

THE OBART

Pumpology Guide



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SELECT THE BEST WATER PUMP FOR YOU

In this section, we're going to help you to select the right water pump or diesel/petrol pump by telling you what you'll need to tell us. What we want to do here at Obart Pumps is make sure you don't just buy the biggest and the most expensive, thinking this may be the best. Buying the wrong pump, cheap or expensive, can be costly: pumping more than you need it to (wasting energy), failing prematurely and damaging property and/or needing to be replaced. Knowing a few key pieces of information before you begin will save you time and make sure you spend your money on the right pump for the job. Giving us the wrong information often leads to problems, just like a computer or mobile device.

I WANT TO REPLACE AN EXISTING PUMP

You'll need to tell us about the pump you're replacing.

If so, have a look at the specification plate. Make a note of the manufacturer's name and model number. Write down the voltage and as much other information that you can see.

Try and remember how long it has been working. A few months or a few years? If it is only a few months it might not be the right pump for the job so we'll need to know more about what you want it to do. A few years old should mean it has worked satisfactorily.

Has it been trouble free during its life? Try and remember if you've ever had to attend to it. What was the problem?

If you can't find a specification plate take a picture of the pump and email it to us.

Once you have all the facts, get in contact with our sales department.

I DON'T HAVE A PUMP TO REPLACE - BUYING A NEW PUMP

You'll need to describe to us the work the pump will be doing.

We'll need to know how much liquid you want to pump, so you'll need to estimate this (for example 1000 litres is the volume of liquid in an area of 1-metre high x 1-metre long x 1-metre wide). We'll also need to know how quickly you want to pump the liquid out. We measure flow rate in litres per minute.

We'll need to know how high you want to pump (from the liquid level to the end of the pipe) and then how far along the ground. We measure distance in metres.

Do you want us to recommend a pipe diameter? We'll select the correct pipe for the job and offer you an alternative depending on your budget.

If you are you using existing pipe, what material and diameter is it? (Some pipe material can slow pumping rates dramatically) We measure in millimetres.

Are there any elbows, T pieces and valves in the pipe/required? Count them up.

We'll need to know about the liquid.

- ▶ Is it water or like treacle or something in between? (more viscous liquids require more powerful and sometimes different kinds of pumps)
- ▶ What is the chemical make up? Are there hydrocarbons present? (Acidic or corrosive liquids and fuels/oils can damage certain pump materials)
- ▶ What is the temperature of the liquid?
- ▶ Does it contain solids? Are those solids soft and fragile? Are they hard and abrasive? (If so, they could wear down a pump made from the wrong material)
- ▶ Do the solids need to be chopped up? Some pumps include a chopper mechanism.
- ▶ What size are the solids?

THINK ABOUT HOW IT WILL BE POWERED

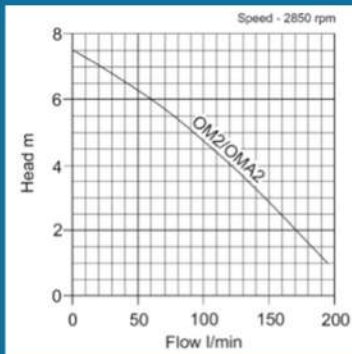
Do you want to use electricity? If it is domestic use you'll probably want 230volts, but we do supply pumps that work using 110volts and 400volts for industrial users. We can also supply pumps in 12volt and 24volt DC for use with a battery.

Do you want to use liquid fuel? Petrol and diesel are available but these pumps must be used outdoors.

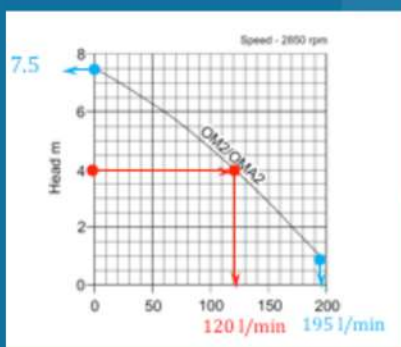
Do you want to pump by hand? Rotary, lift and force and diaphragm pumps are available but performance is limited and can be hard work if you've got a lot to pump or pumping up high. Good exercise though!

Think about what type of pumps you prefer? Submersible pumps or surface pumps?

With a pump specification, you'll often see a graph with a curve, or series of curves. This is called a "pump curve" and it is the way the performance characteristics of a pump are described graphically. The pump curve describes the relation between flow-rate and the head for the pump.



- ▶ Each curve is marked with the model number of the pump which performance it is describing.
- ▶ In the top right hand corner you will see the speed at which the pump(s) described operate at i.e "rpm" (revolutions per minute). The common motor speed for the UK is between 2800 and 3000 rpm.
- ▶ The flow rate of the pump is shown along the bottom of the graph as "Flow l/min". The numbers indicate litres per minute. NB fuel pumps indicate this in reverse.
- ▶ How high the pump can pump liquid is shown up the left side of the graph as "Head m". The numbers indicate the vertical distance in metres.



