GMS

Thermal Products Ltd

www.gmsthermal.co.uk

ELECTRIC STORAGE CALORIFIERS

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Materials of Construction

- √ **Solid Copper - type CS.** Copper is virtually impervious to attack by aggressive water. In the few areas where water is known to attack copper the calorifier can be protected by a sacrificial aluminium anode. This leaves a protective coating on the copper and does not need replacing. The copper thickness required for a calorifier increases with pressure and diameter. Above a certain size copper lined steel is more economical.
- √ **Copper-Lined Steel - type CL.** Carbon steel lined internally with copper. None of the steel is in contact with the water. The steel gives great strength, the copper prevents corrosion. Special techniques have been developed to ensure a close fit of copper to steel, to allow thermal expansion and contraction of the lining and to test the lining. Fitted as standard with an **anti-vacuum valve** to prevent partial vacuum damaging the lining. Even so care should be taken during drain-down to ensure adequate venting of the calorifier. The cold feed must never be restricted during draw-off.
- √ **Galvanised Steel - type GS.** Hot dip galvanising deposits a zinc layer which provides excellent protection against corrosion if the water is hard. Galvanised calorifiers should not be used with copper pipe-work or soft water. The copper causes electrolytic action and releases particles of copper which deposit in the calorifier, causing localised electrolytic action and corrosion. Soft water prevents formation of a protective scale. The copper tube bundle rapidly gets a film of scale because of its higher temperature. This prevents electrolytic action and corrosion. For added protection a magnesium sacrificial anode can be fitted. This must be replaced when exhausted. Also the copper tube bundle can be electro-tinned which reduces the electrochemical potential.
- √ **Stainless Steel - type SS.** Stainless steel calorifiers can suffer chloride attack at welds. Most water supplies contain enough chloride to cause problems. Heat treatment after all welding is completed solves the problem but is expensive. If the water supply is chloride free (e.g. de-ionised water) then stainless steel calorifiers will be acceptable.
- √ **Glass/Polymer Lined Steel - type PL.** An alternative to copper-lined steel. The lining was developed for arduous conditions in industrial processes. It is generally more resistant to abrasion, chemical attack and impact damage than traditional glass linings. If damage occurs the surrounding coating will not be affected and the damage can be repaired. In the lining process minute glass flakes are combined with a special polymer, applied to the steel, cured and electrically tested. The lining is WRC approved for use with hot water.

Other materials available on request. Please contact our sales department with any enquiries you may have.

Some System Considerations

Secondary Vent. Calorifiers can be supplied for open vented or unvented (sealed) systems. In open vented systems the vent pipe allows escape of air from the calorifier, ingress of air during drain-down, thermal expansion of water and (in the event of control failure) escape of steam from the calorifier. The vent pipe should never be blocked. No valves should be fitted to it except, where more than one calorifier share a common vent, special 3-way vent/bypass valves. These ensure that the calorifier is always open to atmosphere.
Unvented systems. When it is not practical to fit a vent, an unvented system will be used. Certain additional precautions and equipment are necessary to ensure that an unvented system will be safe:

- √ The calorifier must be designed for the maximum working pressure - after thermal expansion of the water.
- √ A Temperature (or combined Pressure/Temperature) Relief Valve must be fitted in case of control failure.
- √ An automatic air vent.
- √ An anti-vacuum valve
- √ An expansion vessel.

A water booster set may be required to provide water at the required pressure and flowrates.
Secondary Return. Most large systems circulate DHW around a building and back to the calorifier. This ensures that all draw-off points have hot water available quickly. The pipe-work should be lagged and the re-circulation rate minimised to reduce heat loss. The heat loss should be taken into account when selecting a calorifier.

Thermal Insulation Options

- √ **Type MA** Consists of 50mm mineral wool with dimpled aluminium cladding. This gives good thermal insulation and a quality finish. For some installations there will be a high risk of damage to the factory fitted insulation. In these instances it is preferable to insulate on site.
- √ **Type UF** For sizes up to 1000 litres or 250 kg dry weight (approximately) we can offer **Type UF** semi-rigid urethane foam insulation. This is sprayed on in a standard thickness of 25mm (up to 60mm on request). Its ozone depletion potential (ODP) is zero, it does not support combustion and it resists water penetration. Uniform thickness is not guaranteed.

For a high quality appearance we recommend type MA insulation.

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Low installation, maintenance and off-peak costs can make electricity attractive. It can also be a cost effective back-up for other heat sources during periods of low demand and shut-down of the main primary heating source.

CALCULATING THE PRIMARY POWER REQUIREMENT
For electrically heated calorifiers, the power output is constant irrespective of the water temperature. Therefore the primary power requirement is equal to the average primary power as calculated on page 3.
Space must be allowed for withdrawal of the immersion heater for inspection. If withdrawal distance is not known assume full length. We will be pleased to advise withdrawal distances for specific units.

