



CASTABLE POLYURETHANE SERIES APPLICATION GUIDE



Processing 100% solid Castable Polyurethane requires heating of the resin part A to decrease viscosity for proper mixing and adequate material flow for casting molds or self-leveling applications. Refer to product TDS as processing temperature may differ between products, application methods, and desired finish. Recoat time without additional surface preparation is under 2 hours at 23°C (73°F).

Normac Adhesive Products Inc.

1350 Heine Court, Burlington ON
Canada L7L 6M4
Tel. 1.905.332.6455
info@normacadhesives.com

CASTABLE POLYURETHANE SERIES

PROCESSING EQUIPMENT

- Warming appliance
- Plastic or metal mixing containers
- Spatula, power drill, jiffy mixer
- Mold and release fluid
- Metric weight scale
- Flame torch, heat gun
- Brush, roller, tray

Polyurethane Conditioning: It is critical to understand that at no time during heating should the prepolymer (part A) be heated above 88°C (190°F). Excessive heating will reduce material quality quickly, lowering physical properties. Please monitor and record temperatures and times when heating to assure quality.

- Warming methods: microwave, electrical band heater, industrial oven
- Refer to individual product TDS for processing temperatures
- Part A - No mixing is required
- Part B – Power mix or shake thoroughly to achieve a homogenous mixture
- If resin (Pt A) is highly viscous and has a “frozen” like appearance, slowly warm back to processing temperature. This “unfreezing” can take up to one day at 50°C depending on volume
- For more information see *“Heat History during Pre-heating and Processing Polyurethanes”* data sheet

Pot life / Working Time: Under 30 minutes at 23°C (73°F) at 50% relative humidity. Pot life correlates with temperature, humidity, and mass. The higher the temperature, the larger the mass, the shorter the pot life. Typically, softer durometers will have a longer pot life.

Kit sizes and Packaging: Products are packaged at the proper mix ratio. Splitting pre-packaged kits is possible when done accurately. The use of a weigh scale measuring in one-gram increments will provide the required accuracy.

Application Conditions: Ambient and surface temperature should be similar and between 10°C to 45°C (50°F to 113°F). Warming surfaces and surrounding air is a good option when working in colder temperatures. Relative humidity should be below 85% and dew point is maintained 3°C (5°F) above substrate temperature for the duration of the application. Higher temperatures will speed cure times. It is possible to spray at lower temperatures when dewpoint and humidity levels are safe, expect cure times of all products to lengthen. Always protect the surface from contaminants and direct sunlight.

Mold Preparation: Ensure the mold is clean and free from contaminants. Apply a thin layer of mold release fluid to the mold surface to help with the removal of the finished part. Mold temperature should be minimum 23°C (73°F) or up to the same as mixed polyurethane.

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Calculations are based on total weight required and are expressed as a ratio of part A&B. We recommend adding 5% to the total weight required to account for product waste until we learn otherwise. Mixed density can be found in the product TDS (Technical Data Sheet).

NC-60	NC-80	NC-80AS	NC-90	NC-60D
100A: 15B	100A: 12B	100A: 20B	100A: 30B	100A: 40B

Mixing: Once proper temperature for resin part A has been established, mix A&B parts together in a suitable sized plastic or metal container for approximately 1 to 2 minutes until a uniform appearance without material streaks has occurred. Whether using manual or power mixing methods, scraping of sides and bottom using a spatula is the best way to ensure uniform mixing and should be done multiple times during this process. Avoid air-entrapment during power mixing by keeping the vortex to a minimum. After mixing is complete, pour all mixed contents into a second clean container without scraping the sides or bottom. This two-container method assures any unmixed material from the sides or bottom are not used.

Degassing: If required, degassing can be done after mixing by use of vacuum pump and chamber to remove entrapped air. Degassing vacuum pump and chamber requirements are minimum 8 CFM or 13.6 cubic meters/hr and pulling 29 inches of mercury.

Pouring: For best results, pour mixture from a single location allowing even material distribution throughout the mold or while self-leveling. This method will minimize air entrapment and imperfections.

