

GOT THE WINTER BLUES?

Don't let the cold weather ruin your pump or your composites

No sucky moto when you turn your vacuum pump on in the morning?

As even some northern composite shops have recently experienced, cold snaps can make the oil sealed rotary vane vacuum pumps used for composite manufacture very sluggish in the mornings. In severe conditions they won't start at all.

The cold start problem arises because vacuum pump oils have to be "straight" oils with good lubricating properties at normal working temperatures - usually around 80°C to 100°C. Unlike multi-grade car oils, vacuum oils cannot use viscosity reducing additives.

When cold, vacuum pump oil is quite thick and the sliding vanes inside the pump move less freely and demand more power from the motor. In some cases, the vanes won't even slide out of their slots for a few minutes. When this happens, the pump will turn but it won't suck.

The cold start problem is more severe with single phase motors, which are less torquy than 3-phase motors.

The first signs of cold weather related pump starting problems are;

- **Humming noise**
- **Motor overload trips**
- **Poor/no vacuum when cold**

If your vacuum pump won't start first time, do not keep trying to start it, as repeated starting attempts may burn out the capacitor/s, the motor overload (if there is one) or the motor windings.

Here are some tips to avoid winter starting problems with oil sealed vacuum pumps;

- **Leave the vacuum pump running overnight against a closed inlet valve. Running continuously at maximum vacuum will not harm an oil sealed vacuum pump.**
- **Change your pump oil. (Oil tends to increase in viscosity with prolonged use.)**
- **Open a valve to atmosphere for a few seconds when starting. (Free air flow will reduce the load on the motor.)**
- **Pre-heat the pump with a fan heater or carefully used heat gun.**
- **Use thinner viscosity oil during winter only. (Check with VABS for the correct grade for your pump model.)**



An overloaded capacitor!

6000lbs of lead no problem for 43 kg composite cargo pod!

A local airplane manufacturer needed a lightweight cargo pod with maximum load capacity. The solution was a composite pod built by Auckland-based Rivers Carbon Technologies. The pod was made using pre-preg carbon fibre with 20mm Nomex core to

provide the lightest possible weight. The outside skin, core and inside skin were cured in Rivers Carbon's autoclave in one operation. The finished item was 5m long by 1.2m wide and weighed in at only 43kgs.

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In our next issue

Custom vacuum system for composites oven.

Help! How can I stop applying too much vacuum to my lay-up?

The do's and don'ts when using a resin trap.

The Vacmobile 30/4, a new model for big infusion jobs.



Working height 1m Transport height 0.6m

The 'Infusion 20/2' – 20 m³/h of vacuum pump capacity with integral 2 litre resin trap. Compact and convenient vacuum system for jobs up to the size of a 6 m boat hull.



VABS range of purpose built resin traps, hose connectors, infusion hose, gauges, and bag fittings.



Vacuum Pumps from 4m³/hr to 1000m³/hr

Vacmobile® Composite Systems



Vacmobile 'VB' series
High capacity single and three phase powered vacuum bagging systems



The 'Quick-draw'
Revolutionary patented design, capacities up to 120m³/hr **single phase!**



Vacuum leak detectors and digital absolute vacuum gauges

6000 lbs of lead cont'd ...

As shown below, one stage in the 3g CAA certification procedure required a 6000lb load test. Note the lead ingots and semi-flattened tyres!



Rivers Carbon specialise in the design and production of lightweight autoclaved pre-preg carbon fibre products for top end motor sport, aerospace and marine customers.

www.vabs.co.nz

Rivers Carbon use state of the art equipment including a 4m long by 3m diameter autoclave capable of operating at 140°C and 5 bar of pressure. A further 1 bar pressure differential is available by utilising a rotary vane vacuum pump and manifold which quick connects to vacuum bags inside the autoclave chamber.

VABS takes care of Rivers Carbon's day to day vacuum equipment needs, providing on-site maintenance and technical support.

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And more on the Winter Blues ...

Does mold temperature matter?

You bet it does! To cure properly, thermosetting resin systems require strict observance of recommended mixing ratios, cure times, temperature and humidity levels. Special care is required when resin infusing – as this process is viscosity sensitive.

During winter, don't overlook the effects of cold ambient and cold mold temperatures. Even if the mold is in a warm room, where was the resin stored last night – in the lean-to store outside at 5°C? To make good quality composites during winter all of the components need to be at the recommended working temperature – typically around 20°C to 25°C. If the resin temperature is too low when infusing, the resin viscosity will increase, possibly to the extent that the resin will not be able to completely infuse the lay-up. If the resin is warm but the mold is cold, the resin front may "stall" when it hits the mold.

