

ThermaRad Panel Radiators

Installation and operating instructions



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1 - INTRODUCTION

This brochure has been compiled to give our customers complete technical information on selecting, installing and commissioning ThermaRad Steel Panel Radiators. ThermaRad radiators are produced on the most modern automated radiator manufacturing equipment. ThermaRad radiators are manufactured to ISO 9001 Quality Management System and are certified to comply with the following international standards **EN 442, BS EN ISO 9001:2000, NFP 52 - 011 & - 012**. ThermaRad radiators have the convector fins welded to the waterways for maximum heat transfer. All the radiators are tested to 13 bar pressure to ensure that the completed product is fault free before leaving the factory. ThermaRad radiators are fully cleaned, prime coated and electrostatically powder coated before packing.

2 - GENERAL ADVICE

1. The radiator outputs in this catalogue are quoted with the standard water temperature of **EN442 90/70/20 ΔT 60°C**. The radiators can be used at different temperatures but their heat output will vary accordingly. Please refer to page 5 for further details.
2. ThermaRad radiators are designed to be installed in a sealed system only. Never drain the water in the heating system unless absolutely necessary, add water only if needed. Each time you add water or change the water in the heating system, corrosion occurs and the life of the radiator will decrease. ThermaRad radiators can be used indefinitely without changing the water in the system. Refer also to section 14.
3. The pipe work should be pressure tested to eliminate any leaks but **DO NOT** use **MAINS PRESSURE** if the radiators are connected.
4. Use only **OVENTROP** or approved valves both on the flow and return side of each radiator. The manual or thermostatic valves should be placed on the inlet side with the lockshield valve for flow control on the outlet side. The use of thermostatic valves will provide more comfort and economy.
5. Keep the packing on the radiator until the installation is completed to prevent any unwanted scratches or damage to the radiator.
6. Use the air vent in one of the top connections to eliminate all the air from the radiator.
7. The normal system pressure for a closed vented sealed system is between 1 - 2 Bars when cold.

3 - TECHNICAL SPECIFICATIONS

All Hurlcon Hydronic Heating ThermaRad radiators are manufactured to the following standards.

- Steel quality ST 12.03 DIN 1543
- Panel gauge 1.20 mm cold rolled steel
- Convector fins 0.45 mm cold rolled steel
- Top & side covers 0.75 mm cold rolled steel
- Test pressure 13 BAR minimum
- Working pressure 10 BAR maximum
- Connections Standard radiator 4 ports -1/2" BSP
Compact valve radiator 6 ports -1/2" BSP
- Paint specification Epoxy-polyester Powder RAL 9016

Accessories supplied with each ThermaRad

- Screws and plastic wall plugs
- Wall hangers
- Blanking plug G 1/2"
- Airvent plug G 1/2"
- Side panels (mounted onto the panel radiator)
- Grilles (mounted onto the panel radiator)

TECHNICAL DATA - CLASSIC 4 PORT RADIATORS

Kw's per metre @ ΔT_{60}

Height (mm)	Type 11	Type 21	Type 22	Type 33
200	0.45	0.65	0.81	1.05
300	0.64	0.93	1.20	1.71
400	0.82	1.16	1.53	2.16
500	0.98	1.38	1.83	2.58
600	1.15	1.60	2.13	3.01
700	1.30	1.81	2.41	3.41
900	1.59	2.23	2.92	4.19

Litres per metre

Height (mm)	Type 11	Type 21	Type 22	Type 33
200	1.40	2.60	2.60	4.00
300	1.87	3.50	3.50	5.30
400	2.24	4.37	4.37	6.47
500	2.62	5.13	5.13	7.63
600	3.00	5.90	5.90	8.80
700	3.38	6.57	6.57	9.74
900	4.13	7.90	7.90	11.63

Kilogram per metre (dry weight)

Height (mm)	Type 11	Type 21	Type 22	Type 33
200	6.60	11.30	12.10	17.80
300	9.00	15.00	16.50	24.40
400	12.30	20.70	22.90	33.80
500	14.90	25.00	28.00	41.40
600	18.20	30.70	34.30	50.90
700	20.30	33.90	38.30	56.80
900	26.00	43.40	49.60	73.50

4 - SIZES & TYPES AVAILABLE

Available radiators range from 400mm wide to 3000mm long in 100 mm steps.

