

# Niax<sup>\*</sup> Silicone L-580

for use with CO<sub>2</sub> as auxiliary blowing agent

## Product Description

Niax silicone L-580 is a non-hydrolyzable silicone, designed to provide excellent foam stability and fine regular cell structure in extremely low density foams using liquid carbon dioxide as the blowing agent. In stretched formulations with high TDI, high water, high CO<sub>2</sub>, Niax silicone L-580 provides superior nucleating efficiency and dramatically reduces striations in the foam bun. It has full hydrolytic stability and can be used as a separate stream or in water/amine/silicone preblends. Niax silicone L-580 offers enhanced stability while yielding foams with good breathability.

## Key Features and Typical Benefits

- Silicone with medium efficiency
- Excellent foam stability plus good breathability in low-density formulations blown with liquid carbon dioxide
- Complete hydrolytic stability in water/amine/silicone preblends
- Works well on all commercially available CO<sub>2</sub> equipment (Cardio/Beamech/Novaflex)

## Typical Physical Properties

Form	Clear liquid
Viscosity at 25°C, cSt	600-1200
Specific Gravity, 20°C	1.02
Flash Point, Pensky-Martens Closed Cup <sup>(1)</sup> , °C	97

(1) ASTM Test Method D 93

Momentive Performance Materials provides versatile materials as the starting point for our creative approach to ideas that help enable new developments across hundreds of industrial and consumer applications. We are helping customers

solve product, process, and performance problems; our silanes, fluids, elastomers, sealants, resins, adhesives, urethane additives, and other specialty products are delivering innovation in everything from car engines to biomedical devices.

From helping to develop safer tires and keeping electronics cooler, to improving the feel of lipstick and ensuring the reliability of adhesives, our technologies and enabling solutions are at the frontline of innovation.



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### Formulation

The following formulation illustrates some typical foam results utilizing Niax silicone L-580 on Momentive Performance Materials CO<sub>2</sub> pilot scale machines.

#### General Screening Formulation

Component	php
Polyol (Varied)	100
CO <sub>2</sub>	3.5
Water	4.8
Niax Silicone L-580	1.4
Niax Catalyst A-1	0.08
Stannous Octoate	0.20
TDI, 80/20	Varied with polyol
TDI Index	110

### Discussion

#### Description of Momentive Performance Materials Pilot Scale Equipment

##### Beamech CO-2™

The Beamech CO-2 machine is about 1/7 scale. The machine has seven metered streams, including one for CO<sub>2</sub>. A typical run results in the manufacture of a bun that is approximately 7.5m long, 0.6m high and slightly less than one meter in width. In principle, long pours can be made with the equipment but space limits us to less than two minutes of actual pour time.

## Discussion (Continued)

### Description of Momentive Performance Materials Pilot Scale Equipment (continued)

#### Hennecke NovaFlex®

The Hennecke-Krauss-Maffei Novaflex machine has 7 metered streams, including one for CO<sub>2</sub>. The Novaflex head was specially designed for laboratory usage. A typical run results in the manufacture of a bun that is approximately 1.7m long, 0.45m wide and 0.4m high. The head pressure was maintained at about 15 bars during this evaluation.

#### Cannon CarDio®

The Cannon CarDio CO<sub>2</sub> head designed for lab scale evaluations is mounted on a Hennecke-Krauss-Maffei machine. The machine has 7 metered streams, including one for CO<sub>2</sub>. A typical run results in the manufacture of a bun that is approximately 1.7m long, 0.45m wide and 0.4m high. The head pressure was maintained at about 13 bars during this evaluation.

