LASER WELDING WITH LNP™ EXL POLYCARBONATE COPOLYMER THERMOPLASTIC

LNP EXL resin offers benefits for the laser welding assembly of housings or enclosures for batteries and sensitive electronic equipment such as ECUs and actuators.

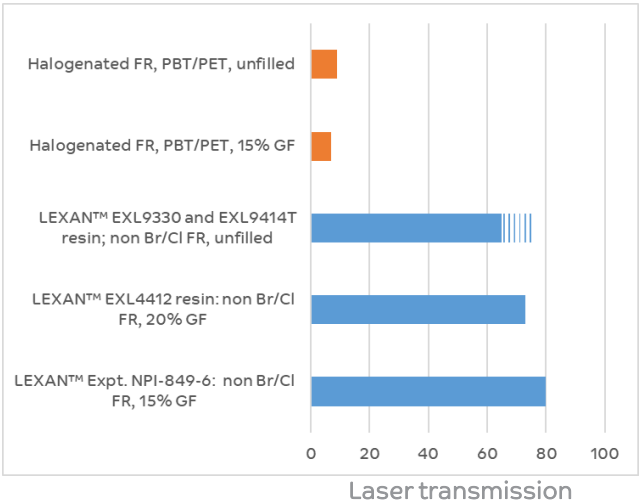
Laser welding is a fast, affordable, vibration - free joining technology used within the mobility industry worldwide. Offering high precision, laser welding is ideal for the reliable welding of both simple and complex 3D geometries with high throughput.

While the laser welding of polymers has been demonstrated for many years, materials that show a significant scattering of laser irradiation are incompatible with the laser welding process. The low transmission to the laser light can cause inconsistencies in the weld, leading to long cycle times and larger reject rates of the final part. Where the materials contain additives and fillers such as glass fiber, talcum or inorganic flame retardants (FR), the attenuation of the incident radiation reaching the laser 'absorbing' member is considerable. Hence, filled, FR materials with good laser-weldability are uncommon.

With increasing levels of electrification in today's world, the applications requiring filled and un-filled FR solutions are growing. However, the thermoplastic options available with the required physical properties and high levels of laser transmission are limited and restrict the options for welding. SABIC's LNP EXL resins are provided in both filled and unfilled variants with non-chlorinated, non-brominated UL94 FR packages and provide a unique combination of features with high levels of near infrared transmission.

LNP EXL resin is uniquely positioned to support the assembly of applications such as electronic control units (ECUs), actuators, battery modules and other sensitive electronic equipment that require vibration-free joining. LNP EXL resin offers processability with excellent mechanical properties, chemical resistance against a range of automotive chemicals and high levels of laser transmission.

Comparative laser transmission data

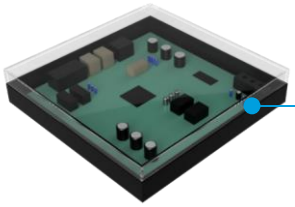


LNP EXL resin properties compared to FR PBT/PET resin

PROPERTY		FR PBT/PET resin	LEXAN™ EXL5689 resin	LEXAN EXL9330 resin	Expt. LNP resin
		15% GF	9% GF	unfilled	10-30% GF
Flammability	UL94 V0 (mm)	1.5	1.5	1.5	0.4 – 1.5
Flexural modulus	ISO 178 (MPa)	5400	3400	2200	4000-8000
Notched IZOD impact (23°C)	ISO 180 (kJ/m²)	6	25	70	10-20
Heat deflection temperature	ISO 75, 1.8 MPa (°C)	185*	132	124	126-139
Laser transmission	980 nm (%)	7	58	64	55-80

* ASTM D 648

LNP EXL resin is available in a range of opaque colors, including black, while retaining high levels of laser transmission



LNP EXL resin is also available in semi-transparent options, allowing the join interface to be viewed for on-line optical characterization

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