Heights of 200, 300, 400, 500, 600, 700, 900, are available.

All are available as Types 10, 11, 21, 22, 33. Refer to drawings page 7.

NOTE: Hurlcon Hydronic Heating has a wide range of sizes in stock, however, check the availability with your nearest Hurlcon Hydronic Heating sales office prior to commencing installation as delivery of special orders can be up to 10-12 weeks.

5 - CALCULATING WATER FLOW

To ascertain water flow requirement to a panel radiator the following information must be known.

- Output required from the radiator.
- Temperature difference between Flow and Return (ΔT).

Then water in flow l/s can be calculated by the formula

$$\text{Flow in l/s} = \frac{\text{output kW}}{\Delta T \times 4.18}$$

Example:

Required output of 2.0 kW

Boiler capacity - flow 80°C return 70°C thus $\Delta T = 10$

The calculation is

$$\text{Required Flow} = \frac{2.0}{10 \times 4.18} = 0.048 \text{ l/s} \quad (\times 3600 = 172.8 \text{ l/hr})$$

6 – HEAT CORRECTION FACTORS

For selection of panel size, ThermaRad radiator heat outputs vary according to the difference between the room air temperature and the average of the flow and return water temperatures (called mean water temperature). The data supplied is based on 90/70 °C water temperatures and 20°C ambient air temperature $C_f = 1$

Flow water Temp	Room Temp °C	Correction Factor C_f Return water Temperature °C							
		40	45	50	55	60	65	70	75
90 °C	24	1.97	1.71	1.53	1.38	1.27	1.17	1.10	1.03
	22	1.81	1.59	1.43	1.31	1.20	1.12	1.05	0.99
	20	1.68	1.49	1.35	1.24	1.14	1.07	1.00	0.95
	18	1.56	1.40	1.27	1.17	1.09	1.02	0.96	0.91
	15	1.41	1.28	1.18	1.09	1.02	0.95	0.90	0.86
85 °C	24	2.10	1.82	1.62	1.46	1.34	1.24	1.16	1.09
	22	1.92	1.69	1.52	1.38	1.27	1.18	1.11	1.05
	20	1.78	1.58	1.42	1.30	1.21	1.12	1.06	1.00
	18	1.65	1.48	1.34	1.24	1.15	1.07	1.01	0.96
	15	1.49	1.35	1.24	1.14	1.07	1.00	0.95	0.90
80 °C	24	2.24	1.94	1.72	1.56	1.42	1.32	1.24	1.16
	22	2.05	1.80	1.61	1.46	1.35	1.25	1.18	1.11
	20	1.89	1.67	1.51	1.38	1.27	1.19	1.12	1.06
	18	1.75	1.57	1.42	1.31	1.21	1.13	1.07	1.01
	15	1.58	1.42	1.30	1.21	1.12	1.06	1.00	0.95
75 °C	24	2.41	2.08	1.85	1.66	1.52	1.41	1.32	1.25
	22	2.20	2.20	1.72	1.56	1.43	1.34	1.25	1.19
	20	2.02	2.02	1.61	1.47	1.35	1.27	1.19	1.13
	18	1.87	1.87	1.51	1.38	1.28	1.20	1.13	1.06
	15	1.67	1.67	1.38	1.27	1.19	1.12	1.06	1.00
70 °C	24	2.61	2.25	1.99	1.79	1.64	1.52	1.43	1.35
	22	2.37	2.07	1.85	1.67	1.54	1.43	1.35	1.28
	20	2.17	1.91	1.72	1.57	1.45	1.37	1.28	1.19
	18	2.00	1.78	1.61	1.47	1.37	1.28	1.19	1.11
	15	1.79	1.61	1.47	1.35	1.27	1.19	1.11	1.03
65 °C	24	2.85	2.44	2.15	1.94	1.81	1.69	1.59	1.45
	22	2.58	2.24	1.99	1.81	1.69	1.59	1.45	1.35
	20	2.35	2.07	1.85	1.69	1.59	1.45	1.35	1.25
	18	2.15	1.91	1.73	1.59	1.45	1.35	1.25	1.15
	15	1.91	1.72	1.57	1.45	1.35	1.25	1.15	1.05
60 °C	24	3.14	2.68	2.36	2.18	2.02	1.87	1.69	1.59
	22	2.82	2.45	2.18	2.02	1.87	1.69	1.59	1.45
	20	2.56	2.24	2.02	1.87	1.69	1.59	1.45	1.35
	18	2.34	2.07	1.87	1.69	1.59	1.45	1.35	1.25
	15	2.03	1.85	1.69	1.59	1.45	1.35	1.25	1.15

