AN-08 9mm SMA FIBER COUPLED PACKAGE

The 9mm SMA package allows a high-efficiency laser chip to be coupled to a fiber that is at least 150um larger than the laser stripe width. If this rule is observed, coupling efficiency is typically about 85-90%. Using that rule, the minimum fiber diameters would be:50um emitter 200um fiber

- 100um emitter 250um fiber
- 150um emitter 300um fiber
- 200um emitter 350um fiber
- 300um emitter 450um fiber

However, not all of those are standard fiber diameters. We recommend using silica-core/silica-clad fibers with NA=0.22 and low OH. Standard fibers of this type are available from stock at Thor Labs in the following diameters:200um

- 273um
- 365um
- 400um
- 550um
- 600um

But custom fibers with core sizes other than these are sometimes available from fiber vendors such as CeramOptec or FiberGuide.

In many cases, good coupling can be achieved with fibers that are only 100 um larger than the emitter. Efficiency in this case would typically be only 70-80%, depending on the divergence of the laser chip. Also, in this case, the coupling is typically less stable than with a larger fiber, and the coupling efficiency can sometimes change depending on the fiber's centering in the connector or how the connector is screwed into the SMA fitting.

Another issue with the 9mm SMA package is that if the fiber diameter is at or near the low end of the recommended range, a “high-power” SMA connector may be necessary on the input end of the fiber, depending on the laser's wavelength and power level. Standard SMA connectors often have polymer cladding or epoxy around the fiber at the connector tip. If the laser chip's focused beam hits those polymer materials, they can burn and damage the fiber and/or the laser. Special “high-power” SMA connectors are available that do not have any polymer materials near the fiber tip. But if the fiber is at least 200 um larger than the emitter, the focused spot is small enough to impinge only on the fiber core, and a high-power SMA should not be necessary.