

## Heatline - Cast Iron Radiators

# **CAST IRON THE** **BASICS**

1. DO NOT LIFT ON YOUR OWN.
2. ONLY LIFT THE RADIATOR VERTICALLY.
3. DO NOT LIFT MORE THAN **8/10** SECTIONS AT ANY ONE TIME.
4. POSITION THE RADIATOR BEFORE FINAL ASSEMBLY.
5. THIS PRODUCT IS NOT **WATER TESTED.** ALL JOINTS SHOULD BE TIGHTENED.
6. FLAT SURFACES SHOULD BE FILED WITH A **SMOOTH FLAT** FILE TO REMOVE ANY SWARF.
7. THE **THIN WASHER** ONLY SHOULD BE USED BETWEEN SECTIONS.
8. 2 BUSHES AND PLUGS WILL BE RIGHTHAND THREAD.
9. 2 BUSHES AND PLUGS WILL BE LEFTHAND THREAD.
10. **DO NOT USE P.T.F.E TAPE OR BOSS WHITE ON ANY JOINTS**

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## IMPORTANT.

Please read these instructions fully before assembly, moving, installing or considering any final decoration of the finished product. Failure to follow these instructions could invalidate any warranty, should damage be caused to the radiator or any of its joints.

## Introduction

- Cast Iron Radiators are made up of a number of individual 'Sections' joined together to form an 'Assembly'.
- An 'Assembly' consists of a maximum of 10 sections joined together.
- A radiator can be made up of one or more 'Assemblies' (joined together locally or 'on site').

Depending on the final specified size, radiators are supplied as a number of 'Sections' or 'Assemblies' which, if necessary, are required to be joined together locally or 'on site' so as to provide the required heat output for comfort conditions of the room(s) to be heated.

Joining of sections and assemblies is a skilled process. These instructions provide guidance on the tools and techniques required to enable water tight radiators to be installed.

## Handling

Cast iron radiators are heavy and great care must be taken when lifting heavy sections. Always use mechanical lifting aids wherever possible. Ensure there are an adequate number of persons available to manoeuvre the radiators into their final position.

Before moving the radiators, they must be turned to the upright position (normally installed orientation). They must always only be moved in the upright position. Failure to follow these instructions could result in bowing of the radiator along its length, caused by strain on the fittings, which may subsequently result in water leaking from the joints.

## Finishing

The final decorative finish to the radiators should normally only be undertaken once the water tightness of all sections has been confirmed. If decoration is carried out prior to final testing, it is possible that the decoration may become damaged during any resealing operations.

**Note:** Powder coating and oven baking can be an acceptable method of finishing cast iron radiators, providing the heat used in the oven baking process is not undertaken at a temperature likely to damage the gasket material used between the joints.

## Tooling Required

To enable 'Sections' to be built into 'Assemblies' and to join 'Assemblies' together to form a larger radiator, the following tools are required.

- Joining key bar (key shape at one end and  $\frac{3}{4}$  inch square drive at other end)
- 22mm Socket (to drive joining key)
- Wrench to suit 22 mm socket (for initial assembly, tightening and disassembly)
- Torque wrench (capable of being set to 250 Nm (180 lb/ft<sup>2</sup>) for final tightening)

## Assembly Instructions

Every cast iron radiator comprises a number of individual sections, which when joined together, form a 'Radiator Assembly'. Each 'Section' is joined to the next using threaded pipe nipples, which screw into the waterway openings formed at both the top and bottom of the radiator. A seal is made with a thin gasket which when in contact with water swells to form a water tight seal.

The maximum number of 'Sections' that form an 'Assembly' is 10. Assemblies of 10 or less can be joined together on site to form longer radiators. The length of individual assemblies is restricted by the length of the jointing key bar used to assemble the sections.

Each 'Assembly', regardless of length, will terminate with threaded waterway openings at each end, at both the top and bottom of the radiator.

To match the threads of the sections, pipe nipples are provided with 'Left handed threads' at one end and 'Right handed threads' at the other end. Thin gaskets are provided that must be positioned over the pipe nipples to join Sections and 'Assemblies' together, as described later in these instructions.

