CHEMISTRY THAT MATTERS™

HEALTHCARE SOLUTIONS

SABIC

Founded in 1976, SABIC is the first public, global multinational enterprise headquartered in the Middle East. Our products range from bulk commodity chemicals to highly engineered plastics for demanding applications. We are a leading producer of polyethylene, polypropylene, glycols, methanol and fertilizers and a global leader in the production of polyolefins.

SABIC's offerings include Chemicals, Polymers, Specialties, Agri-Nutrients and Metals. In Saudi Arabia, the Netherlands, Spain, the USA, India, China and Japan, our dedicated Technology & Innovation centers research ways to meet our customers' needs with excellence.

INNOVATING FOR CUSTOMER SUCCESS

We believe that SABIC customers deserve the full benefit of every advantage our enterprise can offer.

After all, our success is defined by our customers' success.

And with more than 80 years of experience pioneering advanced engineering thermoplastics, SABIC is positioned to help create new opportunities for growth and breakthrough applications.

We offer expertise and experience to our customers in a variety of ways:

- Material solutions to help drive innovation and market leadership.
- Design, logistics and processing expertise to spark new ideas and better efficiencies.
- Unwavering commitment to build long-term relationships with ingenuity, trust and continuous improvement.

It's what we strive for and work to deliver... a mutual benefit.

Excellence and nothing less.

MATERIALS INNOVATION FOR TOMORROW'S HEALTHCARE DESIGNS

A world leader in engineering thermoplastics and polyolefins, SABIC shares your commitment to innovation, quality and consistency. We are dedicated to enabling healthcare solutions that will help improve quality of life.

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LATEST INNOVATIONS FOR THE HEALTHCARE INDUSTRY

To support customers with changing requirements in the healthcare industry, SABIC continues to develop new materials and processing expertise.

Our recent innovations address important trends including higher autoclave temperatures and new, emerging sterilization methods such as low temperature hydrogen peroxide gas; needs for improved infection control; enhanced processing for parts with challenging design geometries; and extended offerings for compliance with environmental regulations.

TURNING HEALTHCARE DESIGNS INTO CUSTOMER SUCCESSES

SABIC offers a breadth and depth of resources that are a vital ingredient to customer success. Our network of global Manufacturing, Technology & Innovation and Application Development Centers stands ready to support our customers' programs.

WORLD-CLASS TECHNOLOGY, SUPPORT AND MATERIALS

Our emphasis on Six Sigma for over a decade enables us to achieve and maintain a track record of enhanced quality and improved productivity. This assists our customers with superior products and access to years of successful Six Sigma implementation – experience we are pleased to share.

Ongoing investment in people, technologies and processes, including state-of-the-art manufacturing and application development, is aimed at helping customers solve their design and manufacturing challenges.

SABIC invented most of the high-performance materials that we sell, from polymers to blends and copolymerized solutions, and pioneered many more capabilities in polymer science.

Innovation continues to drive our culture throughout all industries that we serve, including healthcare. If the right material doesn't exist already, we may be able to custom-compound a solution to help meet your application's precise demands.

HEALTHCARE INDUSTRY SUPPORT

MATERIALS EXPERTISE FOR DIVERSE HEALTHCARE SEGMENTS

Drug delivery
Surgical instruments
Cardiovascular and blood care
Fluid delivery and IV therapy
Orthopedics
Respiratory and sleep therapy
Monitoring and imaging
Lab ware and clinical diagnostics
Medical lighting
Medical trays
Mobile healthcare
Pharmaceutical manufacturing

PERFORMANCE MATERIALS TO SUPPORT A RANGE OF REQUIREMENTS

TYPICAL HEALTHCARE REQUIREMENTS

STERILIZATION DIVERSITY
- Gamma, E-beam, autoclave, EtO and increasingly, the use of low temperature hydrogen peroxide gas

BIOCOMPATIBILITY[A]
- ISO 10993 or USP Class VI

FOOD CONTACT COMPLIANCE
- US FDA, European Union food contact, others

CHEMICAL RESISTANCE
- Disinfectants, cleaners, lipids and IV solutions

MATERIAL CONSISTENCY HEALTHCARE PRODUCT POLICY
- Formulation Lock
- Management of Change: strict policy for healthcare products
- Surety of supply

GENERAL MATERIAL CONSIDERATIONS

OPTICAL CLARITY, COLORABILITY
- View fluids/contents, rapid identification and visual appeal

IMPACT RESISTANCE
- Ductility for practical use conditions
- Low- and high-temperature performance

DIMENSIONAL STABILITY
- Tight tolerance/low creep

HIGH FLOW AND ENHANCED RELEASE
- Complex designs, low draft angles, thin wall and flow length capability

HIGH-PERFORMANCE SPECIALIZATION
- Added strength, lubricity, shielding and anti-stat

FLAME RETARDANCE
- UL 94 - HB, V2, V1, V0, 5VB, 5VA
- No bromine/no chlorine flame-retardant systems for compliance with environmental standards such as Blue Angel and TCO'99

A Biocompatibility: material evaluated based on ISO 10993 or USP Class VI protocol; supporting information available by Type I or Type II letter. Reference page 8.

APPLICATION, POLYMER AND PROCESS DEVELOPMENT ASSISTANCE

SABIC application development specialists guide customers through the breadth of available materials and processing options to enhance application design and manufacturability. Specialists also connect customers to our technical and commercial innovation teams for novel solutions.

SABIC COLORXPRESS™ centers offer an innovative setting to explore the power of color and effects in bringing new dimensions to applications and affecting how they are perceived.

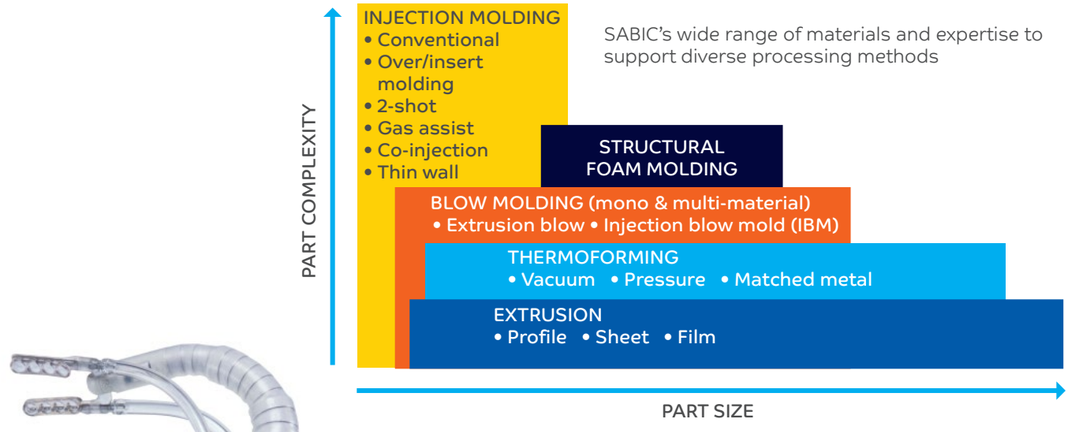
Global Application Technology (GApT) teams lead centers of excellence worldwide to serve our customers in the advancement of new product technologies from assisting in new design concept development through manufacturability and commercialization.

