SELECTION GUIDE

FORMERRA HEALTHCARE SOLUTIONS

Surgical Instruments

MORE THAN MATERIALS

Formerra

SURGICAL INSTRUMENTS

Surgical instruments used by physicians in operating rooms demand robust performance and functional design. To deliver the highest level of care to patients, these surgical instruments must be manufactured for optimal ergonomic design with materials that meet rigorous standards—FDA-approved, excellent chemical resistance and an ability to withstand repeated sterilization.

At Formerra, we help you solve your toughest application challenges by providing a specialized approach to the latest material, colorant and additive technologies. With a dedication to sustainable solutions, technical and logistics expertise and innovative design engineering capabilities, we can help you mitigate risk, optimize design and accelerate product commercialization.


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TUBING AND CONNECTORS
EtO, gamma stable, non-kink,
tear strength, compression set resistance
SOLUTION:
Specialty formulations, fPVC, TPV,
TPU, S-TPE

ERGONOMIC GRIPS
Tactile features, non-slip, chemical
and UV resistance, toughness
SOLUTION:
PBT, PC Blends, TPE, TPV, TPU

DENSITY MODIFICATION
Proper weighting and balance
for optimum control
SOLUTION:
Specialty formulations

LIGHT PIPING
High transmission rate,
optical clarity
SOLUTION:
PMMA, PC, SMMA

This design and rendering were produced
by Avient Design for conceptual purposes.

EQUIPMENT AND COMPONENT HOUSINGS

UL 94V0/5VA rated, chemical and UV resistance, rigidity, toughness

SOLUTION:

FR-PC/PBT FR-PC/ABS, FR-ABS, coPET, PVC

TUBING

Compression set, chemical and fatigue resistance, tear strength

SOLUTION:

Silicone, specialty formulations, TPV

ELECTRICAL WIRE COVERINGS AND CONNECTORS

Electrical insulation, flexibility, chemical, UV and abrasion resistance, UL 94V0 5VA rated

SOLUTION:

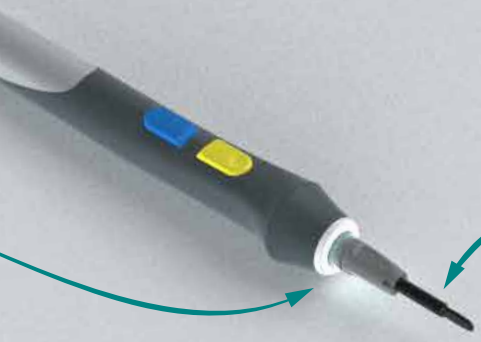
fPVC, TPU, TPV

MONITOR

Transparency, screen protection, UL 94V0/5VA rated, chemical and UV resistance, rigidity, toughness

SOLUTION:

Styrenic Blends (mABS, SAN, SMMA, MBS,); CoPET, PMMA, PC



SURGICAL EQUIPMENT COMPONENTS

High-temperature heat resistance, UL flammability rated

SOLUTION:

PSU, PPSU, PA, HH-PC

RIGID COMPONENTS: SPECIALIZED DEVICES FOR MEDICAL & DENTAL SURGICAL PROCEDURES

Applications include:

- Housings
- Covers
- Handles
- Triggers
- Battery panels
- Nozzles
- Cannulae
- Valves
- Control knobs

Rigid Component Solution Needs:

- Materials compliant with ISO 10993 & USP Class VI, if required
- Excellent rigidity & dimensional stability
- Mechanical property retention after sterilization
- Materials that do not irritate the skin
- Excellent toughness to meet durability requirements
- Excellent chemical resistance to bodily fluids, drug solutions and disinfectant