Material and insulation options are the same as shown on page 4

IMMERSION HEATER ELEMENT OPTIONS

FIXED ELEMENTS
Lowest cost option but if one element fails, the entire heater must be replaced.

REPLACEABLE ELEMENTS
These are fixed to the element plate using special nuts and glands. A failed element can be replaced (after draining the calorifier to remove the heater) without wasting the remaining good elements

REMOVABLE CORE ELEMENTS
The highest cost type. Each heater element can be withdrawn from the immersion heater and replaced without draining down the calorifier.

ELEMENT SHEATH MATERIALS OPTIONS *(The element sheath is the part in contact with the water)*

√ **COPPER** - Most Commonly Used
√ **NICKEL ALLOYS** - (EG Incolloy) - Recommended for use with hard water)
√ **STAINLESS STEEL**

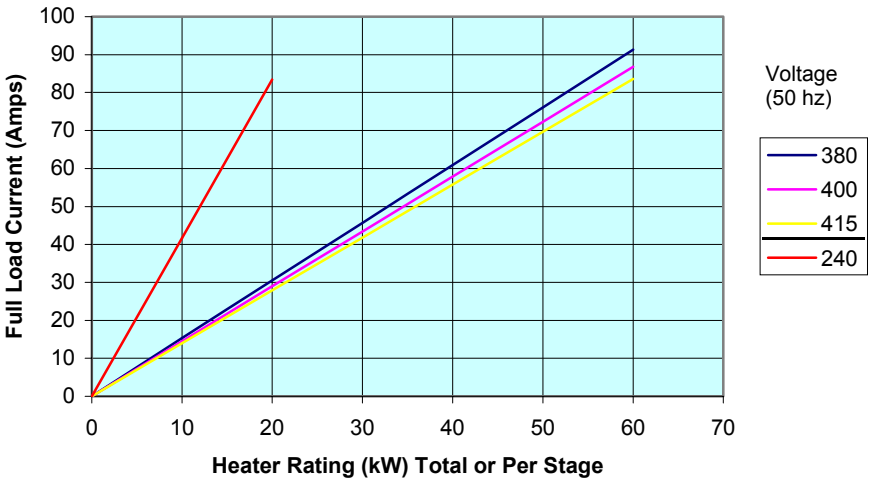


Fig 2. Typical Full Load Current of Immersion Heaters (240v 1ph & 380-415v 3ph)
Please note that when specifying a heaters' kW rating, you must also specify the working voltage to ensure full heating capacity

CONTROL OPTIONS

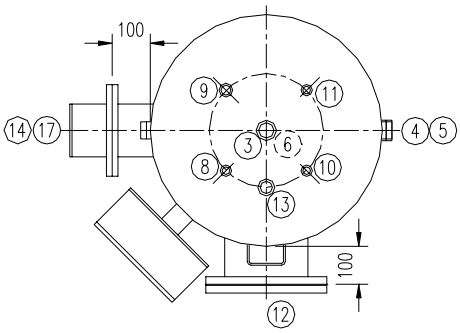
√ **STANDARD** - One temperature control thermostat, one pocket for high temperature limit thermostat.
√ **HIGH TEMPERATURE LIMIT THERMOSTAT OPTION** - Gives Protection if the temperature control thermostat fails.
√ **CONTROL PANEL OPTION** - Our high quality control panels are made specifically for each heater.
√ **LOW WATER CUT-OUT OPTION** - Stops heater operation and damage if the vessel is only half full

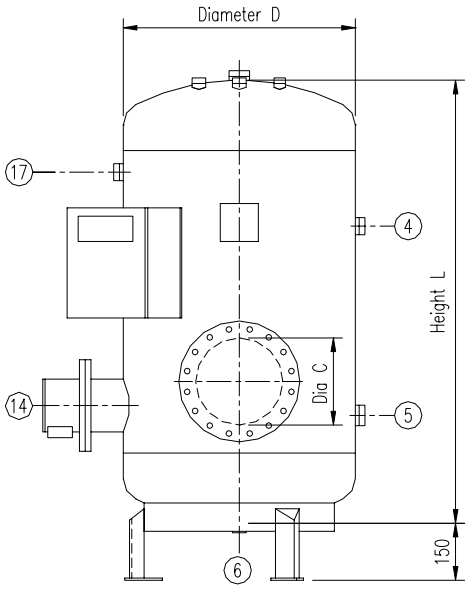
Please contact us should have any other requirements

WATER HEATING MADE EASY

Notes:
*1 - Galvanised calorifiers are not suitable for use with soft or acidic water and is not to be used in conjunction with copper pipework

