

# Your supplier for medical plastics and specialties



- Adhesives for assembly and encapsulation
- Engineering polymers
- High-performance polymers
- Polyolefins
- Silicone coatings and lubricants
- Silicone elastomers
- Silicone HCR& LSR
- Silicone hoses
- Silicone skin adhesives
- Silicone & TPE tubings
- Styrene copolymers
- Thermoplastic elastomers
- Transparent polymers
- UV-curing structural adhesives & encapsulants

Medical Portfolio 

# Contents

## Specialty chemicals

### Medical Fluids for Device Lubrication and Siliconization

Liveo™ 360 Medical Fluid	5
Liveo™ 366 35% Dimethicone NF Emulsion	5
Liveo™ MDX4-4159 50% Medical Grade Dispersion	6
Liveo™ Q7-9180 Silicone Fluid	6

### Silicone Skin Adhesives

Liveo™ MG Series Silicone Soft Skin Adhesives (SSA)	7
Liveo™ MG Series Pressure Sensitive Adhesives (PSA)	8

### PSA/SSA Accessories for Silicone Skin Adhesives

Liveo™ 7-4107 Primer	9
----------------------	---

### HCR Silicone Elastomers

Liveo™ C6-Series High Consistency Rubber (HCR)	10
Liveo™ BioMedical Grade High Consistency Rubber (HCR)	11

### LSR Silicone Elastomers

Liveo™ C6-Series Liquid Silicone Rubber (LSR)	12
Liveo™ BioMedical Grade Liquid Silicone Rubber (LSR)	13

### Silicone Pharma Tubing

Liveo™ Pharma Tubing	14
Liveo™ Pharma Advanced Pump Tubing	15
Liveo™ Pharma 65 Reinforced Tubing	15

### TPE Pharma Tubing

Liveo™ Pharma TPE Tubing	16
Liveo™ TPE Ultra-Low Temp Tubing	17

### Medical Grade UV-curing adhesives

Dymax 1000-series multipurpose adhesives	18
Dymax CTH-series adhesives for catheter assembly	19
Dymax 1400-, 1500- and 1045-series adhesives for needle assembly	20
Dymax MSK-series adhesives for bonding respiratory devices	21
Dymax 2000-MW series adhesives for wearable medical device assembly	22
HLC™ (Hybrid Light-Curable)	22

## Polymers

### BASF – Thermoplastic Polyurethane (TPU)

Elastollan®	25
-------------	----

### Celanese – Polyamide (PA)

Zytel® SC	25
-----------	----

### Celanese – Polybutylen Terephthalat (PBT)

Crastin® SC, Celanex® MT	26
--------------------------	----

### Celanese – Ethylene vinyl acetate copolymer (EVAC)

Ateva® G	27
----------	----

### Celanese – Thermoplastic Polyester-Elastomer (TPC)

Hytrel® SC, Hytrel® PC	27
------------------------	----

### Celanese – Thermoplastic vulcanisate (TPV)

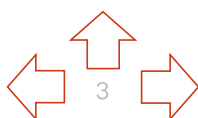
Santoprene®	28
-------------	----

### Celanese – Liquid crystal polymers (LCP)

Vectra® MT	29
------------	----

## Polymers

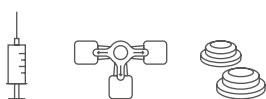
CHIMEI – Methyl Methacrylate Acrylonitrile Butadiene Styrene (M-ABS) Polylac®	29
CHIMEI – Acrylonitrile Butadiene Styrene (ABS) Polylac®	30
CHIMEI – Polycarbonate (PC) Wonderlite®	30
CHIMEI – Styrene Acrylonitrile Copolymer (SAN) Kibisan®	31
Delrin – Polyoxymethylen-Homopolymer (POM-H) Delrin® SC, Delrin® Renewable Attributed	31
INEOS Olefins & Polymers – Polyethylene with low density (LDPE) Eltex® MED LDPE	32
INEOS Olefins & Polymers – Polyethylene with high density (HDPE) Eltex® MED HDPE, Eltex® HDPE, Eltex® organoleptic HDPE	33
INEOS Olefins & Polymers – Polypropylene (PP) Eltex® MED PP Homopolymer, Eltex® MED Random Copolymer PP, Terpolymer	34
LG – Methyl Methacrylate Acrylonitrile Butadiene Styrene (M-ABS) LG TR ABS	35
SK CHEMICALS – Polyethylene terephthalate (PET); Polyethylene terephthalate glycol modified (PETG); Polycyclohexylene dimethylene terephthalate (PCTG) ECOTRIA®, SKYPET®, SKYGREEN®, ECOZEN®	36
Syensqo – Polyaryletherketone (PAEK) AvaSpire®	37
Syensqo – Polyetheretherketone (PEEK) KetaSpire®	38
Syensqo – Polyethersulfone (PESU) Veradel® HC	39
Syensqo – Polyphenylsulfone (PPSU) Radel®	39
Syensqo – Polysulfone (PSU) Udel®	40
USI – Cyclic Block Copolymer (CBC) ViviOn™	41



# Our principals for medical specialities



# Medical Fluids for Device Lubrication and Siliconization



Hydrophobic lubricants for glass, metals, plastics and rubbers

Type	Product Description	Regulatory Status				Physical Properties			
		INCI	USP NF	Ph. Eur.	DMF	Viscosity [cSt., 25°C]	Specific Gravity [at 25°C]	Refractive Index [at 25°C]	Flash Point, closed cup [°C]

## Liveo™ 360 Medical Fluid

Type	Product Description	INCI	USP NF	Ph. Eur.	DMF	Viscosity [cSt., 25°C]	Specific Gravity [at 25°C]	Refractive Index [at 25°C]	Flash Point, closed cup [°C]
20 cSt.	Clear, colourless, PDMS liquid (Polydimethylsiloxan)	✓	✓	✓	✓	20	0,951	1,4018	>100
100 cSt.		✓	✓	✓	✓	100	0,967	1,4032	>100
350 cSt.		✓	✓	✓	✓	350	0,971	1,4042	>100
1000 cSt.		✓	✓	✓	✓	1000	0,972	1,4046	>100
12500 cSt.		✓	✓	✓	✓	12500	-	1,4047	>100

- High water repellency/hydrophobicity
- Excellent lubricating characteristics



Waterborne silicone emulsion for lubrication and siliconization of glass-made parenteral container

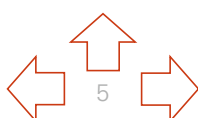
Product Description	Regulatory Status				Physical Properties			
	INCI	USP NF	Ph. Eur.	DMF	Viscosity [cSt., 25°C]	Specific Gravity [at 25°C]	Drying Rate similar to	pH

## Liveo™ 366 35% Dimethicone NF Emulsion

White, liquid emulsion containing 35% Dimethicone	✓*	✓*	✓*	✓	350	0,99	water	5,0
---------------------------------------------------	----	----	----	---	-----	------	-------	-----

\* no monograph exists for the Liveo™ 366 35% Dimethicone NF Emulsion but PDMS used in the production is compliant

- Excellent lubricating and release characteristics
- Not formulated with OPE-surfactant
- Not formulated with parabens





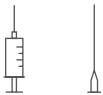
Hydrophobic silicone dispersion for lubrication and siliconization of cutting edges and needles

Product Description	Regulatory Status				Physical Properties			
	INCI	USP NF	Ph. Eur.	DMF	Viscosity [cSt., 25°C]	Drying Rate similar to	Refractive Index [at 25°C]	Flash Point, closed cup [°C]

### Liveo™ MDX4-4159 50% Medical Grade Dispersion

Colorless to slightly hazy liquid, amino-functional silicone dispersion with 50% active ingredients	-	-	-	✓	130	Mineral spirits	1,4089	13,3
-----------------------------------------------------------------------------------------------------	---	---	---	---	-----	-----------------	--------	------

- High adhesion to metal, providing durability
- Only to be used diluted in Liveo™ Q7-9180 0,65 cSt. or 1 cSt. or non-polar solvents to an active content of 1-5%
- Ideal curing conditions: 25-70°C, 55-60% relative humidity for 24h. Lubricity properties further improve for 7-10 days at RT or 3-7 days at 70°C



Diluting solvent for Liveo™ 360 Medical Fluid and Liveo™ MDX4-4159 50% Medical Grade Dispersion

Type	Product Description	Regulatory Status				Physical Properties			
		INCI	USP NF	Europ. Techn. file	VOC	Viscosity [cSt., 25°C]	Specific Gravity [at 25°C]	Drying Rate similar to	Flash Point, closed cup [°C]

### Liveo™ Q7-9180 Silicone Fluid

<b>0,65 cSt.</b>	Clear, colorless, high-purity, volatile Hexamethyldisiloxan	✓	-	✓*	**	0,65	0,76	acetone	-3
<b>1 cSt.</b>	Clear, colorless, high-purity, volatile Octamethyltrisiloxan	✓	-	✓*	**	1	0,82	isopropanol	34

