CHEMISTRY THAT MATTERS™

EMPOWER ROBUST DATA INFRASTRUCTURES

ADVANCED MATERIALS HELP ENSURE HIGH RELIABILITY, CAPACITY AND SPEED

ABOUT SABIC SPECIALTIES

SABIC's Specialties business offers more than just materials. Our technical teams are constantly innovating to bring you advanced thermoplastic technologies that help address the rigorous requirements of data infrastructures. For instance, we are expanding our portfolio meeting PFAS regulations as well as our non-halogenated FR portfolio to offer grades containing more PCR or certified renewable bio-based content.

We invite you to work with us in a personal and collaborative way. Our team is well equipped to support your product development organization with expertise in materials, design, application development, processing and testing.

Contact us today to learn more.
Email us at Specialties@sabic-hpp.com
or scan the code.

SPECIALTY THERMOPLASTICS CONTRIBUTE TO EXCELLENCE IN DATA INFRASTRUCTURES

Engineers require materials that retain critical properties and capabilities in demanding external and internal environments.

Data is the lifeblood of today's organizations, whether it's being processed and stored in data centers or transmitted over fiber optic networks (FTTx). The explosion of data from AI, IoT, clouds and social and digital media requires infrastructures that can optimize speed, capacity and reliability.

Specialty thermoplastics can help improve the performance, reliability, durability and efficiency of data infrastructure components by meeting rigorous requirements.

HARSH ENVIRONMENT EXPOSURE resistance to temperature/weather extremes, UV exposure, and high heat and humidity.

FLAME RETARDANCE meeting the UL94 V0 standard at <1.0 mm, without the use of halogens or intentionally added PFAS.

SIGNAL TRANSMITTANCE for applications such as expanded beam, fiber optic lenses, and microlenses for precise signal alignment.

CHEMICAL RESISTANCE to help avoid degradation from cleaning agents, industrial chemicals, and cooling fluids.

ELECTRICAL PROPERTIES EMI shielding and anti-static to protect sensitive components, insulative to prevent shorting.

DIMENSIONAL STABILITY across a broad range of temperature helps ensure long life and prevent signal yield loss.

MEETING SPECIFIC NEEDS WITH OPTIMIZED FORMULATIONS

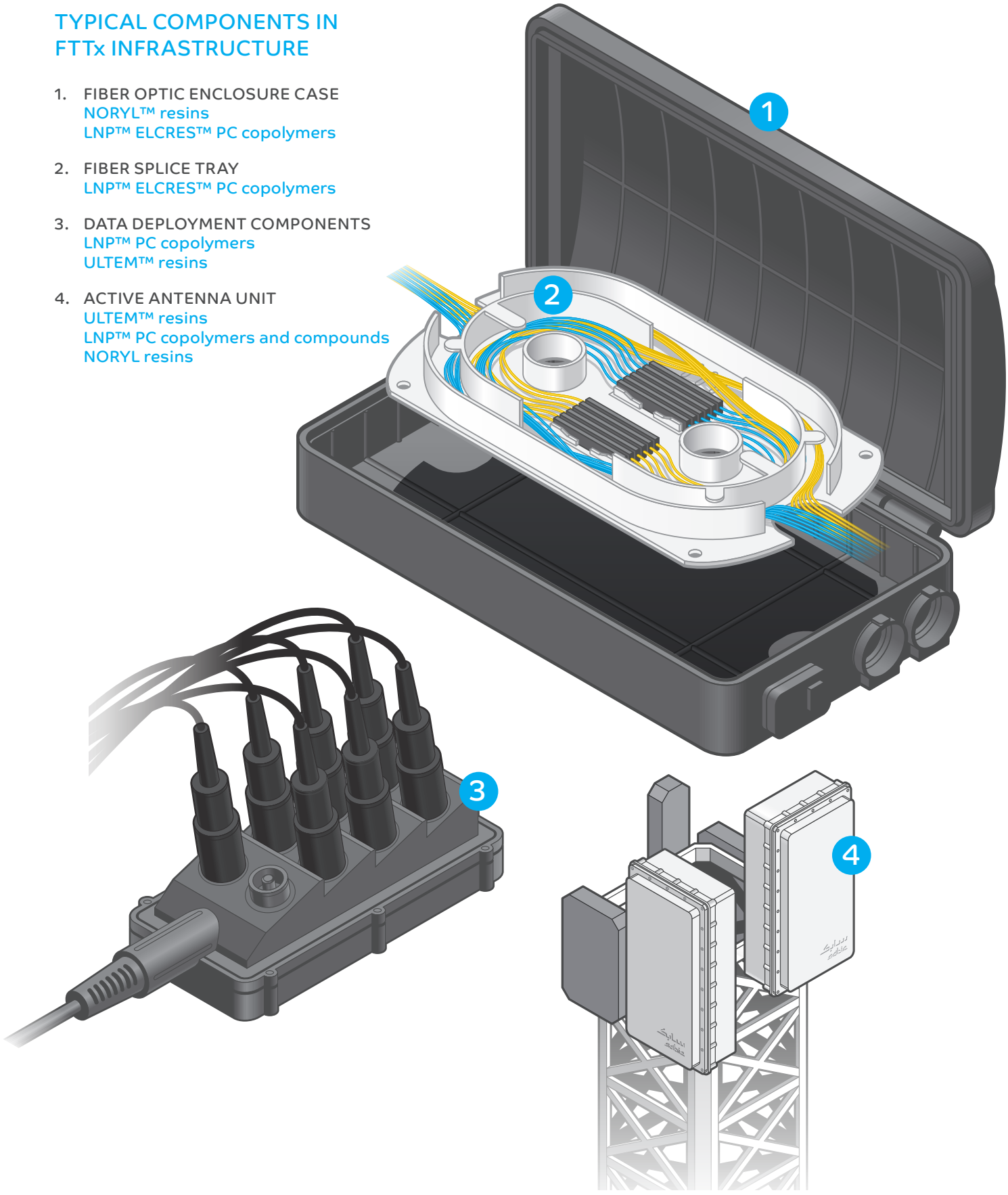
The unique properties of thermoplastics can be optimized through formulation of copolymers and blends and incorporation of additives and reinforcements.

