

# Pump Operator Study Guide

## Pump

*these pumps: Rotary lobe pump Progressing cavity pump Rotary gear pump Piston pump Diaphragm pump Screw pump Gear pump Hydraulic pump Rotary vane pump Peristaltic*

A pump is a device that moves fluids (liquids or gases), or sometimes slurries, by mechanical action, typically converted from electrical energy into hydraulic or pneumatic energy.

Mechanical pumps serve in a wide range of applications such as pumping water from wells, aquarium filtering, pond filtering and aeration, in the car industry for water-cooling and fuel injection, in the energy industry for pumping oil and natural gas or for operating cooling towers and other components of heating, ventilation and air conditioning systems. In the medical industry, pumps are used for biochemical processes in developing and manufacturing medicine, and as artificial replacements for body parts, in particular the artificial heart and penile prosthesis.

When a pump contains two or more pump mechanisms...

## Chopper pump

### *Online Treatment Plant Operator, Case Studies*

July 2019 Carolyn J. Roos, Ph.D. at WSU Extension Energy Program: "A Guide to Pumping Manure Slurries in Centralized - A chopper pump is a centrifugal pump which is equipped with a cutting system to facilitate chopping or maceration of solids that are present in the pumped liquid. The main advantage of this type of pump is that it prevents clogging of the pump itself and of the adjacent piping, as all the solids and stringy materials are macerated by the chopping system. Chopper pumps exist in various configurations, including submersible and dry-installed design and they are typically equipped with an electric motor to run the impeller and to provide torque for the chopping system. Due to its high solids handling capabilities, the chopper pump is often used for pumping sewage, sludge, manure slurries, and other liquids that contain large or tough solids.

### Air source heat pump

*(PDF). Save on Energy. Independent Electricity System Operator. "YOUR GUIDE TO Air-Source Heat Pumps" (PDF). Clean Energy Lives Here. Massachusetts Clean*

An air source heat pump (ASHP) is a heat pump that can absorb heat from air outside a building and release it inside; it uses the same vapor-compression refrigeration process and much the same equipment as an air conditioner, but in the opposite direction. ASHPs are the most common type of heat pump and, usually being smaller, tend to be used to heat individual houses or flats rather than blocks, districts or industrial processes.

Air-to-air heat pumps provide hot or cold air directly to rooms, but do not usually provide hot water. Air-to-water heat pumps use radiators or underfloor heating to heat a whole house and are often also used to provide domestic hot water.

An ASHP can typically gain 4 kWh thermal energy from 1 kWh electric energy. They are optimized for flow temperatures between...

### Kyiv Pumped Storage Power Plant

*even with the optimal opening of the guide apparatus reached above the permitted. Vibration studies of the main pump-turbine hydroelectric units of Kyiv*

The Kyiv Pumped Storage Power Plant (PSPP) (Ukrainian: Київська гідроакмулювальна електростанція (ГАЕС)) is a pumped-storage power station on the west bank of the Kyiv Reservoir in Vyshhorod, Ukraine. The Kyiv Reservoir serves as the lower reservoir and the upper reservoir is located 70 m (230 ft) above the lower. Water sent from the upper reservoir generates electricity with three 33.3 megawatts (44,700 hp) conventional hydroelectric generators and three 45 megawatts (60,000 hp) reversible pump generators. During periods of low demand, such as nighttime, the pump generators push water from the lower reservoir to the upper for use during peak hours. The first generator was commissioned in 1970, and the last in 1972.

### Cambridgeshire Guided Busway

*only operator on the busway. In 2001 the Cambridge-Huntingdon Multi-Modal Study (CHUMMS) recommended widening of the A14 road and building a guided busway*

The Cambridgeshire Guided Busway is a guided busway and Bus rapid transit that connects Cambridge, Huntingdon and St Ives in Cambridgeshire, England. It has the longest guided busway in the world, surpassing the O-Bahn Busway in Adelaide, South Australia.

Two guided sections make up 16 miles (25 km) of the route. The northern section, which uses the course of the former Cambridge and Huntingdon railway, runs through the former stations of Oakington, Long Stanton and Histon. The southern section, which uses part of the former Varsity Line to Oxford, links Cambridge railway station, Addenbrooke's Hospital and the park-and-ride site at Trumpington via housing on the Clay Farm site.

