Northstar Polymers (Div. of Tandem Products, Inc.)
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MPP-F07A

7 Pound-Per-Cubic-Foot Density
Hand-Pourable Flexible Foam
Easy Process Flexible Foam

This foam formulation is designed to make molded flexible foam parts/sheets/dies/blocks by hand-mixing with very basic tools such as a cup and stir stick. The components are low-viscosity stable liquid at room temperature. These properties are ideal in small scale productions for custom foam applications such as custom seating, padding, cushioning, many others.

The free-rise density of the foam is 6 to 7 pounds per cubic foot. The cell structure is partially open-cell, and may be made to open-cell structure by physically crushing soon after foam is made. This is an MDI base water-blown polyether system, and it does not use auxiliary blowing agents

Examples for Applications:

- Molded Upholstery Parts
- Custom Seating, Padding, and Cushioning Parts
- Custom Packaging of Impact/Vibration-Sensitive Items
- Prototyping

Physical Properties of the Cured Foam

Property	**Typical Value**
Foam Density (Free Rise)	7.0 LBS/Cuft
Typical Compression Density	7.5 LBS/Cuft
Foam Consistency	Flexible
Apparent Surface Hardness	Shore OO 10 – 40
Foam Color	Off white*

*Note: The foam color is expected to turn to dark yellow from light, heat, and oxidation after exposure to ambient condition for a while.

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Component Properties (Typical Values)

	Prepolymer (Part-A)	Curing Agent (Part-B)
Code Number:	MPB-028	PPC-026
Specific Gravity:	1.108	1.024
Equivalent Weight:	290	268
%NCO	14.5 %	n/a
Viscosity (@72F)	450 cps	900 cps

Note: In the cold season, part-A component (MPB-028) may freeze during the shipping. If the material arrives frozen, it must be thawed immediately. To thaw MPB-028, the entire content needs to be heated to about 140 ˚F. After the material is thawed to homogeneously smooth liquid consistency, the container top space needs to be purged with nitrogen gas and kept in an air tight container to store. The storage temperature should be within the range of 72 to 90 ˚F. Part-B component (PPC-026) is not likely to freeze in normal weather condition in winter. Northstar Polymers is not refunding or replacing for the materials damaged by cold temperature or mishandling by the customer.

Mixing Ratio

	(A)	(B)
Starting Point Mixing Ratio		
Weight Ratio:	**100**	**100**

Mixing Ratio Range

Weight Ratio:	100	Min 93 – Max 110
Volume Ratio:	100	Min 100 - Max 117
Stoichiometry:	1.00	1.00 – 1.17
NCO Index	1.00	0.86 - 1.00

Note: Please test with 100: 100 = part-A: part-B ratio by weight. In general, higher part-B ratio makes softer foam. Higher part-B ratio will make foam surface stickier as well. If you start seeing a large void within the foam, you may need to increase the part-B ratio.

Processing Temperature:

Part-A	Room Temperature (70 – 85 ˚F)
Part-B	Room Temperature (70 – 85 ˚F)
Mold/Substrate	Room Temperature (70 – 85 ˚F)

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* Substrate can be at ambient temperature if it is made of plastic, resin, wood, or paper. When casting on metal or other heat-absorbing materials, the substrate may need to be heated to
100 – 140 ˚F range.

Cure Pattern:

Pot life (pour within)	60 - 80 seconds
Demolding time	1 to 2 hours
Complete Cure Cycle:	24 hours at room temperature

*NOTE: Cured foam contains some closed-cell structure. After the foam is cured, you must physically crush the cured foam to force the closed cell to open. Crushing can be done about 30 to 60 minutes after the resin component is poured into the mold. After the foam cells are opened, the foam will feel softer. If foam contains a large portion of closed cells, the cured foam may shrink badly.

Processing (manual hand-batch):

We recommend testing small amounts to see how the material behaves, then develop your processing method accordingly. In here, the descriptions are for the manual hand-mixing process. When you process/test, please be sure to operate in a well-ventilated area or large open area with a fan to move air; wear rubber gloves, long sleeves, and protective eyeglasses to avoid skin/eye contact. Read the Material Safety Data Sheet for the details on safety and handling of each component.

