



## **INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTIONS FOR THE WORLD HEAT RANGE OF GASKETED PLATE HEAT EXCHANGERS**

### **1.0 DESCRIPTION**

World Heat range of Gasketed Plate Heat Exchangers offer a highly effective method of transferring heat from one medium to another. They consist of a number of gasketed, corrugated, stainless steel plates sequenced and compressed within a frame made up of a front and back pressure plate. World Heat can offer stand-alone units as well as fully packaged bespoke skid-mounted units.

The World Heat range of Gasketed Plate Heat Exchangers can be used in a number of applications including; Chilled Water, Low Temperature Hot Water (LTHW), Medium Temperature Hot Water (MTHW), Hot Temperature Hot Water (HTHW) and Steam.

### **2.0 PED INFORMATION**

The World Heat standard range of Gasketed Plate Heat Exchangers are designed and manufactured in accordance with the requirements of the Pressure Equipment Directive 2014/68/EU. As per the requirements of the directive, units that fall within the SEO (Sound Engineering Practice) category are not supplied with a CE Mark. Unit that fall within categories I to IV are CE Marked and provided with the necessary markings, certification and inspectorates.

It is the responsibility of the user and/or installer to ensure that the unit is installed and operated safely, and in accordance with the instructions detailed within this document.

### **3.0 COSHH**

Research has suggested that there are no specific items to highlight during normal operating conditions. However, during manufacture, dye-penetrant may be used as part of our pre-inspection process of testing welds. It is therefore essential that adequate flushing and sterilization is carried out before use and that the quality of water produced is to acceptable standards.

### **4.0 INSTALLATION**

#### **4.1 LIFTING AND HANDLING**

- a) Lifting lugs, where fitted, should be used for lifting purposes.
- b) For units without lifting lugs, the user must arrange suitable lifting arrangements (i.e. the use of slings, lifting eyes etc.) to avoid damaging the unit or its attachments during installation, taking into consideration the weight and design of the unit.
- c) Where fitted, insulation, splash guards, drip trays etc. should not be used for lifting purposes.
- d) Due to the insulation, case and plate characteristics, care should be taken when lifting and handling the unit to prevent damage.
- e) Avoid the use of lifting straps where insulation is fitted, as they may damage or crush the insulating material or case.
- f) Do not lift the unit using chains which are directly in contact with the internal heat transfer plates.
- g) Do not allow operatives to stand on the unit.



**WARNING: When lifting, please ensure a clean lift of the unit using lifting lugs or appropriate lifting techniques. The Plate Heat Exchanger and its supports are not designed for pivoting during lifting/siting/installation. Units should be kept in the upright position.**

4.2 STORAGE – *If storing the unit for any period of time before installation*

- a) Upon receipt of the unit, please check the packaging to ensure that it has not been damaged during transport. Any damage to the packaging should be fixed or replaced as necessary.
- b) It is recommended that the unit be stored indoors within a dry frost-free environment with ambient temperatures between 4°C and 40°C.
- c) The integrity of the packaging should be checked monthly. Should the external seal be found to have broken or its condition deteriorated (i.e. become wet, hardened or split), the packaging should be repaired or replaced.
- d) Once sited and the packaging has been removed, the condition of the unit should be thoroughly examined for any signs of corrosion or contaminant ingress.

4.3 SITING

- a) Unless specified at enquiry stage and specifically ordered to suit an external installation, the unit must be sited indoors.
- b) Foundations or plinths must be firm and level to prevent settling, pipe strain or distortion of the unit.
- c) Unless specified at enquiry stage and specifically ordered, the unit must be installed in a level position.
- d) Ensure that there is sufficient maintenance space surrounding the unit.
- e) The unit must be bolted to the floor to ensure stability during and after installation.

4.4 INSTALLATION

- a) Protective covers and plugs may be fitted to connections to protect them in transit, these must be removed prior to use.
- b) Check for any signs of contaminant ingress which may have got into the unit during transportation or storage on site.
- c) Pipe-work connected to the unit must be adequately supported to prevent any loads being transmitted to the unit. Consideration must be taken with regards to thermal expansion through use of bends and expansion joints.
- d) Isolation valves should be fitted prior to the exchanger to facilitate future maintenance and servicing.
- e) To avoid corrosion, use appropriate pipe materials to suit the application.
- f) To connect to screwed connections, a suitable thread sealant should be used.
- g) To connect to flanged connections, bolts should be tightened in a diametrically opposite sequence in order to load the flanges evenly onto the gasket. The gasket should be suitably chosen for the application.
- h) A suitable safety relief valve and safety accessories should be fitted to the pipe-work connected to the unit to prevent over-temperature and over-pressure. The discharge of any safety valves should be piped away to a safe disposal point, preferably an air break and tundish so that the discharge is unrestricted and easily visible.

