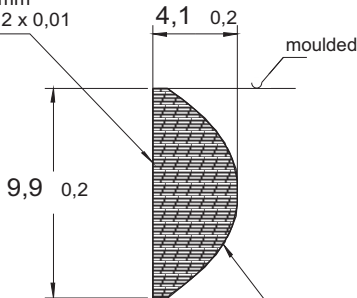
ground & polished surface

3/ 10 (-)

4/ 50° 0,14 mm

5/ 4 x 0,25 K 2 x 0,01

R0,2



moulded surface

3/

4/ 0

5/ 2 x 0,4 K 2 x 0,01

R0,2

1/ 2 x 0,4

2/ 03

All dimensions are in Millimeters

glass type B270

ref.index 1.523

chamfer (.. 0,2 Ref.)

focal length (8 Ref.)

bfl

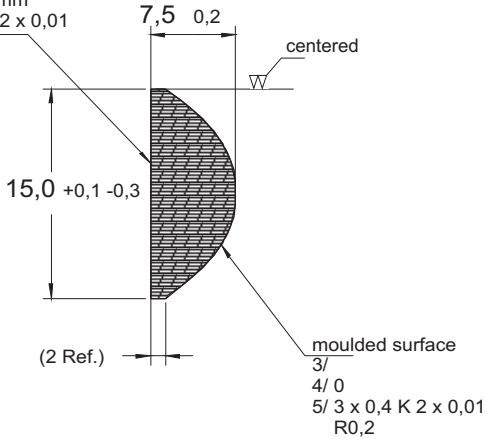
remarks

Notice: Specification, description and dimensional data are for information only, they are subject to correction or change without notice or incurring obligation.

Asphere d15 plan B270

ground & polished surface

3/
4/ 35° 0,15 mm
5/ 3 x 0,25 K 2 x 0,01
R0,2



1/ 2 x 0,4
2/ 03

All dimensions are in Millimeters

glass type B270

ref.index 1.523

chamfer (.. 0,4 Ref.)

focal length (12 Ref.)

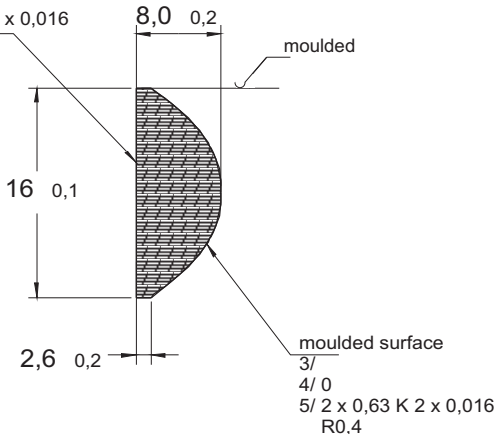
bfl

remarks

Asphere d16 plan F2

ground & polished surface

3/
4/ 30°
5/ 6 x 0,4 K 2 x 0,016
R0,4



1/ 2 x 0,4
2/ 03

All dimensions are in Millimeters

glass type F2

ref.index 1.620

chamfer (.. 0,4 Ref.)

focal length (11,1 Ref.)

bfl

remarks

Asphere d24 plan B270

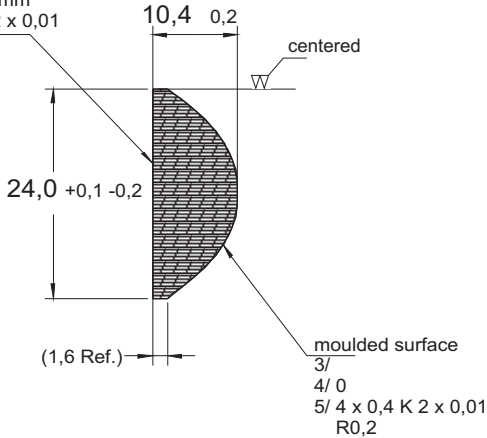
ground & polished surface

3/

4/ 30' 0,21 mm

5/ 2 x 0,4 K 2 x 0,01

R0,2



1/ 2 x 0,4

2/ 03

All dimensions are in Millimeters

glass type	B270
ref.index	1.523

chamfer	(.. 0,4 Ref.)
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focal length	(18 Ref.)
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bfl	
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remarks	
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Asphere d27 plan B270

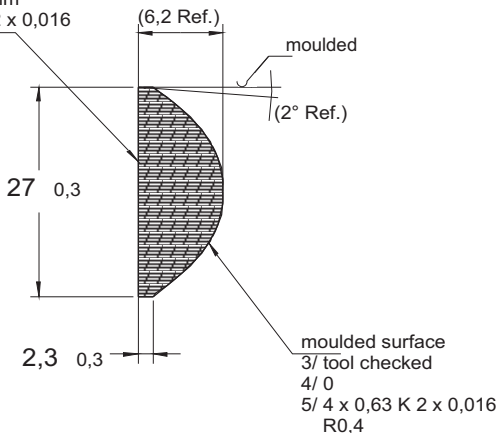
ground & polished surface

3/ 20 (10)