The heat transfer characteristics of the material the mold is made from will also influence winter time performance. Aluminium, for example, is particularly conductive and may be prone to cold spot formation if not appropriately warmed during infusion.

Moral of the story – forget the electricity crisis and keep warm!

Vacmobile® Composite Systems

Changing from bagging to infusion and wondering what to do about your old vacuum pump?

For health, environmental and productivity reasons, processes such as resin infusion and vacuum assisted RTM are becoming more popular for manufacturing composites.

Businesses looking at moving from chopper gun, hand lay-up and bagging will need equipment to suit the new methods. Vacuum pumps are obviously a key part of any vacuum based processes.

Companies upgrading to the new methods may have a vacuum pump lying around which they have used for bagging or veneer pressing. While some types aren't suitable for infusion processes (e.g., liquid ring, "cow shed" rotary vane and diaphragm pumps), most good quality industrial oil sealed rotary vane vacuum pumps will be a suitable basis for an infusion-capable machine. But, even if the vacuum pump is suitable for resin infusion, a resin infusion vacuum "system" must also:

- Deliver a high level of vacuum at the lay-up (up to 99% for good quality epoxy resin work)
- Prevent liquid resin ingress to the pump

These two critical requirements mean that most old vacuum systems won't cut the mustard even if the vacuum pump is suitable. This is because most old vacuum systems aren't leak tight enough for the new methods. And, usually, they haven't been designed to deal with an inflow of resin – which will destroy the pump if allowed to get that far.

While undertaking your own vacuum system upgrade may be tempting, this can be a frustrating and expensive option. Without access to the right materials, vacuum engineering experience and an understanding of the infusion process, even the most lovingly made system may not perform well enough.

If you are moving from an older vacuum process to vacuum infusion and if you have a pump you think might be suitable, please let us know. It is quite possible that your pump will be ideal for a complete system upgrade like the two examples pictured here.

With a suitable pump you will be able to reap all the benefits offered by a new Vacmobile system, while saving the cost of the pump.

Formula Cruisers
-Before-



Formula Cruisers
-After-



Stealth Boats
-Before-



Stealth Boats
-After-



Our newsletter is now going out to a world-wide audience. If you have an interesting composite product that you would like to feature in our next newsletter please tell us about it!

Vacmobile® Composite Systems

Small vacuum pump now available for R&D, part manufacture and hobbyists

Historically, cheap refrigeration vacuum pumps were the only option for low flow requirements and limited budgets in the composites field. While usable, refrigeration duty pumps aren't ideal for vacuum bagging and resin infusion. This is mainly because they are not equipped with an exhaust oil mist filter. In composites duty they tend to discharge oil vapour from the exhaust port. Apart from the unpleasantness of oil smoke in the work environment, refrigeration duty pumps may discharge all of their oil if left running for a long time. They are also more complex internally than they need to be for composites work.

Now there's a better solution!

The Italian made PVR EM 4 is a tiny rotary vane oil sealed vacuum pump ideally suited to small scale composites manufacture. It has an integral exhaust oil mist filter separator and the pump is rated for continuous use.

The EM 4 is a single stage vane pump with a maximum capacity of 4m³/hr. We can configure the pump to develop an ultimate vacuum of either 2 mbar or 20 mbar absolute, depending on the needs of the application.

The EM4 pump weighs in at a mere 5.4 kg and it's quiet - maximum noise level only 57 dB(A).

Please call for a no obligation trial of this economically priced pump.



The best just got better!

Formerly known as the 'Mini' because of its small physical size, the Vacmobile 20/2 is a serious machine for composites work. Recent enhancements include:

- A sturdy metal pump cover
- Stronger vacuum connections
- 'Easy-clean' tubing connectors
- On-board switch & overload
- Power cord connector lock
- 3/4" Camlock connection for optional vacuum clamping accessory. (Very handy!!)



VABS in overview ...

VABS stands for Vacuum & Blowing Solutions and our main area of specialty is the design and manufacture of world class vacuum systems for composites manufacture in New Zealand and export markets.

In New Zealand we also supply the further products and services listed on the right.

- A comprehensive range of quality vacuum pumps and low pressure blowers for industrial and research applications
- Spare parts for most makes of vacuum pumps
- Vacuum gauges, vacuum leak detectors, vacuum tight gland fittings and hose consumables for composites use
- One-off vacuum systems and installations – especially for composites related applications
- Vacuum problem solving
- Vacuum leak detecting
- Vacuum courses
- On site assessment and servicing
- Just good old helpful advice!

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