# High-precision injection molded products for optical communication



## Overview

Optics Injection Molding Elimold provides precision optical injection molding solutions, custom manufacturing services for optical plastic parts according.

## Key Takeaways

High-precision injection molding enables the production of optical components with micrometer-level accuracy, essential for optical communication systems. OverviewHigh-precision injection molding is a specialized manufacturing process used to produce optical components such as lenses, prisms, ferrules, and fiber arrays for optical communication. This technology ensures dimensional accuracy, optical clarity, and repeatable performance, which are critical for devices like optical transceivers, multi-channel fiber systems, and LED backlight lenses.

Key Features and CapabilitiesUltra-Precise Alignment: Components such as MT/MMC ferrules and fiber arrays achieve true position tolerances below 1. 0 μm, ensuring exact multi-channel fiber alignment.

### Micro-

Hole Machining: Circularity of holes can be maintained below 0. 5 μm, with depths up to 100 mm, accommodating ultra-fine fibers. Complex Lens Features: Injection molding can produce sub-micron lens pitch, high transparency, mirror surfaces, and freeform or aspheric lenses, enabling precise optical performance and easier assembly.

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Material Selection: Specialized optical-grade plastics with low birefringence, high transparency, and excellent optical properties are used to maintain signal quality. Process Control: Precision injection molding requires tight control of temperature, injection speed, pressure, and cooling, along with advanced mold design to minimize shrinkage and deformation.

## Manufacturing and Quality Assurance

Custom Mold Design: High-precision molds are designed considering plastic flow, cooling, and shrinkage to achieve consistent optical performance. Automation and Inspection: Modern facilities employ 3D handling, robotic systems, and automated inspection to ensure shot-to-shot consistency and adherence to tight tolerances. Functional Testing: Components are often tested using customer-specific test benches or statistical process control (SPC) to verify optical performance.

Applications in Optical CommunicationSingle-Mode (SM) and Multi-Mode (MM) Systems: Supports 1xN and MxN multi-channel fiber systems. Optical Transceivers: Precision lenses and ferrules improve alignment and signal quality.

## High-

Volume Production: Companies like Enplas and Elimold can scale from low-volume prototypes to mass production, maintaining optical performance across large production runs.

## Advantages

High Repeatability: Ensures consistent optical performance across production batches. Scalability: Suitable for both prototype and high-volume manufacturing. Enhanced Optical Performance: Tight tolerances and high-quality materials reduce signal loss and improve device efficiency.

High-precision injection molding is therefore a critical technology for modern optical communication, enabling the production of components that meet stringent dimensional and optical requirements while supporting scalable manufacturing.

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