\* DuPont has the capabilities to provide safety data sheets to meet requirements

\*\* VOC Exempted in U.S. by EPA

# Silicone Skin Adhesives



Non-sensitizing, gentle adhesion to skin for wound care and scar therapies as well as wearable device fixation

Type	Product Description	Physical Properties				Biocompatibility Testing		
		Viscosity Part A & B [mPa/s] at 25°C	Penetration after Cure [mm/10]	Peel Adhesion [N/2,5 cm]*	Release [N/2,5 cm]	ISO 10993-5	ISO 10993-10/11	DMF

## Liveo™ MG Series Soft Skin Adhesives (SSA)

<b>7-9700</b>	Two-part (1:1 by weight), PT-catalyzed, soft fillerless elastomeric adhesive Low viscosity Transparent	500/ 320	90	0,6	0,11	✓	✓	-
<b>MG 7-9800</b>		500/ 320	90	0,6	0,11	✓	✓	✓
<b>MG 7-9850</b>		2900/ 2900	135	1,1	0,03	✓**	✓**	✓
<b>MG 7-9900</b>		5100/ 5100	140	1,9	0,05	✓**	✓**	✓
<b>MG 7-9960 ***</b>		5000/ 5000	145	2,8	0,06	✓**	✓**	-

\*: @ 250 µm, peel force from polycarbonate

\*\* : based on biocompatibility test data from analogous materials

\*\*\*: meets SVHC (substance of very high concern) threshold for concerned cyclosiloxanes (>0,1%) according REACH regulation (EC) 1907/2006

- High tack, gentle removal from skin, repositionable from skin
- High gas and moisture permeability
- Application method: Knife over roll coating is recommended



Non-sensitizing adherence of medical devices as stoma-appliances, surgical dressings/pads, external prosthetics and wearable medical devices

Type	Product Description	Physical Properties				Biocompatibility Testing		
		% solid content in solvent type	Viscosity [mPa/s] at 25°C	Peel Adhesion [N/2,5 cm]*	Shear [kg]	ISO 10993-5**	ISO 10993-10**	DMF

### Liveo™ MG Series Pressure Sensitive Adhesives (PSA)

<b>MG-2401</b>	One-part, polycondensed polydimethylsiloxane/silicate resin adhesive Volatile solvent-based silicone adhesive	32%, HMDS	90	17,2*	21	✓	✓	-
<b>MG-2402</b>		64%, Ethyl-acetate	2500	17,2*	21	✓	✓	-
<b>MG-2502</b>		59%, Ethyl-acetate	2500	16,4*	16	✓	✓	-
<b>MG-2410 hotmelt</b>	One-part, polycondensed polydimethylsiloxane/silicate resin adhesive Hot-melt silicone adhesive	100%	30300 at 185°C	14,5*	9	✓	✓	-

\*: @50 µm, peel force from stainless steel

\*\* : based on test results on adhesive solids

- Medium to very high tack
- High adhesion and conformity to skin for extended wear time
- High gas and moisture permeability
- Application methods (1) formulated and packaged as spray adhesive, (2) conventional tape coating equipment (transfer coating, brushing), (3) printing/dispensing using specific nozzles provided by Nordson EFC

# PSA/SSA Accessories for Silicone Skin Adhesives



For topical application to skin, including bandages, tapes, wound dressings, medicated patches and plasters

Product Description	Physical Properties				Biocompatibility Testing		
	Tensile strength [mPa]	Shore A Hardness	Thick-ness [ $\mu\text{m}$ ]	Peel adhesion [2,5 g/cm <sup>2</sup> ]*	USP NF	Ph. Eur.	FDA DMF

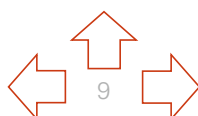
## Liveo™ 7-4107 Silicone Elastomer Membrane

100% Biomedical Grade LSR							
75 $\mu\text{m}$ thick	10	50	75	2,5	Class VI	3.1.9 **	n.a.
Translucent, matte, soft and flexible film							

\*: @75  $\mu\text{m}$ , peel force from stainless steel

\*\* : based on test results on adhesive solids

- Rolled film supplied on PC carrier
- Conforms to curved surfaces
- 300-400 m coil, 145-155 mm width, 83-113 g/m<sup>2</sup>



# Silicone Elastomers



## High Consistency Rubber (HCR)



Millable thermoset silicone elastomers for extruded parts or fabrication of molded medical/surgical/diagnostic devices and components

Type	Product Description	Physical Properties					Biocompatibility Testing					
		Hardness Shore A	Tensile Strength [MPa]	Elongation at break [%]	Tear Strength [kN/m]	Relative Density	ISO 10993-3	ISO 10993-4	ISO 10993-5	ISO 10993-10	Ph. Eur. 3.1.9 <sup>1</sup>	Food Grade

### Liveo™ C6-Series High Consistency Rubber (HCR)

<b>C6-135</b>	Two-part (1:1 by weight), PT-catalyzed HCR	36	8,2	1120	35,1	1,12	-	-	✓	✓	✓	✓	✓
<b>C6-150</b>		50	10,6	980	42,1	1,16	-	-	✓	✓	✓	✓	✓
<b>C6-165</b>	Enhanced tear-resistance HCR ≤ 29 day implant	61	8,0	940	42,1	1,21	-	-	✓	✓	✓	✓	✓
<b>C6-180</b>		77	7,2	610	38,6	1,21	-	-	✓	✓	✓	✓	✓
<b>C6-235</b>	One-Part HCR base Peroxide-curing agent necessary	37	7,5	810	21,1	1,12	-	-	✓	✓	✓	✓	✓
<b>C6-250</b>		49	8,2	530	26,3	1,16	-	-	✓	✓	✓	✓	✓
<b>C6-265</b>	LH: Lower hysteresis for demanding applications (e.g. peristaltic pump tubing)	66	8,2	560	35,1	1,20	-	-	✓	✓	✓	✓	✓
<b>C6-350 LH</b>		49	8,5	730	38,6	1,15	-	✓	✓	✓	✓	✓	✓

<sup>1</sup>: Selected Ph. Eur. 3.1.9: substances soluble in hexane & volatile matter

- Manufactured in dedicated healthcare facility

Type	Product Description	Physical Properties					Biocompatibility Testing					
		Hardness Shore A	Tensile Strength [MPa]	Elongation at break [%]	Tear Strength [kN/m]	Relative Density	ISO 10993-3	ISO 10993-4	ISO 10993-5	ISO 10993-10	Ph. Eur. 3.1.9 <sup>1</sup>	Food Grade

## Liveo™ BioMedical Grade High Consistency Rubber (HCR)

<b>Q7-4720</b>		23	8,9	1310	31,6	1,11	✓	✓	✓	✓	✓	✓	✓
<b>Q7-4735</b>	Two-part (1:1 by weight), PT-catalyzed HCR	36	9,3	1180	36,8	1,12	✓	✓	✓	✓	✓	✓	✓
<b>Q7-4750</b>	Enhanced tear-resistance HCR > 29 day implant	50	10	930	45,6	1,16	✓	✓	✓	✓	✓	✓	✓
<b>Q7-4765</b>	Compliant to USP pyrogenicity	65	8	900	45,6	1,20	✓	✓	✓	✓	✓	✓	✓
<b>Q7-4780</b>		77	7,8	660	42,1	1,20	✓	✓	✓	✓	✓	✓	✓
<b>Q7-4535 base</b>	HCR-base, must add peroxide Enhanced tear-resistance HCR	36	8,1	830	24,6	1,12	✓	✓	✓	✓	✓	✓	✓
<b>Q7-4550 base</b>	> 29 day implant Compliant to USP pyrogenicity	48	9,3	680	31,6	1,16	-	-	✓	✓	✓	✓	✓

<sup>1</sup>: Selected Ph. Eur. 3.1.9: substances soluble in hexane & volatile matter

- Manufactured in dedicated healthcare facility

# Liquid Silicone Rubber (LSR)



Injection molding of precise and intricate parts of medical devices as o-rings, stoppers, closures or mesh and fabric coating

Type	Product Description	Physical Properties					Biocompatibility Testing					
		Hardness Shore A	Tensile Strength [MPa]	Elongation at break [%]	Tear Strength [kN/m]	Relative Density	ISO 10993-3	ISO 10993-4	ISO 10993-5	ISO 10993-10	Ph. Eur. 3.1.9 <sup>1</sup>	Food Grade