HOW TO READ THE CURVE (USING THE ABOVE EXAMPLE)

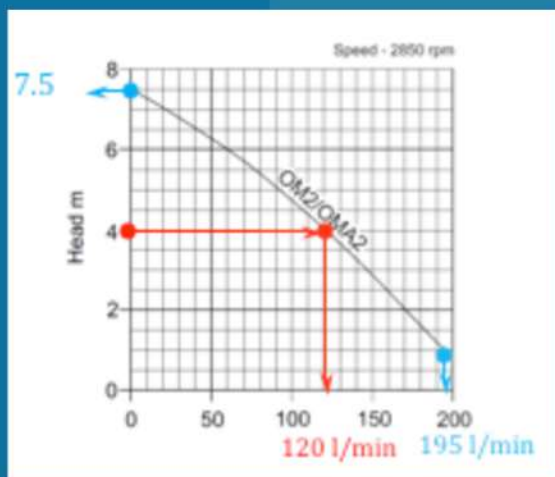
- ▶ Where the line ends on the right is the maximum rate at which it can pump. e.g. 195 l/min.
- ▶ Where the line ends on the left is the maximum height this pump can pump to e.g. liquid stops coming out e.g. 7.5 metres.

Calculate the head you are pumping at (inc. allowance for fittings, pipe material etc) e.g. at 4 metres.

Go to this point on the left hand side of the graph.

- ▶ Move across the horizontal grid line to touch the curve line.
- ▶ Drop down the vertical line to touch the bottom line.
- ▶ The point where the vertical line touches the bottom line is the performance at the head.

Example: at a head of 4 metres, the OM2/OMA2 pump will pump 120 litres per minute.



IT IS VERY IMPORTANT TO USE THE CURVE CORRECTLY

- ▶ You should aim for the pump to work in the middle third of a curve (e.g. on the above curve between 2 metres and 6 metres).
- ▶ Either side of this third and you run the risk of wasting energy and/or overloading the pump leading to damage.
- ▶ Head is crucial: pump can wear, losing flow rate.

SUBMERSIBLE WATER PUMPS

These water pumps are designed to be used fully submerged under water. They are simple to use and reliable in operation because only a discharge pipe is required and priming is unnecessary. All our submersible pumps are electric, with perfectly sealed motors close coupled to the pumping chamber to ensure safe operation when pumping fluids to the surface. Our range of submersible pumps covers all these common voltages and currents: 12V, 24V, 110V, 230V and 400V, alternating current (AC), for use in domestic and industrial applications, and direct current (DC) for use with batteries. AC motors operate with a mains frequency of 50Hz. Alternative voltages and frequencies are available (price on application).



These water pumps are designed to be used out of water. All pumps in this category are electric and, with the exception of model BCP20 condensate pump, they have motors rated from IP44 to IP55 to indicate the level of protection from material and liquids. They require inlet and outlet pipe and require priming initially. Our range of surface pumps covers all these common voltages and currents: 12V, 24V, 110V, 230V and 400V, alternating current (AC), for use in domestic and industrial applications, and direct current (DC) for use with batteries. AC motors operate with a mains frequency of 50Hz. Alternative voltages and frequencies are available (price on application).



These water pumps are designed to be used out of water and must not be used inside buildings or partially enclosed areas. Powered by petrol or diesel, pump end options are either centrifugal or diaphragm. Both types of engine pumps require inlet and outlet pipe, however, a centrifugal requires priming initially to self-prime and should not run without water. A diaphragm pump does not need priming and it can run dry.



FLOAT SWITCH

A float switch is a level controller that has a buoyant, water-tight device that lies on a liquid, actuating a micro-switch when the level rises or falls, turning a pump on or off. There are various types: Agma a floating device guided within a tube (fixed directly to a submersible pump), Remex a floating device attached to a nylon cord (indirectly linked to a pump) and Float Switches, Pendant: floating devices connected to a power cable (linked indirectly, or fixed directly, to a pump)



LEVEL PROBES AND SENSORS

These have metal electrodes which use low voltage and currents to actuate a conductive circuit, turning a pump on or off when they are touching, or not touching, the liquid. There are various types: Sensor has two electrodes encapsulated in an impact resistant rubber shroud (fixed directly to a submersible pump), Probes have single electrodes that are fixed in plastic sleeves and connected to power wire (indirectly linked to a pump) and SwitchH2O (designed specifically for use with LSC1.4S puddle sucker) has three electrodes set in an epoxy-resin holder connected to power wire (indirectly linked to a pump).

