

EMEA - EUROPE, MIDDLE EAST, AFRICA & INDIA

POLYURETHANE ADDITIVES GUIDE

RIGID & MOLDED FOAMS,
SPECIALTY APPLICATIONS



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A LEADER IN POLYURETHANE ADDITIVES

Momentive Performance Materials offers one of the most trusted and diverse polyurethane additive product lines in the industry, ranging from a broad array of silicone stabilizers and a full portfolio of amine and metal-based catalysts to a selection of organic-based property modifiers.

Developed in 1962, Niax™ brand additives have long been essential ingredients in polyurethane formulations used to meet the specialized processing and performance needs of customers across the globe. Niax grades include a comprehensive line of silicones, catalysts, and process modifiers for polyurethane foam production. Momentive also offers Geolite™ modifiers to help flexible slabstock foam producers broaden their offering of foam grades.

Momentive is a pioneer in the polyurethanes additives industry, and continues to serve customers with leading innovations, creative solutions, and excellent application expertise.

POLYURETHANE ADDITIVES FOR RIGID & MOLDED FOAMS AND SPECIALTY APPLICATIONS

Silicones for Molded foams

- Automotive seating
- Head rest
- NVH applications

Silicones for Rigid foams

- Appliances
- Panels
- Discontinuous applications
- Spray
- One Component Foam

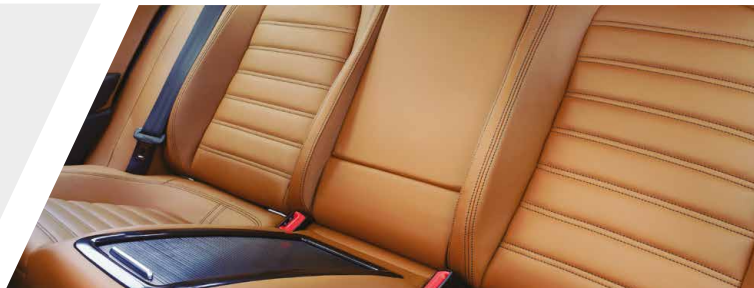
Silicones for Specialty applications

- Shoe soling
- Automotive parts
- Cushioning
- Mechanical froth
- CASE

Catalysts

- Amine catalysts
- Trimerisation catalysts and additives
- Metal catalysts
- Low emission catalysts

NIAX
MOLDED
FOAM



| Silicones | HR TDI | TDI / MDI | HR MDI | VE MDI | Product Description |
|-------------------|--------|-----------|--------|--------|--|
| L-3881 | | | | ○ | Stabilizing low emission silicone for visco-elastic foams, co-silicone together with L-3639 |
| L-3639 | | ○ | ○ | ○ | Very low emission medium potency silicone providing good stabilization along with good foam openness, co-silicone for VE |
| L-3639S | | ○ | ○ | ○ | Very low emission medium potency silicone offering good stabilization along with good foam openness, co-silicone for VE, water soluble |
| L-3415 | | | ○ | | Low emission silicone with high cell opening |
| L-3416 | | ○ | ○ | | Low emission silicone with medium cell opening |
| L-3417 | | ○ | ○ | | Low emission; stabilizing silicone |
| L-3620 | | ○ | | | Low potency, low emission silicone for TDI/MDI technology |
| L-3640 | ○ | ○ | | | High efficiency, low emission silicone for TDI/MDI technology |
| L-3556S | ○ | | | | Low emission, medium potency, water soluble silicone |
| L-3558 | ○ | ○ | | | Low emission, medium - high potency silicone for TDI |
| L-3555 | ○ | | | | High stability, low emission silicone |
| L-3170 | ○ | | | | High efficiency balanced silicone |
| L-3185 | ○ | | | | Low emission version of L-3170, high efficiency balanced silicone |
| L-3167 | ○ | ○ | | | Cell regulator; co-silicone surfactant for TDI |
| L-5309J | ○ | | | | High efficiency balanced silicone |
| L-3629J | ○ | ○ | | | Low fogging, high efficiency surfactant for TM20 and TDI technology |
| L-3001 | | ○ | ○ | | High cell opening silicone |
| L-3111 | | ○ | ○ | | High cell opening silicone (cost effective) |
| L-3002 | | ○ | ○ | | Medium cell opening silicone |
| L-3222 | | ○ | ○ | | Medium cell opening silicone (cost effective) |
| L-3627 | | | ○ | | Low fogging surfactant, medium cell opening for MDI rich technology |
| L-2171 (Y-10366J) | ○ | ○ | ○ | | High efficiency; balanced silicone |

