Global Pumps

GUIDE TO

SELECTING THE BEST PUMP

INTRODUCTION

WHEN YOU'RE PRESENTED WITH VARIOUS TYPES OF PUMPS, IT CAN BE CONFUSING TO SELECT THE ONE THAT'S BEST FOR YOUR NEEDS.

If you cannot decide – here's 10 common questions and points to consider when selecting pumps. We've outlined a few tools and recommendations to help along the way.

Before we start, our initial tip is to suggest centrifugal pumps if you have a best efficiency point (BEP), and positive displacement (PD) pumps if you don't have a BEP.

That's where most can get it wrong. They select a PD pump using the centrifugal pump calculations. So that aside, now it's been flagged, let's continue:

01. CAN YOUR PRODUCT BE POURED?

THE SUBSTANCE BEING PUMPED IS YOUR FIRST CONSIDERATION WHEN SELECTING YOUR PUMP.

There's a big difference between flowable liquids, and those containing solid objects. This determines your pump type.

For example, food processes require sanitary centrifugal pumps, but oils need PD pumps like gear or lobe pumps.
If you're emptying product from a tank and the pump will run dry, this will reduce the number of pumps to select from.
Many pumps (including lobe and gear pumps) can't run dry.
The solution would be tube or diaphragm pumps – which can run dry.

Thick products like grease also exclude certain pump types, as they require higher pressure to move the substance with force.
Whilst if your product contains solids, it limits your choice further, because it reduces your pump's flow rate and pressure.

Your product, combined with head and flow rates, determines the list of pumps that can be used.

02. SO WHAT IS YOUR FLOW RATE?

HOW QUICKLY DO YOU WANT THE PRODUCT TRANSFERRED?

Your flow rate is how much you want to transfer, over what period of time. For example, a 44 gallon drum holds 200 litres, which needs to be moved within 20 minutes.

Flow rate is typically measured in litres per minute, hour or second. For larger volumes it is measured in cubic meters per hour, which is thousands of litres per hour.

03. WHAT ROLE DOES HEAD PRESSURE PLAY?

YOUR PUMP IS ALSO SELECTED BASED ON YOUR PRESSURE REQUIREMENTS.

Head pressure is typically measured in metres. It is the height difference between discharge point and where the product is being moved from.

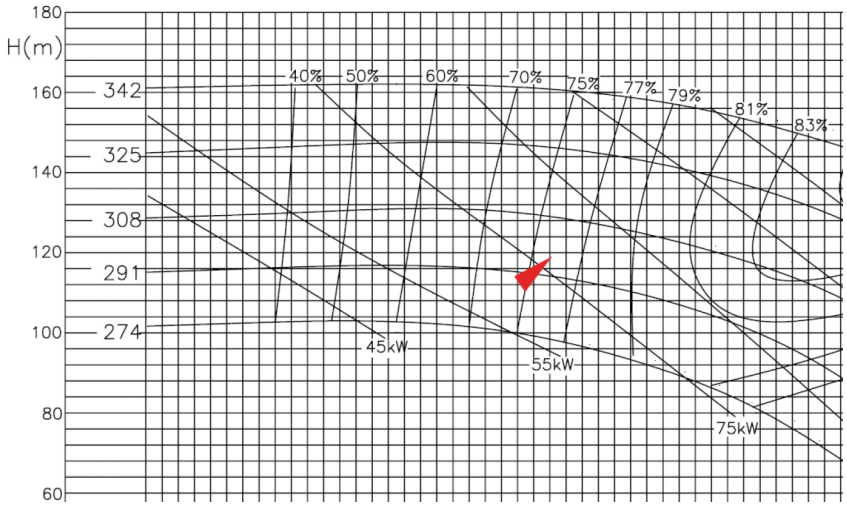
Measure where the liquid is being transferred from, to where it needs to be discharged to. If you want to pump from the floor to the roof and it's approximately ten metres, this equates to a ten metre head pressure. That is then converted to kilopascal (kPa) or pound per square inch (psi) – which pressure is measured in. Then friction pipe loss also needs to be added.