Finishing: After the material has been poured out, allow material to settle or self-level. You may use a spatula to spread material out to speed up this process. Once the material is in position, quickly pass an open flame over the surface to break rising bubbles caused by entrapped air from within the material. These bubbles may continue to appear for up to 10 minutes. Do not burn or scorch the polyurethane surface during the flaming process as it may cause adverse effects.

Demasking: After approx 4 hours of curing is called “the green stage”. At this stage demasking and final trimming take place as the material has not reached final cross-linking and therefore can be trimmed with minimal force. As curing progresses, demasking and trimming will become difficult.

Ultimate Cure Time: This is a room temperature curing product. Ultimate cure time depends on ambient temperature. While post heating is not necessary, heating to a maximum of 60°C (140°F) for 24 hours will speed up ultimate cure times. 80% material cure can be realized after 24 hours at room temperature 23°C (73°F) and the final 20% will take 5 days. The time vs ambient temperature chart below should be used as a general guide to reach 80% cure.

4 hours	8 hours	12 hours	16 hours
180°F	150°F	120°F	100°F

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SAFETY / PPE

- Read and understand the SDS for each product used
- Use respirators including organic vapor cartridges and pre-filters
- Full face mask or respirator with disposable lens covers are recommended
- Supplied air system when working in a confined space environment
- Disposable gloves, coveralls, and footwear are recommended

STORAGE / SHELF-LIFE

- Keep all materials in a cool dry place out of direct sunlight
- Storage temperature range of 15°C to 30°C (60°F to 86°F)
- Pay attention to shelf life of 2+ years and rotate stock
- Only open containers as they are required
- Use clean dry vessels when transferring materials
- Remove atmospheric moisture with dry nitrogen before resealing resin part A

SURFACE PREPARATION WHEN BONDING TO METAL

GENERAL

All substrates must be clean and dry with no oil, grease, or loose debris. NORMAC Polyurethane products use primers to successfully adhere to both porous and non-porous substrates. Individual adhesion tests should be performed to confirm adequate adhesion strength prior to use.

METAL

Metal substrates must be dry, clean, and sound. Remove all dirt, dust, grease, oils, detritus, and all other contaminants. Radius all sharp edges to minimum 3 mm (.120”), grind uneven seam lines, and remove weld splatter. Previously used metal should be checked for contamination that may require additional cleaning. Abrasive grit-blasting to SSPC-SPI0 near white including a minimum depth profile of 2 microns (.002”) is recommended for maximum adhesion strength. Other forms of mechanical roughening to clean and profile are possible such as grinding but expect lower adhesion strength. All metals require NP-9500 to achieve maximum adhesion strength. NP-9600 is used in conjunction with NP-9500 for immersion service only. Specialty and some hardened metals will require adhesion testing to ensure acceptable results.

Salt Contaminated Surfaces/Efflorescence: Metal surfaces that have been immersed for any time in salt solutions should first be grit-blasted to remove existing coating. For best results, power wash with hot water using minimum 120°C (248°F) to flush capillary residue. Quickly force dry completely using open propane torch flame to evaporate dissolved salts. Repeat steps until salt contamination has reached a maximum of 15 mg/sqm. Finish by grit-blasting to specification.

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ELASTOMERS

Elastomer substrates include cured Rubber, Polyurethane, Polyurea, and PVC belting. Surface must be dry, clean, and sound. Remove all dirt, dust, grease, oils, detritus, and contaminants by solvent clean and choose the appropriate method for mechanical roughening to achieve desired adhesion strength. De-glossing using abrasive blast cleaning and or power tool cleaning, to achieve a minimum depth profile of 25 micron (.001"). Grinding or sanding using slow speed rotation (under 2000 rpm) by heavy wire wheel, or 24 to 50 grit aluminum oxide disks can achieve results. Elastomers require either NP-8400 or NP-9500 primer to ensure maximum adhesion strength.