TDI/MDI = typically 80/20 blend / TDI = toluene diisocyanate / MDI = Methylene diphenyl diisocyanate / HR = High resilience / VE = Visco Elastic

| Catalysts | Blow Amine Catalyst | Balanced Amine Catalyst | Gel Amine Catalyst | Product Description |
|-----------------------|---------------------|-------------------------|--------------------|--|
| Low Emission Catalyst | | | | |
| EF-100 | ○ | | | Reactive low emission blow catalyst |
| EF-150 | ○ | | | Delayed action reactive low emission blow catalyst |
| EF-600 | | ○ | ○ | Balanced catalyst; predominantly gel |
| EF-602 | | ○ | ○ | Balanced delayed catalyst; predominantly gel |
| EF-620 | | ○ | ○ | Balanced catalyst, predominantly gel, high efficiency, low water |
| EF-680 | | ○ | ○ | Balanced delayed catalyst; predominantly gel can offer improved curing |
| EF-700 | ○ | ○ | | Balanced catalyst; predominantly blow |
| EF-705 | ○ | ○ | | Balanced cell opening delayed catalyst; predominantly blow |
| EF-708 | ○ | ○ | | Balanced catalyst; predominantly blow |
| A-337 | | | ○ | Surface curing catalyst; low mold temperature (MDI & MDI/TDI) |
| A-338 | | ○ | | Tertiary amine catalyst that can help to improve skin cure at low mold temperatures |
| Niax Catalysts | | | | |
| A-1 | ○ | | | Standard blow catalyst |
| A-107 | ○ | | | Delayed action blow catalyst |
| A-400 | ○ | | | Delayed action load building (TDI), cell opening, improved flowability MDI |
| A-440 | ○ | | | Delayed action load building (TDI), higher cell opening, improved flowability MDI, low water |
| A-4 | ○ | | | Catalyst for improved surface cure |
| C-174 | ○ | | | HR MDI blow catalyst |
| C-225 | | ○ | | Balanced delayed action catalyst |
| C-247 | | | ○ | Delayed action gel catalyst |
| A-300 | | | ○ | Delayed action load building; cell opening gel catalyst (low corrosion) |
| A-33 | | | ○ | Key gel catalyst |



