Gentoo™
Advanced Clear Hydrophobic Coating

Application Instructions

Read through all instructions prior to opening or using Gentoo.

FOLLOW ALL WARNINGS AND CAUTIONS

DO NOT open Part A unless inert gas is available or unless the entire container will be used immediately after opening.

DO NOT mix Part A and Part B, unless Part A has been mixed on its own first.

DO NOT use mixing equipment that has not been rated for flammable liquids.

DO NOT leave Gentoo uncovered when it is mixing or when it is not being applied.

DO NOT spray Gentoo without sufficient engineering ventilation controls or without making a minimum of full-face respirators with OV/AG/P100 filters available to all those exposed to Gentoo spray.

DO NOT wait to clean equipment. Cleaning of equipment must be performed as soon as possible after Gentoo is applied and equipment is no longer in use.

DO NOT mix Part A and Part B by volume.

DO NOT add Part A to Part B.

DO add Part A to the mixing vessel, and then add Part B to Part A.

DO mix Part A thoroughly before adding Part B.

DO apply a blanket of inert gas to the headspace of partially used containers of Part A immediately after the material to be used has been poured off.

DO use mixing equipment that is rated for flammable liquids.

DO cover the Gentoo vessel as often as possible, including when it is mixing and when it is not being applied.

DO clean all equipment with acetone immediately after use.

DO add Part B to Part A at a 1:1 ratio by weight.

Personal Protective Equipment

Flow, Dip, Brush or Roller Coating: always wear the following minimum personal protective equipment: safety goggles and nitrile gloves. A paint suit/Tyvek suit is recommended. If engineering ventilation controls are not available or sufficient, use a respirator (NIOSH/MSHA approved half-face respirator with an organic vapor cartridge) to protect from solvent vapors. Refer to Safety Data Sheets (SDSs) for both Part A and Part B before beginning to apply Gentoo.

Spray Coating: DO NOT spray Gentoo without sufficient engineering ventilation controls or without making a minimum of full-face respirators with OV/AG/P100 filters (OV = Organic Vapor; AG = Acid Gas) available to all those exposed to Gentoo spray. Wear nitrile gloves. A paint suit/Tyvek suit is recommended. Refer to Safety Data Sheets (SDSs) for both Part A and Part B before beginning to apply Gentoo.

Preparation

Surface Preparation:

1. Remove all oil, grease, dust, dirt, loose rust, and other foreign materials to promote optimum adhesion.
2. Clean smooth surfaces with 99% isopropyl alcohol (IPA) and microfiber cloths or other lint-free cloths. If the surface is incompatible with IPA, the application of Gentoo to the surface is not recommended.
3. Gentoo may not bond to all types of plastic without further preparation. Flame treatment, abrasive surface preparation or adhesion promoters may be required in order to attain adequate adhesion on plastics.
4. Adhesion to some surfaces, including surfaces with existing coatings, may improve if they are abraded, but this is not required for all surface types.
5. For best results when applying Gentoo to paint-

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Preparation (continued)

ed surfaces, apply Gentoo when the paint is still "green" (dry to the touch, but not fully cured). If paint is fully dried and cured before Gentoo is applied, it may need to be wet-sanded or otherwise prepared in order to promote adhesion. If neither method is possible, it may be beneficial to try an adhesion promoter or tie-coat on top of the paint before applying the Gentoo.

NOTES:

- Mix and apply Gentoo in a clean, well-lit environment. Dust, dirt, or other particles may influence the appearance of the coating if Gentoo is not mixed and applied in a clean environment.
- Apply Gentoo in a controlled space, free from wind. Applying Gentoo outdoors could result in significant coating defects.
- Use only glass, stainless steel, polyethylene or polypropylene mixing vessels.
- Ensure all mixing vessels are clean. For best results, rinse with 99% IPA to remove any dust from mixing containers prior to mixing Gentoo.

Mixing

NOTICES:

- Mix so that a vortex is produced, but not faster.
- Air should not be forced into the mixture as a result of mixing at excessively high speeds or by any other means.
- If the entire container of Part A will not be used, inert gas (preferably argon, or nitrogen) must be used to blanket the headspace of the remaining liquid in the container. If this is not performed, Part A will be rendered unusable.
- After the blanket of inert gas is applied to Part A, put the lid back on the container.
- After Part B is used, put the lid back onto the container of Part B to prevent evaporation of solvents.
- Cover the mixing vessel with a lid, film or other covering as much as possible to prevent evaporation of solvents during the mixing process. If this is not possible, as in certain production processes, occasional addition of 99% IPA may be required to maintain original density.

Part A and Part B need to be combined to complete a hydrolysis reaction (this is where some of the components of Part A and Part B react together to form a new component) before the coating is ready to be applied. If hydrolysis is not complete, the coating will not bond to the surface or perform properly.

STEPS:

1. Mix or shake Part A thoroughly.
   a. Shake quarts of Part A for 30 seconds.
   b. Mix 5-gal of Part A for 5 minutes.
2. When step one is complete, add Part A to the mixing vessel and turn on the mixer.
3. Add Part B to Part A at a 1:1 ratio, by weight (not by volume).

