NANOPLAS, Inc.

"Tiny Solutions to Large Problems"

www.nanomoldrelease.com

NANOMOLDCOATING® FAQS

NANO

1. **What is Nanomoldcoating?**
   - **NanoMoldCoating®** is a **self-applied** (in house), **non-migrating mold coating** (not an aerosol spray), facilitating part release for up to 300,000 cycles per coating, and it's only 100 nanometers thick.

NANO PROPERTIES / BENEFITS

2. **What makes Nanomoldcoating different from other mold release agents or coatings?**
   - NMC is a semi-permanent hard coating. It does not migrate onto the part surface like aerosol products therefore does not require frequent reapplication. It is only 100-200 nanometers in thickness, therefore does not affect dimensional integrity of molded parts. NMC offers the flexibility of in house application so mold components do not have to be sent to outside vendors which can be time consuming and expensive.
3. **What is the temperature range that it can withstand?**
   - Up to 1000F
4. **Does it build up or affect tolerances?**
   - No, the coating is only between 100-200nm in thickness, basically immeasurable.
5. **What is the shelf life if the product has been opened and resealed?**
   - The shelf life for HC once opened is 6-12 months. The shelf life for the HCF is closer to 6 months once opened.
6. **How does it help with fill or packing of parts?**
   - It minimizes friction in the material flow path making It affective in filling and packing out of parts.
7. **Durability (how many cycles can I expect)**
   - There are several factors which determine coating life including: mold design, molding parameters, plastic and fillers being molded.
   - Generally, speaking parts run with olefin based materials and/or unfilled resins will experience a larger number of cycles (100K-500K) before reapplication is necessary than glass filled or abrasive engineering grade materials (10K-100K+).
   - Return on investment is immediate in either case based on reduction in cycle times, reduction in starting/stopping of machines due to stuck parts, reduction or elimination of mold release agents.
8. **What is the coefficient of friction?**
   - The coefficient of friction ranges from 0.50 to 0.130 kinetic per ASTM 1894 under laboratory testing conditions. What is important is how it actually works per each specific application. Our customers that switch from other types of coatings due so based on release characteristics and flexibility of use.
9. **Temperature compared to PTFE coatings**.
   - PTFE coatings begin to degrade at 450-500F. The HC and HCF products withstands up to 1000F.
10. **Will it crack, or peel?**
    - No, the coating is temperature resistant up to 1000F. It forms a nano-mesh which is designed to expand and contract with the thermal expansion of the steel. It wears in miniscule amounts over time.
11. **Does it penetrate the substrate it is being applied to?**
    - It covalently bonds to atoms at the surface of the substrate. In more porous materials like aluminum it can absorb into the pours as it bonds.
12. **Can the plastic parts be painted or chrome plated after being molded?**
    - Absolutely. The coating does not migrate to the surface of the part therefore it does not inhibit post molding applications.
13. **Can NanoMoldCoating® be used in clean room applications?**
    - Yes. The cured coating does not exude any of the properties of silicone, and does not migrate to the part surface.
14. **Can NanoMoldCoating® be used in paint booth environments?**

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- Yes. The cured coating does not exude any of the properties of silicone, and does not migrate to the part surface.

COMPATIBLE SUBSTRATE MATERIALS

15. **What materials can I apply Nanomoldcoating® to?**
    - NMC will adhere to virtually any metallic substrate.
    - It is currently being used in a wide variety of tooling applications including all tool steels, stainless steel, and aluminum. More product may be necessary for aluminum as it is more porous than the other materials.
    - It has even proven successful in epoxy molds
16. **Will it work with chromed surfaces? How about other existing coatings?**
    - While the coating was originally designed to bond directly to tool steel, we have experienced success with coating chromed surfaces, as well as other ptfe and nickel coatings.
17. **Can you apply it to moving parts such as slides, locks – leader pins?**
    - Products that are better suited for these applications include our Nano-Ceramic Grease and Lubricant. These products offer extreme friction reduction (7 times greater than PTFE) and wear resistance properties coupled with extraordinary adhesion properties, especially under high pressure. These products offer super high temperature resistance, and are NSF certified for food grade applications.
18. **What affect does Nano have on a textured surface?**
    - The coating is so thin that it will not "fill in" textured surfaces.
19. **What affect does Nano have on sandblasted or matte finishes?**
    - The coating is sealing off the surface with a microscopic hard coating. Therefore it is possible that the part finish may be enhanced or possibly produce a slight change in gloss.
20. **What affect does Nano have on mirror finishes?**
    - When applied properly the coating will not alter the surface of the mold or part. If anything it will enhance the properties which are desired by the mirror finish.