INDUSTRIAL DESIGN
- Application tear-downs
- Concept designs

PREDICTIVE ENGINEERING
- Computer-Aided Engineering (CAE)
- Computer-Aided Design (CAD)

PROCESS DEVELOPMENT
- Most conversion methods
- Productivity improvements
- Troubleshooting

APPLICATION REVIEW
- Material selection support
- Controlled laboratory part testing
- Secondary operations



SABIC's wide range of materials and expertise to support diverse processing methods

SUPPORTING DATA AND REGULATORY COMPLIANCE

THE SABIC HEALTHCARE PRODUCT POLICY

- Easily identifiable "healthcare product" nomenclature
  - CYCOLAC™ HM resins
  - CYCOLOY™ HC resins
  - LEXAN HP™ resins
  - XENOY™ HX Resins
  - VALOX™ HX resins
  - XYLEX™ HX resins
- SABIC healthcare compounds are available (ask your SABIC representative for more details)
- Biocompatibility assessed (according to ISO10993 or USP Class VI)
- Food contact compliance for most healthcare products
- FDA Drug Master File and/or device master file listing (letter of authorization provided as needed)
- SABIC healthcare products are subject to formula lock and stringent management of change process (ask your SABIC representative for more details)

IMPLANT POLICY

SABIC does not support applications that remain implanted beyond 29 days.

RESIN BIOCOMPATIBILITY

Typically, a set of tests performed on a resin to determine if the resin or its extractables will cause potential harm to the human body.

SABIC biocompatible grades have been tested and passed either USP/USP Class VI biological tests or tests from the ISO 10993 “Biological Evaluation of Medical Devices”, or similar grades have been so tested and passed.

SABIC does not knowingly support the use of grades not designated as “biocompatible supported” in healthcare applications requiring biocompatibility.

FOOD CONTACT COMPLIANCE

U.S. FDA (Food and Drug Administration): FDA grades comply with the requirements of the U.S. Food, Drug and Cosmetic Act, as amended, and the regulations put forth by the FDA, covering substances for use as basic components of food contact surfaces.

European Union (EU): EU FC grades comply with the compositional requirement of EU Regulation No. 10/2011, and subsequent amendments, for plastics used in food contact applications.

FDA DRUG MASTER FILE (DMF) AND/OR DEVICE MASTER FILE (MAF)

SABIC maintains U.S. FDA Drug Master Files and/or Device Master Files within the FDA’s documentation centers for our “healthcare products”. A Letter of Authorization (LoA) for customer’s reference of our Master Files and for the FDA’s review of our Master Files can be provided upon customer request.

WASTE ELECTRICAL AND ELECTRONIC EQUIPMENT (WEEE) — EU DIRECTIVE 2012/19/EU

WEEE requires OEMs and component and sub-assembly producers providing electrical/electronics (E/E) products to the EU to collect, recover and treat these products at the end of life.

Plastics using brominated flame retardants must be removed and treated separately. To help customers simplify recovery and recycling at end of life, SABIC offers materials that are inherently flame-retardant or that do not contain brominated or chlorinated flame retardants.

RESTRICTION OF HAZARDOUS SUBSTANCES (ROHS 2) — EU DIRECTIVE 2011/65/EU AS AMENDED INCLUDING EU DIRECTIVE 2017/2102/EU

RoHS mandates the “restriction of the use of certain hazardous substances in electrical and electronic equipment,” which include lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBBs) and polybrominated diphenyl ethers (PBDEs), except deca-bromine, for E/E products and components placed into the European market after July 1, 2006.

SABIC offers materials that allow manufacturers to avoid the use of these hazardous substances.

UL 94, IEC 60695-11-10/20

The most widely accepted flammability performance standards for plastic materials are UL 94 ratings. These are intended to identify a material’s ability to extinguish a flame, once ignited. Several ratings can be applied based on the rate of burning, time to extinguish, ability to resist dripping and whether or not drips are burning.

Each material tested may receive several ratings based on color and/or thickness. When specifying a material for an application, the UL rating should be applicable for the thinnest wall section in the plastic part. The UL rating should always be reported with the thickness. Just reporting the UL rating without mentioning the thickness is insufficient. IEC 60695-11-10/20 is the international equivalent of UL 94.

UNIQUE DEVICE IDENTICATION (UDI)

The US FDA and EU Medical Device Regulation require marking and labeling of medical devices with Unique Device Identification (UDI). Benefits are expected to include improved device traceability and easier recall in the case of a safety risk or adverse event. Direct Part Marking (DPM) is a requirement for permanent marking directly on the re-usable device in both the US (21 CFR 801.45) and the EU (Regulation EU 2017/745 Annex VI Part C 4.10). DPM is an option for all devices.

SABIC materials allow for the use of laser marking to achieve DPM requirements on devices.

THE SABIC RESINS PORTFOLIO

The broad and deep SABIC portfolio delivers diverse performance properties to support key healthcare requirements. The range of our materials and representative applications are shown below.

■ = MANUFACTURED BY SABIC

	AMORPHOUS	CRYSTALLINE
HIGH PERFORMANCE	PEI, PES, PPSU	LCP, PEEK, PPS
ENGINEERING THERMOPLASTICS	PC COPOLYMERS, PSU, PPE/PA, m-PPE, PC/PBT, PC/PET, PPA, PBT, POM, PA, PC, PC/ABS, PC/ASA, ABS, ASA	
COMMODITY	PS, PVC	PP, HDPE, PET, LDPE

VALOX™ HX (PBT) RESIN
- Good dielectric strength
- Excellent chemical resistance

LEXAN™ HP (PC) RESIN
- Excellent processability
- Transparency
- Excellent impact resistance

XYLEX™ HX (PC/PET) RESIN
- Good processability
- Good chemical resistance
- Transparency

CYCOLOY™ HC (PC/ABS) RESIN
- Excellent processability
- Colorability and aesthetics
- Good impact resistance

SABIC® PCG (PP AND PE) GRADES
- Cost effectiveness
- Versatility
- Processability

CYCOLAC™ HMG (ABS) RESIN
- Cost effective offering good mechanical properties

XENOY™ HX RESIN
- Good processability
- Balance of chemical resistance and toughness

HEALTHCARE PRODUCTS SUMMARY

CHEMICAL CATEGORY, PRODUCT FAMILY, RESIN SERIES AND GRADE	BIOCOMPATIBLE SUPPORTED (I) HEALTHCARE PRODUCT (J)	LIGHT TRANSMISSION %	CLARITY / GENERAL COLOR	STERILIZATION: STEAM AUTOCLAVE (L) AUTOCLAVE (TEMP °C)	STEAM AUTOCLAVE (L) EXPOSURE (CYCLES)[1]	GAMMA AND E-BEAM[2,3] RETENTION OF MECHANICALS	GAMMA AND E-BEAM[2,3] COLOR STABLE[4]	ETO[2] RETENTION OF MECHANICALS AND COLOR
PC (POLYCARBONATE) BASED								
LEXAN PC resins								
HP series	✓	88	clear	121	Limited	✓		✓
HPS series	✓	88	clear / gamma blue	121	Limited	✓	✓	✓
XYLEX PC/Polyester resins								
HX8300HP	✓	88	clear			✓		✓
HX7409HP	✓	79	clear / slight blue			✓	✓	✓
HX7509HP	✓	88	clear			✓	✓	✓
CYCOLOY PC/ABS resin								
HC1204HF	✓	N/A	opaque			✓	✓-O	✓
ABS (ACRYLONITRILE BUTADIENE STYRENE) BASED								
CYCOLAC ABS resins								
HMGxxMD	✓	N/A	opaque			✓	✓-O	✓
PBT AND/OR PET (POLYBUTYLENE TEREPHTHALATE AND/OR POLYETHYLENE TEREPHTHALATE) RESINS								
VALOX resins								
HX215HP	✓	N/A	opaque			✓	✓-O	✓
HX260HPR	✓	N/A	opaque			✓	✓-O	✓
HX312C	✓	N/A	opaque			✓	✓-O	✓
HX420HP	✓	N/A	opaque	134	Limited	✓	✓-O	✓
HX30x1HP	✓	N/A	opaque	134	Limited	✓	✓-O	✓

N/A - Not Applicable
1 Retention of impact resistance after exposure to autoclave
Limited L = 1-10 cycles
Medium M = 1-350 cycles
Extended E = 1-2500 cycles
2 Gamma radiation; E-Beam (electron beam) radiation; EtO or EO (ethylene oxide).
3 After exposure to gamma radiation – general (80% or better) maintenance of mechanical properties; data available upon request.
4 Noted LEXAN grades contain special color-stable package to support enhanced color stability for reduced YI or YI shift.
✓- O Typically, the influence of radiation on color of opaque grades is limited.

