

CHEMISTRY THAT MATTERS™



ELECTRICAL & ELECTRONIC SOLUTIONS

SABIC ENGINEERING
THERMOPLASTICS (ETP) RESINS



ABOUT SABIC

SABIC is a market leader in key products such as engineering plastics, polyethylene, ethylene, ethylene glycol, methanol and MTBE.

Fostering innovation and a spirit of ingenuity, we have 21 dedicated Technology & Innovation facilities in Saudi Arabia, the USA, the Netherlands, Spain, Japan, India, China and South Korea.

With over 70 years of legacy of pioneering solutions in advanced engineering thermoplastics, SABIC is positioned to help create new opportunities for our customer's growth and breakthrough applications around the world. We offer our customers our expertise in a variety of ways:

- Material solutions generated from our legacy of creating solutions for your needs
- Application development and design support, logistics and processing expertise to spark new ideas and improved efficiencies, supported by global sales and supply
- Unwavering commitment to drive performance for our customers, ensuring long-term reliability and building valuable relationships







ELECTRICAL & ELECTRONICS

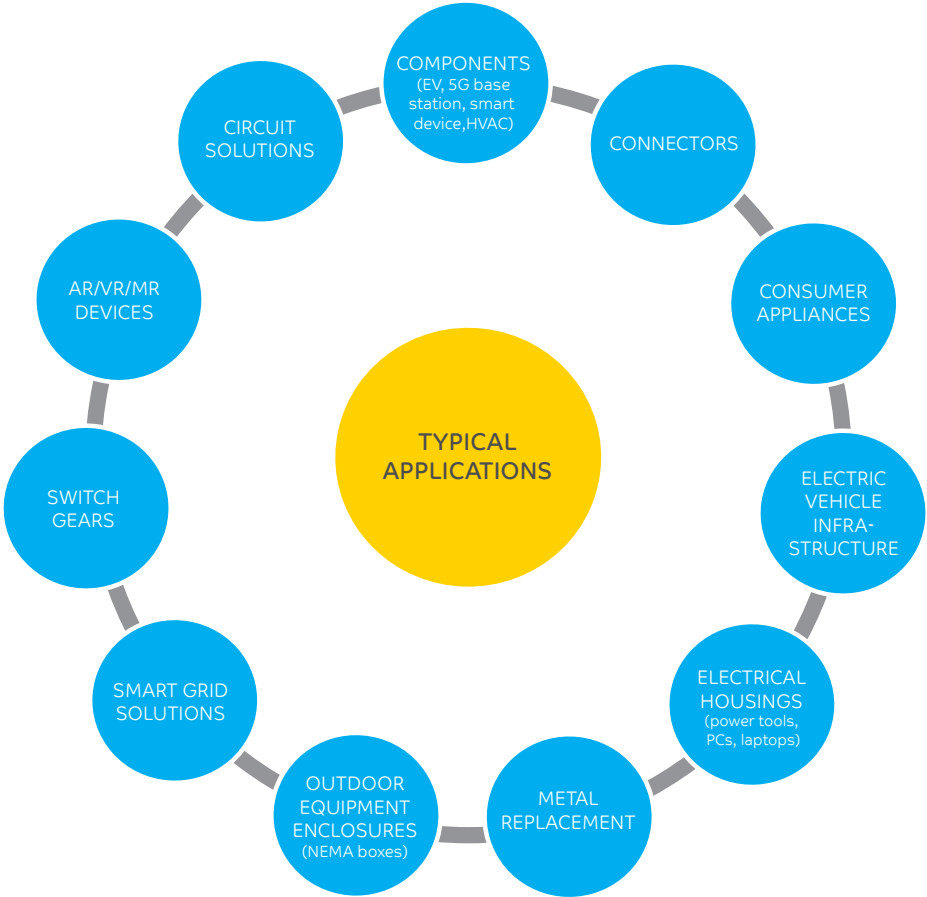
The Internet of Things is building technology into our cities, homes, offices and automobiles, creating a new generation of smart devices.

At the same time, the fierce pace of development and competition in electronics markets drives a constant demand for thinner, lighter, more energy-efficient components.

This, coupled with the trend of inter-connectivity of all devices in higher performing and smaller more compact spaces, has created tremendous opportunity for engineering thermoplastics.

To meet these challenges, manufacturers need to make products that are cost-effective to produce, yet meet consumers' expectations for style, ease of use and sustainability.

SABIC's materials are the foundation for the next generation of electronic devices.



ELECTRONIC DEVICES AND DISPLAYS

As consumer electronics continue to evolve, the future of electronics is inter-connectivity. Everything we feel/touch/see will be part of a connected whole and global advancements in the materials utilized in their development is key to enabling innovation.

Differentiation in design and style is essential to driving commercial success in a very competitive domain.

Electrification is also driving shared requirements across multiple platforms including automotive, consumer, and grid solutions. As the value chains of these markets continue to merge, similar solutions will be required including flame retardancy, functional performance, and sustainability.

SABIC's broad portfolio of materials and our expertise have contributed to the development of many breakthrough electronic device designs, and we continue to create solutions for critical functionality in this segment.

