Rubber Crumb Binder

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

DESCRIPTION

The following **Desmodur® E** aromatic polyisocyanate prepolymers, based on **Methylene Diphenyl Diisocyanate (MDI)**, are recommended by Covestro for rubber crumb binder applications. These products offer the performance properties required for effective rubber crumb binder applications and are available and supplied by Covestro.

RAW MATERIAL DETAILS

Material	Type	% NCO	Equivalent Weight (avg. as supplied)	Viscosity
Desmodur® E 22	MDI	8.60% ± 0.30%	488	2800 ± 400 mPa·s (@ 23°C)
Desmodur® E 2200/76	MDI	9.85% ± 0.25%	426	2750 ± 750 mPa·s (@ 25°C)
Desmodur® MP-101	MDI	9.95% ± 0.30%	422	2000 - 3000 mPa·s (@ 25°C)
Desmodur® E 743	MDI	8.00% ± 0.20%	525	1700 - 3300 mPa·s (@ 25°C)

MIXING AND APPLICATION GUIDELINES

- Recommended mix ratios for base layer is 85% rubber crumb to 15% aromatic polyisocyanate prepolymer binder.
- Recommended mix ratios for topcoat, wear layer is 78% rubber crumb to 22% aromatic polyisocyanate prepolymer binder.
- 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 Desmodur® E 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® E 22	**Clear Film**	25 MPa	900%	400 lbf/in
	With Rubber Crumb	0.39 MPa	49%	25.5 lbf/in
Desmodur® E 2200/76	**Clear Film**	40 MPa	750%	325 lbf/in
	With Rubber Crumb	0.40 MPa	38%	18.0 lbf/in
Desmodur® MP-101	**Clear Film**	40 MPa	800%	300 lbf/in
	With Rubber Crumb	0.29 MPa	28%	17.9 lbf/in
Desmodur® E 743	**Clear Film**	15 MPa	900%	250 lbf/in
	With Rubber Crumb	0.25 MPa	40%	7.2 lbf/in

**Note: Samples "With Rubber Crumb" were prepared at a ratio of 78% rubber crumb to 22% aromatic 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® E 22	Film Build Time (hr)	4	3	3	0.5	0.1
	Film Dry Time (hr)	8	8	5	2	0.4
Desmodur® E 2200/76	Film Build Time (hr)	6	6	1.5	2	0.5
	Film Dry Time (hr)	18	42	11	23	1.5
Desmodur® MP-101	Film Build Time (hr)	4	8	3	2	0.2
	Film Dry Time (hr)	14	47	17	26	0.4
Desmodur® E 743	Film Build Time (hr)	3	7	1.5	2	0.1
	Film Dry Time (hr)	9	47	13	19	0.5

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