Celanese

The chemistry inside innovation™

ENGINEERED MATERIALS

SOLUTIONS OVERVIEW

PARTNERING WITH CUSTOMERS ON THE TOUGHEST MATERIAL CHALLENGES SINCE 1918

At Celanese, we develop and manufacture a variety of material solutions essential for everyday living. These solutions range from engineered thermoplastics that enable lightweighting of vehicles, enhanced connectivity for IOT infrastructure, as well as providing healthcare solutions for life. We aspire to be your preferred development partner in every region where you operate through our extensive global network in production and technology centers. Our goal is to become your development partner of choice by providing unparalleled applications capabilities and expertise, speed and agility in problem solving and our reliable, global and integrated supply network.

We continue to broaden our portfolio by adding functionality to existing polymers and acquisitions of new or highly complementary specialty materials businesses. Couple this with our depth of world-class engineering expertise and one of the largest portfolio offerings in our industry, our Engineered Materials business will act as an extension of your design team, supporting you to achieve your business goals.

We also have a deep sense of responsibility to develop sustainable solutions to help our customers achieve their sustainability objectives. Celanese is much more than just a provider of engineered materials, we are focused on developing and expanding our sustainable product offerings to help "close the loop" on production and consumption. At Celanese, we recognize our customer's aspirations and can tailor offerings to take your applications to the next level of performance. I invite you to get to know Celanese Engineered Materials better. We look forward to finding out how we can work together to bring you cutting edge solutions that improve the world."

TOM KELLY
Senior Vice President, Engineered Materials

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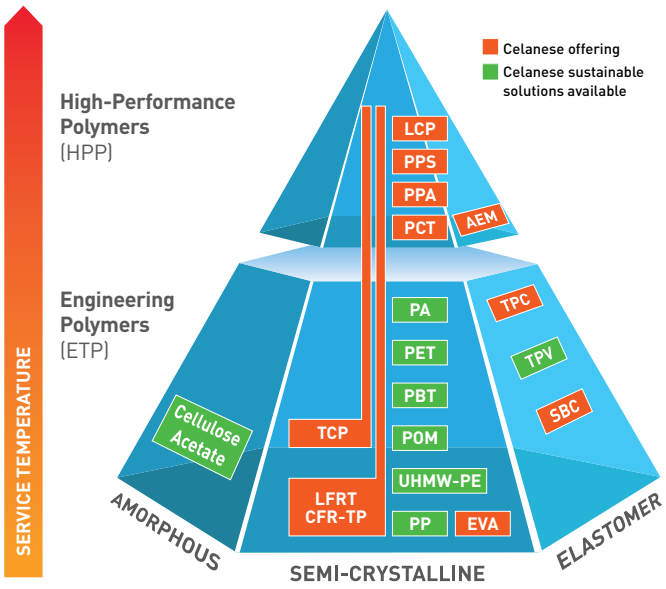
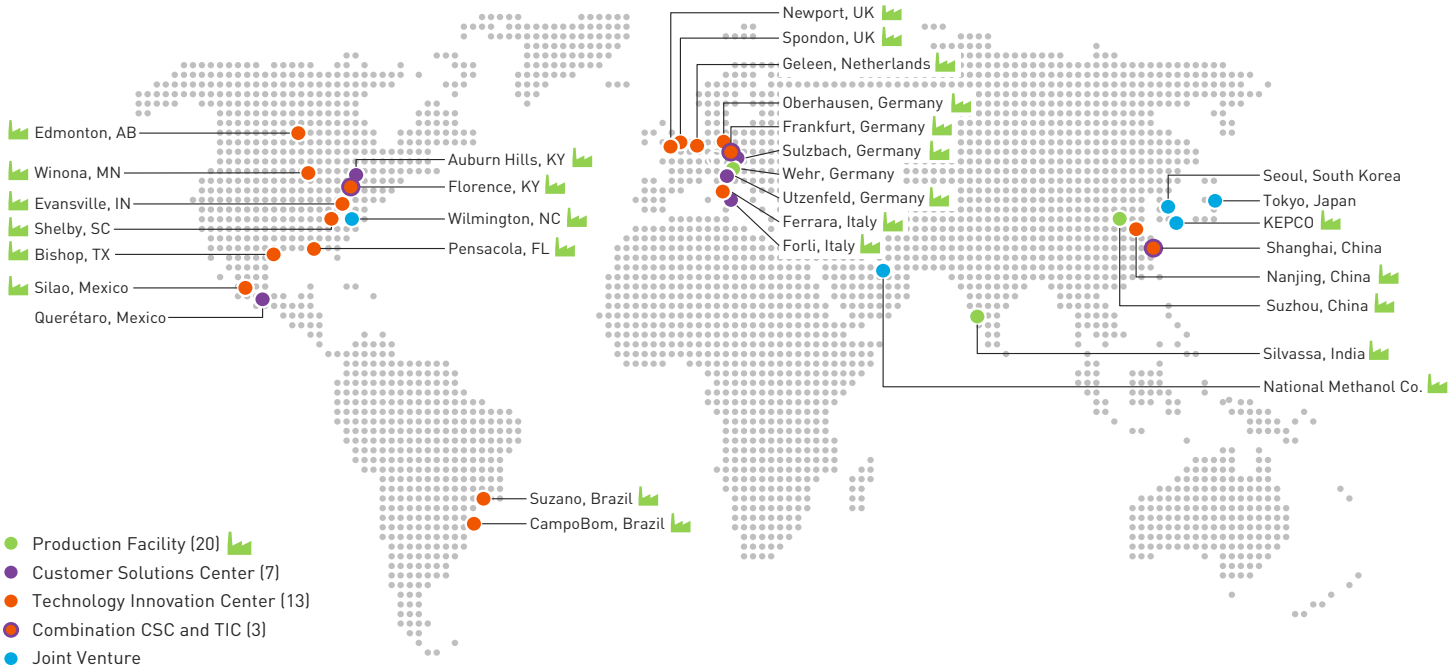
DESIGNING THE FUTURE TOGETHER

The phrase that best describes Celanese is the chemistry inside innovation, which represents our depth and breadth of knowledge, our desire to innovate and create, and our dedication to becoming your partner to help you succeed. With our industry expertise in engineered materials and commitment to collaboration and technical service, we can work together to help you bring the most innovative solutions to the marketplace. Celanese has devoted decades of technical expertise in the art of material selection to cultivate our extensive product line of engineered materials. This allows our engineers the freedom to design and manufacture high-performing, attractive and practical components that expand upon the capabilities of existing products based on our customers' requirements. Celanese will dedicate the time and resources necessary to understand your company's operational, functional, sustainable and financial requirements to select the material solution that will meet your current and future needs.

Whatever your product challenge, a Celanese polymer can help you overcome it through the art of material selection. Our engineered materials are designed to help manufacturers reduce component weight, consolidate parts and meet tough specifications and regulations. In addition to reducing costs and facilitating environmental and safety compliance, our engineered materials provide the following solutions:

- Lightweight strength
- Dimensional stability
- Excellent electrical properties
- Flame retardancy
- Low moisture absorption
- Tough durability
- Chemical corrosion and temperature resistance
- UV stability
- Built-in aesthetics
- Increased operational efficiency
- Sustainability





GLOBAL REACH
AND OPERATIONS

Celanese maintains a global presence to meet the sales and manufacturing needs of customers around the world.

By providing worldwide accessibility to our extensive product line of engineering materials, Celanese has the superior capability to provide innovative solutions to customers in a variety of industries, regardless of the size, scope or complexity of their requirements.

TECHNICAL SERVICE & SUPPORT

Celanese offers a comprehensive technical service model that reflects our knowledge of the marketplace and enhances our customers' capabilities to develop products that improve the world.

Over the past century, we've worked with our customers around the globe to assist them with our extensive technical service and support offerings in all phases of the development process.

CAPABILTIES

1. Material Selection
2. Testing & Analytics
3. Color Development
4. Field Technical Services
5. Technical Exchanges & Training Programs

DESIGN/CAE SERVICES

1. Filling Simulation
2. Static & Dynamic Simulation
3. Thermal Simulation

ENGINEERING

1. Application Development
2. Application Processing & Prototyping

CUSTOMIZED APPLICATION TESTING

1. Comprehensive Material
2. Application Testing Capabilities

CIRCULAR ECONOMY

A CELANESE SUSTAINABLE SOLUTION

Celanese seeks to combine innovation and chemistry to deliver products and solutions made from renewable resources to reduce waste and minimize our carbon footprint, in hopes of achieving a more equitable and productive circular economy.