Example.

Required 2.0 kW heating
Conditions
Flow temp 80 °C
Return temp 70 °C
Ambient air 22 °C

From the chart

$C_f = 1.18$

Corrected Radiator
2 kW x 1.18 = 2.36 kW
std output required.

Select the radiator size of
600 / 22 / 1000
with 2.49 kW std output
being closest to the panel
output required.

1. Outputs increase by approximately 2 % when top grilles are not fitted.
2. Correction factor for other temperature conditions available on request.

7 - PRESSURE LOSS

The pressure loss through a radiator and valves are relatively low but can be calculated by the following formulae:

For a ThermaRad panel radiator with **OVENTROP** valves the calculations are as follows:-

For type 11 panels $P_{11} = 164$

For type 22 panels $P_{22} = 97$

Thus for the example of a 2 kW heat output and with a calculated water flow of 172 l/h (from section 5), the pressure loss through the panel will be:-

$$\text{Pressure loss } P_r = P_x \times \frac{(\text{water flow l/h})^2}{10,000 \times 1,000}$$

For a type 11 panel

$$\text{Pressure loss} = 164 \times \frac{(172)^2}{10,000 \times 1,000} = 0.49 \text{ kPa}$$

For a type 22 panel

$$\text{Pressure loss} = 97 \times \frac{(172)^2}{10,000 \times 1,000} = 0.29 \text{ kPa}$$

Add to this the pressure loss through the valves to obtain the total loss per radiator.

Pressure loss for a standard **OVENTROP** radiator valve set is:-

$$P_v = (36 \times \text{flow l/s} / K_v)^2 = \text{kPa pressure loss}$$

$K_v = 1.1$ for standard OVENTROP valve set

Thus for our example 2.0 kW radiator, the pressure loss for the valves with a water flow of 0.04 l/s is as follows:-

$$P_v = (36 \times 0.048 / 1.1)^2 = 2.47 \text{ kPa pressure loss.}$$

$$\text{Total loss through radiator} = P_r + P_v = P_t \text{ kPa} = 0.29 + 2.47 = 2.75 \text{ kPa}$$

8 - PACKING

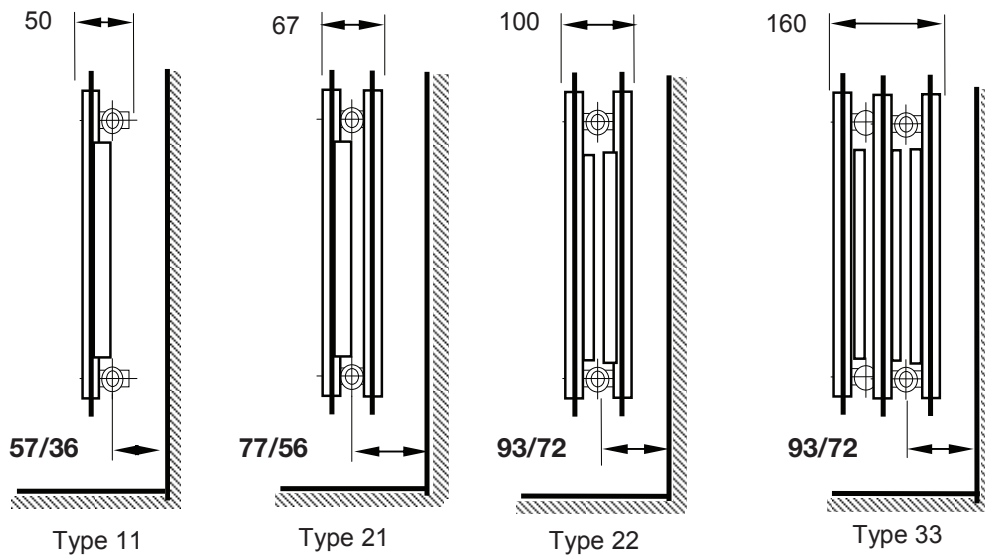
1. In order to protect the ThermaRad radiator and avoid damage from external effects, all four corners of the radiator are protected with thick cardboard.
2. To protect against dirt etc. the radiators are shrink wrapped in heavy plastic. This heavy-duty protection minimises the risk of damage in the delivery and installation phase.
3. It is recommended that the wrapping should be kept on the radiator until all construction work is complete.

