

Santoprene™

Specifications

July 2008

<u>Description:</u>	Santoprene thermoplastic rubber is a family of high-performance elastomers which combine the performance characteristics of vulcanized rubber, such as flexibility and low compression set, with the processing ease of thermoplastics. It is the mixture of in-situ cross linking of EPDM rubber and polypropylene.
<u>Performance:</u>	Withstands transient temperatures up to 150 Celsius (300F) and continuous temperatures to 135 Celsius (275F) per SAE J2236 (Standard Method for Determining Continuous Upper Temperature Resistance of Elastomers). Fluid resistance similar to polychloroprene for aqueous-based fluids, oils and hydrocarbons. Low compression and tension set. Outstanding dynamic fatigue resistance. Excellent ozone and good weathering resistance.
<u>Compound:</u>	Fully vulcanized EPDM rubber particle in a thermoplastic matrix of Polypropylene (PP). Santoprene™ thermoplastic rubber grades are proprietary products. Their composition is trade secret information of Advanced Elastomer Systems, L.P. These products are not identified by CAS number. All components of these products appear on the Inventory of Chemical Substances published by the U.S. Environmental Protection Agency or qualify for the TSCA polymer exemption under U.S. Federal Register Vol. 60, No. 60, 3/29/95. New Jersey Trade Secret Registry No.: 01122800003-5001P.
<u>Color:</u>	Black
<u>Agency Ratings:</u>	EU 2003/11/EC: Compliant to EU Directive 2003/11/EC regarding marketing and use of certain dangerous substances and preparations, specifically pentabromodiphenyl ether or octabromodiphenyl ether. UL QMFZ2, UL QMFZ8: UL listed: file #QMFZ2.E80017, Plastics - Component; file #QMFZ8.E80017, Plastics Certified For Canada - Component. EU Directive 2002/95/EC (RoHS) compliant.
<u>ROHS:</u>	EU Directive 2002/95/EC (RoHS) compliant.
<u>Automotive Specifications:</u>	Chrysler MS-AR100 AGN, Delphi SD-2-346 Sec. 4.1, Ford WSD-M2D378-A1, GM GMP.E/P.001, Valeo VMS-7055
<u>Weight:</u>	Approximate weight per square foot: 1/8" weighs 0.45 lbs.
<u>Durometer:</u>	55-65 Shore Hardness (Shore A, 0.0787 in, 73.4 °F): 59. ISO 868.
<u>Temperature Range:</u>	Continuous -50° to +275° F Intermittent -74° to +300° F
<u>Brittleness Temperature:</u>	-76°F, ASTM D-746, ISO 812.
<u>Specific Gravity:</u>	0.970. ASTM D792.
<u>Density:</u>	0.970 g/cm ² . ISO 1183.
<u>Finish:</u>	Smooth and Block Design
<u>Tensile Stress at 100%:</u>	300 psi, ASTM D412. Across Flow (73°F) 305 psi, ISO 37. Across Flow (73°F)
<u>Tensile Stress at Break:</u>	750 psi, ASTM D412. Across Flow (73°F) 754 psi, ISO 37. Across Flow (73°F)
<u>Elongation at Break:</u>	400%, ASTM D412. Across Flow (73°F)
<u>Tear Strength:</u>	911bf/in, ASTM D624. Across Flow (73°F) 911bf/in, ISO 34-1. Across Flow (73°F)
<u>Compression Set:</u>	ASTM D395 & ISO 815.
(158°F, 22.0 hr)	22%
(257°F, 70.0 hr)	38%
<u>Dielectric Strength:</u>	770 V/mil, ASTM D149. (0.0800 in)
<u>Dielectric Constant:</u>	2.400 V/mil, ASTM D150. (73°F, 0.0760 in) 2.400 V/mil, IEC 60250. (73.4°F, 0.0760 in)
<u>Gauges:</u>	1/32", 1/16", 1/8", 1/4"
<u>Widths:</u>	36 inch (Smooth), 24 inch (Block Design)
<u>Roll Length:</u>	50 feet
<u>Fluid Resistance:</u>	Per ASTM D2000 / SAE J200 AA, BA, BC, CA (Type, Class)
<u>Burn Rate:</u>	Burn rate is considered slow. Meets Federal Motor Vehicle Safety Standard No. 302 (down to .040").
<u>Bonding and Decorating:</u>	Santoprene TPV's, like other polyolefins (PP, PE) are difficult materials for bonding and decorating. In order for an adhesive to wet Santoprene, it must have a critical surface tension lower than 28 dyne/cm. Most adhesives, tapes and coating have surface tension above this range and do not wet (adhere to) solid Santoprene TPV. For more information view document TL00308 (Exxon Mobil).
<u>Applications:</u>	Appliance Components, Automotive Applications, Automotive Under the Hood, Consumer Applications, Diaphragms, Electrical Parts, Gaskets, Seals.
<u>Recyclability:</u>	Santoprene is polyolefin based and completely recyclable.
<u>Custom Cuts:</u>	In addition to hand fabrication, this product can be fabricated using laser, die, and water-jet cut. Please submit your drawings for a price quote.
<u>Availability:</u>	Santoprene is always stocked in popular gauges.
<u>Pricing:</u>	

Pricing:

