



Frequently Asked Questions (FAQ) PARTALL® FORMULA FIVE® MARBALEASE®

IS IT NECESSARY TO USE POLYVINYL ALCOHOL (PVA) IN ADDITION TO WAX?

The answer to this question depends on a number of factors but the bottom line is this: ***if you do not want the part to stick to and possibly ruin your mold, then use PVA.*** If mold is new or reconditioned, then you should definitely use a PVA such as PARTALL® Film #10 or PARTALL® Coverall Film to prevent styrene migration. If mold is seasoned, then the use of PVA is not necessary except as additional insurance against sticking as long as wax is applied properly and with sufficient frequency. If mold is very large or intricate you may have difficulty achieving adequate coverage using wax only. PVA can be sprayed into hard-to-reach crevices and forms a visible barrier you can see on the mold surface.

A HARD WHITE BUILD UP HAS ACCUMULATED ON MY MOLD - WHAT IS IT?

The appearance of a hard white build-up on the mold surface is commonly mistaken as evidence of styrene in the parting wax or wax build-up. The white substance is more likely styrene that has migrated from within the mold to the surface and broken through the wax barrier. Styrene molecules in the mold are attracted to styrene molecules in resins used to form the part and will bond if allowed to come into contact, causing the part to stick.

Waxes are applied to mold surfaces prior to the molding process in order to prevent bonding. However, heat generated during the molding process gradually softens wax and can inhibit its effectiveness as a barrier. In order to prevent styrene migration between mold and part a polyvinyl alcohol film (PVA) such as PARTALL® Film #10 or PARTALL® Coverall Film should be used in conjunction with wax. If applied properly, PVA creates a barrier through which styrene molecules cannot penetrate. Wax and/or PVA must be applied *properly* and *adequately* in order to form an effective barrier.

The use of PVA is particularly necessary on new or reconditioned molds. Once a mold is seasoned wax alone is normally sufficient as a barrier when applied as needed but PVA can certainly be used as extra protection against costly and time-consuming molding hang-ups, particularly on very large, intricate, or expensive molds.

If styrene migration does occur you will need to recondition the mold surface. This type of build-up usually requires stripping down the mold with a power sander until styrene is no longer present on the surface. In some cases buffing or hand rubbing the mold with fine abrasives or finishing compounds may be sufficient - the key is to remove all traces of styrene build-up from the mold surface. Keep in mind that a reconditioned mold should be treated like a new mold in terms of the waxing / PVA process.

HOW THICK MUST PVA COAT BE TO FORM A SUFFICIENT BARRIER?

Apply to a thickness of 2 - 4 mils (50-100 µm) on new or reconditioned molds and 1 - 2 mils (25-50 µm) on seasoned molds. Two mils is approximately equal to the thickness of an industrial-type trash bag. The dry film should be continuous and non-porous.

HOW DO I KNOW IF PVA HAS BEEN APPLIED PROPERLY?

When applied correctly PVA should form a continuous film free of pinholes or air bubbles that is smooth and glossy when dry. Dry film thickness should be at least 2 - 4 mils (50-100 µm) on new / reconditioned molds and at least 1 - 2 mils (25-50 µm) on seasoned molds (2 mils is approximately equal to the thickness of an industrial-type trash bag).

Each coat of PVA must be allowed to dry completely prior to applying additional coats or proceeding with molding. Keep in mind that entire coat - not just the surface - must dry completely in order to form an effective barrier. You may find it helpful to spray a test panel at the same time PVA is applied to mold in order to more easily check that coat has dried thoroughly.

HOW LONG SHOULD I WAIT BEFORE BUFFING WAX?

Begin buffing FORMULA FIVE® Mold Release Wax approximately 10 - 12 minutes after application. If wax wipes off easily or "balls up" when buffed then it has not been allowed to form an adequate bond with mold surface. Begin buffing PARTALL® Paste #2 and PARTALL® Hi-Temp Wax when moderately dry (1 - 2 minutes after application). Buffing will be more difficult if PARTALL® Paste or PARTALL® Hi-Temp Wax remain on mold surface for extended lengths of time.



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CAN PVA BE USED ON A WOOD OR PLASTER MOLD WITHOUT SEALING MOLD FIRST?

No, both wood and plaster molds must be sealed prior to application of PVA. Automobile type primer-sealers and lacquers can generally produce the desired surface. Wax should also be applied to wood molds prior to use of water-soluble PVA coatings such as PARTALL® Film #10 or PARTALL® Coverall Film as moisture that resides naturally in wood may compromise the PVA's integrity and produce areas of the mold surface that are not adequately protected.

I'M SPRAYING PVA ON TOP OF GEL COAT AS PART OF A REPAIR PROCESS BUT THE PVA SEEMS TO BE "ATTACKING" THE GEL COAT - WHAT IS HAPPENING?

Two things are probably happening. The gel coat may not have been allowed to set up properly (is not hard enough) and the PVA is penetrating its surface. Also, you may be too close to gel coat surface while spraying and air pressure in the spray gun is forcing the PVA into the gel coat. Spray from a distance that allows PVA to atomize (mist) completely before coming in contact with the gel coat. The use of an HVLP spray gun with about 20 PSI (~1.5 bar) pressure at the gun using a spray tip orifice size of 1.8 - 2.2 mm is recommended.

CAN PVA BE APPLIED USING A BRUSH INSTEAD OF A SPRAY GUN?

PVA can be applied using a brush although a spray gun is recommended in order to produce a smoother surface on the mold and, thus, on the finished part.

