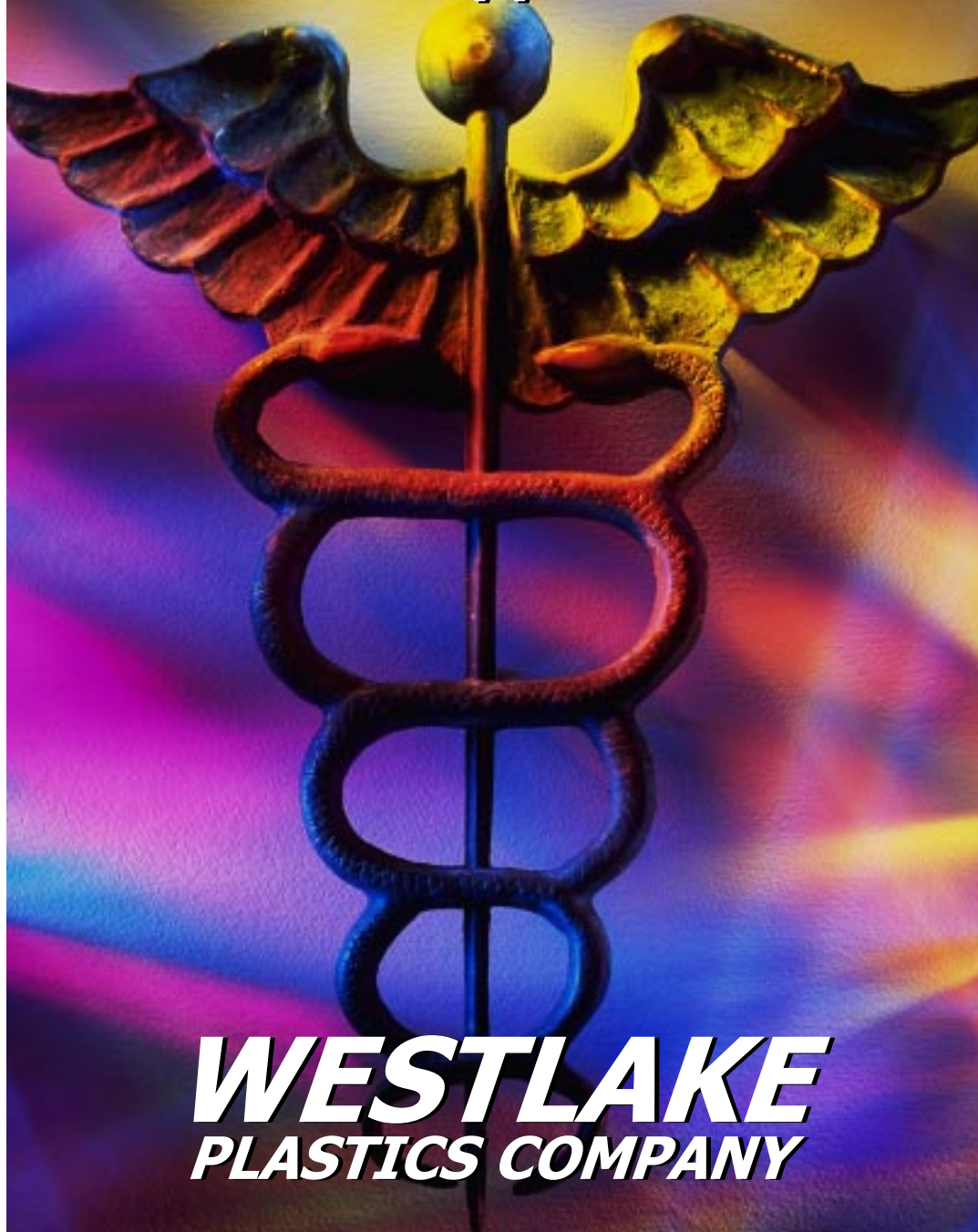


Products for Medical Applications



WESTLAKE PLASTICS COMPANY

Material Descriptions

POMALUX®



(acetal copolymer)

Medical grade Pomalux is made from acetal copolymer resin which allows machined products the ability to retain dimensional integrity, maintain stability in water and most chemicals at elevated temperatures. Pomalux products are opaque and are available in a wide array of standard colors as well as on a custom basis. Recommended sterilization techniques for Pomalux include ETO gas and steam autoclaving. Disinfectants and germicides generally have no effect on Pomalux, however, acidic solutions can degrade the polymer.

PROPYLUX® HS



(polypropylene - heat stabilized)

Medical grade Propylux HS is made from an FDA approved polypropylene resin. Through a unique heat-stabilizing process, the extruded material is able to withstand higher temperatures with less water absorption than standard polypropylene. Recommended sterilization techniques for Propylux HS include steam autoclaving and cold sterilization.