04. HOW DOES FRICTION IMPACT ON THIS?

WHAT IS NEXT DETERMINED IS FRICTION LOSS.

If your product's final destination is two kilometres away then friction needs to be considered when finalising your head pressure, as it could require around twenty to thirty metres head pressure to achieve that distance, depending on pipe size.

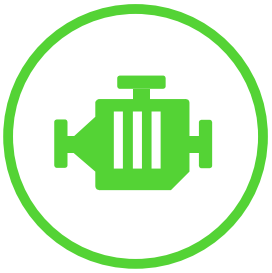
How do you calculate all this? Trust in the manufacturer's recommendations!



Manufacturers provide a table showing flow rates at different head pressures. As you increase the flow rate, the friction loss increases. Just follow their guidelines! However, no matter the size of your pump, there will be an efficiency limit.

Be sure to calculate friction loss, especially when installing pumps for longer distances - whether pumping horizontally or vertically. A short piece of undersized discharge pipe can reduce performance dramatically. Likewise, an oversized discharge line could cause pump failure.

05. WHAT ARE THE INTERNAL DIFFERENCES?



EACH PUMP IS DESIGNED FOR DIFFERENT APPLICATIONS.

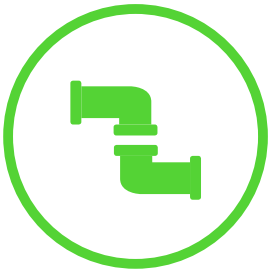
You should also check their rated speed on manufacturer performance curves.

Centrifugal pumps are one of the most common and popular pumps. These use centrifugal force to move liquids, such as water and other non-aggressive substances, for purposes including irrigation. Selecting a centrifugal pump is easy when you know the required flowrate and head pressure or total dynamic head (TDH).

Whereas others like hose pumps, use progression or positive displacement (PD). This means substances are pushed out via pulses, using diaphragms, shoes or celluloids. With these pumps the flow rate won't change much.

When selecting a PD pump, remember there will often be an impulse loss added to the TDH. This is because PD pumps pulsate. You can install pulsation dampeners to reduce the impulse loss. Plus PD pumps can be geared to a specific speed.

06. DOES SUCTION IMPACT THINGS?



ALWAYS KEEP THE SUCTION LINE AS SHORT AS POSSIBLE.

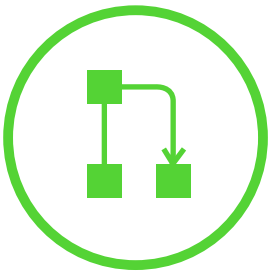
Don’t forget to include the suction line’s length in friction loss calculations and the height.

Pumps are pushers. They don’t suck liquid. Suction lines go from the liquid source to the pump. Pumps create vacuums where the atmospheric pressure pushes liquids into the pump. Centrifugal pumps create a low pressure in the eye of impeller.

Atmospheric pressure then pushes that liquid in. The maximum that you can ever hope to draw liquid up is 9.8 meters at ambient temperature at sea level. Keeping the suction line as short as possible will ensure that the pump doesn’t fail or cavitate.

Cavitation means the pressure on suction drops below the vapour pressure of the liquid. As it flows through the suction of the pump, the velocity increases and pressure decreases. The turning of the impeller increases velocity therefore reducing the absolute pressure of the liquid. This makes the liquid start boiling at 20 degrees, because of the reduced vacuum.

In sufficient positive pressure at suction, vapour may occur and cause cavitation. Consequently, you want to try and move the suction line as close as you can to the source.



07. REMEMBER TO CONSIDER OTHER INSTRUMENTS!

YOU CAN'T JUST RELY ON CALCULATING THE FRICTION OF THE PIPE.

You need to allow for the fact that there's beams, dowels and other things that will create friction. Always remember to include valves, bends and other instruments into your friction loss calculation.

