

# Optics

Optical Systems

Free Space Isolators

E-O Devices

Spherical Singlets

Multi-Element Lenses

Cylindrical Lenses

Aspheric Lenses

Mirrors

Diffusers & Lens Arrays

Windows

Prisms

Gratings

Polarization Optics

Beamsplitters

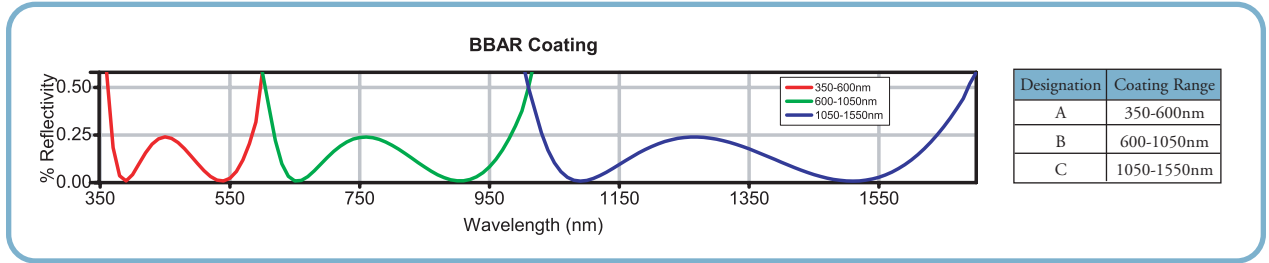
Filters & Attenuators

Gas Cells

## Molded Aspheric Lenses by Rochester Precision

MOUNTED ITEM#	UNMOUNTED ITEM#	PAGE	EFFECTIVE FOCAL LENGTH (mm)	OUTER DIAMETER (mm)	NA	WORKING DISTANCE (mm)	CLEAR APERTURE (mm)
A414TM	A414	745	3.30	4.5	0.47	1.94	3.52
A230TM	A230	749	4.51	6.33	0.54	2.91	4.95
A390TM	A390	750	4.60	6.0	0.53	2.89	4.89
A110TM	A110	752	6.24	7.2	0.42	3.39	5.0
A375TM	A375	753	7.50	6.5	0.30	5.90	4.50
A240TM	A240	754	8.00	9.94	0.50	5.92	8.00
A220TM	A220	754	11.00	7.2	0.26	7.97	5.50
A397TM	A397	755	11.00	7.2	0.30	9.64	6.59

