ADIPRENE® LW 520
A polyether based liquid casting urethane polymer

ADIPRENE LW 520 is a polyether-based liquid casting urethane polymer, prepared with an aliphatic diisocyanate, that yields tough, high quality elastomers in the 95 durometer A hardness range when cured with Vibracure A89. It is readily processable by conventional hand and machine mixing techniques.

TABLE I TYPICAL POLYMER SPECIFICATIONS:	
Available Isocyanate Content, %	4.6 - 4.9
Viscosity, Brookfield, poise **@50°C** **@100°C**	 90.0 - 180.0 7.0 - 13.00
Appearance	Clear viscous liquid free from contamination
Color, Gardner	0-3 (Honey colored)
Specific Gravity **@ 25/4°C (77/39°F)** **@100/4°C (212/39°F)**	 1.03 0.99
Flash Point °C (°F)	above 232 (450)
Solubility	Soluble in aromatic hydrocarbons, ketones, esters, and chlorinated hydrocarbons
Storage Stability	Excellent in absence of moisture and heat

Note: These data are presented to describe ADIPRENE LW 520, and are not intended to serve as specifications.

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PROCESSING AND PERFORMANCE FEATURES

- Excellent hydrolytic stability (vs. other liquid urethane elastomers)
- Excellent low temperature flexibility - Vulcanizates of ADIPRENE LW 520 retain rubbery properties at low temperatures and should be serviceable in many applications at temperatures as low -57°C (-70°F).
- Low sensitivity to moisture during processing and fast demold time.

HANDLING PRECAUTIONS

ADIPRENE LW 520 urethane rubber contains methylene-bis (4-cyclohexyl isocyanate), which is known to cause severe irritation to the eyes, skin and mucous membranes. Avoid breathing vapor. Use only with adequate ventilation. Please consult the SDS for further information.

Other materials that may be used with ADIPRENE LW 520 in the manufacture of finished products, such as Vibracure A89, also present hazards in handing and use. Before proceeding with any compounding or processing work, consult and follow label directions and handling precautions from suppliers of all ingredients.

TABLE II
VULCANIZATE PHYSICAL PROPERTIES (DIAMINE CURE)

Compound	
ADIPRENE LW 520 (4.75% NCO)	100
Vibracure A89 (95% theory)	9.6
Mixing and Curing	
Mix temperature, °C (°F)	100 (212)
Cure[c], hours at °C (°F)	16 @ 100 (212)
Working Life, minutes	4
Stress-Strain Properties	**Typical Values**
Hardness, durometer A	95
100% Modulus, psi	1240
300% Modulus, psi	3580
Tensile Strength, psi	6000
Elongation at Break, %	360
Other Physical Properties	
Tear Strength (ASTM D-470), lb./in (kN/m)	51
Compression Set (Method B), % after 22 hours at 70°C (158°F)	49
Resilience, %	48
Specific Gravity at 24°C (75°F)	1.06
Linear Shrinkage, %	1.3

c Test samples were conditioned one week at 24°C (75°F) and 50%

PROCESSING

Mixing

ADIPRENE LW 520 mixes smoothly at 100°C (212°F) with Vibracure A89. Working life, or fluid casting time, under these conditions is on the order of 4 minutes. Molds should be preheated to 100-110°C (212-230°F) and a mold release applied before casting.

Because of its viscosity and surface tension characteristics, ADIPRENE LW 520 will entrap air and other gases during handling and processing. To insure uniform, void-free castings, the polymer must be degassed prior to addition of curing agents. Degassing is accomplished by heating the polymer to 100°C (212°F) at an absolute pressure of two to five millimeters of mercury (266-666 Pa). Degassing is complete when vigorous foaming stops. (Note: minor bubbling may persist after the polymer has been effectively degassed, but bubbles do not appear in the vulcanizate.)

Curing with Polyols

ADIPRENE LW 520 can be cured with polyols to produce softer vulcanizates in the 60 to 65 durometer A hardness range. Diols in combination with triols are satisfactory as curing agents. As the triol content of the compound is increased, modulus, resistance to compression set and resilience are increased, and elongation and tear strength are decreased. Vulcanizate properties of a typical polyol-cured ADIPRENE LW 520 are given in Table III. Polyol curing systems generally provide longer working lives and correspondingly longer demolding times than are usual in compositions cured with Vibracure A89. The working life and cure rate of a simple polyol cure can be shortened by the use of small quantities of certain catalysts such as stannous octoate or dibutyl tin dilaurate.

Since ADIPRENE LW 520 is aliphatic in structure, it can be cured with aliphatic polyols, such as 1,4-butane diol and trimethylol propane, to yield essentially clear, non-discoloring products. Small quantities of anti-oxidant, such as Santowhite Powder, and an ultraviolet light absorber, such as TINUVIN 327, are needed to protect against the effects of weathering.

TABLE III VULCANIZATE PHYSICAL PROPERTIES (POLYOL CURE)	
Compound	
ADIPRENE LW 520 (4.75% NCO)	100
1,4 Butane diol (80% theory)	4.1
Trimethylol propane (20% theory)	1.0
Stannous Octoate	0.02
Mixing and Curing	
Mix temperature °C (°F)	100 (212)
Cure[e], hours at °C (°F)	8 @ 100 (212)
Working life, minutes	7[f]
Physical Properties	
Hardness, durometer A	62
100% Modulus, psi (MPa)	325 (2.2)
300% Modulus, psi (MPa)	875 (6.0)
Tensile Strength, psi (MPa)	2125 (14.6)
Elongation at break, %	460
Tear Strength (ASTM D-470), lb./in (kN/m)	30 (5.2)

e All samples were conditioned one week at 24°C (75°F) and 50% RH before being tested.

f Working life is > 24 hours in the absence of catalyst.

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