9 - MAINTENANCE

1. Dust build up underneath the radiator can be easily removed using a vacuum cleaner. The side panels can also be removed along with the top grille, allowing easy access for cleaning.
2. The radiator surface should only be cleaned using a soft cloth and warm soapy water, please do not use corrosive or abrasive agents to clean your radiator.

10 - PANEL DIMENSIONS

Types and basic sizes - cover panels & grilles fitted to types 11,21,22 & 33



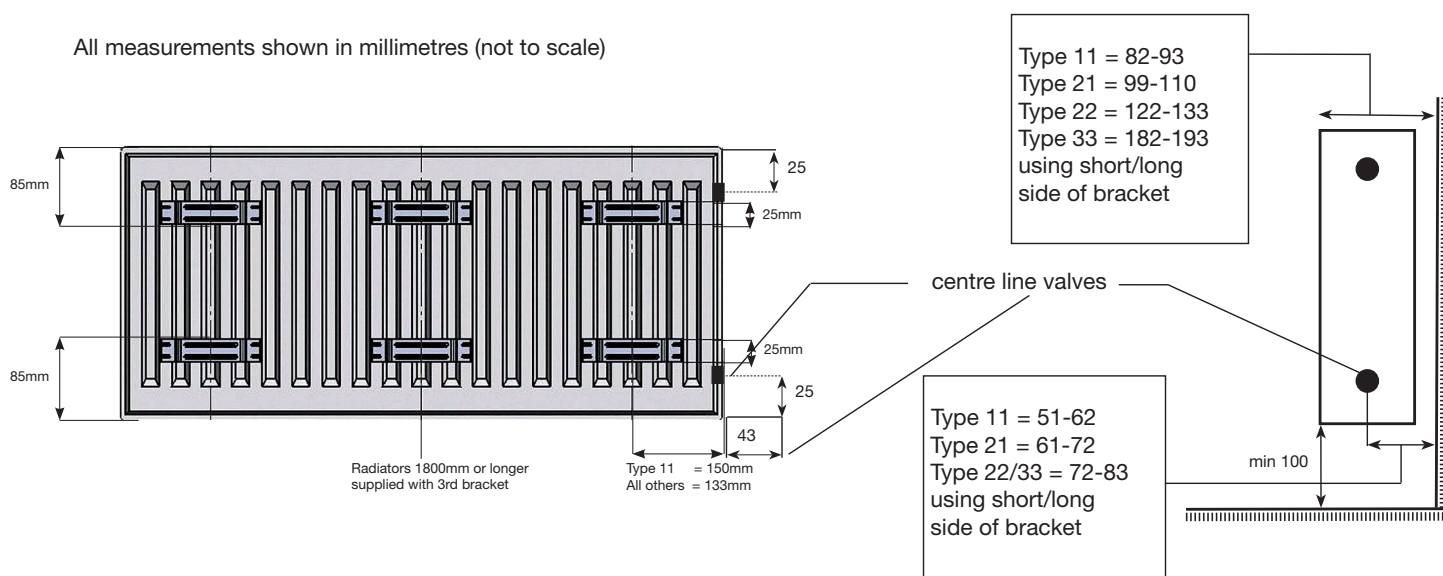
11 - INSTALLATION DETAILS

A method of installation.

