



Tandem Products, Inc., DBA Northstar Polymers  
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## MCG-1

### OOO Scale Microcellular Gel Elastomer

MCG-1 is formulated for making extremely soft products. MCG-1 has unique structure for this class of material. The cured product will be slightly foamed and give a very soft touch, yet faster responding time than the other polyurethane gel of similar hardness range.

MCG-1 has its solid hardness range below Shore OO 1 hardness, or in Shore OOO scale range. (See below for the hardness data.) This allows a manufacturer to use the molded part at OOO scale without plastic film or coated fabric. Whereas typical polyurethane gel materials have solid range between Shore OO 10 to OO 40 hardness, and if the mixing ratio is modified to obtain a softer range product, the material starts to sag like thick liquid, MCG-1 can service even lower hardness range without being liquid.

Another property that is unique to this gel is that since it contains some bubbles inside, it has a property to contract down from the original volume when a deflection force is applied. Regular gel materials do not contract within the same space and need expansion space to deflect, thus typically they are not appropriate for upholstery application. MCG-1 contracts up to a certain point without needing expansion space, thus it can be used as upholstery and bedding applications conveying its softness.

The cured part can be directly covered with Spandex type fabric; this allows your part to directly convey the softness of the gel.

Suggested applications include:

- Cushioning and padding parts for sporting goods and medical devices
- Upholstery application
- Human-fat simulating products (for doll skins, external breast augmentation etc.)
- Shock absorbing products
- Seating products

This polyurethane gel material is formulated in such a way that the user can control/choose the hardness/deflection properties of the product. Following is reference for the hardness to the corresponding mixing ratio.

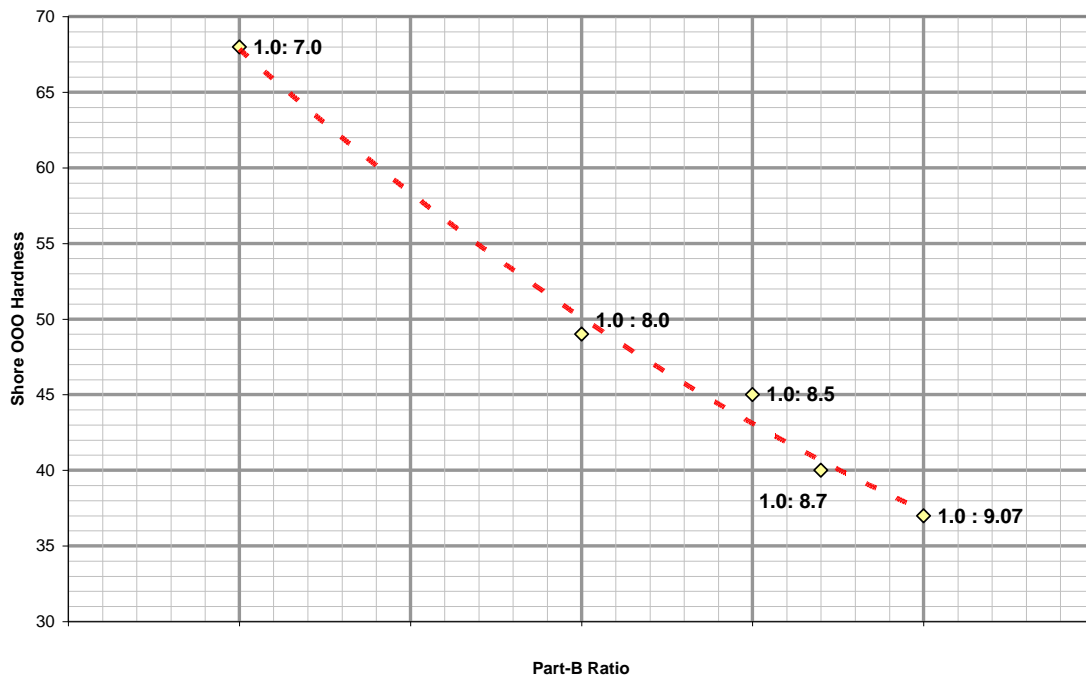
#### Components:

Part-A:	MPA-026
Part-B:	PAA-033

#### Mixing Ratio:

Hardness Range	Mixing Ratio
Shore OOO 37	A:B = 1:9.0 by weight
Shore OOO 40	A:B = 1:8.7 by weight
Shore OOO 45	A:B = 1:8.5 by weight
Shore OOO 49	A:B = 1:8.0 by weight
Shore OOO 68	A:B = 1:7.0 by weight

### MCG-1 Hardness Range



\*The above hardness data is typical values and may vary depending on the various processing conditions. Harder products have faster rebound time and deflection. The user must calibrate the mixing ratio to the desired yielding hardness for each application. The data is reference only.