To help our customers across all industries meet these growing demands, we focus on three key aspects of Circular Economy:

1

Renewable feedstocks which include materials made with biological or renewable materials.

2

Energy and Resource Efficiency which involve alternative products that require less energy or resources to perform the same function.

3

End of Life considerations with products that can be recycled or composted at the end of their life to create new materials and products.

Celanese offers a wide and growing range of products that meet one or more of these critical needs:

		RENEWABLE FEEDSTOCKS	ENERGY AND RESOURCE EFFICIENCY	CLOSED-LOOP PRODUCTS
POM ECO-B	A chemically identical alternative to traditional POM made from mass-balance bio-based feedstocks	✓	✓	
BlueRidge™ Cellulosic Pellets	A bio-based compostable solution for single-use plastics	✓		✓
Automotive Light-Weighting Solution	Technologies that replace metal to make vehicles lighter and more fuel efficient		✓	
ECOMID®	Nylon-based materials made from post-consumer and post-industrial recycled feedstocks	✓		
Emulsions with Renewable Feedstocks	Emulsions made from sustainable feedstocks used in Paints & Coatings	✓		
Emulsions Based on Recycled Content	Vinyl-based emulsions containing recycled content for a variety of applications such as carpet tiles and adhesives	✓		
Lithium Battery Separators	Battery solution technologies for electric vehicles and other battery-powered consumer products		✓	
Aesthetic and Color Polymer Solutions	Eliminating costly and pollutive painting, coating, and finishing steps in many applications like automotive		✓	
Elotex® RDP	Redispersible polymer powders improving the efficiency of cement adhesives and other construction materials		✓	
Clarifoil®	Bio-based compostable film for packaging applications	✓		✓
Santoprene® TPV	Grades available with at least 15% post-consumer recycled (PCR) material, offers an optimized balance of performance for applications across a range of industries	✓	✓	

FEATURED INDUSTRIES

MEDICAL: BRINGING SCIENCE TO LIFE

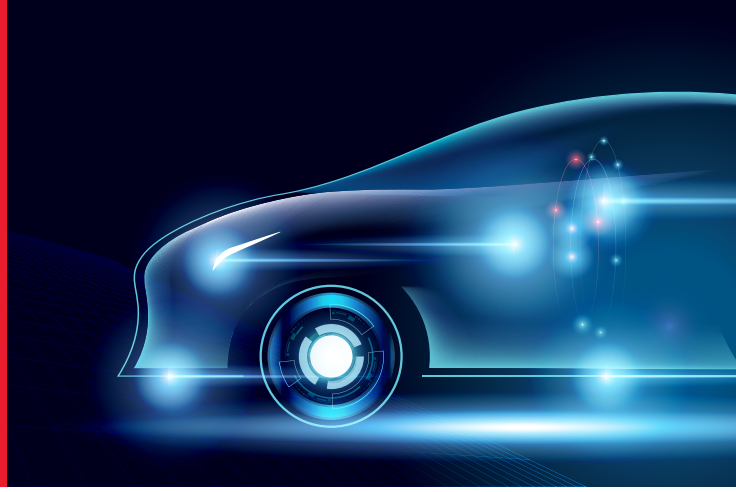
Improve patient care with cutting-edge medical and pharmaceutical solutions and expertise, delivering next-generation design flexibility for your medical devices and pharmaceutical programs. Celanese designs solutions to help you launch innovative devices and therapies that improve patient care. We invest in cutting-edge medical and pharmaceutical materials and expertise to ensure next-generation design flexibility. Our cross-functional customer project teams, including in-house technical experts, zero in on the unique needs of your project and to recommend a bespoke package of service, product and support, helping accelerate your project timeline.

HIGHLIGHTED FEATURED GRADES

Material	Description	Sustained drug delivery	Connected devices	Wearable pumps	Injection devices	Inhalation devices	Implantable medical devices	Surgical solutions	Laboratory and diagnostic equipment	Medical consumables and packaging	Medical filtration
VitalDose® EVA	• Formulate implants for long-acting controlled release therapeutics • Compatible with small molecules, biologics, and nucleotides • Very high drug loadings (>75%) are feasible, enabling longer-term applications • Long history in approved parenteral drug products • Established regulatory profile	●									
Vectra® MT® LCP	• Design more compact, intricate components for connected wearable devices • Integrate electronic functionality into structural components • Increased patient utility, comfort, and concealment • LCP resins deliver exceptional flow in thin-wall molding to enable smaller parts, free up more internal space • Manage overall device costs with rapid cycling, more parts produced per hour		●	●	●	●		●	●		
Hostaform® MT® POM (or ECO-B)	• Thermally stable • High chemical resistance • Excellent impact resistance • Suitable for repeat steam sterilization cycles • Sliding properties • High hardness and rigidity • Spring properties • Hostaform® MT® SlideX® POM is a tribologically modified copolymer for quiet, smooth sliding medical parts (including POM/POM)		●	●	●	●					
Celanex® MT® PBT	• Ideal sliding and wear behavior • High-dimensional stability • Good chemical resistance to polar and non-polar solvents • Gamma-resistance up to 50kGy • Made-to-order colors in accordance with customer specifications. Technical support from our color technology organization		●	●	●	●					●

Material	Description	Sustained drug delivery	Connected devices	Wearable pumps	Injection devices	Inhalation devices	Implantable medical devices	Surgical solutions	Laboratory and diagnostic equipment	Medical consumables and packaging	Medical filtration
OmniTech® HCT® ABS	• Improve the quality of your colored, molded medical parts • Stable, regulatory-compliant colors reduce risk in your medical innovations • Easy processability and fast cycle times • Beautiful aesthetics with made-to-order colors supported by our color technology organization			●	●	●		●	●		
Fortron ® MT® PPS	• High operating temperature, sterilizability and static and dynamic mechanical properties make Fortron® MT® PPS a leading candidate for metal replacement in surgical instruments and other medical equipment. • High thermal stability • Excellent chemical resistance • High stiffness, strength and creep resistance					●		●	●	●	
GUR® UHMW-PE	• Outstanding abrasion resistance • Superior impact resistance • Non-sticking and self-lubricating properties • Excellent mechanical characteristics, even in cryogenic condition • Gamma stable for crosslinking and sterilization						●			●	●
Ateva® G EVA	• EVA polymers reduce consumer and health concerns related to phthalates and our EVA eliminates migratory plasticizer and incineration issues. • Inherently phthalate free • Very low extractable / leachable • Excellent tear, puncture, imapact, and water resistance • Optically transparent • Excellent low-temperature performance • Gamma and e-beam compatible									●	
Santoprene® TPV	• Excellent long term compression set and stress relaxation for sealing performance • Comfort touch – silky touch and grip • Lower density (~20%) than thermoset can reduce part weight • Better stability at higher temperatures and chemical resistance than styrenic TPEs • Colorable and non-hygroscopic (no pre-drying required) product availability • Compatible with PP; bonding grades available compatible with PC, ABS, COPE, etc.	●	●	●		●			●	●	