## Liveo™ C6-Series liquid silicone rubber (LSR)

<b>C6-530</b>	Two-part (1:1 by weight), PT-catalyzed LSR ≤ 29 day implant	30	8,2	830	26,3	1,13	-	-	✓	✓	✓	✓	✓
<b>C6-540</b>		40	8,9	740	24,1	1,13	-	-	✓	✓	✓	✓	✓
<b>C6-550</b>		50	10,4	660	44,7	1,14	-	-	✓	✓	✓	✓	✓
<b>C6-560</b>		60	8,8	540	50,9	1,10	-	-	✓	✓	✓	✓	✓
<b>C6-570</b>		65	9,1	440	54,4	1,15	-	-	✓	✓	✓	✓	✓
<b>C6-720</b>	Two-part (1:1 by weight), PT-catalyzed LSR ≤ 29 day implant Reduced mold fouling Enhanced tear strength & compression set No post-cure to stabilize physical properties	23	6,5	750	26	1,14	-	-	✓	✓	✓	✓	✓
<b>C6-740</b>		40	8,6	680	30,7	1,14	-	-	✓	✓	✓	✓	✓
<b>C6-750</b>		50	8,8	610	42,1	1,13	-	✓	✓	✓	✓	✓	✓
<b>C6-770</b>		67	9,3	450	42,1	1,14	-	✓	✓	✓	✓	✓	✓

<sup>1</sup>: Selected Ph. Eur. 3.1.9: substances soluble in hexane & volatile matter

- Manufactured in dedicated healthcare facility

Type	Product Description	Physical Properties					Biocompatibility Testing					
		Hardness Shore A	Tensile Strength [MPa]	Elongation at break [%]	Tear Strength [kN/m]	Relative Density	ISO 10993-3	ISO 10993-4	ISO 10993-5	ISO 10993-10	Ph. Eur. 3.1.9 <sup>1</sup>	Food Grade

## Liveo™ BioMedical Grade liquid silicone rubber (LSR)

<b>7-6830</b>	Two-part (1:1 by weight), PT-catalyzed LSR > 29 day implant	30	8,8	790	24,1	1,13	✓	✓	✓	✓	✓	✓	✓
<b>7-6840</b>		40	9,8	700	36,8	1,13	✓	✓	✓	✓	✓	✓	✓
<b>Q7-4840</b>		44	9,4	540	36,8	1,12	✓	✓	✓	✓	✓	✓	✓
<b>Q7-4850</b>		50	10,1	630	45,1	1,15	✓	✓	✓	✓	✓	✓	✓
<b>Q7-4860</b>		60	8,8	540	50,9	1,1	✓	✓	✓	✓	✓	✓	✓
<b>Q7-4870</b>		66	9,5	420	47,4	1,15	✓	✓	✓	✓	✓	✓	✓
<b>Q7-7840</b>	Two-part (1:1 by weight), PT-catalyzed LSR > 29 day implant	40	9,3	750	30,7	1,14	✓	✓	✓	✓	✓	✓	✓
<b>Q7-7850</b>		50	9	660	48,2	1,13	✓	✓	✓	✓	✓	✓	✓
<b>Q7-78700</b>		67	9,4	415	45,6	1,14	✓	✓	✓	✓	✓	✓	✓

<sup>1</sup>: Selected Ph. Eur. 3.1.9: substances soluble in hexane & volatile matter

- Manufactured in dedicated healthcare facility

# Silicone Pharma Tubing



Translucent, platinum-cured silicone tubing for safe, secure and ultrapure fluid transfer and filling. Available in 3 durometer

Type	Product description	Physical Properties							Biocompatibility Testing			
		Durometer Shore A <sup>1</sup>	Elongation at break [%] <sup>2</sup>	Modulus at 200% [MPa] <sup>2</sup>	Tensile Strength at break [kN/m] <sup>2</sup>	Burst Pressure [bar] <sup>3</sup>	Tear Strength [kN/m] <sup>1</sup>	Specific Gravity <sup>2</sup>	ISO 11737-1	ISO 10993-3,4,5,6,10,11	USP 788/88/85/151/661	Ph. Eur. 3.1.9 & FDA 21 CFR 177.2600

## Liveo™ Pharma Tubing

<b>50</b>	Translucent, PT-cured silicone tubing	50	795	2,1	8,7	4,1	47,3	1,14	✓	✓	✓	✓
<b>65</b>	3 durometer: 50, 65 and 80 High resiliency	65	775	2,8	6,8	7,7	45,5	1,22	✓	✓	✓	✓
<b>80</b>	Kink resistant Easily sterilizable	80	570	3,9	7,0	13,2	42	1,22	✓	✓	✓	✓

- Shore A 50 durometer: suitable for most applications and for short term pumping operations
- Shore A 65 durometer: offers kink-resistance and higher pressure resistance
- Shore A 80: cost effective alternative to Liveo™ reinforced tubing for moderate to high pressure or vacuum applications. Offers the highest kink-resistance.
- BPOG extractable testing available based on elastomer
- USP665 tests available upon request
- The DuPont Liveo Pharma Silicone Tubing portfolio offers more than 150 standard dimensions. Get in touch!



High purity Shore A 50 translucent silicone tubing for ultrapure fluid transfer. Low-Hysteresis technology provides extended peristaltic pump performance, long pump life & outstanding filling accuracy.

Type	Product description	Physical Properties						Biocompatibility Testing				
		Durometer Shore A <sup>1</sup>	Elongation at break [%] <sup>2</sup>	Modulus at 200% [MPa] <sup>2</sup>	Tensile Strength at break [kN/m] <sup>2</sup>	Burst Pressure [bar] <sup>3</sup>	Tear Strength [kN/m] <sup>1</sup>	Specific Gravity <sup>2</sup>	ISO 11737-1 ISO 10993-3,4,5,6,10,11	USP 788/88/85/151/661	Ph. Eur. 3.1.9 & FDA 21 CFR 177.2600	JP XIV section 11

### Liveo™ Pharma Advanced Pump Tubing

APT 50	50	590	3	8,9	3,4	40,3	1,14	✓	✓	✓	✓
--------	----	-----	---	-----	-----	------	------	---	---	---	---

- Pump life up to four times higher than Liveo™ pharma tubing
- Superior resiliency
- Easily sterilizable
- Kink resistant



High-purity Shore A 65 silicone tubing for ultrapure fluid transfer. Polyester fiber-reinforced pharmaceutical grade silicone tubing for applications requiring high kink, high pressure or high vacuum resistance

Type	Product description	Physical Properties						Biocompatibility Testing				
		Durometer Shore A <sup>1</sup>	Elongation at break [%] <sup>2</sup>	Modulus at 200% [MPa] <sup>2</sup>	Tensile Strength at break [kN/m] <sup>2</sup>	Burst Pressure [bar] <sup>3</sup>	Tear Strength [kN/m] <sup>1</sup>	Specific Gravity <sup>2</sup>	ISO 11737-1 ISO 10993-3,4,5,6,10,11	USP 788/88/85/151/661	Ph. Eur. 3.1.9 & FDA 21 CFR 177.2600	JP XIV section 11

### Liveo™ Pharma 65 Reinforced Tubing

Pharma 65 RFT	65	890 <sup>1</sup>	2,82 <sup>1</sup>	7,94 <sup>1</sup>	41,2 <sup>1</sup>	45,5 <sup>1</sup>	1,22 <sup>1</sup>	✓	✓	✓	✓
---------------	----	------------------	-------------------	-------------------	-------------------	-------------------	-------------------	---	---	---	---

<sup>1</sup>: based on elastomer

<sup>2</sup>: on extruded tubing (Die D)

<sup>3</sup>: burst pressure for tubing dimension is available in product information sheet (PRI)

- Reinforced for improved burst strength
- Resistant to collapse under vacuum
- High resiliency
- Easy sterilizable

# DuPont Liveo™ TPE Pharma Tubing



High-purity Shore A 65 Pharma TPE tubing for fluid, media and solvent transport, single-use processing or peristaltic pump applications in biopharmaceutical processes and biotechnology

Type	Product description	Physical Properties					Biocompatibility Testing			
		Durometer Shore A	Elongation at break [%] <sup>1,2</sup>	Modulus at 200% [MPa] <sup>1,2</sup>	Tensile Strength at break [kN/m] <sup>1,2</sup>	Burst Pressure 1 [bar] <sup>1,2</sup>	Specific Gravity <sup>1,2</sup>	ISO 11737-1	ISO 10993-5,6,10,11	USP Class VI

## Liveo™ Pharma TPE Tubing

Type	Durometer Shore A	Elongation at break [%] <sup>1,2</sup>	Modulus at 200% [MPa] <sup>1,2</sup>	Tensile Strength at break [kN/m] <sup>1,2</sup>	Burst Pressure 1 [bar] <sup>1,2</sup>	Specific Gravity <sup>1,2</sup>	ISO 11737-1	ISO 10993-5,6,10,11	USP Class VI	USP 85/151/232/665/788
Pharma TPE 65	65	1134 <sup>1</sup>	2,7 <sup>1</sup>	9,4 <sup>1</sup>	87 <sup>1</sup>	0,9 <sup>1</sup>	✓	✓	✓	✓

<sup>1</sup>: based on tests with Liveo™ Pharma TPE Tubing 9,5 mm (inner diameter) x 15,9 mm (outer diameter)

<sup>2</sup>: properties after steam sterilization (121°C/30 min) / gamma radiation (50 kGy)

- Improved heat-welding to itself and competitive offer
- High tensile strength and burst resistance before & after welding
- Low extractables
- Good chemical resistance
- Minimal spallation after 24h of pumping
- Stable clarify after sterilization
- Manufactured in ISO Class 7 cleanroom



Sterilizable, weldable TPE tubing for biopharmaceutical processing applications requiring lower temperatures, including advanced fluid management; freeze/thaw; monoclonal antibodies; mRNA vaccines; viral vector vaccines and gene therapies.

