THE WETBLASTING PROCESS

Wetblasting is the propulsion of a mixture of water and abrasive (a slurry) via a blast nozzle, which on impact cleans, degreases and removes debris.

The water media slurry is contained within the cabinet sump, delivery of the slurry to the manual blast nozzle is via a glandless polyurethane pump which is submerged and externally driven using an electric motor. When the slurry is pumped to the blast gun it is accelerated using compressed air to provide the cleaning effect.

After contact/impact with the components the slurry then drains back into the sump, creating a recirculating system. Fine broken down media and other contaminants are fed via an overflow to a sedimentation filter unit positioned at the rear of the machine.
GENERAL ARRANGEMENT

INDEX TO ITEMS

1. ROOF LIGHTS
   4X FLORESCENT TUBES

2. EXHAUST VENT TO WHICH PLASTIC PIPE ATTACHES

3. ELECTRICAL CONTROL BOX

4. WINDOW WIPER WITH WASH

5. WATER WASH GUN CAN BE USED FOR REFILLING ALSO

6. TURNTABLE*

7. REGULATOR AND AIR PRESSURE GAUGE

8. OPERATOR CONTROL PANEL ON/OFF, ESTOP HEATER*, & RESET SWITCH

9. MOTOR 3 PHASE OR OPTIONAL SIGNAL PHASE

10. FOOT PEDAL ON / OFF (OPTIONAL LATCHING IF REQUIRED)

11. WATER DRAIN OFF ONLY

12. MAIN DRAIN

13. REPLACEABLE RUBBER BUFFER PAD PREVENTING WEAR TO HOPPER BASE

*OPTIONAL
SECTION 1

INSTALLATION

The Aquablast machine range does not normally require bolting to the floor except in special build units which may be unstable. INSTALLATION AND ANY NECESSARY GUARDING ARE NOT THE RESPONSIBILITY OF THE MANUFACTURER. The commissioning of the machine once installed should be carried out by a Vixen sales or service engineer or in conjunction with advice from our factory.

1.1 GENERAL INSTRUCTIONS

A The machine should be sited on a firm, level base capable of supporting the weight of the machine and the component loads not forgetting the water and abrasive weight also. In most cases the machine would be free standing.

B The sedimentation box is normally situated at the back of the machine as near to the overflow as possible therefore preventing long lengths of tubing which may block.

C Water connection – the Aquablast requires a mains water connection to the rear of the machine. The mains water normally feeds the window wash and the hand operated rinse gun, which is also used to re-fill the machine with water.

D Vapour Vent – The machine has a 100mm circular vent fitted at the back on the top of the machine, this allows the machine not to have a positive pressure inside the blast machine. The 100mm vent can have a plastic extension pipe and adapter fitted which is supplied separately, this prevents vapour debris falling onto the top of the machine. It is also possible (but rarely required) to connect the vent to an external wall via the extension pipe if required in “clean room” situations for example.
1.2 ELECTRICAL

A  A standard Aquablast cabinet should be connected to a 25amp 3 phase neutral & earth supply (including 3kw heater). Alternatively the machine can be supplied single phase, in this case the machine using the inverter can operate from a 16amp 240V single phase supply (excluding 3kw heater).

B  The pump motor is connected to the mains control panel by a small socket connection externally mounted on the plastic case. This can be unplugged allowing the pump and motor assembly to be carried to a bench for service without disconnecting any wiring.

C  All electrical supplies and connections are the responsibility of the user. If on site any wiring connections are not suitable to the environment then this modification is not the manufacturers responsibility.

WARNING: WITH 3 PHASE UNITS IT IS VITAL THAT THE DIRECTION OF THE MOTOR IS CHECKED BEFORE FILLING THE MACHINE WITH WATER.

RUNNING THE MACHINE IN THE WRONG DIRECTION WITH WATER WILL UNSCREW THE IMPELLER IN THE PUMP AND WILL REQUIRE DISMANTELING.
1.3 COMPRESSED AIR

A  The Aquablast machine requires a compressed air supply to operate. The compressed air requirement depends on the blast gun nozzle size and the pressure required to clean effectively.

It is not normal to clean using air pressures greater than 60psi (4.5 bar) as the greater the air pressure the more vapour generated and visibility is impaired. Therefore to increase cleaning efficiency from the standard nozzle usually fitted (12.5mm) then a larger 14mm nozzle can be fitted with a larger air jet using a greater volume of air.