HELPING CUSTOMERS ACHIEVE SUSTAINABILITY GOALS

For circularity, plastic components of complex systems like data center servers should be easy to remove, separate, sort and recycle into new components. SABIC offers materials that feature upcycled, mechanically recycled and certified renewable bio-based feedstocks.

TYPICAL COMPONENTS IN FTTx INFRASTRUCTURE

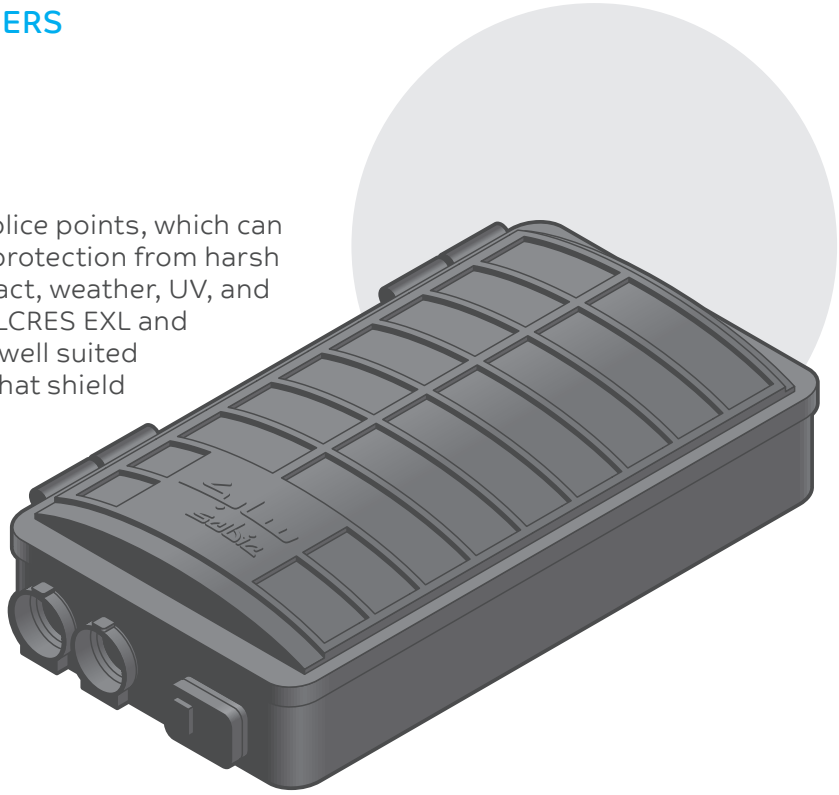
1. FIBER OPTIC ENCLOSURE CASE
   NORYL™ resins
   LNP™ ELCRES™ PC copolymers
2. FIBER SPLICE TRAY
   LNP™ ELCRES™ PC copolymers
3. DATA DEPLOYMENT COMPONENTS
   LNP™ PC copolymers
   ULTEM™ resins
4. ACTIVE ANTENNA UNIT
   ULTEM™ resins
   LNP™ PC copolymers and compounds
   NORYL resins



1 FIBER OPTIC ENCLOSURE CASE
LNP™ ELCRES™ PC COPOLYMERS
NORYL™ RESINS

- Low-temperature ductility
- Chemical resistance
- UV resistance

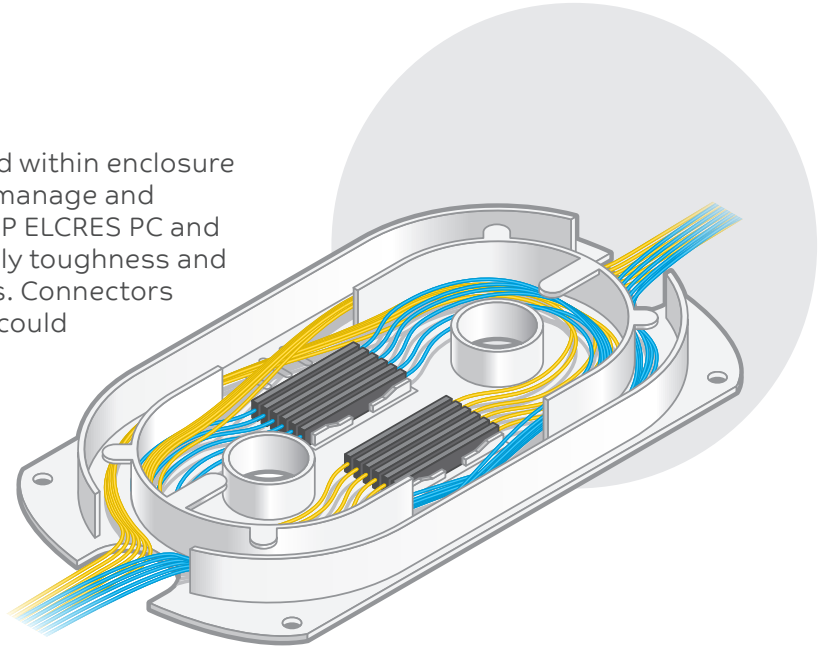
Fiber optic cable termination and splice points, which can be elevated or underground, need protection from harsh conditions including heat/cold, impact, weather, UV, and chemicals. NORYL resins and LNP ELCRES EXL and CXL polycarbonate copolymers are well suited for use in durable enclosure cases that shield against these exposures.