PRESSURE SWITCHES

These are electronic devices that will start or stop a pump immediately when a tap is opened or closed and protect a pump from damage caused by dry-running or water hammer. When operated within the rated pressure flow and motor specification, they can be fitted to surface mounted pumps and to the delivery pipework of submersible pumps. There are various types to cover most applications: Logicflow for surface mounted pumps with positive suction, Logicpress series, for surface and submersible pumps, have gauges and pre-programmed settings, Mascontrol for large flows and Brio 200M when adjustable settings are necessary.

VFD CONTROL

This is an electronic device that reduces energy consumption and pump wear, by varying the frequency and voltage supplied to the electric motor. VFD (variable frequency drive) is also known as adjustable speed drive, AC drive, adjustable frequency drive, microdrive, or inverter drive. In a pumping application, if an application does not require the motor to run at full speed (50Hz), the VFD can be used to ramp down the frequency and voltage to meet the system requirements. Logic SP-STP-TP are pump management devices that control and protect multistage pumps by integrating VFD technology. Simple to install and operate, not only do they save energy and even out pump wear, they remove the need for pressure tanks, check valves, gauges and control panels.



1 Phase - The electric power supply distribution of 110 volts and 230 volts. Used mainly for domestic and light industrial applications.

2 Pole Motor - A motor which rotates at between 2800 and 3000 RPM. Generally higher wear than 4 pole machines.

3 Phase - The electric power supply distribution of 400 volts + . Used mainly for industrial applications.

4 Pole Motor - A motor which rotates at between 1400 and 1500 RPM. Generally a lower wear rate than 2 pole machines.

Aggressive Liquid - A liquid that is likely to cause wear by corrosion from e.g acids, certain chemicals and seawater.

Agitator - A device that is fitted on the end of the rotor, before the impeller. Fitted with vanes, it twists with the impeller to movement of solids and slurry.

Anti Vibration Feet - Rubber cushions to: 1) prevent damage caused by vibration during pump operation 2) stop pump twisting during start up 3) protect sump floor.

Anti-Airlock - A one way valve that enables trapped air in a pump casing to be released to prevent an air-lock.

ATEX - An EU directive describing what pumps are allowed in an environment with an explosive atmosphere e.g. gas, vapour and dust.

Auto Coupling - A cast iron set, used with a rail or rails (not supplied), that allows a pump to be raised and lowered without emptying a chamber during maintenance. Comprises a pedestal, guide hook and top bracket.

Automatic Nozzle - A nozzle that will cut the fuel supply when the end is submerged to prevent a spillage.

Automatic Priming - The pump will be able to pump without any priming water.

Automatic Pump - A pump that has a float control or pressure switch to start and stop without an operator.

Back Pull Out - A design feature which allows the complete rotating element of the pump to be removed for servicing without disconnecting any pipework.

Bar - A metric unit of pressure equivalent to 10 metres of water or 14.22 PSI.

Base Mounting - Fixing to a horizontal surface.

Batch Register - A meter to measure the current quantity being delivered.

Battery Operation - A pump that must only be powered by DC electric from a battery.

Biodiesel - A fuel that is derived from vegetable oil or animal fat.

Black Water - Waste water containing fecal matter and urine.

Body - The outer part of the pump.

Buna - Nitrile rubber which is resistant to fuel and oils.

Bypass Valve - A relief valve to bypass liquid and prevent excessive pressure build up.

Capacitor - An electrical component that will start a single phase motor.

Centistokes - The unit of kinematic viscosity measured as m²/s.

Centrifugal Pump - A pump that uses an impeller to move a fluid by converting rotational kinetic energy to the hydrodynamic energy.

Chrome Steel - stainless steel.

Class A Accuracy - Classification of the meter's ability to measure low flows. Class A has the least ability to do this. Most European nations use Class B meters.

Class B Accuracy - Classification of the meter's ability to measure low flows. Class B has more ability to do this than Class A. Most European nations use Class B meters.

Clean Water - Water that is clear but is not suitable for drinking.

Clogging - when an impeller stops rotating due to a blockage.

Column Of Water - A measurement of vertical liquid usually from the discharge of the pump.

Continuously Rated - a pump or motor that can be operated constantly.

Corrosion Resistant - A material that has a lower rate of corrosion compared to another in a specified environment.

Cutter Pump - A pump that will intake liquid containing soft solids and cut them into small pieces, then pump through a pipe over a short distance.

D.C. - Direct current from a battery.

Delivery Side - The discharge/outlet side of the pump.

Demand Pump - A pump that automatically senses a change in the pressure in a pipe, from a valve/tap opening and closing, and turns the pump on or off accordingly.

Demand Switch - A switch that automatically senses a change in the pressure in a pipe, from a valve/tap opening and closing, turning the pump on or off accordingly.

Depth Of Submersion - The maximum depth at which a pump can be submerged.

Diaphragm - A sheet of rubber that is fixed at its edge for moving liquids or activating a pressure switch.

Diesel - A fuel that is used in diesel engines whose fuel ignition occurs without a spark.

Diffuser - A type of volute used with high pressure pumps to direct water to the discharge.