Santoprene™ Smooth Industrial Rolls

Thickness	Width	1.5M to 7.3M or 5' min. to 24'	7.6M to 30.1M or 25' to 99'	30.5M to 152.1M or 100' to 499'	152.4M + or 500' +
0.020" or 0.5mm	36" or 91.4 cm	N/A	N/A	N/A	\$2.25
1/32" or 0.8mm	36" or 91.4 cm	\$8.22	\$6.17	\$4.93	\$3.62
1/16" or 1.6mm	36" or 91.4 cm	\$16.56	\$12.42	\$9.94	\$7.29
1/8" or 3.2mm	36" or 91.4 cm	\$33.18	\$24.88	\$19.91	\$14.60
3/16" or 4.8mm	36" or 91.4 cm	N/A	N/A	\$32.94	\$24.16
1/4" or 6.4mm	36" or 91.4 cm	N/A	N/A	\$43.92	\$32.21

Santoprene Block Design

Thickness	Width	1.5M to 7.3M or 5' min. to 24'	7.6M to 30.1M or 25' to 99'	30.5M to 152.1M or 100' to 499'	152.4M + or 500' +
1/16" or 1.6mm	24" or 70 cm	\$16.77	\$11.98	\$9.58	\$7.19

Heat Aging of Santoprene Thermoplastic Rubber (ASTM D573/D2240/D412)

Shore Hardness of Santoprene Mechanical Property	1 Days (24 Hours)	7 Days (168 Hours)	15 Days (360 Hours)	30 Days (720 Hours)
55A Change in hardness, Shore A units	+2	+3	+5	+3
Tensile Strength, % retention	92	101	99	80
Ultimate Elongation, % retention	86	97	104	92
100% Modulus, % retention	107	106	104	105

Fluid Resistance of Santoprene™ Rubber

Effect of 166 hour immersion (ASTM D-471) on properties of 55 Shore A

Fluids	Ultimate Elongation, % Change	Tensile Strength, % Change	Hardness Change, Shore A Units	Weight, % Change
Acids & Alkalis				
98% Sulfuric Acid @ 23C	-18	-16	-3	3.2
10% Hydrochloric Acid @ 23C	-5	-8	-3	-1.1
50% Sodium Hydroxide @ 23C	3	9	-1	0.0
10% Potassium Hydroxide @ 23C	-13	-13	-4	-1.6
Aqueous Solutions				
Water @ 100C	-20	-13	-4	6.4
Sea Water @ 23C	9	3	-1	0.5
15% Sodium Chloride @ 23C	9	2	-1	0.3
2.5% Detergent (Tide*) @ 23C	2	-5	-2	0.4
Organic Solvents				
Acetic Acid @ 23C	-3	-13	-5	8.8
95% Ethanol @ 23C	3	-8	-8	2.4
Glycerol @ 23C	0	-5	-4	1.3
Turpentine @ 23C	-32	-27	-16	84.1
Xylene @ 23C	-54	-44	-20	78.2
Petroleum Oils and Fuels				
ASTM #1 Oil @ 100C	-18	-13	-12	35.4
IRM 902 Oil @ 100C	-39	-27	-17	69.3
IRM 903 Oil @ 100C	-54	-41	-20	94.0
Automotive Fluids				
Automatic Transmission Fluid @ 125C	-53	-46	-18	62.2
Hydraulic Brake Fluid @ 23C	3	-6	-3	0.2
Lithium Grease @ 23C	-9	-9	-8	11.9
Power Steering Fluid @ 125C	-41	-33	-20	71.7
Antifreeze, 50/50 Ethylene Glycol (Prestone™)/water @ 125C	-6	-8	-6	6.8
Industrial Fluids				
Pydraul™ 312 @ 125C	-15	-19	-8	17.6
Sunvis™ 706 Fluid @ 125C	-35	-30	-15	58.1
Freon* 11 @ 5C	-21	-10	-15	106.7

Re: The compliance of the Advanced Elastomer Systems, L.P. products to the following Directives of the European Parliament: 2002/95/EC (RoHS), 2003/11/EC and 2002/96/EC (WEEE)

Based on our knowledge of the manufacturing and packaging processes and the raw materials used in those processes, other than the exceptions noted below, none of the chemicals listed in the directives mentioned below are expected to be present in Santoprene™. AES does not add these chemicals to the formulations during their manufacture, it has no reason to believe they would be present, and does not routinely analyze for them. Any presence of heavy metals would only be as a naturally occurring impurity and not likely to exceed trace amounts.

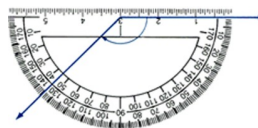
EU Directive 2002/95/EC (RoHS): This Directive is regarding the use of certain hazardous substances in electrical and electronic equipment and includes, lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBB) and polybrominated diphenyl ethers (PBDE).

EU Directive 2003/11/EC: This Directive is regarding the marketing and use of certain dangerous substances and preparations, specifically pentabromodiphenyl ether or octabromodiphenyl ether. Pentabromodiphenyl ether or octabromodiphenyl ether are not formulation components of any AES products.

EU Directive 2002/96/EC (WEEE): This Directive regards polychlorinated biphenyls (PCB), mercury or mercury compounds, batteries, printed circuit boards of mobile phones and those of other devices greater than 10 square centimeters, toner cartridges, plastic containing brominated flame retardants, asbestos, cathode ray tubes, chlorofluorocarbons (CFC), hydrochlorofluorocarbons (HCFC), hydrofluorocarbons (HFC), hydrocarbons (HC), gas discharge lamps, liquid crystal displays, external electric cables, components containing refractory ceramic fibers, components containing radioactive substances, and electrolyte capacitors.

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