2 FIBER SPLICE TRAY
LNP™ PC COPOLYMERS
ULTEM™ RESINS

- High flow for thin-wall molding
- Dimensional stability
- Toughness
- FR and non-FR options available

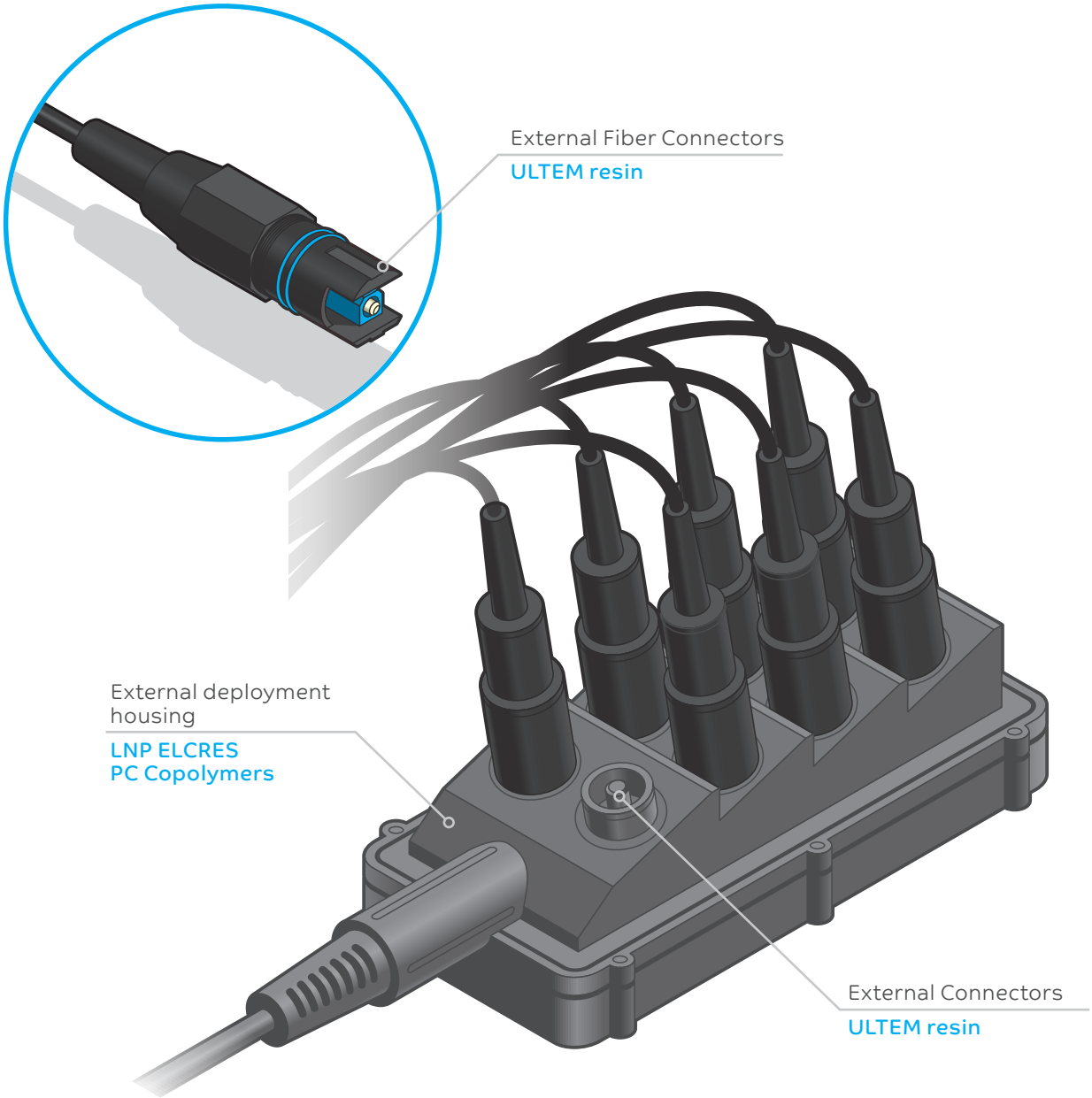
Fiber splice trays, which are contained within enclosure kits, are designed to hold, organize, manage and protect delicate fiber optic cables. LNP ELCRES PC and PC/ABS Copolymers can help to supply toughness and rigidity needed for these applications. Connectors and transceivers used in these trays could benefit from use of ULTEM resin and LNP THERMOCOMP compounds.



3 DATA DEPLOYMENT COMPONENTS
LNP™ ELCRES™ PC COPOLYMERS
ULTEM™ RESINS

- Chemical resistance
- High/low temperature impact resistance
- Weatherability, UV resistance
- Dimensional stability

Outdoor deployment components for FTTx include external enclosures and connectors for network distribution cables. They must withstand broad environmental conditions while delivering secure connectivity and reliable service. LNP ELCRES CXL and EXL copolymers in enclosures, adapters, housings, dust caps, and ULTEM resins in connectors provide robust performance when exposed to the elements.