4/ 25' 0,2 mm

5/ 2 x 0,4 K 2 x 0,016

R0,4



1/ 2 x 0,4

2/ 03

All dimensions are in Millimeters

glass type	B270
ref.index	1.523

chamfer	(.. 0,4 Ref.)
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focal length	(43,75 Ref.)
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bfl	
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remarks	
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Asphere d60 plan B270

ground & polished surface 3/ 4/ 25' 0,43 mm 5/ 3 x 0,4 K 2 x 0,016 R0,4		glass type B270
		ref.index 1.523
		chamfer (... 0,3 Ref.)
		focal length (49 Ref.)
		bfl
		remarks
1/ 2 x 0,4 2/ 03		moulded surface 3/ 4/ 0 5/ 4 x 0,63 K 2 x 0,016 R0,4

All dimensions are in Millimeters

Asphere d60 plan Boro33

ground & polished surface 3/ 4/ 30' 5/ 2 x 0,4 K 2 x 0,016 R0,5		glass type Boro33
		ref.index 1.48
		chamfer (.. 0,8 Ref.)
		focal length (49,75 Ref.)
		bfl
		remarks
1/ 6 x 0,63 2/ 04		moulded surface 3/ 4/ 0 5/ 6 x 0,63 K 2 x 0,016 2 x 1,0 R0,5

All dimensions are in Millimeters

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Asphere d68 plan B270

ground & polished surface 3/ 4/ 30' 0,6 mm 5/ 3 x 0,4 K 2 x 0,016 R0,4		glass type B270
		ref.index 1.523
1/ 2 x 0,4 2/ 03		chamfer (... 1 Ref.)
1/ 2 x 0,4 2/ 03		focal length (55 Ref.) bfl
1/ 2 x 0,4 2/ 03		remarks

All dimensions are in Millimeters

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Asphere d68 plan Boro33

ground & polished surface 3/ 4/ 25' 5/ 2 x 0,4 K 2 x 0,016 R0,5		glass type Boro33
		ref.index 1.48
1/ 1 x 1,0 6 x 0,63 2/ 04		chamfer (.. 1 Ref.)
1/ 1 x 1,0 6 x 0,63 2/ 04		focal length (49,75 Ref.) bfl
1/ 1 x 1,0 6 x 0,63 2/ 04		remarks available with standard hardening and hardened technical glass quality only

All dimensions are in Millimeters

Asphere d75 plan B270

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<p>ground & polished surface 3/ 4/ 15' 0,22 mm 5/ 2 x 0,4 K 2 x 0,016 R0,4</p>	<p>glass type B270</p>
	<p>ref.index 1.523</p>
	<p>chamfer (... 0,7 Ref.)</p>
	<p>focal length (50 Ref.)</p>
	<p>bfl</p>
	<p>remarks</p>

75 0,5
 30 0,5
 moulded
 (2° Ref.)
 moulded surface
 3/
 4/ 0
 5/ 4 x 0,63 K 2 x 0,016
 R0,4
 (3 Ref.)
 1/ 5 x 0,63
 2/ 03
All dimensions are in Millimeters

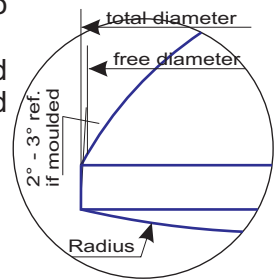
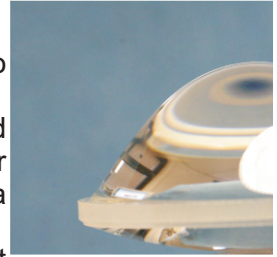
special shapes

The asphere diameter of the lens directly merges into the edge diameter.

Due to a small transition radius between asphere and edge diameters which is difficult to define, the clear aperture diameter of the lens has to be reduced a minimum of 1 mm.

If the edge diameter of the lens is molded, it has about a 3° draft angle, or machined (centered) there is no draft angle.

The spherical concave or spherical convex second surface of the lens is precision ground and polished with an 80-60 scratch and dig surface quality.



surface 1	diameter	surface 2	glass	fl mm
Asphere	9.0 mm	R11.9 mm	B270	6.78 ref.
Asphere	18.5 mm	R11.252 mm	B270	12 ref.
Asphere	20.0 mm	R80 mm	B270	18 ref.
Asphere	52.0 mm	R300 mm	B270	55 ref.
Asphere	80.0 mm	R210 mm	B270	67 ref.