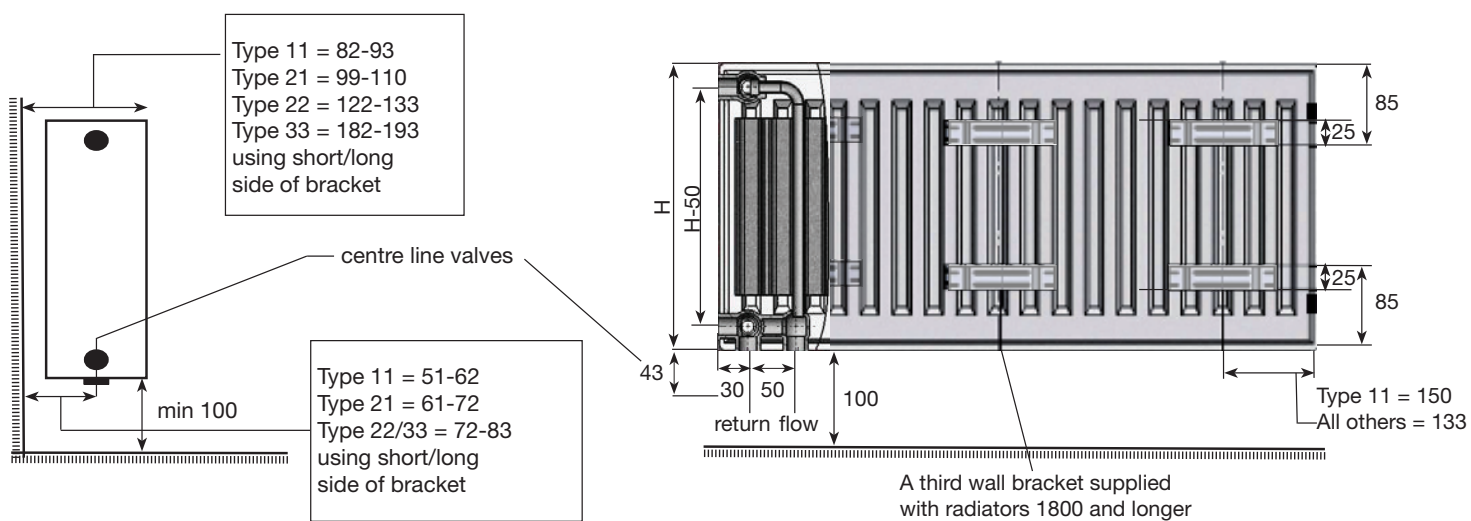
1. Determine the size and position of the radiator to be installed in the room.
2. Determine the height above the floor for the radiator (usually between 90 and 150 mm). Check the height of the skirting board to clear the radiator mounting bracket and the radiator.
3. Locate & drill the four mounting holes according to the details below.
4. Fix the brackets in place with the appropriate fixing screws and level the brackets.
5. Cut away the packing around the four ½" BSP connections point and fit the air bleed plug to a top corner and the valve unions and plug according to the plumbing requirements. Refer page 9.
6. It is wise to check a sample radiator for dimensions before committing the pipe work. This allows for varying valve fittings and bracket location.
7. Determine the position of the pipe entries through the floor or wall. Drill oversize holes to allow for alignment variations and expansion movement.
8. Fit the radiator to the wall brackets using the plastic inserts on the brackets. Leave the outer packing on to protect the paint finish during the installation phase.
9. Install the radiator valves and plumb to suit. **DO NOT** water test with **MAINS PRESSURE** water.
10. When the installation is complete, fill the system, check for leaks, and eliminate all air from the system.
11. Commission and run the boiler to heat the water.
12. Balance the system using the lockshield valves to give proportional flow to all radiators.
13. Re-check for air in the system and that the circulator is running quietly.