NOTE REGARDING UNITS ON UNVENTED SYSTEMS

Arrangements are required on unvented systems to prevent excessive pressure, temperature and the formation of a vacuum. This includes the supply and installation of suitable equipment such as; Pressure



Relief valve, Temperature Relief Valve, Expansion Relief Valve, Expansion Vessel, Anti-Vacuum Valve, Control Thermostat, High Limit Thermostat and Cut-Out Device etc. For further information, please consult the most recent edition of the UK Building and Water Regulations.

## **5.0 COMMISSIONING & OPERATION**

Do not operate the equipment at pressures or temperatures in excess of those specified on the nameplate of the unit. Do not subject the unit to conditions of vacuum or partial vacuum. For example, partial vacuum may occur if the inlet or vent is restricted during draw off or drain down.

### a) Assumptions

- It is assumed that the both the primary and secondary pipe-work prior to the unit is already full of water.
- On sealed systems, it is assumed that the expansion vessel has been pre-charged and that any cold water booster set and/or pressure reducing valve, has been commissioned and set to the correct pressure.

1. All isolating valves isolating the unit from the system should be closed and any circulation pumps turned off.
2. Close any drain valves supplied as part of the unit.
3. Open the secondary side isolating valves and slowly fill the secondary side with cold water.
4. Switch on any secondary circulation pumps.
5. Open the primary side isolating valves and slowly fill the primary side.
6. Switch on any primary circulation pumps.
7. Ensure that any vents within the systems are open and operational, as required.
8. The unit can now be left running.

### IMPORTANT NOTES

- The isolating valves in the inlet and outlet should be opened at the same time as far as possible. The flow-rate of the medium should then slowly be increased until operating temperature is reached.
- Hammering must be avoided so as to prevent damage to the internal Plate Heat Exchanger gaskets.
- The heat exchanger must be vented immediately after start-up. Air can cause air locks and scorching of the internal plates, which can reduce heat transfer capacity and increase the risk of corrosion.

Following installation and commissioning, it is advisable to remove, clean and reassemble any strainers prior to operation.

Some leakage may occur when the heat exchanger is cooled down after a prolonged period of operation at high temperature due to gasket settlement and subsequent thermal contraction. Leakage due to this can often be remedied by tightening the bolts (please contact our technical team, quoting the serial number of the unit to obtain the maximum tightening distance 'A' between the two pressure plates. **Plate Packs should not, in any circumstance, be over tightened**). If tightening does not stop leakage, a new gasket set may be required.

When the unit is taken out of operation, all fluids must be drained from the unit and the unit cleaned, to prevent freezing or possible corrosion. When the unit is not in use, it is recommended that the tightening bolts be loosened slightly to reduce pressure on the gaskets but close enough to prevent any ingress.



## 6.0 MAINTENANCE

World Heat provides an Annual Maintenance Contract service which covers our full range of Plate Heat Exchangers and Plate Heat Exchanger Packages, please contact our sales team for further information.

Maintenance frequency will depend on the characteristics of the fluid circulating through the unit, however it is recommended to regularly check for the following;

- Check for leaks from any of the internal plates or gaskets
- Check that the temperature is not irregularly fluctuating
- Check for any signs of scaling

In order to drain down and dismantle the unit to carry out annual maintenance;

1. It is assumed that all isolating valves isolating the unit from the system are open.
2. Isolate the primary fluid inlet and outlet – switch off the primary pump and boilers if necessary.
3. Switch off any secondary circulating pumps.
4. Isolate the secondary fluid inlet and outlet.
5. On sealed systems, reduce the residual pressure within the unit and associated pipe-work by manually operating the safety valve.

**Please Note: Some water will be produced by the safety valve.**

6. Open the manual vent valve and allow air into the unit during drain down.
7. Ensure that the drain is piped away appropriately to a designated drain point before opening the drain valve and allowing the vessel contents to drain.
8. If possible, allow the heat exchanger to stand and cool overnight.
9. Loosen the nuts and remove the bolts alternately, so that the moveable back plate can move parallel to the fixed front plate.
10. Once loosened sufficiently, the internal plates can be removed as required.