All containers of Part A and Part B have been filled by weight. To use a complete pair of new, unopened Part A and Part B containers, use all of Part A and all of Part B.

For example: Use one complete quart container of Part A + one complete quart container of Part B

OR

Use one complete 5-gal pail of Part A + one complete 5-gal pail of Part B

From this point forward, "Gentoo" refers to the mixture of Part A and Part B.

Follow all other mixing instructions.

MIXING BY HAND:

Gentoo may be mixed by hand. This method has worked with as little as 3 fl oz (90 ml) of Gentoo in a beaker and as much as 4 gallons (15 liters) of Gentoo in a 5 gallon (19 liter) bucket.

1. Mix or shake Part A thoroughly.

a. Shake quarts of Part A for 30 seconds.

b. Mix 5-gal containers of Part A for 5 minutes.

2. When step one is complete, add Part A to the mixing vessel.

3. Add Part B to Part A at a 1:1 ratio, by weight (not by volume).

4. Mix thoroughly with a clean stirring rod (glass, aluminum, stainless steel, polyethylene, or polypropylene) for 2 minutes. Quantities of Gentoo above 4 gallons (15 liters) may require more mix time.

5. After mixing by hand for 2 minutes, cover Gentoo, and allow it to sit at rest for the remainder of the hydrolysis period.

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Checking For Hydrolysis

Checking hydrolysis is critical to ensuring that Gentoo is fully mixed and ready to be applied.

If Gentoo is applied before it has fully hydrolyzed, it will not bond to the surface properly and it will not perform properly.

If the process of checking hydrolysis is new to the user, check it approximately 2 minutes after Part B is added to Part A, and observe the sample. Then, perform the same check at 90 minutes, and again every 30 minutes afterwards until hydrolysis is reached.

https://bit.ly/3SOQzoB

When taking a sample of Gentoo for the purposes of checking hydrolysis, use a small vial, approximately 0.25 oz (7.5 mL) or larger, and fill it ⅛ to ½ of the way with Gentoo using a dropper (pipette). Orient the vial horizontally, and rotate it slowly. Then, stop the rotation. Notice that some of the liquid in the vial will "pull away" from the glass. These small areas where the liquid has not "wet" the glass are called "pockets". These are evidence that Gentoo has not been fully mixed / hydrolyzed. When Gentoo is fully mixed/ hydrolyzed, no pockets will remain when a new sample of Gentoo is collected using a new dropper and a new vial. The following are general guidelines for how long Gentoo may take to fully hydrolyze, but these should not be used as a substitute for checking hydrolysis:

- Mix Gentoo for 120 minutes at 70 °F (21 °C) or above.
- Mixing at temperatures below 70 °F (21 °C) may require mixing times of 3 hours or longer.

Pockets (de-wet areas of the glass) should not be confused with bubbles or gels. Sometimes, when a dropper is used to insert Gentoo into a vial, small bubbles are formed. These dissipate in a short time, and as the vial is rotated. Gels are different from bubbles and pockets. Gels may form after a significant time into the mixing process has elapsed. Gels may appear like small particles or tiny balls. These look different than pockets. Pockets may "grow" or change shape in a matter of seconds, whereas gels do not change shape or size quickly, while Gentoo is inside a sealed vial. If gels are observed, and no pockets are observed, this means the Gentoo is fully hydrolyzed and is ready to be applied. The gels can be filtered out if needed.

Filtration

Filtering Gentoo is helpful for removing gels, as well as particles/dust. Depending on the application, the end-user may decide not to filter Gentoo.

Optical applications (or applications requiring the finest appearance) will benefit from filtering with 1 µm (micron) glass fiber filters.

To filter out larger gel bodies, filters up to 200 µm (microns) can be used. Acceptable filter materials include glass fiber, aluminum, stainless steel, PTFE (Teflon), polyethylene, and polypropylene.

Pot Life:

The pot life of filtered Gentoo is dependent on environmental conditions:

- At 85 °F (30 °C), the pot life may be under 3 hours.
- At standard conditions 70°F (21°C), the pot life will be approx. 5 hours.
- If Gentoo is chilled (at 40 °F / 5 °C), pot life may be up to 16 hours.
- Gentoo has been chilled in both a chemical fridge (at 40 °F / 5 °C) and chemical freezer (at 5 °F / -15 °C). The colder the temperature, the longer the pot life will be.

Notes

When the mixing and filtering processes are complete, continue to cover the vessel of Gentoo to ensure that the loss of solvents due to evaporation is minimized.

For easiest cleaning, it is best to clean all vessels and equipment as soon as possible after use.

See cleanup section for more information.

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Application Methods

For best results, all equipment should be glass, stainless steel, polyethylene, or polypropylene.

NOTE: Once Gentoo has already been applied to an area, even if not fully cured, do not apply additional Gentoo over it. Doing so could cause visual defects, and/or could damage the Gentoo and cause it to delaminate from the substrate.