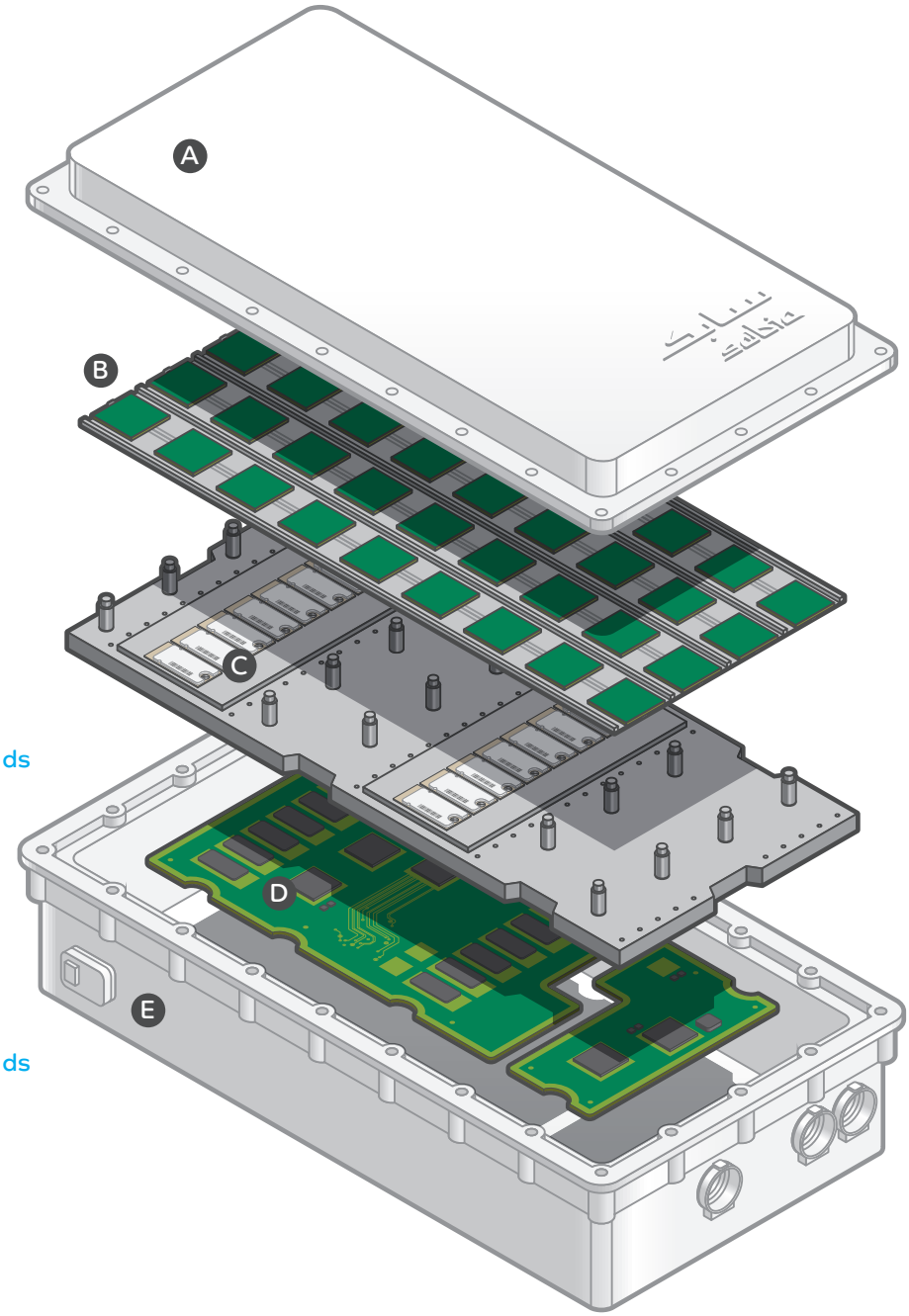


4 ACTIVE ANTENNA UNIT
ULTEM™ RESINS
LNP™ PC COPOLYMERS AND COMPOUNDS
NORYL™ RESINS

- Flame retardance
- Light weight
- Low coefficient of thermal expansion (CTE)
- Dimensionally stable
- Weatherability, UV resistance

A massive MIMO active antenna unit (AAU) in 5G networking houses many antennas, each with dedicated signal processing capability, within one radome. Antenna designers need materials that offer outstanding weatherability, stiffness and strength, light weight for easy installation and dielectric properties.

Connectors and optical transceivers (not pictured) could also benefit from specialty materials.