NIAX
RIGID
FOAMS



| Silicones | Fine Cells | Pentane solubility in Polyols | Blowing agents emulsification | Cell Stabilization | Foam Flow | Void Reduction | Product Description |
|-----------|------------|-------------------------------|-------------------------------|--------------------|-----------|----------------|--|
| L-6891 | ●●●● | ●●● | ●● | ●●●● | ●●● | ●●●● | High polyol/pentane solubility - very low lambda value foam and voids reduction, for discontinuous applications especially refrigerators |
| L-6887 | ●●●● | ●●●● | ●●●● | ●●●● | ●●● | ●●● | Excellent polyol/pentane solubility - can provide very fine cells for discontinuous applications especially refrigerators |
| L-6884 | ●●●● | ●●● | ●● | ●●●● | ●●● | ●●● | Can improve polyol/pentane or HFC's compatibility - can provide very fine cells and good flow, for refrigerators and all discontinuous applications |
| L-6866 | ●●●● | ●● | ●● | ●●●● | ●●● | ●●●● | For pentane blown refrigerators and dis-continuous panels to reduce surface voids formation, while still delivering excellent lambda value |
| L-6988 | ●●●● | ●● | ●●● | ●●● | ●●● | ●●● | Very fine cells with pentane and HFO/HC, increase froth shear stability thus reducing voids formation, good storage stability in acidic condition |
| L-6904 | ●●●● | ●● | ●●●● | ●●●● | ●●●● | ●●● | Strong emulsifier, fine cells with all blowing agents - continuous and discontinuous applications |
| L-6978 | ●●●● | ●● | ●●● | ●●● | ●●●● | ●●●● | For Cyclopentane/HFO co-blown appliances and discontinuous panels systems, it can provide very fine cells and low K factor and good foam surface |
| L-6889 | ●●● | ●●●● | ●●● | ●●●● | ●●●● | ●●● | Very high polyol-pentane solubility for excellent blend stability, good flow and void reduction |
| SR-321 | ●● | ●●●● | ●● | ●●●● | ●●● | ● | For HCFC but also HFC's and pentane co-blown with water, good flow and dimensional stability |
| L-6620 | ●●●● | ●● | ●●● | ●● | ●●● | ●●● | For HCFC but also HFC's and pentane co-blown with water, good flow and dimensional stability |
| L-6630 | ●● | ● | ●● | ●● | ●●●● | ●●● | Reduce foam voids formation in continuous and discontinuous application |
| L-6633 | ●●● | ●●● | ●●● | ●●● | ●●● | ●●● | Reduce foam voids formation in continuous and discontinuous application |
| L-6645 | ●● | ●● | ●● | ●● | ●●● | ●●●● | Excellent silicone properties offering a reduction in foam voids. |
| Y-16460 | ●● | ●● | ●● | ●● | ●●● | ●●●● | Premium grade silicone to reduce foam voids, contributing to outstanding surface quality in metal faced panels |
| L-6642 | ●●● | ●● | ●● | ●● | ●●●● | ●●● | Balanced stabilizer with good voids control and flow for both continuous and discontinuous process , suitable for all blowing agents included formic acid and HFOs |
| L-6100 | ●● | ●● | ●● | ●●● | ●●● | ●● | Can produce foams with good dimensional stability and improved fire properties, good liquid flow and leveling |

HFC = Hydro Fluoro Carbon, HCFC = Hydro Chloro Fluoro Carbon, HFO = Hydrofluoro Olefin, PIR = Polyisocyanurate, PUR = Polyurethane, Features: Strong = ●●●●, Moderate = ●●

