Product & Chemical Disclaimer

The user must take responsibility in the selection of the products materials of construction. Empire Pumps Ltd will act in an advisory role and offer recommendations; however, the user is liable for the product selection in line with solutions and temperatures in which the equipment is operated.

Safety Precautions

WARNING: Prior to operating the heat exchanger read and understand the operating and maintenance instructions.

WARNING: Ensure the heat exchanger is compatible with the fluids and temperatures being transferred. Always consult Empire Pumps Ltd if there is any change in chemical concentrations or solution temperatures.

WARNING: Wear protective eye and personal equipment at all times when operating the heat exchanger. Follow standard safety procedures when handling corrosive or harmful solutions.

WARNING: Ensure all operators of this equipment have been trained for safe working practices, understand its limitations and wear safety goggles and equipment at all times.

WARNING: Correct procedures must be followed to drain the heat exchanger of all solutions prior to physical inspection of the heat exchanger.

WARNING: Excessive Pressure. Can result in serious injury or equipment damage. Do not service or clean the heat exchanger whilst the system is pressurised. Relieve pressure from the system prior to disassembly.

WARNING: Never operate the heat exchanger above the specified maximum operating pressure of the heat exchanger.

WARNING: Suction and discharge connections must be compatible with the solutions being transferred and the maximum pressure capability of the heat exchanger.

WARNING: Maximum temperatures are based on mechanical stress only. Certain chemicals will significantly reduce the maximum operating temperature of the heat exchanger materials. Consult with the chemical manufacturer and Empire Pumps Ltd for solution compatibility and temperature limitations.

WARNING: The heat exchanger must not be used as structural support to the piping system. Ensure the heat exchanger, suction and discharge pipe-work are independently supported to avoid stress on the heat exchanger.

WARNING: Use only Empire Pumps Ltd genuine spare parts to assure compatible pressure rating and longest service life.

WARNING: Upon receipt of the heat exchanger, inspect for any signs of shipping damage. If damage has occurred contact Empire Pumps Ltd.

Important Checks

WARNING: Flammable or Combustible Liquids: Please immediately consult Empire Pumps Ltd if the solutions being transferred are flammable. The heat exchangers detailed in this operating and maintenance instructions cannot be used in explosive atmospheres. We have available specially manufactured heat exchangers for use in zoned areas.

WARNING: Hot Surfaces. Please note the maximum temperature capabilities of the heat exchanger materials. The heat exchanger is conductive and when hot solutions are transferred this will cause the outside areas of the heat exchanger to become hot and cause burns.

WARNING: Please ensure inlet and outlet valves are always open when operating the heat exchanger.

WARNING: Please follow standard lifting procedures when installing and maintaining heat exchangers.

WARNING: Protect the heat exchanger from physical damage.

WARNING: Protect the heat exchanger from external equipment such as overhead conveyors or other equipment entering the process tank.

WARNING: Protect the heat exchanger from contact with an electrically charged tank.

WARNING: Periodically inspect the heat exchanger for leaks, ensuring the operating media doesn't enter the process tank causing a tank overflow.

WARNING: Heat exchanger leaks can cause a siphon of the tank contents. Periodically inspect the heat exchanger for leaks.

WARNING: Isolate the inlet and outlet valves when the heat exchanger is not in use this will help reduce the risk of operating media overflow and siphoning.

WARNING: It is recommended high and low level alarms are used in conjunction with the heat exchanger.

WARNING: Cold Environments. The heat exchanger must be drained of operating media when installed outside or in an environment where temperatures will drop below freezing point.

Installation

- The heat exchanger should be securely fastened to a solid foundation which will enable the support of the entire heat exchanger.
- Locate the heat exchanger coil in the process tank solution and consult Empire Pumps Ltd for correct positioning.
- The heat exchanger and suction and discharge pipe-work must be independently supported preventing potential strain on the heat exchanger.

- Do not use metallic piping with plastic flanged heat exchangers.
- The suction and discharge pipe-work must be aligned to avoid placing stress on the heat exchanger.
- The bore size of the suction pipe must be at least the same size or larger than the heat exchanger to ensure the correct flow and contact time of the thermal fluid.
- Use minimal number of bends at the suction and discharge heat exchanger.
- The suction line must be clean of impurities and foreign particles.
- The suction valve must be completely open to avoid restricting the suction flow.

Start Up:

1. The external valves connected to the heat exchanger suction and discharge should be fully open at start up.

Shutdown

1. The external valves connected to the heat exchanger suction and discharge should be fully closed when not in operation.