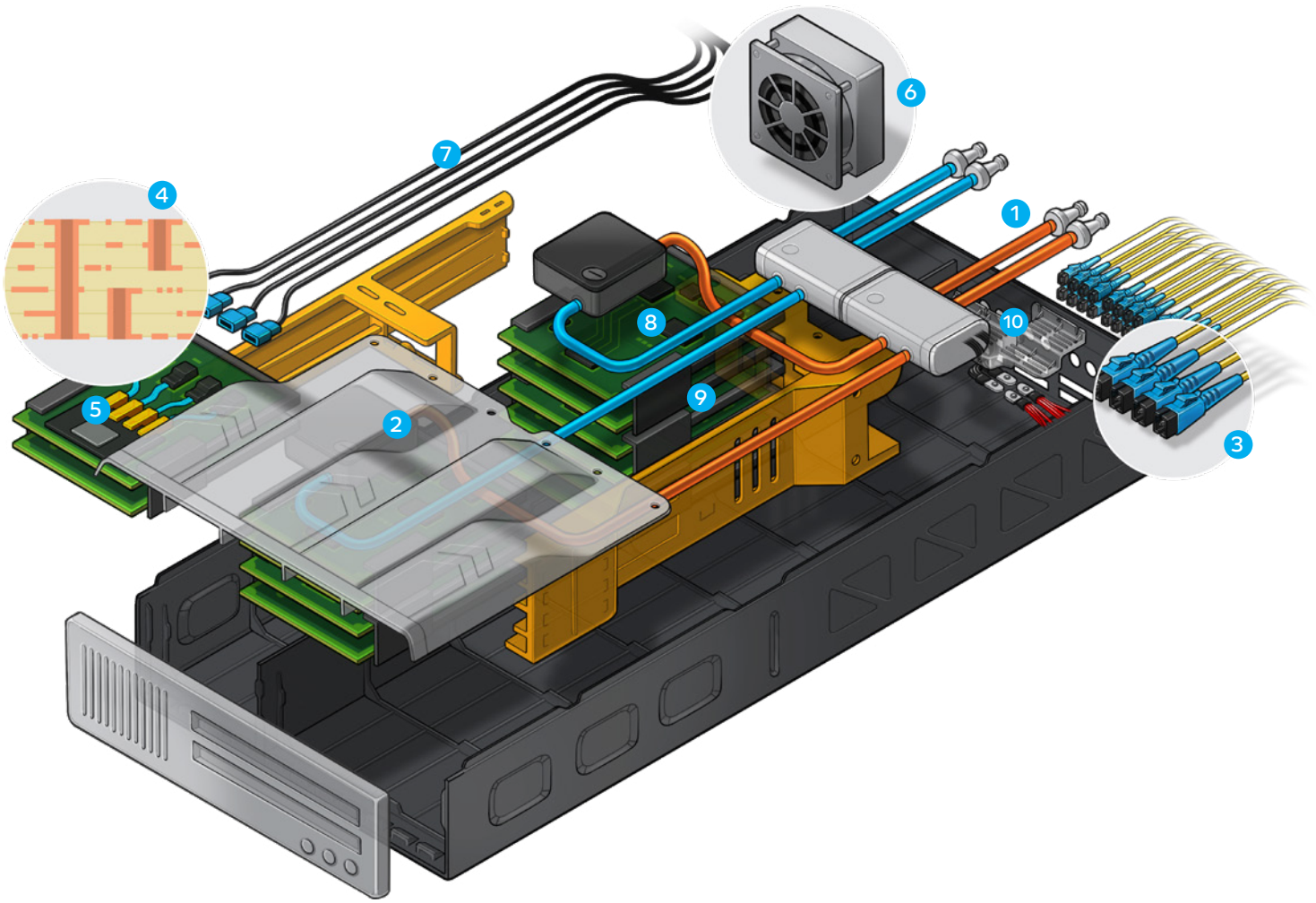
A. RADOME
LNP ELCRES PC Copolymers

B. ANTENNA ARRAY
ULTEM resins
LNP THERMOCOMP compounds

C. RF FILTER ARRAY
ULTEM resins
SHIELDING PLATE
LNP FARADEX Compounds

D. SIGNAL PROCESSING AND POWER SUPPLY UNITS:
NORYL SA resins
ULTEM resins
LNP THERMOCOMP compounds

E. ALUMINUM BACK HOUSING

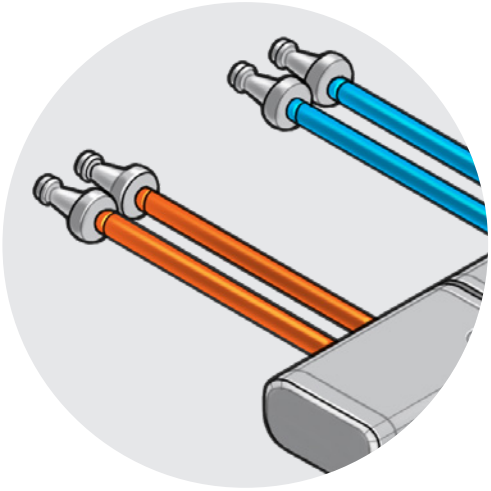


TYPICAL COMPONENTS IN DATA CENTERS

1. LIQUID COOLING CONNECTIONS
   ULTEM™ resins
2. INTERIOR AIR GUIDES, IBLANKS, CABLE GUIDES
   LNP™ ELCRIN™ copolymers
   NORYL™ resins
3. SIGNAL CONNECTORS
   ULTEM™ resins
4. DIELECTRIC SUBSTRATE MATERIALS
   NORYL™ PPE oligomers
5. PLUG-IN, ONBOARD, CO-PACKAGED OPTICS
   ULTEM™ and
   EXTEM™ resins
6. SERVER COOLING FANS
   ULTEM™ resins
   LNP™ ELCRIN™ resins
7. CABLE JACKETING
   SILTEM™ resins
   FLEX NORYL™ resins
   NORYL reactive polyols
8. EMI SHIELDING
   LNP™ FARADEX™ compounds
9. ANTI-STAT AND STATIC DISSIPATIVE IN PACKAGING/SLIDING PARTS
   LNP™ STAT-KON™ and
   STAT-LOY™ compounds
10. BUS BAR COVER
    LNP™ ELCRES™ copolymers

1 LIQUID COOLING CONNECTIONS
ULTEM™ RESINS

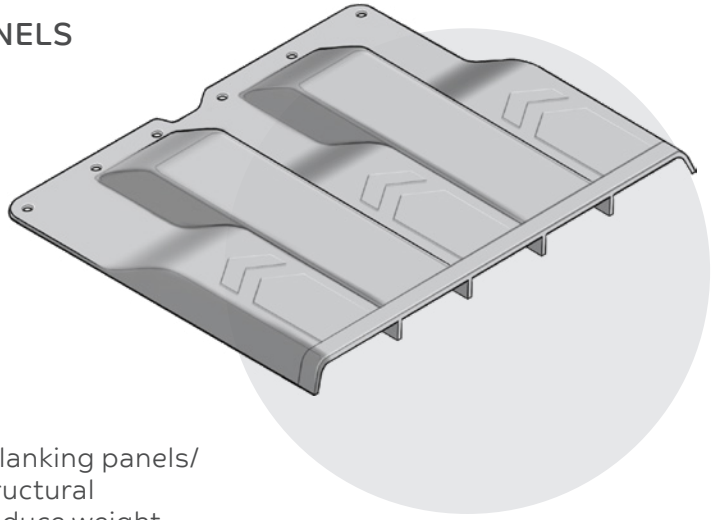
- Inherent FR (non-halogenated), chemical resistance, dimensional stability, burst pressure resistance
- Thin-wall FR: UL94 V0 down to 0.75 mm (0.03 in)
- Potential replacement for corrugated polytetrafluoroethylene (PTFE)
- Renewable, bio-based and PCR grades available



Immersion or direct-to-chip liquid cooling systems dissipate heat more efficiently than air cooling. In these cooling loops, thermoplastics are used in rigid connectors, rigid piping and connection points. ULTEM resins are inherently flame retardant with no additives that can detract from recyclability. These materials should demonstrate low weight loss when exposed to a variety of dielectric cooling fluids.

