

# THE COMPOSITES LETTER

## VACMOBILE HELPS SKYBOARD HEAD FOR THE STRATOSPHERE!

Skyboard is a one-person glider that offers a highly manoeuvrable alternative to skydiving and was invented by Bob Harris of Temuka (located in South Canterbury, NZ)

The glider is a 2.3m long capsule, in which the pilot lies face down with hands on controls that offer full flying functions. On being launched from between 10,000 ft and 35,000 ft (from either a fixed wing aircraft or helicopter) Skyboard's front and rear wings, and tail plane are electronically deployed.

The pilot, using aileron and elevator control surfaces can then fly the glider before making a wheels-down or parachute-assisted landing.

Almost 100% carbon fibre construc-

tion provide a superior strength/weight ratio. The carbon fibre components constructed using over 40 precision CNC machined moulds, which can be used to reproduce parts indefinitely.

First developed in New Zealand in 2004, the new 2007 Skyboard has been fully wind tunnel and field-tested with remarkable results.

Vacmobiles.com assisted the skyboard's development in 2008 with the supply of a Vacmobile 20/2 vacuum system needed to produce the first infused version of the Skyboard.

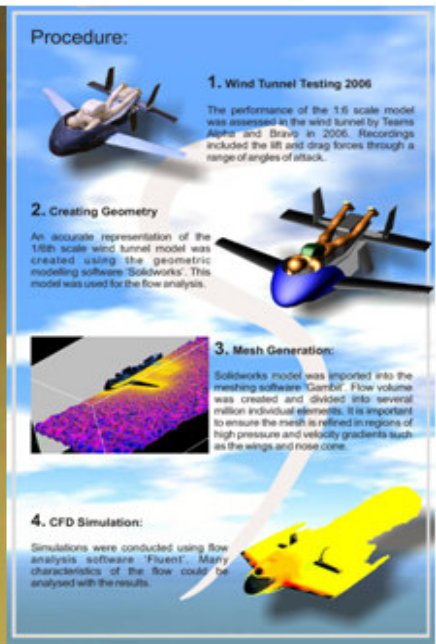
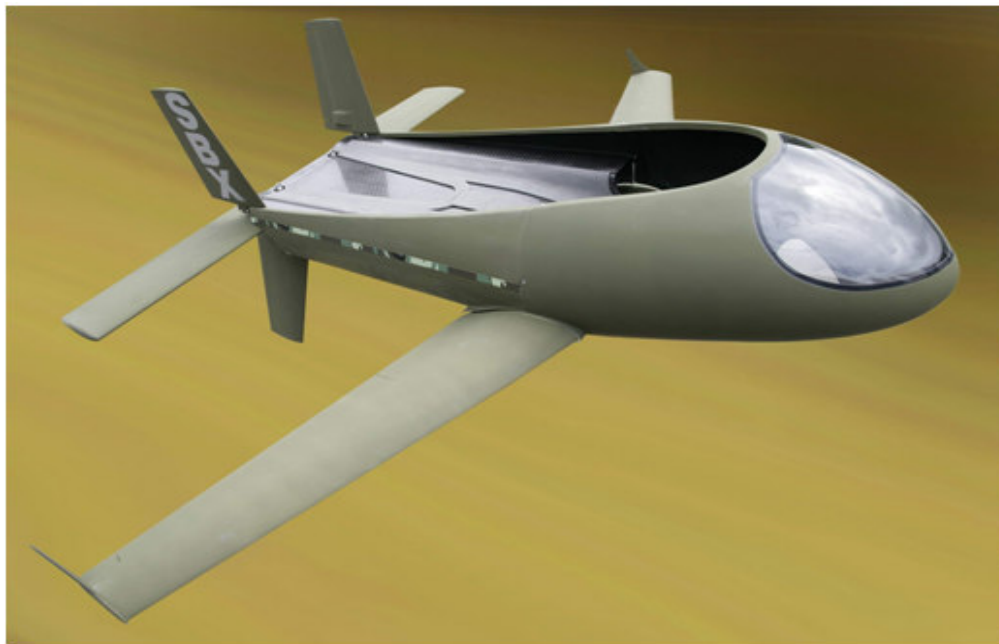
Rex Sly from Adhesive Technologies Ltd supplied the infusion resin and a raft of helpful technical advice.

Another innovative New Zealand company, Auckland-based Marine Excellence Ltd, manufactured the composite components of the skyboard at the Temuka production site and helped Bob and his team to build and assemble the first of this new generation of gliders within an amazing 4 week period.

For more information:  
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### Vacmobile products for the composites industry



Vacmobile systems



Vacuum pumps



Gauges, leak detectors & consumables



**Vacmobiles.com™**  
Better vacuum systems for better composites

# VACMOBILE® BETTER VACUUM FOR BETTER COMPOSITES

## SERIOUS WIND BLADE MOLD!

Two Vacmobile 20/2 machines were used to infuse this giant wind blade mold, which is 120ft (36.6m) long x 15ft (4.6m) wide at the root. The manufacturer was Bayview Edison Industries, one of the first Vacmobile users in the USA.