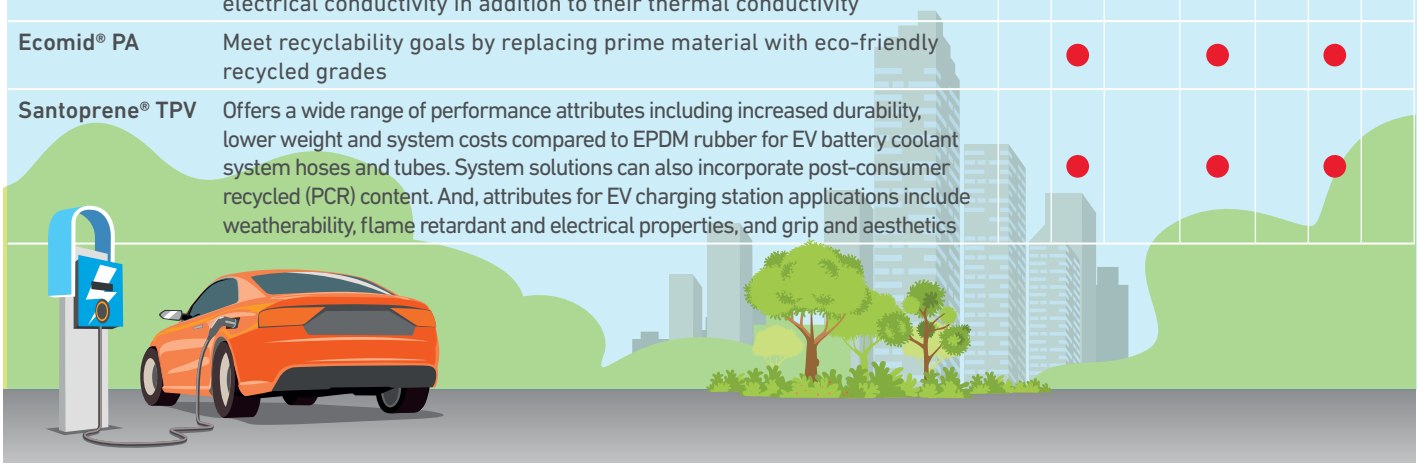
ELECTRIC VEHICLES: DRIVING ELECTRIFIED MOBILITY



Leading OEMs and tiers are developing components in electric powertrain with new requirements to enhance safety, reduce costs and extend range and lifetime. Celanese supports these demands by offering a broad portfolio to address these challenges. Customers can benefit from translating our knowledge from the E&E industry to develop new solutions for future mobility. Our battery separator materials and flame-retardant grades for battery components enhance safety, and our thermally conductive grades for sensors and thermal management parts extend range and lifetime.

HIGHLIGHTED FEATURED GRADES

Material	Description	Battery	Battery System	High Voltage Connectors	Thermal Management	Traction E-Motors	Power Electronics	Fuel Cell
GUR® UHMW-PE	Consistent product quality leads to high quality membranes and improved productivity to enable faster charging	●						
Tecnoprene® PP	PP that is reinforced with chemically-bonded glass fiber and is utilized in housings for EV requiring high rigidity and strong mechanical resistance at high temperatures		●		●			
Celanex® PBT	PBT offers excellent electric insulating performance, combined with good temperature resistance and flame retardancy for HV connectors and power electronics		●	●			●	
Fortron® PPS	Meet the needs for extended thermal mangement with PPS and flex PPS for resistance to cooling agents and lifetime performance in high heat applications			●	●	●	●	●
Vectra® and Zenite® LCP	LCP grades for use under very high temperatures and chemical conditions, for thin wall applications in traction e-motors with excellent insulation properties		●	●	●	●	●	
Frianyl® PA	For battery safety PA grades offer excellent electrical insulation properties in combination with high flame retardancy and thermal shock resistance		●	●				
Celanyl® PA	PA compounds can address multiple thermal, mechanical, electrical, and tribological requirements in electric vehicles		●		●		●	
Coolpoly® TCP	For improved thermal management thermally conductive plastics exhibit electrical conductivity in addition to their thermal conductivity		●		●	●	●	
Ecomid® PA	Meet recyclability goals by replacing prime material with eco-friendly recycled grades		●		●		●	
Santoprene® TPV	Offers a wide range of performance attributes including increased durability, lower weight and system costs compared to EPDM rubber for EV battery coolant system hoses and tubes. System solutions can also incorporate post-consumer recycled (PCR) content. And, attributes for EV charging station applications include weatherability, flame retardant and electrical properties, and grip and aesthetics		●		●		●	

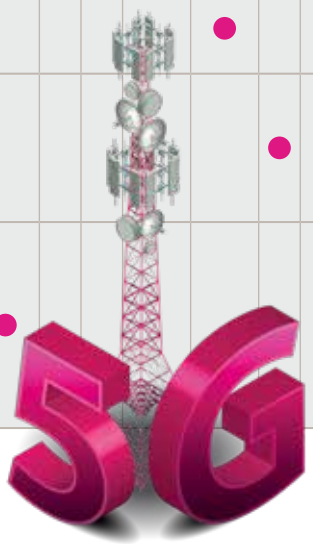


5G: EMERGING NEXT GENERATION CONNECTIVITY

Advanced network connectivity is paving the way for communication infrastructure, smart device and emerging IoT innovations and so on, and the demands for faster high-speed connectivity, very low latency, and universal coverage is every increasing. As these demands increase, so does the demand for newer grades of engineering plastics that can perform up to the demands of balanced dielectric constant (Dk) and dissipation factor (Df), EMI shielding, thermal management as well as miniaturization capabilities. In response to this demand, Celanese has developed a new grade of high-performance material solutions that have been uniquely engineered to convert your great idea into reality.

HIGHLIGHTED FEATURED GRADES

		Base Station Antenna				Server		Smart Device								
Material	Description	Antenna	Radome	Enclosure	Seal and Gasket	Highspeed Connector	CPU Socket	Connectors	Compact Camera Modules	Enclosure and Frame	Speakers	Antenna	Switches	Chargers	Cover
Vectra® and Zenite® LCP	Vectra® and Zenite® LCP products offer a new high-performance, tailored Dk/Df Zenite® LCP portfolio, specifically designed to achieve the most reliable network connections. More importantly, Celanese can engineer the product to have the Dk and Df value that you need to achieve reliable, vast and highspeed network connections. Vectra® and Zenite® LCP meet a wide range of applications, combining greater signal integrity and high-speed server connections for improved data transfers.	●				●	●	●	●			●		●	
Fortron ® PPS	Fortron® PPS with low moisture uptake minimizes Dk/Df shift under harsh conditions and results in minimal signal loss. It also offers good platability while withstanding SMT 265°C.	●		●						●					
Celstran ® LRFT	Celstran® LFRT has a special series of products with stainless steel fiber reinforcement to greatly improve EMI shielding with high frequency in advanced network connectivity.		●	●											
Coolpoly® TCP	Our series of CoolPoly® TCP can provide optimum cooling with significant weight savings and productivity.			●											
Celanex® PBT	Low Dk Celanex® PBT solutions provide good metal adhesion and low dielectric constant (Dk) properties for mobile device' s frames.									●					
Frianyl® PPA	Frianyl® PPA offers high stiffness and strength at elevated temperatures, high dimensional stability, excellent creep resistance, and resistance to chemicals and hydrolysis. To meet complex requirements of mobile devices, we've expanded our Frianyl® PPA to offer flame-retardant grades for all colors.										●				
Santoprene® TPV	Santoprene® TPV offers superior dielectric properties, especially at high frequencies (37GHz) with a dielectric constant <3, enabling excellent 5G signal connection with low transmission loss in 5G infrastructure applications. And for mobile devices, it offers excellent touch, colorability, sealing performance and weather resistance that unleashes creative freedom to expand design possibilities.				●	●									●



PROVIDING MATERIAL SOLUTIONS ACROSS GLOBAL INDUSTRIES

Celanese's high-performance engineering resins offer superior performance in characteristics, including resistance to fatigue, creep, friction and wear, and deliver good mechanical properties such as stiffness and strength. Our portfolio provides cutting-edge material solutions across global industries. Celanese is a world leader in materials like acetal

		Aerospace	Automotive and Transportation	Building and Construction	Consumer Goods	Electronics
SEMI-CRYSTALLINE	POM	●	●	●	●	●
	PET		●		●	●
	PBT		●		●	●
	LCP	●	●		●	●
	PA		●	●	●	●
	PPA		●		●	●
	PCT		●		●	●
	PP Compounds		●		●	●
	PPS	●	●	●	●	●
	UHMW-PE		●			●
	EVA		●		●	●
THERMOPLASTIC ELASTOMER	TPV		●	●	●	●
	SBS				●	
	SEBS		●		●	●
	TPO		●	●	●	
BIOPOLYMER SOLUTIONS	Cellulosic Pellets & Film				●	
TECHNOLOGY	LFRT	●	●	●	●	
	TCP		●		●	●

copolymers, liquid crystal polymers, long fiber reinforced thermoplastics and ultrahigh molecular weight polyethylene. Focused application development and technical services make the company a main business resource for customers in key industries throughout the Americas, Europe and the Asia-Pacific region.

