

INSTALLATION, OPERATION, MAINTENANCE INSTRUCTIONS FOR GMS 'FH' ELECTRIC FLOW HEATERS (NON-STORAGE)



The operating and maintenance instructions contained within this package are for 'FH' electric flow heaters. Please refer to separate instructions for storage type units.

Please note that an electronic version of these instructions are available from our website and also on a CD. Please contact our sales office for further information.

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1. Standard Unit Information & Description

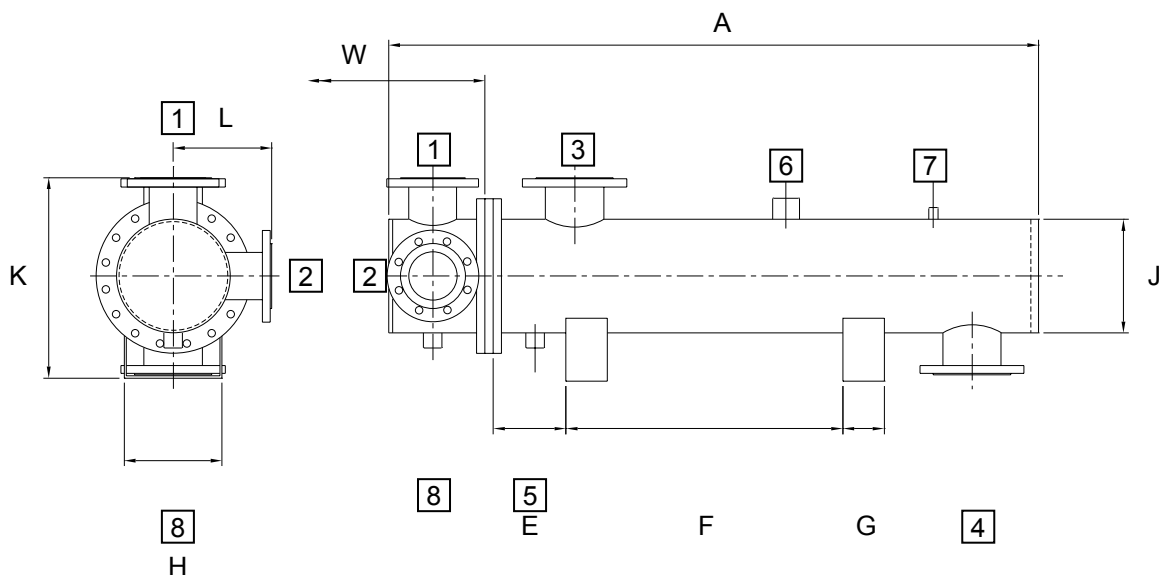
The 'FH' range comprises non-storage electric flow heaters. These are mostly used in systems to heat circulated water using electricity. The majority of applications are for heating LTHW (82/71°C) and DHW (10/65°C) although the calorifiers can be used for other medium generation if required. Other applications may also arise with different water temperatures and materials of construction. The standard units are suitable for a maximum shell temperature of 110°C

Standard Material Schedule	
Shell	
Heater Elements	
Element Plate	
(Other materials on request)	

Design Data	Shell Side	Tube Side
Maximum Working Pressure	7.0 BarG	10.0 BarG
Hydraulic Test Pressure	11.55 BarG	15.0 BarG
Design Code	BS853 1996 Part 1 Grade A & PED 1999 (SI 1999/2001)	
Higher pressures on request		

Connections					
Ref	Description	Size	Ref	Description	Size
1	Primary Inlet	Varies	5	Drain	3/4" BSP
2	Primary Outlet	Varies	6	Safety Valve	Varies
3	Secondary Flow	Varies	7	Primary dRAIN	3/4" BSP
4	Secondary Return	Varies	8	Secondary Pressure Gauge	3/8" BSP

Unit	Dimensions in mm										Connections		Weight (dry)kg
	A	E	F	G	H	J	K	L	W	1	2		
EFH30													
EFH45													
EFH60													
EFH75													
EFH90													
EFH105													
EFH120													
EFH150													
EFH180													
EFH210													
EFH240													
EFH270													
EFH300													
EFH330													
EFH360													
EFH405													
EFH450													



2. PED Information

The standard range of 'Atlantic' steam/water calorifiers are designed in accordance with the requirements of the Pressure Equipment Directive 97/23/EC. Units classed as SEP in the PED category are not supplied with a CE mark. Units in category I & II are CE marked and appropriate markings and certification is supplied with each unit.

