

## O-Ring vs. Hard-Sealed Laser Tubes



*Our O-Ring sealing technology offers several advantages over hard-sealing methods.*

Many of our customers ask questions regarding the advantages and disadvantages of our O-ring sealing technology versus the hard-sealed laser tube approach favored by Coherent/DEOS, for example. There are basically three primary advantages to the methods that we use.

1. Our testing, and that of many of our customers, will attest to the fact that hard-sealed tubes from many of our competitors suffer from some significant power drops over the lifetime of laser operation, especially during the first few months of operation. Typically, these power drops can be up to 25% or more of the rated output power within the first year of operation.

Synrad has taken great steps to ensure that the combination of our unique gas mixture and O-ring seals ensures that the laser output power remains relatively constant over time and only exhibits a slow degradation over years of operation until the end of the product's useful life.

2. Hard seals are difficult to manufacture and, due to their very nature, they make the process of modifying or repairing a damaged unit almost impossible. This is true for any repairs to the laser tube itself, and would include items such as an optic replacement or even a simple gas recharge/refill.

In practice, hard-seal tubes are often non-repairable, and it is common for these tubes to be scrapped and replaced with a new unit rather than repaired. This comes at considerable time and, more importantly, cost that is ultimately borne by the end customer.

In contrast, O-ring seals are very simple and straightforward to work with, are easy and cheap to replace, allowing for simple and inexpensive tube repairs/modifications and gas refills.

3. Perhaps most important, though, we believe that the use of hard seals contributes significantly to the shortened lifetime of other critical components within lasers that use hard seals, and is a significant weakness of this design. The failure mode is a premature laser tube failure due to accelerated wear of certain components.

Synrad tubes (depending on technology) either do not suffer from this particular failure mode, or we have proprietary design solutions to solve the problem. These design solutions are the critical foundations of Synrad's reputation for making reliable, long-lasting lasers.