Copolyester, PBT & PC/Polyester Blends		
Copolyester	Eastman Tritan™ (Copolyester)	High chemical resistance to drugs, lipids, and a wide variety of hospital disinfectants; excellent toughness and impact resistance; retains mechanical properties, clarity, color, and gloss after disinfection and sterilization (gamma, e-beam, EtO); does not contain BPA; biocompatible
	Avient Trilliant™ (Copolyester)	Engineered solutions; good chemical resistance to disinfectants; V0 flammability performance; colorability; toughness; autoclave, radiation and EtO sterilization
Polybutylene Terephthalate (PBT)	DuPont™ Crastin® (PBT)	Excellent surface appearance; good printability; low extractables and volatiles; excellent gamma sterilization performance; good chemical resistance; alternative to nylon for low moisture uptake and dimensional stability; low wear/low friction
Polycarbonate/ Polyester (PC/PET & PC/PBT)	Covestro Makroblend® (PC/Polyester)	Ultra-tough materials that meet demanding physical and environmental requirements; excellent resistance to harsh chemicals; opaque; skin contact biocompatibility available; flame retardant options available
High Heat PC, Glass Filled PC & PC		
High Heat Polycarbonate (HH PC)	Covestro Apec® (HH PC)	High heat transparent, strong co-polycarbonate; suitable for autoclave sterilization; good hydrolysis resistance and biocompatible
Glass Filled Polycarbonate (GF PC)	Trinseo CALIBRE™ (GF PC)	5101 & 5102 (10 and 20%, respectively) glass filled PC; high rigidity and dimensional stability; full biocompatibility; animal-derivative free; suitable for EtO and radiation sterilization
Polycarbonate (PC)	Covestro Makrolon® (PC)	Extremely robust with strength, hardness and rigidity; lightweight with glass-like transparency; biocompatible; sterilizable by gamma, EtO, e-beam and steam
	Trinseo CALIBRE™ & CALIBRE MEGARAD™ (PC)	Transparent and opaque options; full biocompatibility; animal-derivative free; suitable for gamma and e-beam sterilization (2081); EtO and radiation sterilization (2061); custom colors
PA, Rigid TPU & Rigid PVC		
Polyamide (Nylon, PA)	DuPont™ Zytel® (PA66)	Good toughness, chemical resistance and colorability; excellent stiffness and strength; glass reinforced available; sterilizable by EtO, gamma, e-beam, and autoclave sterilization; subject to yellowing in most sterilization techniques, except EtO
	DuPont™ Zytel® (PA612)	Good toughness, chemical resistance and colorability; sterilizable by EtO and autoclave sterilization (limited gamma/e-beam sterilization performance); improved dimensional stability, chemical resistance, and reduced aqueous extractables versus PA66
	DuPont™ Zytel® HTN (PA6T/XT, PA6T/66)	Excellent dimensional stability, chemical resistance, and colorability; sterilizable by EtO, autoclave, gamma, and e-beam

RIGID COMPONENTS: SPECIALIZED DEVICES FOR MEDICAL & DENTAL SURGICAL PROCEDURES (cont.)

Applications include:

- Housings
- Covers
- Handles
- Triggers
- Battery panels
- Nozzles
- Cannulae
- Valves
- Control knobs

Rigid Component Solution Needs:

- Materials compliant with ISO 10993 & USP Class VI, if required
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PA, Rigid TPU & Rigid PVC		
Rigid Thermoplastic Polyurethane (TPU)	Covestro Texin® (TPU)	Biocompatible; excellent chemical resistance; bondable to polar substrates like PC; sterilizable by gamma, EtO, e-beam and dry heat; rigid 65 to 80 Shore D grades
Rigid Polyvinyl Chloride (PVC)	GEON Performance Solutions Resilience™ HC (PVC)	Excellent chemical resistance; maintains physical integrity and color after frequent cleaner and/or disinfectant wipe down; inherently flame retardant to UL94 5VA; high impact toughness; USP Class VI; phthalate-free; sterilizable by gamma, EtO and steam
Styrenics & PC/ABS Blends		
Styrenics	Trinseo MAGNUM™ MED (ABS)	Opaque; full biocompatibility; suitable for EtO and radiation sterilization; custom colors
	INEOS Styrolution NAS® (SMMA)	Sparkling clarity; color neutrality; good rigidity; easy processing; no pre-drying needed; excellent alcohol resistance
	INEOS Styrolution Zylar® & Clearblend® (MBS)	Exceptional toughness; excellent clarity; low specific gravity (more parts per lb. of resin); no pre-drying needed; excellent thermal stability; superior chemical resistance
	INEOS Styrolution Lustran® (SAN)	Rigid; heat resistant; outstanding transparency; good overall chemical resistance; superior processing; good scratch resistance
	INEOS Styrolution Styrolux® (SBC)	Good transparency and excellent toughness; easy and versatile processing; great for adding toughness to styrenic polymer blends
	INEOS Styrolution K-Resin® (SBC)	Sparkling clarity; impact toughness; stiffness; exceptional gloss
	INEOS Styrolution Terlux® HD (MABS)	Good clarity; good heat and overall chemical resistance; good impact strength; good solvent bonding to PVC; outstanding surface quality
	INEOS Styrolution Lustran® (ABS) & Novodur® HD (GF ABS)	Opaque appearance; outstanding chemical resistance; high impact strength; excellent balance of properties; ease of processability; bondable
Polycarbonate/ABS (PC/ABS)	Covestro Bayblend® (PC/ABS)	Excellent mechanical and thermal properties; toughness, rigidity & dimensional stability; opaque; biocompatible options available; flame retardant options available
	Trinseo EMERGE™ MED (PC/ABS)	Opaque; full biocompatibility, suitable for EtO and radiation sterilization; custom colors

RIGID COMPONENTS: SPECIALIZED DEVICES FOR MEDICAL & DENTAL SURGICAL PROCEDURES (cont.)

