CHEMISTRY THAT MATTERS™



SABIC'S INNOVATIVE THERMOPLASTIC RESIN

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THE CHALLENGES OF TODAY ...

INCREASING DEMAND

1.5bn smart phones built per year, increasing demand for integrated photonics.

Tablets, drones, robots, security systems, automotive LiDAR, etc. all using same technology.

CONNECTIVITY

IoT (internet of things) will multiply demand for photonic sensors.

5G technology on the rise with even more connected devices.



Classification: General Business Use





MOLDING

Thermoplastic injection molding of lenses versus incumbent epoxy resin or versus glass



OUTPUT

Clean room production, high volume output, design freedom for optical geometries



Lens overmolded with housing



HIGH PRECISION MASS PRODUCTION WITH MILLIONS OF UNITS PER DAY OR PER WEEK

Source: Soprod SA



PORTFOLIO OF THERMOPLASTIC RESINS

SABIC offers a wide range of solutions for applications that use soldering for mounting of parts and modules onto PCB's. Crystal clear LEXAN[™] CXT resins for low temperature soldering, and IR transparent ULTEM[™] and EXTEM[™] resins for more demanding solder processes, incl. lead-free-reflow-soldering



FUTURE NEEDS - WHY CHOOSE EXTEMTM RESIN?

Value Propositions of EXTEMTM resin, a thermoplastic polyimide:

- Low and stable coefficient of thermal expansion from -20°C to 250°C results in accurate laser function
- High Tg (glass transition temperature) to potentially allow lead-free-reflow-soldering (JEDEC level 3)
- IR transparency
- High Ri (refractive index), 1.64

Potential benefits when using EXTEM[™] resin

- Productivity improvement through injection molding
- Low CTE causes less stress in soldering process
- Overmolding capability, ability to mold lens and housing in two shots on same machine/tool
- Design freedom supporting miniaturization of lens geometries, no stacking
- Recyclability



Classification: General Business Use

SABIC TEST METHOD FOR REFLOW

SABIC Test Method for dimensional stability at JEDEC conditions

- 12 lenses sample (4.8 x 5 x 0.3 mm)
- 1 mm flat optical plaques (37.5 x 50 x 1.0 mm)
- Part dimensions, distance between lenses, and lens diameter before and after reflow

Optical characteristics

- %T measured with UV-VIS-NIR*
- Ri measured at 850 nm, 1310, 1550 nm





* 60 mm integrated sphere for EXTEM data

DESIGN FREEDOM: THERMOPLASTIC EXTEMTM RESIN VS EPOXY



Higher Ri helps to design a thinner lens without a substrate layer...



FOR YOUR CONVENIENCE: OPTICAL AND ENGINEERING DATA AVAILABLE

EXTEMTM resin, and other applicable SABIC materials, are added to the materials database of the Zemax OpticStudio[®], the industry-standard in software for designing optical systems

SOFTWARE FOR ANALYSIS, SIMULATION AND OPTIMIZATION OF THEIR OPTICAL COMPONENTS AND SYSTEMS



Classification: General Business Use

WHY CHOOSE SABIC AS YOUR PARTNER?

SABIC IS A GLOBAL LEADER

From making cars and planes more fuel-efficient, to contributing towards water conservation, and helping enable colorful smartphone cases, we find solutions to the challenges of today to help our customers achieve their ambitions and build a better tomorrow.



SABIC AT-A-GLANCE







1976 Company established

86

US\$ bn

Total

assets

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34,000 Employees around the world

4.9

US\$ bn

Net income



50 Countries of operations

39.9

US\$ bn

Annual revenue



3rd

Largest global chemical company*



≈ 150

New products each year



120th

Largest public company in the world*



11,534

Global patent filings 3.7

US\$ bn

Estimated Brand Value**



64

World-class plants worldwide

*Forbes 2018 **Brand Finance, 2018

THANK YOU

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