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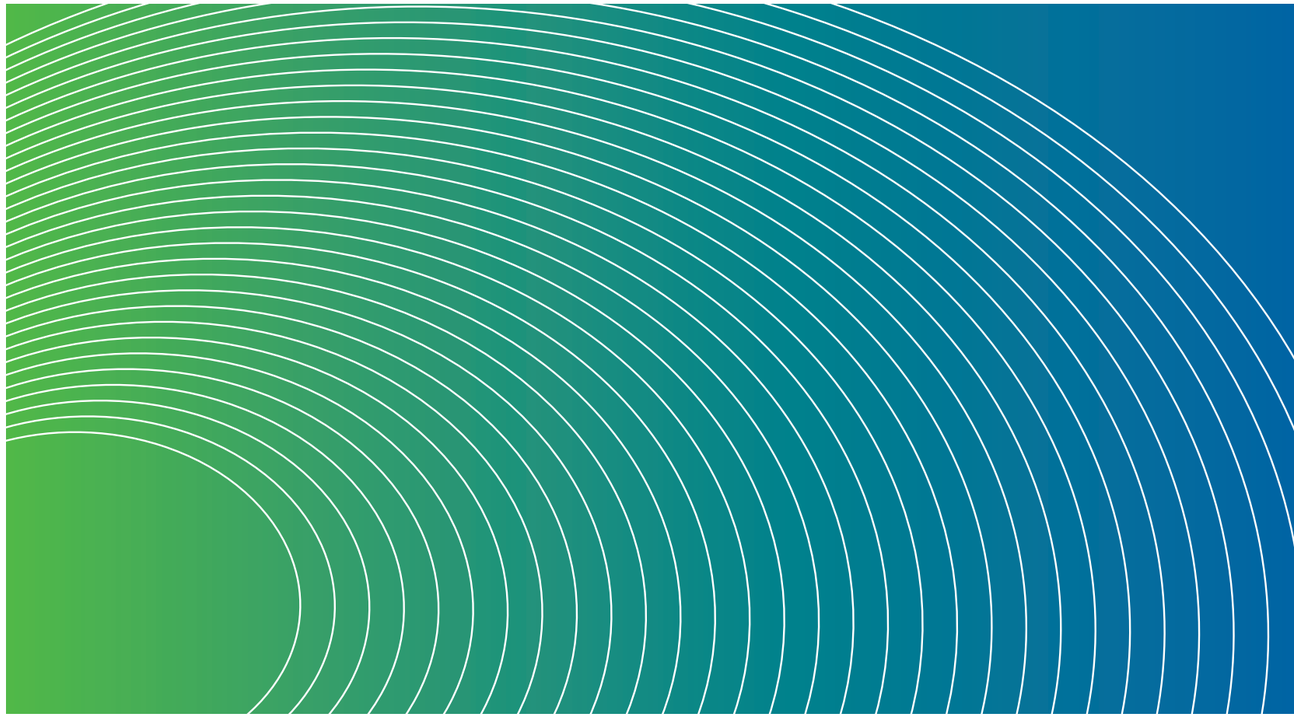
ADIPRENE® K X028



Single component urethane system based on a low free TDI-PTMEG prepolymer and CAYTUR® 31 DA

PRELIMINARY DATA SHEET

ADIPRENE® K X028 is a single component urethane system based on a low free TDI-PTMEG prepolymer and CAYTUR® 31 DA that cures to a 92 Shore A elastomer. The system offers a unique combination of an extended pot life at temperatures below 50°C and rapid cure when the material reaches 115°C.

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PRELIMINARY PRODUCT DATA

Advantages
Relative to conventional two component urethanes, ADIPRENE® K X028 has the following attributes:
- One Component
- Mix ratio assured
- Long pot life
- Snap Cure
- Short demold (thickness-dependent)
- No curative melting or dusting.
- Low-capital processing (NO MACHINE)
- Low Free Isocyanate
- Stable for 6 months at ambient temperatures

Applications
- Open casting of intricate molds
- Rotational and centrifugal casting
- Liquid injection molding (LIM)
- Casting of large rolls or other parts
- Dip-coating of fabrics, screens or other fabrics
- Filament/fiber coating

Hygiene
ADIPRENE® K X028 contains a methylene dianiline (MDA) sodium chloride complex (MDA)3NaCl. Exposure to this amine curative is reduced since the product is premixed before shipment. Furthermore, ADIPRENE® K X028 has no free MDA and low free TDI, which can be beneficial in the management and control of worker exposure to isocyanates and MDA.

Although exposure to the MDA is significantly reduced with the one component technology, proper personal protective equipment should be used when handling this product. Packaging and materials contaminated with ADIPRENE® K should be heated to 115°C to complete the cure and disposed with the general waste. In situations where unreacted material is present, the product should be disposed in accordance with Federal, State and local regulations.

TYPICAL PHYSICAL PROPERTIES

ADIPRENE K® X028 Characteristics

Appearance @ 25˚C	White, viscous, liquid dispersion.
Typical Viscosity, Poise	
30˚C (86˚F)	33.2
40˚C (104˚F)	19.2
50˚C (122˚F)	11.0
60˚C (140˚F)	6.6
70˚C (158˚F)	4.3

Recommended Processing Conditions
1 Gallon Cans only (Table I). 5 gallon containers require at least 5 hours rolling before use.

