



Aquacore

Aquacore is a new high-temperature, water soluble fugitive core material. Aquacore is supplied as a moist powder which is machined, molded or hand shaped to the desired geometry and dried at 93°C (200°F). With a specific gravity of 0.45 wet, it is lightweight, easily machined, and thermally stable.

Aquacore is compatible with most commercial epoxy and cyanate resin ester systems with cure temperatures below 193°C (380° F). It can be dissolved away from the cured composite quickly using tap water, and the effluent is nontoxic.

Unlike conventional mandrel materials, which must be tediously removed from composite lay-ups, Aquacore mandrel is readily soluble in cold tap water and can easily be washed away from the finished part.

Aquacore saves time, labor and the wash-away feature minimizes the possibility of damaging fine details.

Benefits

- Washes out in cold tap water in minutes
- Environmentally friendly, no special disposal procedures required
- Nontoxic and odorless
- Remove mandrel from previously inaccessible hidden areas
- Easily dried in a convection oven
- Strong and lightweight
- Makes complex part manufacturing simple
- Compatible with all commercial resins and prepreg compounds
- Easily repaired and re-formed
- Saves time
- Reduces labor
- Saves money

Aquacore is available in 5 to 55 gallon containers. Aquacore is also available in machinable, pre-formed, dried blocks in virtually any size.

We recommend Aquaseal to seal the tool and prevent resin migration.

Call or fax Aero Consultants AG for assistance with your specific manufacturing requirements.

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Aquapour

Aquapour is a powdered mandrel material, which is easily mixed with water. Aquapour may be poured or injected into molds to form complex mandrels for composite lay-ups.

Aquapour is readily soluble in cold tap water and can easily be washed away from the finished part.

Aquapour saves time, labor and the wash-away feature minimizes the possibility of damaging fine details. Aquapour is formulated to minimize air bubbles and voids.

Benefits

- Easily mixed with water
- Pourable and injectable
- Environmentally friendly, no special disposal procedures required
- Washes away in cold tap water
- Compatible with all commercial resins prepreg compounds
- Makes complex part manufacturing simple
- Easily dried in a convection oven
- Easily repaired and re-formed
- Reduces labor
- Saves money
- Saves time

Aquapour is available in 5 to 55 gallon containers.

Aquaseal is recommended to seal the tool and prevent resin migration.

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Aquafill

Aquafill has been specially formulated to fill, bond or patch the watersoluble mandrel materials Aquacore and Aquapour.

Once applied, Aquafill will give the surface of the mandrel a smooth porcelain-like feel.

Aquafill will be delivered in three parts and is easy to mix.

Once the mandrel has been formed and dried in a convention oven, Aquafill can be applied easily with a rubber squeegee, such as those used in autobody applications.

Aquafill takes slightly longer to washout than Aquacore or Aquapour, but just like the Aquacore and Aquapour it is completely environmentally friendly and requires no special procedures for disposal.

Aquafill is available in Quart and ½ Gallon containers.

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Aquaseal

Aquaseal 3818 has been specially formulated to seal the water-soluble mandrel materials Aquacore and Aquapour. It provides a smooth, nonporous finish on the surface of a mold or tool and inhibits the migration of resins into the porous tool during the lay up or RTM process.

Aquaseal 3818 is compatible with the cure temperatures of commercial resins and pre-preg compounds up to 193°C and washes away in minutes with tap water.

Aquaseal 3818 may be applied with a spray gun or brush. Several coats should be applied. It should be applied evenly over the entire part so as to prevent cracking of the mandrel.

We have added an environmentally safe blue dye to aid in detecting how well the sealer is applied.

After achieving the desired finish, Aquaseal 3818 is thermally stable up to 193°C. To remove, simply wash away mandrel material and sealer with plain tap water.

Aquaseal 3818 is environmentally friendly; no special disposal procedures are required.

Aquaseal 3818 is available in Quart, ½ Gallon and 5 Gallon containers.

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Instructions for using Aquacore

The watersoluble mandrel material, Aquacore™, has been formulated with a minimum amount of water to enable it to be easily formed into complex shapes. Aquacore™ comes ready to use, no additional water is needed for production.

