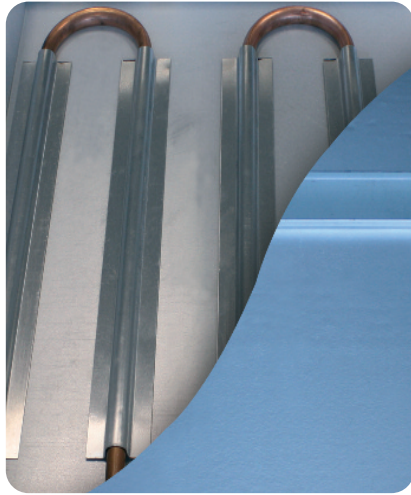


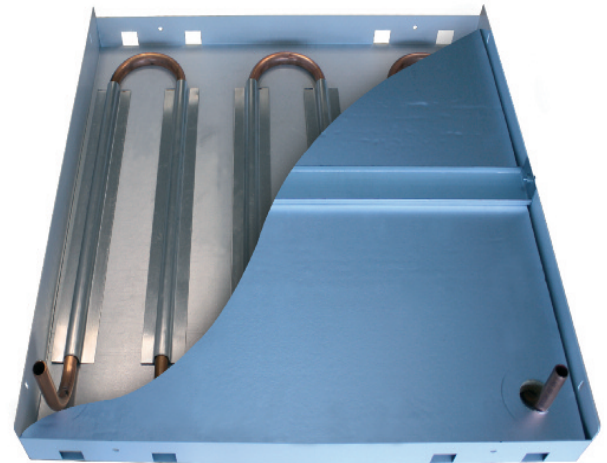


Moduline Radiant Panels

Moduline radiant heating panels

The MHS Moduline range of radiant ceiling panels provide an alternative to traditional heat emitters. These discreet panels offer comfortable space heating with the additional benefits of freeing up valuable wall space and helping conceal pipework. Heat can be delivered directly to those areas where it is required and energy consumption is reduced because systems can generally operate at lower airspace temperatures.

Typically this is some 3°C lower temperature in comparison with convective systems without any loss of comfort. As alternative to direct fired air heaters, considerable increase in efficiency is seen due to the generally higher efficiencies of boiler plant which provides the heat source for installation. In addition, short heat-up times, low maintenance, good controllability and favourable



temperature distribution in the heated area can make energy savings of up to 30% with a radiant heating system versus a direct fired arrangement.

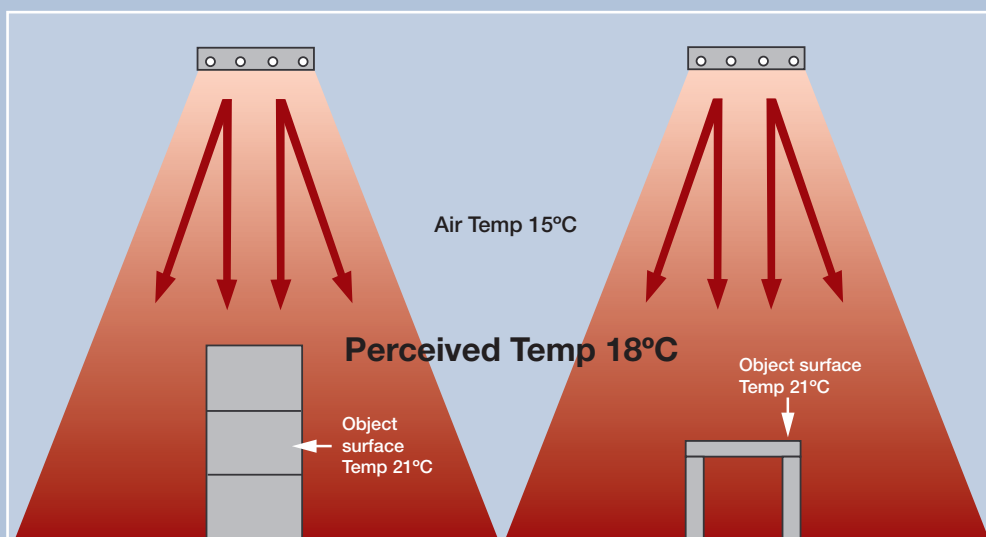
Moduline radiant ceiling panels are a perfect choice for schools, hospitals, retail and educational establishments where T-Bar suspended ceiling grid systems are installed.