WHY DID PARTALL® FILM #10 "COBWEB" WHEN I SPRAYED IT? WHY ARE THERE AIR BUBBLES IN THE PARTALL® FILM #10 COAT I JUST SPRAYED?

These two conditions are generally due to lack of humidity and are very common in deserts or desert-like areas. Cobwebbing occurs when PARTALL® Film #10 dries immediately upon contact with air and sprays out as a stringy substance.

Lack of humidity also sometimes results in air bubbles or "fish-eyes" in PARTALL® Film #10. This happens when the PVA coating dries on the mold surface before air bubbles have had a chance to break. Both of these situations can usually be resolved by adding water to PARTALL® Film #10. Begin with 10 mL of water per 1000mL of PVA solution and test, adding more water if necessary until PVA works properly. It is very important to keep in mind, however, that as PARTALL® Film #10 is diluted the percentage of solids in the mixture decreases, thereby necessitating that more PVA be used to achieve adequate coverage.

CAN I APPLY PVA AND THEN BAKE MOLD IN AN OVEN?

PARTALL® Film #10 and PARTALL® Coverall Film consist primarily of partially hydrolyzed polyvinyl alcohol (PVA) and thus can be baked following application to mold surface. The following are guidelines for approximate length of time at specific temperatures – *these are only suggestions*.

| Temperature in Oven | Length of Time in Oven |
|------------------------|---------------------------|
| 200°F | 12 hours |
| 225°F | 6 hours |
| 250°F | 4 hours |
| 275°F | 2 hours |
| 300°F | 45 minutes |

It is not recommended that PARTALL® Film #10 or PARTALL® Coverall Film be subjected to temperatures higher than 300°F as carbonization is likely to occur. Carbonization is a process by which molecules in the PVA film bond with molecules on the mold surface. If this occurs, sanding will be required to remove PVA from the mold surface rather than the normal procedure of simply rinsing with water. Even if carbonization does not occur PVA is likely to require hot water for removal when baked in an oven. *If you choose to bake a mold with PVA on it, keep a close eye on the process and use your own judgment as to when to remove mold from oven.*



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HOW DO I REMOVE WAX FROM MY MOLD?

Use FORMULA FIVE® Wax Stripper according to instructions. If less aggressive methods are desired, try melting wax from surface using steam cleaner or boiling water. Alternatively, mixing one pound of Trisodium Phosphate (TSP) with one gallon of hot water makes an effective degreaser and wax remover. TSP can be found at hardware stores and stores that sell paint-related items.

If suggestions outlined above do not remove wax residue or if styrene migration has occurred it may be necessary to use a more aggressive cleaner such as FORMULA FIVE® Mold Stripper as well as buffing or cutting compounds or sanding techniques to recondition the mold surface. Once reconditioning is complete mold should be treated as if new. Use a high quality composites-specific sealer such as FORMULA FIVE® Semi-Permanent Mold Sealer and then appropriate mold releases for your resin and process.

HOW CAN I ACHIEVE A "SATIN FINISH" USING PVA?

PARTALL® Film #10 and PARTALL® Coverall Film normally produce a smooth finish on the mold surface and in turn on the molded part. In order to achieve a matte or non-glossy (i.e. - satin finish) you may add fumed silica to PVA solution. Silica is a very fine crystalline compound that does not dissolve in PVA, thus producing the desired texture.

Fumed silica should be added at a ratio of 1 ounce (~25 grams) per one gallon (3.79 liters) PVA. Mixture should be agitated vigorously immediately before use, then allowed to sit for approximately one minute until any air bubbles disperse. If not mixed sufficiently, silica will settle at bottom of spray gun cup. Note that the addition of fumed silica will increase the viscosity of the PVA solution and adjustments to spray equipment may be required. Some common trade names for silica are Cabosil and Aerosil.

CAN I PREP MY MOLD WITH PVA AND LEAVE ON OVERNIGHT PRIOR TO MOLDING?

PARTALL® Film #10 and PARTALL® Coverall Film are water-soluble solutions that may be attacked and weakened by moisture in the atmosphere and for this reason it is not recommended that either be allowed to sit on a mold overnight. If you do prep your mold the night before molding be certain to carefully check the integrity of PVA film and make certain that its effectiveness as a release agent / protective barrier has not been compromised.

CAN PARTALL® PASTE #2 BE USED IN HIGH HEAT APPLICATIONS?

No, PARTALL® Paste #2 is not designed for use in applications exceeding approximately 120°F (48°C) as wax will begin to melt and will not provide adequate protection. Use PARTALL® Hi-Temp Wax for higher heat processes up to 350°F (177°C). PARTALL® Hi-Temp Wax contains polytetrafluoroethylene (PTFE) that bonds to the mold surface and continues protecting after waxes have melted away, resulting in more pulls per product application. Because PARTALL® Hi-Temp Wax does not contain silicone it can usually be used in applications where silicone-based waxes hinder post-finishing operations, such as painting.

IS IT OK TO DILUTE PARTALL® FILM #10 OR PARTALL® COVERALL FILM PRIOR TO USE?

PARTALL® Film #10 and PARTALL® Coverall Film are shipped ready to use and should not be diluted. The addition of water (or any other liquid additive) will decrease the amount of solids per unit of measure, thus requiring the application of additional coats in order to achieve the same degree of release protection as would be obtained with undiluted product. Never add chemicals as they may not be compatible and may change the product's physical characteristics.

The information and recommendations contained in this bulletin are, to the best of our knowledge, accurate and reliable. No guarantee of their accuracy is made, however, and the products discussed are sold without warranty, express or implied and upon conditions that the purchasers shall make their own tests to determine the suitability of such products for their particular purposes and uses.