

## INSTALLATION, OPERATION, MAINTENANCE INSTRUCTIONS FOR GMS INDIRECT STORAGE CYLINDERS



The operating and maintenance instructions contained within this package are for standard indirect storage calorifiers (vessels fitted with an internal copper coil). Please refer to separate instructions for storage calorifiers with U-tube batteries and direct cylinders.

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 standard range of indirect storage cylinders range from 230 litres to 2000 litres. These are mostly used in systems to heat domestic hot water. In the majority of applications the water is heated by LTHW (82/71°C) although the heater can be used for steam if required. Other applications may also arise with different water temperatures and materials of construction. This manual covers types 'SF' & 'SR' cylinders.

Standard Material Options Schedule	
Shell	Copper (SF) Galvanised Steel (SR)
Heater Tubes	Copper 'low-fin' Integron Plain Copper (Tubes are tinned on galvanised cylinders)
(Other materials on request)	

Design Data	Shell Side	Tube Side
Maximum Working Pressure	4.0 BarG	4.4 BarG
Hydraulic Test Pressure	6.6 BarG	6.6 BarG
Design Code	Commercial Standards & PED 1999 (SI 1999/2001) – Cat: SEP	
Higher pressures on request		

Please refer to our brochure for standard connection and dimensional data.

## 2. PED Information

The standard range of indirect storage cylinders 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 standard 'IS' unit is designed for a water 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:** 'IS' Indirect Storage Cylinders  
**Country of Origin:** England

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

**GMS PED Certificate Number:** PED-IS-11-05  
**Date of issue:** 4<sup>th</sup> November 2005

**Applicable Design Standards:** BS853 1996 Part 1 Grade A OR:  
GMS Commercial Standards

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

Size (Litres)	Fluid Group	PED Category	Module
All Sizes From 230 Litres To 2000 Litres (Refer to brochure for actual capacities)	Chart 4 Group 2 Liquids	SEP	A

PED Information for the primary medium can be supplied after the unit has been ordered and issued for manufacture.

### **3. Installation**

**Lifting & Handling:** Use lifting eyes where fitted. Do not lift a calorifier using the insulation (if fitted). Straps may crush the insulation. The shell of the calorifier may be made of relatively light gauge metal and care should be exercised when handling and moving the unit not to damage the shell. Do not lift the calorifier using chains directly in contact with the shell. Do not allow operatives to stand on the calorifier

**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 vessel. 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 do not use copper pipework with galvanised steel calorifiers or vice-versa. Fit isolation valves prior to calorifier connections to facilitate servicing (NOT TO THE VENT). 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. The vent must not be blocked so, if the unit may need to be isolated from the vent, fit a 3-way vent valve. Ensure adequate venting for air removal during filling and operation ("sealed" systems should have an auto-air-vent and a manual air vent valve for this). Pressure and temperature relief valves (and bursting discs if fitted) should have their outlets piped away to a safe disposal point, preferably via an air-break and tundish so that discharge is unrestricted and easily visible. Water expansion must be accommodated by separate expansion vessel on the cold feed side (on sealed systems) or via the vent pipe on vented systems. Allowing expanded water back into the cold feed tank on vented systems is not recommended as the resultant warm water will encourage bacterial growth.

#### **Destratification Pumpset**

To avoid damage in transit the pipe-work and pump of a de-stratification set (if included) may be supplied loose for fitting on site. The pump should be installed to circulate water from the top of the cylinder to the bottom. To ensure that the anti-stratification pump does not adversely affect performance of the calorifier during peak demand periods the power supply to the pump should be timed to come on during periods of low demand if possible, but often enough to guarantee heating the calorifier contents fully for a period of at least 1 hour per day. The unit should be flushed thoroughly with clean water prior to operation.

## 4. Commissioning & Operation

Do not operate the equipment at pressures or temperatures in excess of those specified on the nameplate of the vessel marking. Do not subject the equipment to conditions of vacuum or partial vacuum. For example partial vacuum can be caused if the cold feed or the vent are restricted during draw off or drain down.

It is assumed here that the secondary pipework is already full of water.

For sealed systems it is assumed here that any cold water booster set and/or pressure reducing valve is already commissioned and set to the correct pressure.

Start with primary, secondary flow, return and cold feed valves closed, anti-stratification and secondary re-circulation pumps off.

Close the drain valve.

For sealed systems ensure auto-air vent is operational

For sealed systems open manual vent valves

For sealed systems open expansion vessel isolation valve

Open the cold feed valve and slowly fill the calorifier with cold water.

For sealed systems when water reaches the manual vent valve, close it.

When the calorifier is full slowly introduce the hot fluid to the tube bundle. Allow the unit to heat up. Adjust the temperature control gradually and ensure that the correct operating temperature is maintained by it.

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

Open anti-stratification pump isolation valves

Switch anti-stratification and secondary re-circulation pumps' power on

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

Annual maintenance should include cleaning debris from the base of the calorifier to comply with guidelines on prevention of legionella bacteria proliferation. Also 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 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.

Switch off anti-stratification pump power.

Isolate the secondary flow

Isolate the cold feed

For sealed systems reduce the residual calorifier pressure by manually operating the safety valve - some hot water will come out

For sealed systems open the manual vent valve to allow air in during drain-down

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

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 to allow visual examination

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

## 6. Recommended Spares

Please contact our sales department for recommended spares prices and availability. The recommended quantities given are per unit supplied.

Description	Part Ref.	230-550 Litres	600-2000 Litres	2000-9000 Litres	All Copper Lined
Inspection Gasket	RG250-P	1			
Inspection Gasket	RG380-P		1		
Inspection Gasket	RG450-P			1	1