Typical air volumes are detailed in section 3.1
2.1 PRINCIPAL OF THE AQUABLAST

**OFF** At the off position the machine is at rest with only the water heater and cabinet lighting switched on. When the machine is stood for thirty seconds or so, the media separates from the slurry and will settle at the base of the machine hopper. The liquid will be above which has the benefit of easy replacement when over contaminated. The liquid only may be drained through the upper ball valve (No. 11 on G.A. drawing) and afterwards re-filled using the mains water hand gun, in the cases of a closed loop system then the machine will require filling from an external hosepipe. Finally after re-filling a rust inhibitor/detergent maybe added if required.
2.2 PRINCIPLE OF THE AQUABLAST

INITIAL RUNNING Once the foot pedal is depressed the machine begins to operate. Make sure that the operator has a firm hold of the blast gun at this point otherwise damage to the machine may occur due to the blast gun moving due to water pressure! When the machine is running the electric window wiper and wash operate simultaneously with the electrically driven pump, a solenoid valve opens also allowing the compressed air to the blast gun. It is normal during the first few seconds (10-20) that the gun is only propelling water mainly until the water agitation nozzle mixes both the water and abrasive properly.
2.3 PRINCIPLE OF THE AQUABLAST

RUNNING After initial running the water and abrasive are now fully mixed to a slurry and the window wash will be adding mains water to the sump, all be it at only a few litres /hour. This additional water will exit the machine via the overflow. Typically small broken down media floating near the top of the water level will be finer than near the pump inlet. This water overflowing then will contain mostly debris and unwanted abrasive and can be disposed of through the sedimentation box. The free standing sedimentation box can be emptied periodically firstly by draining the water off and disposing of, and then emptying the box of debris and broken down blast media.
SEDIMENTATION FILTER AND CLOSED LOOP RINSE

The purpose of the sedimentation filter is to separate solid particles from the water coming out of the overflow. It is inevitable that with the window washer and the mains water rinse gun using mains water that over hours of blasting the water level would increase if no overflow was fitted. The overflow serves another purpose though in bringing debris and soils out of the slurry which would otherwise over contaminate the blasting water slurry solution. There are two types of overflow systems.

A Standard Open Drain Overflow

This system simply has the sedimentation box situated at the rear of the machine and accepts water via the overflow into the sedimentation box. The baffle within this box retains particles of abrasive (usually broken down) together with debris and soils which is removed when blasting. The debris settles to the base of the sedimentation filter and is mostly trapped in the corner of the baffle as shown. Periodically the filter will need emptying and water may usually be disposed down a foul drain and the solid particles in a waste bin. The frequency on emptying the sedimentation box will vary depending on the usage of the mains water rinse gun and the water flow directed to the window washer. As both of these use mains water and are operator dependent so is the frequency of water and solid disposal.
B Close Loop Rinse

This system consists of the sedimentation box as standard but have several options.

An electrically operated solenoid valve which only allows water to drain via the overflow after the blasting operation ceases. The time delay is adjustable but usually 1 – 2 minutes depending on course or finer abrasives used. The purpose of the delay is to allow the abrasives to settle (with finer abrasives the delay should be longer than with coarser abrasives) in the machine hopper and following this the valve opens and allows over filling of water to exit via the overflow tube to the sedimentation filter.

It would be expected therefore that this system would differentiate better with fine broken down abrasive (which should be discarded anyway) and good re-usable abrasive. Therefore water exiting the overflow will be of higher quality or less contaminated. The closed loop system has a paper filter and carrier supplied and due to the water being less contaminated the debris exiting is collected mainly on the paper roll. The paper roll needs to be pulled through manually when it becomes over contaminated. A 12volt pump is fitted to the base of the sedimentation filter which supplies relatively clean water to the rinse gun. Therefore the only overfilling occurring with use is the window wiper which is usually consuming 5 litres of mains water/hour and therefore allowing hours of blasting before the sedimentation filter needs emptying.

The closed loop system can be retrofitted to a machine and costs details etc are available through your distributor or the manufacturer.
SECTION 3

THE BLAST GUN

The blast gun fitted to the Aquablast is a polyurethane moulded unit designed to resist wear due to abrasive and water running through it. The blast gun consists of 4 components as shown in the exploded diagram below.

1. Air jet (hardened steel)
2. Grub screw
3. Polyurethane gun body
4. Nozzle
5. Nozzle retaining ring

All the above parts will wear in time and require replacement, however the first component to wear is the hardened steel air jet. This is located or held in the correct position using the grub screw shown. Rotation of the air jet periodically will extend the life of this, examination is quite easy when the nozzle is removed. The same principle of rotation will also increase the life of the nozzle.

3.1 NOZZLES & AIRJETS

There are two main nozzle sizes offered with the 915 blast machine, 12mm & 14mm, and with each nozzle is a corresponding airjet. The larger air jet will consume more compressed air. Consumption and jet sizes are detailed in the chart below. In addition the machine is fitted as standard with a silicone carbide nozzle, if with aluminium oxide the wear of this nozzle is excessive a boron carbide replacement is available with a much greater life for a marginal increase in the cost.