Combining excellent mechanical properties, versatile colorability and processability, SABIC's thermoplastic technology can help make products more durable, reliant, lighter, responsive and visually unique.

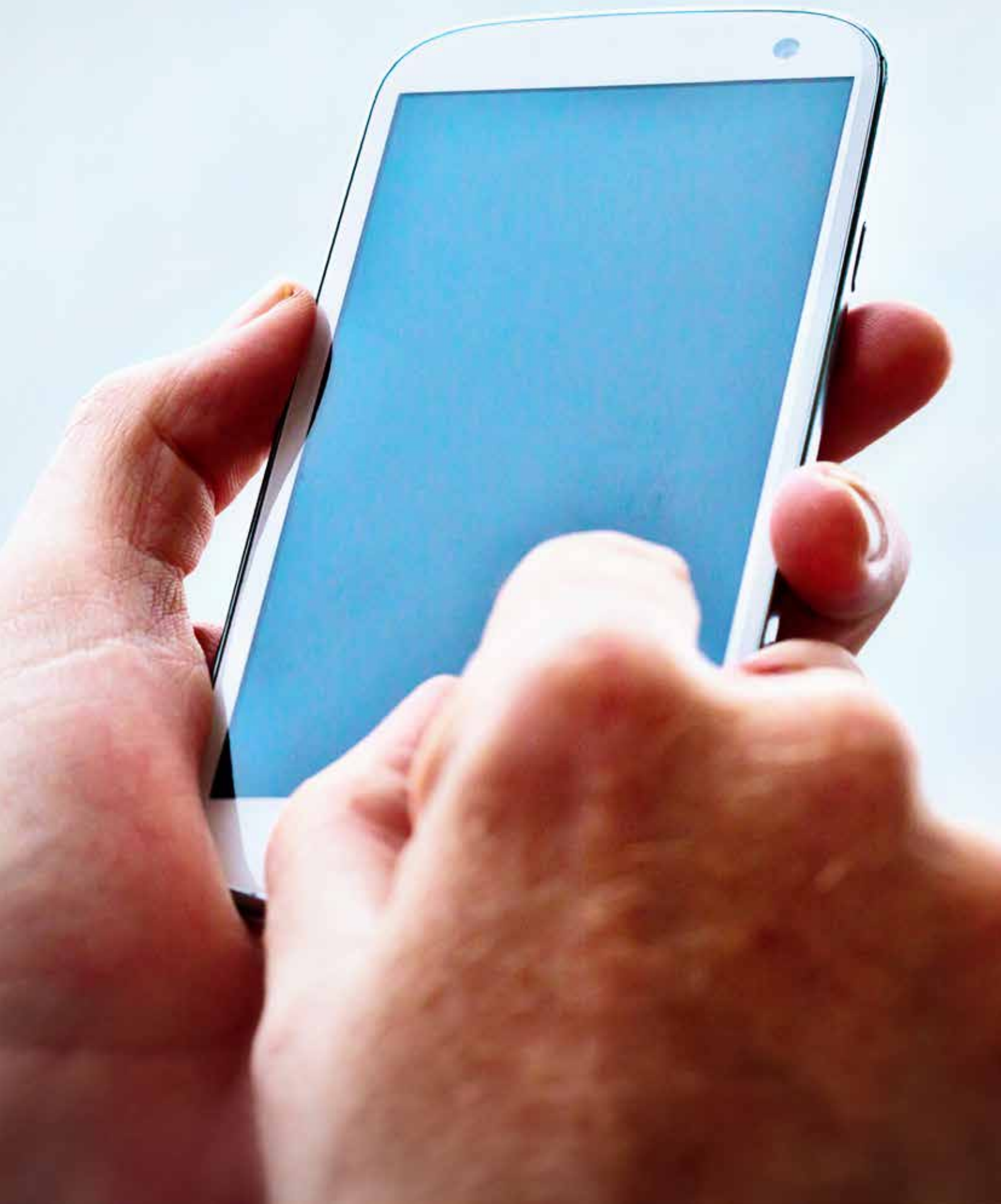
INDUSTRY TRENDS

- 5G
- Data reliability
- Foldable/rollable screens
- High resolution screens
- High speed
- Increased product life cycle
- Increased capacity
- Metal replacement
- Miniaturization and weight reduction
- Sustainability
- System integration to other devices

TYPICAL APPLICATIONS INCLUDE

- Aesthetic solutions
- Display solutions
- Emerging solutions
- Structural solutions
- Sustainable and environmentally-compliant solutions
- Wireless solutions

| SABIC MATERIALS | |
|-----------------|-------------------|
| ABS | CYCOLAC™ FR Resin |
| PC/ABS | CYCOLOY™ FR Resin |
| ASA | GELOY™ FR Resin |
| PC | LEXAN™ FR Resin |
| - | SABIC® PMMA |
| - | SABIC® PC |
| PBT | VALOX™ FR Resin |



ELECTRICAL COMPONENTS AND INFRASTRUCTURE

Shifting requirements and more sustainable solutions are driving change at every level. Electrification of society has presented new challenges to build out the infrastructure to support this shift by making electric vehicles, smart grid solutions, and connected devices more powerful and cost effective.

