

NIAX* flame lamination ether FLE-200

URETHANE ADDITIVES - FLEXIBLE SLABSTOCK FOAM



Niax flame lamination ether FLE-200 is a low viscosity additive designed to improve adhesion properties of polyether flame bonding foams. Its rapid buildup of tack time adhesion allows a new approach to FLE foams. Niax flame lamination ether FLE-200 produced foams give excellent adhesion properties and bond strengths (after flame lamination) that is superior to common ether additives. Niax flame lamination ether FLE-200 represents an advance in ether bonding foam technology.

Key Features and Typical Benefits

- final flame lamination adhesion properties equivalent to polyester based foams
- a low viscosity additive that can be metered by standard pumping systems alone or in polyol premixes. Typical use levels are 3-8 part per 100 polyol (php)
- excellent processing can be maintained in the typical use range by increasing concentration of Niax catalyst A-1 by 10-20%, while decreasing tin catalyst 15-30%
- foam physical properties are excellent over a wide use range.
- automotive FLE foams require less flame retardant to pass MVSS302 than is required with other additives
- less smoke generated in the flame lamination process
- based on foam/paper adhesion tests, the initial tack time is shorter (better), which should help improve flame lamination speeds
- excellent bond strength is achieved after 10 minutes, compared to conventional ether foam systems
- reactive material resulting in low automotive fogging potential

Typical Physical Properties

Physical Form	Clear, colorless liquid
Specific Gravity at 25°C	1.0872
Viscosity at 25°C, cSt.	361
Flash Point, °C	135
Pounds/Gallon at 25°C	9.03
Hydroxyl Number, mg KOH/g	480

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Formulations

The following are typical machine formulations utilizing Niox flame lamination ether FLE-200:

	Formulations							
Polyol (OH-56)	95.0	95.0	92.0	92.0	95.0	95.0	92.0	92.0
Niox FLE-200	5.0	5.0	8.0	8.0	5.0	5.0	8.0	8.0
Water	4.2	4.2	4.2	4.2	3.0	3.0	3.0	3.0
Niox silicone L-620	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Niox catalyst A-1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Stannous Octoate	0.16	0.17	0.13	0.14	0.14	0.14	0.12	0.10
Flame Retardant	—	5.0	—	5.0	—	5.0	—	5.0
80 / 20 TDI	54.6	54.6	56.3	56.3	42.4	42.4	44.1	44.1
TDI (Index)	105	105	105	105	105	105	105	105
Density pcf	1.37	1.43	1.39	1.44	1.82	1.83	1.88	1.86
Air Flow, scfm	2.7	2.9	2.9	1.9	2.7	2.4	2.8	2.0
25% IFD	35	38	37	37	32	33	34	33
Tensile, psi	22	21	23	26	21	20	23	21
Elongation %	195	200	195	236	235	206	267	212
Tear, lbs/in.	2.6	2.7	3.0	3.2	3.0	2.6	3.3	3.1
Compression Set %								
@ 90%	6	5.5	9.8	9.8	7.5	4.9	5.8	8.9
@ 50%	3	2.5	7.3	8.2	2.4	2.2	3.5	7.4
Cell Counts, cpi	40	40	40	40	40	40	40	40
MVSS-302	Fail	Pass	Pass	Pass	Pass	Pass	Pass	Pass
Foam Adhesion Test								
1 Minute	G	G	G	G	G	G	G	G
10 Minutes	VG	VG	VG	VG	VG	VG	VG	VG
24 Hours	VG	VG	E	E	E	E	E	E

Note: ■ The foam / paper adhesion test was an internal test designed for this study.

G = Good Adhesion

VG = Very Good Adhesion

E = Excellent Adhesion – Paper Tears

■ All foams formulated to have comparable air flows

Recommendation – We recommend that Niox flame lamination ether FLE-200 be evaluated in current customer formulations at 3 – 8 part loading range. Higher loadings (6 – 10 parts) can be used, but at some sacrifice of processing latitude. In addition, automotive formulations that must pass MVSS-302 may reduce flame retardant levels. This study showed MVSS-302 could be passed in the range of 6-8 parts. Niox flame lamination ether FLE-200, without additional flame retardant. In addition, isocyanate indexes can be adjusted to achieve the desired laminating characteristics (100-105 index).

Flame Bonding Overview			
Ether Foams	Common Additives	Niax Flame Lamination Ether FLE-200	Ester
No Foam Adhesion		Improved Foam Adhesion	
Niax Flame Lamination Ether FLE-200 Application Guide			
Standard Polyol (parts)			
100	95		92
Niax Flame Lamination Ether FLE-200 (parts)			
0	5		8
Stannous Octoate Reduction (%)			
0	15-20		25-30
Amine Increase (%)			
0	5-10		10-20
Flame Lamination Properties			
Standard	Midpoint		Improved

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Patent Status

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