Additional footnotes listed on page 33.

PRODUCT PORTFOLIO OVERVIEW

LEXAN™ PC RESINS

- Polycarbonate resins+, ++
- Water-clear and colorable
- Excellent toughness and dimensional stability
- Clear, flame-retardant and high flow/ release grades
- Chlorine, bromine, phosphorous and Teflon® free technologies available
- Healthcare options
  - Biocompatible[A]
  - Sterilization: EtO, γ-Ray, γ-Ray LC, A-121-M and A-134-M

XYLEX™ PC/POLYESTER RESIN BLENDS

- Polycarbonate/polyester resin blends
- Water-clear and colorable
- Balance of chemical resistance and toughness
- Dimensional stability
- Healthcare options
  - Biocompatible[A]
  - Sterilization: EtO, γ-Ray, and γ-Ray LC
  - Lipid resistance

CYCOLOY™ PC/ABS RESIN BLENDS

- Polycarbonate/acrylonitrile-butadiene-styrene resin blends+, ++
- Excellent aesthetics colorable and UV-stable options
- Good balance of toughness/flow and chemical resistance
- Flame-retardant and high flow/ release grades
- Healthcare options
  - Biocompatible[A]
  - Enhanced resistance to certain disinfectants/cleaners

XENOY™ PC/PET, PC/PBT RESIN BLENDS

- Polycarbonate/semi-crystalline polyester resin blends++
- Outstanding aesthetics: high gloss and colorable
- UV-stable options
- Good chemical resistance
- Excellent impact resistance and toughness

CYCOLAC™ ABS RESINS

- Acrylonitrile-butadiene-styrene resins++
- Excellent aesthetics - high-gloss options
- Good processability and practical impact
- Flame-retardant grades
- Healthcare options:
  - Biocompatible[A]
  - Sterilization: EtO, γ-Ray, and γ-Ray LC

VALOX™ PBT AND/OR PET RESINS AND BLENDS

- Polybutylene terephthalate (PBT) and/ or polyethylene terephthalate (PET) resins++
- Outstanding electrical properties
- Chemical and high-heat resistance
- Healthcare options
  - Biocompatible[A]
  - Formaldehyde-free
  - Sterilization: EtO, γ-Ray, and A-134-L

SABIC® PCG PORTFOLIO WITH DEDICATED PP AND PE MATERIALS

The dedicated SABIC® PCG portfolio is especially designed to meet the stringent requirements of the pharmaceutical and medical industry. They are produced and handled with a dedicated set of cares and procedures with the vision to deliver optimal patient safety.

- Production in accordance with the requirements of Good Manufacturing Practice (GMP)
- Compliance with Food standard, European Pharmacopoeia (EP) and United State Pharmacopoeia (USP VI)
- No change policy on product composition/formulation; minimum 18 months pre notification prior to grade change or deletion
- Safety stock
- Access to Drug Master File data (DMF)
- Quick on-line access to material documentations
- Support towards material testing, validation and registration
- Fully dedicated sales and technical support; longterm joint development partnership
- Worldwide supply

KEY

+	FR (flame-retardant) package available without bromine or chlorine additives
++	RoHS-compliant options available
EtO	Ethylene Oxide
γ-Ray	Gamma / E-Beam radiation
γ-Ray LC	Gamma / E-Beam with clear Low Color Shift option
A-121-M	Steam Autoclave @ 121 °C; options within 1-350 cycles
A-134-M	Steam Autoclave @ 134 °C; options within 1-350 cycles
A-134-E	Steam Autoclave @ 134 °C; options within 1-2500 cycles

A Biocompatibility: material evaluated based on ISO 10993 or USP Class VI protocol; supporting information available by Type I or Type II letter. Reference page 8.

REPRESENTATIVE HEALTHCARE SEGMENTS

CARDIOVASCULAR AND BLOOD CARE

This area encompasses handling and management of blood, such as during cardiovascular and orthopedic surgeries, blood donations and kidney dialysis treatments. Applications include devices to support extracorporeal systems, blood collection and separation, as well as equipment to move, filter and hold blood.

TYPICAL APPLICATIONS

- Blood oxygenators and reservoirs
- Blood collection and separation bowls
- Filters (leukocyte/arterial)
- Renal dialyzers
- Blood filter and membrane media

PERFORMANCE CONSIDERATIONS

- Biocompatible[A] (disposables)
- Clarity (disposables)
- EtO and gamma/E-beam sterilization (disposables)
- Chemical resistance (disposables and pumps)
- Impact resistance (pumps)

RESIN SOLUTIONS

- LEXAN™ HP and HPS resins (devices)
- VALOX™ HX30x1HP resins (membranes)

FLUID DELIVERY AND IV THERAPY

This segment includes handling and management of fluids for use in IV (intravenous) therapy and enteral (gastrointestinal) fluid delivery systems. These systems often include various pumps to facilitate fluid delivery to the patient and connection devices that integrate the fluid bag/bottle, pump and tubing into a single system.

TYPICAL APPLICATIONS

- Stopcocks, luers, Y-sites and check valves
- Fluid filters
- Infusion sets
- Infusion and syringe pumps
- Enteral feeding pumps

PERFORMANCE CONSIDERATIONS

- Biocompatible[A]
- Clarity and colorability
- EtO, gamma and autoclave sterilization
- Impact and wear resistance
- Formaldehyde-free valves

RESIN SOLUTIONS

- LEXAN™ HP, HPS
- CYCOLOY™ HC resins
- CYCOLAC™ HM resins
- VALOX™ HX resins
- SABIC® PCG PP AND PE resins

DRUG DELIVERY

Drugs come in diverse forms, requiring delivery devices to span a broad set of formats from injection to inhalation. Safety and patient compliance issues have led to needle-less techniques, improved accuracy/efficiency in drug transfer, as well as aesthetic, miniaturized, ergonomic designs for drug-type identification and consumer appeal/use.

TYPICAL APPLICATIONS

- Inhalers
- Insulin delivery devices
- Needle-less injection devices
- Nebulizers
- Syringes, bottles, tubes and vials

PERFORMANCE CONSIDERATIONS

- Biocompatible[A]
- EtO, gamma and autoclave sterilization
- Strength and stiffness
- Ductility and toughness
- Precision fit and high dimensional tolerance
- Smooth part interaction and low wear

RESIN SOLUTIONS

- LEXAN™ HP, HPS resins
- CYCOLAC™ HM resins
- SABIC® PCG PP AND PE resins

REPRESENTATIVE HEALTHCARE SEGMENTS

RESPIRATORY AND SLEEP THERAPY

These devices and supporting equipment are used for treating respiratory-related illnesses in hospitals, clinics and at home. Respirators, ventilators, positive airway pressure devices and respiratory masks assist a growing number of patients with ongoing therapy needs.

