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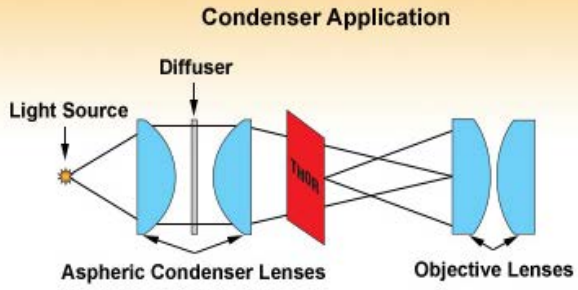
THORLABS

ACL1815, ACL1815-A, ACL1815-B - July 15, 2015

Item #s ACL1815 and ACL1815-A, ACL1815-B were discontinued on July 15, 2015. For informational purposes, this is a copy of the website content at that time and is valid only for the stated product.

- **Diameters Ranging from 10 to 75 mm**
- **Numerical Apertures Ranging from 0.488 to 0.79**
- **Substrate Transmission Range: 380 - 2100 nm**
- **Optimized For Condenser Applications**



ACL1210
Ø12 mm, f = 10.5 mm

ACL5040
Ø50 mm, f = 40 mm

ACL1815-A
Ø18 mm, f = 15 mm

ACL7560-A
Ø75 mm, f = 60 mm

ACL25416U-B
Ø25.4 mm (Ø1"), f = 16.0 mm

Hide Overview

OVERVIEW

Features

- 13 Different Diameters Available
- Available Uncoated or with One of Two AR Coatings
- Offers Higher NA (0.488 to 0.79) and Less Spherical Aberration than Spherical Lenses

Zemax Files

Click on the red Document icon next to the item numbers below to access the Zemax file download. Our entire Zemax Catalog is also available.

High-Efficiency Illumination Applications

- Light Collection
- Projection
- Detection
- Condensing

These Aspheric Condenser Lenses are ideal for high-efficiency illumination applications. Compared to spherical lenses, our aspheric condenser lenses introduce less aberration, offer larger apertures, and provide lower f/# ratios. These aspheric condenser lenses are designed for collimating light from a lamp, LED, or similar light source; for best performance in this application, the flatter side of the lens should face the source. Shorter focal lengths and a low f/# also allows these lenses to be used in close proximity to one another or other optical elements. This makes them well suited for focusing light onto a detector or light collection.

To offer more flexibility for the design of your optical system, these lenses are available in diameters ranging from 10 to 75 mm. The aspheric surface is

Common Specifications[a]	
Design Wavelength	Visible
Glass Type	B270 Optical Crown Glass
Wavelength Range	Uncoated: 380 - 2100 nm A: 350 - 700 nm B: 650 - 1050 nm
Reflectance Over AR Coating Range for Coated Optics (Avg., AOI = 0°)	<0.5%
Uncoated Transmission Graph (Click Here to Download Raw Data)	
A Coating Reflectance Graph (Click Here to Download Raw Data)	
B Coating Reflectance Graph (Click Here to Download Raw Data)	
Diameter Tolerance	+0.0 mm / -0.5 mm
Center Thickness Tolerance	±0.3 mm
Centration	<30 arcmin
Clear Aperture	>90%
Maximum Temperature	250 °C

- Please see the *Specs* tab for more specifications.

precision molded on the aspheric side and ground and polished on the plano or spherical convex side.

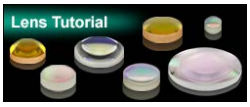
For demanding applications, we recommend our CNC-Polished, Precision Aspheres (available with N-BK7, S-LAH64, or UV Fused Silica substrates), which offer diffraction-limited performance at their design wavelength.

Antireflection-Coated Versions

These aspheric condenser lenses are available uncoated for use in the 380 - 2100 nm range, although the lens performance is optimized for visible wavelengths. They are also available with an AR coating for the 350 to 700 nm (-A Coating) or 650 to 1050 nm (-B Coating) range. The Reflectivity curve for the coated versions can be found by clicking on the graph icon in the table above.