RADEL® R4400



(polyphenylsulfone)

Medical grade Radel R4400 resin offers exceptional hydrolytic stability, toughness, heat deflection temperature and resistance to stress cracking. This polymer also has excellent thermal stability, and impact strength over a wide temperature range. Recommended sterilization techniques for Radel R4400 include ETO gas, radiation, steam autoclaving, dry heat and cold sterilization.

RADEL® R5500



(polyphenylsulfone)

Medical grade Radel R5500 resin offers exceptional hydrolytic stability, toughness, and superior impact strength over a wide temperature range. This product also offers high deflection temperatures and outstanding resistance to environmental stress cracking. Recommended sterilization techniques for Radel R5500 include ETO gas, radiation, steam autoclaving, dry heat and cold sterilization.

TEMPALUX®



(polyetherimide)

Medical grade Tempalux is made from Ultem® polyetherimide resin, an amorphous thermoplastic which exhibits excellent resistance to a wide range of chemicals and disinfectants. Ultem maintains its size and shape over a broad temperature range as well as tolerates a high amount of stress over extended periods of time. Recommended sterilization techniques for Tempalux include ETO gas, radiation, steam autoclaving, dry heat and cold sterilization.

ZELUX® GS



(polycarbonate - gamma stabilized)

Medical grade Zelux GS polycarbonate is produced from resin formulated to meet the stringent performance characteristics and requirements of the healthcare industry. Suitable for ETO gas and limited autoclaving sterilization, the resin also has proprietary color enhancement technology to reduce color shift caused by gamma radiation.

Westlake Products for Medical Applications—Properties

	Units	ASTM Test	Pomalux acetal copolymer	Propylux HS polypropylene- heat stabilized	Radel R 4400 polyphenylsulfone	Radel R 5500 polyphenylsulfone	Tempalux polyetherimide	Zelux GS polycarbonate- gamma stabilized
MECHANICAL								
Compressive Modulus	psi	D695	-	-	288,000	251,000	480,000	-
Compressive Strength								
@yield	psi	D695	-	8,000	14,210	14,350	21,900	-
@1% deflection	psi	D695	4,500	-	-	-	-	-
@10% deflection	psi	D695	16,000	-	-	-	-	-
Fatigue Endurance	psi	D671	4,000	-	-	-	-	-
Flexural Modulus	psi	D790	375,000	313,000	368,000	350,000	480,000	340,000
Flexural Strength				9,270				
@break	psi	D790	-	-	-	-	-	-
@yield	psi	D790	13,000	-	14,100	13,200	22,000	14,200
Hardness-Rockwell (R, M, L or D)	-	D785	M78	R101	-	-	M109	R118
Izod Impact Strength								
Notched @73°F	ft•lbs/in	D256	1.5	1.5	5.0 ⁽¹⁾	10.0	1.0	17.0
Un-Notched	ft•lbs/in	D256	-	21.0	No break	No break	25.0	60.0
Shear Strength	psi	D732	7.7	-	-	-	-	-
Tensile Elongation								
@break	%	D638	75.0	40.0	60.0	60.0-120.0	60.0	135.0
@yield	%	D638	-	10.0	7.2	7.2	7.0	-
Tensile Impact	ft•lbs/in ²	D1822	90	-	175	190	-	-
Tensile Modulus	psi	D638	380,000	319,000	340,000	340,000	430,000	-
Tensile Strength								
@break	psi	D638	-	4,360	-	-	-	10,000
@yield	psi	D638	8,800	5,310	10,100	10,100	15,200	9,000
THERMAL								
Coefficient of Thermal Expansion	in/in/°F	D696	4.5 to 6.1x10 ⁻⁵	4.6x10 ⁻⁵	3.1x10 ⁻⁵	3.1x10 ⁻⁵	3.1x10 ⁻⁵	3.1x10 ⁻⁵
Flammability Rating - UL94	-	-	@0.60* HB	HB	@.031* V-0	@.031* V-0	@.075* 5VA	-
Heat Deflection Temperature								
@66 psi	°F	D648	316	305	-	417	410	280
@264 psi	°F	D648	230	176	374	405	392	270
Thermal Conductivity	(BTU•in)/(hr•ft ² •°F)	C177	1.6	-	2.42	2.42	1.53	-
OTHER								
Steam Sterilization Cycles Passed without Cracking ⁽²⁾ , Cracking or Rupture	-	-	-	-	>1,000	>2,000	-	-
Specific Gravity	-	D792	1.41	.92	1.28	1.29	1.27	1.20
Water Absorption @24 hours	%	D570	0.22	0.025	0.35	0.37	0.25	-

⁽¹⁾Actual values may vary depending on pigment.