12 - POSITIONING OF WALL BRACKETS

ThermaRad Classic Valve & Bracket Positioning Details



ThermaRad VK (Compact Valve Radiators), Valve & Bracket Positioning Details

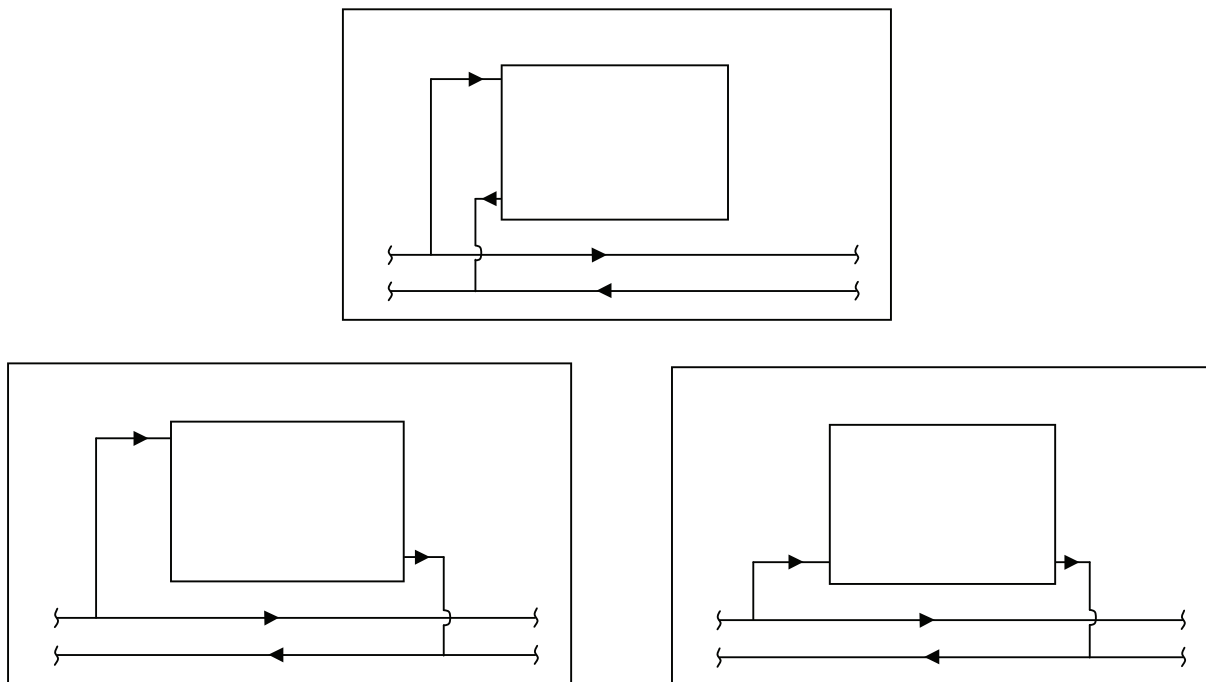


All panels 1800mm and longer come with a 3rd central bracket

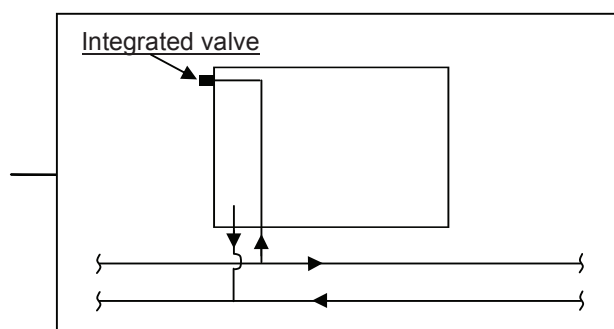
13 - METHODS OF PLUMBING

With the four 1/2" connections, fit the control valve (manual or thermostatic), lockshields and airbleeds. The connections may be on the same side for the smaller radiator or opposite sides for longer radiators to ensure good water distribution. An air bleed plug must always be located at the top of the radiator.

Typical Methods of Plumbing a Standard 4 Port Radiator



Typical Method of Plumbing a Compact Valve 6 Port Radiator



Note: Air bleeds **MUST** be in one of the top connections of the radiator.
Radiators **MUST** be installed level and vertical.