Energy	Industrial and Manufacturing	Medical and Pharma	Oil, Gas & Mining	Packaging	Personal Care and Cosmetics	Telecom	
●	●	●			●	●	POM
	●			●	●		PET
		●				●	PBT
●	●	●				●	LCP
●	●					●	PA
	●					●	PPA
						●	PCT
						●	PP Compounds
	●		●			●	PPS
●	●	●	●				UHMW-PE
●		●					EVA
●	●	●	●	●	●	●	TPV
	●						SBS
●		●					SEBS
							TPO
				●			Cellulosic Pellets & Film
●	●					●	LFRT
●						●	TCP

POM
(POLYOXYMETHYLENE)

For outstanding wear resistance, long-term fatigue resistance, toughness and creep resistance with excellent resistance to moisture, solvents and strong alkalis.

Hostaform® & Celcon® POM

Hostaform® and Celcon® POM are acetal copolymers that possess a linear structure with a highly crystalline quality that provides a variety of advantageous characteristics. The POM copolymer chemical structure provides a higher stability to thermal and oxidative degradation compared to acetal homopolymers. Both Hostaform® and Celcon® POM are utilized for their unique ability to sustain outstanding wear and long-term use, their toughness and creep resistance, and their excellent resistance to moisture, solvents and strong alkalis.

Most POM grades comply with FDA and EU food contact regulations (2002/72 EC), and standard Hostaform products have successfully passed drinking water testing at WRAS, KTW and NSF. MT® grades, with an active Drug Master File (No. 11559), comply with USP Class VI guidelines. All Hostaform® POM products are also available in a wide array of colors that do not contain heavy metals.

A CELANESE SUSTAINABLE SOLUTION

POM ECO-B
Sustainable material solution

- Chemically identical product as standard material
- Identical properties and performance
- Maintains regulatory certifications.
- No need for requalification

Product Benefits of Hostaform® & Celcon® POM

- Good mechanics – high stiffness-to-strength ratio
- Good dimensional stability over broad temperature range: -40 to 100°C (-40 to 212°F)
- Excellent electrical and dielectric properties > 550 V
- Inherent sliding properties
- Broad chemical resistance to solvents, cleaners, fuels, oils, and strong alkalis, pH 4 to pH 14
- Sustain toughness (below -40°C)
- No environmental stress cracking
- Excellent resilience – ability to recover to original shape after stress has been removed
- Excellent process robustness – good thermal stability

Available Grades

- Reinforced grades for improved heat distortion temperature and stiffness
- High-impact grades with step-change improvement in energy absorption
- Grades with improved media resistance
- Conductive grades to dissipate or conduct electrical charges
- Medical and pharmaceutical compliant grades where stringent requirements are enforced
- Low emission grades for automotive interior applications
- Appearance effects, laser marking, low gloss and metallic effect product
- Improved friction and wear grades
- ECO-B Sustainable grades: up to 97% bio-content (from renewable feedstock waste that does not use or contain food or feed crops) via ISCC+ Certified mass-balance approach. LCA report for POM ECO-B shows ~50% CO_2 reduction on polymer basis for our POM ECO-B solutions

Processing

- Injection molding
- Extrusion
- Rotational molding
- Blow molding

PET
(POLYETHYLENE TEREPHTHALATE)

For outstanding physical properties and superior thermal and chemical resistance, with the ability to support higher temperature exposure.

Impet® PET

Glass-reinforced Impet® polyester products are outstanding candidates for high-performance applications calling for strength, rigidity, dimensional stability, toughness and excellent electrical properties.

Product Benefits of Impet® PET

- Very hard, rigid and strong
- Very good creep strength
- Paintable surface
- High heat distortion temperature (up to 228°C under load)
- Service temperature up to 150°C
- Good low friction and wear resistant properties
- Very good electrical properties
- Good dielectric properties
- High chemical resistance
- Good weathering resistance

Available Grades

- Glass fiber reinforced
- Glass fiber & mineral reinforced
- Special color formulations
- Recycling content
- ECO-R Sustainable grades

Processing

- Injection molding

A CELANESE SUSTAINABLE SOLUTION

PET ECO-R
Sustainable material solution

- Post Consumer Recycled (PCR) feedstock

PBT
(POLYBUTYLENE TEREPHTHALATE)

Stands for high strength, rigidity and toughness, low creep even at high temperatures and resistance to a wide range of chemicals and solvents.

Celanex® PBT and Pibiter® PBT

Celanex® PBT is a series of thermoplastic polyester polymers and compounds which features excellent dimensional stability, low moisture absorption and powerful insulation resistance, along with very good chemical and weathering resistance.

Numerous grades of Celanex® PBT hold regulatory approvals, including VDE listing or UL certification approvals for the electrical and electronic market, or for instance EU 10/2011 food contact. compliance and FDA approval for the food and cosmetics industry, and last but not least biocompatibility according to USP 25 Class VI, ISO 10993 and DMF listing for medical markets.

These features promote Celanex® PBT as material of choice for many sensitive or regulated applications.

A CELANESE SUSTAINABLE SOLUTION

PBT ECO-B
Sustainable material solution

Drop-in solution for all grades:

- Chemically identical product as standard material
- Identical properties and performance
- Maintains regulatory certifications
- No need for requalification

PBT/PET ECO-R
Sustainable material solution

- Post Consumer Recycled (PCR) feedstock

Product Benefits of Celanex® PBT

- Very hard, rigid and strong
- Good creep resistance
- High heat-distortion temperature, especially for glass fiber-reinforced grades
- Continuous use temperature up to 140°C
- Very good low-friction and wear-resistant properties
- High dimensional stability (low thermal expansion coefficient, low water absorption)
- Good electrical properties
- Good chemical resistance
- No environmental stress cracking
- Good weathering resistance
- Rapid crystallization and fast cycle time
- Paintable / printable

Available Grades

- Unreinforced / unfilled
- Glass fiber (GF) reinforced
- Glass bead (GB) filled
- Glass fiber + Mineral-filled (GF/Min)
- Carbon fiber reinforced (ICF)
- Glass fiber reinforced with high surface gloss
- Low warpage (LW)
- UV stabilized (UV / HL)
- Laser markable (LM)
- Hydrolysis (HR) and alkaline resistant (AR)
- Recycling (R) content
- Impact modified / toughened (T)
- Slip & Wear modified (SW)
- High flow (HF)
- Flame retardant (conventional FR)
- Flame retardant (halogen-free: XFR ®)
- Food contact compliant (FC)
- Medical and Pharmaceutical Polymers (MT®)
- Appearance Polymers (MetaLX®)
- Laser transparent (LT)
- **ECO-B Sustainable grade**: up to 40% certified bio-content (from renewable feedstock waste that does not use or contain food or feed crops) via RedCert mass-balance approach. LCA report for PBT ECO-B shows ~45% CO2 reduction on polymer basis for our PBT ECO-B solutions
- **ECO-R Sustainable grades**: Recycled content min 25% for PBT/PET blends (average based on recipe). Recycle source PET for PBT/PET blends and Carbon fiber for ICF grades

Processing

- Injection molding
- Extrusion
- Meltblown
- Spunbond
- Fiber Spinning
- Physical foaming
- Water and Gas Injection Technology (WIT/GIT)

Product Benefits of Vandar® PBT

- High impact resistance and impact strength at low temperatures
- High heat-deflection temperature (service temperature to 120°C)
- High resistance to organic solvents, fuels, lubricants and brake fluids
- High abrasion resistance
- Good processability
- Paintable / printable

Available Grades

- Unreinforced
- Glass fiber reinforced
- Mineral-filled
- Extreme high impact modified
- Flame retardant

Processing

- Injection molding
- Extrusion

PBT
(POLYBUTYLENE TEREPHTHALATE)

CONTINUED . . .

Vandar® PBT

Vandar® PBT combines high ductility and good stiffness with the excellent chemical and thermal resistance of polyester. Its alloys are easy to mold and retain their impact strength down to -40°C. Vandar® PBT products are available as unreinforced grades, as well as grades reinforced with glass fibers and glass beads or minerals. Glass fiber reinforced Vandar® PBT alloys grades provide added strength and toughness over a wide temperature range, from -40°C to 130°C.

LCP
(LIQUID CRYSTAL POLYMER)

For stable dimensions and high-temperature performance in thin-walled applications.

Vectra® & Zenite® LCP

Vectra® and Zenite® LCP are part of a family of halogen-free, high-performance liquid crystal polymers with exceptionally precise and stable dimensions. These highly crystalline, thermotropic (melt-orienting) thermoplastics are distinguished from other semi-crystalline plastics by their special molecular structure, which consists of rigid, rod-like macromolecules that form liquid crystal structures in the melt phase.