### Average Operating Parameters

Machine Parameter	CO-2	CarDio	NovaFlex
Polyol Temperature, °C	21	22	22
TDI Temperature, °C	20	22	22
Total Throughput, kg/min	15	15	15
Laydown Pressure, bar	17	13	15

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### Discussion (continued)

There was, of course, some variability of operating parameters during sample production, but, in most cases, differences were quite small. The exception to this was that a significant throughput difference was required with the Beamech equipment, with the two different polyols. The higher viscosity of the 3500MW polyol required that we increase the surface area of the sinter (which controls pressure at the lay-down) because pressure was higher than desired. This pressure is the key operating parameter for froth and cell structure control at any given CO<sub>2</sub> concentration. Since surface area can only be changed in discrete increments, the resulting pressure was too low at the same throughput used for the 3000MW polyol. Therefore, it was necessary to significantly increase total throughput to maintain pressure at the desired level. The throughput with 3000MW polyol averaged 11 kg/min, while it averaged almost 19 kg/min using the 3500MW material. For the Novaflex and Cardio equipments, throughput with 3000MW polyol was 14 kg/min and 16 kg/min for the 3500MW material.

### Results

All foams poured using Niax silicone L-580 on above CO<sub>2</sub> pilot scale equipments were of good quality. A fine and uniform cell structure with good density distribution was achieved with CO<sub>2</sub> Cardio and Novaflex technologies. In figures 1 and 2, Niax silicone L-580 was compared with a competitive product in a low density foam grade on a Novaflex full scale equipment. The cell structure, in this stretched formulation, was finer and more uniform than that of the competitive product.

Figure 1: Niax Silicone L-580 in Low Density Foam (1.0 pcf)

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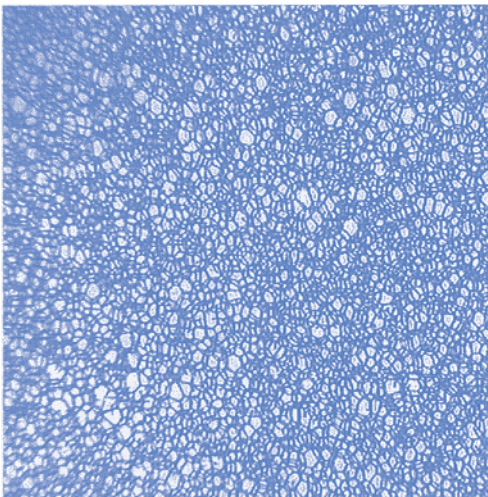
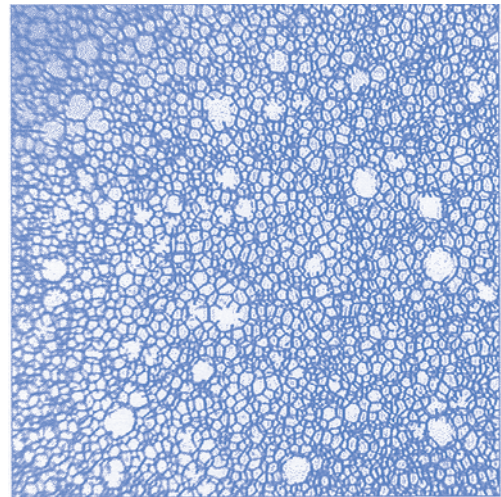


Figure 2: Competitive Product in Low Density Foam (1.0 pcf)

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### Patent Status

Nothing contained herein shall be construed to imply the nonexistence of any relevant patents or to constitute the permission, inducement or recommendation to practice any invention covered by any patent, without authority from the owner of the patent.

### Product Safety, Handling and Storage

Customers considering the use of this product should review the latest Material Safety Data Sheet and label for product safety information, handling instructions, personal protective equipment if necessary, and any special storage conditions required. Material Safety Data Sheets are available at [www.momentive.com](http://www.momentive.com) or, upon request, from any Momentive Performance Materials representative. Use of other materials in conjunction with Momentive Performance Materials products (for example, primers) may require additional precautions. Please review and follow the safety information provided by the manufacturer of such other materials.

### Limitations

Customers must evaluate Momentive Performance Materials products and make their own determination as to fitness of use in their particular applications.

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