⁽²⁾Steam autoclave conditions: temperature 270°F (132°C); time 30 minutes/cycle; steam pressure 27 psig (0.19 mPa); stress level 1,000 psi (7.0 mPa) in flexure; additive - Morpholine at 50 ppm.

The Company

Westlake Plastics Company is the world leader in extrusion and compression molding technologies of high performance thermoplastics. Our advanced technologies allow us to convert the full range of thermoplastic resins into stock shapes and film.

New product development is the hallmark of Westlake Plastics. Our six business groups (Chemical Resistance, Engineering, Film, High Performance, Medical and Static Control) work in close conjunction with resin suppliers and end users to develop new products that meet the critical needs of customer applications as well as industry specific standards.

Our field and in-house technical experts provide you with excellent resources for product application and recommendations. Our industry focused expertise includes:

- Analytical Instrumentation
- Aviation and Aerospace
- Computer
- Food Handling
- Nuclear Energy
- Semiconductor
- Automotive
- Chemical Processing
- Electrical/Electronics
- Medical
- Pharmaceutical
- Telecommunications

In addition to our knowledge on specific industries, Westlake also offers over 40 years of manufacturing experience. With both compression molding and extrusion technologies, we are able to offer small runs of customized products with short turn around times as well as generous samples.

If it's product or application knowledge you seek, Westlake is ready to respond to your challenges.

Other Westlake Products

Many of our standard products are also available in different grades including: FDA compliant, fire retardant and glass fiber reinforced.

Made from:

- **Engineered and Other Thermoplastic Resins**
 - Acetal Copolymer (ULTRAFORM[®], CELCON[®])
 - Acrylonitrile-Butadiene-Styrene (CYCOLAC[®])
 - Modified Polyphenylene Oxide (NORYL[®])
 - Polycarbonate (LEXAN[®], MAKROLON[®])
 - Low-Density Polyethylene
 - High-Density Polyethylene
 - Ultra-High Molecular Weight Polyethylene
 - Polymethylpentene
 - Polypropylene
 - Crystal Polystyrene (STYRON[®])
 - High Impact Polystyrene (STYRON[®])
- **Fluoropolymer Resins**
 - Ethylene-Chlorotrifluoroethylene (HALAR[®])
 - Ethylene-Tetrafluoroethylene (TEFZEL[®])
 - Polyvinylidene Fluoride (KYNAR[®])
 - TFE/PVDF/HFP Terpolymer
- **High Performance Resins**
 - Polyetheretherketone (VICTREX[®])
 - Polyethersulfone (RADEL[®]A, ULTRASON[®] E)
 - Polyetherimide (Ultem[®])
 - Polysulfone (UDEL[®])
 - Polyphenylsulfone (RADEL[®] R)

Westlake Product

Pomalux[®]
Absylux[®]
Norylux[™]
Zelux[®]
Ethylux[®]
Ultra Ethylux[®]
Lennite[®]
TPX[®]
Propylux[®]
Styraclear[®]
HIPS

ECTFE
ETFE
PVDF
Clariflex[™]

PEEK
PES
Tempalux[®]
Thermalux[®]
PPSU

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Trade Names:

ABSYLUX[®] – Westlake Plastics Co.
CELCON[®] – Ticona
CYCOLAC[®] – GE Plastics
CLARIFLEX[™] – Westlake Plastics Co.
ETHYLUX[®] – Westlake Plastics Co.
HALAR[®] – Ausimont USA, Inc.
KYNAR[®] – Elf Atochem North America, Inc.
LENNITE[®] – Westlake Plastics Co.
LEXAN[®] – GE Plastics
MAKROLON[®] – Mobay

NORYL[®] – GE Plastics
NORYLUX[™] – Westlake Plastics Co.
POMALUX[®] – Westlake Plastics Co.
PROPYLUX[®] – Westlake Plastics Co.
RADEL[®] – Amoco Performance Products, Inc.
STANYL[®] – DSM Engineering Plastics
STYRACLEAR[®] – Westlake Plastics Co.
STYRON[®] – Dow U.S.A.
TEFZEL[®] – Du Pont Co.
TEMPALUX[®] – Westlake Plastics Co.

THERMALUX[®] – Westlake Plastics Co.
TPX[®] – Mitsui Plastics, Inc.
UDEL[®] – Amoco Performance Products, Inc.
ULTEM[®] – GE Plastics
ULTRAFORM[®] – BASF Corp.
ULTRA ETHYLUX[®] – Westlake Plastics Co.
ULTRASON[®] – BASF Corp.
VICTREX[®] – Victrex, Inc.
WESTLAKE[®] – Westlake Plastics Co.
ZELUX[®] – Westlake Plastics Co.

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