Dirty Water - Water that is cloudy containing very small particles.

Epdm - A synthetic rubber which is resistant to alkalis, ketones, salt/sea water and is a good insulator.

Explosion Proof - The description for pumps that are allowed in an environment with an explosive atmosphere e.g. gas, vapour and dust.

Fibrous - Solids that float or suspended, which are long and fibrous and of an organic nature.

Flash Point -The temperature point at which a volatile liquid will vapourise to form an ignitable mixture in air.

Floatswitch - A device connected to a pump, directly or indirectly, that detects the liquid level and automatically turns the pump on or off accordingly.

Floatswitch - Integral a device wired directly to a pump, that detects the liquid level and automatically turns the pump on or off accordingly.

Foot Valve - A non return valve with a strainer.

Free Passage - The dimension of a particle that a pump can take.

Free Standing - A pump not connected to an auto coupling but fitted with a hose union connected to discharge pipe for portable use or permanent installation.

Full Load Current - The maximum current expected when the device is running, and defines the rating required for circuit breakers.

Glass Reinforced Polyester - Is a composite material or fibre-reinforced polymer made of a plastic reinforced by fine fibers made of glass.

Gravity Fed - Liquid under pressure from the force of gravity only.

Gravity System - A system supplied with liquid that is under pressure from the force of gravity.

Grinder Pump - A pump that will intake liquid containing soft solids and cut them into very small pieces, then pump through a pipe over a long distance.

Grounded Earth Point - A direct physical connection to earth.

Guide Hook - A cast iron claw that is fixed to a sewage pump to move safely up and down on guide rails during maintenance. It ensure perfect connection of the pump with the discharge pipework.

Guide Hook Adaptor - An assembly that converts / enables a Tsurumi sewage pump to be used on Flygt auto coupling system.

Guide Rail Kit - A cast iron set, used with a rail or rails (not supplied), that allows a pump to be raised an lowered without emptying a chamber during maintenance. Comprises a pedestal, guide hook and top bracket.

Guide Rails - Steel or stainless steel tube required for use with guide rail kit/auto coupling.

Hand/Off/Auto Switch - A 3 position switch with two sets of contacts: one set is made in hand (direct running) and the other is made in auto (e.g. float switches).

Hard Solids - Solids that are hard and/or abrasive which may not disintegrate during pumping.

Head Cover - The component of a submersible pump that fits over the top of the stator.

High Head Pump - A pump that can develop high pressure.

IDS Rubber Cable - Cable with individually screened cable for mines and quarry use.

Impeller - The rotating component of a centrifugal pump that transfers the energy from the motor to "move" a liquid".

Internal Overloads - A component inside a motor to protect it from over heating. It senses when the motor amperage is beyond the limit and opens the circuit, stopping the pump. They can reset after the motor cools off.

Iron, Chromium - A hard iron that work extremely well in intensive abrasive wear conditions. Superior to ductile iron.

Iron, Ductile - An iron that is impact, fatigue resistant and unlikely to crack. Superior to traditional cast iron .

Jet Pump - A type of centrifugal pump with a type of volute that comprises a nozzle for creating high heads/pressure.

Light Sewage - Waste water that contains faeces, urine and toilet tissue.

Line Fuse - An electrical device that disconnects the power to the pump, from the supply, during overcurrent.

Lip Seal - A component, in rubber with a compression spring, to seal a pump shaft from liquid penetration. Good for clean liquids only.

Low Flash Point - A liquid that will combust easily.

Low Viscosity Liquid - A liquid that flows quickly i.e. has a low centipoise value e.g. water has a low viscosity compared to honey.

Manual Nozzle - A nozzle that will not cut the fuel supply when the end is submerged to prevent a spillage.

Manual Pump - A pump that does not have a float control or pressure switch to start and stop. It will require an operator to control it.

Mechanical Seal, Single - A component,with one sealing element to seal a pump shaft from liquid penetration. Generally used for low pressure and non-abrasive liquids.

Mechanical Seal, Double - A component, with two sealing elements to seal a pump shaft from liquid penetration. Generally used for high pressures and abrasive liquids.

Mono Block - A pump which is directly coupled to the motor.

Motor Fuses - Fuses fitted inside a control panel.

Motor Protector - An electrical device that disconnects the power to the pump, from the supply, during overcurrent.

Motor Supports - The brackets which a surface pump motor rests on and for fixing.

Multi Stage - A centrifugal pump that contains two or more impellers. Normally associated with high head/pressure pumps.

Neoprene - A synthetic rubber which is resistant to oil, solvents, alkalines and ozone. It can tolerate high temperatures.

Non Abrasive Liquid - A liquid that does not contain sand, silt or any other material that can cause abrasion.

Non Self Priming - A pump that needs the pump casing filled with water before starting to enable it to function. Running without water will damage the pump.

Oil Alert - A detection device in an engine that will switch off an engine, and/or prevent it starting, if the oil level drops below the minimum operating level.