2 INTERIOR AIR GUIDES, BLANKING PANELS & CABLE GUIDES
LNP™ ELCRIN™ COPOLYMERS
NORYL™ RESINS

- Metal replacement potential
- Design freedom due to impact resistance, high strength, thin-wall capability, high flow, HDT of more than 100°C
- Custom colors
- High PCR content options
- Flame retardancy without intentionally added halogens



Server elements such as interior air guides, blanking panels/ sheets and cable guides may benefit from structural thermoplastics, which can replace metal to reduce weight, support more-intricate designs and offer custom colors. Requirements of structural materials include mechanical strength, sustainability and flame retardancy – ideally without halogens.

Download brochure:
bit.ly/ELCRIN_iQ

Download brochure:
bit.ly/NORYL_Structural_Parts

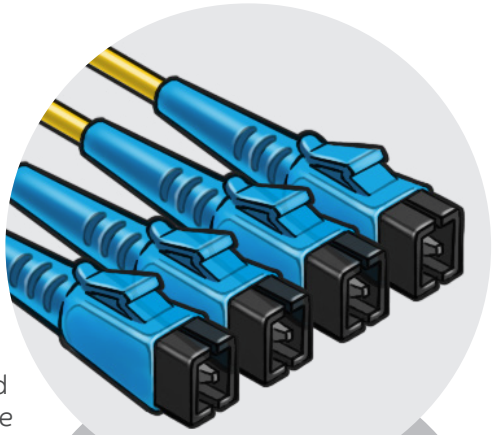
3 CONNECTORS (OPTICAL, ELECTRICAL & EXPANDED BEAM)

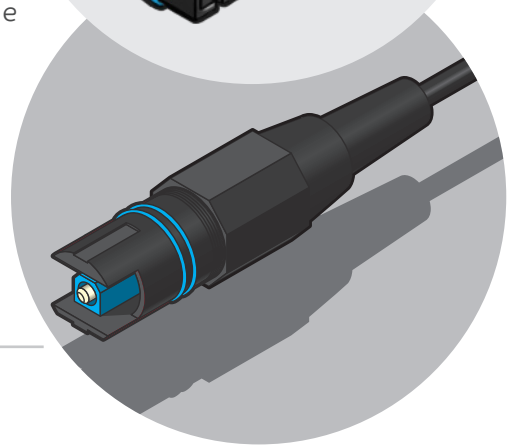
ULTEM™ RESINS

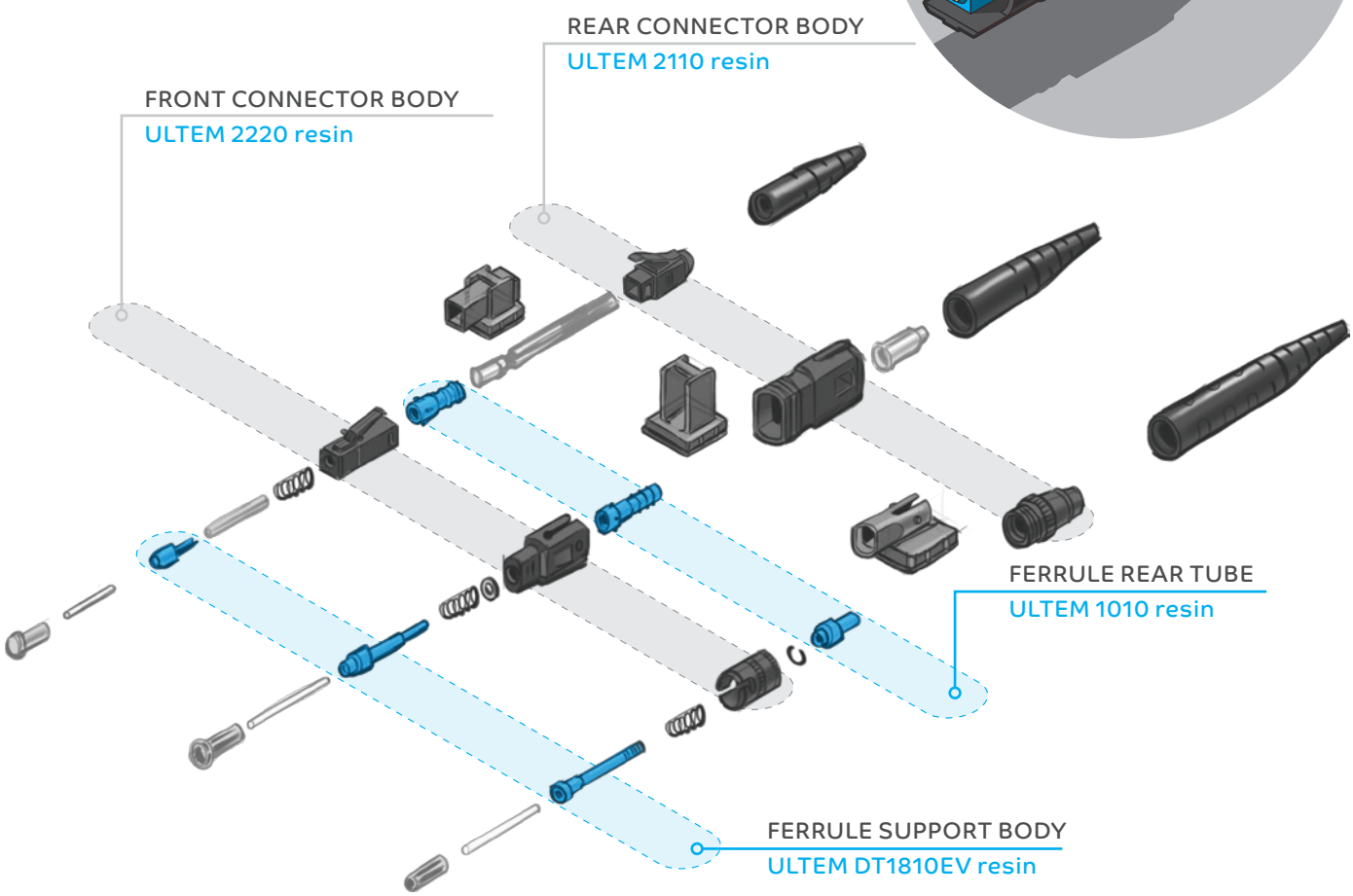
- Dimensional stability, high flow, colorability
- Weatherability, UV and chemical resistance
- ISCC+ Certified renewable made with bio-based feedstocks