Click to Enlarge

The light from an M530L3 530 nm LED is focused onto a ground glass diffuser by an ACL5040-A aspheric condenser lens. The beam is then roughly collimated by a second ACL5040-A lens. The square image of the LED can be seen on the surface of the diffuser. After the diffuser, the beam is uniform. Both condenser lenses are mounted in SCL04 self-centering lens mounts.



Hide Specs

SPECS

Item # Prefix	Diameter (mm)	f[a] (mm)	Focal Length Tolerance	Focal Shift (Raw Data)	f/#[ab]	Clear Aperture (mm)	f_b[a] (mm)	Numerical Aperture	t_c[a] (mm)	t_e[a] (mm)	Surface Quality	Non-Aspheric Surface	Reference Drawing
ACL108	10	8	±5%		0.8	>90%	4.2	0.547	5.8	2.0	60-40 Scratch-Dig	Plano	
ACL1210	12	10.5	±5%		0.88	>90%	6.7	0.545	5.8	2.0	60-40 Scratch-Dig	Plano	
ACL12708U	12.7	8.0	±8%		0.63	>90%	3.7	0.78	7.5	1.6	80-50 Scratch-Dig	Spherical Convex	
ACL1512	15	12	±5%		0.8	>90%	6.7	0.546	8.0	2.4	60-40 Scratch-Dig	Plano	
ACL1815	18	15	±5%		0.83	>90%	10.5	0.534	6.8	2.5	60-40 Scratch-Dig	Plano	
ACL2018	20	18	±5%		0.9	>90%	12.7	0.488	8.0	1.8	60-40 Scratch-Dig	Plano	
ACL2520	25	20	±5%		0.8	>90%	12.1	0.543	12.0	2.8	60-40 Scratch-Dig	Plano	
ACL25416U	25.4	16.0	±8%		0.63	>90%	7.3	0.79	14.0	1.2	80-50 Scratch-Dig	Spherical Convex	
ACL3026	30	26.5	±5%		0.88	>90%	19.3	0.522	11.0	3.0	60-40 Scratch-Dig	Plano	
ACL4532	45	32	±5%		0.71	>90%	20.9	0.612	18.5	2.2	60-40 Scratch-Dig	Spherical Convex	
ACL5040	50	40	±5%		0.8	>90%	26.2	0.554	21.0	2.6	60-40 Scratch-Dig	Plano	
ACL50832U	50.8	32.0	±8%		0.63	>90%	17	0.76	25.0	1.9	80-50 Scratch-Dig	Spherical Convex	
ACL7560	75	60	±5%		0.8	>90%	40.3	0.619	30.0	2.3	60-40 Scratch-Dig	Plano	

- See the reference drawing for symbol definition.
- Approximate f/# for the lens obtained by dividing the focal length of the lens by its diameter. Note that this will be an underestimate of the true f/# since the condenser lens cannot be used over its entire diameter.

Aspheric Lens Design Equation

$$z = \frac{y^2}{R\left(1+\sqrt{1-(1+k)y^2/R^2}\right)} + A_2y^2 + A_4y^4 + A_6y^6 + A_8y^8 + A_{10}y^{10} + A_{12}y^{12}$$

Item # Prefix[a]	ACL108	ACL1210	ACL12708U	ACL1512	ACL1815	ACL2018	ACL2520	ACL25416U	ACL3026	ACL4532	ACL5040	ACL50832U	ACL7560
R (mm)	4.18464	5.49234	4.753124	6.27696	7.904980028	9.41544	10.4616	8.818197	13.8595	18.280674	20.923201	18.32253	31.384801