Amount of foam enters into the mold is important to mold your foam parts at the right density. Measure your in-mold volume in cubic inches. Divide it by 1728 to obtain the volume in cubic foot. Multiply by 7 to obtain the weight needed in the mold to get the 7 pounds per cubic foot density foam in pounds. Use the mixing ratio supplied in this document to batch the foam resin. The foam expands by approximately 9 to 10 times of the liquid volume.

About 1 to 2 hours after casting the foam resin, the foam should be solid enough to de-mold. At this point, foam is expected to have some closed-cell structure. This closed-cell foam may shrink badly after it cools down. In order to avoid the shrinkage, the foam should be crushed down physically to force the internal cell structure to be open-cell. At first, the foam feels like a balloon when you press. You would hear popping sounds as you crush the foam. You should crush all regions of the molded foam part so that the foam deflects equally throughout the part.

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Compression Molding

Foam needs to fill the mold space from its expansion pressure by putting a slightly larger amount of foam resin into the mold. The mold, therefore, needs to be a closed mold and has to have a capacity to retain the internal pressure. A simplest compression mold will be an open-top box with a lid. The lid needs to be clamped to hold the pressure.

The air trapped in the mold could make large voids if it is not vented. For this purpose, you need to have very small holes to let the trapped air escape from the mold. Determine the mold position so that trap air is pushed toward a corner or sections where the vent holes are. Small amounts of the foam may squeeze out from the vent holes, which you can machine off after the part is cured.

The mold material can be metal, plastic, or elastomeric material. Mold surface needs to be slick as foam could stick to any porous surface. Metal molds tend to absorb heat. The heat created from urethane reaction is required for foam to cure properly. If mold is cold, this heat is absorbed and the foam does not cure properly. The mold needs to be heat to 100 to 140 ºF range in case of using metal molds. If your mold is made of a plastic or elastomeric material, such as silicone rubber, epoxy, and urethane, this may not be necessary. Please test and determine the optimal temperature for your mold. Higher mold temperature increases the shrinkage rate. For tight shrinkage variation, controlling temperature parameters is very important.

The “compression rate” describes the additional amount of material you would put into the closed mold to create the internal pressure so that the foam fills the entire inside space of the mold. Typically, about 5 to10 % compression should give enough pressure to distribute the foam within the mold. Using higher rate makes the foam denser and stronger. However, it will increase the chance of closed-cell/shrinkage problem described below.

Other Information

Applications that requires fire-retardant property:

This foam is not fire-retardant 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 by law. It is the user's responsibility to conform to the applicable regulations. We also do not recommend this foam to be used to the applications in which the foam can be exposed to high temperature or being near an ignition source.

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By adding fire retardant additives, this foam may be modified to 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.

Storage:

Part-A component (prepolymer) contains isocyanate component, which is very much 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 a can and dispensing the content, nitrogen gas or argon gas needs to be injected to the can to blanket the material. Silica gel or calcium chloride desiccant filter should be installed to 55 gallon drum-vent for your drum feeding system. The storage temperature should be at a room temperature between 72 and 100 °F.

Part-B component is hygroscopic. If the material is exposed to ambient air, it may absorb moisture. Moisture contaminated part-B material may become source of degradation or excessive bubbles in the product. Avoid exposure of the material to air. Purging the empty space in the container with nitrogen gas or negative-40-degree-due-point dry air is also recommended to prevent moisture contamination of part-B as well. The storage temperature should be at a room temperature between 65 and 90 °F.

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 Material Safety Data Sheet (MSDS) for detail information on safety and handling of the material. The MSDS for each component is sent with the shipment of the material.

Whenever using this material, please 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, we recommend, in addition to the above, installation of a proper ventilation system and using a half-face respirator recommended for the use 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. Please refer to the MSDS for each component for the detailed health information.

For any questions, please contact Northstar Polymers.

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