Product Benefits of Vectra® & Zenite® LCP

- Continuous service temperatures up to 240°C
- Short-term service temperatures up to 340°C
- Very low melt viscosity
- Very low water absorption
- Very low heat of fusion allowing for short cycle times
- Very low coefficient of linear thermal expansion
- Very high tensile strength and elastic modulus in the flow direction
- Inherently flame-resistant (UL 94 V-0, some grades with 5 VA)
- Halogen free without additives
- Very good chemical and oxidation resistance
- FDA compliant (specific grades are BPA- and PTFE-free)

Available Grades

- Easy flow
- Glass fiber reinforced
- Carbon fiber reinforced
- Fiber/filler modified
- Electroplated
- Electrically shielded & conductive
- Flame retardant (V-0 UL94B)
- ISO 10993 and USP Class VI compliant
- Drug (DMF 14844) and Device (MAF-1097) Master Files available
- European Directive 2002/72/EC compliant
- Tailored electrical properties like Dk and Df

Processing

- Injection molding
- Extrusion
- Co-extrusion
- Thermoforming

PA
(POLYAMIDE)

For outstanding resistance to high temperature, excellent surface quality, high dimensional stability, and high performance across environmental conditions.

Frianyl® PA66 & PA6

Our Frianyl® A6 and PA66 flame retardant compounds for the electrical & electronics, industrial and railways industries. Frianyl® PA flame retardant compounds meet stringent industry requirements with multiple grades UL listed and certified by VDE.

Product Benefits of Frianyl® PA

Multiple flame technologies available:

- Halogen and red phosphorous-free reinforced and unreinforced
- Halogenated, reinforced and unreinforced
- Halogenated, antimony trioxide free
- Compounds are rated at maximum safety level according to international and national railway regulations
- Wide range of colors
- More than 80 grades are UL listed or certified by VDE
- Products rated at maximum safety level according to international and national railways norms

Available Grades

Halogen and red phosphorous free:

- Glass fiber reinforced up to 35%
- Unfilled V0 and V2 compounds
- Glass fiber reinforced V2 compounds
- Halogen: from unfilled up to 30% glass fiberor mineral filled
- ECO-R Sustainable grades

Processing

- Injection molding

A CELANESE SUSTAINABLE SOLUTION

PA ECO-R
Sustainable material solution

- Post Industrial Recycled (PIR) feedstock

PA
(POLYAMIDE)
CONTINUED . . .

Celanyl® PA

Celanyl® PA technical and specialty PA6 and PA66 compounds provide a broad range of solutions for industrial & consumer and automotive applications. In addition, our Celanyl® compounds can address multiple thermal, mechanical, electrical and tribological requirements.

Product Benefits of **Celanyl® PA** Technical Compounds

- Excellent stiffness and tensile strength
- Very low warpage
- Very good creep resistance
- Excellent surface quality
- High dimensional stability
- Wide range of colors

Product Benefits of **Celanyl® PA** Specialty Compounds

- Tribological products for low wear and friction
- Electrically conductive and dissipative
- Cross linkable
- Effective alternative to metal
- High mechanical strength
- Water contact compliancy

Available Grades

- Tribological with PTFE, silicon, graphite, molybdenum disulfide; unreinforced and reinforced with glass, carbon and aramid fibers; lubricated flame retardant compounds
- Glass fiber reinforced up to 60%
- Metal and carbon fibers reinforced
- High mechanical performance for metal replacement
- Mineral and/or glass bead-filled
- Unfilled, unreinforced and fiber reinforced
- Heat stabilized
- Hydrolysis resistant

Processing

- Injection molding
- Extrusion
- Co-molding with special grades of Laprene® (SEBS-based thermoplastic elastomer)

PA
(POLYAMIDE)
CONTINUED . . .
Ecomid® PA & Ecomid® ARX PA

Our Ecomid® recycled PA66 and PA6 and Ecomid® ARX recycled PA66 compounds contain high-quality, postindustrial recycled polyamide fibers and textiles and offer a lower footprint alternative to standard grades. Sourcing and quality practices provide customers with materials with high lot-to-lot consistency.

A CELANESE SUSTAINABLE SOLUTION

Product Benefits of Ecomid® PA & Ecomid® ARX PA

- Long-term thermal performances
- High stiffness
- Thermal and creep resistance
- Very good processability
- High performance with up to 100% recyclate
- Some grades are UL Listed
- High resistance to organic solvents
- Good resistance to wear and fatigue at high temperatures

Available Grades

- Unfilled
- Glass fiber reinforced
- Heat stabilization
- Impact modification
- Flame retardant
- Easy flowing
- ECO-R Sustainable grades

Processing

- Injection molding

PPA
(SEMI-CRYSTALLINE POLYPHTHALAMIDE)

High Performance Polyamide in the poylamide family. PPA based polymers are molded into parts to replace metals in applications requiring high temperature resistance such as automotive powertrain components, the housing for high temperature electrical connectors and many other uses.

Frianyl® PPA

Our Frianyl® XT flame retardant PPA compounds for the electrical & electronics, lighting, industrial and automotive industries.

Celanyl® PPA XT

Our Celanyl® PPA XT compounds for the automotive and industrial industries.

PARTIALLY AROMATIC Celanyl® PA XS

Our partially aromatic PA compounds for the sport & leisure, furniture and automotive industries.

Product Benefits of Frianyl® PPA

- Maximum service temperature significantly higher than polyamide 6.6
- V0 rating at 0.4 mm according to the UL 94 flammability standard
- High short-term temperature resistance
- High stiffness and strength at elevated temperatures
- High dimensional stability
- Excellent creep resistance
- Resistance to chemicals and hydrolysis

Available Grades

- Halogen and red phosphorous free
- With halogen

Processing

- Injection molding

Product Benefits of Celanyl® PPA XT

- Largely resistance to high temperatures
- Excellent mechanical properties
- High stiffness and strength at elevated temperatures
- High dimensional stability
- Excellent creep resistance
- Resistance to chemicals and hydrolysis

Processing

- Injection molding

Product Benefits of Celanyl® PA XS

- Developed as alternative to metal
- High stiffness and strength
- Low warpage
- Good creep resistance
- Excellent surface finish
- High dimensional stability
- Performance independent from environmental conditions

Available Grades

- Glass fiber reinforced up to 65%
- Impact modified
- Mineral filled
- Specialty types such as carbon fiber reinforced and low wear and friction

Processing

- Injection molding

PCT
(POLYCYCLOHEXYLENE-DIMETHYLENE TEREPHTALATE)

For superior performance and value through improved heat resistance, fast molding cycles and excellent processability.

Thermx® PCT

Thermx® PCT offers the desirable chemical resistance, processability and dimensional stability of engineering polyesters similar to PET and PBT.
However, the added benefits of heat resistance make Thermx® PCT particularly well-suited for demanding automotive and electrical applications.

Product Benefits of Thermx® PCT

- Short-term temperature resistance up to 255°C
- Chemical resistance
- Low moisture absorption
- Low-flash processing
- High CTI and arc resistance
- High whiteness and color stability

PP COMPOUNDS
(POLYPROPYLENE)

For lighter engineering plastics suitable for applications that facilitate weight reduction.

Polifor® PP

Polifor® PP represents a wide range of polypropylene compounds manufactured and marketed by Celanese. Polypropylene is the third most widely used thermoplastic polymer at a global level, and our range of Polifor® PP products includes both polypropylene homopolymer and copolymer compounds that can be extensively modified to meet our customers' needs.

Product Benefits of Polifor® PP

- High stiffness and abrasion resistance
- Low specific gravity
- High impact and fatigue resistance
- Excellent resistance to chemical agents
- Low hygroscopic sensitivity
- Easy processability
- Fully recyclable
- Wide range of fillers, reinforcing agents and additives

Available Grades

- Glass fiber reinforced
- Mineral filled
- Electrically conductive
- Elastomer modified
- Flame retardant
- Flame retardant (halogen-free)

Processing

- Injection molding
- Extrusion

PP COMPOUNDS
(POLYPROPYLENE)

CONTINUED . . .