SABIC provides a wide range of high performance material solutions for various segments in the electrical industry.

Our solutions can help customers address today's top challenges: smaller & thinner components, increased energy storage and management, cost effective design, longer product life, more stringent regulations and enhanced sustainability.

This comprehensive and growing product offering demonstrates the company's deep understanding of customer needs and the ability to deliver tailored materials to meet our customers' requirements.

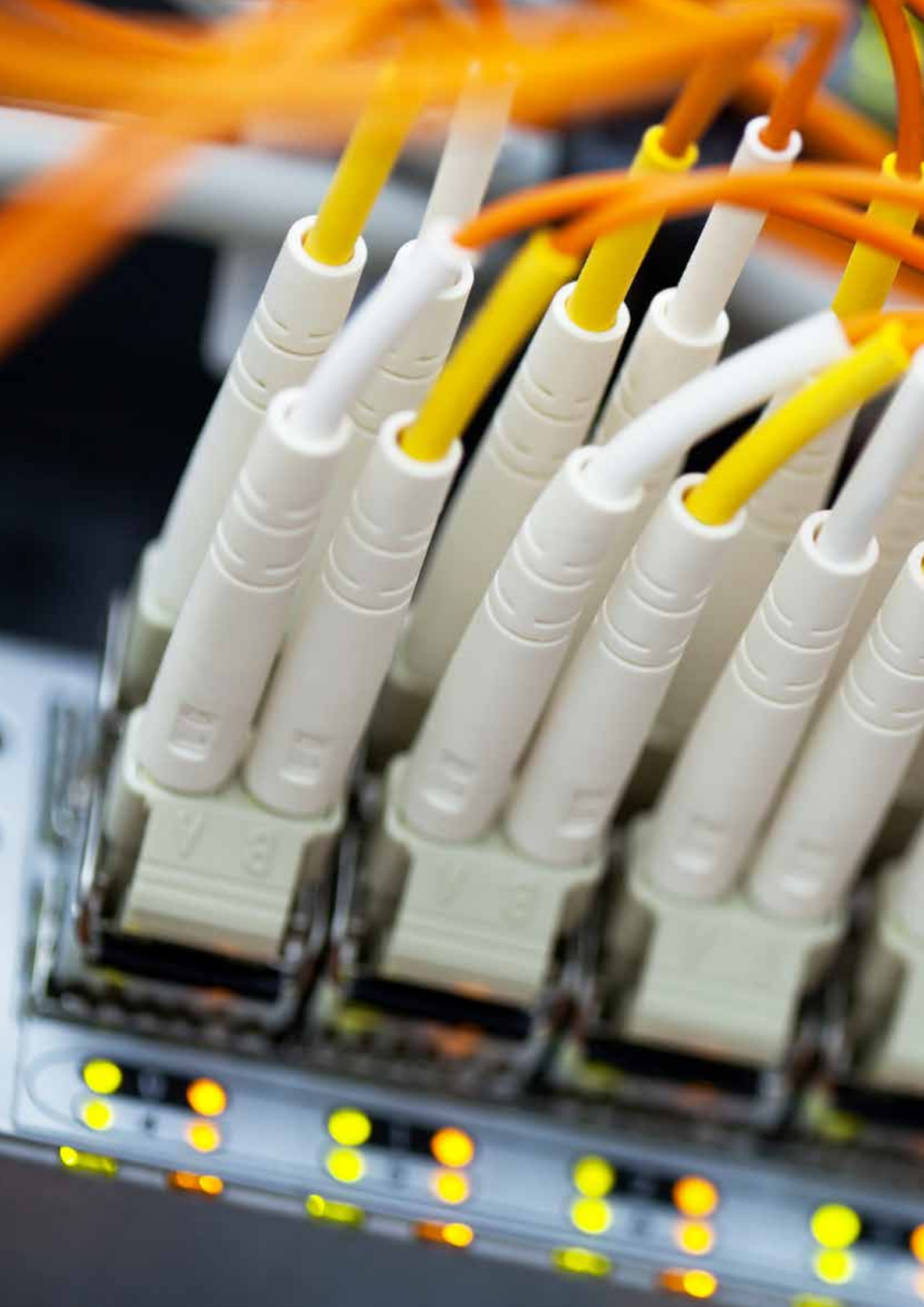
| SABIC MATERIALS | |
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| PC/ABS | CYCOLOY™ FR Resin |
| ASA | GELOY™ FR Resin |
| PC | LEXAN™ FR Resin |
| - | SABIC® PC |
| PBT | VALOX™ FR Resin |

INDUSTRY TRENDS

- Efficiency of energy management
- Electric vehicle infrastructure build- out
- Electrification of mobility
- Electrification of the world
- Harsher operating environments
- Increased data transmission speed
- Increased energy density in storage medium
- Increased use of solar, wind, and other sustainable energy
- Miniturization and increased energy density
- Product life cycle management
- Smart grid technology
- Sustainable solutions
- Thermal management

TYPICAL APPLICATIONS INCLUDE

- Automation
- Cable Management Systems
- Circuit Protection
- Electronic Components
- Energy Management
- EV Infrastructure
- Enclosures
- Photovoltaic Components
- Wire & Cable
- Wiring Devices



LIGHTING

Delivering more energy-efficient illumination and potentially longer lifetimes than conventional light sources, light-emitting diodes (LEDs) also pack a rainbow of intense colors into compact form factors.