CONCRETE

Concrete surfaces are plane, and must be clean, sound, and dry. For best results, uneven profiled and blow-holed surface imperfections should be repaired and allowed to cure to a smooth level surface prior to mechanical roughening. Grit-blasting and grinding are best to achieve a minimum depth profile of 50 microns (.002"). Remove any dust, laitance, grease, oil, dirt, detritus, and all other contaminants from the concrete. New concrete must be cured for a minimum of 28 days with less than 15% moisture content. The compressive strength of the concrete substrate should be at least 20 MPa (3000 psi) at the time of application. Concrete requires NP-100 primer to ensure adequate adhesion strength and to stop outgassing. NP-100 can be mixed with aggregate to make high strength repair mortars.

OTHER SUBSTRATES

These substrates include Carbon Fiber, Fiberglass, and Wood. Surface must be dry, clean, and sound. Remove all dirt, dust, grease, oils, detritus, and contaminants by solvent clean and choose the appropriate method for mechanical roughening for desired adhesion strength. De-glossing using abrasive blast cleaning and or power tool cleaning, to achieve a minimum depth profile of 25 micron (.001"). Use NP-9500 primer to ensure maximum adhesion strength. Wood is porous and may not require primer.

Note: Cured product results will vary as each application has specific service condition variables. NORMAC cannot accept responsibility for determining the suitability of an existing coating as a substrate for our products. The Owner or their Representative shall perform adhesion tests on any existing substrate to determine suitability.

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METAL PRIMER APPLICATION

NP-9500 PRIMER

- Two coats of NP-9500 are required for all metal applications; 30 minutes between coats.
- PU top-coat window is 6 hours. If you find yourself outside the window, simply re-prime.
- The 2nd coat of primer can be applied at a maximum of 5 days after the 1st coat.
- A two-part system, mixed ratio of 3A to 1B by weight only. Shake both parts well before use.
- Applied by roller, brush, or spray.
- Dilute using MEK solvent up to 25% depending on application method.
- A DFT of 50 microns (0.002") is required.

FOR IMMERSION SERVICE ONLY

NP-9600 WASH PRIMER

- One thin coat is required, used in conjunction with NP-9500 primer only.
- Applied a minimum 6 hours before topcoating with NP-9500 primer.
- Mix each part well prior to use. It's recommended to scrape the bottom of the "A" side can.
- A two-part system, mixed ratio of 100A to 91B by weight. 1:1 by volume.
- Applied to prepared metal using roller, brush, or spray.
- Dilute using MEK solvent up to 25% depending on application method.
- A DFT of 12.5 microns (0.0005") thickness is required.

Recoat and Repair for Polyurethane: Surface preparation for over-coating becomes necessary when more than 2 hours have elapsed, or you wish to adhere to previously coated urethane. NP-9500 primer is used to bond new urethane to previously applied urethane using one coat of 25 micron (0.001") after proper surface preparation has been completed.

Surface Prep Options:

- Grit-blasting using a medium to coarse grit size. Plan to remove the gloss and 50 micron (.002") of existing coating.
- Sanding with a slow speed sander at 2000 rpm or less and a 24, 36, 50 grit aluminum oxide sanding disks. Plan to remove the gloss and 50 micron (.002") of existing coating.
- Wire brush attachment on a grinder or drill. Use a slow speed under 2000 rpm. Plan to remove the gloss and 50 micron (.002") of existing coating.

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TROUBLESHOOTING

SYMPTOM	POTENTIAL CAUSE	POSSIBLE SOLUTIONS
Not curing	Off ratio Improper mixing	Ensure calculations are correct Check mixing procedure
Delamination	Exceeding recoat window Off ratio mixing	Recoat window is under 2 hrs Mix products according to TDS
Blisters	Off ratio mixing Contamination Primert has not flashed At dew point water entrapment	Mix products according to TDS Check and clean contaminants Ensure primer is dry Check environment conditions
Cracking	Uneven material heating Mold temperature cold	Ensure batch temps are even Mold and material temps should be similar

DISCLAIMER

The direction for the use of our products are based upon tests believed to be reliable but no warranty is given. Since conditions for the use of this product are beyond the seller's control, all risks are assumed by the user. Please contact your local agent or call Normac Adhesive Products Inc. (905) 332.6455 for further assistance.



Normac Adhesive Products Inc.

1350 Heine Court, Burlington ON
Canada L7L 6M4
Tel. 1.905.332.6455
info@normacadhesives.com