

# Iron Master



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[www.springhillwaterservices.co.uk](http://www.springhillwaterservices.co.uk)

## Applications

### Overview

Closely related, iron and manganese are twin troublemakers. Even where their concentrations in water are low, they cannot be ignored. Iron presents the greater problem only because it appears more frequently. The presence of iron alone or in combination with manganese leads to staining problems.

In most cases, filtration will totally remove iron and manganese however; in some instances it is only possible to achieve a “significant reduction”.

### Maintenance

The condition of the iron reduction resin will need checking from time to time dependent on the water low rates through the unit and levels of iron, manganese and other minerals. Occasionally it will be necessary to top up this media.

### Installation Guidelines

In order to remove accumulated deposits from the resin bed, the water flow through the filter is reversed taking the unit through a backwashing cycle. Water runs to drain at a high flow rate so the bed can be lifted and the deposits separated from the media. The control valve completes the backwash cycle automatically at the intervals and times set during the commissioning of the filter.

At low levels, iron and manganese can be relatively easy to remove. In some cases however, the chemistry of the raw water may require “special” attention if the filtration process is to be successful. In some cases effective treatment will only take place where an additional oxidising column is installed, or in extreme cases, a strong oxidising agent such as chlorine is added.

As specialists in iron reduction Springhill engineers recommend that the chemistry of the water is carefully analysed before any decision regarding the filtration method is decided.

### Boreholes

Most borehole supplies are governed by legislation which sets the limit for iron contamination at 0.2 mg/l and the limit for manganese at 0.05 mg/l. Without filtration, iron and manganese can cause staining of fixtures and fittings and in some cases can introduce an unpleasant taste into drinking water.

The iron master is a tried and tested method of significantly reducing the levels of both contaminants in a borehole supply.

### Spring Supplies

Spring supplies are often contaminated by surface waters that contain elevated iron levels. This means some form of filtration is often needed, especially in situations where UV is also installed. In many cases, the most practical solution involves the installation of a pH corrector followed by filtration. Increasing the pH will often precipitate the iron and manganese and the filter will then remove the particulate.

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## Iron removal chemistry

Derived from minerals and sediments iron in its elemental form is rarely found in nature. As  $\text{Fe}^{2+}$  and  $\text{Fe}^{3+}$  iron readily combines with oxygen and sulphur containing compounds to form oxides, hydroxides, carbonates, and sulphides. Iron is most commonly found in nature in the form of its oxides.

Groundwaters often contain low levels of oxygen which means the iron remains in the  $\text{Fe}^{2+}$  state. When exposed to air or when oxidants are added, ferrous  $\text{Fe}^{2+}$  is oxidised to the ferric  $\text{Fe}^{3+}$  state as the carbon dioxide ( $\text{CO}_2$ ) concentration is lowered and the molecular form of Oxygen ( $\text{O}_2$ ) content is increased.

As with many other contaminants of water, the solubility of iron is linked to the pH of the water and the concentration of  $\text{Fe}^{3+}$  is proportional to the cube of the hydrogen ion concentrations. At a pH of 6 the solubility of all forms of iron is  $10^5$  greater than at pH 8.5. Water with high  $\text{CO}_2$  concentrations, low pH value and low alkalinity are generally corrosive. This is of importance as corrosive water can attack materials used in the distribution network and domestic plumbing system and can lead to elevated concentrations of iron.

Where total iron is present at levels below 0.1 milligrams per litre it may be considered negligible for domestic use but if the total iron level is above 0.3 milligrams per litre it can produce brown or red stains on plumbing fixtures, dishes, cooking ware and many other surfaces which come into contact with the iron water.

Although the standard for iron in the United Kingdom is 0.2 milligrams per litre, staining in washing machines and pipework will only generally occur where levels of iron exceed 0.3 milligrams per litre with concentrations below this level causing few problems in a domestic situation.

The WHO suggests that iron levels around 2.0 milligrams per litre are acceptable from a health point of view and the Drinking Water Inspectorate suggests that levels up to 2.8 milligrams per litre are even acceptable. However, for aesthetic reasons, the UK standard for iron is 0.2 milligrams per litre.

In anaerobic groundwater where iron is in the form of  $\text{Fe}^{2+}$  concentrations will usually be 0.5–10 milligrams per litre, but concentrations up to 50 milligrams per litre can sometimes be found.

# Iron Master

	IMC1054	IMC1248	IMC1354	IMC1465	IMC1665	IMC2160
Max flow rate (M <sup>3</sup> Hr)	0.90	1.35	1.80	2.30	3.65	6.40
B/W flow (m <sup>3</sup> Hr)	1.80	2.60	3.00	3.50	4.60	7.90
Connections in/out	1" BSP	1" BSP	1" BSP	1" BSP	1.5" BSP	2" BSP
Overall height (mm)	1310	1430	1570	1860	1860	1830
Diameter (mm)	270	315	335	370	410	560
Power requirement	230V	230V	230V	230V	230V	230V
Drain size	3/4"	3/4"	3/4"	3/4"	1"	1"

Typical Iron removal filter installed in a plant room serving a large residential property



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## Warranty

The warranty for the Iron Master components is 12 months parts and labour.

The warranty starts 6 months from the date of delivery or from the date of commissioning, whichever occurs first.

The warranty does not cover any damages resulting from misuse, incorrect installation or application.

In some cases it may not be possible to totally remove the iron or manganese from the water; however a significant reduction is guaranteed.

Goods should be checked when delivered and any breakages or missing parts reported immediately to Springhill, in writing.

The warranty will be invalid if the equipment is not serviced according to manufacturer's service intervals or is not carried out by a Springhill Water Services approved engineer.

This warranty forms part of Springhill's general terms and conditions and does not affect statutory rights. For a full copy visit the legal section of our web site, or telephone the main office to request a copy.