Typ	Product description	Physical Properties					Biocompatibility Testing				
		Durometer Shore A	Elongation at break [%] <sup>1,2</sup>	Modulus at 200% [MPa] <sup>1,2</sup>	Tensile Strength at break [kN/m] <sup>1,2</sup>	Specific Gravity <sup>1,2</sup>	ISO 11737-1	ISO 10993-5,6,11, 23	Food contact 21 CFR 117.2600 e) & f)	USP Class VI	USP 85/87/88/232/665/788

### Liveo™ TPE Ultra-Low Temp Tubing

Pharma Ultra-Low Temp TPE	Improved elastomer toughness down to -86°C; resistant to multiple freeze/thaw cycles; high ductility; less susceptible to brittle fracture; bending, crushing and impact strength at -80°C	62	1030 <sup>2</sup> / 1256 <sup>3</sup>	1,88 <sup>2</sup> / 1,9 <sup>3</sup>	9,1 <sup>2</sup> / 8,7 <sup>3</sup>	0,9	✓	✓	✓	✓	✓
---------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----	---------------------------------------	--------------------------------------	-------------------------------------	-----	---	---	---	---	---

<sup>1</sup>: Based on tests with Liveo™ Pharma TPE Ultra-Low Temp Tubing 9.5mm (inner diameter) x 15.9 mm (outer diameter)

<sup>2</sup>: Properties after steam sterilization (121 °C/30 min)

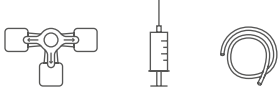
<sup>3</sup>: Properties after gamma irradiation (50 kGy)

- Manufactured in an ISO class 7 clean room
- Excellent chemical resistance
- Designed to meet biopharmaceutical processing standards and cold resistance requirements

# Medical Grade UV-curing adhesives



## Multipurpose UV-curing adhesives



Dymax 1000-series adhesives are ideal for bonding a wide variety of substrates found in reservoirs and housing, respiratory devices, needles & syringes, transducers, tube sets & fittings, wearable devices and other medical disposables.

Type	Recommended substrates / specific features	Physical Properties					Biocompatibility Testing				
		Viscosity [cP]	Durometer Hardness	Tensile break [MPa]	Elongation at break [%]	Modulus of elasticity [Mpa]	ISO 10993-4	ISO 10993-5	ISO 10993-6	ISO 10993-10	ISO 10993-11

### Dymax 1000-series multipurpose adhesives

<b>1209-M-UR-SC*</b>	ABS, PC, PCTG, PEEK, PETG, PMMA, PPO, PS, PVC, SS • self-leveling adhesive	1200	D60	15,6	170	641	✓	✓	✓	✓	✓
<b>1405-M-T-UR-SC*</b>	ABS, PC, PCTG, PEI, PET, PETG, PMMA, PPO, PS, PSU, PU, PVC, SAN, TPU, SS, PCB	7000	D70	23	180	379	-	✓	-	-	-
<b>1040-M</b>	ABS, PC, PCTG, PMMA, PPO, PS, SAN, AL, BR, SS, glass • autoclavable	775	D60	18,6	8	668,8	-	✓	-	-	-
<b>1172-M-UR*</b>	ABC, COC, COP, EVA, PA, PC, PCTG, PEBA, PEI, PET, PETG, PMMA, PS, PSU, PVC, SAN, TPU, CER, AL, SS	1100	A70	4,1	600	8,8	-	✓	-	-	-

\*TPO free alternatives under development. Please reach out to receive your sample!



Dymax CTH-series adhesives provide a high degree of flexibility, excellent moisture and humidity resistance and meet the unique assembly challenges associated with newest catheter materials as Nylon12 and PEBA.

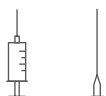
Type	Recommended substrates / specific features	Physical Properties					Biocompatibility Testing				
		Viscosity [cP]	Durometer Hardness	Tensile break [MPa]	Elongation at break [%]	Modulus of elasticity [Mpa]	ISO 10993-4	ISO 10993-5	ISO 10993-6	ISO 10993-10	ISO 10993-11

## Dymax CTH-series adhesives for catheter assembly

<b>209-CTH</b>	ABS, CAP, PC, PCTG, PET, PET-G, PMMA, PS, SAN, SS, NiTi	300	D70	17	120	300	✓	✓	✓	✓	✓
<b>215-CTH-SV01-UR-SC*</b>	ABS, PA, PC, PCTG, PEBA, PEEK, PEI, PET, PETG; PMMA, PS, PSU, PU, PVC, TPU	1100	D53	11,7	300	105,4	✓	✓	✓	✓	✓
<b>215-CTH-LV-UR-SC*</b>	ABS, PA, PC, PCTG, PEBA, PEEK, PEI, PET, PETG; PMMA, PS, PSU, PU, PVC, TPU	450	D53	11	300	117	✓	✓	✓	✓	✓
<b>250-CTH</b>	ABS, CAP, PC, PCTG, PEI, PETG, PS, PU, PVC, SAN, glass, PCB • complete heat-curing at 80-85°C	58000	D90	51,7	2	1425	✓	✓	✓	✓	✓

\*TPO free alternatives under development. Please reach out to receive your sample!

## UV-Curing adhesives for Needle Assembly



Dymax 1400- and 1500-series adhesives are ideal for automated high-speed assembly lines for cannula bonding to hubs, various hypodermic- and biopsy needles, syringes and winged infusion sets. They provide fast-cure, fluorescing properties and allow bonding of UV-blocking or heavily tinted plastics.

Type	Recommended substrates / specific features	Physical Properties					Biocompatibility Testing				
		Viscosity [cP]	Durometer Hardness	Tensile break [MPa]	Elongation at break [%]	Modulus of elasticity [Mpa]	ISO 10993-4	ISO 10993-5	ISO 10993-6	ISO 10993-10	ISO 10993-11

### Dymax 1400-, 1500- and 1045-series adhesives for needle assembly

<b>1406-M*</b>	ABS, PC, PCTG, PE, PETG, PS, PVC, SAN, TPU, SS, PCB	150	D70	15	120	419	-	✓	-	-	-
<b>1405-M-UR-SC*</b>	ABC, PC, PCTG; PEI, PET, PETG, PMMA, PPO, PS, PU, SAN, SS PCB	150	D70	18,6	150	397	-	✓	-	-	-
<b>1501-M-UR</b>	ABS, CAP, PC, PETG, PP (st), PVC, SAN, SS • for shadowed areas/colored plastics	80	D70	180	80	397	-	✓	-	-	-
<b>1045-M</b>	ABS, PC, SS, glass • very low extractables • autoclavable	525	D78	23,4	20	1861,6	✓	✓	✓	✓	✓



Dymax MSK-series adhesives are formulated for bonding a variety of (highly plasticized) substrates within respiratory devices such as anaesthesia masks, resuscitator bags and breathing circuits.

Type	Recommended substrates / specific features	Physical Properties					Biocompatibility Testing				
		Viscosity [cP]	Durometer Hardness	Tensile break [MPa]	Elongation at break [%]	Modulus of elasticity [Mpa]	ISO 10993-4	ISO 10993-5	ISO 10993-6	ISO 10993-10	ISO 10993-11

## Dymax MSK-series adhesives for bonding respiratory devices

<b>108-MSK</b>	CAP, PC, PEEK, PMMA, PS, PU, PVC, SAN, TPU	600	D75	25	70	388	-	✓	-	✓	-
<b>104-MSK-Gel</b>	ABS, PCTG, PETG, PU, PVC, SAN	23500	D60	19	205	147	-	✓	-	-	-
<b>111-MSK</b>	ABS, PC, PI, PMMA, PS, PU, PCC, SAN, SEBS, TPU	250	D55	6,9	400	400	-	✓	-	-	-

## UV-Curing Adhesives for Wearable Medical Device Assembly



Dymax 2000-series adhesives are uniquely designed for assembly of wearable medical devices. Formulated without skin-irritants, the series provides strong bonds and dependable performance against moisture and thermal shock.