Step #	*Table I - Processing Steps*
1	Preheat ADIPRENE K 1 gallon cans to 50˚C (122˚F). 1 gallon can requires approximately 8 hrs to reach equilibrium temperature.
2	Apply mold release to mold. Preheat Mold to 115˚C (240˚F)
3	Pour the entire gallon of ADIPRENE K into a can and stir with a spatula in a "figure-eight" motion to ensure homogeneity. Add any additional ingredients at this time.
4	Fill the hot mold by pouring ADIPRENE K down the side of the mold. Pouring down the side of the mold will reduce air entrapment.
5	Place filled mold into the 115°C oven.
6	Allow material to reach 115°C for curative deblocking and complete curing. Demold times for small parts (0.25lb) require approximately 20 minutes.
7	Optional - Post Cure for 16 hours at 115°C for optimum properties

Elastomer Properties

Curing Conditions	
ADIPRENE K Temperature	50°C
Mold Temperature/ Oven Temperature	115°C/ 115°C
Post Cure, hr/115°C	16
Physical Properties	
Hardness Shore A	92±1A
Drop Ball Resilience %	58 %
Tensile, psi	5190
Elongation, %	480
100% Mod psi	1140
300% Mod psi	1920
Split Tear, lb./in	95
Trouser Tear, lb/in	140
Die C Tear, lb./in	440
Bashore Rebound	50
Compression Set % (Method B) 22 hours @ 158°F (70°C)	40
Compressive Mod., psi Third Cycle [aged]	
5%	200
10%	370
15%	560
20%	780
25%	1080
Specific Gravity	1.05

Heat Stability
The stability of ADIPRENE® K X028 is a function of temperature and time. ADIPRENE® K products can be stored at 50°C for up to one week and up to six months at ambient temperatures. A hot air circulated oven is recommended for heating this product. Extended exposure to temperatures above 50°C will destabilize and deteriorate the product resulting in gel formation or solidification. Furthermore, localized hot spots can destabilize the product. Use of band heaters, heating elements or steam jacketed day tanks are NOT recommended.

Moisture Sensitivity
Like all urethanes, ADIPRENE® K is sensitive to moisture exposure. Extended exposure to humidity will destabilize the material causing viscosity increases and possible gel formation. Material exposed to humidity should be used immediately. All opened containers should be re-capped and blanketed with nitrogen or dry air.

Elastomer Properties as a Function of Curing Time
Property development of Adiprene KX028 is a function of time in the hot oven. A cure cycle of 16-24 hours at 115˚C is recommended for best performance. However for faster production it might be desirable to cure for a shorter duration (e.g. 1 hour) in which case the cured elastomer would exhibit relatively lower performance as shown in the table below.

Curing Conditions		*1150C, 24 hours*	*1150C, 1 hour*
Hardness Shore A		92±1A	93
Drop Ball Resilience %	D412	58 %	57
Tensile, psi	D412	5190	3457
Elongation, %	D412	480	402
100% Mod psi	D412	1140	1210
300% Mod psi	D470	1920	2158
Split Tear, lb./in	D1938	95	72
Trouser Tear, lb/in	D624	140	97
Die C Tear, lb./in	D2632	440	436
Bashore Rebound, %	D395-B	50	44
Specific Gravity		1.05	1.05

Bonding to Metal
Excellent urethane to metal adhesion can be achieved with CHEMLOK® by Lord Corporation metal bonding agents. CHEMLOCK® 219 is applied first to the clean, grit blasted steel or aluminum hub. After the solvent has evaporated, a layer of CHEMLOCK® 218 is applied. Solvent is allowed to evaporate again, and then the hubs are heated in a 125°C oven.

Once the hubs reach 120°C, they can be held at this temperature for 1 – 4 hours without effect on the bonding agent. Then the hubs are placed in a mold, which has been preheated to 120 – 130 °C, and the mixed polyurethane system is then poured.

Since the ADIPRENE® K is heat activated, material begins to cure at the surface of the metal hub and at the surface of the mold while it is still liquid in the center of the polyurethane mix. Because of this, there is very little stress on the bond line. Heat from the curing reaction continues to push the cure closer and closer to the center of the polyurethane mixture, until it is complete.

Other Additives
- Polar additives destabilize ADIPRENE® K (Glycerin, NMP, BENZOFLEX®, REACTINT® are a few examples)
- Test system stability of all additives at ambient and processing temperatures before large scale use.
- Recommended plasticizer – Dioctyl Adipate
- Mold Release – Stoner Inc (800-227-5538) (http://www.moldmoreparts.com/Silicones.htm)
- Pigments – REPI (DOA based pigments) (<2.0phr) (www.repi-usa.com)*
- Degassing Agent – BYK 560A (<0.5phr) (www.byk-chemie.com)*

*It is recommended that Pigments and Degassing agents be added right before processing Adiprene® K. Addition of these additives to the product package (e.g. 1 gallon container) followed by extended storage (>24 hours) will destabilize the mix leading to gel formation.