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**IMPORTANT: The gaskets provided to join 'Sections' and 'Assemblies' are much thinner than the gaskets provided to seal the end caps bushes. It is important that the correct gaskets are used for each purpose. Care must be taken to ensure that the thicker gaskets are NOT used to seal any of the 'Section' joints.**

Every Radiator, regardless of length is provided with a set of threaded 'end cap bushes' to terminate the waterways and allow connection of the radiators valves and the air release valve. One finishing plug is provided to terminate the end cap bush, which is not connected to be connected to pipework, or fitted with the air release valve. Two of the end cap bushes that screw into the ends of the radiator will have LEFT hand threads, to be used at one end of the radiator and the opposite pair will have RIGHT handed threads. The tapings for the radiator valves and air release valve in the end caps are threaded R½. The air release valve must be fitted to one of the top bush connections, chosen for ease of future accessibility for allowing air to be removed from the radiator.

The threads of the radiator valves and air release should be sealed into the bushes using PTFE thread sealing tape.

## NOTES:

1. Jointing compounds or other jointing materials of any type must NOT be used on any of the sealing faces or gaskets. Gaskets must be dry jointed against clean joint faces.
2. Care must be taken to ensure the thinner section gaskets do not get confused with the thicker end cap gaskets
3. Radiators must NOT be lifted or moved in the horizontal orientation. They must be turned to the vertical position prior to being moved.
4. The radiator must NOT be subjected to or any heat or baking treatments after assembly, which may damage the joints or gasket material.

## Radiator Support

All cast Iron radiators must be adequately supported. Where radiators include feet built into the 'Sections' e.g. Heatline 'Renaissance Range' it is important that the foot sections are located correctly so as to provide the correct support. Wall restraining brackets must be used towards the top of the radiators so as to prevent them from tipping forward (See Photograph 1).

### 'Heritage' Range

The Heatline 'Heritage' range is supplied with loose feet which must be evenly spread so as to adequately support the entire radiator. The loose feet are designed to fit between the sections of the radiator.

As an alternative to using feet on the 'Heritage Range', where a good sound solid wall fixing can be achieved, wall support brackets can be used as an alternative to feet to support the base of the radiator (See Photograph 2).

### 'Renaissance' Range

The Heatline 'Renaissance' Range is designed with the feet built into some of the actual 'Sections' of the radiator depending on the size of the finished radiator. This type of radiator is required to have 'Foot Sections' positioned so that there are no more than 8 standard 'Sections' between any pair of 'Foot Sections'.

The following guidance detail how the foot sections must be assembled to provide the correct level of support for each individual radiator.

- For radiators of 10 sections or less, one foot section must be located at either end of the radiator e.g. 8 standard sections and two feet, configured as shown:-

**Y X X X X X X X Y**

(8 Standard columns + 2 foot sections = 10 sections)

- Where radiators comprises between that 11 and 19 sections, the radiator will normally be formed from an odd number of sections, (because a third foot section will normally be included at the centre of the radiator) e.g. a radiator formed of 19 sections will include 3 feet sections with 8 standard sections at each end between the feet e.g. a 19 section radiator will comprise a foot section at each end, and an additional foot sections in the middle as shown:-

**Y X X X X X X X Y X X X X X X X Y**

(2 x 8 standard sections + 3 foot sections = 19 sections)

- Radiators between 21 and 25 sections will require 4 foot sections and so on.

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**y x x x x x x x y x x x x x x x y x x x x x x x y**

(3 x 8 standard sections + 3 foot sections = 25 sections)

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## Assembly Instructions

### Planning Assemblies.

Where radiators include feet built into the 'Sections' (Renaissance Range) it is important that the foot sections are correctly located so as to provide the correct support. (See 'Radiator Support' Section)

This does not apply to the Heritage range where all sections are identical.

### Joining Sections Together

#### Identification.

The smooth end of the section is the top and the rough end is at the bottom of each section. One side of every section will incorporate an embossed logo or part number marking on its surface. The smooth tops and the embossed markings are used to ensure that all sections are aligned in the same orientation and direction prior to assembly (See Figure 1).

#### Preparation

- 1 Using a fine toothed file or fine sandpaper, clean all paint, dust etc., from mating/connecting surfaces around all four waterways on all sections before assembly.

**Notes:** a. It is recommended that the first two second sections are prepared and joined together first, then prepare the next section etc.  
b. If using a file, it is important to use it flat and level so that the section waterway faces are filed smoothly and evenly.