COMPATIBLE PROCESSES AND MATERIALS

21. **What Plastic Resins does Nanomoldcoating® help with?**
    - NMC can be used successfully on all thermoplastic and flexible thermoset materials (such as urethanes, silicones, etc...). As each application is unique, the degree of success will be a function of the following: mold design, mold cavity/core material, plastic resin, and molding parameters.
22. **Is Nanomoldcoating® effective on rubber applications?**
    - While originally designed for plastics injection molding, the coating has been successfully used in black rubber, silicone, TPE, TPU and other rubber applications.
23. **What other processes can Nanomoldcoating® be used in?**
    - NMC has proven successful in a wide variety of applications including:
    - Injection Molding
    - Blow Molding
    - Thermoforming
    - Extrusion
    - Fiberglass layup
    - Epoxy molding
    - Continuous research and development is being done in other processes.
24. **What applications are not right for Nanomoldcoating®?**
    - Threaded cores coupled with glass filled materials. This tends to sand the coating away.
    - Threaded cores in olefins and unfilled materials are ok.
25. **How does Nanomoldcoating® affect clear parts?**
    - When properly applied NMC will have no negative effect on clear parts and may actually enhance clarity.

FDA COMPLIANCE

26. **Is Nanomoldcoating® FDA approved?**
    - The hardened coating is a cross linked amorphous material that has been tested by multiple international independent laboratories and found to be non-toxic. These documents are available upon request.
    - The HCF grade is FDA compliant.

PREPARATION OF SUBSTRATE

27. **Why is cleaning of the substrate so critical?**
    - The most obvious answer is that we want to avoid sealing in any imperfections.
    - The objective is to remove any oils, grease, or grime that may be hidden in the pores at and below the surface of the substrate. This debris will interfere with the covalent bonding of the coating to the steel surface.
28. **Why do we need to clean the surface with a 100% solvent (non-water or alkaline based)?**
    - The HC coating cross-links forming a nano-mesh by using moisture from the atmosphere as a catalyst. Any premature introduction of moisture or oils can cause a failure in the curing process.
    - This is less critical for the HC or HCF coatings.

APPLICATION OF NMC

29. **Can I apply it over itself without removing the first coating?**
    - It is possible for the HC, HCF and QC coatings.
30. **How critical is the cure time?**
    - The coating must be allowed to completely crosslink in order to work affectively. Therefore, following the instructions for cure time is very important.
31. **Can I clean and reuse my brushes?**
    - The best course of action is to dispose of the brushes once used to avoid contamination.
32. **How do I clean the atomizers?**
    - It is best to remove the atomizer from the bottle, and pump the nozzle it into a cloth until the straw has completely emptied.
33. **What is the best way to access deep rib areas, and holes?**
    - Each kit is supplied with small hobby brushes. Other items that can be used are cotton swabs, and micro fiber brushes.
34. **Can I use compressed air to move the product around in tight areas?**
    - It is not recommended as most plants compressed air is not completely dry by the time it comes out of the nozzle. One drop of water will destroy the entire coating.

MOLD CLEANING, REMOVING, and STORING

35. **Can I clean the surface once coated with Nanomoldcoating®**
    - There are certain cleaners and degreasers that have removed the coating. To date we have not been able to determine which ones do and which ones do not.
    - Our Nano Clean is designed specifically to not affect our coatings, and is recommended for use with any of our coatings.
36. **How do I remove the coating?**
    - Each kit comes with a bottle of remover. Simply spray the remover on the coating and allow it to soak for 10 minutes. This will break up the bonds of the coating. Then aggressively rub the surface. Compressed air can be used in tighter areas.

- Commercial paint removers are also affective in removing the coating.

37. **Can I use rust inhibitors over the coating?**
    - Some rust inhibitors may contain ingredients that can negatively affect the coating. Our Anti Rust product is designed to not affect any of our coatings.
    - Since the coating seals the surface many customers will clean and coat the mold with NanoMoldCoating® only. Especially when storing for short periods of time.

WHAT CAN AND CAN'T BE DONE AFTER COATING

38. **Can I weld over top the nano coated surface?**
    - Welding will damage the surface where it has been penetrated, and the immediate area surrounding it. Recoating may be necessary.
39. **Can I machine through it.**
    - Machining or otherwise physically penetrating the substrate will damage the surface where it has been penetrated, and the immediate area surrounding it. Recoating may be necessary.
40. **Can you use mold release after it has been coated?**
    - Not suggested as it will at the very least mask the properties of the coating. Some petroleum based products can cause it to gel the surface of the coating, rendering it useless. If silicone spray is applied over the coating, simply wipe off what you can and then mold off the rest as normal.