Oil Chamber - The compartment that a mechanical seal operates in.

Oil Lifter - A mechanism that supplies oil to the top faces of a mechanical seal even when the level in the oil chamber drops below the minimum operating level.

On Demand - The automatic supply of liquid from a pump on opening of a valve or tap

Overload Protection Device - An electrical device that disconnects the power to the pump, from the supply, during overcurrent.

Partial Immersion - When a submersible pump is not fully submerged and the of motor cooling becomes important.

Pedestal - The cast iron bracket, fixed at the bottom of a chamber, that a submersible pump is connected to as part of a guide rail system.

Peripheral Pump - A pump that has an impeller with slots giving energy to the liquid. Good head at fairly small flow.

Permanently Pipe - Pipework that is not temporary i.e. it is fixed or buried.

Petrol - A fuel that is used in petrol engines whose fuel ignition occurs with a spark.

Polyurethane - thermoplastic that is rigid and smooth with a sealed surface that is impermeable to water.

Ponds - A small or medium sized area of water containing aquatic life and /or vegetation.

Positive Displacement - The movement of a liquid by trapping a fixed amount of liquid and then forcing (displacing) this into the discharge pipe with a constant flow.

Potable Water - Water that is safe to drink by humans.

Pressure Switch - A switch that closes an electrical contact when a certain set pressure has been reached. Can work on pressure rise or pressure drop.

Pressure Vessel - A container designed to hold water at high pressure.

Priming/Primed - The action of adding water to or having added water or water being held within the pump casing ready for operation.

Probe - An electronic level sensor.

Puddle Sucker - A pump or pumping accessory which can remove water down to a very low level and/or water which would remain after a traditional pump would stop pumping due the height of the strainer.

Pulse Output - A device that converts the rotary motion of a water meter into electronic pulses for measurement by a remotely located monitoring device.

Pump Chamber - A tank for storing waste water and sewage for use in pumping stations.

Pumped System - A mechanical arrangement that moves liquid under pressure of a pump.

PVC - Abbreviation for polyvinyl chloride. A plastic that used for pipes and insulation of electrical cables.

Quick Release Couplings - A hose fitting that provides a fast connection or disconnection without using threads or flanges.

Rails - Steel or stainless steel tube required for use with guide rail kit/auto coupling.

Residue Pump - A submersible which can remove water which would remain after a traditional pump would stop pumping due the height of the strainer.

Rocker Switch - An electrical on/off switch that rocks when pressed.

Rotary Vane Pump - A positive displacement pump that has vanes, forming chambers, which slide against the pump casing, fill and pump under pressure.

Running Current - Indicates the current expected in normal operation, which is normally noticeably less than the starting current.

Self Priming - A pump which retains fluid within the body and is then capable of a suction lift when restarting without an external suction device.

Semi Trash Pump - A pump that will accept solids in suspension, but does not have an inspection cover or wear ring found on a trash pump.

Sewage - Waste water that contains faeces, urine, toilet tissue and menstrual protection items.

Shaft - The rotor of a pump and the "pump end" of the crank shaft of an engine pump."

Side Outlet - A submersible pump which has the discharge nozzle located on the side of the volute casing.

Single Channel Impeller - An impeller with a single vane. Very large flow and large free passage of solids, which pass through the impeller.

Single Impeller - A centrifugal pump that contains one impeller. Normally associated with drainage, sewage, solids handling etc.

Single Phase - The electric power supply distribution of 110 volts and 230 volts. Used mainly for domestic and light industrial applications.

Site Water - Waste water found on a construction site which contains sand and silt in suspension.

Soft Solids - Solids that are not hard nor abrasive which are likely to disintegrate during pumping.

Solvent - A clear, colourless liquid with an odour that dissolves substances into a solution.

Spring Check Valve - A type of non return valve, spring loaded, fixed in the centre. Used mainly when a liquid is clear of debris.

Stage - A description of an impeller when inside a pump.

Star Delta - Alternative starting method to DOL for large motors. Voltage is reduced as motor is started then full voltage is applied near full speed.

Starter And Motor Protection Box - A simple control box that has an electrical device to protect a pump during overcurrent. They often have manual on/off switches.

Static Electricity - The build up of electrical charges on the surface of a material which then move by means of an electrical discharge e.g. a spark.

Strainer - A type of filter to prevent unwanted particles entering a pump. Integral on a submersible pump and external, on the suction pipe inlet, on a surface pump.

Suction Cover - a plate in pump which faces the impeller. When combined with the volute, it forces the liquid to discharge from the pump by converting velocity to pressure. It is wearing part.

Suction Lift - The negative pressure created by a surface pump, which is expressed as the vertical distance from the centre line of the pump to the water surface.

Suction Side - The side of a pump that has the suction pipe.

Suction Strainer - A filter, on the suction pipe inlet of a surface pump, to prevent entry of unwanted particles.