Asphere d9 R11,9cx B270

ground & polished surface

3/

4/ 30°

5/ 2 x 0,63 K 2 x 0,016

R0,2

5 0,3

centered

9 0,2

R11,9

(1,4 Ref.)

moulded surface

3/

4/ 30°

5/ 2 x 0,63 K 2 x 0,016

R0,2

1/ 2 x 0,4
2/ 03

glass type **B270**

ref.index **1.523**

chamfer

focal length (6,78 Ref.)

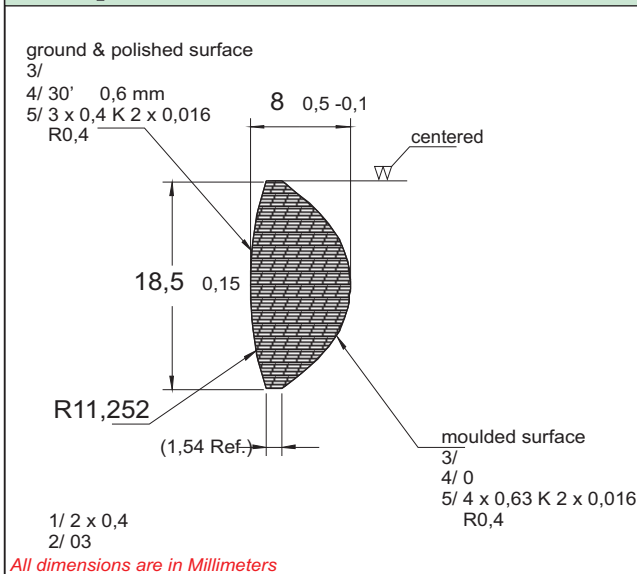
bfl (4,08 Ref.)

remarks

All dimensions are in Millimeters

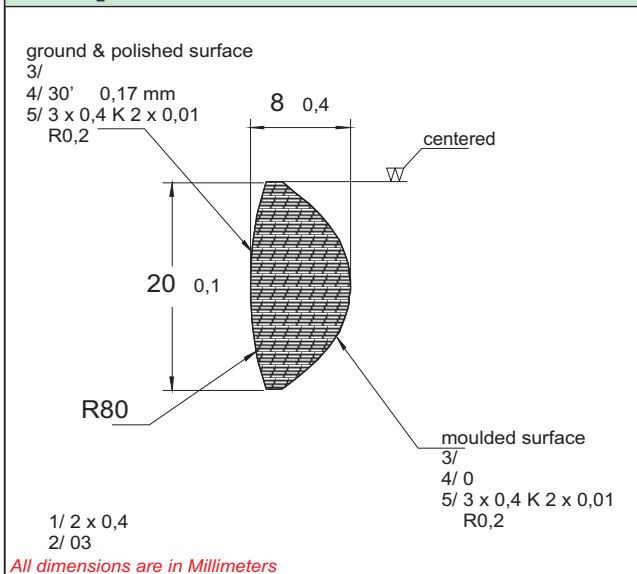
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Asphere d18,5 R11,25cx B270



<i>glass type</i>	B270
<i>ref.index</i>	1.523
<i>chamfer</i>	
<i>focal length</i>	(12 Ref.)
<i>bfl</i>	
<i>remarks</i>	

Asphere d20 R80cx B270



<i>glass type</i>	B270
<i>ref.index</i>	1.523
<i>chamfer</i>	(... 0,2 Ref.)
<i>focal length</i>	(18 Ref.)
<i>bfl</i>	
<i>remarks</i>	

Asphere d52 R300cx B270

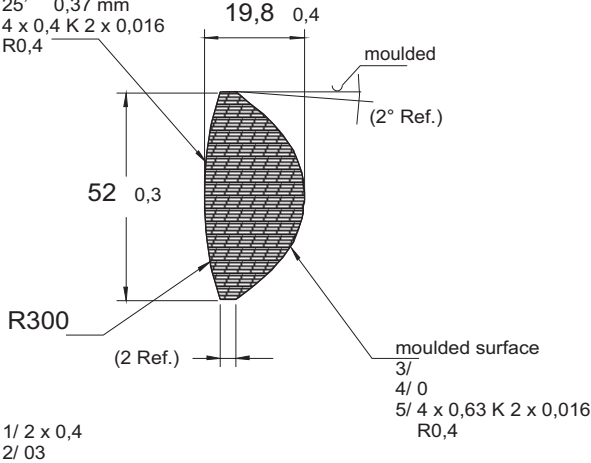
ground & polished surface

3/

4/ 25° 0,37 mm

5/ 4 x 0,4 K 2 x 0,016

R0,4



1/ 2 x 0,4
2/ 03

All dimensions are in Millimeters

glass type B270

ref.index 1.523

chamfer (... 1 Ref.)

focal length (55 Ref.)