Principle of Operation

Radiant Heat Transfer is the transfer of energy between regions of temperature produced by electromagnetic waves. Radiant energy is converted to heat when it impinges on the receiving body and is absorbed.

The transfer of radiant energy does not depend upon a material to transfer the energy as in the case of conduction and convection. The factors determining the amount and the rate at which this is transferred to a hot body and to a cold body will depend upon the following;

- **The distance between the two bodies "Hot" and "Cold".**
- **The difference in absolute temperature.**
- **The nature of the emitting and receiving bodies.**



- **Even temperature distribution across whole room**
- **Rapid response warm up times**
- **Radiant panels operate at lower room temperatures (thus reducing costs and valuable energy)**

Fig.1 - Diagram showing Radiant Principle

Standard Features

- Smooth faced front panel
- Ideal solution for integration within T-Bar suspended ceiling grid system (other ceiling applications available)
- Lengths available in single build modules - 600mm, 1200mm, 1800mm, 2400mm, 3000mm (longer lengths available assembled in modules, please contact MHS for details).
- Panel depth 50mm
- 480 watts/m² @ 50Δt°C (MWT – Room temp)
- Standard powder coated finish RAL 9010, 30% gloss (Anti-bacterial paint finish available on request - extra cost)
- Maintenance free, no moving parts
- Panel width – Nominal 600 mm for Standard T-Bar ceiling grid application – (other widths available on request.)



Application

Moduline radiant panels are suitable for a wide variety of applications – Schools, Colleges, Hospitals, retail and commercial showrooms where T-Bar suspended ceiling grid systems are installed. (Other applications are available, please contact MHS for details).

The simplicity of the hanging system coupled with the lightweight panel proves to be an advantage for the installation contractor by:

- Reducing the risk of back injury during installation especially while working at height
- Ease of maneuverability due to the reduced weight of the panel

Panel Sizes

Typically the panels are of modular design for integration within a standard 600 x 600 T-bar suspended ceiling grid system but can be constructed to suit the building requirements and can include architectural design if required.

Panel widths and lengths are manufactured less 5mm for integration into a standard T-bar suspended ceiling grid only. (i.e 1200mm x 600mm = 1195mm x 595mm).

Typical modular panel sizes available shown below – these can also be linked to make longer runs, bespoke sizes can be provided where required (please contact MHS for further details).

- 600 x 600
- 600 x 1200
- 600 x 1800
- 600 x 2400
- 600 x 3000

Technical data

Panel Emission (W/m ²)								
$\Delta t^{\circ}\text{C}$ (MWT - Room Temp)	40	45	50	52	55	55.5	56.5	60
Panel Emission (w/m ²)	359	418	480	505	543	550	562	582

Moduline radiant panel - heat outputs (Watts)								
$\Delta t^{\circ}\text{C}$ (MWT - Room Temp)								
Dimensions	40	45	50	52	55	55.5	56.5	60
600 x 600	128	150	172	180	195	197	201	217
1200 x 600	258	300	345	363	390	395	404	437
1800 x 600	387	451	518	545	586	593	607	656
2400 x 600	516	602	691	727	782	791	810	875
3000 x 600	646	753	864	908	978	989	1012	1094
Multi-Panels (supplied in modules complete with intermediate cover plates)								
3600 x 600	775	904	1037	1090	1174	1187	1215	1258
4200 x 600	904	1054	1209	1272	1368	1384	1417	1466
4800 x 600	1034	1205	1382	1454	1564	1582	1619	1676
5400 x 600	1163	1356	1555	1636	1760	1780	1822	1886
6000 x 600	1292	1506	1728	1818	1956	1978	2025	2096

For outputs using other $\Delta t^{\circ}\text{C}$ not stated above, multiply the outputs shown in Column $\Delta t 50^{\circ}\text{C}$ by the correction factors shown on the back page of this brochure.