Type	Recommended substrates / specific features	Physical Properties					Biocompatibility Testing				
		Viscosity [cP]	Durometer Hardness	Tensile break [MPa]	Elongation at break [%]	Modulus of elasticity [Mpa]	ISO 10993-4	ISO 10993-5	ISO 10993-6	ISO 10993-10	ISO 10993-11

### Dymax 2000-MW series adhesives for wearable medical device assembly

<b>2022-MW</b>	ABS, PC, PETG, PI, PU, SAN, AL, SS, Glas	700	D60	19,3	25	620,5	-	✓	-	-	-
<b>2101-MW-UR</b>	ABS, PC, PCTG, PETG,PVC, SAN, TPU	5500	D80	24,8	80	1020,4	-	✓	-	✓	-
<b>2103-MW-UR</b>	PC, ABS, PVC, PEBA, SS	5500	D70	18,6	23	641,2	-	✓	-	✓	-

## Curing with light and contact/moisture



A revolutionary patented adhesive platform, HLC™ (Hybrid Light-Curable) technology, combines the best qualities of anionic and free radical chemistries. Cure with UV/Visible light or a combination of light and contact/moisture. The contact curing feature allows bonding to a broad range of substrates, including opaque and light-blocking materials, and in shadow areas.

Type	Recommended substrates / specific features	Physical Properties					Biocompatibility Testing				
		Viscosity [cP]	Durometer Hardness	Tensile break [MPa]	Elongation at break [%]	Modulus of elasticity [Mpa]	ISO 10993-4	ISO 10993-5	ISO 10993-6	ISO 10993-10	ISO 10993-11

### HLC™ (Hybrid Light-Curable)

<b>HLC-M-1000</b>	ABS, PC, PCTG, PEBA, PETG, PMMA, PS, SAN, SS	3	D80	49	4	2144,3	✓	✓	✓	-	✓
-------------------	----------------------------------------------	---	-----	----	---	--------	---	---	---	---	---



## Dymax Nomenclature

LV = Low Viscosity

T = Thick

SV = Special Viscosity

VT = Very Thick

SC = See-Cure (Patented Color-Change Technology)

UR<sup>®</sup> = Ultra-Red (Patented Color-Change Technology)



# Our principals for medical plastics



## BASF – Thermoplastic Polyurethane (TPU)

### Properties

Elastollan is a thermoplastic polyurethane with excellent hydrolysis resistance, good resistance to microorganisms and excellent transparency.

### Medical applications

Infusion systems, redon-drains, stool drainage systems, hollow fibre membranes for oxygenator, wound coverings, general catheters (single- and multi-lumen), tracheal tubes

Type	Hardness	Food compliance	Medical approvals			Sterilisation		
			10993	USP	DMF	Steam	EtO	Gamma

### Elastollan®

1170 A 10 FC	Shore 70 A	FDA; (EU) 10/2011; GMP	5; 10		-	-	✓	✓
1180 A 10 FC	Shore 80 A							
1185 A 10 FC	Shore 85 A			VI				
1190 A 10 FC	Shore 90 A							
1195 A 10 FC	Shore 95 A							
1198 A 10 FC	Shore 98 A							
1154 D 10 FC	Shore 54 D							
1164 D 11 FC	Shore 64 D							
1174 D 10 FC	Shore 74 D							

## Celanese – Polyamide (PA)

### Properties

Zytel® – high mechanical strength, combines rigidity and impact strength

### Medical applications

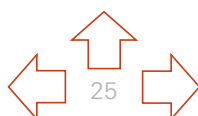
Forceps, applicator guns, medical valves, filters, syringe barrels

Type	Description	Food compliance	Medical approvals			Sterilisation			
			10993	USP	DMF	Steam	EtO	Gamma	E-Beam

### Zytel®

SC315	PA 6.12. High flow	FDA; (EU) 10/2011; GMP	5; 11	VI	-	87°C +3min 134°C <25-100 cycles*	50°C 2hr. 1x	-	*
PC310	PA 6.6 High flow	FDA; EU 10/2011; GMP	5; 11	VI	✓	87 °C +3 min 134°C <25-100 Zyklen	50 °C 2 h 1 X		

\*Please contact your contact your sales or technical person for more information.



## Celanese – Polybutylene Terephthalat (PBT)

**Properties** Exceptional surface finishes, good dyeing performance, chemical resistance

**Medical applications** Components for insulin syringes

Type	Description	Food compliance	Medical approvals			Sterilisation			
			10993	USP	DMF	Steam	EtO	Gamma	E-Beam

### Crastin® SC

<b>SC193</b>	30% glass fibre-reinforced, low warpage	FDA; (EU) 10/2011; GMP	5; 11	VI	-	87 °C +3min 134°C <25 cycles*	50 °C 2hr. 1x	40 kGy 1x	50 kGy 1x
--------------	-----------------------------------------	------------------------------	-------	----	---	-------------------------------------------	---------------------	--------------	--------------

\*Please contact your sales or technical person for more information.

### Celanex®

<b>2401MT</b>	Without fillers	FDA; (EU) 10/2011; GMP	5; 6; 10; 11	USP 23 VI	✓	up to 30 cycles	✓	✓	
<b>2401MT ECO-B</b>	Without fillers, Partly bio-based raw materials								
<b>2402MT</b>	Without fillers, high precision								
<b>2402MT ECO-B</b>	Without fillers, partially bio-based PBT								
<b>2404MT</b>	Without fillers, low friction and wear wear properties								
<b>2405MT</b>	Without fillers, PT- FE-free*, improved lubricity, low friction friction and wear wear properties								
<b>2406MT GF20</b>	20% glass fiber rein- forced, improved sliding and wear properties								
<b>2408MT GF20</b>	20% glass fiber reinforced, high gloss and improved improved overmolding shafting on TPEs								
<b>2409MT GF30</b>	30% glass fiber reinforced, high stiffness								
<b>2411MT</b>	Without fillers, nucleat- ed, faster cycle time*, faster crystallization								
<b>2414MT</b>	Without fillers, low friction and wear properties properties, shorter								

\* no intentionally added PTFE

## Celanese – Ethylene vinyl acetate (EVA)

### Eigenschaften

Ateva® G EVA can be processed at low temperatures. The polymers are optically transparent and contain no plasticizers. They are mechanically stable and can be welded with excellent results.

### Medizinische Anwendungen

Medical bags such as blood bags or for total parenteral nutrition, medication packaging, tubes and drains.

Typ	Vinyl acetate content (% by weight)	Food compliance	Medical approvals			Sterilisation			
			10993	USP	DMF	Steam	EtO	Gamma	E-Beam

### Ateva® G

<b>1081 G</b>	9	FDA; (EU) 10/2011; GMP	5; 6; 10; 11	VI	✓	-	✓	✓	✓
<b>1807 EG</b>	18								
<b>2803G/ 2803 G-CP</b>	28								
<b>2820 AG</b>	28								
<b>4030ACG</b>	40								
<b>4200 ACG-CP</b>	41								
<b>AT7110*</b>	0								

\*LDPE and not EVA

## Celanese – Thermoplastic Polyester-Elastomer (TPC)

### Properties

Hytrell® – good flexibility, sterilisation resistance, chemical resistance, low material fatigue, high resistance to long-term stress

### Medical applications

Tubing with high resistance to long-term stress, wrist protection, foot prostheses

Type	Hardness	Food compliance	Medical approvals			Sterilisation			
			10993	USP	DMF	Steam	EtO	Gamma	E-Beam

### Hytrell® SC

<b>SC956</b>	Shore 55D	FDA; (EU) 10/2011; GMP	5; 11	VI	✓	87°C +3min 134°C <25-100 cycles*	50°C 2hr. 1x	40kGy 1x	50kGy 1x
<b>SC969</b>	Shore 63D								
<b>SC976</b>	Shore 72D								
<b>SC988</b>	Shore 82D								

\*Please contact your contact person for more information.

Type	Hardness	Food compliance	Medical approvals			Sterilisation			
			10993	USP	DMF	Steam	EtO	Gamma	E-Beam

## Hytre<sup>®</sup> PC

<b>PC945 NC010</b>	43	FDA; (EU) 10/2011; GMP	5; 11	VI	✓	87°C +3min 134°C <25-100 cycles*	50 °C 2hr. 1x	40 kGy 1x	50 kGy 1x
<b>PC952 NC010</b>	55								

\*Please contact your contact person for more information.

## Celanese – Thermoplastic vulcanisate (TPV)



### Properties

Santoprene<sup>®</sup> is a thermoplastic vulcanizate with excellent long-term compression set and stress relaxation for sealing performance

### Medical applications

Syringe tips, plunger stopper, soft grip, seals

Type	Colour	Hardness	Food compliance	Medical approvals			Sterilisation		
				10993	USP	DMF	Steam	EtO	Gamma

## Santoprene<sup>®</sup>

<b>181-55MED</b>	bk	Shore 59A							
<b>281-55MED</b>	nc	Shore 60A							
<b>8281-35MED</b>	nc	Shore 38A							
<b>8281-45MED</b>	nc	Shore 49A							
<b>8281-55MED</b>	nc	Shore 59A		5; 6; 10; 11	VI	-	✓	✓	50kGY
<b>8281-65MED</b>	nc	Shore 68A							
<b>8281-75MED</b>	nc	Shore 79A							
<b>8281-90MED</b>	nc	Shore 93A							
<b>8281-55B1MED</b>	nc	Shore 57A							
<b>8181-55B1MED</b>	bk	Shore 57A							

bk = black, nc = natural color

## Celanese – Flüssigkristalline Polymere (LCP)

### Eigenschaften

Vectra® MT LCP liquid crystal polymers combine high flowability with high rigidity and strength. The polymers enable designers to produce thinner structures without compromising structural performance.