Tecnoprene® PP

Tecnoprene® PP is reinforced with chemically-bonded glass fiber and is utilized for applications requiring high rigidity and strong mechanical resistance at high temperatures. The chemical bond between polypropylene and glass fiber guarantees a high impact resistance, improved mechanical properties and better performances under tensile strength. The high thermal performances and considerable impact resistance in different operating conditions make Tecnoprene® PP especially suitable for various technical applications. Tecnoprene® PP is capable of co-molding with other Celanese products, including Santoprene® TPV and Forprene® TPV, Laprene® SEBS and Sofprene T® SBS.

Product Benefits of Tecnoprene® PP

- High impact resistance
- High fluidity
- Chemical resistant
- Suitable for contact with food and potable water
- Excellent mechanical properties
- Strong performance under tensile strength

Available Grades

- Glass fiber reinforced
- Mineral Filled
- High crystallinity
- Elastomer modified
- Aesthetic grades
- Suitable for food contact
- Flame retardant
- Flame retardant (halogen-free)
- **ECO-R Sustainable grades:** Recycled content 30% of overall formulation (average based on recipe).

Processing

- Injection molding
- Extrusion
- Blow molding
- Rotational molding

A CELANESE SUSTAINABLE SOLUTION

PP ECO-R
Sustainable material solution

- Post Industrial Recycled (PIR) feedstock

PP COMPOUNDS
(POLYPROPYLENE)

CONTINUED . . .

Carboprene® PP

Carboprene® PP are polypropylene-based homopolymers or copolymers filled with calcium carbonate. These products have been designed for technical applications operating at different thermal conditions. These materials are characterized by high dimensional stability coupled with strong mechanical properties and aesthetic appeal.

Talcoprene® PP

Talcoprene® PP are polypropylene-based homopolymers or copolymers filled with talc. These products have been developed for technical applications operating at different thermal conditions. These materials are characterized by high dimensional stability coupled with strong mechanical properties and aesthetic appeal.

Product Benefits of Carboprene® PP

- High dimensional stability
- Good aesthetical properties
- Strong mechanical properties

Available Grades

- Mineral filled (Calcium carbonate filled up to 40%)
- High impact resistance
- UV & detergent stabilization (available upon request)

Processing

- Injection molding

Product Benefits of Talcoprene® PP

- High dimensional stability
- Good aesthetical properties & wide range of colors
- Strong mechanical properties
- High density
- Wide range of colors
- Thermal aging & resistance

Available Grades

- Mineral filled
- Elastomer modified
- Flame retardant
- High impact modified
- UV & detergent stabilization

Processing

- Injection molding
- Extrusion

PPS
(POLYPHENYLENE SULFIDE)

For high temperature stability, broad chemical resistance, stiffness, strength and creep resistance at elevated temperatures.

Fortron® PPS

Fortron® PPS is an is an ideal candidate for mechanically and thermally stress molded or precision machined parts. Its low proportion of ion contamination gives Fortron® PPS an advantage over other materials for electronic applications.

Product Benefits of Fortron® PPS

- Unreinforced Fortron® PPS has comparably low heat resistance – but adding glass fibers and mineral mixtures allow characteristics like:
  - Service temperatures up to +240°C
  - Very good resistance to chemicals and solvents
  - Very hard and rigid
  - Very low moisture absorption
  - Flame resistance (UL 94 V-0, some grades 5VA)
  - Suitable for lead-free soldering
  - Excellent creep resistance at elevated temperatures

Available Grades

- Glass fiber reinforced
- Mineral reinforced
- Fiber / filler modified
- Flame retardant (V-0 UL94B)
- ISO 10993 and USP Class VI compliant
- Drug (DMF 14844) and Device (MAF-1097) Master Files available
- European Directive 2002/72/EC compliant

Processing

- Injection molding
- Extrusion
- Blow molding

UHMW-PE
(ULTRA-HIGH MOLECULAR WEIGHT POLYETHYLENE)

For outstanding abrasion resistance, superior impact resistance, non-sticking and self-lubricating properties.

GUR® UHMW-PE

GUR® UHMW-PE is a linear polyethylene with a much higher molecular weight than standard PE grades, which offers high impact strength, excellent wear-resistant properties, high chemical resistance and a wide service temperature range.

GUR® UHMW-PE is used in industrial semifinished parts like sheets, rods, profiles, medical applications, high performance fibers, microporous membranes e.g. as battery separators, porous applications like filters, sound dampening devices and others, functional additives and more.

GUR® UHMW-PE has excellent mechanical characteristics, even in cryogenic conditions. GUR® UHMW-PE standard and premium grades meet the requirements of health organizations, such as the U.S. Food and Drug Administration (FDA) and European Union regulation (EC) No. 1935/2004 regarding food contact materials.

A CELANESE SUSTAINABLE SOLUTION

UHMW-PE ECO-B
Sustainable material solution

Drop-in solution for all grades:

- Chemically identical product as standard material
- Identical properties and performance
- Maintains regulatory certifications
- No need for requalification

Product Benefits of GUR® UHMW-PE

- Exceptionally high impact strength
- High energy absorption capacity at high stress rate
- Excellent low-friction and wear properties
- Very high chemical resistance to acids, alkalis and resistance to all chemical except for (strong) oxidizing agents
- Highly resistant to environmental stress cracking
- Wide service temperature range from -269°C to +80°C

Available Grades

- Very broad range of products in terms of particle size and molecular weight
- Specialized grades for different applications and processing technologies (e.g. micro-powder as additive for rubber and thermoplastics)
- **ECO-B Sustainable grades**: Up to >99.9% certified Bio-content via ISCC Plus mass-balance

Processing

- Compression molding
- Ram extrusion
- Screw extrusion and injection molding
- Pressureless sintering
- Gel spinning (fibers)
- Solid state fiber processing
- Gel extrusion of membranes

EVA
(ETHYLENE VINYL ACETATE)

An extremely versatile elastomeric resin that can be easy processed on conventional thermoplastic equipment. EVA copolymers offer exceptional adhesion, toughness, flexibility, resilience, clarity and excellent environmental stress crack resistance over a broad temperature range.
EVA offers environmental and safety advantages to PVC in medical and electrical application due its absence of migratory plasticizers and good organoleptics.

Ateva® EVA

Celanese manufactures a full line of high-performance Ateva® EVA copolymers containing up to 42% vinyl acetate. Ateva® EVA copolymers have a broad melt index range and are recognized around the world for their exacting quality, performance and versatility.

Product Benefits of Ateva® EVA

- Broad melt index and VA range
- Customizable controlled-release performance
- Exceptional low temperature API processing
- Custom/bespoke specialized polymer solutions
- Excellent adhesion to substrates
- Excellent processability even at low melt temperatures
- Broad polarity ensures compatibility with wide range of additives and high loadings
- High flame retardant additive loading capability
- Excellent flexural & low temperature properties
- Excellent flexibility
- Excellent weldability
- Good transparency
- High impact resistance
- Excellent low-temperature properties
- Resistant to stress cracking
- Easy processability
- Fully recyclable

Available Grades

- VitalDose™ controlled release pharmaceutical excipients
- Medical and Pharmaceutical Polymers (MT®)
- USP Class VI certification
- Food and beverage contact
- Custom fully formulated compounds and masterbatches
- Flame retardant (halogen-free)
- Free-flowing pellets
- Powders

Processing

- Extrusion
- Co-extrusion
- Blown film extrusion
- Cast film extrusion
- Extrusion coating
- Calendering
- Injection molding
- Blow molding
- Thermoforming
- Solvent coating
- Intensive mixing
- Compression molding
- Rotational molding
- Physical and chemical foaming
- Spunbond, Meltblown (non-woven fabrics)

TPV
(THERMOPLASTIC VULCANITE)

For easy, inexpensive processing, full recyclability of all products, and rubber-like specifications, such as recoverability and softness.

Santoprene® TPV

Santoprene® TPV is an engineered thermoplastic vulcanizate (TPV) created more than 40 years ago out of a simple concept to develop a ready-to-use material that behaves like a rubber but processes like a thermoplastic. A truly revolutionary product, it quickly became the acknowledged industry-standard for TPV.

Santoprene® TPV is used very successfully across many industries and applications including – Automotive and Electric Vehicles (EV), 5G Connectivity, Electronics and Electrical, Industrial, Consumer Goods, Oil & Gas, Medical, Healthcare and Pharmaceutical, Food and Potable (FDA & NSF Grades).