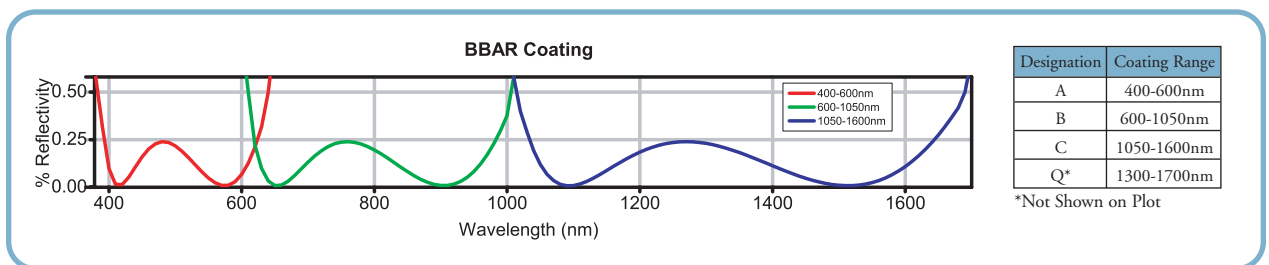
## Rochester Precision AR Coatings



## Geltech™ Molded Aspheric Lenses, Manufactured by LightPath® Technologies

MOUNTED ITEM#	UNMOUNTED ITEM#	PAGE	EFFECTIVE FOCAL LENGTH (mm)	OUTER DIAMETER (mm)	NA	WORKING DISTANCE (mm)	CLEAR APERTURE (mm)
C200TM	350200	740	1.14	2.4	0.43	1.16/4.93	1.13
C140TM	350140	740	1.45	2.4	0.55	0.88	1.6
C710TM	350710	741	1.49	2.65	0.50	1.1	1.5
C890TM	370890-Q	741	1.8	1.85	0.30	1.1	1.08
C150TM	350150	742	2.0	3.0	0.50	1.09	2.0
C390TM	350390	742	2.75	4.0	0.68	1.56	3.6
C570TM	350570	743	2.84	5.4	0.67	1.56	4
C440TME	352440	743	2.95	4.7	0.53	2.66/6.91	4.2
C660TM	350660	744	2.97	4.0	0.60	1.56	3.6
C330TME	352330	744	3.1	6.33	0.68	1.76	5.0
C610TM	350610	745	4.0	6.33	0.60	1.73	4.8
C940TM	370940-Q	746	4.0	1.825	0.17	3.36	1.37
C671TME	352671	747	4.02	6.325	0.60	2.39	4.8
C340TM	350340	747	4.03	6.33	0.62	1.76	5.0
C350TME	352350	748	4.5	4.7	0.42	2.38	3.7
C230TME	352230	748	4.51	6.33	0.55	2.91	4.95
C430TM	350430	750	5.0	2.0	0.15	4.36	1.5
C170TME	352170	751	6.16	4.7	0.30	4.37	3.7
C110TME	352110	752	6.24	7.2	0.40	3.39	5.0
C240TM	350240	753	8.0	9.94	0.50	5.92	8.0
C220TME	352220	755	11.0	7.2	0.25	7.96	5.5
C560TM	350560	756	13.86	6.33	0.18	11.99	5.10
C260TME	352260	756	15.29	6.5	0.16	14.00	5.0
C280TME	352280	757	18.4	6.5	0.15	17.10	5.5

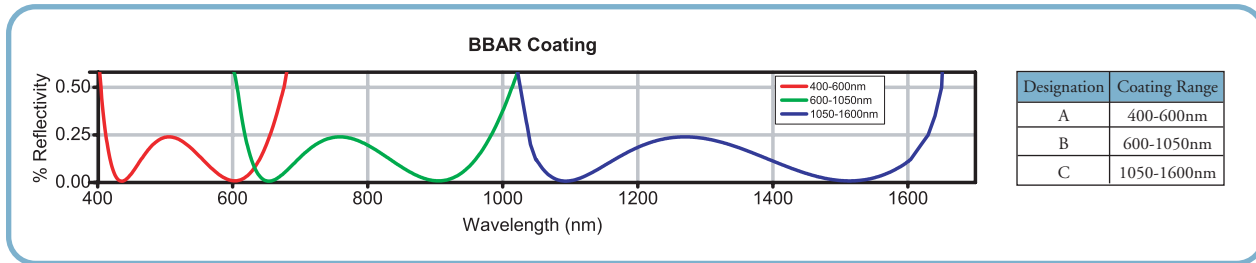
## LightPath® AR Coatings



Large Diameter Precision Ground Aspheric Lenses by Asphericon

UNMOUNTED ITEM#	PAGE	EFFECTIVE FOCAL LENGTH (mm)	OUTER DIAMETER (mm)	NA	WORKING DISTANCE (mm)	CLEAR APERTURE (mm)
AL108	760	8.0	10	0.547	6.00	9.00
AL1210	760	10.0	12	0.545	7.61	11.25
AL1512	761	12.0	15	0.546	8.96	13.50
AL1815	761	15.0	18	0.534	11.41	16.50
AL2018	762	18	20	0.488	13.84	18.0
AL2520	762	20	25	0.543	15.70	22.5
AL3026	762	26	30	0.522	20.54	28.0
AL4532	763	32	45	0.612	24.12	41.0
AL5040	763	40	50	0.554	31.42	46.0
AL7560	764	60	75	0.619	36.60	69.0
AL100100	764	100	100	0.478	76.27	92.0