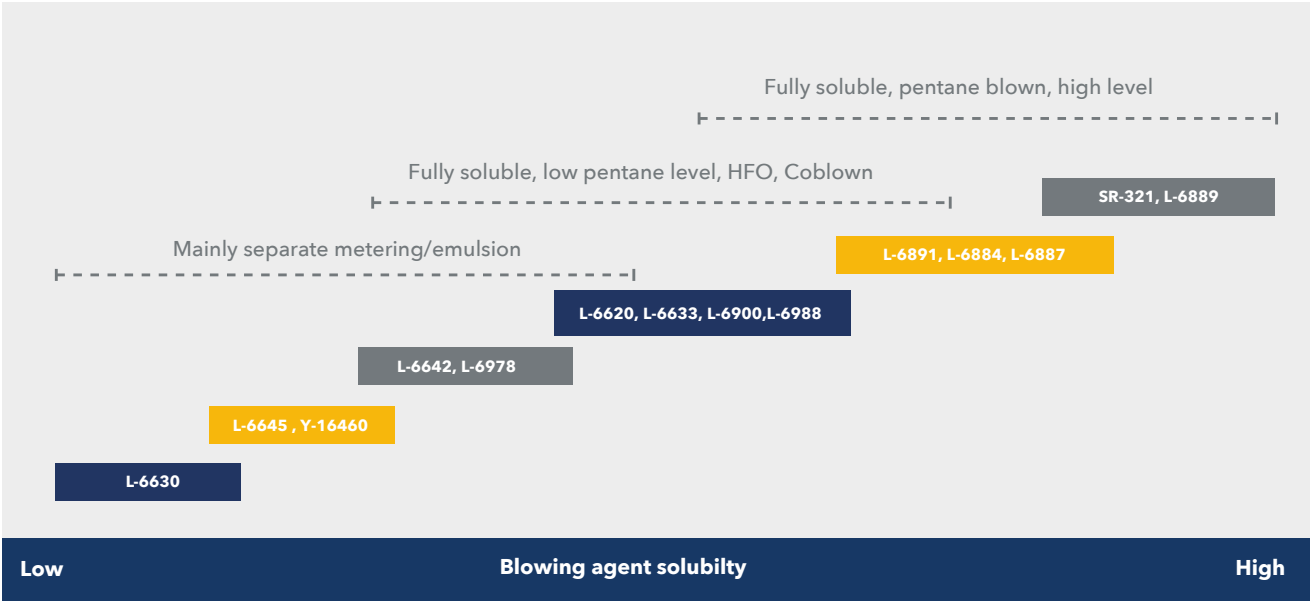


| Silicones | Fine Cells | Pentane solubility in Polyols | Blowing agents emulsification | Cell Stabilization | Foam Flow | Void Reduction | Product Description |
|------------------|------------|-------------------------------|-------------------------------|--------------------|-----------|----------------|--|
| L-6265 | ●● | ●●● | ●●● | ●●● | ●● | ●● | Can improve dimensional stability and FR for spray and panels application with various water/co-blown technologies |
| L-5111 | ●●●● | ● | ●●● | ● | ●●● | ●● | For boardstock fine cells with pentane blowing agents - for PIR/PUR boardstock lamination |
| L-5112 | ●●●● | ●● | ●●●● | ●● | ●●● | ●●● | For boardstock, offers improved mixing quality and emulsification of pentane up to high usage level. Typically improves foam quality and reduces laydown defects |
| L-5164 | ●●●● | ●● | ●●● | ●●● | ●●● | ●●● | For boardstock, strong nucleation and emulsification power, for n- and iso-pentane and less compatible raw materials |
| L-5158 | ●●● | ● | ●●● | ●● | ●●●● | ●●●● | For PIR boardstock, offers better processing and edge stability, can help reduce surface defects and emulsion viscosity |
| L-5466 | ●●●● | ●● | ●●● | ●●● | ●●● | ●●●● | For boardstock, strong nucleation and stabilization can reduce surface voids when using gas-tight facings, help compatibility with APP's |
| L-5345 | ●● | ●● | ●●●● | ● | ●●● | ●● | 1K/OCF foam, good emulsification also for structural foam, blocks and phenolic foams |
| L-5348 | ●● | ● | ●●● | ●● | ●●● | ●● | 1K/OCF foam, also manufactured without HFC, high froth volume, good compatibilization, excellent storage stability |
| L-5350 | ●●● | ● | ●●●● | ● | ●● | ●● | 1K/OCF foams. Multipurpose stabilizer mainly for straw foam applications |
| L-5351 | ●●● | ● | ●●●● | ● | ●●● | ●● | 1K/OCF foam - can improve foaming at low temperature and is manufactured without HFC |
| L-5360 | ●●● | ● | ●●●● | ● | ●● | ●●● | 1K/OCF foams. High yield in gun foams allowing high propellant levels to be used |
| L-5362 | ●●● | ● | ●●●● | ● | ●● | ●●● | 1K/OCF foams, good dimensional stability over a wide range of temperatures. PIR boardstock and blocks, fine cells and improved side compressions |
| Y-16371 | ●●●● | ● | ●●●● | ●●●● | ●●● | ●●●● | 1K/OCF, excellent performance in winter conditions and premium foams. Easy flow and low expansion rate |
| Y-16450 | ●●● | ● | ●●● | ●●●● | ●●●● | ●●● | 1K/OCF, improved dimensional stability at low density. Well balanced, easy flow and popcorn-like froth |
| L-5388 | ●●● | | ●●● | ●●● | ●● | ●●● | Excellent solution for low density foams like open cells spray, packaging and OCF. Wide compatibility with polyethers and polyesters, strong foam stabilization |
| L-6164 | ●● | | ●● | | ●● | | Cell-opener, cell-regulator - very efficient cell opener, OCF/1K and 2K systems |
| L-6186 L-6188 | ●● | | ●● | ● | ●● | | Open cells rigid foam - also efficient in overpacked conditions and high index - polyether and polyester based, density range 15-200 g/l |
| L-6189 | ●●●● | | ●●● | ●● | ●● | ●●● | Low density Open cells rigid foams, polyethers or polyesters based, mainly water blown, fine and regular cells structure, good polyol solubility |