TYPICAL APPLICATIONS

- Respirators and ventilators
- Positive Airway Pressure (PAP) devices
- Humidifier tanks
- Oxygen concentrators
- Respiratory masks and valves

PERFORMANCE CONSIDERATIONS

- Biocompatible[A] (airflow pathways)
- Clarity (masks)
- EtO and autoclave sterilization (masks and tanks)
- Impact and chemical resistance (masks and equipment)
- Flame retardance

RESIN SOLUTIONS

- LEXAN™ HP resins
- VALOX™ resins
- CYCOLOY™ resins (equipment)

MONITORING AND IMAGING

Monitoring and imaging devices comprise a very diverse range of applications from hand-held and small devices such as pulse oximeters, blood pressure and other patient monitors to larger transportable devices such as anesthesia delivery and ultrasound, to very large stationary equipment such as x-ray, CT, MRI and PET imaging machines.

TYPICAL APPLICATIONS

- Imaging equipment (MRI, CT, PET and x-ray)
- Anesthesia delivery and monitoring
- Patient monitors
- Blood glucose meters
- External defibrillators

PERFORMANCE CONSIDERATIONS

- Durability and impact resistance with light weight
- Chemical resistance to cleaners/ disinfectants
- WEEE and RoHS compliance
- Flame retardance
- Colorability and indoor UV stability

RESIN SOLUTIONS

- LEXAN™ 9x5 resins
- CYCOLOY™ resins
- GELOY™ resins
- VALOX™ FR resins (chemical resistance)

LAB WARE AND CLINICAL DIAGNOSTICS

The segment encompasses instruments and accessories for the analysis and diagnosis of patient samples, as well as for pharmaceutical and biopharmaceutical research. They range from disposable vials and containers for sample collection, to hand-held instruments, such as pipettors, for sample preparation, to clinical diagnostic equipment for rapid processing/evaluation of many samples.

TYPICAL APPLICATIONS

- Vials, tubes
- Diagnostic vial transport trays
- Pipettors
- Diagnostic machines
- Cassettes, centrifuges and covers

PERFORMANCE CONSIDERATIONS

- Biocompatible[A] (disposables)
- Clarity (disposables)
- Gamma and/or autoclave sterilization
- Impact and chemical resistance
- Light weight (equipment)

RESIN SOLUTIONS

- LEXAN™ HP and HPS resins (disposables)
- CYCOLOY™ resins
- VALOX™ resins
- XENOY™ FR resins (equipment)

REPRESENTATIVE HEALTHCARE SEGMENTS

MEDICAL LIGHTING

Focused lighting is critical in healthcare areas from general examination rooms to surgical theaters to dental offices. The generation or avoidance of heat from light sources is important in areas such as an operating room. In other cases, such as infrared therapy lighting, heat generation is desired. Lighting systems utilize a wide variety of components including housings, reflectors, handles and covers.

TYPICAL APPLICATIONS

- Luminaire housings
- IR transparent housings
- Reflectors
- Handles
- Light source covers

PERFORMANCE CONSIDERATIONS

- Heat management
- Lightweight
- Durability and reliability
- Flame and chemical resistance
- Biocompatible[A] and autoclave sterilization (handles)

RESIN SOLUTIONS

- VALOX™ resins (housings)

MOBILE HEALTHCARE

Devices and equipment allowing connectivity to enable remote patient monitoring. This equipment must be portable and durable enough to be worn on a patient's body for continuous monitoring.

TYPICAL APPLICATIONS

- Continuous Glucose Monitoring
- Insulin pumps

PERFORMANCE CONSIDERATIONS

- Impact resistance
- Colorability
- Chemical resistance
- Thinwall capable
- Durability

RESIN SOLUTIONS

- VALOX™ resins
- XYLEX™ resins
- CYCOLOY™ resins
- LEXAN™ resins

PHARMACEUTICAL MANUFACTURING

Devices and equipment such as connectors, filtration housings and filtration media are used in the manufacturing and processing of pharmaceuticals, including biopharmaceuticals. Many such devices are being created in disposable formats.

TYPICAL APPLICATIONS

- Connectors, couplings, and fittings
- Filtration and cassette housings
- Melt-blown membrane media

PERFORMANCE CONSIDERATIONS

- Gamma/E-beam and autoclave sterilization
- Advanced protein compatibility (housings and membranes)
- Clarity and low haze post-sterilization (housings)
- Chemical resistance (housings and membranes)

RESIN SOLUTIONS

- VALOX™ HX30x1HP resins

PACKAGING

Combination of components necessary to contain, preserve, protect and deliver a safe efficace drug product: containers, bottles, caps & closures, films and bags for pharmaceutical packaging

TYPICAL APPLICATIONS

- Containers for parenteral solutions
- Containers for OTC and prescription drug products
- Caps & closures
- Syringes, cups, spoons

PERFORMANCE CONSIDERATIONS

- Chemical resistance
- Sterilization conditions
- Clarity and transparency
- Additive free LDPE resins (low interaction with drug content)