**WARNING: Plate edges are very sharp, suitable protective gloves should be worn at all times.**

11. Plates are sequenced at our factory prior to dispatch, plates must be replaced back in the original sequence. If you have any queries, please contact our technical team.

[World Heat recommends that a fully sequenced plate pack and gaskets are kept as spares in the event of maintenance. The existing unit can then be sent back to World Heat for cleaning and re-sequencing whilst the spare pack can be easily fitted, causing no disruption in service].

### 6.1 FAULT FINDING

Scaling of the secondary side of the unit could be evidenced by the following;

- Increased pressure drop on the secondary side of the unit.
- Incorrect secondary side outlet temperature.
- Lower than expected temperature difference on the primary side of the unit, when the control valve is fully open.

### 6.2 CLEANING

In the event that scaling has been evidenced, the first method of cleaning the internal heat exchanger plates should be through the use of flow-rate. Where possible, an increase in the flow-rate throughout the unit for a set period of time could cause sufficient turbulence within the unit to de-scale the plates. [It is important that



equipment and pipe-work within the system is checked prior to ensure that it can withstand an increase in flow-rate].

However, crystallization, scorching or heavy fouling can often not be remedied by an increase in turbulence, therefore the plates should be cleaned professionally;

1. Open the Plate Heat Exchanger as per the method prescribed above.
12. Clip-On Gaskets should be removed from each individual plate. [Please Note: Gaskets have been attached and sequenced to suit the application. Gaskets and plates must be replaced back in the original sequence. If you have any queries, please contact our technical team.  
[World Heat recommends that a fully sequenced plate pack and gaskets are kept as spares in the event of maintenance. The existing unit can then be sent back to World Heat for cleaning and re-sequencing whilst the spare pack can be easily fitted, causing no disruption in service].
2. The surface of each plate should firstly be rinsed with a pressurized jet of water (take care not to damage or distort the plate).
3. Scrub the surface of the plate with a nylon brush.
4. Rinse the surface of the plate once more with a pressurized jet of water.
5. Chemical Cleaning;
  - a. Oxide or chalk deposits can be removed with a soft nylon brush and 2.5% nitric acid solution.
  - b. Organic deposits can be removed with a soft nylon brush and 2% sodium hydroxide solution at 50°C.
  - c. Greasy deposits can be removed with a soft nylon brush and kerosene.

**WARNING: Appropriate precautions should be taken when using hazardous substances. Please refer to the COSHH instructions detailed on the product used and use appropriate Personal Protective Equipment (PPE).**
6. After chemical cleaning, the plate surfaces should be thoroughly rinsed with a pressurized jet of water.
7. Once cleaned and dried, the gaskets should be re-applied to each of the plates as previously installed.
8. Once all gaskets have been re-applied and the "Plate Pack" re-assembled it can then be fitted back within the unit.
9. The movable back pressure plate must always be moved parallel to the front fixed pressure plate and not drawn out of alignment.
10. Nuts and bolts should be re-tightened alternately. Please contact our technical team before tightening to ascertain the 'A' dimension of the "Plate Pack" between the two pressure plates. The unit must not be over tightened as this can damage the gaskets and cause leaks.  

**Never tighten or loosen the heat exchanger while the unit is under pressure.**
11. We recommend that all bolts are kept lubricated with Molybdenum Disulphide or equivalent, particularly on sections of thread used when tightening or loosening the unit.

## 7.0 RECYCLING

For details on the end of life disassembly, recycling and disposal requirements of the unit, please consult the general assembly drawing and technical data sheet issued at quote/order stage, to determine the materials used.

All materials should be disposed of responsibly and in accordance with local regulations.

Please consult our technical team for further information.



**WORLD HEAT**  
C Y L I N D E R S

## WH-IOM-009

### Installation, Operation & Maintenance Instructions

Unit 4, Tudor Industrial Estate, Ashton Street, Dukinfield SK16 4RN  
Tel: 0161 343 8610 Email: [sales@whcylinders.co.uk](mailto:sales@whcylinders.co.uk)

#### **8.0 SPARES**

World Heat recommends the following spares for a standard Gasketed Plate Heat Exchanger;

- Plate Heat Exchanger Plate and Gasket Set (fully sequenced)
- Gasket Set

Please contact our sales department for recommended spares and availability, please quote the unit serial number in order for our sales team to correctly specify the spares required.