Northstar Polymers (Div. of Tandem Products, Inc.)
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MPS-M23E

Room-Temperature Curable Microcellular Foam (Polyether/Polyester Hybrid)

This foam polyurethane formulation is designed to yield closed-cell microcellular foam by either hand-mixing or machine casting method at room temperature. The components are liquid at room temperature. It is designed to be used in a compression molding method to make a durable 23 pounds-per-cubic-foot density foam part. The surface hardness of the foam part is expected to be Shore Durometer 35A to 45A. For a small quantity, this can be batched manually with hand tools. This can also be cast with a multi-component meter-mixing/dispensing machine.

Component Properties

	Prepolymer (A)	Curing Agent (B)
Code Number:	MSA-018	PBD-029
Specific Gravity:	1.183	1.046
Equivalent Weight:	183	291
%NCO	23 %	n/a

Mixing Ratio

	(Part-A)	(Part-B)
Weight Ratio:	1.000	1.609
Volume Ratio:	1.000	1.852
Gear Ratio:	54	100

NCO Index: 1.000

*Mixing ratio can vary within 3-5 %. Higher ratio of part-B will make it slightly more flexible. Always calibrate your meter mixing equipment before use.

Processing Temperature:

Part-A	Ambient
Part-B	Ambient
Mold/Substrate	100 – 140 °F

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Cure Pattern:

Mixing time	30 seconds
Pot life (pour within)	75 minutes
Demolding time*	35 - 45 minutes with mold temperature 120 °F
Complete Cure Cycle:	2 days at room temperature

**Based on our lab test with 1-inch-thick sample.*

Standard Packaging: 5-gallon Plastic Pails and 55-gallon Steel Drums

Additional Processing Information

Compression Molding

Foam needs to fill the mold space by put a slightly larger amount of foam into the mold.
The expansion pressure of the foam sends the foam material to fill the mold. The mold, therefore, needs to be a closed mold, and it must have a capacity to retain the expansion pressure. The simplest mold will be just an open-top box with a lid. The lid then needs to be clamped to hold the pressure. The air trapped on the top side of the mold could make a large void if it is not released. For this purpose, you need to have a very small vent (hair vent) to let the trapped air escape from the mold.

The mold material can be metal, plastic, or elastomeric material. The mold surface needs to be slick as foam could stick to any porous surface. Metal molds tend to absorb the heat. The heat created from the chemical reaction is required for foam to cure. If mold is cold, this heat is absorbed, and the foam does not cure properly. The mold needs to be heated to 100 to 120 ºF in case of metal molds if metal mold. If your mold is plastic or elastomeric mold, this may not be necessary as those materials retain heat better than metal molds.

Compression rate indicates how much more component material is put into the mold.
The rate indicates the percentage of excess amount of material to the amount in which to fill the mold using the foam's free-rise density. Typically, about 10 % compression should give enough pressure to distribute the foam within the mold. Using a higher rate makes the foam denser and stronger.

Shrinking problem for closed-cell microcellular foams:

Polyurethane foam uses a chemical reaction within the components to create carbon dioxide as a source of foaming. Because the gas is hot when it is created, it contracts when the foam is cooled to room temperature. Closed-cell foam with flexibility can shrink together with this contracting gas as it cools. The compression molding method gives outward pressure to the gas in foam cells to compensate for this shrinking force.

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If your foam shrinkage is too much, try increasing the compression rate to compensate. (This does not apply to open-cell foams and rigid foams.)

Applications with fire-retardant grade

This foam is not fire-retardant grade foam, and it is not recommended for applications, which require or should be using fire-retardant grade materials. The applications such as automotive interior, building material, and components for some electronic parts often require fire-retardant grade materials and it may be regulated by laws. It is the user's responsibility to conform to the applicable regulations. We also do not recommend this foam to be used in the applications in which the foam can be exposed to high temperature or being near an ignition source.

By adding fire retardant additives, this foam may be modified to a fire-retardant grade foam. The user must test the foam modified with the fire-retardant additives for the fire-retardant property and the conformance to the applicable regulations. Contact Northstar Polymers for source information for fire retardant additives.

Storage/Handling Information for the Component Materials

Storage:

Part-A (Isocyanate Prepolymer) Component

Part-A component (prepolymer) contains isocyanate component, which is highly sensitive to moisture. If it is left in air, part-A will react with atmospheric moisture and will be ruined. This reaction is non-reversible. Soon after opening the container to dispense the content, dry nitrogen gas or argon gas needs to be injected to the container to purge and blanket the top space. Please consult Northstar Polymers for nitrogen gas set-up information.

For gravity feeding system from a 55-gallon, silica gel or calcium chloride desiccant filter(s) should be installed to the vent-hole of the drum. A valve to inject dry nitrogen gas can be installed instead.

Store the containers a dry indoor storage within the temperature range between 72 and 86 °F. Avoid direct sunlight.

Part-A component freezes just below room temperature. The material may be frozen when you receive. Part-A component must be thawed immediately. If the material is left frozen for an extended period, a side-reaction undergoes, and the material will be ruined. The material temperature needs to reach 140 ˚F to be thawed. Please consult the instructions provided by Northstar Polymers for details.

If a large amount of water mixes with a large amount of isocyanate base materials, the chemical reaction may produce a large amount of CO2 gas and heat to create a hazardous condition. Keep the storage area free of water.

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Part-B (Curative) Component

Part-B component is hygroscopic. If the material is exposed to ambient air, it absorbs moisture. Part-B component contaminated by moisture can become a source excessive bubbles in the product after mixed with part-A. Avoid exposure of the material to moisture in air.

Purging the empty space in the container with dry nitrogen gas, argon gas, or negative-40-degree-due-point dry air is also recommended to prevent moisture contamination of part-B as well. (However, simply keeping the material in an airtight container may also be sufficient depending on the moisture level of the work place.)

Store it in a dry indoor storage at a room temperature between 72 and 92 °F. Avoid direct sunlight.

Safety:

The component materials are industrial-grade chemicals. Please keep them in a secure place and prevent access from any unauthorized individual. The personnel who handle these materials need to read the Safety Data Sheet (SDS) for detail information on safety and handling of the material. The SDS for each component is sent with the shipment of the material.

When using this material, be sure to operate in a wide-open area with good air movement, or in a well-ventilated area. Wear rubber gloves, long sleeves, and protective eyeglasses to prevent skin/eye contact of the material. When your operation involves heating or spraying of the material, and if you expect the isocyanate content level in the work place atmosphere may become above the threshold regulated by OSHA or by other appropriate working place safety standard, we recommend, in addition to the above, installation of a proper hooded dynamic ventilation system and/or using an appropriate type of respirator (such as a full-face respirator equipped with OSHA approved HEPA filters for particulate and organic vapor) to prevent inhalation of the fume.

Direct contact of polyurethane raw materials to skin/eye, as well as ingestion may lead to health problems. No eating or smoking should be permitted at the working area. The operator should wash hands well with soap and water after handling the materials and follow the other procedures of the Standard Industrial Hygiene Practices. Please refer to the MSDS for each component for the detailed health information.

For any questions, please contact Northstar Polymers.

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