RESIN SOLUTIONS

- SABIC® PP
- SABIC® PE

SEGMENT AND MATERIAL SELECTION CONSIDERATIONS

PRODUCT FAMILY	BLOOD MANAGEMENT	FLUID DELIVERY AND IV THERAPY	DRUG DELIVERY	PACKAGING	RESPIRATORY AND SLEEP THERAPY	MONITORING AND IMAGING	LABWARE, DIAGNOSTICS AND HOSPITAL EQUIPMENT	MEDICAL LIGHTING	BIOPHARMACEUTICAL EQUIPMENT
LEXAN™ PC resins++	**Disposables** **HP and HPS resins :** clarity, impact resistance, EtO, γ-ray LC, A-121-L	**Disposables** **HPS7 resin:** clarity, lipid resistance, EtO, γ-ray LC, A-121-L **Pump housings** **HP resins:** clarity, impact resistance, colorability, A-121-L	**Disposables** **HP and HPS series resins:** clarity, impact resistance, EtO, γ-ray (HPS-LC), A-121-L **Device housings** **HP resins:** clarity, colorability, impact resistance, A-121-L		**Respiratory masks** **HP resins:** clarity, impact resistance, EtO, A-121-L	**Equipment enclosures** **9x5(A)(U) resins:** FR, impact resistance, (Transparency and UV stable options)	**Equipment enclosures** **9x5(A)(U) resins:** FR, impact resistance, (Transparency and UV stable options) **Disposables** **HP and HPS series resins:** clarity, impact resistance, EtO, γ-ray (HPS-LC)		**Connectors and filtration housings** **HPS resins:** clarity, impact resistance, EtO, γ-ray LC, A-121-L
XYLEX™ PC/Polyester resin blends++		**Disposables** **HX7509HP resin:** clarity, EtO, γ-ray LC **Pump housings** **XYLEX™ HX and X series resins:** clarity, enhanced chemical resistance	**Device Housings** **XYLEX HX resins:** clarity, enhanced chemical resistance						
CYCOLOY™ PC/ABS resin blends++		**Pump housings** **CY6xxx series resins:** for balance of impact resistance and enhanced chemical resistance	**Device housings** **HC biocompatible resins:** for impact resistance, colorability		**Equipment enclosures** **CY6xxx series resins:** for balance of impact resistance and enhanced chemical resistance, FR	**Equipment enclosures** **CY6xxx series resins:** for balance of impact resistance and enhanced chemical resistance, FR **CM6210 resin:** thermoformed panels, FR	**Equipment enclosures** **CY6xxx series resins:** for balance of impact resistance and enhanced chemical resistance, FR		
XENOY™ PBT, PET/PC resin blends++	**Device Housings** chemical resistance, impact strength	**Pump housings** **XENOY™ X series resins:** balance of impact resistance and enhanced chemical resistance				**Equipment enclosures** **XENOY™ resins:** high gloss, balance of impact, chemical and UV resistance, FR options	**Equipment enclosures** **XENOY™ resins:** high gloss, balance of impact, chemical and UV resistance, FR options		
CYCOLAC ABS resins++			**Device Housings** **HMxxMD resins:** general balance of toughness and flow, excellent aesthetics, high gloss			**Equipment enclosures** **CYCOLAC resins:** excellent aesthetics, high gloss, FR options	**Equipment enclosures** **CYCOLAC resins:** excellent aesthetics, high gloss, FR options		
VALOX PBT and/or crystalline PET semi resins and blends ++	**Melt blown fibers** **HX30x1HP resins:** melt blown membrane media	**Disposables** **HX series resins:** enhanced chemical resistance EtO, γ-ray	**Internal Components** **VALOX HX resins:** formaldehyde-free wear resistance, EtO, γ-ray			**Work surfaces VALOX resins:** enhanced chemical resistance, FR options			
SABIC® PCG portfolio		Functional parts, connectors	**PP & PE PCG** Device housings and functional parts PP PCG: injector pens, syringes, inhalers	Containers, caps & closures, bags, PP & PE PCG, good chemical resistance and mechanical properties				**Luminaire housing** **VALOX resins:** enhanced chemical resistance, FR options	

In the chart above, only materials listed with nomenclature beginning with “H” are biocompatible supported (I) by SABIC; other materials are not. See page 8.
+ : Grades available without bromine and/or chlorine additives (F). ++ : RoHS compliant grades available (H).
EtO : Ethylene Oxide. γ-ray: Gamma / E-Beam. γ-ray LC: Gamma / E-Beam with clear Low Color Shift options.
A-121-M: Steam Autoclave @ 121ºC; options within 1-350 cycles. A-134-M: Steam Autoclave @ 134ºC; options within 1-350 cycles.
A-134-E: Steam Autoclave @ 134ºC; options within 1-2500 cycles.

CHEMICAL RESISTANCE PERFORMANCE GUIDELINES

PRODUCT FAMILY	GRADE/SERIES	Exposure time (days)	Bleach sodium hypochlorite solution, 50%	Cidex† glutaraldehyde based disinfectant	Methyl ethyl ketone (MEK)	Virex† organic ammonium chloride based disinfectant	Betadine† microbicide; povidone-iodine solution	Ethanol (ethyl alcohol)	Hydrogen peroxide 3%	Isopropanol (isopropyl alcohol; ipa) 70%	Saline 10%	Lipid hydrocarbon-containing organic compounds; fatty acid derivatives	DEHP diethylhexylphthalate
LEXAN PC RESINS													
Healthcare products													
	HP1R	3	⊕	⊕	■	●	⊕	●	⊕	⊕	⊕		
	HPS2R	3	⊕	⊕	■	●	⊕	⊕	⊕	⊕	⊕		
	HPS7	3	⊕	●	■	●	⊕	⊕	7 days ⊕	⊕	⊕	●	5 days ⊕
XYLEX PC/POLYESTER RESIN BLENDS													
Healthcare products													
	HX8300HP	3	⊕	●	■	●⚠	⊕⊕	■	⊕	⊕⊕	⊕⊕	■	
CYCOLOY PC/ABS RESIN BLENDS													
Healthcare Products													
	HC1204HF	7	●	▲	■	▲	■	■	⊕⊕	⊕	●		
Standard products													
	C2950	7	●	■	■	■	■	▲	●	●	▲		
	C6600	7	●	■	■	■	⊕⊕	■	●	■	⊕⊕		
CYCOLAC ABS RESINS													
Healthcare products													
	HMG47MD	7	⊕⊕	●	■	●	■	■	▲	●	●		
	HMG94MD	7	⊕⊕	■	■	■	■	■	⊕	■	●		
Standard products													
	MG37EPX	7	⊕⊕	●	■	⊕⚠	●	■	⊕⊕	■	⊕⊕		
	GRM2600L	7	⊕⊕	●	■	⊕⊕	●	■	⊕⊕	●	⊕⊕		

LEGEND FOR SYMBOLS

- ● Compatible at 0.5% strain
- ⊕ Compatible at 1.0% strain
- ⊕⊕ Compatible at 1.5% strain
- ▲ Marginal for one or both measures at 0.5% strain
- ▲⚠ Marginal for one or both measures at 1.0% strain
- ▲⚠⚠ Marginal for one or both measures at 1.5% strain
- ■ Not compatible

LAB BENCH COMPATIBILITY RATING:

Color rating	Retention tensile stress at yield, %	Retention tensile elongation at break, %
COMPATIBLE	≥ 90	80 -139
MARGINAL	80 - 89	65 - 79
NOT COMPATIBLE	≤ 79	≤ 64 OR > 140

PRODUCT FAMILY	GRADE/SERIES	Exposure time (days)	Bleach sodium hypochlorite solution, 50%	Cidex† glutaraldehyde based disinfectant	Methyl ethyl ketone (MEK)	Virex† organic ammonium chloride based disinfectant	Betadine† microbicide; povidone-iodine solution	Ethanol (ethyl alcohol)	Hydrogen peroxide 3%	Isopropanol (isopropyl alcohol; ipa) 70%	Saline 10%	Lipid hydrocarbon-containing organic compounds; fatty acid derivatives
VALOX PBT AND/OR PET RESINS AND BLENDS												
Healthcare products												
	HX420HP	3	⊕	■	⊕	⊕	⊕	⊕	⊕	⊕	⊕	⊕
Standard products												
	365	3	⊕	⊕	■	⊕	⊕	●	⊕	⊕	⊕	
	855	3	●⚠	⊕	⊕	⊕	⊕	⊕	⊕	⊕	⊕	

CHEMICAL RESISTANCE TESTING ACCORDING TO ISO 4599 (DETERMINATION OF RESISTANCE TO ENVIRONMENTAL STRESS CRACKING (ESCR) — BENT STRIP METHOD) OR ASTM D543 (EVALUATING THE RESISTANCE OF PLASTICS TO CHEMICAL REAGENTS).
This information should be used as indicative only: Accurate chemical compatibility can only be determined under final application conditions. Therefore, extensive testing of the finished part is strongly recommended. The performance and interpretation of end-use testing are the end producers responsiblity.