<table>
<thead>
<tr>
<th>Air Jet No.</th>
<th>Size (mm)</th>
<th>Nozzle Size</th>
<th>Air Consumed 30-50psi</th>
</tr>
</thead>
<tbody>
<tr>
<td>HF3</td>
<td>5mm</td>
<td>12mm</td>
<td>24 - 34 cfm</td>
</tr>
<tr>
<td>HF4</td>
<td>6mm</td>
<td>14mm</td>
<td>40 - 60 cfm</td>
</tr>
</tbody>
</table>

NOTE The above nozzle and air jet combination are the standard we supply. Machines are fitted with standard silicone carbide nozzles, boron carbide are available if required for use with aluminium oxide.

GUIDE TO SIZING COMPRESSORS

In good condition, compressors generally produce 3 cfm (FAD) per horse power of the electric motor. Therefore a 5 hp motor can produce 15 cfm (FAD) of compressed air. However if a new compressor is required the cfm should be double that required by the Aquablast, gun & air jet combination for longevity and duty cycle.

N.B. On making air connections to the machine all hoses etc should be checked for air leaks as even a small air leak can consume 3 or 4 cfm.
SECTION 4

SERVICING INTERVALS – ASSUMING DAILY USE

Daily: Check water level and contamination, replenish with fresh water if required using the water drain off valve (no. 11 on general arrangement)

Note: Make sure a detergent or rust inhibitor is replenished and maintained to the correct dosage if blasting and cleaning ferrous items.

CHECKING THE PERCENTAGE OF ABRASIVE TO WATER

To check this is quite simple.

1. Turn off air supply or turn regulator on machine to zero
2. Depress foot pedal and operate blast gun for 10-15 seconds
3. Fill a plastic container with the slurry exiting the blast gun to say 50% full
4. Allow the abrasive to settle to the bottom of the container, a 10% abrasive to water is the desired level

Weekly

1. Check condition of abrasive and replace if required. To remove abrasive connect a hose to the lower drain ball valve and drain to waste. An air agitator is fitted to the base of the hopper to create a slurry without the need to run the pump. Do not run the pump dry otherwise damage will occur. Alternatively, drain the water from the solution and dispose of the abrasive manually, rinse the machine via the lower drain valve. Close valve and recharge with abrasive, the abrasive level should be below the water drain approximately 15 – 20 litres of volume of abrasive will be sufficient for a full re-charge.

2. Check window glass and replace with new supplied by Vixen. Do not use ordinary glass in this machine, the glass fitted is laminated safety glass and ground on the edges to prevent damage to the sealing rubber.
3 Check window wipers

4 Check blast gun hoses for wear

5 Check for debris in blast media (i.e. nuts, bolts, large objects which could damage the pump)

6 Clean vent deflector from abrasive inside machine

7 Check door seal and replace if necessary, Note, the door seal has silicone between the steel and push on bead

8 Check rubber lining of cabinet

**Monthly**

Check rubber pad bonded to base of hopper, this prevents internal wear of the hopper due to media agitation from the agitation nozzle fed from the pump. The rubber is glued using a 3m adhesive (Evostik type) for bonding rubber to metal. The edges where it does not meet fully are then in filled with silicone seal.
SECTION 5

5.1 BLAST MEDIA

Obviously the types of blast media suitable for the wetblast process must be non corrosive, the most common media used for wetblasting are glass beads and aluminium oxide (Vixosheen & Vixograin Virgin) it is important that Virgin Aluminium Oxide is only used on re-claimed material can contain metallic particles which again can corrode.

Other media used would be stainless steel shot ceramic beads, glass grit and even plastic.

For further information please consult the manufacturers.

5.2 RUST INHIBITORS

It is important when blasting mild steel or cast iron components that a rust inhibitor or detergent is added to the water solution, this prevents immediate corrosion after the parts are blast cleaned. In addition a closed loop rinse is preferable which operates using filtered water in the sedimentation box which will contain a rust inhibitor that is pumped to the rinse gun (No 5 on general arrangement) as opposed to a mains water connection as normal.

5.3 DEGREASING

Wet blasting allows for oily or greasy components to be blasted without the need to be grease/oil free and dry as with dry blasting machines. The grease removed is assisted by adding a non-caustic detergent (usually a liquid) to the water solution, these detergents (available from Vixen) contain also a rust inhibitor as above.

Most degreasing detergents operate better using a warm solution. It is advisable that the electric heater has been switched on if fitted. The pre-set temperature (with the heater thermostat) is normally 40°C, temperatures above this cause high degrees of vapour and restrict operator visibility.
SECTION 6

PUMP DISMANTLING FOR SERVICE & INSPECTION

The Aquablast pump is a moulded polyurethane unit which is obviously non-corrosive and resistant to abrasive with the media slurry. The pump unit when removed can be easily inspected in the following manner.

