

## Light Guides

### *Small in size, big in protection*

Precision and complexity are indispensable in fibre optics. Endoscope tips, light guides and the general miniaturization of mechanisms play a key role in advancing minimally invasive surgery. With the help of micro laser sintering (MLS), the required components are flexibly adapted to the respective application and manufactured as needed. Size and shape depend on the specific requirements of the application.

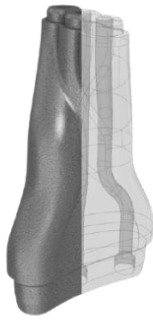
### **What really matters?**

The basic function of every optical fibre is to guide light - it therefore acts as a dielectric waveguide: light that is fed in at one end should remain guided within the fibre. In other words, light must be prevented from being lost. Due to the high refractive index contrast, even the smallest scratches on the glass surface can lead to considerable optical losses due to scattering. The outer surface must therefore be reliably protected against damage and soiling. This problem can be solved on the one hand by suitable protective coatings (buffer coatings) around the fibre and on the other hand by a precisely guided, protective and fixing periphery.

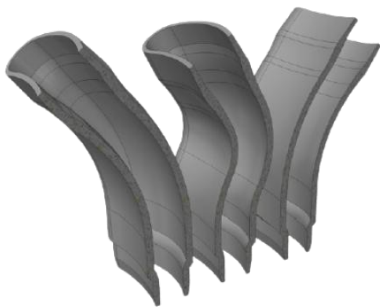
Conventionally manufactured components are generally used for these tasks, the geometric complexity of which is technologically limited - and whose manufacturing costs are correspondingly high due to the precision required.

### **Additive thinking**

The ability to produce highly complex channel guides with very thin walls and tight tolerances without complex joining processes is one of the key strengths of microstructured 3D printing. The areas of application are correspondingly diverse: from light guides, bundles or splitters to end pieces, couplings and connectors through to tips for cameras or endoscopes. Compared to other available metal 3D printing processes, micro laser sintering offers decisive advantages: a significantly higher level of detail resolution for intricate structures and outstanding surface quality directly after the construction process - which significantly reduces the amount of post-processing required.



Guide for complex fibre optics



Thermowells for fibre optic cables



(Sectional view)Endoscope tip