- 2 Align the sections to be assembled on a flat surface all the same way up, with all embossed markings facing in the same direction.
- 3 Each joining pipe nipple is marked on one side with small saw like teeth. The saw like teeth should always face away from the side of the section with the embossed marking (see Figure 1).
- 4 Screw two pipe nipples (one at the top and the other at the bottom) into the 'Section' waterways, just enough to hold the thread. Add a thin gasket onto each pipe nipple (always screw clockwise to tighten).
- 5 Bring another 'Section' into position with the embossed markings facing the same direction as the original sections. Align both waterways against the threaded pipe nipples of the original 'Section'. Hand screw the threaded pipe nipples until the threads just catch. Using the joining key, screw the pipe nipples (clockwise), alternating between top and bottom waterways, so as to pull together evenly, until there are no gaps between the 'Sections'. (The gaskets should now be sealing the two 'Sections' together). Make a final check to ensure the 'Sections' are uniformly aligned, then tighten to the recommended torque setting of 250 Nm (Newton metres) or 185 lb/ft<sup>2</sup>. (See Figure 2). **DO NOT OVER TIGHTEN.**

For joining further 'Sections' to the 'Assembly' repeat steps 1 to 5 above.

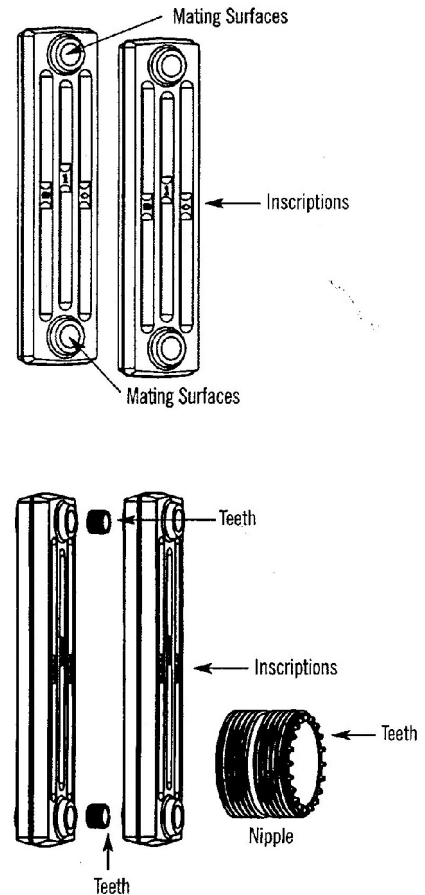
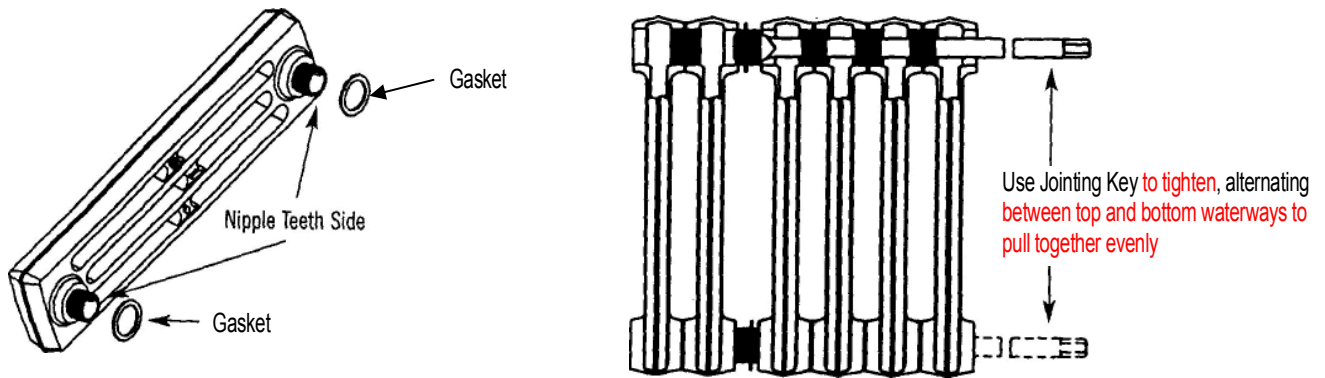


Figure 1. Identification

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The maximum number of 'Sections' that can be joined together to form an 'Assembly' is 10 (this is limited by the tooling available to enable 'Sections' and 'Assemblies' together). However, the tooling allows 'Assemblies' to be joined together to form larger Radiators (See 'Joining Assemblies Together').



**Figure 2. Alignment and Jointing**



The Manton Centre, 16-19 Manton Lane, Bedford MK41 7PX.  
Tel: 0870 7873363 Fax: 0870 7778322 [www.heatline.co.uk](http://www.heatline.co.uk)

## Joining Assemblies Together

'Assemblies of 10 or less 'Sections' can be joined together to form larger radiators.

The process of jointing 'Assemblies' is identical to Jointing 'Sections' together, other than alignment of the 'Assemblies' is critical and great care needs to be taken.