Applications include:

- Housings
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- Cannulae
- Valves
- Control knobs

Rigid Component Solution Needs:

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POM (Acetal), PP & PE

Polyoxy-methylene (Acetal, POM)	DuPont™ Delrin® (POM)	Excellent low wear/low friction; excellent surface appearance; good chemical resistance; alternative to nylon for low moisture uptake and dimensional stability; sterilizable by EtO and autoclave (not recommended for gamma or e-beam sterilization)
Polypropylene (PP) & Polyethylene (PE)	INVISTA™ (PP)	Good strength and stiffness; easy processing; sterilizable grades available
	Pinnacle™ (PP)	
	Dow™ HEALTH+ Polymers (PE)	
	Lyondellbasell™ (PP) & (PE)	

FLEXIBLE COMPONENTS: SPECIALIZED DEVICES FOR MEDICAL & DENTAL SURGICAL PROCEDURES

Applications include:

- Grips
- O-rings
- Gaskets
- Buttons
- Caps
- Tubing
- Seals

Flexible Component Solution Needs:

- Comfortable handles & grips
- Water-tight seals
- Durable buttons or knobs
- Chemically resistant materials for the user interface

TPE, TPC-ET, TPU, TPV & Flexible PVC		
Thermoplastic Elastomers (TPE)	Avient Versaflex™ HC Overmolding Series (TPE)	Unlimited design freedom; easy processing; biocompatible; colorable; hardness ranges 42-65 Shore A; autoclave, radiation, and EtO sterilizable; bondable to many substrates; customizable haptics
Thermoplastic Polyester Elastomers (TPC-ET)	DuPont™ Hytrel® (TPC-ET)	BPA-free; excellent flex fatigue and toughness; low temperature flexibility; good chemical resistance; sterilizable by EtO, gamma, e-beam, and autoclave (limited autoclave performance with lower durometers)
Thermoplastic Polyurethane (TPU)	Avient NEU™ Specialty Engineered Materials (TPU)	Short-term in vivo solutions; biocompatible; various durometer ranges with customization; autoclave, radiation and EtO sterilizable
	Avient Trilliant™ (TPU)	Engineered solutions; various durometers with functional performance enhancement; autoclave, radiation and EtO sterilization
	Covestro Texin® (TPU)	Biocompatible; soft touch; sterilizable; good chemical and abrasion resistance and toughness; excellent bonding to polar substrates like PC; 70 to 95 Shore A grades
Thermoplastic Vulcanizate (TPV)	Avient Versalloy™ (TPV)	Proven healthcare solutions with hardness ranges 45–90 Shore A; autoclave; radiation and EtO sterilizable; natural and colorable; smooth texture; bonds to PP
	Celanese Santoprene™ (TPV)	Durable sealing performance; elastic recovery; excellent chemical resistance; compliance with medical standards
Flexible Polyvinyl Chloride (PVC)	GEON Performance Solutions Geon® Flexible PVC	Engineered exclusively for the healthcare market; transparent and opaque colors; durometer ranges from 55A to 40D; gamma and EtO sterilizable
Thermoset Elastomers		
Thermoset Elastomers	DuPont™ Liveo™ Liquid Silicone Rubber (LSR)	Biocompatible; non-irritating and non-sensitization; sterilizable; made without plasticizers, phthalates or latex; used in Liquid Injection Molding (LIM) process
	DuPont™ Liveo™ High Consistency Rubber (HCR)	Biocompatible; non-irritating and non-sensitization; sterilizable; made without plasticizers, phthalates or latex; used in extrusion or compression molding process
SBC		
Styrene Butadiene Copolymer (SBC)	INEOS Styrolution Styroflex® (SBC)	Rubber-like mechanics; outstanding resilience; toughness and transparency; extremely high elasticity; excellent bonding to other polymers

Healthcare Supplier Line Card

You face a unique set of challenges when designing parts for the healthcare industry. In addition to maintaining an effective manufacturing and supply chain operation, you're challenged with designing products that must meet strict regulatory and quality assurance standards. At Formerra, we help you achieve these goals with our comprehensive portfolio of leading suppliers, on-time delivery and a host of services focused on helping you succeed.

AmSty

AVIENT

Celanese
The chemistry inside innovation™

covestro

DOW

DUPONT

EASTMAN

GEON
Performance Solutions

INEOS Olefins & Polymers USA

INEOS STYROLUTION

INVISTA
POLYPROPYLENE

lyondellbasell

Pinnacle Polymers

TRINSEO

FORMERRA HEALTHCARE SOLUTIONS

formerra.com

At Formerra, we're prepared to help you:

- Mitigate risk
- Optimize design
- Accelerate commercialization

Contact us today to learn more about how we can help you overcome your toughest challenges.

SURGICAL INSTRUMENTS THAT DELIVER PERFORMANCE

Your surgical instruments need to enable physicians to perform sometimes complex and lifesaving surgeries. By choosing the right polymer for your device, you can help make these instruments more reliable and precise in their function, ultimately improving patient outcomes.

- Trocars
- Drills
- Surgical Saws
- Scalpels
- Clip Appliers
- Skin Staplers
- Forceps
- Ligasure Tools
- Arthroscopes
- Endoscopes
- Electrosurgical Tools
- Lancets

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