Flow Coating:

- In essence, flow-coating is controlled pouring.
- Flow coating by hand is not complicated but takes practice to attain an even coating.
- Very small objects can be coated using plastic droppers.
- Objects smaller than a few square feet can be flow coated using a squeeze bottle.
- For large objects, a recirculation pump attached to a hose with an in-line filter can be used.
- Curtain coating equipment could also be used to coat objects in an automated or semi-automated process environment.
- The object to be coated should be inserted into or suspended above a collection vessel, so the excess Gentoo can drain off of the object and be collected, filtered, and re-used.
- After the object has been coated, refer to the drying and curing sections.

Dip Coating

- Use a clean vessel of sufficient size that holds enough Gentoo to completely coat the desired portion of the object.
- Dip the object only once.
- After the object has been coated, refer to the drying and curing sections.

Brush/Roller Coating

- Foam brushes and rollers designed for solvent-based or oil-based paints and coatings may be used with Gentoo.
- Applying Gentoo with brushes or rollers may result in bubbles within the coating. This may be avoided by varying the application speed and the applied pressure. A larger quantity of product may be required in order to obtain uniform coverage using a foam roller due to the amount of pickup required in order to saturate the foam roller.

Brush/Roller Coating (continued)

- Gentoo allowed to begin to dry on the brush will create undesirable defects in the coating during application.
- Avoid overcoating any area of the Gentoo coating that has begun to dry. This will adversely affect the appearance, and may adversely affect the adhesion.
- After the object has been coated, refer to the drying and curing sections.

Spray Coating

- The appearance of Gentoo as applied by HVLP (high volume low pressure) sprayers may contain defects. This may include very small gel bodies, orange-peel, slight mottling and/or dust.
- Proper engineering controls or personal protective equipment are required when spraying Gentoo.

NOTICE:

Engineering controls include a fume hood or other sufficient ventilation, which must be available to remove all Gentoo vapors from the working environment. If engineering controls are not available, a minimum of a full-face respirator with OV/AG/P100 filters must be used to protect all those exposed to the spray application.

HVLP Parameters:

1. An in-line particle filter and moisture trap is recommended for the HVLP gun.
2. A 1.0 mm needle/tip is recommended for HVLP sprayers.
3. Use gun pressure of less than 20 psi.
4. Ensure spray gun is clean before spraying Gentoo.
5. Pre-flush gun with 99% IPA after gun has been cleaned.
6. Apply in a thin single coat for best results (approximately 1 mil [25 microns] wet film thickness recommended).
7. Avoid overcoating any area of the Gentoo coating that has begun to dry. This will adversely affect the appearance, and may adversely affect the adhesion.
8. Do not apply multiple film builds over hydrophobic coating.
9. When spraying is complete, immediately flush the spray gun with acetone.

Spray Coating (continued):

For more information, please see the following document:

http://ow.ly/9szR30iOprt

After the object has been coated, refer to the drying and curing sections.

Drying and Curing

Drying: Allow objects with smooth surfaces to sit at room temperature for 15-30 minutes (or until dry to the touch) after they have been completely coated. Rough or porous surfaces may require more than 30 minutes to become dry to the touch.

Curing:

- For best performance, insert the object into a clean oven for 1 hour at 302 °F (150 °C), if this will not adversely affect the object. Typical oven curing: 194 °F (90 °C) for one hour.
- It is also possible to initialize curing at a temperature under 194 °F (90 °C). For example, cure in an oven at 122 °F (50 °C) for 1 hour, then cure at room temperature (68 - 77 °F / 20 - 25 °C) for 16 - 24 hours.
- If the coated object cannot sustain any elevated temperatures, it is possible to cure at room temperature (68 - 77 °F / 20 - 25 °C) in a clean environment for at least 24 to 48 hours. Some materials, for example - some plastics and some painted surfaces, may never achieve full properties with only a room temperature cure.
- This is dependent on the type of material and/or substrate, the surface preparation method(s) and the environmental conditions of the application. However, in some cases achieving less than full performance may be acceptable.
- A heat gun or heat lamps may be used to impart heat onto the surface, but care must be taken to not exceed surface temperatures of 302 °F (150°C).
- After curing, if the coated object is found to meet the needs of the end-user, it may be put into service. Performance may continue to improve over time at ambient conditions.

Cleanup

- When a vessel is no longer needed during the Gentoo mixing and application processes, remove excess Gentoo from the mixing vessel as soon as possible after taking the mixing vessel out of service.
- Excess Gentoo should be poured into a waste container, where it will turn into a gel over several hours.
- Rinse the mixing vessel with acetone and wipe it clean.
- For pumps and spray equipment, flush the systems with acetone.
- Abrasive material and/or other strong chemicals may be required if cleanup is not performed immediately.
- Dispose of all unused Gentoo, cleaning solvents and cleaning materials such as rags in accordance with local, state and federal regulations.

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