1. Place the assemblies to be joined together on a clean flat surface allowing both 'Assemblies' to be kept flat and level. The assemblies will move together as they are joined and therefore a means of protecting the surfaces of the radiator against damage should be provided. Clean the gasket seating areas of the four waterway openings between the two 'Assemblies' thoroughly, ensuring they are free from paint, dirt and grit etc.

**NOTE** One side of a cast iron 'Assemblies' can be identified by a Logo or Part Numbers embossed on the individual 'Sections'. The other side of the cast iron 'Section' can be identified as being without embossed Logos or Part Numbers.

2. Align the 'Assemblies' accurately together, ensuring the end sections to be joined together present opposite threads i.e. one with left-handed threads, and the other with right-handed threads. Ensuring all 'Assemblies' to be joined face the same direction and are the same way up will ensure correct alignment. Both joining threaded pipe nipples are marked at one end with small saw like teeth. These teeth should always face away from the side of the Sections with the embossed marking (See Figure 1).
3. Screw both joining NIPPLES into the first pair of threads – UNTIL THEY JUST ENGAGE THE THREAD and then place a thin joining gasket over each pipe nipple at the mid-way point.

### NOTES:

- a. The section joining gaskets are thinner than the end cap gasket. It is important that the correct gasket is used for the purpose intended. Use of the incorrect gasket will result in a water leak on filling the radiator.
  - b. All jointing NIPPLES have both left and right handed threads to enable the Assemblies to be jointed together.
  - c. Jointing compounds of any type must NOT be used on any of the sealing gaskets.
5. Gently align the second 'Assembly' into position; matching the internal threads of the waterways with the protruding external threads of the pipe Nipples
  6. Lay the 'Assembly' with the embossed writing facing the engineer and insert the 'Joining Key' through one of the waterways of the 'Assembly' to be joined, until it engages with the jointing nipple to be tightened. Applying slight pressure, pull the two 'Assemblies' together with one hand and begin to turn the 'Joining Key' with the other hand until the Assemblies begin to join together. Partially tighten both the top and bottom joints in turn, alternating between top and bottom waterways, so as to pull together evenly, until both joints meet at the gasket face. Make a final check to ensure the two 'Assemblies' are uniformly aligned. For example one 'Assembly' is not lower or higher than another.
  7. Using a torque wrench, tighten the joints to the recommended torque setting of 250 Nm (Newton metres) or 185 lb/ft<sup>2</sup>. DO NOT OVER TIGHTEN.

### NOTES:

- a. If the 'Assembly' has the embossed Logo or Part Numbers facing the engineer undertaking the work, turning Clockwise will tighten the joint and turning Anti-Clockwise will loosen the joint.
  - b. To ensure that the water ways threads are not damaged by the joining key, Heatline™ recommend employing a wooden block under the key, between the wrench handle and the radiator, so as to keep the key bar centrally in line with the waterway opening.
  - c. If there are several 'Assemblies' to be joined together, it is wise to check at every joint between the 'Assemblies' to ensure they are all in line with each other.
  - d. The radiator must NOT be subjected to any lifting or manoeuvring in the horizontal orientation. They must be turned to the vertical position prior to being moved.
  - e. The radiator must NOT be subjected to or any heat or baking treatments after assembly, which may damage the joints or gasket material.
8. Add further 'Assemblies' as required, repeating the above procedure.
  9. Turn and manoeuvre the radiator IN THE UPRIGHT POSITION to the installation location.

DO NOT CARRY THE RADIATOR ON ITS SIDE - this will place undue stress on the joints. Use a mechanical aid, or get help to carry the radiator if it's too heavy or unmanageable for one person.

## Breaking Down Assemblies

Lay the 'Assembly' on a flat level surface, with the embossed logo or Part Number facing the engineer. Insert the Joining Key through one of the waterways (after end bushes have been removed) until engaging desired joining nipple. Unscrew the 'Section' pipe Nipple a couple of turns at a time, alternating between both top and bottom assemblies. Gently separate the two 'Assemblies'.

NOTE: To dismantle; turn the joining key Anti-Clockwise when the embossed logo or Part Number on the section is facing the engineer.

## Radiator Installation

Depending on the size of the radiator, they can be extremely heavy and become heavier still when filled with water. Adequate provision must be made to ensure the final filled weight can be supported by the floor material, especially at the point of contact with the floor, or by adequate wall fixings, where wall support brackets are used.