STRAIN LEVEL <0.5%
Generally represents molded-in stress of actual part, when designed and molded in line with recommended guidelines

STRAIN LEVELS >0.5%
A material is generally more susceptible to chemical attack at higher strain levels. [e.g. chemically induced cracking will more readily occur at strain level 1.5% than at strain level 0.5%]

TEST TEMPERATURE - 23°C

PERFORMANCE PROPERTIES
HEALTHCARE RESINS

				HEALTHCARE CONSIDERATIONS (D)					PHYSICAL PROPERTIES (E)				MECHANICAL PROPERTIES (E)							
	LEVEL OF RELEASE ADDITIVE				STANDARDS AND REGULATORY															
	None	Standard	Higher				Food contact													
Product family	Grade / series			Data provided for:	RoHS compliant (H)	Biocompatible supported (I) healthcare product (J)	FDA (K)	EU (K)	Lipid resistance	Light transmission % ASTM D 1003 %	Specific gravity ASTM D 792 -	Melt flow rate ASTM D 1238 g/10 min	Mold shrinkage flow, 3.2 mm SABIC Method %	Tensile stress, yld ASTM D 638 MPa	Tensile stress, brk ASTM D 638 MPa	Tensile strain, yld ASTM D 638 %	Tensile strain, brk ASTM D 638 %	Flexural modulus ASTM D 790 MPa	Izod impact, notched, 23°C ASTM D 256 J/m	HDT unannealed ASTM D 648 °C	HDT unannealed ASTM D 648 °C
LEXAN PC RESINS standard												300°C/1.2 kgf		Type I, 50 mm/min	Type I, 50 mm/min	Type I, 50 mm/min	Type I, 50 mm/min	1.3 mm/min, 50 mm span		0.45 MPa, 6.4 mm	1.82 MPa, 6.4 mm
		HP1HF		HP1HF	●	●	●	●		88	1.18	39	0.5 - 0.7	63	58	6	108	2410	687		125 (3.2 mm)
		HP1	HP1R(EU)	HP1	●	●	●	●		88	1.2	25	0.5 - 0.7	62	65	6	120	2300	640	137	126
	HP2NR	HP2	HP2R(EU)	HP2	●	●	●	●		88	1.2	17.5	0.5 - 0.7	62	68	7	125	2130	694	137	129
	HP3NR	HP3	HP3R(EU)	HP3	●	●	●	●		88	1.2	14	0.5 - 0.7	62	130	7	125	2340	800	-	132 (3.2 mm)
	HP4NR	HP4	HP4R(EU)	HP4	●	●	●	●		88	1.2	10.5	0.5 - 0.7	62	68	7	130	2340	801	137	132
	HP6NR	HP6		HP6	●	●	●	●		88	1.2	7	0.5 - 0.7	62	68	7	135	2340	907	137	132
Gamma stabilized[2]																					
		HPS1	HPS1R	HPS1	●	●	●	Not listed		88	1.2	25	0.5 - 0.7	62	65	6	120	2300	640	137	126
		HPS2	HPS2R(EU)	HPS2	●	●	●	Not listed		88	1.2	17.5	0.5 - 0.7	62	68	7	125	2130	694	137	129
		HPS4		HPS4	●	●	●	Not listed			1.19	10.5	0.5 - 0.7	62	74	6.5	140	2400	840	138	132
		HPS6		HPS6	●	●	●	Not listed		88	1.2	7	0.5 - 0.7	62	68	6.5	135	2340	907	137	132
		HPS7	HPS7R	HPS7	●	●	●	Not listed	●	88	1.2	5	0.5 - 0.7	62	72	6.5	125	2340	935	142	132
XYLEX PC/POLYESTER RESIN BLENDS												265°C/2.16 kgf		Type I, 50 mm/min	Type I, 50 mm/min	Type I, 50 mm/min	Type I, 50 mm/min	1.3 mm/min, 50 mm span		0.45 MPa, 3.2 mm	1.82 MPa, 3.2 mm
	HX8300HP			HX8300HP	●	●	●	●		88	1.2	15	0.5 - 0.8	47	46	5	150	1680	1120	79	75
		HX7509HP		HX7509HP	●	●	●[1]	●		88	1.2	12	0.4 - 0.6	60	63	6.3	135	2300	854	119	106
CYCOLOY PC/ABS RESIN BLENDS												260°C/5.0 kgf		Type I, 50 mm/min	Type I, 50 mm/min	Type I, 50 mm/min	Type I, 50 mm/min	1.3 mm/min, 50 mm span		0.45 MPa, 3.2 mm	1.84 MPa, 3.2 mm
		HC1204HF		HC1204HF	●	●	●	●		Opaque	1.15	24	0.5 - 0.7	57	45	5	150	2340	587	126	109
CYCOLAC ABS RESINS												230°C/3.8 kgf		Type I, 5 mm/min	Type I, 5 mm/min	Type I, 5 mm/min	Type I, 5 mm/min	1.3 mm/min, 50 mm span		0.45 MPa, 3.2 mm	1.84 MPa, 3.2 mm
			HMG47MD	HMG47MD	●	●	●	●		Opaque	1.05	5.6	0.5 - 0.8	44	33	2	24	2340	320	96	82
			HMG94MD	HMG94MD	●	●	●	●		Opaque	1.04	11.7	0.5 - 0.8	46	35	2	18	2620	240	95	82
VALOX PBT AND/OR PET RESINS AND BLENDS												250°C/2.16 kgf		Type I, 50 mm/min	Type I, 50 mm/min	Type I, 50 mm/min	Type I, 50 mm/min	1.3 mm/min, 50 mm span		0.45 MPa, 6.4 mm	1.82 MPa, 6.4 mm
	HX215HP			HX215HP	●	●	●[1]	●	●	Opaque	1.31	80	0.9 - 1.6	51	26	3.7	300	2340	53	154	54
	HX312C			HX312C	●	●	●[1]	●	●	Opaque	1.31	35	0.9 - 1.6	51			300	2340	53	154	54
	HX420HP			HX420HP	●	●	●[1]	●		Opaque	1.53	26	0.3 - 0.8	120 (5 mm/min)	120 (5 mm/min)	3 (5 mm/min)	3 (5 mm/min)	7580	85	215	207
	HX3091HP			HX3091HP	●	●	●[1]	●	●	Opaque	1.31	21	1.8 - 2.2	56	30	3.6	300	2400	55	112	49

● Yes ■ No

1 FDA food contact with use limitations
2 LEXAN HPSxS resins - highest release level

Additional footnotes listed on page 34.

