

ULTEM™ AND EXTEM™ RESINS IN PHOTONICS APPLICATIONS



SABIC has provided specialty thermo-plastics polymers for the opto-electronics industry for several decades.

Recent trends such as improved user experience, functionality and connectivity are driving the need for both increased bandwidth and speed.

Optical elements in data communication and mobile applications play a critical role for seamless connectivity of electronic devices and back-end infrastructures.

SABIC's specialty materials are addressing the evolving industry requirements and customer needs for both pluggable and co-packaged optics. ULTEM resins and EXTEM resins offer multiple benefits for optical interconnects and lenses for applications like IR sensors and optical transceivers.

Design Freedom & Miniaturization

Thermoplastics can help enable complex part designs for pluggable and co-packaged optics to replace solutions like glass or thermoset resins. Potential applications include aspherical lenses or lens arrays.

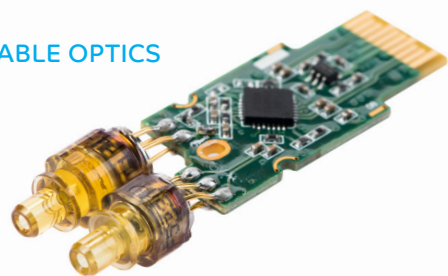
Integration and Simplification

Thermoplastics are well-suited for the integration of mechanical and optical features to simplify design and assembly for potential cost improvement. Examples include alignment fixtures and over-molding of other thermoplastic materials.

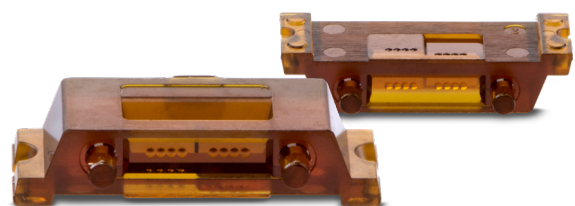
Mass Production with High Precision

Injection molding of thermoplastics can help enable high precision manufacturing of complex parts at large build numbers.

TODAY PLUGGABLE OPTICS



TOMORROW CO-PACKAGED OPTICS



Optical interconnect lens provided by Nalux Co., LTD.



KEY PRODUCT FEATURES

Near-infrared transparent ULTEM resin

offers a unique balance of:

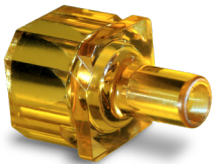
- High heat resistance with a glass transition temperature (Tg) up to 220°C
- Micro-injection moldable for optical elements (lenses, diffractive optical elements)
- High dimensional stability
- High refractive Index

Near-infrared transparent EXTEM resin

offers the same benefits as ULTEM resin with additional properties:

- Higher heat resistance (Tg up to 279°C)
- Reflow soldering capable (withstanding reflow peak temperature up to 260°C)

POTENTIAL APPLICATIONS INCLUDE:



FIBER OPTICAL CONNECTOR

- High IR transmission
- High refractive index
- Low CTE 25 - 200°C
- Design for easy assembly



ON BOARD LENS* ARRAY

- Can withstand reflow soldering peak temperature up to 260°C
- Complex interconnect designs for co-packaged optics



SENSOR LENS

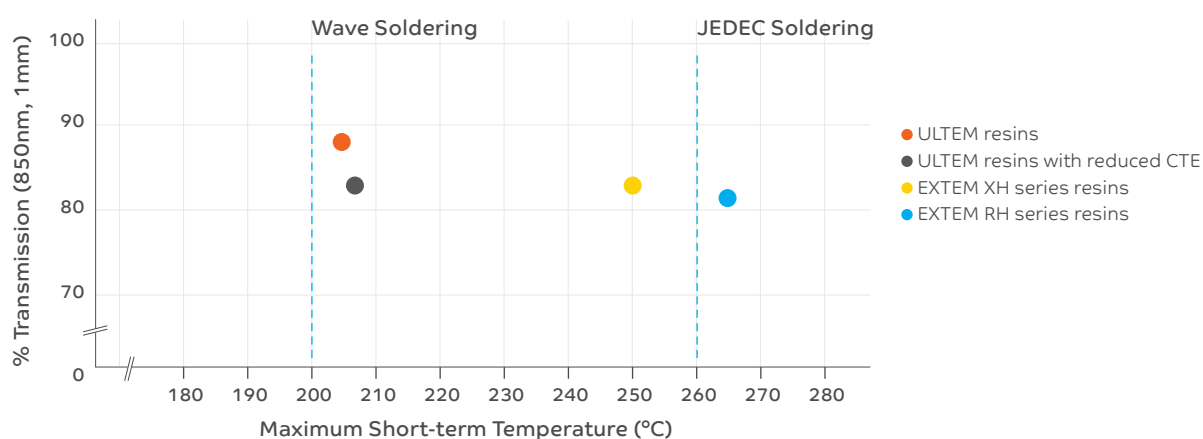
- Option for partial overmolding to reduce light scattering
- High IR transmission
- High flow for complex tooling

* Optical interconnect lens provided by Nalux Co., LTD.

SABIC'S THERMO-OPTICAL PORTFOLIO

SABIC offers a broad portfolio of ULTEM and EXTEM resins to address material requirements for the optoelectronics industry, including the ability to withstand the high heat of typical opto-electronic solder processes.

These resins have near IR light transmission with stable signal quality and are tested according to industry aging standards like Telcordia.



TYPICAL OPTICAL PROPERTIES

Property	Standard	Unit	ULTEM 1010UCL resin	ULTEM 3310TD resin	EXTEM XH1015UCL resin	EXTEM RH1016UCL resin
Flexural Modulus	ISO 178	MPa	3300	4900	2870	2950
Flexural Strength	ISO 178	MPa	160	120	120	130
HDT, 0.45 Mpa	ISO 75	°C	207	211	250	262
Vicat B120	ISO 306	°C	212	216	260	273
Density	ISO 1183	g/cm ³	1.27	1.55	1.31	1.35
CTE (-40 to 150°C)	ISO 11359	10 ⁻⁵ /°C	5.5	3.9	5	5
Transmission at 1mm at 850nm	ASTMD1002	%	88	81	82	82
Transmission at 1mm at 1310nm	ASTMD1003	%	89	86	87	87
Refractive index 589 nm (n _D)	ISO 489	-	1,662	1,660	1,657	1,691
Refractive index 850 nm	ISO 489	-	1,639	1,637	1,634	1,663
Refractive index 1310 nm	ISO 489	-	1,626	1,626	1,622	1,651
Abbe number	ISO 489	-	21	19	18	18
dn/dT (+23°C-140°C)	ISO 489	10 ⁻⁵ /°C	-11	-8	-10	-10

SABIC ISCC+ CERTIFIED RENEWABLE ULTEM RESIN SOLUTIONS

A new portfolio of bio-based ULTEM resins that delivers a lower carbon footprint while offering the same high performance and processability as incumbent ULTEM materials is now available.



SABIC IS A MEMBER OF



SCAN TO CONNECT
WITH US ON LINKEDIN



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