NIAX RIGID FOAMS



Relative Scale of Niaux Silicone Contribution to Blowing Agent Solubility in Rigid Foam System Applications



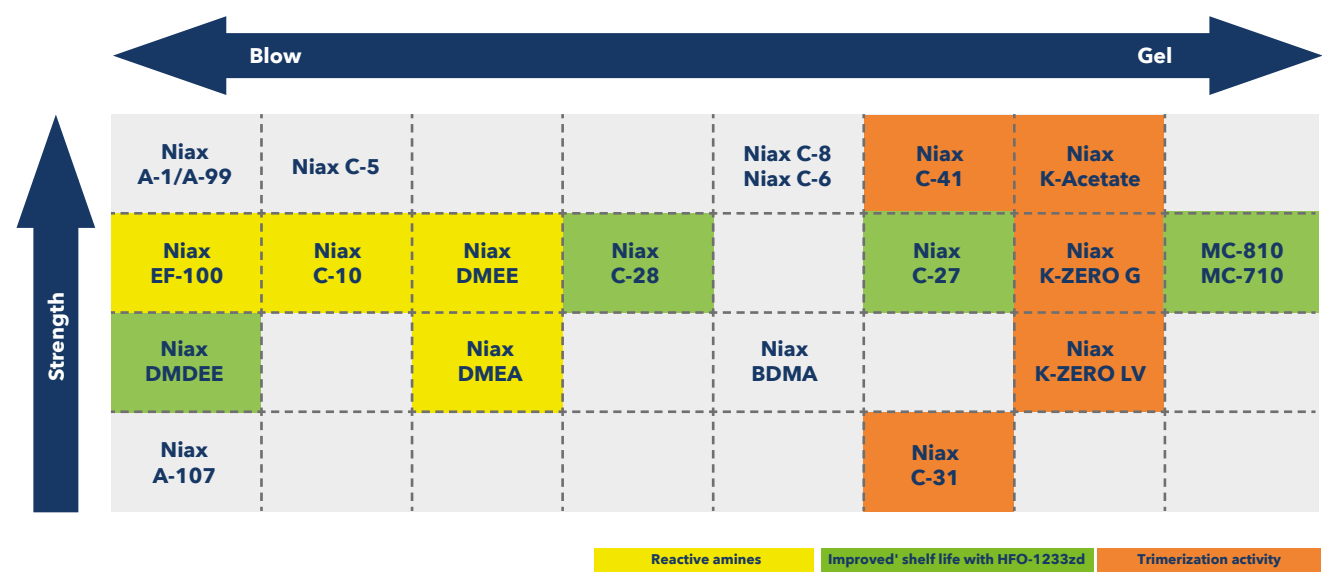


| Catalysts | PUR discontinuous | PUR continuous lamination and block | PIR continuous lamination and block | Water blown PUR | Packaging, open cells foam | Product Description |
|-----------------------|-------------------|-------------------------------------|-------------------------------------|-----------------|----------------------------|---|
| A-1 | ● | ● | ● | ● | ● | Very effective blowing catalyst, promote selectively water-NCO reactions, can improve foam flow and rate of expansion |
| C-5 | ● | ● | ● | | | General purpose blowing catalyst |
| EF-100 | ● | ● | ● | ● | ● | Reactive blow catalyst, excellent candidate for applications where low odor is a relevant feature |
| C-6 | | ● | ● | | | Efficient gel catalyst for a variety of PU application |
| C-8 | ● | ● | | ● | ● | General purpose PUR catalyst |
| C-10 | | ● | ● | ● | ● | Reactive amine catalyst, ideal for spray and open-cell applications. Blowing catalyst giving a smooth reaction profile, good candidate also in flexible moulded foams |
| PM-40 | | ● | ● | | | Blowing catalyst based on A-1, moderate odor and viscosity and may be used with direct metering |
| BDMA | ● | ● | | ● | ● | Dimethylbenzylamine, weak gel catalyst, can reduce surface friability and can improve foam adhesion in particular with mainly water-blown foams |
| DMEA | ● | ● | | | | Moderate odour, typically cost-effective, reactive catalyst |
| DME | ● | | | ● | ● | Moderate odour, typically cost-effective, reactive catalyst, more blowing efficiency compared to DMEA |
| DMDEE | ● | | | | ● | Moderate activity blow catalyst, excellent storage stability also in isocyanate and prepolymers, 1K/OCF foams |
| PM20 PLUS | | ● | ● | ● | ● | Blow-gel catalyst for direct in line metering in the continuous lamination of PUR or for PIR in combination with a potassium catalyst |
| C-27 | ● | ● | ● | ● | ● | Low odor catalyst offering improved shelf life for water co-blown systems |
| C-28 | ● | ● | ● | ● | ● | Balanced blow-gel catalyst, good shelf-life with HFO-1233zd |
| C-31 | ● | ● | ● | ● | | Delayed action catalyst for PIR and PUR, improve green strength and surface curing, reduce post expansion in thick panels |