If Aquacore™ has notably separated, we recommend placing the product in a shallow trough or bucket and kneading it by hand until thoroughly mixed.

Aquacore™ is porous and may need to be sealed. Aquaseal™, a water-soluble and thermally stable sealer, is recommended for sealing the mandrel. No special disposal procedures need to be followed for the washed mandrel material, as it is completely environmentally friendly. Aquacore™ is compatible with the curing temperatures of all commercial pre-preg resins.

NOTE: If the Aquacore™ has been sitting for a length of time, mix well before using.

1. Prepare mould. We recommend a Lecithin based mould release (e.g. rape oil) and apply the rape oil with a brush or use a Teflon foil or tape. *Never use release wax!*
2. Form material into the desired shape by packing into a mould or shaping it by hand. Compress it well.
3. Remove material from mould carefully. If you have problems to demold the material, before you put it in the oven. You can put the material with the mold in the freezer, to get the material very hard (frozen) and after it is frozen you can remove the mold without problems. The frozen material will then put in an oven and dried without the mold.
4. Dry material in a convection oven at 125°C (257°F). Fundamental Heating- / Cooling rate 3°C /min.
 - a. The material can also be dried at temperatures below 125°C (257°F). However, Aquacore™ is very thermally stable and can withstand temperatures in excess of 195°C (383°F).
 - b. Drying times for Aquacore™ vary according to the part geometry and surface area. For example, a cylinder measuring 2 inches in diameter and 6 inches in length will require approximately 1.5 hours of drying time at 125°C (257°F) or approximately 2 hours at 95°C (203°F). Objects much larger in diameter are also dried at the same temperatures. Drying times will increase at approximately 1 hour per inch in diameter at 125°C (257°F) and at 1.5 hours per inch in diameter at 95°C (203°F).
 - c. To avoid cracking, we recommend turning the oven off with the mandrel inside and letting the mandrel cool in the oven. This prevents thermal shock.
5. Once dried, seal the mandrel with Aquaseal according Instructions for using Aquaseal. After dried, apply Release Agent or Release Wax on the Aquacore. After lay up composite material around Aquacore™ and cure according to the specifications of the material.
6. After cure, simply wash with tap water to remove the mandrel particulate.

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Instructions for using Aquapour

Note:

Remove the desiccant bag and mix the material in the pail with a blender very well before beginning Step 1.

1. Prepare mould. We recommend a Lecithin based mould release (e.g. rape oil) and apply the rape oil with a brush or use a Teflon foil or tape. *Never use release wax!*
2. Combine Aquapour™ with water.
 - a. Recommended mixing ratio is 55% Aquapour™ powder material to 45% water by weight.
 - b. Small amounts of additional water may be added to improve pouring consistency; however, drying times will increase slightly if excess water is added.
3. Pour Aquapour™ into mould.
 - a. Working time is 5-10 minutes.
 - b. Vibrating the material while in wet form will help reduce bubbling. Pouring the material in a Vacuum will also reduce surface bubbling greatly.
 - c. Material will set up in approximately 1 hour.
4. Remove mandrel from the mould.
 - a. Mandrel must be removed from mould prior to being dried.
If you have problems to demold the material, before you put it in the oven. You can put the material with the mold in the freezer, to get the material very hard (frozen) and after it is frozen you can remove the mold without problems. The frozen material will then put in an oven and dried without the mold.
5. Dry in a convection oven. Fundamental Heating- / Cooling rate 3°C /min.
 - a. We recommend the material be dried at 135°C (275°F) at 1.5 hours per inch of mandrel thickness.
 - b. The material can also be dried at temperatures below 135°C (275°F). However, drying time will be increased. Aquapour™ is thermally stable and can withstand temperatures in excess of 200°C (392°F).
 - c. Drying times for Aquapour™ vary according to the part geometry and surface area. The more surface area that is exposed the shorter the drying time.
 - d. Drying times will increase exponentially as the part geometry increases.