### Medizinische Anwendungen

Dry powder inhalers, networked and portable devices, surgical instruments, microelectrical devices.

Typ	Beschreibung	Lebensmittel-verträglichkeit	Medizinische Zulassungen			Sterilisation		
			10993	USP	DMF	Dampf	EtO	Gamma

### Vectra®

Typ	Beschreibung	Lebensmittel-verträglichkeit	10993	USP	DMF	Dampf	EtO	Gamma
MT® LCP 1300	Without fillers	FDA; (EU) 10/2011; GMP	5; 6; 10; 11	USP 23 class VI	✓	✓ up to 250 cycles	✓	
MT® LCP 1305	15% glass fiber reinforced, high strength, high stiffness							✓
MT® LCP 1310	30% glass fiber reinforced, high strength, high stiffness							
MT® LCP MT 1335	Glass fiber reinforced, tribologically modified with PTFE							-
MT® LCP MT 1345	30% mineral-reinforced, good surface properties, hydrolytic stability							
MT® LCP 4310	30% glass fiber reinforced, high flowability, high strength, high stiffness							✓
MT® LCP 4350	40% mineal reinforced, high flowability, low deformation, excellent surface properties							

Vectra® LCP E840iLDS\* / E845iLDS\* LDS are suitable for electronic components

## CHIMEI – Methyl Methacrylate Acrylonitrile Butadiene Styrene (M-ABS)

### Properties

M-ABS exhibits high transparency and offers good impact strength and chemical resistance. It is also easy to process.

### Medical applications

Syringe covers

Type	MFR (g/10min)	Density (g/cm³)	Food compliance	Medical approvals			Sterilisation		
				10993	USP	DMF	Steam	EtO	Gamma

### Polylac®

PA-703TRP	2,3	1,08	FDA	5; 10	-	-	-	✓	-
PA-758	3,0	1,08	FDA; (EU) 10/2011; GMP	-	VI	-	-	✓	-

## CHIMEI – Acrylonitrile Butadiene Styrene (ABS)

### Properties

Polylac® is an impact-resistant, high-gloss ABS that is suitable for a wide range of applications. The material can be processed by injection molding as well as extrusion. In addition to good flowability, which facilitates processing in many applications, Polylac® 757F also meets the requirements of EU Directive 10/2011 and is therefore suitable for contact with food.

### Medical applications

IV regulators

Type	MFR (g/10min)	Density (g/cm³)	Food compliance	Medical approvals			Sterilisation		
				10993	USP	DMF	Steam	EtO	Gamma

### Polylac®

<b>ABS PA-704LRP (milky white)</b>	18	1,05	FDA	5; 10	-	-	-	✓	-
<b>ABS PA-757F (milky white)</b>	18	1,05	FDA; (EU) 10/2011; GMP	-	VI	-	-	✓	-

## CHIMEI – Polycarbonate (PC)

### Properties

Wonderlite® is a transparent material suitable for a wide range of applications. Polycarbonate has very good temperature resistance combined with high impact strength and transparency.

### Medical applications

Infusion valves, infusion tubes, dialysers

Type	MFR (g/10min)	Density (g/cm³)	Food compliance	Medical approvals			Sterilisation		
				10993	USP	DMF	Steam	EtO	Gamma

### Wonderlite®

<b>PC-115P</b>	15	1,2	FDA	3; 4; 5; 6; 10;11	-	-	-	✓	-
<b>PC-115P F01 (slight blue tint)</b>	17	1,2	FDA	5; 10	-	-	-	✓	-
<b>PC-115P F17111C1 (blue tint)</b>	17	1,2	FDA	3; 4; 5; 6; 10;11	-	-	-	✓	50kGy

## CHIMEI – Styrene Acrylonitrile Copolymer (SAN)

### Properties

Kibisan® is a transparent material with very good processing properties. Another important feature is the material's good chemical resistance, which is a prerequisite for many applications in the medical sector. In addition, both grades listed meet the requirements of EU Directive 10/2011 and are therefore also ideally suited for contact with food.

### Medical applications

Syringe covers

Type	MFR (g/10min)	Density (g/cm³)	Food compliance	Medical approvals			Sterilisation		
				10993	USP	DMF	Steam	EtO	Gamma

### Kibisan®

Type	MFR (g/10min)	Density (g/cm³)	Food compliance	10993	USP	DMF	Steam	EtO	Gamma
PN-107 L125FG	58	1,06	FDA; (EU) 10/2011; GMP	-	VI	-	-	✓	-
PN-127 L150FG	17	1,06	FDA; (EU) 10/2011; GMP	-	VI	-	-	✓	-

## Delrin – Polyoxymethylen-Homopolymer (POM)



### Properties

Delrin® – high abrasion resistance, good durability, dimensional stability

### Medical applications

Injector pens, inhalers, dosing systems

Type	Description	Food compliance	Medical approvals			Sterilisation			
			10993	USP	DMF	Steam	EtO	Gamma	E-Beam

### Delrin® SC; Delrin® RASC

Type	Description	Food compliance	10993	USP	DMF	Steam	EtO	Gamma	E-Beam
SC631	Low to medium flow properties	FDA; (EU) 10/2011; GMP	5; 11	VI	-	87°C +3min 134°C <25 cycles	50°C 2hr. 1x	-	-
SC655	Medium flow properties								
RASC655	Medium flow properties								
SC690	High flow properties								
SC698	High flow properties (filled with silicone oil)								
RASC698	High flow properties (filled with silicone oil)								

# INEOS Olefins & Polymers – Polyethylene with low density (LDPE)



**Properties** Eltex® MED – good flow properties, good dimensional stability, high purity

**Medical applications** Blow-fill-seal (BFS) bottles and ampoules, medical tubing, film applications

Type	MFR (190°C/2,16kg) (g/10min)	Density (kg/m³)	Food compliance	Medical approvals				Sterilisation			
				10993	USP	EP	DMF	Steam	EtO	Gamma	E-Beam

## Eltex® MED LDPE

Type	MFR	Density	Food compliance	10993	USP	EP	DMF	Steam	EtO	Gamma	E-Beam
PH19N630	7,5	920	FDA; (EU) 10/2011; GMP	5	[661,1]; [87]	3.1.3; 3.1.4	-	-	(✓)	50 kGy	-
PH21G630	1,5	921		5	[661]; [87]; USPVI		(✓)	-	(✓)	-	-
PH22D630	0,3	922		5	[661]; [87]; USPVI		(✓)	-	(✓)	-	-
PH23H630	2	923		-	[661,1]; VI		(✓)	-	(✓)	-	-
PH23T630	22	923		-	VI		(✓)	-	(✓)	50 kGy	-
PH27D630	0,3	927		-	[661,1]; VI		(✓)	108 °C 1 h	(✓)	-	-
PH30D630	0,3	930		-	[661,1]; VI		(✓)	112 °C 1 h	(✓)	-	-

(✓) on request



# INEOS Olefins & Polymers – Polyethylene with high density (HDPE) INEOS

**Properties**      Eltex® MED – fast-flowing, good dimensional stability, high purity  
 Eltex® – good chemical resistance, outstanding organoleptic properties

**Medical applications**      Syringes (syringe plungers), thin-walled containers for pharmaceutical applications, caps and closures

Type	MFR (190°C/2,16kg) (g/10min)	Density (kg/m³)	Food compliance	Medical approvals				Sterilisation			
				10993	USP	EP	DMF	Steam	EtO	Gamma	E-Beam

## Eltex® MED HDPE




 <b>HD5226EA-M</b>	26	953	FDA; (EU) 10/2011; GMP	5	[87]; VI	3.1.3; 3.1.5	✓	✓	✓	-	-
----------------------------------------------------------------------------------------------------	----	-----	------------------------	---	----------	-----------------	---	---	---	---	---

## Eltex® HDPE

 <b>HD5502M</b>	0,2	954	FDA; (EU) 10/2011; GMP	-	-	3.1.3; 3.1.5	✓	✓	✓	-	-
-------------------------------------------------------------------------------------------------	-----	-----	------------------------	---	---	-----------------	---	---	---	---	---

(/) auf Anfrage

## Eltex® organoleptic HDPE

 <b>CAP508</b>	1,8	953	FDA; (EU) 10/2011; GMP	-	[661.1]	3.1.3; 3.1.5	-	(✓)	(✓)	-	-
 <b>HD5211EA-B</b>	11	951	FDA; (EU) 10/2011	-	-	3.1.3	-	(✓)	(✓)	-	-
 <b>HD6070EA-B</b>	7,6	960		-	-	3.1.3; 3.1.5	-	(✓)	(✓)	-	-

(/) on request



 bio based       recycling (mechanical & chemical)