08. HOW WILL YOUR PRODUCT REACT WITH DIFFERENT MATERIALS?

YOU NEED TO ENSURE THAT THE PRODUCT YOU'RE PUMPING IS NOT GOING TO REACT WITH THE MATERIALS WITHIN THE PUMP.

The key here is to refer to the chemical resistant guides and charts available. This is crucial to review, as there are certain materials that can dissolve or react.

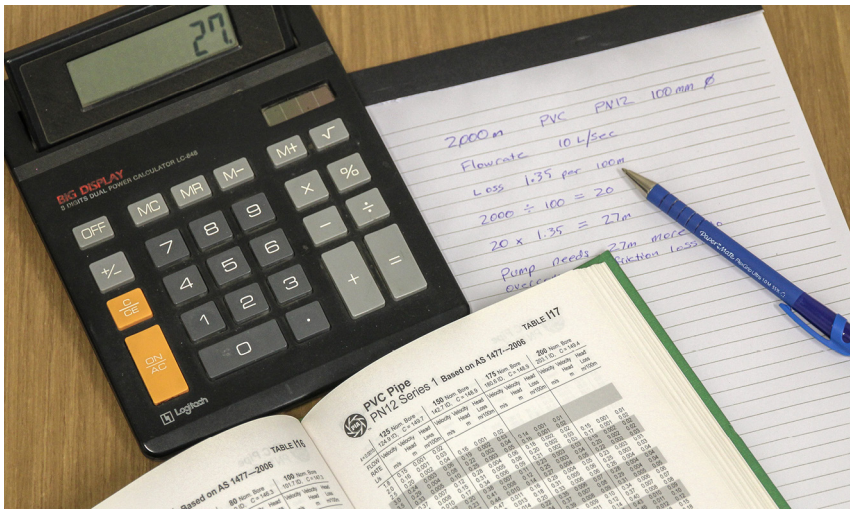
For instance, acid will dissolve dyes and materials that can contaminate the product. Ensure that not only are they compatible, but if you're pumping food – are they going to be food correct materials? Some materials will contaminate a liquid that might be used in explosives for example – so there can be serious life-threatening consequences, depending on your product.

09. DO NOT USE SAFETY MARGINS!

PUMPS ARE LIKE MEDICINE DOSES – THERE'S NO MARGIN FOR ERROR.

You must follow specific instruction and calculations! Don't risk destroying your pump by trying to second-guess – or leave approximate windows either side, to gauge things.

Pumps are a specific science, as they can't operate off their manufacturer's performance curve. Manufacturers publish 2-pole and 4-pole curves to cover a wider range of applications.



Never add safety margins to your selection. If you do, then please tell your pump consultant, as this could cause the pump to operate off the curve.

Whilst on the curve, it's recommended to select centrifugal pumps to the middle of the curve, or slightly to the right of the centre. That is often considered the BEP (best efficiency point).