Instructions for using Aquapour

6. Remove mandrel from oven.
 - a. To avoid cracking, we recommend turning the oven off with the mandrel inside and letting the mandrel cool in the oven. This prevents thermal shock.
 - b. If tooling is necessary, using Aquafill™ to give the mandrel a smooth porcelain-like feel.
 - c. Aquafill™ can also be used to patch any defects or imperfections on mandrel.
7. Seal the mandrel.
 - a. We recommend Aquaseal™, a water-soluble sealer, compatible with Aquapour™.
 - b. Once dried, apply Release Agent or Release Wax on the Aquapour.
8. Lay-up on mandrel to make finished part.
 - a. Aquapour™ is compatible with the curing temperatures of all commercial pre-preg materials and resins.
9. Wash away Aquapour™ from finished part.
 - a. The material can be washed away under a faucet or with a standard garden hose.
 - b. Heated water is not necessary but will drastically increase the wash out of the mandrel.
 - c. Aquapour™ is environmentally friendly so no special disposal procedures are needed.

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Instructions for mixing and using three part Aquafill

Kit contains three parts: Part A, Part B and Part C

To mix

1. Mixing ratio for small quantities: 100 gram = A 40g, B 38g, C 22g
2. Place Part A in mixing bucket
3. Add Part B and slowly mix for 5 minutes
4. Add Part C and mix well until a smooth, even consistency is achieved – approx. 12-15 minutes
5. Shelf life 1 month after mixing

Aquafill™ has been specially formulated to fill or patch the watersoluble mandrel materials Aquacore™ and Aquapour™. Once applied, Aquafill™ will give the surface of the mandrel a smooth porcelain-like feel.

Once the mandrel is dried, there may be small defects on the surface of the mandrel formed by air bubbles in the material. Apply Aquafill™ to the mandrel to patch these defects.

Tips for applying Aquafill™

- Aquafill™ has been pre-mixed and is ready to use.
- The best method of applying the material is using a rubber squeegee.
- Simply spread Aquafill™ on the mandrel in a very thin coat making sure to fill in all imperfections on the surface.
- If applied too thick, the surface may be bumpy, or it may result in decreased mandrel solubility. Aquafill™ can be sanded to a smooth finish once it has dried.
- Allow at least 30 minutes between coats. Aquafill™ does not need to be dried in an oven, simply allow to air dry.
- The washout time for Aquafill™ is slightly longer than that of Aquacore™, and Aquapour™. The edges of the mandrel may need additional soaking time of about 15 minutes before coming out of the finished part.
- The material can be washed away under a faucet or with a standard low-pressure garden hose. No special procedure is needed the disposal of the product; Aquafill™ is completely environmentally friendly.

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Instructions for using Aquaseal

Aquaseal has been specially formulated to seal the watersoluble mandrel materials Aquacore and Aquapour.

Form the mandrel material into the desired shape and dry it in a convection oven to cure. Once the mandrel is dried and cooled, apply Aquaseal to seal the product prior to usage. It will take 4-6 coats to acquire the desired finish.

**Note: Aquaseal is not to be used on mandrel prior to drying in convection oven.
After the sealing is dried, apply a Release Agent or a Release Wax.**

Tips for applying Aquaseal 3818

- Shake sealer well before applying it to the mandrel, as setting is common
- Aquaseal can be sprayed or brushed onto the mandrel
 - a. Aquaseal can be sprayed on with a spray gun
 - b. Aquaseal can be applied with any brush suitable for latex or waterbased paint
 - c. It will take several coats to obtain the desired finish on the mandrel material
- We recommend to spray on the first coat onto the mandrel and allow to dry. Once the first coat is dry, you can continue to spray or brush the additional coats. It should be applied evenly over the entire part so as to prevent cracking of the mandrel.
- Drying times for Aquaseal vary according to humidity and room temperature. It may be necessary to apply 4 - 6 coats. We have added an environmentally safe blue dye to aid in detecting how well the sealer is applied.
- Allow approx. 20 min. drying time in an oven at 65°C between coats for sealer to dry properly.
- To remove, simply wash out mandrel material and sealer with tap water. Room temperature water will remove sealer, but heated water will significantly increase the wash out process.
- Aquaseal takes slightly longer to dissolve than the mandrel, but still requires only water. Soaking in water for 15 minutes will loosen sealer. No special procedure is needed for the disposal of the product. Aquaseal is completely environmentally friendly.

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