Panels longer than 3-metres would be supplied in modules together with cover plates to form a continuous appearance. Longer panel runs available on request.

PLEASE NOTE:

For heights exceeding 3-metres from floor surface a 5% contingency factor should be included for each additional metre

Easy Selection Guide

To find the length from a given width

Determine your flow, return and room temp to calculate $\Delta t^{\circ}\text{C}$

$$\text{Length} = \frac{\text{Output Req'd (Watts)}}{\text{Panel emission (w/m}^2\text{) x panel width}}$$

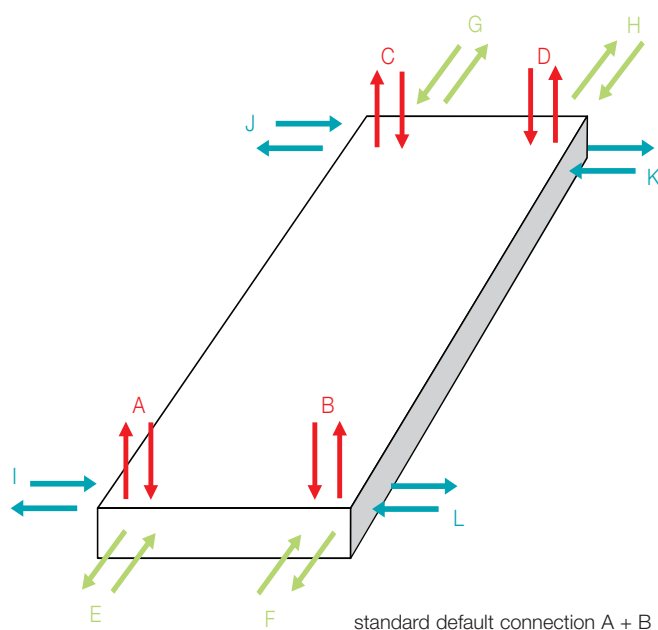
Example: (Based on $\Delta t 50^{\circ}\text{C}$)

$$\frac{860 \text{ Watts}}{480 \text{ Watts/m}^2 \times 0.60 \text{ m wide}}$$

Length = 2.98 metres length required.

Therefore selection would require 3000 mm x 600 mm Moduline panel

Connection Possibilities



Flow Rate / Pressure Drop

Flow rate Calculation:

