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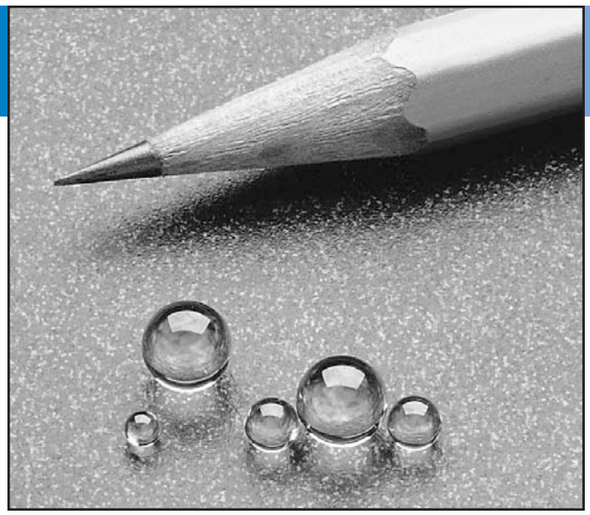
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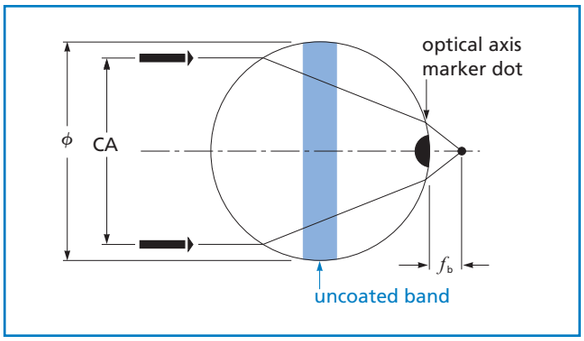
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Ball Lenses for Diode Lasers

CVI Melles Griot spherical ball lenses are ideal for fiber-to-fiber and diode laser-to-fiber coupling. They are easier to align than thin lenses and have greater coupling efficiency.

- f-number values have been calculated for all spheres.
- A black dot, which indicates the optical axis, can be removed with acetone and a cotton swab.
- Spherical ball lenses are available uncoated or with an antireflection coating.
- Ball lenses are available in four standard diameters: 1 mm, 2 mm, 3 mm, and 5 mm.



Spherical ball lens

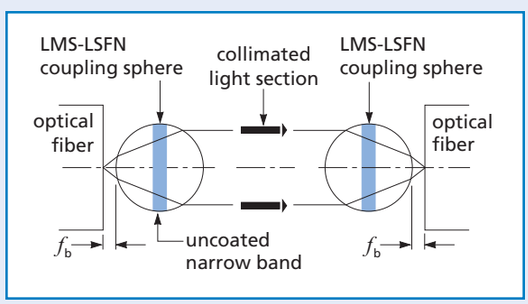
SPECIFICATIONS: Ball Lenses for Diode Lasers

Wavelength Range	600–1550 nm
Design Wavelength	830 nm
Optical Material	Schott N-LaSF9
Refractive Index	n_{633}=1.84489, n_{830}=1.83098, n_{1300}=1.81764, n_{1550}=1.81330
Clear Aperture (CA)	80% of diameter
Reflectance	<0.25% at specified wavelength for coated versions
Diameter	$\phi \pm 1$ μm
Sphericity	<λ/4 at 632.8 nm

APPLICATION NOTE

Spherical Ball Lenses for Fiber Coupling

Spheres are arranged so that the fiber end is located at the focal point. The output from the first sphere is then collimated. If two spheres are aligned axially to each other, the beam will be transferred from one focal point to the other. Translational alignment sensitivity can be reduced by enlarging the beam. Slight negative defocusing of the ball can reduce the spherical aberration third-order contribution common to all coupling systems. Additional information can be found in "Lens Coupling in Fiber Optic Devices: Efficiency Limits," by A. Nicia, *Applied Optics*, vol. 20, no. 18, pp 3136–45. Off-axis aberrations are absent since the fiber diameters are so much smaller than the coupler focal length.



Fiber coupling using spheres. Lateral positioning sensitivity is greatly reduced with this method.

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Ball Lenses for Diode Lasers

ϕ (mm)	f_λ (mm)	f_b (mm)	f/#	CA	PART NUMBER FORMER‡	PART NUMBER REPLACED BY
Uncoated						
1.0	0.55	0.05	0.69	0.8	06 LMS 001	LMS-1.0-0.55-LSFN
2.0	1.10	0.10	0.69	1.6	06 LMS 002	LMS-2.0-1.10-LSFN
3.0	1.65	0.15	0.69	2.4	06 LMS 003	LMS-3.0-1.65-LSFN
5.0	2.75	0.25	0.69	4.0	06 LMS 005	LMS-5.0-2.75-LSFN
Antireflection coated for λ = 633 nm						
1.0	0.55	0.05	0.69	0.8	06 LMS 101	LMS-1.0-0.55-LSFN-633
2.0	1.09	0.09	0.68	1.6	06 LMS 102	LMS-2.0-1.09-LSFN-633
3.0	1.64	0.14	0.68	2.4	06 LMS 103	LMS-3.0-1.64-LSFN-633
5.0	2.73	0.23	0.68	4.0	06 LMS 105	LMS-5.0-2.73-LSFN-633
Antireflection coated for λ = 830 nm						
1.0	0.55	0.05	0.69	0.8	06 LMS 201	LMS-1.0-0.55-LSFN-830
2.0	1.10	0.10	0.69	1.6	06 LMS 202	LMS-2.0-1.10-LSFN-830
3.0	1.65	0.15	0.69	2.4	06 LMS 203	LMS-3.0-1.65-LSFN-830
5.0	2.75	0.25	0.69	4.0	06 LMS 205	LMS-5.0-2.75-LSFN-830
Antireflection coated for λ = 1300 nm						
1.0	0.56	0.06	0.69	0.8	06 LMS 301	LMS-1.0-0.56-LSFN-1300
2.0	1.11	0.11	0.69	1.6	06 LMS 302	LMS-2.0-1.11-LSFN-1300
5.0	2.75	0.25	0.69	4.0	06 LMS 305	LMS-5.0-2.75-LSFN-1300
Antireflection coated for λ = 1550 nm						
1.0	0.56	0.06	0.69	0.8	06 LMS 401	LMS-1.0-0.56-LSFN-1550
2.0	1.11	0.11	0.70	1.6	06 LMS 402	LMS-2.0-1.11-LSFN-1550
3.0	1.67	0.17	0.70	2.4	06 LMS 403	LMS-3.0-1.67-LSFN-1550

‡ Former Melles Griot part number is replaced by new CVI Melles Griot part number

Do you need . . .

BALL LENS HOLDERS

CVI Melles Griot spherical ball lens holders are part of the MicroLab™ optical component cell and holder system.

Ball Diameter	PART NUMBER
2 mm	07 HCS 505
3 mm	07 HCS 507
5 mm	07 HCS 509



The 07 TPE 001 two-axis positioner can be used with these holders to obtain precise alignment.

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