Changes in data center and external architectures are expected to significantly impact connector design and material selection. From densification to rapid deployment, and from weathering harsh environments to providing maximum uptime, designing with materials that can adapt and perform across multiple environmental conditions has become increasing more important.

Below are some examples of connector types and sub-components with suggested ULTEM resin grade. Other grades may also be suitable.







Download brochure:
bit.ly/ULTEM_Portfolio

5 PLUG-IN, ON-BOARD, CO-PACKAGED OPTICS
ULTEM™ AND EXTEM™ RESINS

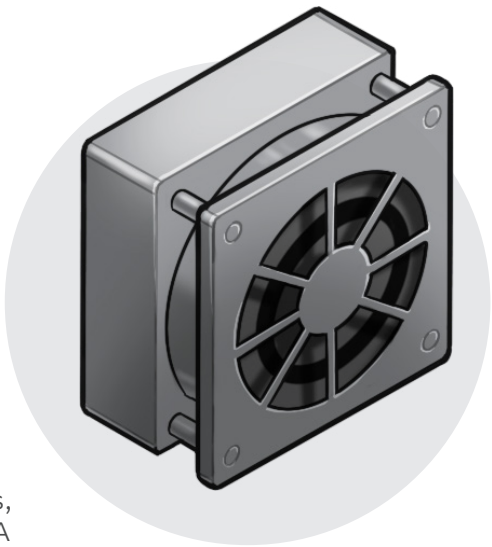
- **Reflow soldering capability (Tg = 260°C)**
- **Near-IR transparency, dimensional stability**

ULTEM resins have been used for decades to produce near-IR transparent lenses in fiber optic connectors, pluggable optical transceivers, and sensors.

Co-packaged optics are a next-generation technology that can help increase data center bandwidth and reduce power consumption and costs by bringing the optical connection much closer to the main switching ASIC. EXTEM RH1017UCL resin addresses these needs as it allows optical engineers the design freedom of injection molding but also the assembly efficiency enabled by having multiple solder reflow capability.

Download brochure:
bit.ly/Photonics-SABIC

6 SERVER COOLING FANS
ULTEM™ RESINS
LNP™ ELCRIN™ RESINS



- **Dimensional stability, creep resistance, high temperature resistance**
- **PCR content options**

ULTEM resins can help designers create cooling fans with improved precision and tolerancing for efficient airflow and heat dissipation, while featuring non-halogenated flame-retardant properties that meet UL94 V0 requirements at gauges down to 0.75mm.

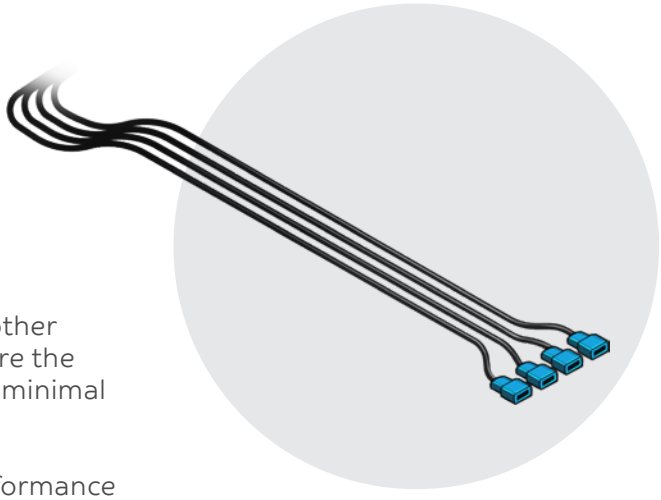
LNP ELCRIN compounds, which are based on PBT resin formulated using ELCRIN iQ upcycling technology, are available with different glass fiber reinforcement percentages, feature non-brominated/non-chlorinated FR, UL94 V0 and 5VA flame ratings, and excellent chemical resistance.

Download brochure:
bit.ly/ULTEM_Cooling_Fans

Download brochure:
bit.ly/ELCRIN_iQ

7 CABLE JACKETING

SILTEM™ RESINS
FLEX NORYL™ RESINS
NORYL™ REACTIVE POLYOLS



- **Novel flexible, non-halogenated FR materials**
- **Colorable**
- **Heat stable**

Cabling system connects servers, switches and other essential networking equipment, helping to ensure the smooth flow of data across multiple devices with minimal latency and high speed.