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 supplied within this manual. The 'Atlantic' unit is designed for a steam primary medium (in the tubes) and water secondary medium (in the shell).

EC DECLARATION OF CONFORMITY

We

Manufacturer Name: GMS Thermal Products Ltd
Address: Riverside Works, Egmont Street
Mossley, OL5 9NE
Country: England

declare, in sole responsibility, that the following equipment

Product: Pacific Water/Water Shell & Tube Heat Exchangers
Country of Origin: England

are in accordance with the requirements of the Pressure Equipment Directive 97/23/EC

GMS PED Certificate Number: PED-PA-11-05
Date of issue: 4th November 2005

Applicable Design Standards: BS853 1996 Part 1 Grade A

Subject products are designed, manufactured and tested according to the appropriate quality control procedures.

Date: 4/11/05
Steve Rawlins
Technical Director
GMS Thermal Products Ltd

Model Number	Fluid Group	PED Category	Module
PA125A2 or A4	Chart 2 Group 2 Gases	SEP	A
PA125B2 or B4		SEP	A
PA150A2 or A4		SEP	A
PA150B2 or B4		I	A
PA200A2 or A4		I	A
PA200B2 or B4		I	A
PA200C2 or C4		I	A
PA250A2 or A4		I	A
PA250B2 or B4		I	A
PA300A2 or A4		I	A
PA300B2 or B4		II	A1
PA350A2 or A4		II	A1

3. Installation

Lifting: Use lifting eyes where fitted. Do not lift a calorifier using the insulation (if fitted). Straps may crush the insulation.

Siting: Unless specifically ordered for outside siting, the calorifier must be sited indoors. Foundations must be firm and level to prevent settling, pipe strain or distortion of the calorifier. Unless specifically ordered differently, the calorifier should be installed in a level position. For calorifiers with removable tube bundles, ensure enough room exists to withdraw the bundle from the shell. For calorifiers with inspection openings ensure enough room exists to gain access to the opening.

Protective covers/plugs may be fitted to connections to protect them in transit. These must be removed prior to use. If a connection is not required seal it appropriately. Check for and remove any foreign material which may have got into the connections. Pipe-work connected to the calorifier should be supported to prevent loads being transmitted to the calorifier. Provide for thermal expansion with bends and expansion joints. To avoid corrosion, ensure that pipe-work materials are compatible with calorifier materials. Fit isolation valves prior to calorifier connections to facilitate servicing. For flanged connections tighten bolts in a diametrically opposite sequence to load the flanges evenly onto the gasket. For screwed connections use a thread sealant approved for use with potable water by the local water authority. Ensure that the tube bundle can be isolated and easily disconnected for removal during maintenance. Ensure adequate venting for air removal during filling and operation. Pressure relief valves (and bursting discs if fitted) should have their outlets piped away to a safe disposal point. Allowances must be made for thermal expansion and contraction of the fluids as the 'Atlantic' unit is not designed to withstand any external stresses due to expansion and also where connecting pipework is not adequately supported.

4. Commissioning & Operation

Do not operate the equipment at pressures or temperatures in excess of those specified on the nameplate of the vessel marking. Flowrates should not exceed design values specified for the calorifier.

It is assumed here that the secondary pipework is already full

Start with primary, secondary flow, return and cold feed valves closed and secondary re-circulation pump is off.

Close the drain valve.

