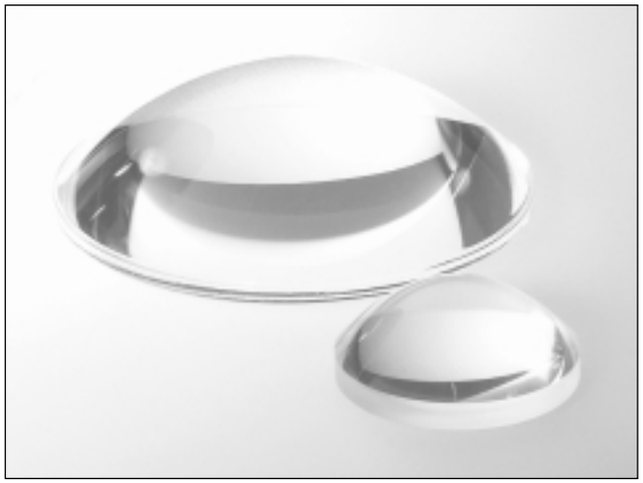


Aspheric Lenses.

- **Low cost focusing and collimating lenses**
- **Highest throughput single element lens**
- **Short focal lengths**

Low cost, low F/# (high throughput), and very low spherical aberration make Aspheric Lenses a smart choice for focusing VIS-NIR radiation. They offer the highest throughput of any single element lens, and have shorter focal lengths than equivalent plano and bi-convex lenses.

## WHAT IS AN ASPHERE?

Aspheric lenses are the odd shaped lens; one surface is either plano or spheric, the other has a discontinuous conic shape. The shape of the lens is designed and matched to provide the absolute minimum spherical aberration, even when used at full aperture.

## MINIMUM SPHERICAL ABERRATION

In any plano convex or bi-convex lens, the rays passing through the thin outer edges of the lens are focused at a point closer to the lens than the rays passing through the thick center; this is spherical aberration. This aberration can be reduced by using only the central portion of the lens, but this severely limits throughput, or requires the use of a larger diameter lens. Aspheres offer the needed compromise. They have a non-spherical shape designed to minimize the problem.

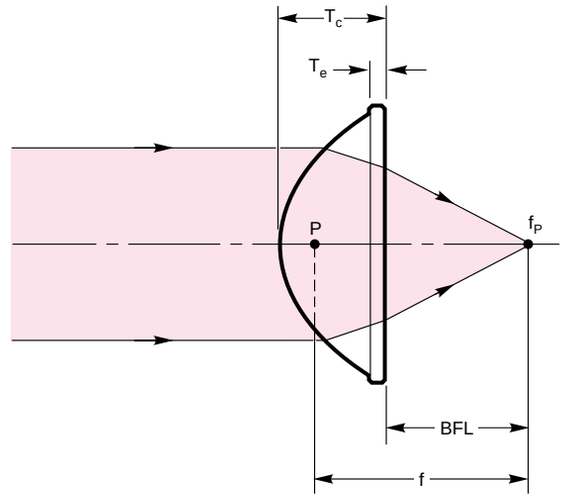
## MATERIAL

Our aspheric lenses are fabricated from crown glass or Pyrex®. Pyrex® has excellent thermal properties and can withstand thermal shock and prolonged high intensities. We use this material in some of our Arc Lamp Source Condensers.

Both materials have good transmittance from ~350 nm to 2.1 µm. See pages 15-8 and 15-9 for transmittance curves.

**Also see these pages...**

*On **page 9-23** we compare the features of all our collimating and focusing lenses, as an aid to helping you select the appropriate lens for your application. If you have any questions, please contact an Oriel Sales Engineer.*




| | | | |
|---|---|---|---|
| $T_c$ | CENTER THICKNESS | f | FOCAL LENGTH |
| $T_e$ | EDGE THICKNESS | $f_P$ | FOCAL POINT |
| P | PRINCIPAL POINT | BFL | BACK FOCAL LENGTH |

**Fig. 1 Aspheric Lens.**

## TECH NOTE

*Because these lenses have steep curvatures, we do not recommend coating them with an anti-reflection coating. The transmittance properties of coatings shift with angle of incidence; at high angles the transmittance of an AR coated lens may be less than that of an uncoated lens.*

## SPECIFICATIONS

| | |
|---|---|
| Diameter tolerance: | ±0.5 mm |
| Edge/center thickness tolerance: | ±0.30 mm |
| Edge finish: | Fine ground, beveled |
| Clear aperture diameter: | 95% of central diameter |
| Focal length tolerance: | ±10% |
| Materials: | Optical Crown Glass or Pyrex® |
| Index of refraction: | |
| Crown glass: | 1.522 @ 589 nm |
| Pyrex®: | 1.474 @ 587.6 nm |
| Surface quality: | |
| Aspheric side: | Fire polished, 80 - 50 |
| Non-aspheric side: | Ground and polished, 80 - 50 |

## ORDERING INFORMATION

| Dia. in (mm) | Nom. f @ 589 nm (mm) | Nom. BFL @ 589 nm (mm) | F/# | Center Thk. (mm) | Edge Thk. (mm) | Model No. | Price |
|---|---|---|---|---|---|---|---|
| **Pyrex® Aspheric Lenses** | | | | | | | |
| 1.0 (25.4) | 21.5 | 13.89 | 0.59 | 13.89 | 5.28 | **42865** | |
| 1.5 (38.1) | 31 | 21 | 0.68 | 16.0 | 4.0 | **42872** | |
| **Crown Glass Aspheric Lenses** | | | | | | | |
| 1.06 (27) | 20 | 10.5 | 0.75 | 12.3 | 2.0 | **42950** | |
| 1.34 (34) | 24 | 14.4 | 0.71 | 15.6 | 1.8 | **42960** | |
| 1.97 (50) | 35.5 | 21.4 | 0.71 | 21.1 | 3.0 | **42970** | |
| 2.7 (68) | 50 | 34.3 | 0.74 | 27.5 | 2.5 | **42980** | |
| 3.15 (80) | 66 | 48 | 0.83 | 26.4 | 3.0 | **42990** | |