$\text{Kg / sec} = \text{Output (Kw)}$

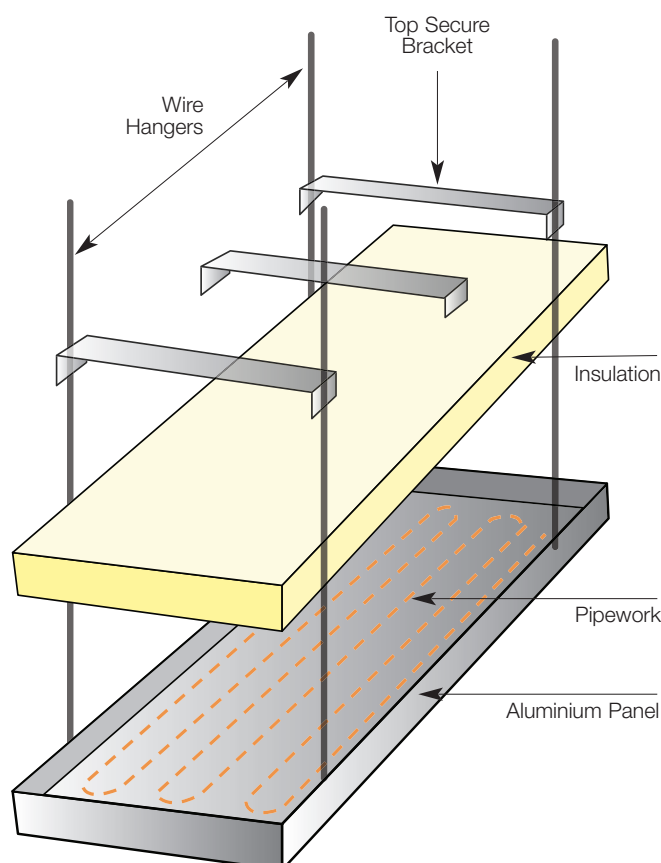
$4.2 \times \text{temp drop}$

Panel Size	Output (Watts)	Flow Rate (Kg/sec)	Length of Tube (15 mm Ø) 6-pass coil	Pressure Drop (Pascal /metre)	Total Pressure Drop (pa)
600 x 600	172	0.0041	4.3	4	17.2
1200 x 600	345	0.0082	8.6	7	68.2
1800 x 600	518	0.0123	12.9	12.5	161.3
2400 x 600	691	0.0164	17.2	22.5	384
3000 x 600	864	0.0205	21.5	32.5	698
3600 x 600	1037	0.0247	25.8	45	1161
4200 x 600	1209	0.0288	30.1	66	1806
4800 x 600	1382	0.0329	34.4	85	2924

The above is based on ΔT 50°C. Temp drop over panel 10°C

Advantages of Radiant Heating

- Even temperature distribution across whole room
- Reduced CO²
- Rapid response warm up times
- All pipe-work above ceiling level
- Radiant panels operate at lower room temperatures (thus reducing costs and valuable energy).
- A Radiant panel system is completely open to use alternative energy sources such as Solar Energy, Biomass or Heat Pumps which could lead to heating without CO² - Emission.
- Alternative against Gas Fired Radiant Heating **(NO REQUIREMENTS TO ALWAYS BE RELIANT ON FOSSIL FUEL ENERGY).**
- No Moving Parts - Silent in operation & Maintenance free
- Frees up valuable wall & floor space



Radiant Panel Specification

Construction

Smooth faced panel is typically 1.6 gauge (2mm available on request) aluminium sheet folded with a 70mm up stand (sides) and 50mm up stand (end). Manufactured in accordance with EN14037.

- 15mm OD copper coil to BS EN 1057 standard at 100mm pipe centres designed to give maximum output for the application.
- 50mm inserted insulated sheet.
- Multiple hanging points.

Paint Finish

Panels are finished to RAL 9010 (Warm white) of epoxy resin powder paint. Special paint finishes including anti-bacterial paint for specific applications. A variety of non standard colours are available (extra cost).

Insulation:

The fully insulated panel ensures that the optimum radiant heat is transmitted with minimum loss through the panel to ceiling voids. The insulation is of rigid construction with aluminium foil on both faces fully sealed at the edges between the panel shell and the insulated insert. Fully compliant to EUROCLASS A1 fire rating in accordance with BSEN 13501-1. Foil backing complies with BS 476: Part 6 "Fire Propagation" and BS 476: part 7 "Surface Spread of Flame". The foil facing therefore complies with Building Regulation and is rated Class O.

Connections

Flow & Return connections are open ended copper (15mm OD) to receive compression fitting by installer. Standard supply would be connections (same end) protruding vertically from end of panel – other connection configurations available on request. Flexible connections are available on request (extra cost).

Mounting Height

For heights exceeding 3-metres from floor surface a 5% contingency factor should be included for each additional metre in height.

