



Vapormatt

**ENGINE  
START**

# Composite preparation

For bonding, lacquering or painting by wet blasting

With its combination of strength and light weight the use of composites has grown exponentially in industries like Formula One and Aerospace. Conventional fastening processes add weight and stress to composite components, defeating the very reason for using them in the first place. That is why bonding is so critical to their use.

Bond strength is therefore critical and to ensure maximum bond strength surfaces have to be clean, wax free and ideally finished to a specific Ra surface roughness. Our wet blasting technology perfectly prepares composite surfaces for bonding and that is why our wet blasting systems can be found in many of the leading Formula One and Aerospace manufacturers for preparing carbon fibre, titanium, aluminium and other materials for bonding and painting.

### **The wet blasting process**

In all bonding and coating operations, preparation of the surfaces is key.

GRP and carbon fibre are notoriously difficult to bond due to the presence of resinous residues on the normally smooth non-retentive surfaces. The presence of grease or dust can further compromise effective adhesion.

The wet blasting process uses water and an abrasive media to create a slurry. A wet blast gun, or multiple guns, blasts the slurry toward the composite surface using compressed air.

The result is a thoroughly clean and lightly abraded composite surface. To help with this process water can be heated and a mild detergent added to ensure all grease and oils are completely removed. The finished surface is surgically clean and extremely reactive, and the resulting hydrophilic surface is particularly good at evenly accepting adhesives and other coatings.

Another controllable variable is the blast pressure which is easily adjusted to suit the material being finished. Where the wet blasting process has not been adopted, manufacturers tend to use a combination of peel ply and hand flattening using wet and dry abrasive papers. The latter leaves a very uneven surface finish, and the part still needs to be chemically cleaned to remove any contamination left on the surface.



A composite propeller blade about to be processed in a Vapormatt Leopard Cub

## **Wet blasting has many controllable variables, especially compared with other surface finishing processes.**

**With high levels of control, the exact surface finish required can be achieved. The ratio between water and air pressure in the blast gun is one of these controllable variables and allows for the creation of a 'water buffer' that is maintained throughout the blasting process. The water buffer between the abrasive particles and the composite surface has several effects, it...**

- Lubricates the action of the media
- Eliminates static build up
- Washes the surface continually during processing
- Prevents impregnation of hard abrasive particles into the soft composite resin surface
- Prevents fibre damage

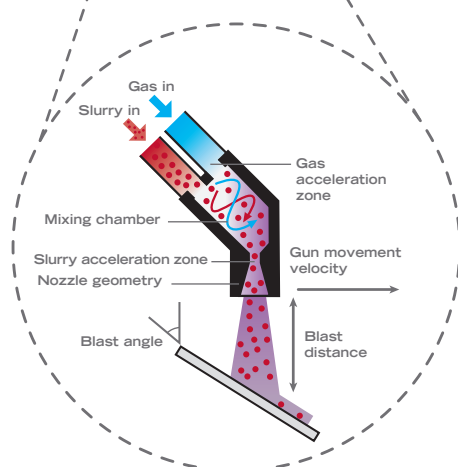
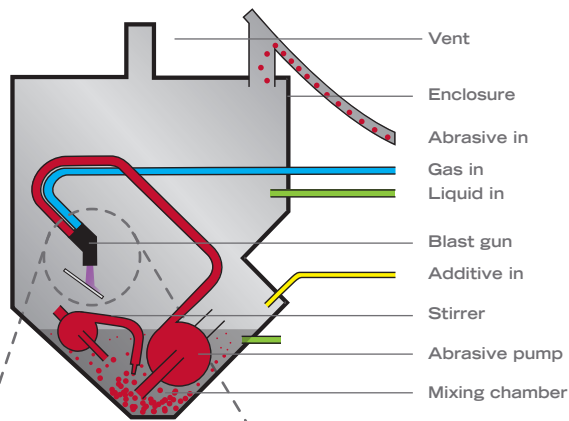
**The last point is particularly important as fibre damage can compromise the integrity of components.**





Strong and light composite propeller

## The controllable factors of wet blasting



**Gas** - Type, pressure, flow speed and temperature

**Slurry** - Solid/liquid ratio

**Liquid** - Type, pressure, flow speed and temperature

**Solid** - Type, size, hardness and shape

**Gun/part kinematics** - Velocity, distance and angle

### Automatic and manual finishing

Our automatic and manual wet blasting machines that are well suited to the finishing of composite components

Automatic machines ensure complete and consistent surface finishing every time. They also boost productivity and as a result deliver excellent ROI. This type of machine is ideal when components are similar to one another and when production volumes are higher.