The bold new options these solid-state sources introduce to lighting design have attracted interest from OEMs in residential and commercial lighting, automotive, architectural illumination, displays and dozens of other industries.

SABIC provides a wide range of high-performance materials for light-emitting diode (LED) lighting that can help customers address today's top challenges: enhancing designs and aesthetics, extending useful life and greater sustainability and improving cost-effectiveness vs. metal.

SABIC's materials provide the fresh and effective solutions lighting manufacturers are looking for when developing LED lenses and light guides, diffusion covers, bulbs, tubes, reflectors and heat sinks.

This comprehensive and growing product offering demonstrates the company's deep understanding of customer needs – particularly in the retrofit LED space – and its ability to deliver

TYPICAL APPLICATIONS INCLUDE

- Diffusion
- High Heat
- Opaque
- Reflection
- Transparent
- Weatherability

| SABIC MATERIALS | |
|-----------------|-----------------------------------|
| PC/ABS | CYCOLOY™ FR Resin |
| PC | LEXAN™ Resin and LEXAN™ LUX Resin |
| - | SABIC® PMMA |
| - | SABIC® PC |
| PBT | VALOX™ FR Resin |



SABIC SOLUTIONS

LEXAN™ RESIN

CYCOLOY™ RESIN

VALOX™ RESIN

CYCOLAC™ RESIN

GELOY™ RESIN

SABIC® PC

SABIC® PMMA

SABIC® POM



LEXAN™ RESIN

LEXAN™ polycarbonate is an amorphous engineering resin characterized by high levels of mechanical, optical, electrical and thermal performance.

With its broad portfolio of flame retarded and non-flame retarded in both unfilled and glass reinforced grades, LEXAN™ resin is found in a wide a range of electrical applications due to the following key properties:

- Arc and track resistance
CTI>175 volts
- Consistent electrical properties in aggressive environments
- Dimensional stability
- ECO flame retardant systems
- Excellent processability
- Excellent thermal properties
- Extreme toughness
- High heat resistance: RTI of 125°C
- Transparency

CONVERSION METHODS

LEXAN™ resin is tailor made for a range of conversion processes including:

- Blow molding
- Extrusion
- Foam processing
- Injection molding

High flow grades are included in the portfolio, which are suitable for thin wall, long flow length applications.

PERFORMANCE

After its first application life, LEXAN™ resin can be reground and reused. As is characteristic of an engineering thermoplastic, LEXAN™ resin retains a high residual value and in many cases can be recycled into similar application spaces within the electrical segment.

Alternately, LEXAN™ resin can be cascaded down the value chain for use in less demanding applications.

TYPICAL APPLICATIONS

- Connectors
- EV Infrastructure components
- Fuse box housings
- Indoor/outdoor enclosures
- Lenses
- Low voltage switch gear
- Meter covers and housing
- Switches, plugs, and sockets

LEXAN RESIN PORTFOLIO*

LEXAN™ Resin 900 Series*

Unreinforced, flame retardant transparent and opaque UL94 flame class rated grades. Available with release and UV packages.

| | | | |
|-------------|------------------|-----------|------------|
| TRANSPARENT | 13 MFI, V0@3.0mm | 920A/923A | 925A/925AU |
| | 10 MFI, V0@3.0mm | 940A/943A | 945AU |
| | 7 MFI, V0 @1.5mm | | 9915A |

NON BR & CL FR

LEXAN™ Resin Glass Reinforced Series*

10% to 30% glass reinforced, UL94 flame class rated grades.

| | | | | |
|-----------|-----|--------------------------|-----------|---------------|
| GF FILLED | 10% | 7 MFI, V0@1.5mm | 500R/503R | 505R(U)/515RU |
| | 20% | 5-9 MFI, V1/ V0@1.5mm | 3412R | 3412ECR |
| OPAQUE | | 7 MFI, V0@1.1 & 1.5mm | 950 | 955 |
| | | 10 MFI, V0@1.1 & 1.5mm | 940/943 | 945/945U |
| | | 14 MFI, V0@1.1 & 1.5mm | 920/923 | 925/925U |
| | | 18 MFI, V0@1.1 mm | | 915R |

NON BR & CL FR

LEXAN™ Resin 200 Series*

Unreinforced, flame retardant grades available with UV and release packages. All rated V2 at measured thickness.

| | | |
|----------------------|------------------------|-----------|
| UL94 V2 | EXTREME FLOW; MVR=36 | ML3729(R) |
| | VERY HIGH FLOW; MVR=26 | HF1110(R) |
| | | HF1130(R) |
| | HIGH FLOW; MVR=21 | 221R |
| | | 223R |
| MEDIUM FLOW; MVR=12 | 241R | |
| | 243R | |
| STANDARD FLOW; MVR=6 | 201R | |
| | 203R | |

LEXAN™ Resin FL Series*

Foamable Flame Retardant grades for structural components at reduced weight.

| | | | |
|------------|-----|-------|----------------|
| GFF FILLED | 5% | FL905 | NON BR & CL FR |
| | 10% | FL910 | |

*Key global portfolio offerings only.
For details on the full portfolio available in your region please ask your local SABIC contact.
Please refer to technical data sheet and UL yellow card on www.sabic.com for updated properties.