PERFORMANCE PROPERTIES STANDARD RESINS

		HEALTHCARE CONSIDERATIONS (D)					PHYSICAL PROPERTIES (E)				MECHANICAL PROPERTIES (E)							
		STANDARDS AND REGULATORY			Food contact		Light transmission	Specific gravity	Melt flow rate	Mold shrinkage, flow, 3.2 mm	Tensile stress, yld	Tensile stress, brk	Tensile strain, yld	Tensile strain, brk	Flexural modulus	Izod impact, notched, 23°C	HDT unannealed	HDT unannealed
Product family	Grade/ series	No bromine/no chlorine flame wretardant systems used in grade (F)	RoHS compliant (H)	UL 94 flame class ratings (G)	Biocompatible supported (I) healthcare product (J)	FDA (K)	EU (K)	ASTM D 1003	ASTM D 792	ASTM D 1238	SABIC Method	ASTM D 638	ASTM D 638	ASTM D 638	ASTM D 638	ASTM D 790	ASTM D 638	ASTM D 638	ASTM D 638
							%	-	g/10 min	%	MPa	MPa	%	%	MPa	J/m	°C	°C
LEXAN PC RESINS									**300°C/1.2 kgf**		Type I, 50 mm/min	Type I, 50 mm/min	Type I, 50 mm/min	Type I, 50 mm/min	1.3 mm/min, 50 mm span		0.45 MPa, 6.4 mm	1.82 MPa, 6.4 mm
	925	●	●	V2–0.8mm; V0–1.1mm	■	■	■	Opaque	1.19	14	0.6 - 0.8	62	65	6	125	2340	801	137	126
	945	●	●	V2–0.8mm; V0–1.1mm	■	■	■	Opaque	1.19	10	0.6 - 0.8	62	65	6	125	2340	801	137	126
	925A	●	●	V2–0.8mm; V1–1.5mm; V0–3.0mm	■	■	■	86	1.19	13	0.6 - 0.8	62	67	6	125	2370	801	137	126
	945AU	●	●	V2–0.8mm; V0–3.0mm	■	■	■	86	1.19	10	0.6 - 0.8	62	67	6	125	2370	801	137	126
	FL905 (Foamable)	●	●	V0–3.0mm	■	■	■	Opaque	1.20	3.2	0.6	58	47	5.7	30	2670	520		
CYCOLOY PC/ABS RESIN BLENDS									**260°C/2.16 kgf**		Type I, 50 mm/min	Type I, 50 mm/min	Type I, 50 mm/min	Type I, 50 mm/min	1.3 mm/min, 50 mm span		0.45 MPa, 3.2 mm	1.84 MPa, 3.2 mm
	C1200HF	●	●	HB–1.2mm	■	■	■	Opaque	1.15	19 (260°C/5.0 kgf)	0.5 - 0.7	57	44	5	150	2340	587	129	112
	C6600	●	●	V2–0.8mm; V0–1.5mm; 5VB–2.0mm	■	■	■	Opaque	1.19	21.5	0.4 - 0.6	63	48	4	80	2620	587	97	90
	CY6110	●	●	V0–1.2mm; 5VB–2.0mm; 5VA–2.0mm	■	■	■	Opaque	1.18	23	0.4 - 0.6	63	47	4	65	2760	475		88
	CY6310	●	●	V0–0.8mm; 5VB–1.5mm; 5VA–3.0mm	■	■	■	Opaque	1.16	20	0.4 - 0.6	63	50	4	>50	2700	600	100	88
	CY6414	●	●	V0–1.2mm; 5VB–2.0mm; 5VA–2.0mm	■	■	■	Opaque	1.18	6	0.4 - 0.8	64	62	6	85	2330	795		118
	CM6210	●	●	V0–1.5mm	■	■	■	Opaque	1.28	14.6 (260°C/5.0 kgf)	0.4 - 0.6	64	50	4.9	80	3500	500		90
XENOY PC/POLYESTER RESIN BLENDS									**266°C/5.0 kgf**		Type I, 50 mm/min	Type I, 50 mm/min	Type I, 50 mm/min	Type I, 50 mm/min	1.3 mm/min, 50 mm span		0.45 MPa, 6.4 mm	1.82 MPa, 6.4 mm
	6370	●	●	HB–1.5mm	■	■	■	Opaque	1.44		0.3 - 0.4		91 (5 mm/min)		4 (5 mm/min)	5370	170	204	148
	6620	●	●	HB–1.5mm	■	■	■	Opaque	1.20		1.6 - 1.8	43			175	1720	801	98	60
CYCOLAC ABS RESINS									**230°C/3.8 kgf**		Type I, 5 mm/min	Type I, 5 mm/min	Type I, 5 mm/min	Type I, 5 mm/min	1.3 mm/min, 50 mm span		0.45 MPa, 3.2 mm	1.84 MPa, 3.2 mm
	FR15	■	●	V0–1.5mm; 5VA–2.5mm	■	■	■	Opaque	1.20	4	0.5 - 0.7	41	35	2.3	9	2720	213	82	70
VALOX PBT AND/OR PET RESINS AND BLENDS									**266°C/5.0 kgf**		Type I, 50 mm/min	Type I, 50 mm/min	Type I, 50 mm/min	Type I, 50 mm/min	1.3 mm/min, 50 mm span		0.45 MPa, 6.4 mm	1.82 MPa, 6.4 mm
	310SE0	■	●	V0-0.71mm; 5VA-3mm	■	■	■	Opaque	1.40	8.6 (250°C/2.16kgf)	1.5 - 2.3	58	58	20	20	2620	37	162	71
	357U	■	●	V0–0.6mm; 5VA–3.0mm	■	■	■	Opaque	1.34		0.8 - 1.1	48	48		110	2060	534	137	98
	357X	■	●	V0–0.6mm; 5VA–3.0mm	■	■	■	Opaque	1.34		0.8 - 1.1	48	48		110	2060	534	137	98
	364	■	●	V0-1.47mm; 5VA-2.99mm	■	■	■	Opaque	1.30		0.8 - 1.0	46	39	5	70	1860	747	103 (3.2mm)	68 (3.2mm)
	365	■	●	V0–0.8mm; 5VA–2.2mm	■	■	■	Opaque	1.33		0.8 - 1.0	41	41		120	2240	640	129	121
	3706	■	●	V0–1.5mm; 5VA–2.5mm	■	■	■	Opaque	1.30	23	1.2 - 1.4	48	39	6	50	1990	667	126 (3.2 mm)	85 (3.2 mm)
	855	■	●	V0–1.5mm	■	■	■	Opaque	1.54	81	0.4 - 0.6		89 (5 mm/min)			4820	53	204	187
	V3900WX	■	●	V0-1.5mm; 5VA-3mm	■	■	■	Opaque	1.30	11 (265°C/2.16kgf)	0.7 - 1.0	53	43	5	50	2200	800	119	96

● Yes ■ No
1 GFN2V in Europe
2 Inherent flame resistance
N/A: Not Applicable
Additional footnotes listed on page 34.

PERFORMANCE PROPERTIES HEALTHCARE PACKAGING SOLUTIONS

SABIC® PCG - CONTAINERS FOR SMALL AND LARGE VOLUME PARENTERAL SOLUTIONS

- Additive-free LDPE resins; full compliance with European Pharmacopoeia monograph 3.1.4 and USP VI
- Wide range of density to help optimize squeezability and sterilization conditions
- Typically used on Blown Fill Seal (BFS) machines (Rommelag Bottelpack®, Weiler)

GRADE NAME	POLYMER	MFR (G/10MIN)	DENSITY (KG/M3)	
SABIC® PCG02	LDPE	1.9	921	Additive-free resin commonly used in SVP containers (ampoule, small bottle) with high squeezability. It's higher flow allows optimized processing conditions. BFS process
SABIC® PCG80	LDPE	0.3	922	Additive-free resin commonly used in SVP containers (ampoule, small bottle) with high squeezability. BFS process
SABIC® PCG01	LDPE	0.8	925	Additive-free resin commonly used in SVP containers (ampoule, small bottle) with good squeezability. BFS process
SABIC® PCG00	LDPE	0.3	926	Additive-free resin commonly used in SVP ampoules/ bottles and LVP bottles using BFS process. Sterilizable by autoclaving up to 106°C
SABIC® PCG06	LDPE	0.5	928	Additive-free resin. Typically used for LVP IV bottles using BFS process; sterilizable by autoclaving up to 110°C

SABIC® PCG - DISPOSABLE SYRINGES, DIAGNOSTIC TUBES, CARTRIDGES

- Ultra-clear PP resin with enhanced transparency for better visual inspection of drug content
- Peroxide-free PP resins with improved cleanliness and purity
- High flow grades that enable higher design capability and energy saving opportunity during processing