## VACMOBILE FOR WSV VEHICLE CONVERSIONS


Jason from Walton Special Vehicles (WSV) wanted a convenient to use and portable vacuum system for vacuum bagging wet laminate for making molds and production articles, such as firewalls and dashboards, for their range of American car conversions.

WSV also wanted the ability to bag pre-preg down the track and chose to trial a Vacmobile 20/2 for a couple of weeks to confirm that it was the right machine for their needs.

Steve Gaunt (shown below working with a new vehicle firewall mold) from WSV was in charge of the tests and was very happy with the results.

## ESSENTIAL VACUUM PUMP CARE CARD

Vacmobiles.com has released a laminated “essential vacuum pump care” reference sheet which provides invaluable tips for keeping your pumps in good order as well as providing a water vapour versus temperature graph. Please contact one of our team if you want a copy .

**ESSENTIAL VACUUM PUMP CARE** 

For more information refer to instruction booklet supplied with machine!

**Before the first use in a new location**  
 Please ensure the power supply voltage is correct and the power cord is of sufficient size for the current draw of the pump (refer to label next to motor fan). Check that the cord and its plug and socket are in good condition.

**Always check the oil level and the oil colour before and after each use**  
 If oil is not visible in the sight glass and/or shows until the level is approximately half way up the sight glass. Do not fill above the top of the sight glass. If overfilled, drain out the excess. If the oil appears milky white or dark brownish in colour change it as soon as possible, as described in “Oil changing” below.

**Start-up procedure**  
 OPEN both valve levers on the manifold. Depress the brass knob on top of the vacuum regulator (which is above the top valve on the manifold). While keeping the brass knob depressed, operate the start switch. As soon as the pump is up to speed release the face of the vacuum regulator and CLOSE the valve above the pump. Alternatively, OPEN all 3 valve levers on the manifold and open one of the connection ports on the top of the resin bag. Operate the start switch. As soon as the pump is up to speed, CLOSE the valve above the pump. The reason for starting the pump with the air flow on is to reduce the starting load on the motor. This is particularly important in cold conditions. **Do not allow the pump to run for more than 1 to 2 minutes with the oil flow.**

**Warm-up procedure**  
 As soon as the pump is up to speed, ensure the valve above the pump is CLOSED and allow the pump to warm up to maximum vacuum for at least 30 minutes before using the machine. **Switching the pump up or off full vacuum prior to use will minimize air contamination from vapours such as water vapour and styrene. Refer to page 2 for more information.**


**Shut-down procedure**  
 After completion of the work, CLOSE the valve above the pump and leave the pump switched on for at least 30 minutes, leaving the pump run at full vacuum after use will help remove water vapour contamination from the pump oil. As long as the oil is in good condition, long term running at maximum vacuum will not harm the pump.

**Routine cleaning of external surfaces**  
 Regularly wash the pump and motor external surfaces with compressed air, paying particular attention to the top end of the motor. Best results can usually be achieved with the pump running, but **take care not to insert the cleaning nozzle into the moving motor fan!**

**Oil changing**  
 Change the oil when the pump is hot. Take care when removing the oil drain plug as both it and the drained oil may be hot enough to cause burns. Change the pump oil as soon as it discolors when it turns from yellow/grey to other milky white or dark, or every 500 operating hours – whichever is the sooner. Use Vacmobiles oil, or oil recommended for vacuum pumps. Oil quantity 1 US pint or 0.5 litre.

**Exhaust oil mist separator and gas ballast filter service**  
 Change exhaust oil mist separator and gas ballast filter every 12 months or as soon as one of the following occurs:  
 • New exhaust filters gaskets after changing.  
 • Motor overload trips on stalling or during the course of a job – but first check power supply voltage is correct and the power cord is in good condition.

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**WATER VAPOUR & VACUUM PUMPS** 

Water vapour is often the unseen cause of vacuum pump problems in the composites industry. It originates from the water content in the atmosphere. This is absorbed into resins and onto the surfaces of moulds and bagging films. Under certain conditions of vacuum and ambient temperature (as shown in the chart below), water will be evaporated from these materials and transported to the vacuum pump. Especially if the pump is cold, the water vapour will condense into liquid water on the exhaust side of the vacuum pump. The liquid water may circulate with the pump oil and then harm the pump in a number of ways:

1. It will convert back into a relatively large volume of water vapour on the inlet side of the vacuum pump and its presence will reduce the effective capacity of the pump.
2. An emulsion of oil and water may block the vent filter or mist filter on the exhaust side of the pump. The increased pressure may overload the pump, causing the motor to overload to cut-off and stop the pump.
3. Liquid water in the pump will cause internal corrosion when the pump is stopped for any length of time.