Asphericon AR Coatings



Plastic Aspheric Lenses by Philips

UNMOUNTED ITEM#	PAGE	EFFECTIVE FOCAL LENGTH (mm)	OUTER DIAMETER (mm)	NA	WORKING DISTANCE (mm)	CLEAR APERTURE (mm)
CAY033	766	3.30	7.4	0.40	1.98	2.7
CAY046	766	4.60	7.4	0.40	2.28	3.7
CAX100	767	10.0	6.3	0.20	8.33	4.1
CSX122	767	12.1	6.3	0.12	10.35	3.8
CAX183	767	18.33	6.3	0.12	16.48	4.3

GRIN Lenses

UNMOUNTED ITEM#	PAGE	EFFECTIVE FOCAL LENGTH (mm)	NA	PITCH	WORKING DISTANCE (mm)
GRIN2313A	768	1.94	0.46	0.23	0.24
GRIN2315A	768	1.94	0.46	0.23	0.24
GRIN2913	768	1.98	0.46	0.29	0.49
GRIN2915	768	1.99	0.46	0.29	0.50

Aspheric Lens Equation

Lens Design Formula

- Positive Radius Indicates That the Vertex is Located to the Left of the Center of Curvature
- Negative Radius Indicates That the Vertex is Located to the Right of the Center of the Curvature

Variable Definitions	
z	SAG as a Function of Y
R	Radius of Curvature
k	Conic Constant
A <sub>4</sub>	4th Order Aspheric Coefficient
A <sub>6</sub>	6th Order Aspheric Coefficient
A <sub>8</sub>	8th Order Aspheric Coefficient
A <sub>10</sub>	10th Order Aspheric Coefficient
A <sub>12</sub>	12th Order Aspheric Coefficient

$$z = \frac{Y^2}{R \left( 1 + \sqrt{1 - (1 + k) Y^2 / R^2} \right)} + A_4 Y^4 + A_6 Y^6 + A_8 Y^8 + A_{10} Y^{10} + A_{12} Y^{12}$$

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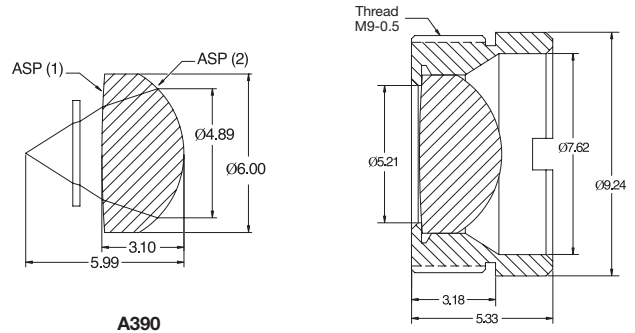
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### A390 f = 4.6mm and 0.53 NA

All Dimensions Are in Millimeters



**A390**  
Unmounted Lens

**A390TM**  
Mounted Lens

#### Rochester Precision Molded Glass Aspheric Lens

Optical Design Specifications

- **Design Wavelength:** 655nm
- **Numerical Aperture:** 0.53
- **Clear Aperture:** 4.89mm
- **Effective Focal Length:** 4.6mm
- **Magnification:** Infinite
- **Laser Window Thickness:** 0.275mm
- **Laser Window Material/Index:** BK7/1.51
- **RMS WFE (Axial @ 632.8nm)<sup>1</sup>:** <Diffraction Limit
- **Scratch-Dig:** 60-40
- **Glass (CDGM):** H-LAK54

<sup>1</sup> Averaged over full aperture

#### Aspheric Coefficients

	R	k	A <sub>4</sub>	A <sub>6</sub>	A <sub>8</sub>	A <sub>10</sub>
ASP (2)	3.50	-0.3366	-8.4900000E-04	-4.7770000E-05	-4.9590000E-06	3.3740000E-09
ASP (1)	-42.19	-	-	-	-	-