Product Benefits of Santoprene® TPV

- Wide hardness range from 35 ShA to 50 ShD
- Service temperature ranging from -60 °C to 135 °C
- Sealing performance
- UV ageing, ozone and weathering resistance
- Chemical and oils resistance
- High elastic recovery within a wide temperature range
- High flex-fatigue resistance
- High thermal and electric insulation values
- Weight reduction – through part redesign versus thermoset rubber
- Colorability – metallic, photochromic/thermochromic effects
- Aesthetics – surface, feel and appearance options
- Easy processing and total system costs reduction
- In process and end-of-life recycling
- **ECO-R Sustainable grades**:

Available Grades

- Material with post-consumer recyclate (PCR)
- High resilience
- High flow
- UV stabilized
- Flame retardant
- Food contact grades
- Medical
- Bonding

Processing

- Injection molding, including 2k
- Blow Molding
- Extrusion
- Foaming – chemical and physical
- Calendering

TPV
(THERMOPLASTIC VULCANITE)
CONTINUED . . .

Santoprene® TPV

A CELANESE SUSTAINABLE SOLUTION

Santoprene® TPV grades made with at least 15% and up to 30% post-consumer recycle (PCR) material, can help improve its life cycle impact compared to regular Santoprene TPV, while offering an optimized balance of performance and cost-effectiveness for many applications including for automotive parts like weatherseals.

Santoprene® TPV scrap generated during manufacture can be melted, re-extruded or remolded, reducing the amount of waste. And, when a product reaches its end-of-life, components made with Santoprene TPV can potentially be recovered and recycled, further contributing to the customer's circular economy model.

Product Benefits of Geolast® TPV

- Wide hardness range from 70 ShA to 45 ShD
- Service temperature ranging from -40°C to 125°C
- Similar oil resistance and performance to NBR and ECO rubber compounds
- Chemical resistance
- Weight reduction through part redesign
- Sealing performance
- High fatigue resistance
- Aesthetics – surface, feel and appearance options
- Easy processing and total system costs reduction
- In process and end-of-life recycling

Processing

- Injection molding, including 2k
- Blow molding
- Extrusion
- Foaming – physical and chemical

Geolast® TPV

Geolast® TPV is an engineered thermoplastic vulcanizate (TPV) made of an elastomeric phase of dynamically vulcanized EPDM which is deeply dispersed in a polyolefinic thermoplastic (PP) matrix. This combination delivers a genuine plastic-elastomeric alloy characterised by the high performance of a rubber and the easy processability of a thermoplastic. Geolast® TPV combines excellent oil and hot air resistance for use in a wide range of applications, meeting or exceeding the oil resistance offered by nitrile rubber and epichlorohydrin. It offers cost savings and comparable performance to thermoset rubbers such as NBR, polychloroprene, ECO and even some urethanes.

SBS
(STYRENE-BUTADIENE-STYRENE COMPOUNDS)

For cost-effectiveness and easy processability allowing the production of rubber-like materials and minimizing the length of the curing process.

Sofprene® TPS SBS

Sofprene® TPS SBS is a Thermoplastic Elastomer in which the elastomeric phase is based on SBS (Styrene-Butadiene-Styrene block copolymer) rubber and the plastic phase is usually made of either polyolefinic or styrenic polymers. Sofprene® offers excellent elastic properties and maintains its flexibility even at very low temperatures (-50°C). The unsaturated nature of the SBS rubber makes Sofprene® TPS SBS vulnerable to UV, heat and ozone; however it is possible to improve its resistance to these agents by using appropriate additives. Sofprene® TPS SBS can be easily processed by means of the traditional technologies used for thermoplastic materials and it is fully recyclable.

Product Benefits of Sofprene® TPS SBS

- Wide hardness range from 25 ShA to 40 ShD
- Density from 0.90 g/cm3 to 1.25 g/cm3
- Operating temperature from -50 to 60°C
- High elastic recovery both at low and room temperatures
- Excellent resistance to several chemical agents, i.e. bases, acids, alcohols, detergents, water solutions
- High thermal and electric insulation values
- Good abrasion resistance
- Specific rheology for each type of process
- Excellent colorability

Available Grades

- High transparency
- Suitability for food contact
- UV and heat resistant
- Varying grades of shore hardness (ShA/ShD)

Processing

- Injection molding
- Extrusion

Product Benefits of Laprene® TPS SEBS

- Excellent resistance to UV ageing, ozone and weathering
- Wide hardness range from 2 ShA to 60 ShD
- Operating temperature ranging from -50°C to +120°C
- Good fatigue resistance
- Excellent resistance to several chemical agents, i.e. bases, acids, alcohols, detergents, water solutions
- High elastic recovery within a wide temperature range
- High thermal and electric insulation values
- Specific rheology for each type of process
- Density ranging from 0.90 g/cm3 to 1.20 g/cm^3
- Excellent colorability and aesthetic properties

Available Grades

- Standard grades for injection molding
- Translucent and transparent grades
- Extrusion grades
- Grades for adhesion on polar polymers
- Grades with very high fluidity
- Grades with improved temperature resistance

Processing

- Injection molding
- Extrusion
- Blow molding
- Calendering
- Thermoforming

SEBS
(STYRENE-ETHYLENE-BUTYLENE-STYRENE COMPOUNDS)

For an easy, inexpensive way to utilize thermoplastic materials that are fully recyclable with rubber-like qualities.

Laprene® TPS SEBS

Laprene® TPS SEBS refers to a family of Thermoplastic Elastomers in which the elastic phase is made of SEBS [Styrene-Ethylene-ButyleneStyrene] rubber and the plastic phase has usually a polyolefinic nature. The plastic phase allows Laprene® to be processed by means of the traditional technologies used for thermoplastic materials and to be fully recyclable, while the elastomeric phase features typically rubber-like performance such as elastic recovery and softness.
The chemical nature of the SEBS rubber is saturated, which means it has no double bonds in the molecule, and this particular structure gives Laprene® TPS SEBS special resistance to weathering and UV ageing.

TPO
(THERMOPLASTIC OLEFIN COMPOUNDS)

For improved weather resistance, excellent electrical insulation and elastic properties at low temperatures.

Forflex® TPO

The Forflex® TPO thermoplastic elastomer family consists of heterophasic compounds based on an amorphous elastomeric phase and a crystalline phase, usually both of a polyolefinic nature. This chemical composition confers elastic properties to finished products up to a temperature of 70 - 80°C. These compounds are classified as TPOs.

Product Benefits of Forflex® TPO

- Good weathering resistance
- Excellent electrical insulation properties
- Low density (from 0.89 g/cm^3)
- Excellent elastic properties at low temperatures
- Excellent colorability
- Adhesion on PP and polyolefin based materials
- Standard grades for injection molding and extrusion

Available Grades

- Suitability for food contact
- Varying grades of shore hardness (ShA/ShD)
- Compliant with Regulation
- (EC) No. 1907/2006 (REACh)

Processing

- Injection molding
- Extrusion

CELLULOSIC PELLETS & FILM

BioPolymer Solutions represents a family of bio-based and biodegradable materials engineered as alternatives to traditional petroleum-based plastics to help address the Single Use Plastics (SUP) global challenge while providing other unique performance benefits.

Since the 1930's, Celanese has been a major producer of Cellulose Acetate, a cellulosic material which is both bio-based and biodegradable. BlueRidge® and Clarifoil® branded products leverage this core material technology.

BlueRidge® Cellulosic Pellets

BlueRidge® Cellulosic Pellets are an excellent alternative to traditional petroleum-based plastics used in many of the rigid packages found in the produce and bakery aisle of local grocery stores. Not only can BlueRidge® Cellulosic Pellets help customers meet their sustainable end of life objectives, they also offer the visual transparency and clarity required for effective product promotion to the end consumer. For packaging manufacturers, Celanese's pellets have been engineered to operate on traditional plastic processing equipment at customer's operations.

Product Benefits of BlueRidge® Cellulosic Pellets

- Bio-Based Material (non-food source)
- Biodegradable
- Home & Industrial Compostable
- US FDA and EU approved for direct food contact
- Natural Transparency & Excellent Clarity
- Colorable (Translucent or Opaque)
- Liquid, Oil, and Grease Resistant

Processing

- Sheet Extrusion
- Profile Extrusion
- Thermoforming

A CELANESE SUSTAINABLE SOLUTION

SUSTAINABLE CREDENTIALS

Celanese BlueRidge® and Clarifoil® products are made with sustainably sourced, certified wood pulp[1], and are Certified Bio-based[2], Water Biodegradeable[3], and Home[4] and Industrial[5] Compostable.