GRADE NAME	POLYMER	MFR (G/10MIN)	DENSITY (KG/M3)	
SABIC® PCGH19	PP-HPP	19	905	Our PP resin commonly used in 3-part syringe plunger applications and various injection molded parts
SABIC® PCG3054	HDPE	30	954	Our alternative HDPE resin commonly used for 2-part syringe plungers. Its high flow allows optimized processing conditions and high production rate. The resin has a good stiffness
SABIC® PCGR40	PP-RCP	40	905	Peroxide-free PP resin with glass-like transparency. Its high flow allows lower energy consumption while maximizing production rate
SABIC® PCGR40L	PP-RCP	40	905	Peroxide-free PP resin with glass-like transparency. Its high flow allows lower energy consumption while maximizing production rate. The grade is lubricated in order to reduce friction

SABIC® PCG – CONTAINERS FOR OTC AND PRESCRIPTION DRUG PRODUCTS

- Additive-free LDPE resins with low interaction with drug contents during expected shelf-life
- Wide range of density for optimized squeezability, ESCR and sterilization temperature
- PP option for enhanced transparency and autoclaving sterilization at 121°C

GRADE NAME	POLYMER	MFR (G/10MIN)	DENSITY (KG/M3)	
SABIC® PCG5421	LDPE	0.2	954	HDPE resin commonly used in white or natural bottle/container applications. Can be processed using EBM and/or IBM processes
SABIC® PCG00	LDPE	0.3	926	Additive-free resin commonly used in flexible bottles or containers; BM process
SABIC® PCG80	LDPE	0.3	922	Additive-free resin commonly used in bottle and/or container with good softness and high flexibility. BM process
SABIC® PCG01	LDPE	0.75	925	Additive-free resin commonly used in flexible bottle and/or container applications. BM process
SABIC® PCG02	LDPE	1.9	921	Additive-free resin commonly used in bottle and/or container with good softness and high flexibility. Its higher flow allows optimized processing conditions. BM process

PERFORMANCE PROPERTIES HEALTHCARE PACKAGING SOLUTIONS

SABIC® PCG - CAPS AND CLOSURES

- Optimized flow for optimal processing productivity (shorter injection cycle-time, faster cooling time)
- Additive-free LDPE resins with good organoleptic properties

GRADE NAME	POLYMER	MFR (G/10MIN)	DENSITY (KG/M3)	
SABIC® PCG453	HDPE	5	953	Medium flow resin with good rigidity/ESCR balance commonly used for caps and closures
SABIC® PCG863	HDPE	8	963	Resin with improved flow typically used for caps with high stiffness
SABIC® PCG3054	HDPE	30	954	Resin with high flow while showing good stiffness/ESCR balance used in caps
SABIC® PCGH19	HPP	19	905	Our alternative solution for PP caps & closures with good rigidity and high HDT; its higher flow allows optimized processing conditions
SABIC® PCG09	LDPE	7.5	924	Our solution for LDPE caps & closures with excellent flow, flexibility and softness balance
SABIC® PCG07	LDPE	7.5	920	Gain improved flexibility and softness from lower density
SABIC® PCG22	LDPE	22	919	Gain higher processing productivity from high flow; high flexibility and softness; typically used in tamper-evident caps and lids

SABIC® PCG – FLEXIBLE PACKAGING FOR DRUG PRODUCTS AND MEDICAL DEVICES

- Wide range of mechanical properties to choose from to help optimize packaging integrity so as to preserve quality and sterility while enabling cost-efficiency from potential down-gauging
- Improved sealing properties and tear resistance from unique C6-LLDPE grade offer
- Additive-free and gamma sterilizable LDPE grades

GRADE NAME	POLYMER	MFR (G/10MIN)	DENSITY (KG/M3)	
SABIC® PCG80	LDPE	0.3	922	Our alternative solution for film with excellent toughness and outstanding biaxial shrink properties; good optical properties, high purity and gamma sterilizable; used in blown film
SABIC® PCG01	LDPE	0.8	925	Grade for thin film with combined excellent optical properties, processability and stifness; commonly used in lamination applications. High purity and gamma sterilizable; used in cast film
SABIC® PCG00	LDPE	0.3	926	Gain excellent optical and mechanical properties from high density. High purity and gamma sterilizable; used in blown film
SABIC® PCG61	C6-LLDPE	0.9	918	Our alternative solution for film with combined high tear resistance, high impact strength and excellent sealing properties; good optical properties; suitable for lamination; used in blown film
SABIC® PCGF0863	HDPE	8	964	Our alternative solution for film with excellent stiffness, very low gel level and improved water vapor permeability - typically used in extrusion coating application in blend with LDPE

LEGAL DISCLAIMER

Do not use SABIC® PCG product range in medical applications involving any of the following medical devices in accordance with the classification criteria and definitions as outlined in annex IX of the EU council directive on medical devices (93/42/EEC of 14 June 1993 including amendments):

- Class IIb implantable medical devices and both short-term and long-term surgically invasive devices
- All medical devices in class III

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FOOTNOTES TO PRODUCT CHARTS

A Biocompatibility: material evaluated based on ISO 10993 or USP Class VI protocol; supporting information available by Type I or Type II letter. Reference footnote I below.

C Implant policy: SABIC does not support applications that remain implanted beyond 29 days.

D Healthcare Considerations: The material may offer capability of attribute shown; please consult with a SABIC representative for additional information.

E Physical and Mechanical Properties: Information presented in parenthesis ( ) after data indicates that different test conditions were applied.

F No bromine, no chlorine flame-retardant systems used in grade formulation; however, final product assessment must include colorants (grade-color combination).

G UL 94 Flame class rating: Representative information from UL Yellow Card provided; see UL (www.ul.com) for full Yellow Card data set.

H RoHS compliant: Grade listed conforms to EU Directive 2011/65/EU (as amended including EU Directive 2017/2102/EU) Restriction of Hazardous Substances (RoHS 2); final assessment must include colorants (grade-color combination).

I Biocompatibility: A representative lot of material evaluated based on ISO 10993 or USP VI protocol. Biocompatibility information available via Type I or Type II letter. Type I Letter: Issued for products that have been specifically tested for biocompatibility. Type II Letter: Issued when specific product has not been tested but similar products have been tested for biocompatibility.

SABIC does not knowingly support the use of grades not designated as "biocompatible supported" in healthcare applications requiring biocompatibility.

J The SABIC Healthcare product policy

- Easily identifiable healthcare product nomenclature
  - CYCOLAC HM resins
  - CYCOLOY HC resins
  - LEXAN HP resins
  - NORYL HN resins
  - ULTEM HU resins
  - VALOX HX resins
  - XYLEX HX resins
- Biocompatibility assessed (according to ISO10993 or USP Class VI)
- Food contact compliance for most “healthcare products”
- FDA Drug Master File and/or Device Master File listing (Letter of Authorization provided as needed)
- SABIC healthcare products are subject to formula lock and stringent management of change process (ask your SABIC representative for more details)

K Food Contact: Food contact status may be contingent on the color package used in combination with the base resin.

L Steam sterlization: Though steam autoclave testing has been conducted, performance may vary by exact temperature, time and conditions of exposure. Design of device also influences duration of materials' ductility in use.

Do not use SABIC® PCG product range in medical applications involving any of the following medical devices in accordance with the classification criteria and definitions as outlined in annex IX of the EU council directive on medical devices (93/42/EEC of 14 June 1993 including amendments):
- Class IIb implantable medical devices and both short-term and long-term surgically invasive devices
- All medical devices in class III

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