Services are operated by Stagecoach in Huntingdonshire and Whippet, which have exclusive use of the route for five...

#### Alarm management

*shut down since it adds no value for the operator, because he or she already knows it was caused by the pump being shut down. This technique can of course*

Alarm management is the application of human factors and ergonomics along with instrumentation engineering and systems thinking to manage the design of an alarm system to increase its usability. Most often the major usability problem is that there are too many alarms annunciated in a plant upset, commonly referred to as alarm flood (similar to an interrupt storm), since it is so similar to a flood caused by excessive rainfall input with a basically fixed drainage output capacity. However, there can also be other problems with an alarm system such as poorly designed alarms, improperly set alarm points, ineffective annunciation, unclear alarm messages, etc. Poor alarm management is one of the leading causes of unplanned downtime, contributing to over \$20B in lost production every year, and...

#### Saint-Gervais-les-Bains

*as it had the potential to threaten another outburst flood. Melt-water pumping, formal evacuation plans and installation of a siren alarm system in 2010*

Saint-Gervais-les-Bains (French pronunciation: [sɛ̃ ʒɛʁvɛ le bɛ̃]) is a commune in the Haute-Savoie department in the Auvergne-Rhône-Alpes region, southeastern France. The village is best known for tourism and has been a popular holiday destination since the early 1900s. It has 445 km (277 mi) of pistes, the third largest domain exclusively in France, and is one of the least busy ski areas of its size. In 1892, two hundred people were killed when a water pocket in a glacier above the town suddenly burst open and caused flooding.

### Personal watercraft-related accidents

*of rental operators. The NTSB report did not conclude that PWCs are disproportionately represented in boating-accident statistics. A study performed by*

The number of personal watercraft-related accidents has increased with the popularity of personal watercraft (PWC) (also commonly known as jet skis) since their introduction during the late 1960s. The use of the term jet ski for all types of PWCs is a misnomer; Jet Ski is a registered trademark in the United States for a line of PWCs manufactured by Kawasaki. With the increased use of personal watercraft since their inception, the hazards accompanying their use have also increased. According to U.S. government reports, most accidents are associated with rental operators, underage operators, under-trained and undereducated boaters and a variety of factors associated with recreational-boating accidents (excessive speed, inattention, reckless operation, alcohol consumption and violations of the...

### Three Mile Island accident

*valves. When the feedwater pumps tripped, three emergency feedwater pumps started automatically. An operator noted that the pumps were running but did not*

The Three Mile Island accident was a partial nuclear meltdown of the Unit 2 reactor (TMI-2) of the Three Mile Island Nuclear Generating Station, located on the Susquehanna River in Londonderry Township, Dauphin County near Harrisburg, Pennsylvania. The reactor accident began at 4:00 a.m. on March 28, 1979, and released radioactive gases and radioactive iodine into the environment. It is the worst accident in U.S. commercial nuclear power plant history. On the seven-point logarithmic International Nuclear Event Scale, the TMI-2 reactor accident is rated Level 5, an "Accident with Wider Consequences".

The accident began with failures in the non-nuclear secondary system, followed by a stuck-open pilot-operated relief valve (PORV) in the primary system, which allowed large amounts of water to escape...

### Wave soldering

*manufacturing. The circuit board is passed over a pan of molten solder in which a pump produces an upwelling of solder that looks like a standing wave. As the circuit*

Wave soldering is a bulk soldering process used in printed circuit board manufacturing. The circuit board is passed over a pan of molten solder in which a pump produces an upwelling of solder that looks like a standing wave. As the circuit board makes contact with this wave, the components become soldered to the board. Wave soldering is used for both through-hole printed circuit assemblies, and surface mount. In the latter case, the components are glued onto the surface of a printed circuit board (PCB) by placement equipment, before being run through the molten solder wave. Wave soldering is mainly used in soldering of through hole components.

As through-hole components have been largely replaced by surface mount components, wave soldering has been supplanted by reflow soldering methods in...

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