CYCOLOY™ RESIN

CYCOLOY™ resins are amorphous polycarbonate/acrylonitrile-butadiene-styrene (PC/ABS) blends or modified PC blends, which combine the most desirable properties of both resins; the excellent processability of ABS and the superior low temperature impact and heat resistance of PC.

CYCOLOY™ resins are an excellent candidate for electrical and electronics industry applications, having been developed to meet industry standards offering the following:

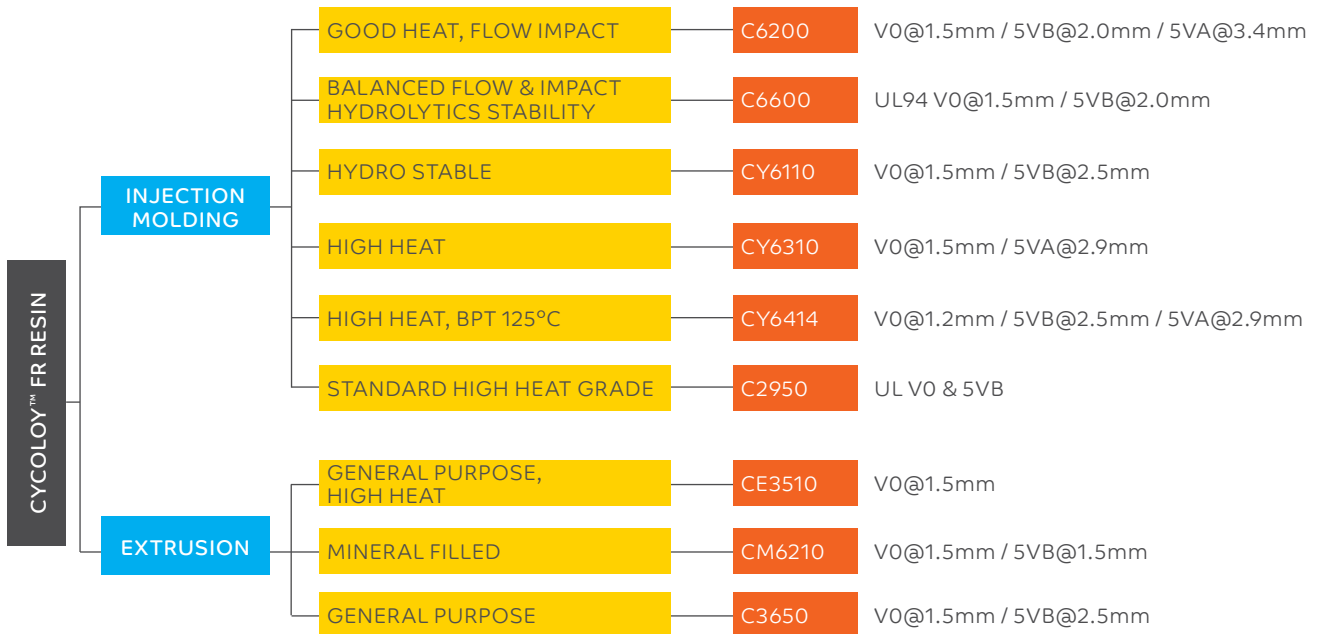
- Chlorine/bromine free FR systems
- Design flexibility for intricate components for part integration
- Excellent flow for thin wall parts
- Excellent processability
- Good thermal resistance
- High impact resistance/ductility
- High tracking resistance
- Range of surface finishes

TYPICAL APPLICATIONS

- Appliance housings
- Cable channels and ducts
- Display components
- Electrical enclosures
- Game consoles
- Low voltage switch gear
- Modem and router housings
- Switches, plugs, and sockets

CYCOLOY™ Flame Retardant (FR) Portfolio*

Unreinforced flame retardant grades for a wide range of electrical and electronics applications. These non-chlorinated and non-brominated formulations have UL94V0/5V listings to meet the requirements of the current regulatory environment.



*Key global portfolio offerings only.

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SUSTAINABILITY

With increased demands on recyclability of products, CYCOLOY™ resin products can incorporate PCR polycarbonate which can contribute to lower material, energy and greenhouse gas (GHG) footprint.