k	-0.602689	-0.623014	-1.205071	-0.613902	-0.67576240	-0.639158	-0.626528	-0.9991715	-1.0	-1.0	-0.640512	-0.7980728	-1.911446
A_2	0	0	0	0	0	0	0	0	7.9E-6	0	0	0	0
A_4	2.21E-4	8.7E-5	5.3324183E-4	6.8E-5	-2.0269E-4	1.7E-5	1.5E-5	8.6821674E-5	1.5E-7	2.0E-6	2.0E-6	3.4036234E-6	5.0E-6
A_6	0	0	1.1162887E-5	0	0	0	0	6.3760123E-8	1.3E-9	0	0	6.8362712E-9	0
A_8	0	0	-3.7455666E-7	0	0	0	0	2.4073084E-9	0	0	0	-1.9656086E-11	0
A_{10}	0	0	-7.6342017E-9	0	0	0	0	-1.7189021E-11	0	0	0	0	0
A_{12}	0	0	1.36022E-10	0	0	0	0	0	0	0	0	0	0
S2[b] Radius (mm)	Plano	Plano	-15.6494	Plano	Plano	Plano	Plano	-69.99948	Plano	-130	Plano	-99.63679	Plano

- Values are approximate.
- S2 is the non-aspheric side of the lens.

Hide Aspheric Condenser Lenses, Uncoated

Aspheric Condenser Lenses, Uncoated

Part Number	Description	Price	Availability
ACL108	**Aspheric Condenser Lens, Ø10 mm, f=8 mm, NA=0.547, Uncoated**	**$17.30**	**Today**
ACL1210	**Aspheric Condenser Lens, Ø12 mm, f=10.5 mm, NA=0.545, Uncoated**	**$17.30**	**Today**
ACL12708U	**Aspheric Condenser Lens, Ø1/2", f=8 mm, NA=0.78, Uncoated**	**$16.50**	**Today**
ACL1512	**Aspheric Condenser Lens, Ø15 mm, f=12 mm, NA=0.546, Uncoated**	**$16.20**	**Today**
ACL1815	**Aspheric Condenser Lens, Ø18 mm, f=15 mm, NA=0.534, Uncoated**	**$16.20**	**Today**
ACL2018	**Aspheric Condenser Lens, Ø20 mm, f=18 mm, NA=0.488, Uncoated**	**$16.20**	**Today**
ACL2520	**Aspheric Condenser Lens, Ø25 mm, f=20 mm, NA=0.543, Uncoated**	**$17.70**	**Today**
ACL25416U	**Aspheric Condenser Lens, Ø1", f=16 mm, NA=0.79, Uncoated**	**$16.90**	**Today**
ACL3026	**Aspheric Condenser Lens, Ø30 mm, f=26.5 mm, NA=0.522, Uncoated**	**$21.60**	**Today**
ACL4532	**Aspheric Condenser Lens, Ø45 mm, f=32 mm, NA=0.612, Uncoated**	**$43.30**	**Today**
ACL5040	**Aspheric Condenser Lens, Ø50 mm, f=40 mm, NA=0.554, Uncoated**	**$43.30**	**Today**
ACL50832U	**Aspheric Condenser Lens, Ø2", f=32 mm, NA=0.76, Uncoated**	**$41.20**	**Today**
ACL7560	**Aspheric Condenser Lens, Ø75 mm, f=60 mm, NA=0.619, Uncoated**	**$54.10**	**Today**