1 Certified by PEFC (Programme for the Endorsement of Forest Certification) or FSC (Forest Stewardship Council)
2 USDA certified Bio-based and DIN-Geprüft certified Bio-based 50-85% (Based on Cellulose Acetate Flake)
3 TUV OK Biodegradable Water certified
4 TUV OK Compost Home certified (film up to 116 microns)
5 BPI Industrial Compostability certified (film up to 95 microns) and Din Certco Industrial Compostability certified (film up to 116 microns)

CELLULOSIC PELLETS & FILM

Clarifoil® Cellulosic Film

Clarifoil® Cellulosic Film, like BlueRidge® Pellets, are an excellent alternative to traditional petroleum-based plastic films commonly used today. Celanese film is produced using a precision casting process that provides excellent optical clarity, gauge control, and a wide range of film thicknesses and surface finishes available for customers. Clarifoil® film also has very unique vapor permeability properties that are excellent for delivering moisture control for a wide range of applications including food packaging for sensitive bakery products and anti-fog performance for upright freezer doors.

Product Benefits of Clarifoil® Cellulose Acetate Film

- Bio-Based Material (non-food source)
- Biodegradable
- Home & Industrial Compostable
- US FDA and EU Approved For Direct Food Contact
- Colorable (Translucent or Opaque)
- Liquid, Oil, and Grease Resistant
- Scratch Resistant
- Natural Transparency & Excellent Clarity
- Controlled tear for "Easy Open" Flexible Packaging
- Breathable Films (Water Vapor & Oxygen)
- Gloss & Matte Film Finishes Available
- Low Haze Films With Superior Optical Properties
- Flame Retardant Film Available

Available Grades

- Clarifoil® T17 & T24 Standard films
- Clarifoil® T95 High-slip print lamination films
- Clarifoil® AF1 & AF1000 Anti-Fog films
- Clarifoil® LOKI Ultra destructible film
- Clarifoil® FR4 Flame retardant film
- Clarifoil® CFJ24 and CFM19 Tape films

Processing

- Lamination (film to film, film to paperboard, film to glass)
- Printing, glueing, foil stamping and embossing

ADDITIONAL SPECIALIZED COMPOUNDS

LFRT
(LONG FIBER REINFORCED THERMOPLASTIC)

For excellent mechanical properties, impact and creep resistance and low warpage for metal replacement applications.

Celstran® and Compel® LFRT products are produced in a special patented pultrusion process that achieves a high impregnation quality without damage to the fibers. Incorporated fibers can be glass, carbon, aramid and stainless steels. As matrix materials, nearly all types of polymers are suitable.

Celstran® LFRT

Using Celstran® LFRT allows cost-saving production methods and short cycle times in component manufacturing. Celstran® LFRT also provides added benefits to the environment, since products within this line are also recyclable because of their high fiber lengths.

Compel® LFRT

Compel® LFRT is known for the mechanical properties that make products within this family excellent solutions for metal replacements like automobile front ends and control panels. Products with longer fiber reinforcements suitable for extrusion compression molding are available as Compel® LFRT with fiber lengths of approximately 25 mm.

Product Benefits of Celstran® & Compel® LFRT

- High dimensional stability
- Excellent mechanical properties
- High energy absorption
- Meets typical crash requirements
- Retention of properties such as impact resistance, rigidity and strength over a wide temperature range
- High heat distortion temperature
- Low creep, low warpage and shrinkage

Available Grades

- Matrix materials: PP & PA (additional upon request)
- Glass fiber/glass bead reinforced
- Carbon fiber reinforced
- Aramid fiber reinforced
- High-impact modified grades
- Low-emission grades

Processing Celstran® LFRT

- Injection molding

Processing Compel® LFRT

- Injection stamping
- Compression molding

Product Benefits of CoolPoly® TCPs

- Weight reduction
- Avoid metal manufacture and machining
- Inherent corrosion resistance
- Part consolidation opportunities
- Improve safety
- Increase reliability
- Reduce amplification of electrical interference
- Extended part and component life (reduced device temperature)
- Enable flexibility in material choice
- Efficient heating and cooling
- Eliminate need for active cooling
- High throughput injection molding
- Manufacture of complex shapes and geometries
- Rapid prototyping and evaluation

Processing

- Injection molding

TCP
(THERMALLY CONDUCTIVE PLASTICS)

For thermal conductivity in a plastic that provides the ability to meet demanding engineering requirements in many applications more cost effectively than other materials including metals, ceramics and other plastics.

CoolPoly® TCP

CoolPoly® thermally conductive plastics are engineered materials. They are formulated compounds using commodity, engineering and high-performance grade thermoplastic resins. Various additives and ingredients are compounded to impart thermal conductivity and other desirable attributes.

LIGHTWEIGHT COMPOSITE POLYMERS

For lightweight solutions that enhance produce with excellent dimensional stability and versatility.

Litepol® PP/HB

Litepol® PP/HB compounds are used to produce extra light engineering plastics suitable for applications in which weight reduction is the primary objective. Our Celanese Litepol® PP/HB compounds are comprised of polypropylene polymers filled with hollow glass microspheres. They have added significant value to customers in the automotive industry by facilitating compliance with strict regulations and targets in terms of emissions.

Product Benefits of Litepol® PP/HB

- High impact resistance
- Low Density (Less than 1/5 of mineral fillers)
- Reduced cooling times
- Excellent dimensional stability of molded parts
- Excellent versatility and customization potential
- Low acoustic transmittance, for a sound deadening effect
- Low thermal conductivity to facilitate faster cooling times
- Weight reduction from -9% to -30%
- Stiffness from +13% to +179%
- Mixed HB/GF grades, an impact from +20% to +218%

Processing

- Injection molding
- Additional processing conditions available

TRIBOLOGICAL POLYMERS

(SlideX®)

Celanese tribology products platform includes the most advanced engineering polymers to help meet emerging needs across many market segments.

Manufacturers need conveyors made from more durable and versatile materials with better chemical resistance and lower friction. Temperature-resistant materials and those that can be used without external lubricants are also in demand. Low-dust and no-dust materials are critical for most manufacturers whether they produce food, electronics, sports equipment or medical supplies.

Celanese tribology solutions provide most comprehensive low-wear, low-friction and low-noise product portfolio in the industry.

Product Benefits of Tribological Polymers (SlideX®)

- Superior tribological application analysis and testing
- Excellent technical support from lab to manufacturing
- Excellent durability, versatility and chemical resistance
- Low-dust or no-dust materials meet critical manufacturer demand
- Quiet, smooth sliding parts

Product Benefits of Fortron® PPS ICE

- Reduced molding cycle times
- Increased production cost savings
- Increased operating capacity
- Improved demolding of parts resulting in superior durability
- Full crystallization at lower temperatures with cold injection units

Processing

- Injection molding

Product Benefits of Fortron® PPS Flex

- Continuous use temperature range is -40°C up till 165°C/180°C
- Broad chemical resistance
- Higher Flexibility (60% lower modulus)
- Increase in elongation
- Improved impact strength

Product Properties of Fortron® PPS FX

- Good heat stability up to 220°C
- Improved impact properties
- Higher viscosity

IMPROVED CRYSTALLIZATION EVOLUTION POLYMERS

Fortron® PPS ICE

Fortron® PPS ICE polymers have material properties that are equivalent to or better than standard injection molding grades and significantly improve processing characteristics.

Fortron® PPS ICE grades can help customers stay competitive by reducing cycle times and overall production costs, as well as improve flatness and enable easier demolding.

FLEXIBLE PPS AND TOUGHENED GRADES

Fortron® PPS Flex and and Fortron® PPS FX

Fortron® PPS Flex are new grades with a unique combination of flexibility while maintaining excellent high temperature, permeation and chemical resistance. Toughened grades like Fortron® PPS Flex provide improved impact properties over standard grades, while maintaining chemical resistance and temperature performance

These new grades could be considered when the application temperature challenges other flexible polymers like PE, Polyamides, and PVDF or when the application calls for thermal shock resistance, or less stiffness than standard filled PPS products.

Celanese

The chemistry inside innovation™

www.celanese.com/engineered-materials

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