Rubber Crumb Binder

One-Component, Moisture Cure Aliphatic Prepolymers for Rubber Crumb Binder Applications

DESCRIPTION

The following product, **Desmodur® ultra E 30500**, is a recommended aliphatic polyisocyanate prepolymer based on **Hexamethylene Diisocyanate (HDI)**. The **Covestro Prototype 73095A** is an aliphatic prepolymer in development and based on **Methylene Bis(4-Cyclohexylisocyanate) (H12MDI)**. These products provide the properties suited for rubber crumb binder applications and are recommended and supplied by Covestro.

RAW MATERIAL DETAILS

Material	Type	% NCO	Equivalent Weight (avg. as supplied)	Viscosity
Desmodur® ultra E 30500	HDI	12.5%	336	4250 mPa·s (@ 25°C)
Covestro Prepolymer Prototype 73095A	H_{12}MDI	7.0%	600	4500 mPa·s (@ 25°C)

MIXING AND APPLICATION GUIDELINES

- Recommended mix ratios for topcoat, wear layer is 78% rubber crumb to 22% aliphatic polyisocyanate prepolymer binder.
- Aliphatic prepolymers may require use of a catalyst. The recommended prepolymers were catalyzed with 2% tin catalyst for curing and physical property testing.
- Load rubber crumb into a clean, dry paddle cement mixer before adding binder.
- With the mixer at a slow speed, add the appropriate amount of binder.
- Mix for 30 to 60 seconds until the rubber crumb is uniformly coated.
- Apply immediately once mixing is stopped — do not allow the mixture to sit. This could lead to excess air and cause foaming.
- Surface moisture control: Ensure all surfaces and rubber crumb materials are completely dry before application. The presence of morning or evening dew will result in foaming and compromised surface quality.
- Weather window requirements: Allow a minimum 24–48-hour rain-free period following application to ensure complete curing. Check weather forecasts and postpone application if precipitation is expected during this critical curing window.
- Cure rate increases in hot or humid conditions and slows in cold or dry conditions — plan application timing accordingly.

CURED AND DRYING PHYSICAL PROPERTIES

Table 1: The tensile strength and elongation at break, according to ASTM D 412, and the Die C tear resistance, according to ASTM D 624. For each prepolymer, the cured properties as a clear film and mixed as a binder with rubber crumb are provided.

		Tensile Strength @ Break ASTM D 412	Elongation @ Break ASTM D 412	Tear Resistance, Die C ASTM D 624
Desmodur® ultra E 30500	**Clear Film**	28 MPa	500%	250 lbf/in
	With Rubber Crumb	1.5 MPa	33%	72 lbf/in
Covestro Prepolymer Prototype 73095A	**Clear Film**	30 MPa	675%	150 lbf/in
	With Rubber Crumb	1.5 MPa	158%	79.0 lbf/in

Note: Samples "With Rubber Crumb" were prepared at a ratio of 78% rubber crumb to 22% aliphatic polyisocyanate prepolymer binder.

Table 2: The film build time and film dry time (in hours), obtained using linear dry time recorder, at five temperature and humidity conditions.

Temperature / Humidity		5°C / 90%	25°C / 20%	25°C / 50%	40°C / 20%	40°C / 90%
Desmodur® ultra E 30500	Film Build Time (hr)	19.7	2.4	1	2	0.7
	Film Dry Time (hr)	43.3	4.3	6.7	3	2.2
Covestro Prepolymer Prototype 73095A	Film Build Time (hr)	19	9	6	3	1.5
	Film Dry Time (hr)	36	14	12	4	2.5

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