Hide Aspheric Condenser Lenses, AR-Coated: 350 - 700 nm

Aspheric Condenser Lenses, AR-Coated: 350 - 700 nm

Part Number	Description	Price	Availability
ACL108-A	**Aspheric Condenser Lens, Ø10 mm, f=8 mm, NA=0.547, ARC: 350-700 nm**	**$27.30**	**Today**
ACL1210-A	**Aspheric Condenser Lens, Ø12 mm, f=10.5 mm, NA=0.545, ARC: 350-700 nm**	**$27.30**	**Today**
ACL12708U-A	**Aspheric Condenser Lens, Ø1/2", f=8 mm, NA=0.78, ARC: 350-700 nm**	**$26.00**	**Today**
ACL1512-A	**Aspheric Condenser Lens, Ø15 mm, f=12 mm, NA=0.546, ARC: 350-700 nm**	**$26.20**	**Today**
ACL1815-A	**Aspheric Condenser Lens, Ø18 mm, f=15 mm, NA=0.534, ARC: 350-700 nm**	**$26.20**	**Today**
ACL2018-A	**Aspheric Condenser Lens, Ø20 mm, f=18 mm, NA=0.488, ARC: 350-700 nm**	**$26.20**	**Today**
ACL2520-A	**Aspheric Condenser Lens, Ø25 mm, f=20 mm, NA=0.543, ARC: 350-700 nm**	**$27.70**	**Today**
ACL25416U-A	**Aspheric Condenser Lens, Ø1", f=16 mm, NA=0.79, ARC: 350-700 nm**	**$26.40**	**Lead Time**
ACL3026-A	**Aspheric Condenser Lens, Ø30 mm, f=26.5 mm, NA=0.522, ARC: 350-700 nm**	**$31.60**	**Today**
ACL4532-A	**Aspheric Condenser Lens, Ø45 mm, f=32 mm, NA=0.612, ARC: 350-700 nm**	**$53.20**	**Today**
ACL5040-A	**Aspheric Condenser Lens, Ø50 mm, f=40 mm, NA=0.554, ARC: 350-700 nm**	**$53.20**	**Today**
ACL50832U-A	**Aspheric Condenser Lens, Ø2", f=32 mm, NA=0.76, ARC: 350-700 nm**	**$50.70**	**Today**

ACL7560-A	Aspheric Condenser Lens, Ø75 mm, f=60 mm, NA=0.619, ARC: 350-700 nm	$64.00	Today

Hide Aspheric Condenser Lenses, AR-Coated: 650 - 1050 nm

Aspheric Condenser Lenses, AR-Coated: 650 - 1050 nm

Part Number	Description	Price	Availability
ACL108-B	Aspheric Condenser Lens, Ø10 mm, f=8 mm, NA=0.547, ARC: 650-1050 nm	$27.30	Today
ACL1210-B	Aspheric Condenser Lens, Ø12 mm, f=10.5 mm, NA=0.545, ARC: 650-1050 nm	$27.30	Today
ACL12708U-B	Aspheric Condenser Lens, Ø1/2", f=8 mm, NA=0.78, ARC: 650-1050 nm	$26.00	Today
ACL1512-B	Aspheric Condenser Lens, Ø15 mm, f=12 mm, NA=0.546, ARC: 650-1050 nm	$26.20	3-5 Days
ACL1815-B	Aspheric Condenser Lens, Ø18 mm, f=15 mm, NA=0.534, ARC: 650-1050 nm	$26.20	Today
ACL2018-B	Aspheric Condenser Lens, Ø20 mm, f=18 mm, NA=0.488, ARC: 650-1050 nm	$26.20	3-5 Days
ACL2520-B	Aspheric Condenser Lens, Ø25 mm, f=20 mm, NA=0.543, ARC: 650-1050 nm	$27.70	Today
ACL25416U-B	Aspheric Condenser Lens, Ø1", f=16 mm, NA=0.79, ARC: 650-1050 nm	$26.40	Today
ACL3026-B	Aspheric Condenser Lens, Ø30 mm, f=26.5 mm, NA=0.522, ARC: 650-1050 nm	$31.60	Today
ACL4532-B	Aspheric Condenser Lens, Ø45 mm, f=32 mm, NA=0.612, ARC: 650-1050 nm	$53.20	Today
ACL5040-B	Aspheric Condenser Lens, Ø50 mm, f=40 mm, NA=0.554, ARC: 650-1050 nm	$53.20	Today
ACL50832U-B	Aspheric Condenser Lens, Ø2", f=32 mm, NA=0.76, ARC: 650-1050 nm	$50.70	Today
ACL7560-B	Aspheric Condenser Lens, Ø75 mm, f=60 mm, NA=0.619, ARC: 650-1050 nm	$64.00	Today