



Northstar Polymers (Div. of Tandem Products, Inc.)
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SAI-1

Low Viscosity, Variable Ratio Polyurethane Gel

SAI-1 is custom formulated polyurethane gel material to yield very soft elastomer gel material from low viscosity components at room temperature. This material is variable mixing ratio so that the user can change the properties of the product simply by changing the same combination of part-A and part-B liquid components. The material does not contain plasticizer so that it will not leach plasticizer to affect the other plastic material surrounding the gel part, or to cause a severe hardness change in long term use.

Possible application for this material includes potting and encapsulation of optical cables, manufacturing of puncture-free tire layer, cushioning and padding parts by open-cast molding, and many other custom applications. This material is not designed to be cast directly into flexible film casings. For such applications, we recommend our standard polyurethane gel formula MPP-V37A.

Material Information:

System Code:	SAI-1 (Custom Formula)
Part-A:	MPC-022
Part-B:	PAA-109

Processing Temperature:	Ambient (> 70°F)
Mixing Ratio:	Variable

Curing Pattern:

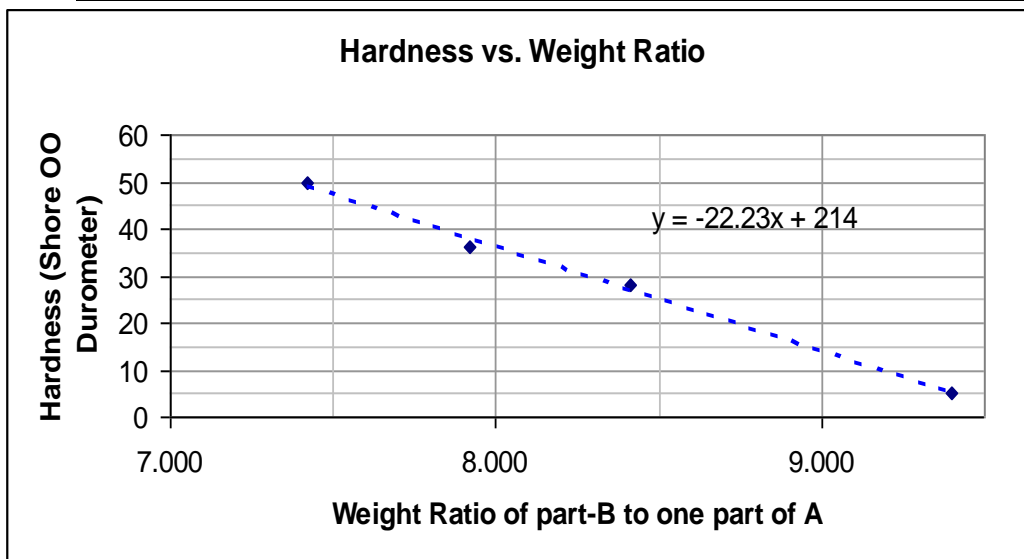
Pot Life:	11 – 12 minutes
Demolding Time:	1 to 3 hours at room temperature (Demolding time will be shorter if a heated mold is used.)
Complete Cure Cycle:	3 to 4 days at room temperature.

*Curing pattern can be shortened by use of heat or addition of catalyst.



Hardness vs. Mixing Ratio Correlation

Stoichiometry Ratio		Weight Ratio		Volume Ratio		Hardness Shore OO (At 72 °F)
NCO	OH	Part-A	Part-B	Part-A	Part-B	
1.00	1.50	1.000	7.422	1.000	8.268	48 – 53
1.00	1.60	1.000	7.917	1.000	8.819	35- 40
1.00	1.70	1.000	8.412	1.000	9.370	28 – 33
1.00	1.90	1.000	9.402	1.000	10.472	3 – 6
1.00	2.10	1.000	10.391	1.000	11.575	< 0.1



Note: The hardness is dictated by the stoichiometry ratios between NCO and OH mole numbers. However, in practice, you can use weight ratio or volume ratio for the guidance. Please contact Northstar Polymers for more precise method of hardness control. The above is the result of our lab test, and it is reference only.





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Typical Values of the Component Materials:

Typical Properties of Part-A Component

Product Code:	MPC-022
Description:	Isocyanate terminated prepolymer extended with polyether polyol
%NCO:	19.0% (+/- 0.5%)
Amine Equivalent	221
Specific Gravity:	1.141
Appearance at 25 °C (77 °F):	Clear amber colored liquid
Viscosity at 25 °C (77 °F):	800 – 1000 cps
Storage:	Store in an airtight container in dry indoor storage room at room temperature range between 72 °F and 100 °F. The ideal storage temperature is 90 °F. 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. Avoid high temperature above 120 °F and direct sun light.

Typical Properties of Part-B Component

Product Code:	PAA-109
Description:	Curing agent based on a blend of polyols and additives
OH number:	51.3
Equivalent Weight:	1094
Specific Gravity:	1.024
Physical State at 25 °C (77 °F):	Clear with slight yellow tint; Liquid
Viscosity at 77 °F:	800 – 1100 cps
Storage:	Store in a dry indoor storage at room temperature in an airtight container. 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.

Standard Packaging Sizes:

- 5-gallon plastic pails (40 pounds net each)
- 55-gallon steel drums (450 pounds net each)

Other Handling Information

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





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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.

The material has been tested for the stability at 32 °F for a few days. However, when the outdoor temperature is below 32 °F during transportation, there is a chance of freezing. The frozen material must be immediately thawed to avoid permanent damage from freezing. If the material color is opaque with the consistency of thick liquid, gel, waxy, or solid, the material requires immediate thawing. The container should be put into an industrial oven at 180 °F until the material temperature is 140 °F or the color of the material is clear with smooth liquid consistency. Storing frozen material more than a few days will cause a permanent damage to the material, and it will not be returnable or refundable.

Store the containers a dry indoor storage within the temperature range between 72 and 96 °F. Avoid direct sunlight.

Under a certain combination of heat, catalyst (basic chemicals), amounts of reactive materials, and some other favorable conditions for the reaction, the water (or alcohol/glycol/amine) to isocyanate reaction can reach a dangerous state of accelerated reaction. The accelerated reaction may create a very high temperature condition. The thermal decomposition of isocyanate based material by extremely high temperature or fire can produce toxic gasses and smokes. Please be sure that the containers are stored in dry indoor storage, away from source of large amount of water.

If a leak is found in a drum, please place the drum in such a position that the leaking part is at the highest part of drum so that the content no longer leaks out. Cover the leaking area with dry towel to prevent air from entering. If possible, transfer the material into new container(s) with nitrogen purge. If moisture enters into an isocyanate container from a small leakage, CO₂ gas may be produced to gradually pressurize the container. If pressure built up is suspected, open the bung (or cap) very slowly to release the pressure before you change the drum position.

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 96 °F. Avoid direct sunlight.

Note: Moisture contamination of part-B material can be reversed by heating material to 180 °F and vacuuming it at about 29" Hg or above negative pressure for 20 to 40 minutes.





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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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