Technical Data Sheet

TFG-5

Low Viscosity, Variable Ratio Polyurethane for Flexible Resin Filling Applications

TFG-5 is variable hardness polyurethane casting resin formula with a long pot life. The hardness of the cured resin can be made into a range of Shore Durometer 5A to 50A by simply changing the mixing ratios of the same part-A/part-B combination. This will provide a convenience in applications to fill larger volume at a certain hardness range.

Possible application for this material includes filling tires for low speed vehicles such as the tires for wheel barrows, snow blowers, lawn mowers, and other slow moving equipment. This also can be used as re-enterable potting compound for various applications. The cured material is easy to cut/tear to remove with hand tools.

This material is not appropriate for tire filling application for high-speed vehicles. The material always needs to be tested for the intended applications to ensure the fitness of the material. Northstar Polymers is a resin supplier and does not supply machines/tools to fill tires or any other equipment.

Processing Information

System Code:	TFG-5
Part-A:	MPC-022
Part-B:	CPX-050-5
Processing Temperature:	Room Temperature (70 °F – 80 °F)
Mixing Ratio:	Variable (Please see the below chart)

Curing Pattern:

Pot-Life:	30 – 40 minutes
Demolding Time:	6 – 10 hours at room temperature
(Demolding time will be shorter if a heated mold is used.)	
Complete Cure Cycle:	3 to 5 days at room temperature.

Mixing Ratio versus Hardness / Rebound Correlation

Mix Ratio By Weight		Mix Ratio By Volume		Hardness*	Rebound
Part-A	Part-B	Part-A	Part-B	Shore A	Bashore %
100:	240	100:	280	50	32
100:	260	100:	303	42	34
100:	280	100:	326	33	32
100:	300	100:	350	23	28
100:	320	100:	373	12	23
100:	340	100:	396	5	15

*The hardness data is of samples cured after degassing. The hardness of the cured material with bubbles will be softer. The foamy segment within a part, which is made without degassing, is expected to measure about 5 degrees lower in Durometer than the above data values. This data is reference only. The hardness made at a certain mixing ratio may vary depending on the processing conditions.

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 77 ˚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. Note: In cold seasons, the material may freeze during the shipping. It may need to be thawed immediately after receipt to avoid damaging the material from crystallization.

Typical Properties of Part-B Component

Product Code:	CPX-050-5
Description:	Curing agent based on a blend of polyols and additives
Equivalent Weight:	504
Specific Gravity:	0.989
Physical State at 25 °C (77 °F):	Clear with slight yellow tint; Liquid
Viscosity at 77 °F:	500 - 650 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° due-point dry air into the container to blanket the material.

Basic Processing Information:

When you use these raw component chemical materials, please be sure to operate in a well-ventilated area, wear rubber gloves, long sleeves, and protective eyewear to avoid skin/eye contact of the materials. Please refer to the Safety Data Sheet (SDS) for the details on safety and handling.

The temperature of the raw material components must be within the range of 70 ˚F to 86 ˚F (20 ˚C to 30 ˚C). The part-B component (CPX-050-5) has constituents that may separate into layers in the container. Please stir the content gently with a steel or plastic spatula before dispensing out of the container each time.

Digital Scale with Tare Function

Put a mixing container on a scale. Using a digital scale with tare function is recommended. The mixing container should be a clean/dry disposable round container with a smooth flat bottom. Plastic pails, tin paint cans, and plastic cups are some of the recommended containers.

Pour the proper amount of part-A component material first as you weigh it. Allow enough head space if you are degassing in a vacuum chamber.

Calculate the part-B amount according to the recommended mixing ratio and pour the correct amount of part-B on the top of part-A in the mixing container.

Start a clock to measure time as you start agitating the part-A/B components. The time marks for curing pattern data herein are based on this clock starting at the beginning of agitation of part-A/B blend.

Use a stainless steel spatula or hand-held power mixer to agitate. A paint mixer blade or mortar mixer blade (such as Jiffy Mixers) attached to a power drill is recommended for the mixing a larger amount. Scrape the side and bottom of the mixing container with a spatula as you agitate with a power mixer to ensure homogeneous mix.


Jiffy mixers

Put the container of the blended components into a vacuum chamber for degassing if needed. The vacuum gage should be about 29” Hg or above to degas quickly. Degas until all bubbles are popped from the surface. Degassing should be done within about 10 minutes after the beginning of the agitation, or before the material is too thick to degas. Degassing is optional. Without degassing, your part will have some bubbles.

Apply mold release agent on the mold surface if needed.

Pour the blended material into the mold, frame, or other casing. The pot life of this material is over 30 minutes. However, the material viscosity increases gradually. Try to pour/inject early while the material viscosity is still low to avoid air-traps, bubbles, and to get a better resolution from the mold surface.

Stainless Steel Spatula

If the mold is made of resins, plastics, or other non-heat-absorbing materials, the mold can be used at room temperature. If the mold is metal or other heat-absorbing materials, you may need to heat the mold to ensure curing.

The material creates heat while curing. This heat energy is required for the chemical reaction to cure properly. If the mold is made of a heat-absorbing material, a cold mold absorbs the heat energy necessary for curing. The material, especially at thin parts, may not cure properly. In such a case, pre-heat the mold to the 110 ˚F – 180 ˚F (43 ˚C – 82 ˚C) range. The heat from chemical reaction varies depending on the temperature conditions and heat properties of the mold/substrate as well as the batch size. Test with various mold temperatures to find the optimum for your molding operation.

The material cures to solid at room temperature in hours. Check the strength of the material before demolding to avoid damaging your parts. Heat will accelerate the curing rate. The molded part will take another 3 to 5 days at room temperature to reach the final hardness.

Packaging Sizes:

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

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 not 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.

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 90 °F. Avoid direct sunlight.

If a large amount of water mixes with a large amount of isocyanate based 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. 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 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 for the system. 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 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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