

# Innovation News

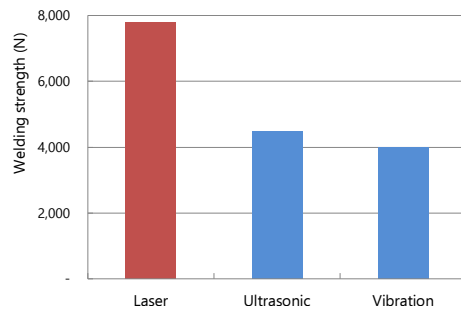
## Laser Weldable DURANEX® PBT Series (730LW, 733LD and 734LD)

### Welding processes

Polybutylene terephthalate (PBT) is a well-known crystalline-structured engineering plastic that has strong heat and chemical resistance. PBT can be modified for various purposes such as flame retardance, low warpage and thermal shock resistance. PBT is widely used in housings and enclosures of electric control units.

Welding of PBT for assembly of enclosures has been updated from ultrasonic to vibration and laser welding over the years. Laser welding delivers assemblies with excellent strength and efficiency, as seen in Graph 1.

Graph 1: Welding Processes and Performance (Duracon M90-44)



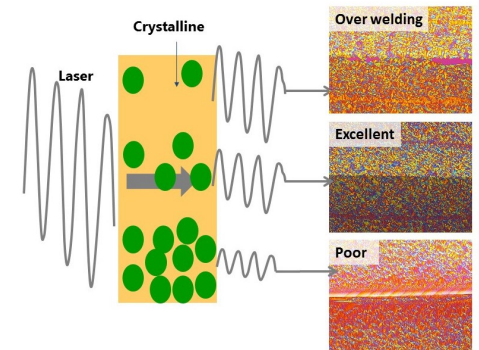
### Laser welding for PBT

High quality PBT laser welding requires special considerations:

- 1) Controlling crystallization rate for stable laser transparency
- 2) Minimizing contaminants (black specks)
- 3) Keeping warpage low
- 4) Ability to add laser permeable pre-coloring

The polymer type and formulation must optimize and control the crystallization rate because crystalline boundaries either reflect or absorb laser energy. Contaminants are managed via production and process control. Low warpage is necessary to avoid air gaps which spoil welding. Special coloring technology for pre-coloring is needed because standard pigments may not have the desired laser transparency.

Chart 1: Importance of Crystallization



#### Material:

DURANEX® PBT 730LW, 733LD, 734LD

#### Application:

Enclosure Applications

#### Benefits:

- Stable laser permeability
- Hydrolysis Resistance
- Pre-Colored Options Available (730LW)
- Heat Shock Resistance (730LW)

| Property            |             | Multi Purpose Laser Weldable |                       | Low Warpage Laser Weldable |
|---------------------|-------------|------------------------------|-----------------------|----------------------------|
|                     |             | 730LW                        | 733LD                 | 734LD                      |
| Tensile Strength    | ISO 527-1,2 | 135 MPa                      | 139 MPa               | 142 MPa                    |
| Elongation at Break |             | 2.9 %                        | 2.0 %                 | 2.5 %                      |
| Flexural Modulus    | ISO 178     | 8,100 MPa                    | 9,000 MPa             | 9,000 MPa                  |
| Charpy Impact       | ISO 179/1eA | 11.2 kJ/m <sup>2</sup>       | 7.6 kJ/m <sup>2</sup> | 7.4 kJ/m <sup>2</sup>      |

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## Laser Weldable DURANEX® PBT Series (730LW, 733LD and 734LD)

### DURANEX® 730LW multi-purpose laser weldable PBT

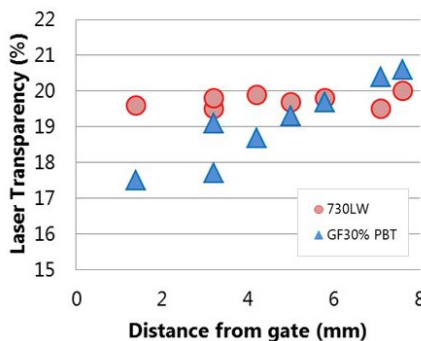
DURANEX® PBT 730LW is specially designed for laser welding. Its laser transparency is high, and kept stable by controlling crystallization. Polyplastics' advanced production line and inspection processes have a demonstrated record of success in preventing various possible contaminants for 730LW.

With excellent laser permeability as seen in Graph 2, DURANEX® 730LW provides stable and uniform strength and is suitable for applications requiring air and liquid leakage resistance.

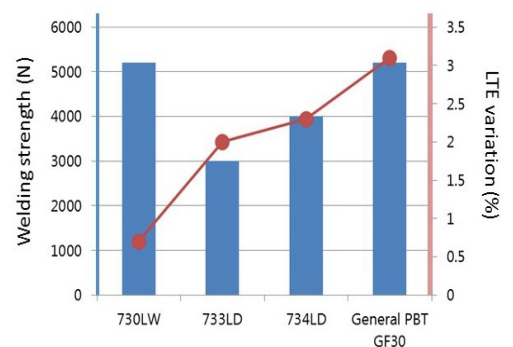
Because DURANEX® 730LW is optimized for use of laser-compatible color formulations, unwanted results from standard colorants can be avoided.

730LW also has strong hydrolysis resistance and toughness versus thermal shock.

Graph 2: LTE Stability of DURANEX® 730LW



Graph 3: Laser Welding Performance



### DURANEX® PBT 733LD, 734LD

DURANEX® PBT 733LD and 734LD are GF30% reinforced low warpage and hydrolysis resistance purpose PBT. They also have good laser permeable performance.

733LD is the standard version and 734LD is optimized its welding strength and laser permeability.

## DURACON® POM

POM (Acetal Copolymer)

## DURANEX® PBT

PBT (Polybutylene Terephthalate)

## DURAFIDE® PPS

PPS (Polyphenylene Sulfide)

## TOPAS® COC

COC (Cyclic Olefin Copolymer)

### About Polyplastics

Polyplastics is a global leader in the development and production of engineering plastics solutions. With more than 50 years of experience, its technical experts enhance manufacturing and product performance with a proficiency that has become second nature. Backed by a strong global network of R&D, production and sales resources, the team is able to create advanced solutions for an ever-evolving market.

For more information, visit our website, [www.polyplastics.com/en/](http://www.polyplastics.com/en/).

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