Venting the panel

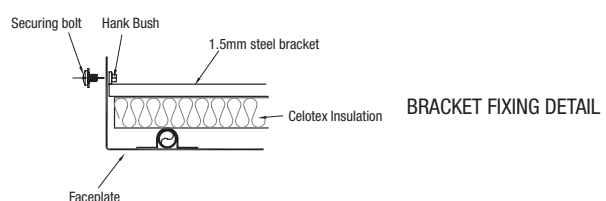
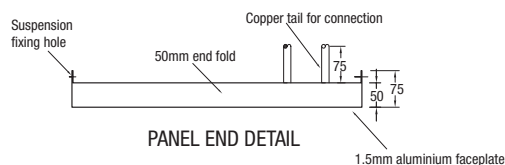
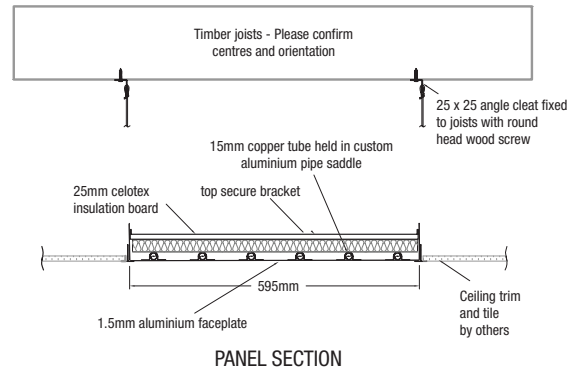
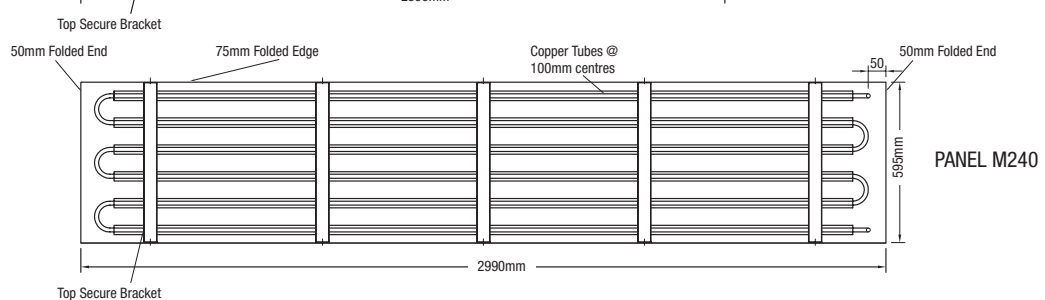
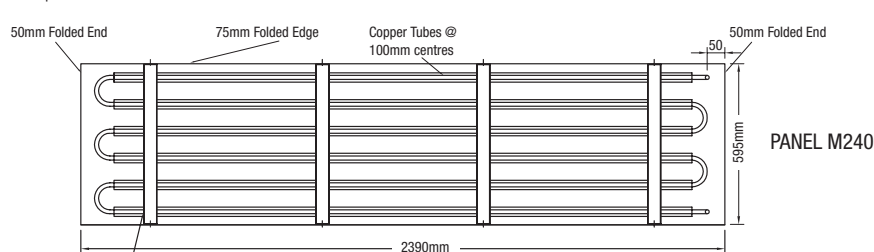
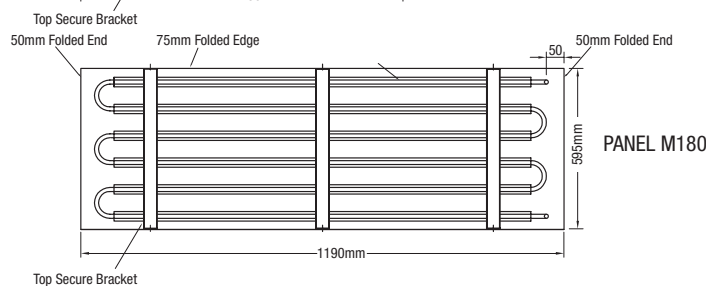
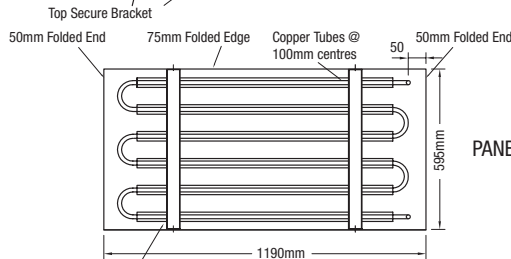
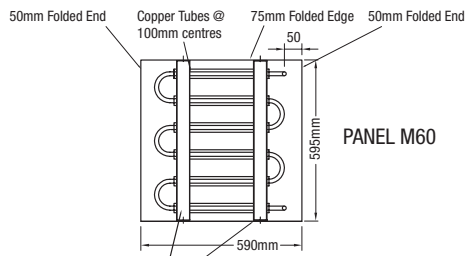
Allowance must be made during design or installation to ensure adequate venting of the panel that ensures the efficient operation and maximum output without interference. This vent can be on the flow and returns above the panel.