# INEOS Olefins & Polymers – Polypropylene (PP)



**Properties** Eltex® MED – outstanding optical properties, high transparency, low odour, high purity

**Medical applications** Inhalation components, syringe barrels and plungers, thin-walled containers for pharmaceutical applications, blow-fill-seal (BFS) (bottles and ampoules)- \* PP terpolymer for film applications, medical IV bags

Type	MFR (230°C/2.16 kg) (g/10min)	Bend elast. modulus (MPa)	Food compliance	Medical approvals				Sterilisation			
				10993	USP	EP	DMF	Steam	EtO	Gamma	E-Beam

## Eltex® MED HPP

<b>100-MG03</b>	3	1450	FDA; (EU) 10/2011; GMP	-	VI	3.1.3 ; 3.1.6	✓	121°C 1hr	✓	-	-
<b>100-MG12</b>	12	1400		5	[87]; VI	3.1.3 ; 3.1.6	✓		✓	-	-
<b>100-MG25</b>	25	1200		-	VI	3.1.3 ; 3.1.6	✓		✓	-	-

## Eltex® MED RCP

<b>200-MG02</b>	1,8	900	FDA; (EU) 10/2011; GMP	-	VI	3.1.3 ; 3.1.6	✓	121 °C 1 hr	✓	-	-
<b>201-MG02</b>	1,8	900		-		3.1.3 ; 3.1.6	✓		✓	-	-
<b>240-MS23</b>	23	980		-		-	-		✓	-	-

## Terpolymer

<b>KS357</b>	5	620	FDA; (EU) 10/2011; GMP	-	VI	3.1.3	-	121 °C 20 Min	(✓)	-	-
--------------	---	-----	---------------------------	---	----	-------	---	------------------	-----	---	---

(/) on request



bio based recycling (mechanical & chemical)

# LG – Methyl Methacrylate Acrylonitrile Butadiene Styrene (M-ABS)



## Properties

Exceptional transparency similar to PMMA or PC, impact strength, rigidity and ease of processing; well balanced properties; LG TR ABS exhibits good Izod impact strength and good results in the falling weight test, similar to a standard ABS; the material also does not fracture under low impact energy.

Type	MFR (g/10min)	Density (g/cm <sup>3</sup> )	Food compliance	Medical approvals			Sterilisation		
				10993	USP	DMF	Steam	EtO	Gamma

## LG TR ABS

TR 556	5	1,09	FDA; (EU) 10/2011; GMP	-	VI	✓	-	✓	-
TR 557	23	1,09							
TR 558A	24	1,01							



# SK CHEMICALS – Polyethylene terephthalate (PET); Polyethylene terephthalate glycol modified (PETG); Polycyclohexylene dimethylene terephthalate (PCTG)



## Properties

SKYPET® PET BR – high transparency, excellent chemical resistance, easy to recycle  
SKYGREEN® PETG S2008 – high transparency, good impact strength, easy thermoforming, good printability

## Medical applications

Blister packs, disposable syringes, medical dishes and containers, sample grippers

Type	Density (g/cm³)	Food compliance	Medical approvals				Sterilisation		
			10993	USP	EP	DMF	Steam	EtO	Gamma

## SKYPET®

SKYPET® BR	1,33	FDA; (EU) 2023/2006; GMP	-	[87]; VI	3.1.15	✓	-	-	-
------------	------	--------------------------	---	----------	--------	---	---	---	---

Type	Density (g/cm³)	Food compliance	Medical approvals				Sterilisation			
			10993	USP	EP	DMF	Steam	ETO	Gamma	E-Beam

## SKYGREEN®

SKYGREEN® S2008	1,27	FDA; (EU) 2023/2006; GMP	3; 4; 5; 6; 10; 11	[661]; [87]; VI	3.1.15	✓	-	50°C 50% 5hr.	50kGy 30min	50kGy 24hr.
SKYGREEN® MP200	1,27		-	VI	-	-	-			
SKYGREEN® MJ200	1,23		-	VI	-	-	-			

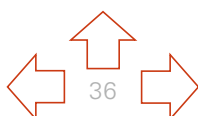
## ECOZEN®

ECOZEN® MT5G	1,25	FDA; (EU) 10/2011; GMP	-	VI	-	-	-	50°C 50% 5hr	50kGy 30min	50kGy 24hr
ECOZEN® MT10	1,27		-			-	-			
ECOZEN® MT10G	1,27		-			-	-			

## ECOTRIA®

ECOTRIA® S2008-CR	1,27	FDA; (EU) 2023/2006; GMP	3; 4; 5; 6; 10; 11	[661]; [87]; VI	3.1.15	✓	-	50 °C 50 % 5 hr	50 kGy 30 min	50 kGy 24 hr
-------------------	------	--------------------------	--------------------	-----------------	--------	---	---	-----------------------	------------------	-----------------

bio based recycling (mechanical & chemical)



## Syensqo – Polyaryletherketone (PAEK)

### Properties

AvaSpire® PAEK (polyaryletherketone) is a family of high-performance polyketones tailored to close cost and performance gaps between PEEK and other high-performance polymers. For example, ductility and toughness can be significantly improved over comparable PEEK grades, resulting in 20% higher elongation at yield and twice the elongation at break.

### Medical applications

Medical and dental instruments, sterilisation cases and trays, operating theatre equipment, diagnostic equipment; reusable medical equipment

Type	MFR (g/10min)	Density (g/cm <sup>3</sup> )	Food compliance	Medical approvals			Sterilisation		
				10993	USP	DMF	Steam	EtO	Gamma

### AvaSpire®

<b>AV-621 NT</b>	5	1.29	FDA / (EU) 10/2011	5; 10; 11							
<b>AV-621 GF30</b>	2	1.55	FDA								
<b>AV-650 BG15</b>	25	1.3	FDA							-	
<b>AV-651 NT</b>	25	1.29	FDA / (EU) 10/2011	5; 10; 11			134°C 18min 500x	500x	40kGy		
<b>AV-651 BG15</b>	25	1.29	FDA / (EU) 10/2011							-	-
<b>AV-651 BK95</b>	25	1.29	FDA / (EU) 10/2011								
<b>AV-651 CF30</b>	4,5	1.42	-								
<b>AV-651 GF30 BG20</b>	9	1.52	FDA								
<b>AV-651 GF30 BK95</b>	9	1.52	-								



## Syensqo – Polyetheretherketone (PEEK)

### Properties

KetaSpire® PEEK are polyetheretherketones for highly demanding applications. The high-performance plastics are characterised in particular by an outstanding combination of fatigue strength and chemical resistance.

### Medical applications

Medical and dental instruments, sterilisation cases and trays, operating theatre equipment, diagnostic equipment; reusable medical devices.

Type	MFR (g/10min)	Density (g/cm <sup>3</sup> )	Food compliance	Medical approvals			Sterilisation		
				10993	USP	DMF	Steam	EtO	Gamma

### KetaSpire®

Type	MFR (g/10min)	Density (g/cm <sup>3</sup> )	Food compliance	10993	USP	DMF	Steam	EtO	Gamma
<b>KT-820 NT</b>	3.0	1.30	FDA; (EU) 10/2011	5; 10; 11; 18	VI				
<b>KT-820 CF30</b>	1.1	1.41	FDA	5; 10; 11					
<b>KT-820 FP</b>	3.0	1.30	FDA; (EU) 10/2011						
<b>KT-820 GF30</b>	0.7	1.53	FDA	5; 10; 11; 18	-				
<b>KT-820 P</b>	3.0	1.30	FDA; (EU) 10/2011			-	134°C 18min 500x	500x	40kGy
<b>KT-820 SL30</b>	2.4	1.45		-					
<b>KT-880 NT</b>	36	1.30	FDA; (EU) 10/2011		VI				
<b>KT-880 CF30</b>	11	1.41	FDA	5; 10; 11; 18					
<b>KT-880 GF30</b>	14	1.53	FDA						

KT-820 CF30, KT-820 GF30, KT-880 CF30 and KT-880 GF30 are not "EU Food" compliant.

## Syensqo – Polyethersulfone (PESU)

### Properties

Veradel® HC- a rigid, transparent high-temperature polymer for use in high-performance healthcare applications. The material has inherent flame resistance and is highly resistant to a wide range of cleaning agents used in healthcare as well as sterilising agents. It retains its transparency, mechanical properties and dimensional stability in both humid and very hot environments. In sterilisation it is compatible with ethylene oxide, vaporized hydrogen peroxide, gamma radiation and steam.

### Medical applications

Medical device housings

Type	MFR (g/10min)	Density (g/cm³)	Food compliance	Medical approvals			Sterilisation		
				10993	USP	DMF	Steam	EtO	Gamma

### Veradel® HC

<b>HC-A301 NT</b>	30	1,37	FDA; (EU) 10/2011; GMP	5; 10; 11; 18	VI	-	134°C 18min 100x	✓ 100x	40kGy
-------------------	----	------	------------------------	---------------	----	---	------------------------	-----------	-------

## Syensqo – Polyphenylsulfone (PPSU)

### Properties

Radel® – Incredibly tough, transparent plastic with a heat deflection temperature (HDT) of 207°C, excellent chemical resistance and the ability to withstand over 1000 steam sterilisation cycles without significant loss of properties. Available in solid and transparent colours.

