

Polyurethane Specialty Products Group

VERSALINK™

Oligomeric Diamines in Molding Compounds

Table 2A compares hand cast physical properties for various grades of Versalink oligomeric diamines processed with liquid MDI. Table 2A shows Versalink oligomeric diamines based on a PTMEG backbone. All data is based on 95% stoichiometry and a room-temperature cure (25 °C) for 14 days.

Although Versalink P-250 is a solid at room temperature, can be heated and sub-cooled and will remain liquid for up to one week at room temperature. It also can be blended with other Versalink products to maintain a liquid state.

TABLE 2A - PHYSICAL PROPERTIES OF PTMEG-BASED VERSALINK OLIGOMERIC DIAMINES IN CASTABLE ELASTOMERS				
	P-250	P-250/650	P-650	P-1000
Isocyanate	Isonate® 2143L	Isonate 2143L	Rubinate® PBA-2225	Rubinate PBA-2225
NCO, %	29	29	31	31
Mix Ratio (parts)				
Versalink	100	100*	100	100
MDI	60	47	33	23
Temperature, °C				
Versalink	25	25	25	25
Isocyanate	25	25	25	25
Pot Life, min	< 1	2.5	12	25
Hardness	84D	73D	55D	95A
Modulus, psi				
100%	—	—	1700	900
300%	—	—	3000	1200
Tensile, psi	9600	4000	7500	4500
Elongation, %	9	6	330	460
Tear, pli				
Die C	—	800	530	370
Split	—	140	140	110
Rebound, %	—	35	45	53

*50/50 mix of Versalink P-250 and Versalink P-650 oligomeric diamines.

Table 2B shows a comparison of the physical properties of a Versalink oligomeric diamine-cured and a diol-cured system. In this test, both liquid MDI and an MDI prepolymer were reacted with Versalink P-1000 oligomeric diamine. Harder elastomers can be obtained by blending Versalink oligomeric diamines with cocuratives such as Versalink 740M, Ethacure® 300 or MBOCA.

TABLE 2B - COMPARISON OF AMINE- AND DIOL-CURED MDI SYSTEMS			
	MDI PREPOLYMER	LIQUID MDI	MDI PREPOLYMER
System	1,4 BDO Baytec® MP-090	Versalink P-1000 Isonate 2143L	Versalink P-1000 Baytec MP-090
NCO, %	8.8	29	8.8
Mix Ratio (parts)			
Versalink	—	100	100
MDI	—	25	76
Mix Temperature, °C	—	25	25
Pot Life, min	4	15	30
Cure Time @ Temp.	—	14 days @ 25 °C	14 days @ 25 °C
Hardness	85A	95A	75A
Modulus, psi			
100%	960	1200	500
300%	2730	1600	800
Tensile, psi	5375	7100	4900
Elongation, %	410	450	525
Tear, pli			
Die C	360	360	200
Split	120	100	40
Rebound, %	—	52	30
NBS Abrasion Index	—	410	—

Table 2C illustrates the improvements in abrasion resistance obtained from a Versalink oligomeric diamine/MDI system. Improvements also were seen in the overall physical properties.

TABLE 2C - ABRASION RESISTANCE COMPARISON: VERSALINK OLIGOMERIC DIAMINE/MDI SYSTEMS VERSUS CONVENTIONAL SYSTEMS			
	VERSALINK P-1000/ ISONATE 2143L	BUTANEDIOL/ MDI PREPOLYMER	MBOCA/ TDI PREPOLYMER
Mix Ratio	100/24	10.3/100	19.5/100
Mix Temperature, °C	25	80	85
Pot Life, min	15	4	5
Demold Time @ Temp.	150 min @ 25 °C	30 min @ 110 °C	60 min @ 100 °C
Cure Time @ Temp.	14 days @ 25 °C	16 hrs @ 100 °C	16 hrs @ 70 °C
Hardness, Shore A	95	95	95
Modulus, psi			
100%	1000	1800	1800
300%	1400	3800	3400
Tensile, psi	8000	5500	5000
Elongation, %	460	375	400
Tear Strength, pli	150	125	150
Rebound, %	49	35	40
NBS Abrasion Index	410	220	300
Compression Set, %	49	35	40

Safety and Handling Information

For all safety and handling information, please refer to the Versalink oligomeric diamine Material Safety Data Sheets, available upon request from Air Products.

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Isonate® is a trademark of Dow Chemical, U.S.A.
Baytec® is a trademark of Bayer.
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