Each radiator is required to have a valve fitted on both the flow and return connections so as to provide for 'balancing' purposes and to allow future maintenance of the radiator without having to drain the heating system. When installing thermostatic radiator valves, it is normal practice to install this type of valve on the flow pipe to the radiator. The air release valve must be installed into one of the top end cap threads.

All threaded connections to the radiator end caps must be made using PTFE tape.

## Wall Support Fittings

For the 'Heritage Range of Radiators where the walls are of solid construction it is possible to employ a system of wall support fixings to support the bottom of the radiator rather than use feet. This support system can only be used with sound walls of solid construction.

Each set of wall support rods comprise 2 parts: (See Photograph 1)

- Steel threaded Support Rod
- Plastic Wall Sleeve

To fit the steel support rods, drill 16 mm holes in an appropriate position in the wall to support the radiator in the correct position. Drive the plastic wall plugs into the drilled holes. Screw the support rods into the wall plugs, so that the 'U' shape in the rod supports the radiator in the correct position.

## Retaining Stays

Retaining stays are required to be attached to the wall behind and towards the top of the radiator, so as to prevent the radiators from tipping forward (Photograph 2 shows the assembly of the retaining stays).

The retaining stays clamp the rear tube section of the radiator and each retaining bolt is secured to the wall using a brass wall insert.

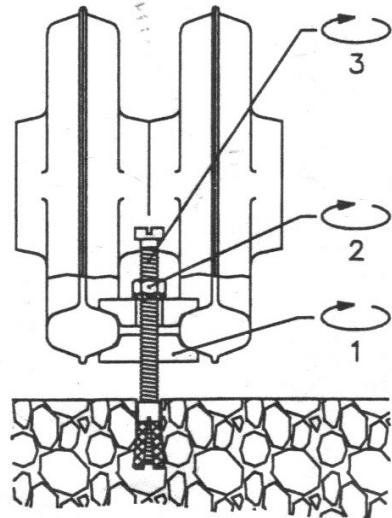
Each retaining stay assembly comprises:

- A zinc coated threaded bolt with screw head, washer and locknut
- 2 x Radiator Tube Clamps (one threaded and one not)
- Brass Wall Plug (insert)

**Fixing and securing details of the wall stays are shown in Figure 3.**



**Figure 3. Assembly and location of Radiator Stays (Plan View)**



1. ADJUST POSITION
2. ASSEMBLE ON RADIATOR AND TIGHTEN NUT
3. PLACE BRASS INSERT IN THE WALL AND TURN SCREW
4. LOCK NUT

Before final assembly the bolts should be cut to length to suit the depth of the radiator and the required distance from the wall so that the head of the bolt is positioned within the sections of the radiator. The locknut along the length of the bolt will allow for final adjustment.

For wall types, other than of solid construction, alternative arrangements will be required to enable adequate fixing to secure the radiator stay to the wall (e.g. brass wall insert located in wooden studs or noggins secured in, or on the wall).

### **Filling the System, Cleansing and adding a Corrosion Inhibitor.**

Following installation of the radiator(s), the heating system should be filled with water and checked for water leaks. Cast Iron radiators rely on a gasket material that swells on contact with water to seal the joint.

Any leaks identified from the joints must be rectified.

When the heating system is confirmed as water tight, the system should be adequately flushed. Further guidance on the adequate flushing of heating systems can be found in British Standard 7593: *Code of Practice for treatment of water in domestic hot water central heating systems*. After flushing, the system should be refilled, adding a proprietary (recognised and well respected brand) water treatment, chemical corrosion inhibitor. An inhibitor is required to be added to the system water, in the proportions determined by the inhibitor manufacturer, to control corrosion and the formation of scale and sludge occurring within the heating system.

**NOTE:** Should the system be subsequently drained for maintenance purposes, the inhibitor will need to be replaced when the system is re-filled with water. If adding or replacing radiators, or If individual radiators are drained for maintenance or redecoration, the inhibitor strength must be checked and confirmed as adequate after refilling the radiator with water. Where the strength of inhibitor is found to be inadequate, extra inhibitor should be added to the system water.

### **Final Decoration.**

The final decorative finish to the radiators should ideally be undertaken once the water tightness has been confirmed. If decoration is carried out prior to final testing, it is possible that the decoration may become damaged during any resealing operations.

### Photograph 1.

Wall Support fixings as shown in photograph 1 can be used as an alternative to feet, on the Heritage Range of radiators, providing sound and adequate fixings can be achieved to walls of solid construction, immediately behind and below the radiator.



### Photograph 2.

The radiator stays shown in photograph 2 are used to support the top of the radiators against the wall so as to keep the radiator upright and prevent them from toppling forward.