Working Pressure

Panels tested at works to 10-bar pressure for a final working pressure of 4-bar. The heating tubes are suitable for a heating system up to 6-bar.



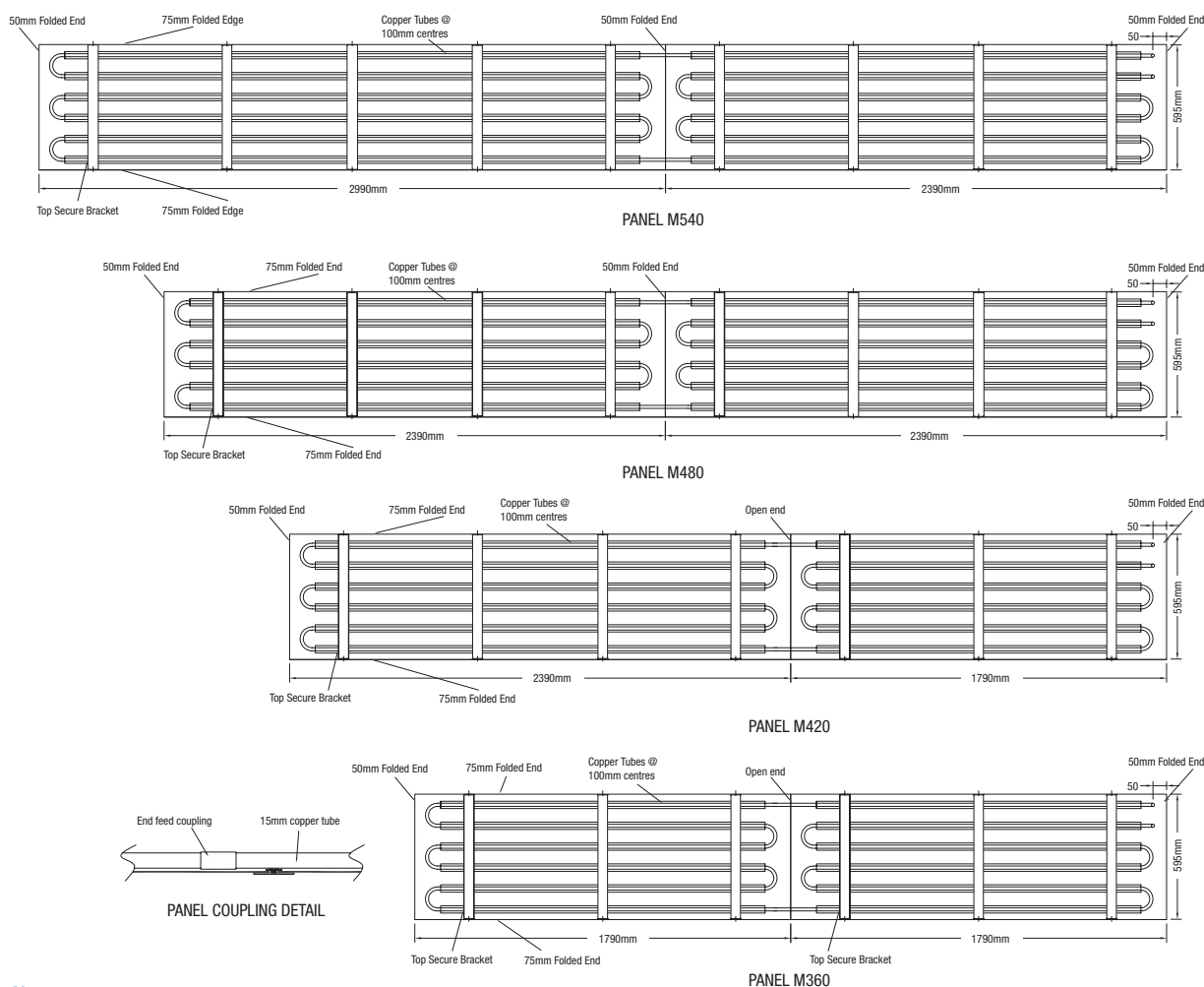
Moduline radiant panel details



Notes

1. 15mm copper tube held to panel face by full length aluminium saddles.
2. 15mm pipe connections left vertical for connection to main pipework by others.
3. Panels to vent through main pipework.
4. No securing straps to be used for 2400mm long panel.
5. All edges folded
6. Panels factory finished in white.
7. Fixings directly to timber joists; any secondary bracketry/support required to be supplied by others
8. Abrev
 - M60 = 600 Long panel
 - M120 = 1200 Long panel
 - M180 = 1800 Long panel
 - M240 = 2400 Long panel
 - M300 = 3000 Long panel
 - M360 = 3600 Long panel
 - M420 = 4200 Long panel
 - M480 = 4800 Long panel
 - M540 = 5400 Long panel

Moduline radiant panel details



Notes

1. 15mm copper tube held to panel face by full length aluminium saddles.
2. 15mm pipe connections left vertical for connection to main pipework by others.
3. Panels to vent through main pipework.
4. 4no securing straps to be used for 2400mm long panel.
5. All edges folded
6. Panels factory finished in white.
7. Fixings directly to timber joists; any secondary bracketry/support required to be supplied by others
8. Abrev

- M60 = 600 Long panel
- M120 = 1200 Long panel
- M180 = 1800 Long panel
- M240 = 2400 Long panel
- M300 = 3000 Long panel
- M360 = 3600 Long panel
- M420 = 4200 Long panel
- M480 = 4800 Long panel
- M540 = 5400 Long panel