Manual machines on the other hand are well suited to smaller production volumes and where components regularly differ from one another.

### The benefits of wet blasting

The advantages of wet blasting composites for bonding, lacquering or painting are numerous:

- Rapid efficient removal of resinous residues, grease, oils and other contaminants
- Production of a surface to a specific Ra level of roughness that is perfect for chemical bonding, lacquering, paint or other coatings
- Creation of a surface that allows for the even application of adhesives, paints and other coatings
- An ever-present water buffer that prevents impregnation of abrasive media and that protects the fibres in composites
- The same Vapormatt machine can be used to treat all composites, metals, plastics and ceramics prior to bonding with equally acceptable results
- There are no health or environmental side effects, and the process is completely dust free
- Highly controllable so precisely the correct finish can be applied to composite components
- In the case of automatic machines, exactly the same finish is delivered to every component with the additional advantage of increased productivity and subsequent ROI

## Why work with us?

Vapormatt isn't just the world leader in wet-blasting. We invented the process and remain solely focused on it to this day.

Since Norman Ives Ashworth developed the first wet-blasting machines in the 1940s, we've been developing, improving and refining wet blasting for edge radiusing, surface preparation and peening. And we're still led by the Ashworth family today, continuing to design and manufacture bespoke machinery and after-market services built to the specific requirements of your composite manufacturing business.

Our expertise spans many different sectors: from tooling carbide insert manufacturing, to the preparation of composites for bonding.. Our breadth of knowledge means we can explore a wider range of applications that benefit a business like yours.

Because at Vapormatt, while we might be pioneers of wet-blasting technology, we never believe the job is done. We're constantly researching, developing our techniques and discovering new technological enhancements that we can apply to the preparation of composites.. Consequently, we hold and have patent applications pending in significant areas of process control and repeatability.

When working with you, we'll build a long-term technical partnership, giving you access to our know-how and world-leading wet blasting services. As a result, we understand you may need us to develop methods and processes in confidence. You'll benefit from our discretion too – in fact, we have a long track record of doing just that with our key customers across a number of high-tech sectors.

## What you can expect of us?

- **Integrity** - We always conduct business with you in a confidential, honest, open and ethical manner
- **Commitment** - Every member of our team aims to exceed your expectations at every level
- **Innovation** - We're at the forefront of wet-blasting technology, implementing our technical expertise
- **Value** - You gain value from us through our high levels of service and technical excellence
- **Collaboration** - As a customer focused company, we work collaboratively to ensure you enjoy the best possible experience

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## The Vapormatt Promise

In designing and manufacturing specialist machines that meet your exact requirements, we're always improving. Always refining. Always pushing the boundaries. We build on the successes of the past, incorporating proven designs and approaches, and combine them with innovative thinking to meet the specific challenges we face together with you.

Throughout that collaborative process, we're also completely honest and discreet. And it's in this respect that we make a promise to you.

As we develop more efficient, more seamless and more effective ways to deliver the benefits of wet-blasting to you, any off-the-shelf solution is unlikely to be suitable. So complete validation of every design detail is practically impossible, and some functions – software, for example – will inevitably need modification as they're integrated into your processes.

Equally, once the equipment is installed on your premises, things are unlikely to be up and running without a glitch from the first moment, in a plug-and-play manner. Performance will always improve as operators and maintenance teams become familiar with the machines and their operation.

Other manufacturers might shy away from such an honest admission. However, we accept that this is simply part of building and refining the right wet-blasting machines for you. That's why we promise to make the entire Vapormatt team, including our engineers, designers and sales specialists, available to offer advice, guidance and practical assistance once the equipment is installed and integrated in your workplace.

**And we won't be satisfied until it's working to its full potential and this promise is kept.**

### The four pillars of our promise:

- To continuously improve the design and manufacture of our equipment
- To provide you with machines of the highest possible quality
- To support you in achieving optimal performance from your machines
- To collaborate with honesty and discretion