Clearweld® Weldable Resins Guide

Product Description
Thermoplastics can be laser welded with the use of Clearweld weldable resins. Clearweld resins contain infrared absorbing materials and are designed for use with 800-1100 nm lasers. In laser welding of thermoplastics, the laser energy passes through a transmissive layer into an absorptive layer (as shown below). The absorbing material is dispersed throughout the resin used to create the absorptive part. The weldable resin absorbs the laser energy, converts it to heat, which causes the melting of the plastic and the formation of the weld.

Additionally, the resin can be extruded into a film that can be used as an intermediate layer or for insert molding. Clearweld resins also offer the benefit of color flexibility. Furthermore, Clearweld infrared absorbers have successfully undergone cytotoxicity testing.

Laser welding with Clearweld resins is shown by the following diagram.

Benefits
- Provides consistent, clean, high quality welds
- Requires no secondary steps in production, such as dispensing
- Can be formulated for use with a variety of laser technologies
- Allows extensive color flexibility
- Are thermally stable
- Can be formulated to meet application requirements

Available Resins
Resins can be formulated for lasers in the wavelength range of 800 to 1100nm.

Clearweld resins can be custom formulated for each application. They are available in two forms, a compound and a masterbatch. A compound is ready for use to create a weldable part. A masterbatch is a higher concentration mixture designed to be “let-down” by mixing with virgin resin.

Polymers successfully compounded with Clearweld infrared absorbers include:
PC, PMMA, PS, ABS, PC/ABS, TPU, PET, COC, COP, Polyamide, PETG, PP, PE, PVC, SAN and some TPE’s.

Other polymers can be evaluated upon request.

Infrared absorbers can be degraded by heat. Avoid prolonged exposure to elevated temperatures. The absorber may also be affected by shear forces from processing. Therefore, it is also recommended to minimize shear.
Color Matching

Infrared absorbing materials will add some tint to the resin. The tint will depend upon the absorber used and the concentration in the formulation. Colorants can be combined in the resin to achieve a custom color. Through color matching, a transmissive layer and absorptive layer can appear identical. A wide array of colors can be achieved.

Getting Started

Clearweld can assist you in determining if a Clearweld resin is the appropriate solution for your needs. Masterbatch resins are also available as samples for evaluation. General purpose grades of PC, PMMA and PP are available. Additionally, other grades or resins can be created on a case by case basis.

To ensure that a Clearweld resin can be formulated for your application the following information is required:

- Type of Resin
- Color Requirements
- Process Information
- Weld Requirements
- Presence of Fixed Parameters (i.e. laser power, line speed, wavelength)
- Special Constraints (i.e. medical or food application)
- Post Welding Processes

Application development can also be assisted by our extensive worldwide network of laser welding specialists and partners.

Need More Information?

- Visit our website at www.clearweld.com
- Contact us today to discuss your application.