CYCOLOY™ resin PCR grades deliver superior mechanical performance, and excellent processability, making them suitable for demanding applications such as enclosures and casings in the electrical and consumer electronics industry due to the following key benefits:

- Can contribute to EPEAT eco-labeling
- Chlorine and bromine-free flame retardant
- Cleaner chemistry compliance to REACH, RoHS, and IEC
- Lower GHG and energy footprints
- Wide range of flow, modulus, and performance



VALOX™ RESIN

VALOX™ resin is a fast crystallizing thermoplastic polyester that offers the designer a performance profile engineered for demanding end-use environments.

VALOX™ resin is processable by injection molding, blow molding, extrusion structural foam and thermoforming. This, coupled with excellent physical properties, meets the toughest performance challenges in electrical & electronic (E&E) applications.

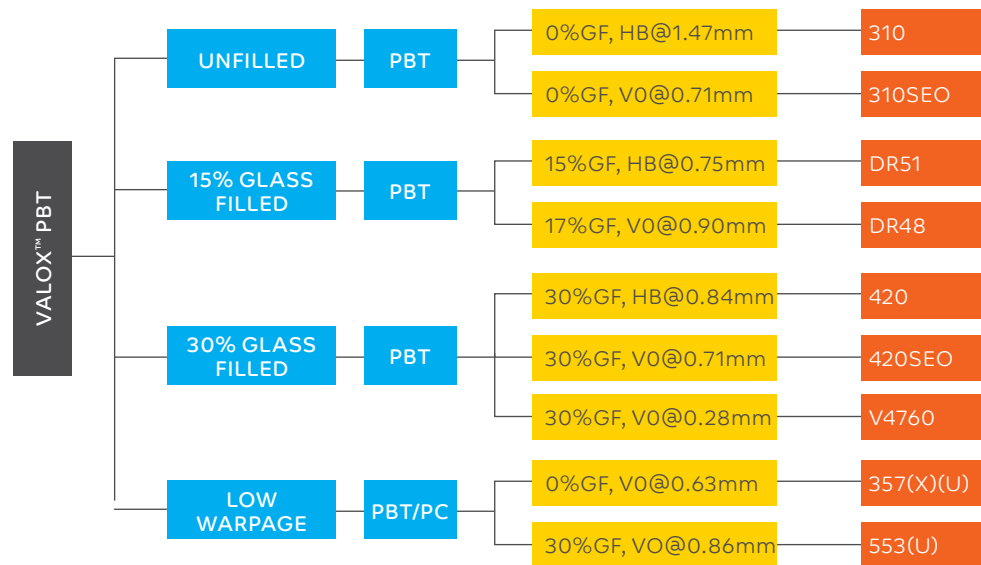
TYPICAL CHARACTERISTICS

- Excellent dimensional stability
- High flow & fast cycling
- High heat resistance
- High strength-to-weight ratio
- Ignition resistance
- Inherent lubricity
- Low moisture absorption
- Outstanding chemical resistance
- Superior dielectric strength

TYPICAL APPLICATIONS

- Automotive electrical systems
- Circuit protection
- Compressors and motor windings
- Connectors, switches
- Electrical vehicle infrastructure
- Fibers & food contact applications
- Lighting and under hood
- Nylon & acetal replacement
- Sensors

VALOX™ PBT Portfolio*



*Key global portfolio offerings only.
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ELECTRICAL PROPERTIES

VALOX™ resins have excellent electrical properties. Compared to most other engineering materials, VALOX™ resins exhibit higher dielectric strength and insulation resistance, superior arc resistance, consistent dielectric constant and low dissipation factors. Flame retardant grades of VALOX™ resin are also available.

With their very low water absorption rates, VALOX™ resins maintain electrical properties even under humid conditions. Because of the solvent resistance of the materials, electronic components molded from VALOX™ resin can be easily degreased using alcohols.

HIGH HEAT RESISTANCE AND LOW THERMAL EXPANSION

All VALOX™ resins show outstanding thermal resistance, exhibiting heat deflection temperatures ranging from 154°C in unreinforced grades up to 215°C in glass-reinforced grades.

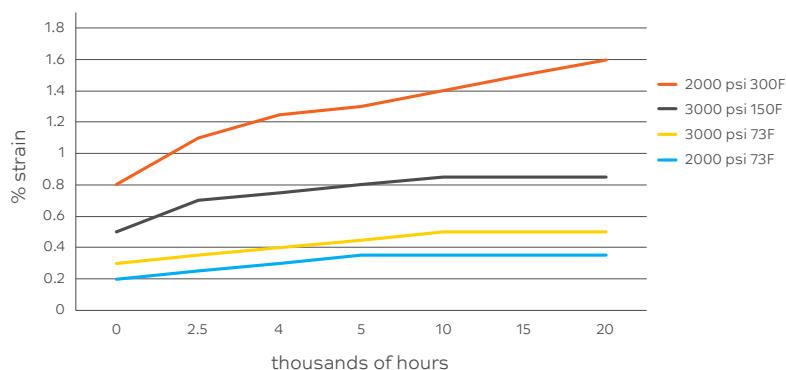
In addition to high temperature resistance, glass reinforced grades of VALOX™ resin have very low mean coefficients of thermal expansion that can be used under conditions of thermal cycling.