Maintenance

During the warranty period of the equipment, manufacturing changes are allowed only by Empire Pumps Ltd personnel or personnel authorized by Empire Pumps Ltd. All of the operations below must be done exclusively by qualified staff and in full accordance with the detailed procedure.

Inspection

Periodic inspections are recommended to substantiate the condition of the heat exchanger. It is advisable the heat exchanger is flushed and neutralised a minimum of once in every 12 months. If a problem has occurred see below procedures ‘prior to disassembly’ and ‘disassembly’.

Procedure prior to disassembly

Prior to maintenance ensure the heat exchanger has cooled from hot liquids before disassembly procedure. It is possible the heat exchanger has transferred toxic liquids, so it is necessary to wear personal protective equipment at all times.

After the initial visual, non-contact examination of the heat exchanger it is recommend that the heat exchanger be removed from service as follows:

1. Relieve pressure from the system prior to disassembly.
2. Correct procedures must be followed to drain the heat exchanger of all solutions prior to physical inspection of the heat exchanger.

3. The external valves connected to the heat exchanger suction and discharge should be fully closed when not in operation.
4. Disconnect the suction and discharge ports of the heat exchanger.
5. Following standard lifting procedures remove the heat exchanger from the process tank.
6. Use antistatic equipment to clean the external surface of the heat exchanger.
7. Caution some internal liquids can have dangerous reactions in contact with water
8. Prior to heat exchanger inspection, make sure the internal liquids have been removed and the heat exchanger has been fully flushed and neutralised. The heat exchanger must be drained and decontaminated. The liquid has to be collected and eliminated according to environmental laws.

Equipment Performance Characteristics

1. Installation piping arrangements can affect the heat exchanger performance. Elbows and pipe reductions will significantly reduce the flow through the heat exchanger which will reduce the contact time of the operating media with the process media.
2. Assistance with heat exchanger selection and guaranteed flow rates is available when contacting Empire Pumps Ltd.

Warranty

Empire Pumps Ltd warrants this pump product to be free of defects in materials and workmanship for a period of two years from the purchase date.

It does not cover installation or system design faults, pumps seized due to deposits or damaged packaging and Empire Pumps Ltd is not liable for consequential losses.

If a warranted defect, which is determined after inspection by Empire Pumps Ltd, occurs within the 24 month warranty period, it will be repaired or replaced as per the manufacturer's decision. Proof of purchase is required, along with a manufacturing serial number, data code and date of purchase.

This warranty does not apply to any other equipment used or purchased in combination with this product. The manufacturer accepts no responsibility for product damage or personal injuries sustained when the product is modified in anyway. This warranty shall not apply to products which have been used other than for their intended use, misuse, negligence or accident.

Empire Pumps Ltd shall not be liable for damage or delays caused by defective material, nor shall be liable for incidental or consequential damages, process down time, loss of production, loss of production costs, transportation costs, labour costs, product installation or removal costs, or loss of profit. On any and all events, the manufacturer liability shall not exceed the purchase price of the product and/ or accessories.

De-contamination of Hazardous Solutions

Prior to returning equipment to Empire Pumps Ltd for refurbishment or inspection, the equipment must be fully flushed, cleaned and neutralised in accordance with the chemical hazard, safety packaging regulations and Health & Safety at Work Act 1974.

The equipment must be decontaminated and must be flushed of all dangerous chemicals in accordance with environmental laws.

Declaration of conformity

Manufacturer: **Empire Pumps Ltd**

Unit 4, Guide Bridge Trading Estate, South Street, Ashton-Under-Lyne, OL7 0HU, United Kingdom

This declaration of conformity is issued under the sole responsibility of Empire Pumps Ltd. This declaration certifies that Air-Operated Diaphragm Pump EPA series, Magnetic Driven Pump EPM series, Drum Pump EPD series, Self-priming Pump EPS series comply with the European Community Directive 2006/42/EC on Machinery, according to Annex VIII. This product has used Harmonized Standard EN809:1998+A1:2009, Pumps and Pump Units for Liquids - Common Safety Requirements, to verify conformance.

The conformance is valid only if the pump is used for the liquids communicated by the customer and for the pump characteristics required with regard to the quotation. Empire Pumps Ltd does not take any responsibility for its pumps unless the customer operates the equipment strictly in accordance with the operation and instruction manual.

Signed for and on behalf of Empire Pumps Ltd

Peter Zhang, Director of Operations: .....

Ashton-Under-Lyne, November 2019

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