

Niax* catalyst A-537

Description

Niax catalyst A-537 is a liquid, delayed action, tertiary amine catalyst selective to the gelling (urethane forming) reaction.

Key Features and Benefits

- Delayed-action extends pour time needed for pouring complex parts with
- Excellent foam endcure relative to other delayed-action catalysts
- Improved flowability

Typical Physical Properties

Specific Gravity, @ 25°C	1.168
@ 55°C	1.148
Viscosity, cSt @ 25°C	25
Freezing Point, °C	<-20
Flash Point, °C. (PMCC)	none
Hydroxyl Number, mg KOH/g	
without water	1327
apparent with water	1514
Water, %	3.0

Potential Applications

Niax catalyst A-537 is a delayed-action analog to Niax catalyst A-533 and provides the added benefit of delayed cream time that is necessary for pouring complex parts without hurting foam endcure. Niax catalyst A-537 is an excellent candidate for microcellular integral-skin applications that include shoe soles and steering wheels. Niax catalyst A-507 and Niax catalyst A-537 belong to a family of new catalysts that offer the benefits of delayed cream time and improved flowability without negatively affecting foam cure and demold time.

Processing Recommendations

Niax catalyst A-537 offers a combination of improved flowability and excellent endcure. Table 1 below shows

a fast-curing midsole formulation using Niax catalyst A-537. Table 2 below shows the reactivity profile and Table 3 on the next page shows the physical properties of this system. Figure 1 compares the reactivity profiles of Niax catalyst A-537 as the sole catalyst versus Niax catalyst A-533, the non-delayed version of Niax Catalyst A-537, and versus Niax catalyst A-507, another delayed-action version of Niax catalyst A-533.

Table 1: Fast-Cure Polyester-Based Midsole System Featuring Niax Catalyst A-537

Polyester Polyol Blend	100
Ethylene glycol / Diethylene glycol	
Average OH#: 66, Average functionality	2.1
Ethylene Glycol	7.5
Water	1.3
Niax catalyst A-507 (amine blow catalyst)	0.10
Niax catalyst A-537 (amine gel catalyst)	0.3
Niax catalyst A-533 (amine gel catalyst)	1.10
Niax silicone L-1505 (surfactant)	0.5

Table 2: Reactivity Profile of Low-Density Polyester-Based Midsole System Featuring Niax Catalyst A-537

Cream Time, sec.	6
Gel Time, sec.	18
Rise Time, sec.	48
Tack Free Time, min.	2 ^{1/2}
Pinch/Pull Time, min.	6
Free-rise Density, g/cc.	0.142

Table 3: Physical Properties of Fast-Cure Polyester-Based Midsole System Featuring Niax Catalyst A-537

Physical Property	Value
Molded Density, g/cc	0.350
Tensile Strength, kgf /cm ² ASTM D-412	31.6
Elongation, % ASTM D-412	410
Die C Tear Strength,kgf /cm ASTM-624	14.2
Split Tear Strength, kgf /cm ASTM D-3574	3.8
Hardness, Shore A ASTM D-2240	43-45
Compression Set, % ASTM D-3574	
After 30 min.	8.1
After 16 hours	6.6

The physical properties listed above for this fast-cure midsole system show the outstanding capabilities that can be achieved using Niax catalyst A-537. Niax catalyst A-537 is a highly efficient catalyst that gives a long delay to the cream time but still gives an excellent endcure. Niax catalyst A-537 is the delayed-action version of Niax catalyst A-533 (33% triethylenediamine in ethylene glycol). The blocking agent used in Niax catalyst A-537 reacts in the foaming process and adds to the blowing of the foam by its reaction products while liberating the base catalyst. Niax catalyst A-537 also improves foam flowability over that of Niax catalyst A-533.

Figure 1: Gel Catalyst Reactivity Profiles

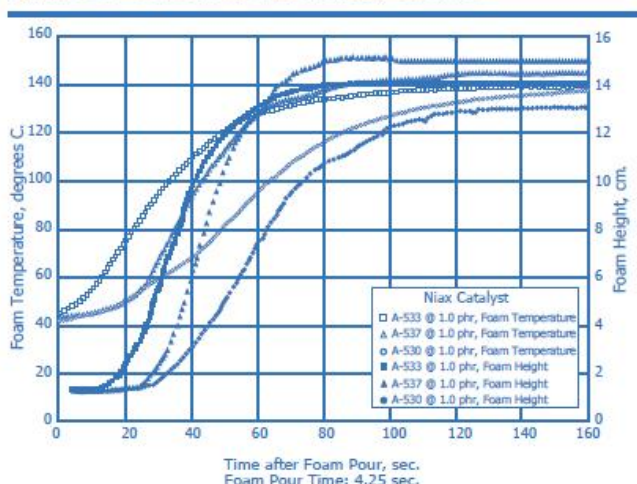


Figure 1 shows the reactivity profiles for a low-density midsole system having either Niax catalyst A-530, Niax catalyst A-533 or Niax catalyst A-537 as the sole catalyst. The use level of the active catalyst ingredient (not including blocking agent) is the same for all of these catalysts. The above figure shows the delay and moderation of the activity in Niax catalyst A-537 and Niax catalyst A-530 versus the base catalyst, Niax catalyst A-533.

The rise profile shown above for Niax catalyst A-537 is much more delayed when compared to Niax catalyst A-533 but not as delayed as for Niax catalyst A-530. The final rise height for Niax catalyst A-537 is significantly higher than that of Niax catalyst A-533 demonstrating the reaction and disappearance of the blocking agent with the added benefit of increased blow. This disappearance of the blocking agent in Niax catalyst A-537 gives it the same curing potential as Niax A-533 with the added benefits of a longer cream time and improved flowability.

Patent Status

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