

Application Guide: Sapphire Lenses for Optical Fiber Coupling

1. Core Advantage of Sapphire Lens For Fiber Coupling

1. High thermal stability: No focal shift under continuous high-power laser operation
2. Ultra-low light scattering surface polishing, reduce coupling loss
3. High mechanical hardness, resist abrasion during assembly & long-term service
4. Wide-spectrum transmittance match single-mode / multi-mode fiber signal band

2. Lens Model Selection Rules

Scenario 1 Single-mode fiber collimation & coupling

Recommended: Small diameter half ball lens (2mm - 10mm), double-side IR AR coating

Scenario 2 Multi-mode fiber signal transmission

Recommended: Medium size ball lens / plano-convex lens, custom focal length to match fiber core diameter

Scenario 3 High-temperature industrial fiber sensing

Must use uncoated or high-temperature resistant AR sapphire lens, avoid coating delamination

3. Assembly Matching Tips

1. Keep lens surface clean with anhydrous ethanol before installation
2. Control clamping pressure to prevent sapphire surface scratch
3. Match lens curvature radius with fiber core distance to minimize insertion loss

4. Common Failure Avoidance

- Low coupling efficiency: Centration error or surface scratch
- Coating peeling: Exceed continuous working temperature limit
- Signal drift: Thermal expansion mismatch of glass lens (switch to sapphire to solve)

5. OEM Custom Support

We adjust lens diameter, curvature and coating spectrum according to customer fiber device optical path drawing.