**FIG. 1**

A Fig 1 shows the pump removed from the Aquablast, the first piece to inspect before the removal is the quick release coupling must be uncoupled shown at A. This should be checked for blockages and can be removed by opening of the clips. Any debris trapped inside should be removed and the unit inspected for wear. If worn replace, as this item uses water from the pump delivery outlet and excessive wear in the quick release coupling will result in a lower nozzle pressure & poor performance.
B First stop in dismantling the pump is to remove the four retaining bolts which clamp the two piece pump body together. Ensure that if stainless shims are fitted between the clamps these are replaced at the correct side. The shims if fitted prevent the impeller catching the pump body, it is imperative therefore that the shims are refitted to the correct face.

B.1 The impeller consists of a stainless steel housing with a polyurethane outer skin with 4 impeller blades. This will wear in due course and will need replacing when the impeller blades (4 off) wear away causing low pump performance.
C The pump impeller is threaded and to replace simply unscrew from the motor shaft. In order to unscrew this from the motor shaft simply place a screwdriver or similar through the motor shaft, via the location hole (Fig 1.B) and the impeller can be unscrewed. It is normal to use a soft mallet in order to break the screw thread lock. When re-fitting ensure that the threadlock is again used and the impeller is firmly tightened to the motor shaft once again.

1. TEST IMPELLOR FOR RUBBING OR STICKING (2-3MM RECOMMENDED)

2. ENSURE ANY 3MM SPACERS ARE PLACED UNDER THE PUMP BODY WHEN REASSEMBLED (EXTRA SPACERS MAY NEED TO BE INSERTED OR REMOVED WHEN REPLACING THE PUMP BODY OR IMPELLOR)
SECTION 7

REPLACING WINDOW GLASS

After many hours of blasting the window glass will become etched and the visibility inside the cabinet will be impaired. The frequency of the glass replacement will depend on the media being used i.e. glass bead or aluminium oxide, the ricochet hitting the glass and of course the operator using the machine. To remove the worn glass remove the inner bead from the window seal and the glass should puss out quite easily.

Changing the glass is quite a simple procedure covered below. When ordering your first replacement window it is advisable that the special tool (Vixen WDR tool No 73) is purchased to make the replacement quicker.
1. To assist the fitting of the strip it is advisable to lubricate the rubber and glass using a soap/water mix. Make sure that the rubber mould joins at the top of the machine as shown.

2. If a new moulded rubber seal is fitted be careful to use a piece longer than required and finally trim the last 25mm or so to suit.

3. When trimmed the join should be a tight fit and compressed slightly.

4. Drop the replacement window into the bottom corner first at a slight angle and proceed as far as possible without force.

5. Using the special tool (WRD73) the lip of the seal should be lifted allowing the glass to slip into position – apply more soap/water if required.

6. The WDR73 tool enables the glass channel to be opened where required and some centralising of the window within the seal by hand may be required otherwise the last corner will be more difficult.
7 Once the main seal and glass are fitted the retaining bead is the final job. Again push soap/water into the seal where the retaining bead is fitted.

8 Push bead through handle of tool (WDR73) as shown and through the eye at the end of the tool.

9 Starting at the top of the window is a different position to the main window frame rubber joint start to feed the filter strip into the main seal, the tool will open the main seal to allow the filter to be fed in.

10 The tool slides in the channel all the time feeding the filter strip through the handle and eye. Move/twist the tool slightly from left to right will assist the process.

11 After making the complete circuit the tool is removed and the trim bead should be cut to length allowing a 2 or 3 mm overlap so it is compressed when in place.

12 The spur on the handle compresses the overlapping filter strip into the channel ensuring the tight joint seal that is required.

Finally check inside the cabinet and make sure the seal is seated correctly before putting wiper/washer back in place.

01642 769333 • SALES • SERVICE • SPARES • MEDIA
8.1 SERVICE LINE DIAGRAM

1. 1/8" PORT 230V AIR SOLENOID VALVE
2. 1/2" PORT PILOT AIR ACTUATOR VALVE
3. 1/4" PORT 230V WIPER WATER VALVE
4. WASH OFF / MACHINE FILL GUN
5. BLAST GUN
6. SUMP HEATER 3KW
7. MEDIA PUMP HOUSING
8. MEDIA PUMP FILTER
9. MEDIA AGITATION PIPE
10. MACHINE DRAIN 2" BALL VALVE
11. WATER DRAIN 1" BALL VALVE
12. OVERFLOW DRAIN 1" CONNECTION
13. PUMP MOTOR 1PH OR 3PH
14. FOOT PEDAL
15. FILTER UNIT
8.2 ELECTRICAL CIRCUIT DIAGRAM

R1 = EMERGENCY STOP RELAY
R2 = LIGHT RELAY
R3 = SOLENOID RELAY
R4 = WIPER RELAY
C1 = PUMP CONTACTOR
C2 = HEATER CONTACTOR
WM = WIPER MOTOR