

- Smaller spot size provides better quality cuts
- Increases life of laser and optics
- Pre-assembled for quick, easy installation
- Simple one-lens design



The High Cost of Contamination

Many of the problems associated with today's high power laser applications are a result of contamination on optical surfaces. Contaminants on the lens surface absorb the laser light, heat up, and damage the AR coating and the lens itself. Cleanliness is one of the most important steps in keeping a system on-line and performing its work consistently. The focusing optic takes the brunt of the abuse in most systems. They may be exposed to work piece splatter, dust, dirt and handling contamination. Most laser heads provide glass coversheets, which protect the lens from splatter, but do little to protect the lens from other contaminants.

Even in the best sealed or air filtered laser heads, small particulates find their way onto the top surface of the focusing lens. Typically, these lenses are removed and cleaned on a routine basis. Each time the lens is removed more contaminants find their way into the head assembly. SEM/EDAX analyses of focusing optics shows that the primary contaminants are waste products (Figure A) of the cutting, welding or drilling operation.

Lowering Your Cost of YAG Laser Ownership

LightPath's® DuraYAG™ modules provide a barrier from these contaminants. The lens modules are designed to replace the lens holder and the two silica lenses found in many laser systems. By utilizing a singlet GRADIUM® lens in conjunction with a protective plano optic, the lens lifetime is increased and the cost of operating your laser system is decreased. LightPath's® DuraYAG™ modules are cleaned and assembled in Class100 clean room conditions.

When routine maintenance must be performed, just unscrew the optics module, carefully clean the plano optic, and with a few turns of the assembly you are ready to go. Modules require no alignment and are easy to clean (plano optics are much easier to clean than a convex optical element). When your module needs replacing, just send it back to LightPath® and you will have a replacement in 24 hours with our 24 Hour Priority Plan.



When contaminants fall on an unprotected lens, the heat can cause the lens to crack. With DuraYAG™, the window acts as a shield for the lens, protecting it from breaking.

GRADIUM® Lenses vs. Competitors

GRADIUM® assembly DYTP2770F used in Figure A provides a higher quality cut reducing dross.



Traditional silica doublets have a large spot size, which produces poor quality cuts with a large amount of dross. This must be ground down manually.

GRADIUM® lenses provide a much higher quality cut, requiring little or no post-cut grinding.

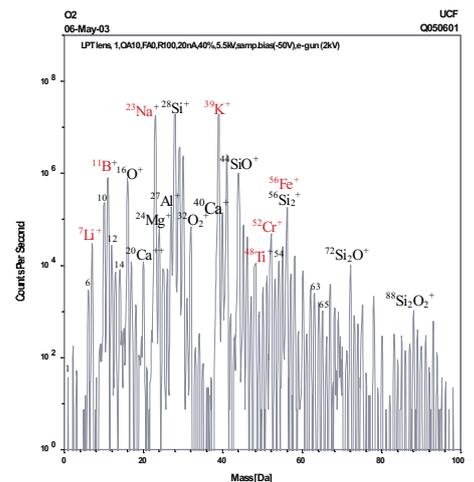


Figure A

SEM analysis on a failed lens shows traces of contamination from the cutting process. Titanium, Chromium, Vanadium, Iron, Sodium, Lithium, Boron, Manganese, Copper, Chlorine and Potassium.

GRADIUM® Lenses

GRADIUM® DuraYAG™ Optics Module

The assemblies below are LightPath's® current off-the-shelf DuraYAG™ optics modules. LightPath® also has a very strong capability to manufacture custom DuraYAG™ assemblies to your individual specifications. Please contact LightPath® sales for more information.



The DYTP2770F is designed to be a drop in replacement for the focusing lens assembly of the Precitec YH27 head for use with Trumpf Nd:YAG lasers.



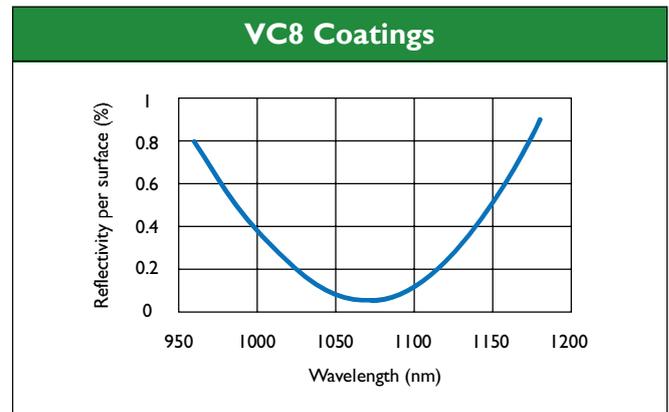
The DYRP3070F is designed to be a drop in replacement for the focusing lens assembly of the Precitec YR30 head for use with Rofin-Sinar Nd:YAG lasers

DURAYAG™ DYTP2770F Assembly Specifications	
Lens material	GRADIUM® Glass
Lens diameter	27mm
Lens focal length	70mm
Design wavelength	1064nm
AR coating reflectivity	<0.25% at 1064nm
Maximum laser power	4kW (CW)
Holder material	Stainless steel

DURAYAG™ DYRP3070F Assembly Specifications	
Lens material	GRADIUM® Glass
Lens diameter	30mm
Lens focal length	70mm
Design wavelength	1064nm
AR coating reflectivity	<0.25% at 1064nm
Maximum laser power	4kW (CW)
Holder material	Stainless steel

Anti-Reflective Coatings

All of LightPath's® Nd:YAG lenses and modules are available with high quality anti-reflective coatings. The VC-8 coating is designed to withstand the high power, rugged environment of YAG laser manufacturing. Reflectivity is typically less than <0.15% per surface and guaranteed to be <0.25% at 1064nm. GRADIUM® lenses and DuraYAG™ modules have been tested at the Fraunhofer Institute and are suitable for applications up to 4000 watts CW. Please contact LightPath® if you need coatings for applications which are greater than 4000 watts CW.



24-Hour Quick Replacement Priority Plan

LightPath's® 24 hour Priority Plan provides 24 hour delivery of your DuraYAG™ module to replace an assembly that has failed. LightPath® offers GRADIUM® lenses and modules off-the-shelf for most common YAG laser systems and heads including Trumpf®, Rofin-Sinar®, GSI Lumonics®, Precitec® and others. Customized optics and modules can also be designed for your specific application.

Customization

LightPath® would be happy to design a custom GRADIUM® lens to meet your individual specifications. We can customize the focal length, diameter, and design wavelength to meet your specific needs. Lenses can also be provided with custom anti-reflective coatings or mounted in custom housings.