#### Unmounted AR Coated Aspheric Lenses

ITEM #	\$	£	€	RMB	DESCRIPTION
A390-A	\$ 81.55	£ 51.40	€ 75.80	¥ 778.80	Lens, AR Coated 350-600nm
A390-B	\$ 81.55	£ 51.40	€ 75.80	¥ 778.80	Lens, AR Coated 600-1050nm
A390-C	\$ 81.55	£ 51.40	€ 75.80	¥ 778.80	Lens, AR Coated 1050-1550nm

#### Mounted AR Coated Aspheric Lenses

ITEM #	\$	£	€	RMB	DESCRIPTION
A390TM-A	\$ 87.60	£ 55.20	€ 81.50	¥ 836.60	Mounted Lens, AR Coated 350-600nm
A390TM-B	\$ 87.60	£ 55.20	€ 81.50	¥ 836.60	Mounted Lens, AR Coated 600-1050nm
A390TM-C	\$ 87.60	£ 55.20	€ 81.50	¥ 836.60	Mounted Lens, AR Coated 1050-1550nm

### 350430 f = 5mm and 0.15 NA

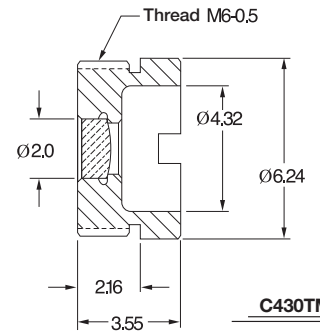
#### Geltech™ Molded Glass Aspheric Lens

Optical Design Specifications

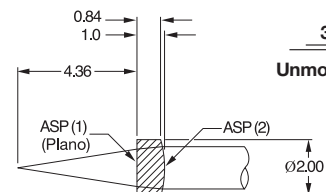
- **Design Wavelength:** 1550nm
- **Numerical Aperture:** 0.15
- **Diffraction Limited Range:** 350-1550nm
- **Clear Aperture:** 1.50mm
- **Effective Focal Length:** 5.0mm
- **Magnification:** Infinite
- **RMS WFE (Axial @ 632.8nm)<sup>1</sup>:** ≤<Diffraction Limit
- **Scratch-Dig:** 40-20
- **Glass (Corning):** C0550

<sup>1</sup> Averaged over full aperture

Geltech™ lenses are manufactured by LightPath® Technologies



**C430TM**  
Mounted Lens



**350430**  
Unmounted Lens

All Dimensions Are in Millimeters

#### Aspheric Coefficients

	R	k	A <sub>4</sub>	A <sub>6</sub>	A <sub>8</sub>	A <sub>10</sub>
ASP (2)	2.93	-0.5812332	-	-	-	-

#### Unmounted AR Coated Aspheric Lenses

ITEM #	\$	£	€	RMB	DESCRIPTION
350430-A	\$ 69.00	£ 43.50	€ 64.20	¥ 659.00	Lens, AR Coated 400-600nm
350430-B	\$ 69.00	£ 43.50	€ 64.20	¥ 659.00	Lens, AR Coated 600-1050nm
350430-C	\$ 69.00	£ 43.50	€ 64.20	¥ 659.00	Lens, AR Coated 1050-1600nm

#### Mounted AR Coated Aspheric Lenses

ITEM #	\$	£	€	RMB	DESCRIPTION
C430TM-A	\$ 73.00	£ 46.00	€ 67.90	¥ 697.20	Mounted Lens, AR Coated 400-600nm
C430TM-B	\$ 73.00	£ 46.00	€ 67.90	¥ 697.20	Mounted Lens, AR Coated 600-1050nm
C430TM-C	\$ 73.00	£ 46.00	€ 67.90	¥ 697.20	Mounted Lens, AR Coated 1050-1600nm