bfl

remarks

available with
standard hardening
and
hardened

Asphere d80 R210cx B270

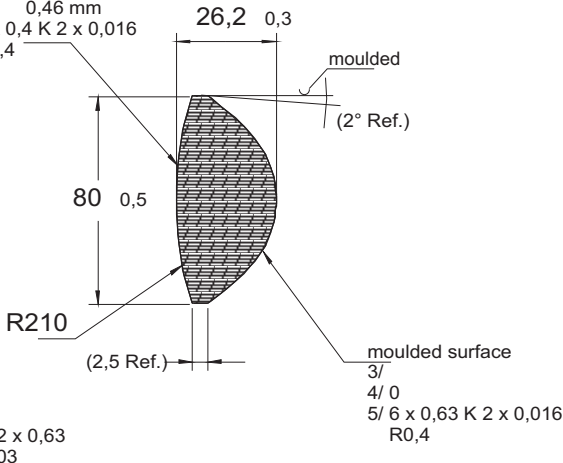
ground & polished surface

3/

4/ 20° 0,46 mm

5/ 4 x 0,4 K 2 x 0,016

R0,4



1/ 2 x 0,63
2/ 03

All dimensions are in Millimeters

glass type B270

ref.index 1.523

chamfer (0,3 ... 1 Ref.)

focal length (67 Ref.)

bfl

remarks

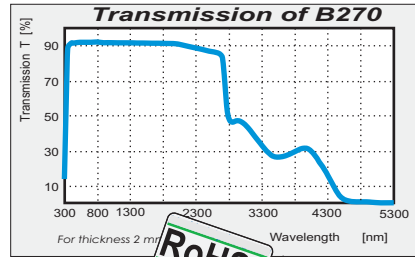
available with
standard hardening
and
hardened

Standard glass

B270 Superwhite by Schott is a high-quality optical glass with an excellent transmission in long wavelengths.

DOCTER OPTICS GMBH has specialised in manufacturing aspherical lenses, mirrors, prisms, and other optical components from this glass, using a blank moulding process. High-quality Half Ball Lenses, in extremely large quantities and at the lowest cost, are the latest development of DOCTER OPTICS GMBH. Blank moulded lenses offer the best cost-effectiveness.

Lenses made from B270 Superwhite are lead-free, mercury-free, chromium-free and cadmium-free. They fulfill RoHS and WEEE.



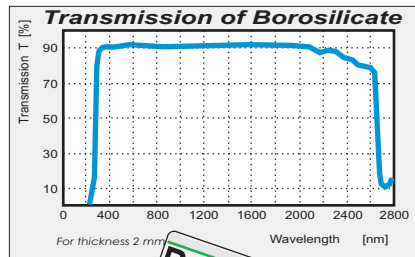
thermal expansion index (+20 .. +300 °C)	$95 \times 10^{-7} / K$
Refraction index	$n_d = 1.5230$

Borosilicate glass

Comparable, known glass types are Duran by Schott or Pyrex by Corning.

Borosilicate glass is used where a low thermal expansion index is required.

Thermal expansion index of Borosilicate glass is close the index of ceramics. The refraction index of Borosilicate glass is close to the index of plastic. They fulfill RoHS and WEEE.



thermal expansion index (+20 .. +300 °C)	$32 \times 10^{-7} / K$
Refraction index	n_d approx. 1.48

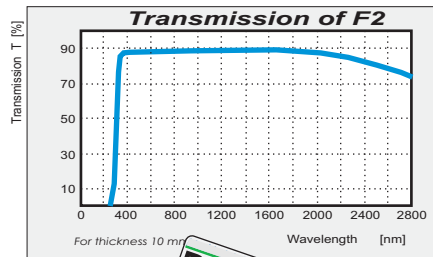
F2 glass

High-quality optical glass, by Schott, with a high refraction index.

The expansion index is a little bit better than the index of B270, but the price of F2 is much higher.

So, F2 is the best glass where a much higher refraction index than B270 is a must.

F2 fulfills RoHS and WEEE for the next years (2005/747/EC)



thermal expansion index (-30 .. +70 °C)	$82 \times 10^{-7} / K$
Refraction index	$n_d = 1.62004$

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For your information:

DOCTER OPTICS lenses made from
B270 glass
and DOCTER OPTICS lenses made from
Borosilicate glass
and DOCTER OPTICS lenses made from
F2 glass
fulfill all requirements concerning:

German “Elektro- und Elektronikgesetz (ElektroG)” §5(1)

***“Restriction on the use of certain hazardous substances in
electrical and electronic equipment (RoHS)”
2002/95/EC***

***“Waste Electrical and Electronical Equipment Directive
(WEEE)”
2002/96/EC***

***Guideline to the RoHS by the European Commission,
published in May 2005, §2.2***

**Commission Decision of 21 Oct 2005
2005/747/EC**

Please ask us for the certificate for all the lenses you are buying
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