Water Treatment

These products are for use on closed heating systems only; they are not suitable for installation on secondary HWS circuits.

On completion of the installation the entire system MUST be thoroughly cleaned and flushed to remove debris/flux residues etc. If a chemical cleanser is used, it must be thoroughly flushed from the system. Following this, the system MUST be dosed with a good eminence water treatment to prevent corrosion.

System design, flushing and dosing must be in accordance with BS 5449: 1990, BS EN 12828 & 12831: 2003 and BS 7593: 2006

IMPORTANT: Failure to observe these requirements will render the guarantee on the product void.

Corrosion inhibitor must be used in accordance with the manufacturer's instructions and recommendations and should take into account the particular metals within the system.

Δt	CF
60	1.267
59	1.240
58	1.213
57	1.186
56	1.159
55.5	1.145
55	1.132
54	1.105
53	1.079
52	1.052
51	1.026
50	1.000
45	0.872
40	0.748
35	0.629

Correction factor table

The outputs shown within this brochure are based on BS EN442, 75-65-20°C operating conditions, giving a Δt of 50°C, for Δt 's other than this, a correction factor must be applied.

Example:

Output required @ 82-71-21°C Δt 55.5 the CF = 1.145, therefore multiply the listed Δt 50°C output by the correction factor to give actual radiator output under these operating conditions.



A member of the Modular Heating Group Plc

3 Juniper West, Fenton Way,
Southfields Business Park,
Basildon, Essex SS15 6SJ
Tel: 01268 546700
Fax: 01268 888260
www.mhsradiators.com



RC/0111/6274RC