Water vapour problems may be reduced by storing raw materials in a dehumidified environment and by keeping the work area as dry as practical. While these are good practices, they may not always be feasible and the most practical solution is usually to provide optimal vacuum pump running conditions and implement a rigorous oil change regime – as detailed on page 1.

**Using the water boiling point curve to assess the water vapour risk**  
 Some water vapour will be present in almost every vacuum situation, but there will be a large increase in volume when liquid water starts to boil. Water will boil at boiling temperatures as the vacuum level increases – see water boiling point chart below. Any combination of temperature and vacuum above the boiling point or will generate large volumes of water vapour until all of the water has cooled down. If required to operate at any condition above the curve the vacuum pump should be warmed up first and the oil condition should be checked on completion of the job – as described on page 1. A slow down in vacuum pump performance should also be expected until the vacuum pump has removed the water vapour and discharged it from the pump exhaust.

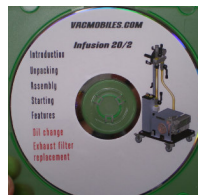
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Picture

## FREE VACMOBILE DVD

Please email [brendan@vacmobiles.com](mailto:brendan@vacmobiles.com) if you would like a copy of a DVD showcasing the features of the Vacmobile 20/2 and demonstrating a panel infusion.



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 Better vacuum systems for better composites



# VACMOBILE® BETTER VACUUM FOR BETTER COMPOSITES

## SUPERBOAT INFUSION AT SANCTUARY COVE BOAT SHOW MAY 2008

David Joseph from Queensland based Absolute Vacuum & Engineering assisted FGI with the supply and setup of resin infusion vacuum equipment for this year's Sanctuary Cove boat show in Queensland Australia.

The equipment scope consisted of a Vacmobile 20/2 mobile infusion

vacuum system and two AVE 10 litre HDPE resin catchpots for an infusion demonstration of an 8m Paul Gibbs offshore supercat Outboard Lite (400hp category) deck.

The pictured mould is 4m wide and 8m long and the layup was successfully infused in 23 minutes.

David has a wealth of vacuum experience in vacuum bagging, resin infusion and light-RTM applications and is available to help Australian customers with their projects.

Please contact David Joseph for more information;

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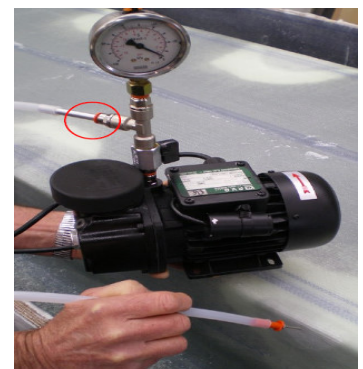


## VACUUM NEEDLE KIT

It's common in any first time infusion layup to encounter dry spots in the laminate due to leaks in the bag, mold or permeability inconsistencies in the laminate or flow stack.

To ensure complete wet-out Vacmobiles.com has released a low cost vacuum needle kit that may be used to increase the vacuum level in a defined region of the bag to draw wet resin from surrounding areas. This will promote full wet out and eliminate dry spots.

We have been amazed at the results from our initial tests and offer the kit as an add-on to suit any Vacmobile 20/2 system, or as a standalone repair kit complete with a small dedicated vacuum pump as shown below. Please contact Brendan for more information.



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## FGI & VACMOBILE INFUSE A RIB HULL

The Vacmobile team was pleased to work with David Lees from FGI in June for a trial infusion of a 5.5m RIB hull infusion. A traditional user of wet laminates, David's client was interested in reducing the hull weight to improve efficiency and provide their product with a competitive edge in a market where energy consumption is a key issue.

We supplied on loan a Vacmobile 20/2 machine and RT 19/11 resin trap along with a an ultrasonic leak detector and digital absolute gauge to allow the team to conduct a drop test and resolve leak issues. After a day of preparation, the client instantly saw the benefits of the infusion process as the resin began to flow.

Under David's guidance the team went on to successfully infuse a deck and the client will be undertaking an infusion using their new-found knowledge sometime in August.

Partnerships between material/resin suppliers and the Vacmobile team provide manufacturers with a low cost method to test the infusion process.



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## VACUUM & RESIN PORTS

Vacmobiles.com have released a range of cost effective reusable vacuum and resin port distribution fittings, as shown below. These were developed by Peter Kjosen, an infusion specialist we work with in the USA.

The fittings are made from UHMWPE material and are coated with mold release to ensure minimal clean-up after each use.

The fittings are designed to suit 12.7mm O.D. or 16mm O.D. polyethylene supply tubing and distribute to 10mm or 16mm O.D. spiral tie.

The beauty of using these fittings is that they can be positioned in-bag and you only need to make the bag penetration once you have successfully completed your drop test.

We have free samples to give away to the first 5 respondents.



Please contact Brendan on 0800 822 726 or by email at [brendan@vacmobiles.com](mailto:brendan@vacmobiles.com) for more information or pricing.

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