Surge Reduction Chamber - On a diaphragm pump this is the vertical column, which draws in liquid during the up stroke, to limit peak stress during the down stroke.

Suspended Solids - Solids that float or are suspended, not hard nor abrasive and which are likely to disintegrate during pumping.

Swing Check Valve - A type of non return valve that is flap, fixed at one side. Used mainly when a liquid contains solids.

Three Phase - The electric power supply distribution of 400 volts + . Used mainly for industrial applications.

Top Outlet - A pump which has the discharge nozzle located at the top of the pump.

Transformer - An electrical device in a submersible pump that will take electricity at a high voltage and reduce it to a low voltage.

Trash - Litter, solids and debris that are submerged or floating in a liquid.

Trash Pump - A pump that will accept solids in suspension, which has an inspection cover and a wear ring.

Tungsten Carbide Tips - The leading edges of the impeller of a cutter pump of a wear resistant material.

Twin Impeller - A centrifugal pump that contains two impellers. Normally associated with high head/pressure pumps.

Urethane - A modern rubber used on impellers to give exceptional abrasion resistance three times greater than cast iron.

Vent Valve - A one way valve that enables trapped air in a pump casing to be released to prevent an air-lock.

Venturi - A component of a pump with a nozzle to increase pressure caused by pressure differential (like in a jet engine).

Viscosity - A measure of a liquid's resistance to flow or, basically, the of its thickness.

Viton - A synthetic rubber developed by DuPont for fuels, oils, inorganic acids and other aggressive chemicals.

Volute - An inner component that surrounds an impeller and directs the liquid to the discharge nozzle.

Vortex Impeller - An impeller with a series of vanes. Capable of a large flow with free passage of large solids and long and fibrous material.

Water Features - fountains, pools, ponds, cascades, waterfalls and streams powered by pumps.

Wear Plate - A type of suction cover that is designed to be a sacrificial wearing part.

Wetted Parts - All the components inside a pump that are in contact with the liquid being pumped.

model	Manual or Auto	outlet (mm)	kW	volt	flow (l/min)	head (mtrs)	free passage (mm)	w x l x h (mm)	dry weight (kgs)	packing weight (kgs)	Price (£)	code
SV-150	M	32	0.15	230	170	6	27	145x205x390	7.70	9.00	142.00	4

Below we give an explanation of the terms we use within the descriptions and data sheets

“Manual or Auto” + on level and off level...pump operation

“M” or “manual”: a float switch is not fitted. The pump will require an operator to control the water level by switching the pump on or off at the mains because it will operate immediately when power is applied. Some pumps must not be run dry, so care should be taken not to operate them without water unless we have stated that it is possible to do so.

“A” or “auto”: a float switch is fitted. The pump will turn itself on and off automatically with a rise and fall of the water level, so the presence of an operator is not required. When power is connected, the pump will only operate when the float switch is actuated, which generally occurs at or about the point when the top of the pump casing is submerged. The float normally stops the pump when the water level is still covering the impeller, so it is normal for residual water to remain in the sump. The volume of this water can be minimised by fitting a non-return valve in the discharge pipe near the pump, to prevent backflow into the sump. It is vital to ensure that no protrusions, pipes, wiring, debris etc. can obstruct the float switch movement. Failure of the float to move freely could damage the pump due to dry running, and/or cause flooding. Pendant float switches can only be adjusted slightly, and should not be altered so much that the pump will not start or stop. If you do adjust it, check the pump operates correctly before relying on the installation i.e. feed water into the chamber/sump slowly. Watch it starting and stopping and adjust if necessary. Turning the float up and down by hand is not sufficient.

When selecting an automatic pump for an application, it is essential that the dimensions and volume of the sump allow full and free movement of the float. Too small a sump can lead to rapid on/off operating cycles, whereas a larger sump will reduce the number of starts the pump will make and, in turn, increase its life. Most motor manufacturers suggest no more than 25 starts per hour. Many outside influences can alter the point at which an automatic pump starts or stops operating. An example of this would be a build-up of grease or fat on the pump, the float, or the walls of the chamber. Therefore we strongly recommend that all installations are inspected regularly to check operation.

“outlet (mm)”...pump connections

When the figure is given in an imperial measurement (e.g. 1¼”) then the inlet and/or outlet is threaded. A hose tail would be necessary if fitting to a flexible pipe is required.

When the figure is given in a metric measurement (e.g. 32mm) then the inlet and/or outlet is supplied with a hose tail to enable fitting to a flexible pipe.