*2 - Connections in boxes are flanged, otherwise connections are screwed



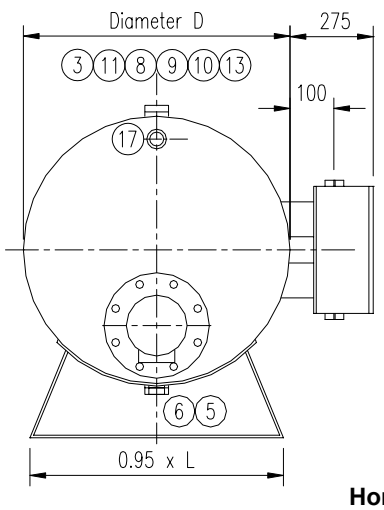


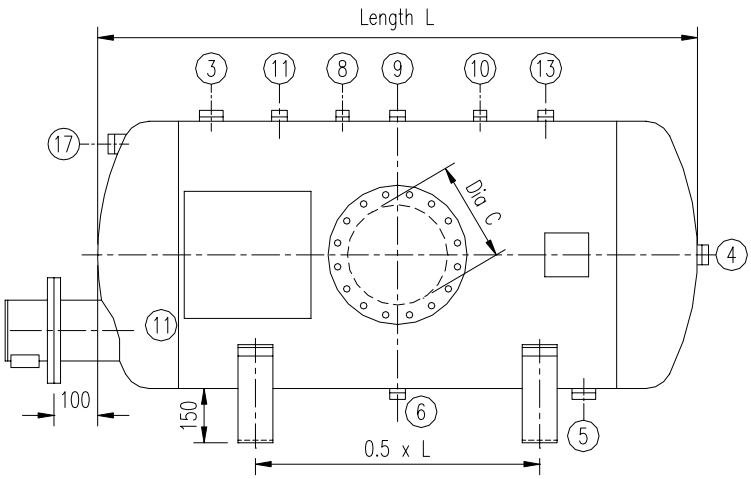
Vertical Orientation

Connections

Ref	Description	Size	Ref	Description	Size
3	Secondary Flow	Varies	10	Pressure Gauge	⅜"
4	Secondary Return	Varies	11	Vent (Optional)	Varies
5	Cold Feed	Varies	13	Anti-Vacuum Valve (Optional)	Varies
6	Drain	Varies	14	Immersion Heater	Varies
8	Thermometer	¾"	17	Low Water Cut-Out (Optional)	1"
9	Safety Valve	Varies			

Size Litres	D (mm)	L (mm)	C (mm)	Main Connection Sizes 3	4	5	6	11	13
230	508	1270	200	1¼"	1"	1¼"	¾"	1"	¾"
270	508	1473	200	1¼"	1"	1¼"	¾"	1"	¾"
360	610	1372	200	1¼"	1"	1¼"	¾"	1"	¾"
450	610	1753	200	1½"	1"	1½"	¾"	1"	¾"
500	686	1473	250	1½"	1"	1½"	¾"	1"	¾"
550	686	1727	250	1½"	1"	1½"	¾"	1"	¾"
600	762	1448	300	1½"	1"	1½"	¾"	1"	¾"
700	762	1678	300	1½"	1"	1½"	¾"	1"	¾"
800	762	1930	300	1½"	1"	1½"	¾"	1"	¾"
900	813	1956	300	1½"	1½"	1½"	¾"	1¼"	¾"
1000	915	1753	300	2"	1½"	2"	1"	1¼"	1"
1200	915	2086	300	2"	1½"	2"	1"	1¼"	1"
1500	1067	1956	375	2"	1½"	2"	1"	1¼"	1"
1750	1067	2175	375	2"	1½"	2"	1"	1¼"	1"
2000	1067	2388	375	2"	1½"	2"	1"	1½"	1"
2250	1220	2133	450	65	2"	65	1"	1½"	1¼"
2500	1220	2388	450	65	2"	65	1"	1½"	1¼"
3000	1220	2845	450	80	2"	80	1"	1½"	1½"
3500	1372	2743	450	80	2"	80	1"	1½"	1½"
4000	1372	3081	450	80	2"	80	1"	1½"	1½"
4500	1524	2768	450	80	2"	80	1"	1½"	1½"
5000	1524	3048	450	80	2"	80	1"	2"	1½"
5500	1524	3302	450	100	65	100	1"	2"	2"
6000	1600	3429	450	100	65	100	1"	65	2"
7000	1676	3302	450	100	65	100	1"	65	2"
8000	1676	3657	450	125	65	125	1½"	65	2x2"
9000	1676	3911	450	125	65	125	1½"	65	2x2"





Horizontal Orientation