SILTEM resins can be used in a range of high-performance wire & cable jacketing or tubing applications. It combines high-heat performance, non-halogenated FR, and flexibility. This extrusion material is also resistant to chemicals, UV degradation and radiation.

FLEX NORYL resins can be used in wire and cable insulation and jacketing. These grades provide low moisture absorption, creep resistance, heat stability, colorability and non-halogenated FR, and provide potential alternatives to polyvinyl chloride (PVC) materials.

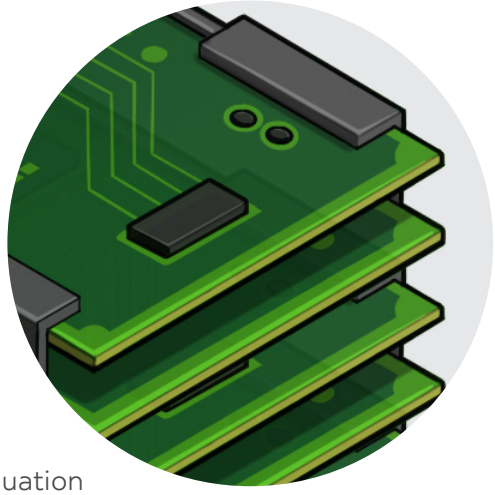
NORYL reactive polyol is a low molecular weight, di-functional hydroxyl-terminated. Adding to a solid elastomer matrix may improve structural, wear and chemical resistance properties in polyurethane formulations. These properties may be maintained at elevated temperatures and humidity levels.

Download brochure:
bit.ly/Discover-SILTEM-resins

Download brochure:
bit.ly/NORYL_Wire_coating

8 EMI SHIELDING
LNP™ FARADEX™ COMPOUNDS

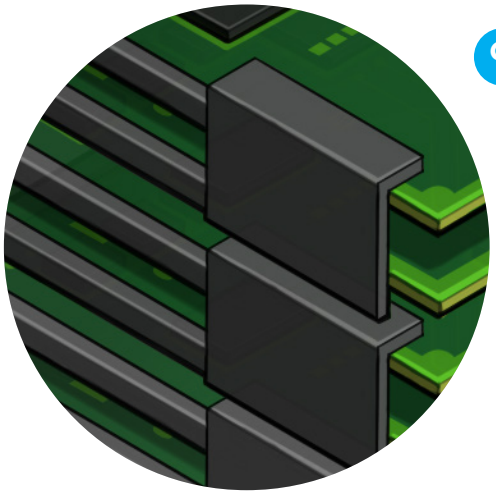
- Flame-retardant options
- Range of base materials
- Lightweight, colorable



EMI can harm IT equipment and communications cables, leading to operational issues ranging from hardware failures to data corruption and loss. Unprotected cables near EMI sources can experience damaging voltage surges. This high-voltage current also generates electrical noise, which interferes with data transfer.

LNP FARADEX compounds with conductive fibers provide attenuation of EMI and radio frequency interference (RFI). They can also meet requirements for electrostatic discharge (ESD). These compounds deliver mechanical properties, part weight and design freedom similar to those of unfilled base resins. They also avoid secondary operations like metal plating to reduce system costs.

Download brochure:
bit.ly/FARADEX_EMI_Shielding



9 ANTI-STATIC AND STATIC DISSIPATION IN PACKAGING, HARD DRIVE PARTS
LNP™ STAT-KON™ COMPOUNDS
LNP™ STAT-LOY™ COMPOUNDS

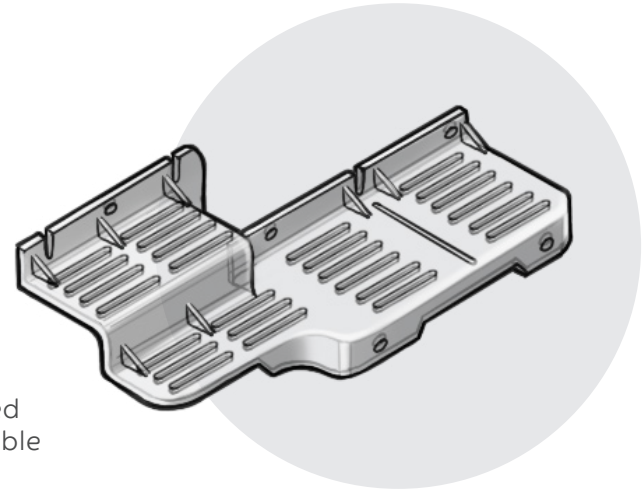
- Electrically conductive additives with varying surface resistivities
- Flame retardant options
- Unfilled or glass/mineral filled
- Multiple base resins

Electronic components such as server hard drives are typically shipped in electrostatic dissipative packaging to prevent charge buildup due to movement during transport. Once in the data center, these components – and the technicians who work with them – need to be protected against static buildup and discharge that can cause shocks and malfunctions.

Learn more here:
bit.ly/STAT-KON_Compounds

10 BUS BAR COVER
LNP™ EXL COMPOUNDS (PC COPOLYMER SERIES)

- High voltage/electrically insulative
- Impact and scratch resistance
- Transparency (some grades)
- PCR and non-halogenated FR options available in some grades



LNP ELCRES EXL resins are polycarbonate (PC) siloxane copolymers featuring low temperature ductility, thin-wall, non-chlorinated/non-brominated FR and easy processing. These materials are available in a wide range of opaque colors.

WE'RE ALWAYS HERE FOR YOU

Did you know that SABIC can offer all these services and more?

- Material suggestions and samples
- Design and predictive engineering services
- COLORXPRESS™ color matching services
- Teardowns and prototyping
- Processing technical support
- Application testing guidance
- Industry-specific regulatory information

Reach out to us for one-on-one support to ensure you have all the information and insights you need to choose the best-fit materials for your applications.

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