“outlet” (where you find an outlet on a page): this is the internal diameter size of the discharge pipe required to suit the pump outlet port. Outlet pipe sizes can be reduced, e.g. to match existing pipe-work, however, due to increased friction losses, pumping capacity will be reduced, and power consumption may be affected. On solids handling pumps particularly, the risk of blockage is also increased. Outlet pipe size can be increased to improve flow over long pipe runs, but must not be of such a diameter that the pump is caused to operate below its minimum head.

model	inlet (BSPF)	outlet (BSPF)	kW	volt	flow (l/min)	head (mtrs)	w x l x h (mm)	dry weight (kgs)	packing weight (kgs)	Price (£)	code
KPM50	1"	1"	0.37	230	40	40	120x255x144	5.70	6.20	63.00	4

Below we give an explanation of the terms we use within the descriptions and data sheets

“inlet” (where you find inlet on a page): this is the internal diameter size of the inlet pipe required to suit the pump inlet. Reducing this size is not recommended as cavitation or erratic operation of the pump could result, leading to greatly reduced pump life. In some instances, e.g. suction lift duty on oils, it may actually be necessary to increase the bore of the suction pipe from that specified. Inlet pipe or suction hose must have a sufficiently rigid construction and temperature range to avoid collapsing during pump operation.

model	outlet (BSPF)	kW	volt	flow (l/min)	head (mtrs)	free passage (mm)	w x l x h (mm)*	dry weight (kgs)*	packing weight free-standing (kgs)	packing weight auto-coupling set (kgs)	Price (£) free-standing	Price (£) auto-coupling set	code
80U2.75	3"	0.75	400	450	12	46	173x383x419	29	37	30	630.00	460.00	1

Submersible sewage pumps models are supplied in two versions:

“free-standing version”: this includes feet or a support stand, and a mating flanged elbow with a female BSP outlet flange to suit a hose tail or pipework.

“fixed-guide rail version”: this includes the components required for guide rail mounting but excludes the guide rails.

“kW” and “watt” MOTORS

“our published motor power ratings are “output” powers, but the power drawn from the mains (“input”) will always exceed this figure. As a guide, the percentage difference between output and input is greater on the lowest powered motors. An input figure should be used for calculating running costs and will vary depending on the application.

Voltage: the voltage that this model is available. When you see two voltages on one line e.g. 110•230 this means the pump is available in one or the other voltage, but not dual voltage.

model	outlet (mm)	volt (DC)	amp	flow (l/min)	head (mtrs)	free passage (mm)	dia x h (mm)	dry weight (kgs)	packing weight (kgs)	Price (£)	code
Amazon	13	12	4.5	18	10	1	Ø40x162	0.22	0.45	36.00	1

“amp”: this is the full load current specified on the motor rating plate, i.e. the running current. Instantaneous starting currents will be several times this figure and details can be supplied if needed for any application, e.g. when running off a generator.

Current: our single and three phase pumps run on A.C. (alternating current) while low voltage pumps run on D.C. (direct current)

Frequency: all our AC motors are designed for 50Hz operation, but some models have alternative frequencies available.

MOTOR ENCLOSURE RATINGS

Motors are classified according to the degree of enclosure protection. The designation used for the degree of protection consists of the letters "IP" followed by two characteristic numerals.

IP23	2	Protection against solid bodies greater than 12mm.
	3	Protection against spraying water up to 60° from the vertical.
IP44	4	Protection against solid bodies greater than 1mm.
	4	Protection against splashing water, any direction.
IP54	5	Protection against dust.
	4	Protection against splashing water, any direction.
IP55	5	Protection against dust.
	5	Protection against water jets, any direction.
IP68	6	Complete protection against ingress of dust.
	8	Submersible machine.

The first characteristic numeral (0 – 6) designates the degree of protection of persons against contact with live or moving parts inside the enclosure and protection of machines against ingress of solid foreign bodies.

The second numeral (0 – 8) designates the degrees of protection of machines against harmful ingress of liquids.

EXPLOSION PROOF MOTORS: ATEX

Many industrial processes utilising flammable materials have the potential to give rise to a potentially explosive atmosphere. Potentially explosive atmospheres exist where there is a risk of explosion due to mixtures of gas and air, vapour and air, dust and air or other flammable combinations. Where a potentially explosive atmosphere is present, in order to protect personnel and plant, measures must be taken to ensure that the electrical equipment cannot ignite that potentially explosive environment. It is, therefore, necessary to eliminate all sources of ignition which might ignite such mixtures. These sources include, for example, electrical arcs and sparks, flames and hot surfaces, static electricity and mechanical impact and friction. To ensure compliance, equipment, such as pumps, must meet the essential requirements as specified in the ATEX Directive 94/9/EC and be marked with the CE marking for EU use. Information on this website that describes the explosion proof pumps, carry a classification e.g. Eexd-IIB-T3- II-2-G. The key is as follows (and this pump's classification):

- Eexd** – type of protection (explosion-proof enclosure)
- IIB** – gas group (ethylene)
- T3** – maximum surface temperature (200° C)
- II** – group (surface)
- 2** – level of protection for zone (high level of protection for zone 1)
- G** – type of hazardous atmospheres (gases, vapours, mists)

“duty”:

Pumps: most of our A.C. pumps, have continuously rated motors. If you intend to run a pump continuously, please check with our Sales Department to check its suitability. Motors on some of our D.C. pumps are shown as continuously rated, while others have an intermittent rating that requires a period of rest, after running, for cooling purposes.