The following is the processing parameters of 1:8.5 mixing ratio, ambient temperature for the component materials and the mold. Harder material has faster curing pattern in general.

Pot life:	2 to 2-1/2 minutes at ambient temperature
Demolding:	12 – 15 minutes at ambient temperature
Complete Cure:	24 hours at ambient temperature

#### Processing Temperatures:

Part-A	Ambient
Part-B	Ambient
Mold	72 to 110 °F
Post cure	Ambient

Part-A component is viscous at a room temperature. If your casting machine requires lower viscosity part-A component may be heated between 100 and 160 °F to lower the viscosity to help well-mixing of the components. Normally part-B viscosity is low enough for the casting process at room temperature.

Higher processing temperature may cause excessive shrinkage. Test the optimum mold temperature for each application and control the processing temperature parameters for a predictable shrinkage range.

Part-A component has a small amount of dark and viscous sediment. It is a highly cross-linked prepolymer compound produced during our production, and we cannot remove this within our normal procedure. This material is heavier than the main body of part-A. **Please agitate the part-A content** to homogeneously mix this segment before dispensing from the container each time. The blended material will look opaque lighter brown color. Your product will be much softer if you do not blend in this sediment. However, you can choose not to include this sediment, to make softer material. In this case, you should only use the part-A material above the sediment for your consistent product quality.

The cured surface of this product is sticky; so it is recommended the material is covered with soft fabric or flexible film material if the stickiness is an issue for the application. For temporary handling, you may use talc powder to prevent it from sticking to the handlers or equipment. In case of casting or molding, silicone release agent can be used.

Component Data:

Part-A

Product Code:	MPA-026
Description:	Isocyanate terminated prepolymer extended with polyether polyol
%NCO:	16.0% +, - 0.5%
Amine Equivalent	263
Specific Gravity:	1.136
Physical State at 25 °C ( 77 °F):	Liquid
Viscosity at 25 °C (77 °F):	6000 – 8000 cps
Storage:	Store in a dry indoor storage at room temperature. The material is highly sensitive to moisture. After using the content, immediately inject dry nitrogen gas or argon gas into the container to blanket the material then store. Heat will accelerate the subsequent reaction within the material and shorten the shelf life of the material. Do not store at an elevated temperature above 100 °F. Avoid direct sunlight.

Part-B

Product Code:	PAA-033
Description:	Curing agent based on a blend of polyether polyols and additives
Equivalent Weight:	514
Specific Gravity:	1.024
Physical State at 25 °C ( 77 °F):	Viscous Liquid with slight yellow tint
Viscosity at 25 °C (77 °F):	500 – 900 cps
Storage:	Store in a dry indoor storage at room temperature. The material is hygroscopic. For long term storage, inject dry nitrogen gas, argon gas, or -40° dew-point dry air into the container to blanket the material.

Handling Information:

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 the detail information on safety and handling of the component materials. The MSDS for each component is sent with the shipment of the component material.

When you are conducting a test, or producing your parts 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 that can emit isocyanate vapor or mist above OSHA threshold of 0.02 ppm, installation of a proper dynamic ventilation system to reduce the isocyanate concentration in air and/or using an approved half-face respirator for organic vapor as well as particulates. Full-faced respirators with positive-pressured air supply can also be used as a protection.

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. It is recommended that hand-washing and eye-bath facilities are established. Please refer to the Material Safety Data Sheet for each component for the detailed health information.

#### Storage:

Part-A component (prepolymer) contains isocyanate component, which is highly sensitive to moisture. If it is left in air, part-A component will react with atmospheric moisture and will be ruined. This reaction is non-reversible. Soon after opening a can and dispensing the content, dry nitrogen gas or argon gas needs to be injected to the container to blanket the material. Silica gel or calcium chloride desiccant filter should be installed to 55 gallon drum-vent for your drum dispensing system. The storage temperature should be at a room temperature between 72 and 96 °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 atmospheric air. For long term storage, 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. The storage temperature should be at a room temperature between 60 and 90 °F. Store the containers in a dry indoor space.

For any questions, please contact Tandem Products, Inc., DBA Northstar Polymers.

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