### Medical applications

Sterilisation containers and trays, orthopaedic devices, medical and dental instruments

Type	MFR (g/10min)	Density (g/cm³)	Food compliance	Medical approvals			Sterilisation		
				10993	USP	DMF	Steam	EtO	Gamma

### Radel®

<b>R-5000</b>	14-20	1,29	FDA; (EU) 10/2011; GMP	5; 10; 11; 18	VI	-	134°C 18min 1.000x	✓ 100x	40kGy
<b>R-5100</b>	17	1,30				-			
<b>R-5500</b>	12-17	1,29				-			
<b>R-5800</b>	20-28	1,29				-			

The polymer base is compliant. Please check with a member of the sales team whether the colour you require is approved.

## Syensqo – Polysulfone (PSU)

### Properties

Udel® – Almost crystal-clear transparent plastic with a heat deflection temperature (HDT) of 174°C, high strength, good chemical resistance and excellent dimensional stability in the presence of steam and oxidising agents. Available in solid colours, transparent and glass fibre-filled grades.

### Medical applications

Medical and dental instruments, vacuum flasks, tube connectors, device housings, haemodialysis membranes

Type	MFR (g/10min)	Density (g/cm <sup>3</sup> )	Food compliance	Medical approvals			Sterilisation		
				10993	USP	DMF	Steam	EtO	Gamma

### Udel®

<b>GF-110</b>	5-9	1,33	FDA		-	-			
<b>GF-120</b>	5-9	1,40			-	-			
<b>P-1700</b>	5-9	1,24	FDA; (EU) 10/2011	5; 10; 11; 18	VI	-	134°C 18min 500x	✓ 100x	40kGy
<b>P-3500 LCD</b>	5-9	1,24				-			
<b>P-3703</b>	14-20	1,24				-			

The polymer base is compliant. Please check with a member of the sales team whether the colour you require is approved.





## USI – Cyclic Block Copolymer (CBC)

### Properties

The key properties of CBC include high transparency, exceptional purity, low extractable substances, exceptional chemical resistance, low moisture absorption, low autofluorescence and exceptional UV-vis transmittance.

### Medical applications

Bio-diagnostic devices, syringes, bottles, laboratory equipment, medical packaging, dental applications, microtitre plates

Type	MFR (g/10min)	Density (g/cm <sup>3</sup> )	Food compliance	Medical approvals			Sterilisation		
				10993	USP	DMF	Steam	EtO	Gamma

### ViviOn™

<b>1325 / 1325 EUT*</b>	13	0,94	FDA; (EU) 10/2011; GMP	4; 5; 6; 10; 11	[661]; VI	3.1.3	-	✓	50kGy
<b>0510 / 0510 EUT*</b>	5	0,94							
<b>8210 / 8210 EUT*</b>	200	0,94							
<b>0510 HF (High Flow)</b>	13	0,94							
<b>0645 (High TG)</b>	6	0,94							
<b>1608 (Flex. Shore D 65)</b>	3	0,92							
<b>0510HFE (High Flow)*</b>	13	0,94							

\*improved UV characteristics



## Approvals

**FDA** - The Food and Drug Administration (FDA) is a U.S. public health agency that provides a range of health-related services and sets standards for food packaging and labelling. All drugs and medical devices approved for use in the U.S. must be tested by the FDA and must satisfy the agency's standards.

**ISO 10993** - ISO 10993, regulated by the International Organization for Standardization (ISO), is a series of standards for the biological evaluation of medical products. The standard covers the biological evaluation of the biocompatibility of materials with the human body.

Test	Method
Genotoxicity	ISO 10993-3
Cytotoxicity	ISO 10993-5
Bone and muscle implant tests	ISO 10993-6
Sensitisation	ISO 10993-10
Intracutaneous toxicity	ISO 10993-10
Acute systemic toxicity	ISO 10993-11
Subchronic toxicity	ISO 10993-11
Full characterisation(1)	ISO 10993-18
Physicochemical	ISO 10993-18

(1) Including exhaustive extractions and risk assessment

**DMF** - A Drug Master File (DMF) is a confidential, detailed document describing the active ingredients contained in a medical product. It is submitted by manufacturers to the U.S. Food and Drug Administration (FDA). A DMF details the chemistry, manufacturing processes and checks that apply to a component of a drug. There is no regulatory requirement to create and file a DMF.

**USP** - The United States Pharmacopeia (USP) defines standards that guarantee the quality and purity of drugs and health technologies worldwide. It includes tests for the biological reactivity of elastomers, plastics and other polymer materials that come into direct or indirect contact with people. USP Class VI is the most stringent test and is accepted throughout the industry.

**EP** - The European Pharmacopoeia (EP) defines quality testing for medicines in Europe. All drugs and medical devices manufactured in European countries must satisfy these standards. EP quality standards (Europe)

EP 3.1.3	Release of medicinal products from some additives
EP 3.1.4	Release of pharmaceuticals from PE without additives
EP 3.1.5	Release of pharmaceuticals from PE with additives (additives are tested for compatibility of pharmaceuticals)
EP 3.1.6	Release of medicinal products from PP with additives (additives are tested for compatibility of pharmaceuticals)
EP 3.1.9	Silicone elastomer for closures and tubing

**EFSA** - The European Food Safety Authority (EFSA) is a European agency which provides information and scientific advice on existing and emerging risks in the food chain. It deals with all issues relating directly or indirectly to food and animal feed safety, including animal health and welfare, plant protection, plant health and nutrition.

Classification	Definition
Biotolerant materials	are recognised as foreign by the surrounding tissue and are enclosed by a layer of connective tissue but not rejected.
Bioinert materials	do not form any chemical bonds when in contact with surrounding tissue.
Bioactive materials	are capable of chemical and biological interaction with tissues such as bone.

Contact time	Description
Short-term	Medical devices with one-off or repeated use or contact time likely to last up to 24 hours
Longer-term	Medical devices with one-off, repeated or long-term use or contact time likely to last more than 24 hours but not longer than 30 days
Permanent	Medical devices with one-off, repeated or long-term use or contact time lasting more than 30 days

## Your contact person for medical specialist products

### **Dr. Anna Geffken**

Business Manager Medical Specialties  
Phone: +49 40 32008-710  
a.geffken@biesterfeld.com

### **Caroline Heinrich**

Product Manager  
Phone: +49 40 32008-750  
c.heinrich@biesterfeld.com

## Your contact for medical plastics

### **Saskia Wiebel**

Global Segment Manager HealthCare  
Mobile: +49 151 12705301  
s.wiebel@biesterfeld.com

### **Elef Asaly**

Product Manager  
Phone: +49 40 32008-364  
e.asaly@biesterfeld.com

---

## Legal notice

### **Published by:**

Biesterfeld Spezialchemie GmbH – Life Science, Healthcare  
Ferdinandstrasse 41  
20095 Hamburg  
Germany  
Phone: +49 40 32008-0  
healthcare@biesterfeld.com

Head office: Hamburg, court of registration: Hamburg District Court, Commercial Register HRB 66970, VAT ID DE196 930 661

Biesterfeld Plastic GmbH  
Ferdinandstrasse 41  
20095 Hamburg  
Germany  
Phone: +49 40 32008-0  
plastic@biesterfeld.com

Head office: Hamburg, court of registration: Hamburg District Court, Commercial Register HRB 41045, VAT ID DE811 186 394

Information, data and graphics relating to raw materials have been sourced from the records provided by our suppliers.  
Local product availability may vary from country to country.

---

### **Disclaimer:**

We shall not be held liable for the goods being suitable for the purpose intended by the purchaser, unless the contract expressly states that a particular use will achieve a successful outcome. Our technology-based consulting services, information and recommendations are all given to the best of our knowledge. Since how the product is actually used is beyond our control and not all potential situations can be foreseen, any information, advice and so on, whether given verbally or in writing, shall always be non-binding. In particular, such information or advice does not release the purchaser from their duty to check that our products and goods are suitable for the intended purpose and procedure.



We will be happy to advise you in detail about our sustainable solutions.  bio based  recycling (mechanical & chemical)

Local availability of products might differ from country to country.



Published by:  
**Biesterfeld SE**  
Ferdinandstrasse 41  
20095 Hamburg  
[www.biesterfeld.com](http://www.biesterfeld.com)



September 2025

**Imprint:** Biesterfeld Plastic GmbH, Ferdinandstrasse 41, 20095 Hamburg, Germany, [www.biesterfeld.com](http://www.biesterfeld.com) | Registered Office: Hamburg, Commercial | Register: Hamburg, HRB 41045, VAT ID DE 811186394 | Managing Director: Frank Johanning | Our raw material information, data and graphics was obtained from the records of our raw material suppliers. Local availability of products might differ from country to country.