N.B. – Even if continuously rated, all our D.C. motors have a finite brush life.

Panels: the number of pumps that can be operated from the panel and at what voltage.

PUMPING PERFORMANCE

“flow” (flow l/min): published flows are given in litres per minute and are based on pumping clean, cold water (or diesel, or oil, when referring to fuel and lubricant pumps), through the outlet bore specified. This figure is the maximum the pump can deliver at the minimum head recommended. Flow will decrease with an increase in head created by adding pipe vertically (physical head), and/or horizontally (head due to friction losses in pipe run)

“head” (head meters): published heads are given in metres and are based on pumping clean, cold water (or diesel, or oil, when referring to fuel and lubricant pumps), through the outlet bore specified. The figure is the maximum height of a vertical column of water that the pump could support if there were no other losses in the system. For submersibles, the head is the distance from the water level to the highest point in the pipeline. For surface mounted pumps operating with a flooded suction, it is the distance from the pump’s centre line to the highest point in the pipeline. For surface pumps operating with a suction lift, the total head is again the distance from the water level to the highest point in the pipeline. In practice, total head is not simply a height difference between suction and delivery points, because the friction losses created by horizontal pipe-work, valves, elbows, etc., and the specific gravity and viscosity of the liquid need to be added. This means that in systems with long pipe runs and many fittings, pump output may be greatly reduced.

“suction lift”: published lifts are given in metres and are based on pumping clean, cold water (or diesel, or oil, when referring to fuel and lubricant pumps), through the inlet bore specified. A “suction lift” is the distance from the pump’s centre line to the water level. There are few limitations on the discharge side of a pump or pumping system, however, there are very definite limitations to the suction side. This is why we suggest that submersible pumps should always be chosen in preference to surface mounted pumps, whenever possible. The theoretical maximum lift for clean, cold water is approximately 10 metres; however, in practical terms, it is considerably lower and we recommend 6 metres or less of the inlet pipe. For fuel transfer pumps the maximum is even lower and 3 metres or less is recommended. For oil transfer pumps it is 2 metres or less. In all cases the additional losses created by horizontal pipe-work, valves, elbows, specific gravity and viscosity of the liquid need to be added.

Performance Curves: these indicate the output possible at measured points. Care should be taken not to select a pump for operation off the bottom or the top of the curve, as this could lead to premature pump failure. Ideally, the pump should operate within the middle third of the curve to achieve maximum efficiency. Published flows are given in litres per minute at a head point in metres, and are based on pumping clean, cold water (or diesel, or oil, when referring to fuel and lubricant pumps), through the outlet bore specified. From the preceding notes, it should be obvious that all aspects of the system must be taken into account when making a pump selection. Please consult our Sales Department for advice and guidance when using these curves.

DIMENSIONS AND WEIGHTS

"w x l x h" (width x length x height) or "diam x h"(diameter x height): the figures published are either taken from the manufacturers' latest specifications or, when these are not available, from our own measurements. If your application requires precise information we strongly recommend that you request written confirmation from our Sales Department.

Submersible pumps: the width dimension excludes the hose coupling (when supplied). The height is measured to the top of the handle, lifting-eye or outlet, whichever is greater.

Surface pumps: the height and length, in most cases, excludes the handle, hose couplings and any hose kit.

Engine pumps: for centrifugal pumps, this is the outside dimension of the frame or base plate (WX10). For the diaphragm pumps, the dimensions include the chassis, wheels, prop stands and handles.

Hand pumps: dimensions exclude the length of the removable lever on the DD and SD45 pumps. It is inclusive of the integral lever on the SD60. Where a foot-plate is fitted, the dimensions include this size. For the rotary pumps, the outlet and riser pipes dimensions are included. Hoses and hose kits are not included in any dimension.

Dry weight: is the weight of the pump only so excludes any power cable, hoses or connections. For Tsurumi free-standing sewage pumps, it includes the flanged elbow.

Packing weight: is the weight of the product in the packaging, for the purposes of delivery

NB: figures published are approximate and either taken from the manufacture's latest specifications or, when these are not available, from our own measured weight. This data should be used as a guide only and, if your application requires specific information, then we strongly recommend that you ask our Sales Department to provide written confirmation.

SOLIDS HANDLING

"free passage mm": this is the size of the solids that the manufacturer specifies that the pump can pass.

ENGINES

Petrol driven pumps run on unleaded fuel.

"oil alert": this is a protection device for petrol engines that will stop the engine during operation or prevent the engine starting if there is insufficient oil in the sump.

Diesel engine pumps run on red or white diesel, but not bio-diesel.