



Northstar Polymers (Div. of Tandem Products, Inc.)
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MPP-A25E

(Soft Polymer for Concrete Mold Making, Gaskets, Grip Parts)

Technical Data Sheet

MPP-A25E is room temperature curable polyurethane casting resin system formulated to meet typical requirements for concrete mold making application. The mixing ratio is set to be 1:2 by volume for simple manual metering. Relatively, low viscosity values of the component materials help copying the fine mold surface resolution. The long pot-life and gradual curing pattern gives more working-time/ open-time for a manual mixing/casting operation.

Its soft/rubbery consistency and high elongation value help demolding concrete parts with deep-cuts and under-cuts. Its good tensile strength and tear strength help the longevity of the molds made of this material.

The cured material is hydrophobic. This helps the longevity of concrete molds made from this material. Also, this set of properties makes this material a good candidate for the raw materials to make gaskets, grip parts for tools, and many other custom applications.

Designations

System Name: MPP-A25E
Part-A Component: MPE-046 (Prepolymer)
Part-B Component: PPE-089 (Curative)

Mixing Ratio

100: 200 = Part-A: Part-B by Volume
(100: 191 by Weight)

Processing Temperature

Part-A: Ambient (72 – 82 °F)
Part-B: Ambient (72 – 82 °F)
Mold: 72 – 100 °F



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Curing Pattern:

Pot-Life: 15 – 18 minutes at room temperature
 Demolding Time: 6 to 8 hours at ambient room temperature
 The material continues to cure and hardens at room temperature for the next 3 to 5 days to reach the final physical properties.

The curing patterns are tested at ½” thick sample in resin mold (polyurethane mold) at 77 °F. Thinner segments may take longer to cure. Lower mold temperature can cause the material to cure slowly or not cure properly. Auxiliary heating may be required if thin parts are not curing properly.

Physical Properties (Typical Values Based on Lab Tests)

Hardness (Shore Durometer)	25 – 30 A
Tensile Strength	389 psi
Elongation	995 %
Die-C Tear Strength	90 pli
Split Tear Strength	27 pli
Bashore Rebound	51 %
Mixed Density (Theoretical)	1.040 grams/cm ³
Mixed Viscosity	1650 cps at 77 °F

Component Properties (Typical Values)

	<u>Prepolymer (Part-A)</u>	<u>Curing Agent (Part-B)</u>
Code Number:	MPE-046	PPE-089
Specific Gravity:	1.072	1.024
Equivalent Weight:	457	888
%NCO	9.2 %	n/a
Viscosity (@72F)	2000 cps	1000 cps

Low Temperature Sensitivity of Part-A Component

Part-A component (MPE-046) is cold-temperature sensitive. If it is kept in a cold place for a long time, crystal is formed and depletes the functional chemical within part-A. Especially, if the material is frozen, the crystal formation rate is very fast. In the coldest part of winter, it may freeze during the transportation. If it is frozen, it must be thawed quickly by heating the material to 140 – 160 °F. MPE-

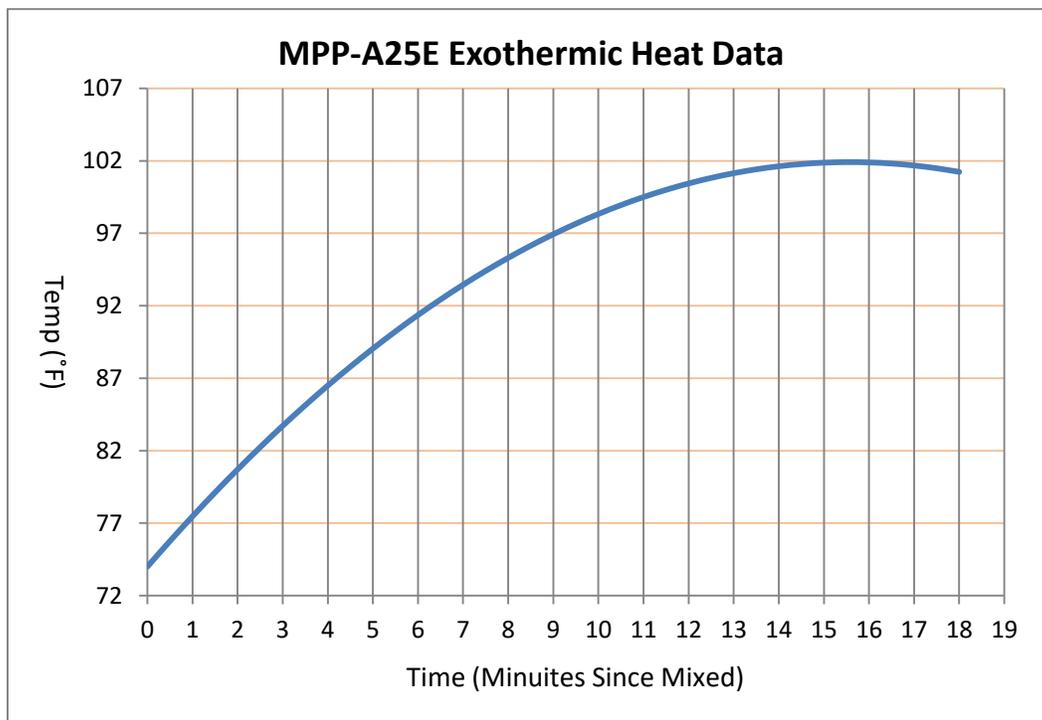
046 should be stored in a warm place in the temperature range 72 – 100 °F. The shelf life of these component materials are 6 months.

Brief Safety Outline

When you are handling these component materials, please operate in a wide area with good air circulation or well-ventilated area. Please wear rubber gloves, long sleeves, and protective eyewear (paint goggle etc.) to avoid skin/eye contact of the materials. Please read the Safety Data Sheets for the details on safety, handling, storage, and processing information.

Low Shrinkage Formula

When producing resin molds, shrinkage of resin is a critical aspect. The temperature, at which material turns to solid, plays the most important role. When a typical resin material is hot, it takes larger volume than when it is cooler. So if resin cures at a higher temperature, it shrinks more when it cools down. Polyurethane resins cures with exothermic heat, which means heat created from the chemical reaction. This formula is specially design to minimize shrinkage by making the chemical reactions taking place more gradually. The chart below shows the temperature increase between the time part-A and part-B are mixed and the material is too thick to pour.





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Standard Packaging Sizes:

5-gallon pails (40 LBS per pail)
55-gallon drums (450 LBS per drum)

Pail Kit (21 LBS of part-A in 1 pail and 40 LBS of part-B in 1 pail; 61 LBS total in 2 pails)
Drum Kit (236 LBS of part-A in 1 drum and 450 LBS of part-B in 1 drum; 686 LBS total in 2 drums)

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 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 77 and 100 °F. The ideal storage temperature is 90 °F. Avoid direct sunlight.

The prepolymer used for this formulation contains different isocyanate isomers with different freezing points. When the product is shipped in cold season, the isocyanate isomers and extended prepolymer may separate into layers in the container. During the cold season, the container must be heated to about 150 °F and agitated to ensure homogeneous blend before use. The material should stay as viscous liquid at room temperature. To avoid separation during the storage, store it in between 77 °F and 90 °F storage temperature range.

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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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-dew-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 65 and 90 °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.

Part-B material contains chemical constituents that can separate during the storage. Agitation of the part-B content before dispensing may be required if stored for a long time. Separation can be seen in a higher degree when the material is stored in cold temperature. You may need to heat to re-blend the separated material in some cases. Please consult Northstar Polymers when separation is suspected.

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





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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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