Slowly fill the calorifier.

If the calorifier is open vented and shares a vent with other calorifiers, connect it to the common vent using the 3-way valve

Carefully open the secondary flow and return valves

Switch secondary re-circulation pump on

Slowly introduce the hot fluid to the tube bundle. If excessive noise is heard this may be caused by:-

- Excessive flowrates
- Insufficient secondary fluid flowrate - causing overheating and “kettling”

Adjust the temperature control gradually and ensure that the correct operating temperature is maintained by it.

Check that all gaskets are effective when the unit is operating - some bolt tightening may be necessary after the unit has been first heated and subsequently from time to time. Following installation and commissioning it is advisable to remove, clean and re-assemble any strainers. All fluids must be drained when the unit is out of operation to prevent freezing or possible corrosion.

5. Maintenance

The site insurers may require annual inspection of tube bundle and shell condition. If a loss of performance or increase in primary pressure drop has been observed the following are possible causes:-

- a) Primary fluid restriction (blocked strainer, faulty control valve etc.)
- b) Air lock on primary side.
- c) Scale deposits on the heater battery tube surfaces (primary or secondary side). This can severely affect heat transfer rates.

To drain the calorifier down (secondary side)

Obtain a complete set of replacement gaskets from GMS Thermal Products Ltd.

It is assumed here that all isolation valves (except drain) are open at the start.

Isolate the primary fluid inlet and outlet - switch off primary pump and boilers if necessary.

Switch off the secondary system return pump and isolate secondary return to calorifier.

Let the calorifier cool to a safe temperature

Isolate the secondary flow

If the calorifier shares a vent with other calorifiers, isolate it from the common vent using the 3-way valve (it will now vent to atmosphere).

If the calorifier has no vent it may be necessary to remove a fitting above the calorifier to let air in during draining.

Pipe the drain to a drain point and open the drain valve.

The calorifier shell internal condition can be inspected by removing the inspection cover (if fitted) or the tube-bundle (if removable-see below) to allow visual examination

Re-fit new gaskets and re-fill the calorifier according to the commissioning instructions above.

To check for leaking tubes

Drain the secondary side as above. Mark all relative positions of covers, etc., to ensure correct

re-assembly. Isolate the primary side. Remove primary pipework and header. Bolt the tubeplate fully to the secondary shell. Isolate the secondary flow and return. Fill the secondary shell to normal working pressure (or to test pressure if isolated properly from the system). Inspect tubes for leaks. Do not leave unit standing under test pressure for longer than necessary. Before making repairs reduce the pressure to atmospheric. Leaking tubes can sometimes be sealed using plugs. If the leak is between tube and tube-plate then, for roller expanded tubes, it may be possible to effect repairs using roller expanders. If the tubes have been welded or brazed into the tube-plate then contact GMS for advice and a quotation for repair work. Re-test, drain, re-fit header (with new gaskets) and re-fill as above.

Removing and cleaning tube bundles

Note: Not all tube bundles are removable.

Drain as above. Remove header as above. The tube bundle may be heavy. Ensure that adequate facilities are available to withdraw the bundle without distortion or damage. Avoid damaging surfaces of flanges. When lifting or working on the tube bundle support it by the tubeplates and the support plates - ideally on wooden blocks cut to fit the curvature of the tube bundle. The tube bundle must not be supported on the tubes. Do not bend or distort supports and baffles.

5. Maintenance

Because tube bundles are fairly tightly packed, chemical cleaning, e.g. using acid solution containing inhibitors, will generally give the best results. Take care that the chemicals used will not cause any adverse or hazardous reaction with the materials of the tube bundle or the deposits being cleaned.

Do not blow steam through single tubes - this will cause the tube to expand and disrupt the tube joint.

Do not blow air through tubes if they may contain inflammable fluids (explosion hazard)

Re-fit the tube bundle using new gaskets and re-fill the calorifier. Check all gaskets and joints for signs of leaks.