| C-41 | ● | ● | ● | | | Strong gel catalyst promoting both PUR and PIR reaction, promote fast crosslinking, can reduce demould time and improve foam adhesion |
| A-107 | ● | | | ● | | Acid blocked delayed action blow catalyst |
| C-520 | | ● | ● | | | Formulated blowing catalyst for a safer and more accurate handling |
| C-520 Plus | | ● | ● | | | Formulated balanced blow-gel catalyst, for a safer and more accurate handling |
| MC-710/ MC-810 | | | | | ● | Bismuth based catalysts, exhibiting strong gel catalytic activity. |

HFC = Hydro Fluoro Carbon, HCFC = Hydro Chloro Fluoro Carbon, HFO = Hydrofluoro Olefin, PIR = Polyisocyanurate, PUR = Polyurethane, Features: Strong = ●●●●, Moderate = ●

| Niax Catalysts | Product Description | | | | | | |
|------------------------|---------------------|--------------------------|-------------------------------------|-------|-----------------|----------------------------|--|
| | PUR discontinuous | PIR discontinuous panels | PIR continuous lamination and block | Spray | Water blown PUR | Packaging, open cells foam | |
| Potassium Octoate LV | | | | | | | 15% K containing PIR catalyst for direct metering (2500 cPs), also good as general purpose curing catalyst in PUR |
| Potassium Octoate | | | | | | | 15% K containing PIR catalyst, also good as general purpose curing catalyst in PUR |
| K-ZERO G | | | | | | | 15% Potassium content, glycol free catalyst, reduce MDI use and improve isotropy in PIR |
| K-ZERO LV | | | | | | | Low viscosity (600 mPas) glycol-free Potassium octoate, to facilitate in-line metering and reduce MDI use |
| Potassium Acetate | | | | | | | 15% K containing PIR catalyst |
| Niax Special Additives | | | | | | | |
| RA-1 | | | | | | | Can speed up foam hardening and adhesion without influencing gel time, in particular for PIR foam made with aromatic polyester polyols |
| AP-01 | | | | | | | Adhesion promoter additives, can reduce surface friability in high water and/or high index formulations |
| FRP | | | | | | | Halogen free additives to help improve fire properties in both PUR or PIR foams |

Niax Catalysts for Rigid Foams Applications



NIAX
SPECIALTIES
APPLICATIONS

POLYURETHANE COATINGS,
ADHESIVES, SEALANTS AND
ELASTOMERS (CASE)