14 - PROBLEM SOLVING

1. A panel radiator needs a continuous flow of hot water to work effectively.
2. If the radiator is hot at the bottom but cold at the top - bleed the air out.
3. If the radiator flow pipe is hot and the return cold - increase the flow of water by re-balancing the system.
4. If the radiator or the pipe work is noisy, check for air in the system. Switch the circulator off and allow the air to settle to the top of the radiators. Then bleed the radiators, top up water if necessary.
5. A radiator will be hot only at maximum heat output. A warm radiator indicates that the boiler has switched off or the thermostatic valve, if fitted, has adjusted the output down to suit the required room conditions. It is wise to provide an external drain at the lowest point of the pipe work in the event that the system has to be drained for maintenance or modification.

15 - WATER TREATMENT

1. There is a basic need to treat the water contained in all heating systems that have steel panel radiators.
2. There will always be some corrosion in a steel panel radiator system even though the system is closed.
3. The water in a closed system will promote corrosion unless the initial charge of water is correctly treated.
4. Open vented systems in particular should be treated, as open vented systems are not completely sealed off from the atmosphere. It is essential to provide a tank open to the atmosphere if proper venting and expansion of the system is to be achieved. The same tank that is used to fill the system provides the capacity for the storage of water that has expanded when heated. When the system cools down, this same water is drawn back into the system taking with it a small quantity of dissolved oxygen. Even without any leakages from the system, there will be evaporation losses from the surface of the tank depending on the ambient temperature.
5. In practice the development of corrosion in a system reduces the transfer of heat through the formation of black iron oxide sludge. This corrosion process causes noises from the boiler and circulator eventuating in the premature failure of the radiators, circulator and boiler.
6. For the above reasons, it is suggested that the system is thoroughly flushed through at the time of installation.
7. The system should then be filled with a stable water treatment solution that does not require continuous topping up. For example **GEL LONG LIFE 100 CORROSION INHIBITOR**. Please refer to our website for more technical details.

Hurlcon ThermaRad steel panel radiator

25 year warranty

ThermaRad panel radiators are guaranteed against defects in material or manufacturing for a period of 25 years, commencing either on the date of installation or 3 months from Hurlcon invoice date, whichever is earlier.

This warranty covers repair or replacement of the radiator, parts or components accepted as faulty by Hurlcon Heating.

This warranty does DOES NOT COVER any labour charges, travel time expenses, or any consequential losses or damage.

The points below must be followed or the warranty may be voided:

1. *ThermaRad panel radiators must only be used for the purpose for which they are intended.*
2. *ThermaRad panel radiators must be installed and/or repaired by a qualified contractor.*
3. *ThermaRad panel radiators must be installed and used according to accepted plumbing practices, such as BS5449, or any other relevant national or local standards, as well as the manufacturer's installation and operating instructions.*
4. *ThermaRad panel radiators are designed for use in closed heating systems. Radiators installed in open circuit (steam, thermal springs bore, boiled water or tap water) systems, or with pipe systems that are not oxygen-tight to relevant DIN standards (DIN 4726) will not be covered under this warranty.*
5. *ThermaRad panel radiators installed in aggressive or humid environments such as swimming pool areas, saunas, bathrooms, showers or greenhouses will not be covered under this warranty.*
6. *After installation the system must be properly flushed, and filled using an approved corrosion inhibitor (i.e. Gel Long Life 100). The corrosion inhibitor must be checked at regular intervals and recommended concentration levels must be verified and recorded by a qualified installer. The annual boiler service provides a convenient opportunity for this service.*
7. *Ensure that any connection threads are free of any dirt and burr after the installation, and do not over tighten stoppers, air bleeds or valves, otherwise the connection threads could be damaged.*
8. *Maximum working pressure of the radiators is 10 bars, maximum recommended water temperature 95 degrees C.*
9. *This warranty shall not apply to any radiators that have been subject to accident, negligence, alteration, abuse or misuse during transport, handling or storage, or incorrect installation, or to fair wear and tear or deterioration due to normal use, such as paint fading.*



installation and operating instructions

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