10. HOW DO I CHOOSE BETWEEN POWER, PERFORMANCE AND MANUFACTURERS?

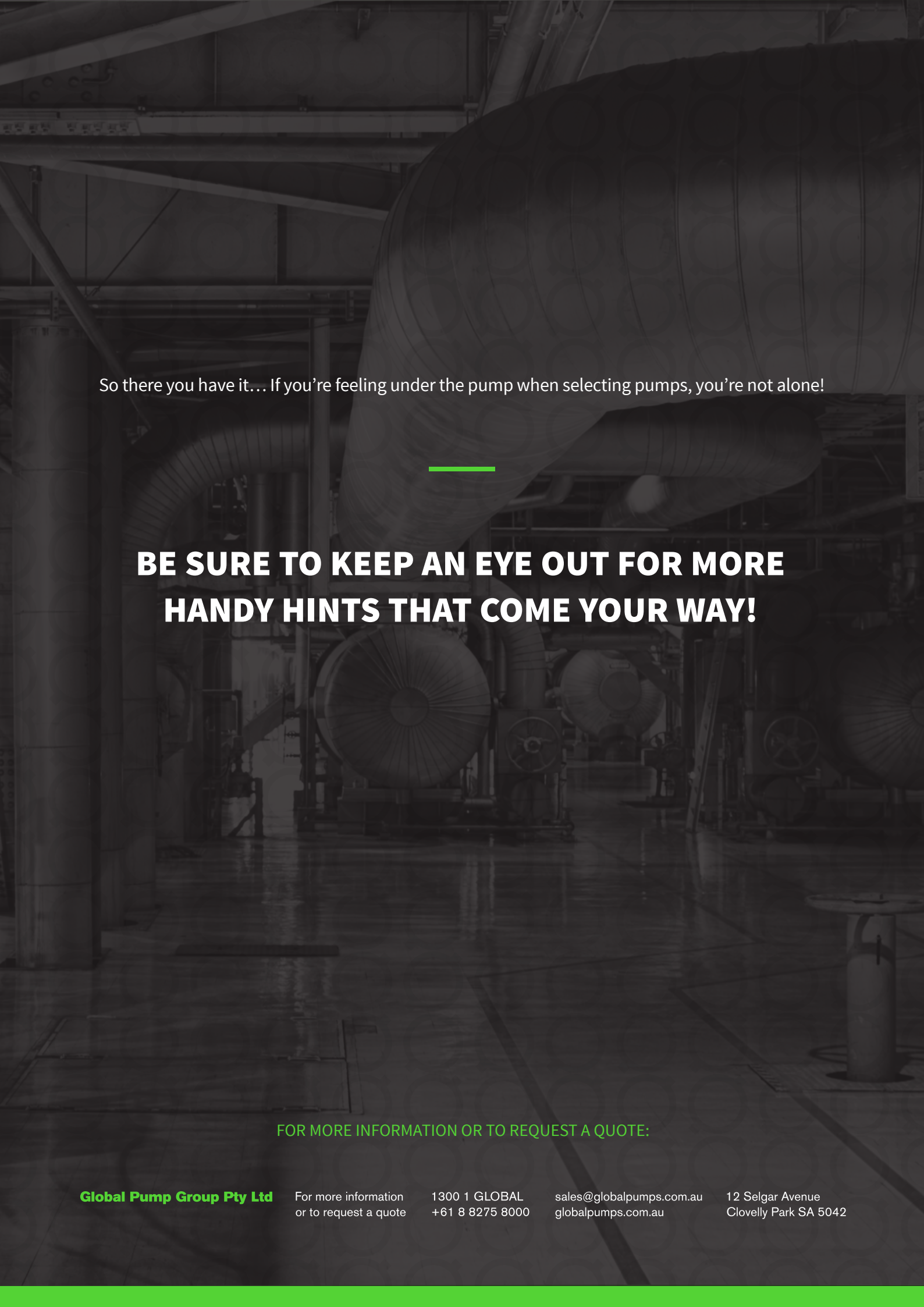
PUMPS CAN BE POWERED A NUMBER OF WAYS, DEPENDING ON YOUR REQUIREMENTS.

You can select from either single-phase (240 volt power) or 3-phase (415 volt power). Where you don't have electricity at all, the alternatives in these cases are compressed air operated or hydraulically operated pumps – based on your location and needs.

There's a number of pumps that will operate on electricity but won't operate on compressed air, so it's important to decide upon your power supply in advance. Your hands may be tied there, or the selection may be varied.

Manufacturer choice should currently be based around your application. Ask an expert wherever possible, as there are so many varieties in pumps that can do the same job.

Always consult a pump expert when selecting pumps for slurry, viscous liquids or for any substance that has a suction lift involved. For best practice, you should do this even if you're an expert yourself, to reduce the risk of human error.



So there you have it… If you're feeling under the pump when selecting pumps, you're not alone!

BE SURE TO KEEP AN EYE OUT FOR MORE HANDY HINTS THAT COME YOUR WAY!

FOR MORE INFORMATION OR TO REQUEST A QUOTE:

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