DIMENSIONAL STABILITY FOR CRITICAL TOLERANCES

With their combination of high heat distortion temperatures, excellent chemical resistance, and low water absorption, VALOX™ resins offer long-term dimensional stability unmatched among crystalline polymers, as well as low deformation under load.

The figure below highlights the creep characteristics of VALOX™ 420SEO demonstrating that VALOX™ resins are stable under load at elevated temperatures and for long periods. This stability, plus low water absorption and post-mold crystallization makes VALOX™ resin a logical candidate for a number of applications in the E&E segment.

Flexural creep 420SEO





CYCOLAC™ RESIN

CYCOLAC™ ABS resin is a terpolymer which is formed by blending an amorphous thermoplastic copolymer of acrylonitrile (A) and Styrene (S), and an elastomeric component which is usually polybutadiene or a butadiene copolymer (B).

The flexibility offered by the use of the three monomer systems allows the property profile to be tailored to meet a broad range of end-use requirements within the electrical industry.

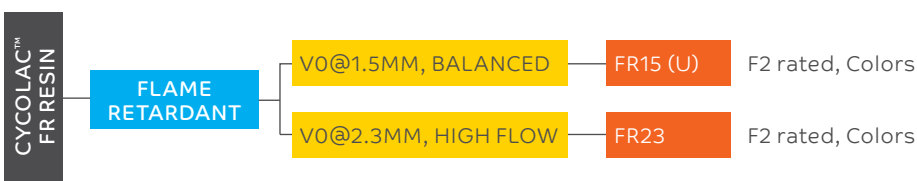
TYPICAL CHARACTERISTICS

- Colorability
- Excellent surface appearance / High gloss finish
- Excellent processability
- Good practical impact
- Heat resistance up to 100°C
- High dimensional stability
- Low specific gravity

TYPICAL APPLICATIONS

- Alarm system components
- Electrical housings
- HVAC control covers
- Indoor/outdoor enclosures
- Lamp housings
- Lighting reflectors
- Switches, plugs, connectors

CYCOLAC™ Flame Retardant (FR) Portfolio*



*Key global portfolio offerings only.
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 Please refer to technical data sheet and UL yellow card on www.sabic.com for updated properties.



68 °F
AUTO
ECO 
23 °F
OUTDOOR



GELOY™ RESIN

GELOY™ resins are amorphous PC/ASA blends that offer excellent property retention after weathering of ASA materials and the superior mechanical properties and heat resistance of polycarbonate (PC) resins.

There are a variety of product choices that can be tailored to the specific requirements of an application - offering an excellent balance of heat, flow and impact. These unique properties are well suited for applications in the electrical industry.

TYPICAL CHARACTERISTICS

- High dimensional stability
- High heat resistance
- Non-chlorinated/non-brominated FR system
- Outdoor use
- Property retention after weathering
- Superior weathering
- Visualfx* (paint alternative)

TYPICAL APPLICATIONS

- Alarm system components
- Enclosures
- Lighting end caps
- Plugs and sockets
- Wall switches

GELOY™ Resin High Performance Portfolio*



*Key global portfolio offerings only.

For details on the full portfolio available in your region please ask your local SABIC contact. Please refer to technical data sheet and UL yellow card on www.sabic.com for updated properties.

SABIC® PC

Polycarbonate (PC) is an amorphous thermoplastic that is a clear, colorless polymer with outstanding physical properties, extensively used for engineering, electrical and optical applications.

Special grades can be offered for use in custom compounding, extrusion, general purpose, electrical and optical media applications. These products are available in a standard transparent color and are excellent candidates for a wide variety of applications and compounding needs.

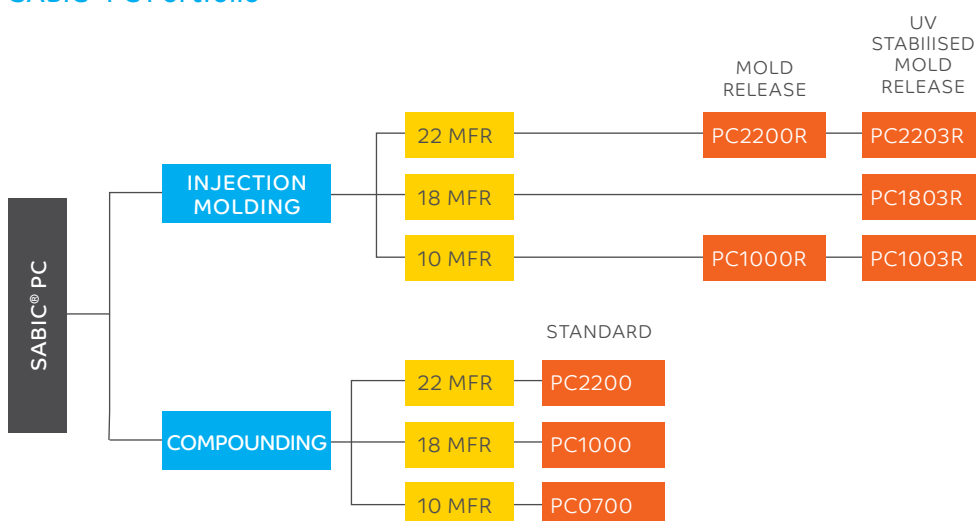
TYPICAL CHARACTERISTICS

- High transparency
- Dimensional stability
- UV stability
- High heat resistance
- Exceptional impact resistance
- Advanced processability

TYPICAL APPLICATIONS

- Electrical domestic switches and meter housing
- Electrical housing & enclosures
- Fiber optic hoses & splice boxes
- LED light bulbs/luminaries
- Switch gears, relays and connectors

SABIC® PC Portfolio*



*Key global portfolio offerings only.