Niox Silicone and Modifiers

| Silicones | Microcellular (Polyether) | Microcellular (Polyester) | SRIM/Composite | Integral Skin Foam | PU Leather/Coatings | Mechanical Froth | Product Description |
|-----------|---------------------------|---------------------------|----------------|--------------------|---------------------|------------------|--|
| L-1500 | ● | | | | | | Standard surfactant for microcellular systems (PES) |
| L-1501 | ● | ● | | | | | Wide processing latitude with excellent open cells for low-medium density systems |
| L-1507 | ● | ● | | ● | | | For low-density polyester or polyether-based microcellular systems with excellent emulsification |
| L-1541 | | ● | ● | | | | For high-density polyester-based microcellular systems with thick skin and SRIM applications |
| L-1510 | ● | | ● | ● | | | General purpose surfactant for polyether shoe sole and rigid foam systems, low freezing point |
| L-5309J | ● | | ● | ● | | | Surfactant for I-skin with HFO or CP, medium-low stabilization, good open foam content |
| L-620 | ● | | | ● | | | Strong stabilizing surfactant for I-skin and high density microcellular applications |
| L-5302 | ● | | ● | ● | | | Medium stabilizing surfactant can be considered for use in integral skin and high-density polyether-based microcellular systems |
| L-1131 | | | | ● | | | Cell stabilizer for wet process PU leather, provides good deposition, increases thickness, speeds up DMF and water exchange |
| L-1160 | | | | ● | | | Linear reactive silicone, enhance anti-sticking property, good solubility in PU system. Improves leveling in coating application |
| L-1169 | | | | ● | | | Linear reactive silicone, enhance anti-sticking property, good leveling, and silky hand feeling |
| L-5614 | | | | ● | | | Industry-standard surfactant for the mechanically frothed foam process |
| L-5617 | | | | ● | | | Low VOC surfactant analog of L-5614, used in the mechanically frothed foam processes |
| L-5639 | | | | ● | | | A low VOC mechanical froth surfactant, non-hydrolysable, provides high closed cell content while reducing both froth density and shear induced cell collapse |
| L-5690 | | | | ● | | | Co-surfactant that enhances froth stability and reduce foam density when used with standard mechanical froth surfactants |
| L-5641 | | | | ● | | | Low VOC surfactant for increased closed cell content and decreased density (< 300 kg/m³) |

Niox Catalysts

| Catalysts | Microcellular/Shoe Sole | SRIM/Composite | Elastomers | Spray Elastomer | Integral Skin Foam | PU Leather/Coatings | Product Description | Urea Selectivity | Urethane Selectivity | Pot Life | Curing Speed | Hydrolytic Stability |
|-----------|-------------------------|----------------|------------|-----------------|--------------------|---------------------|--|------------------|----------------------|----------|--------------|----------------------|
| A-400 | ● | ● | | ● | | | Delayed-action, blowing-selective catalyst for open-mold pouring applications | ● | | 2 | 3 | 4 |
| A-440 | ● | ● | | ● | | | Delayed-action, blowing-selective amine catalyst developed for microcellular foams | ● | | 2 | 2 | 4 |
| A-533 | ● | ● | ● | ● | ● | ● | Industry-standard TEDA catalyst in (mono)ethylene glycol | ● | | 1 | 4 | 4 |
| A-525 | ● | ● | ● | ● | ● | ● | Industry-standard TEDA catalyst in BDO | ● | | 1 | 4 | 4 |
| A-534 | ● | ● | ● | ● | ● | | Delayed action, improve flow, demold and mechanical properties | ● | | 3 | 2 | 4 |
| A-535 | | ● | ● | | ● | | Delayed-action gel catalyst for microcellular/SRIM/PUL applications | ● | | 3 | 3 | 4 |
| A-537 | ● | ● | ● | | ● | | Delayed-action TEDA-based catalyst for open-mold pouring applications | ● | | 3 | 2 | 4 |
| A-575 | ● | ● | ● | | ● | | DBU based Temperature-activated, delayed-action, powerful, gelling-selective catalyst | ● | | 3 | 2 | 4 |
| A-577 | | ● | ● | | ● | | Delayed-action, powerful, gelling-selective catalyst | ● | | 3 | 2 | 4 |
| LC-5619 | | ● | ● | | ● | | Gel selective tin carboxylate catalyst for polyurethane production, transesterification catalyst | | | 1 | 4 | 2 |
| LC-5636 | | ● | ● | | ● | | Heat activated catalyst Sn/Hg/Ni free. | ● | | 3 | 2 | 2 |
| MC-710 | ● | ● | | ● | ● | ● | Enhanced reactivity and stability over MC-810 | ● | | 1 | 4 | 3 |
| MC-810 | ● | ● | | ● | ● | ● | Tin free metal based catalysts, strong gelling, can replace DBTDL | ● | | 1 | 3 | 2 |

4 = more ; 1 = less



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