

# Micro Spheres | MS

RoHS

Micro Spheres are mostly used for coupling optical fibers to laser diodes and other fibers or detectors.

- Since these ball lenses are much smaller they are suitable for applications requiring reduction in size and weight. The lens circumference are completely polished and should be handled carefully to avoid damage
- Both AR coated and uncoated are available. Single layer  $MgF_2$  is available in 3 variations of bandwidths 400 – 700nm, 700 – 900nm and 1300 – 1550nm.
- Design wavelength of the focal lengths is 587.6nm (yellow helium line [d])



## Specifications

Material	LaSF9
Coating	Uncoated: MS-P Anti-reflection coating: MS-P1, -P2, -P3
Clear aperture	80% of actual aperture
Surface Quality (Scratch-Dig)	40-20

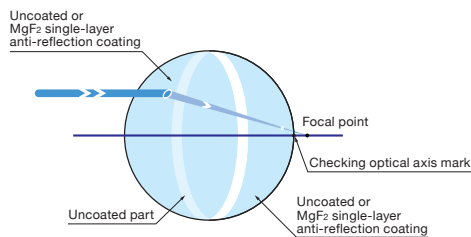
## Guide

- ▶ Please contact our Sales Division for micro lenses with AR coatings.
- ▶ Contact our Sales Division for customized products. (customized on outer diameter, etc.)

## Attention

- ▶ Small ball lenses with anti-reflective coating are marked at its optical axis to identify the direction of coating. After installation of a small spherical lens, clean the ball lens by wiping with alcohol and check marks on the optical axis.
- ▶ Small ball lenses have a short focal length, so it is possible to focus the beam at a very large angle. However, since spherical aberration is large, the focused spot size will not be small.

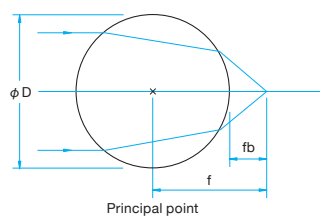
## Schematic



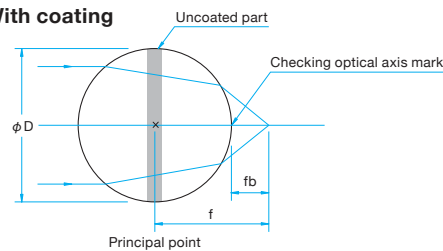
## Outline Drawing

(in mm)

### Uncoated



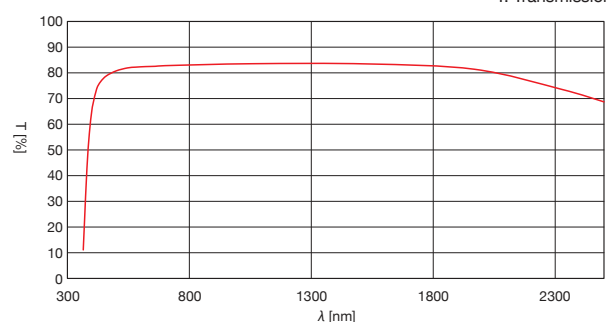
### With coating



- Tolerance Diameter  $\phi D \pm 0.001$

## LaSF9 (Uncoated) Typical Transmittance Data

T: Transmission



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Uncoated				
Part Number	Wavelength Range [nm]	Diameter $\phi$ D [mm]	f (588nm) [mm]	fb (588nm) [mm]
MS-01-0.54P	400 – 2000	$\phi$ 1	0.54	0.04
MS-02-1.1P	400 – 2000	$\phi$ 2	1.09	0.09
MS-03-1.7P	400 – 2000	$\phi$ 3	1.63	0.13
MS-05-2.8P	400 – 2000	$\phi$ 5	2.72	0.22
MS-08-4.35P	400 – 2000	$\phi$ 8	4.35	0.35

632.8nm with AR coating				
Part Number	Wavelength Range [nm]	Diameter $\phi$ D [mm]	f (633nm) [mm]	fb (633nm) [mm]
MS-01-0.54P1	400 – 700	$\phi$ 1	0.55	0.05
MS-02-1.1P1	400 – 700	$\phi$ 2	1.09	0.09
MS-03-1.7P1	400 – 700	$\phi$ 3	1.64	0.14
MS-05-2.8P1	400 – 700	$\phi$ 5	2.73	0.23
MS-08-4.35P1	400 – 700	$\phi$ 8	4.37	0.37

830nm with AR coating				
Part Number	Wavelength Range [nm]	Diameter $\phi$ D [mm]	f (830nm) [mm]	fb (830nm) [mm]
MS-01-0.54P2	700 – 900	$\phi$ 1	0.55	0.05
MS-02-1.1P2	700 – 900	$\phi$ 2	1.10	0.10
MS-03-1.7P2	700 – 900	$\phi$ 3	1.65	0.15
MS-05-2.8P2	700 – 900	$\phi$ 5	2.75	0.25
MS-08-4.35P2	700 – 900	$\phi$ 8	4.41	0.41

1300nm with AR coating				
Part Number	Wavelength Range [nm]	Diameter $\phi$ D [mm]	f (1300nm) [mm]	fb (1300nm) [mm]
MS-01-0.54P3	1300 – 1550	$\phi$ 1	0.56	0.06
MS-02-1.1P3	1300 – 1550	$\phi$ 2	1.11	0.11
MS-03-1.7P3	1300 – 1550	$\phi$ 3	1.67	0.17
MS-05-2.8P3	1300 – 1550	$\phi$ 5	2.78	0.28
MS-08-4.35P3	1300 – 1550	$\phi$ 8	4.45	0.45

Table of Focal Length Shifts According to Wavelength

Wavelength Range [nm]	LaSF9 Refractive index	Diameter $\phi$ D [mm]									
		$\phi$ 1		$\phi$ 2		$\phi$ 3		$\phi$ 5		$\phi$ 8	
		Focal length f [mm]	Back focal length fb [mm]	Focal length f [mm]	Back focal length fb [mm]	Focal length f [mm]	Back focal length fb [mm]	Focal length f [mm]	Back focal length fb [mm]	Focal length f [mm]	Back focal length fb [mm]
404.7	1.8984	0.53	0.03	1.06	0.06	1.58	0.08	2.64	0.14	4.23	0.23
435.8	1.8847	0.53	0.03	1.07	0.07	1.60	0.10	2.66	0.16	4.26	0.26
480	1.8706	0.54	0.04	1.07	0.07	1.61	0.11	2.69	0.19	4.30	0.30
546.1	1.8565	0.54	0.04	1.08	0.08	1.63	0.13	2.71	0.21	4.34	0.34
587.6	1.8503	0.54	0.04	1.09	0.09	1.63	0.13	2.72	0.22	4.35	0.35
632.8	1.8449	0.55	0.05	1.09	0.09	1.64	0.14	2.73	0.23	4.37	0.37
706.5	1.8383	0.55	0.05	1.10	0.10	1.64	0.14	2.74	0.24	4.39	0.39
830	1.8310	0.55	0.05	1.10	0.10	1.65	0.15	2.75	0.25	4.41	0.41
852.1	1.8300	0.55	0.05	1.10	0.10	1.65	0.15	2.76	0.26	4.41	0.41
1060	1.8229	0.55	0.05	1.11	0.11	1.66	0.16	2.77	0.27	4.43	0.43
1300	1.8176	0.56	0.06	1.11	0.11	1.67	0.17	2.78	0.28	4.45	0.45
1529.6	1.8136	0.56	0.06	1.11	0.11	1.67	0.17	2.79	0.29	4.46	0.46

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