For details on the full portfolio available in your region please ask your local SABIC contact.

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SABIC® PMMA

POLYMETHYL METHACRYLATE (PMMA) is an amorphous thermoplastic commonly referred to as acrylic.

SABIC® PMMA can be used for electrical & electronic applications that require high transparency, performance and weight reduction, substituting glass in many applications.

TYPICAL CHARACTERISTICS

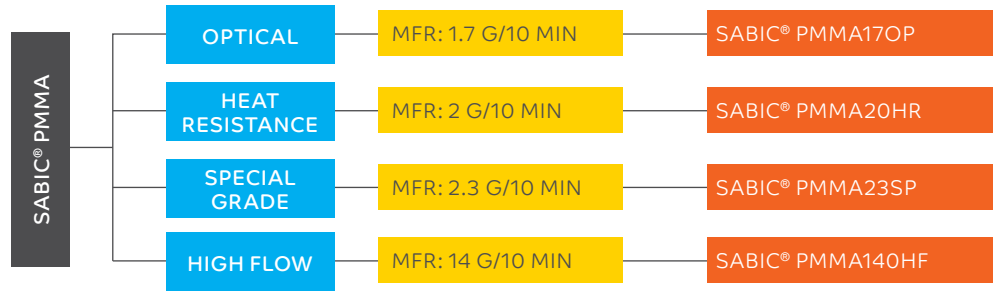
- High transparency
- Good chemical resistance
- Excellent weatherability
- Lightweight
- Excellent scratch resistance
- Ease of processing
- High gloss & colorability
- Good impact resistance

TYPICAL APPLICATIONS

- LED Lenses
- Signage
- Streetlight covers
- Light guide plates
- Screens
- TV's



SABIC® PMMA Portfolio*



*Key global portfolio offerings only.
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SABIC® POM

POLYOXYMETHYLENE (POM) is a semi-crystalline thermoplastic material commonly referred to as acetal or polyacetal. SABIC® POM is suitable for highly engineered applications that require precision and durability. It may be used to replace metal in many applications.

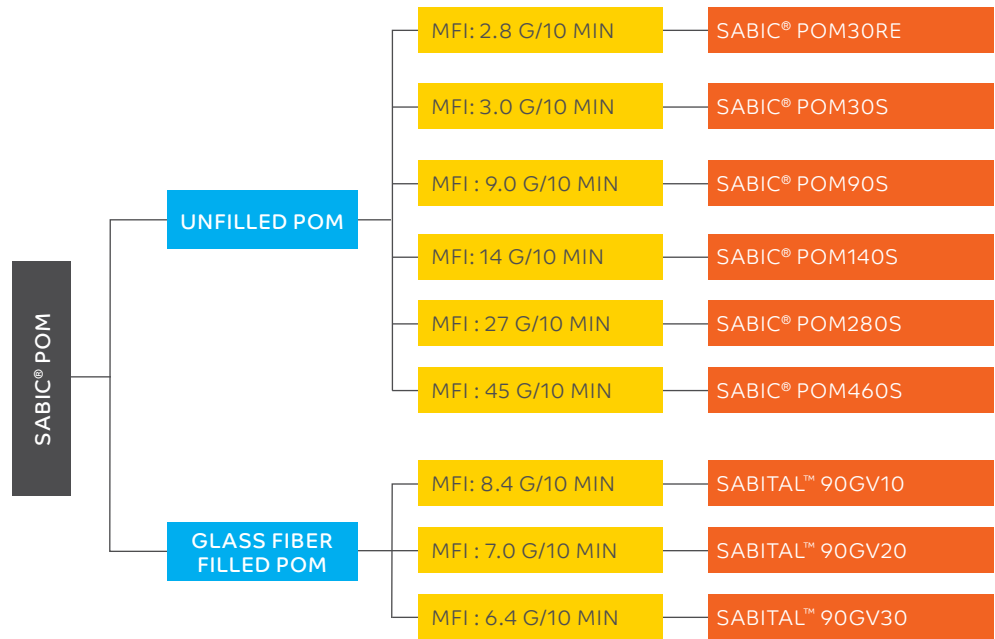
TYPICAL CHARACTERISTICS

- High strength and stiffness
- Excellent wear properties
- Superior chemical resistance
- Ease of machining
- Self-lubrication
- Good dimensional stability

TYPICAL APPLICATIONS

- Washing machines
- Gears
- Printers
- Keyboard push buttons

SABIC® POM Portfolio*



*Key global portfolio offerings only.
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