

Iron and Manganese Removal

Crystal Right™



Iron and manganese are commonly found in waters. They can cause unsightly staining and at high levels they can cause health problems. Both can be removed to leave the water crystal clear. Some medias will also remove the hardness which causes furring in boilers at the same time with no extra treatment.



Crystal Right™

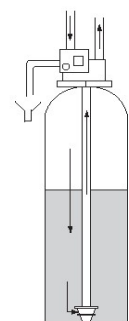
Crystal Right™ is a silica crystal that works by an ion exchange process which removes iron, manganese **and** hardness (and reduces ammonia). The minimum pH requirement is 6.0 and Crystal Right™ balances the pH in these acidic waters. Crystal Right™ works at it's best on clear water, i.e. when the iron/manganese are in a dissolved form. Crystal Right™ will also reduce hardness with no extra treatment. The media bed can be sanitised with chlorine from time to time (some valves can do this automatically). The regeneration process is exactly the same as that used in a water softener and requires regeneration with salt (sodium chloride).

There are two types of Crystal Right™, CR100 is used where the pH is between 6 and 7 and CR200 is used where the pH is 7 or above.

Crystal Right has a number of advantages over conventional systems in that pH correction, iron/manganese removal, ammonia reduction and softening can all be addressed in a single process. It can reduce dissolved iron and manganese even at pH 6 (most other medias can not).

How does it work?

Water flows into the valve at the top, down through the media and then up through the 'riser' tube in the middle of the vessel. As the water travels through the media the iron and manganese are removed leaving crystal clear water. There are timer options that can be set to automatically self clean (backwash) and wash away any of the accumulated iron and manganese. Cleaning can be set for a given time or after a certain amount of water has been used. With Crystal Right™ salt is also added to regenerate it ready for service. Iron and manganese filters can also be used in conjunction with other filters such as sand filters if the water has high turbidity or pH correction filters if the pH of the water very low.



How to size.

On average 160 litres of water is used per person per day. This normally occurs in two peak periods, one in the morning and one in the evening. A family of four typically uses 700 litres of water per day but may use 300 litres in an hour in the morning. Larger households, farms, stables and irrigations systems all use more water.

When sizing a system the average flow and the peak flow rate need to be taken into account. Try and size a system to run for 3 days without regenerating or a duplex for 12 hours. The vessel size is given as the diameter and the height (in inches).

The amount of water produced between regenerations depends on the hardness, sodium and iron/manganese levels. The apparent hardness = total hardness (mg/l CaCO₃) + 2 x sodium (mg/l) + iron & manganese in mg/l. The capacity or water produced between regenerations (Cap m³) at 100 mg/l apparent hardness is shown as Cap m³. in the table overleaf.

Eg for a 1252 CR100 system this is 17.4 m³, or at 200ppm is 8.7m³

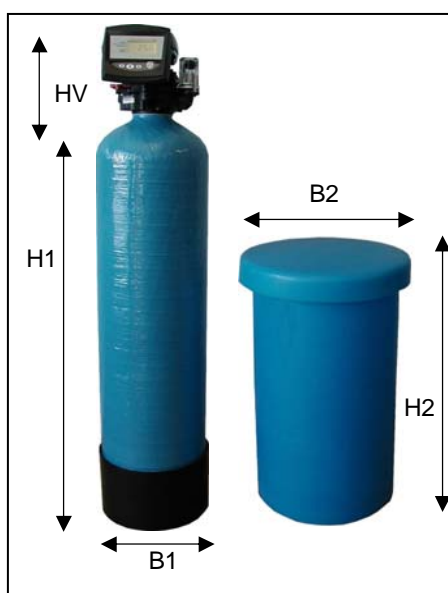
Recommended operating pressure range 20 to 120 psi. Water temperature range from 2 to 38°C

Maximum iron + manganese is 5mg/l for 1044, 10mg/l for 1054/1252 and 15mg/l for 1354 and over.

Simplex Crystal Right

Vessel Ø" X h"	Vol (bag)	Flow m3/h	CR100		CR200		Valve Option	Salt (Kg)	BT Vol	BT (B2)	BT (H2)	Ves (B1)	Ves (H1)
			BW m3/hr	Cap m ³ *	BW m3/hr	Cap m ³ *							
10-44	1	1	1.0	7.4	0.8	12.4	255/WS1	4	125	432 ^R	839	269	1124
10-54	1.5	1.5	1.0	13.4	0.8	20.7	255/WS1	5.2	125	432 ^R	839	269	1387
12-52	2	1.8	1.4	17.4	1.1	26	268/WS1	6.7	125	432 ^R	839	315	1338
13-54	2.5	2.0	1.7	21.8	1.3	31.2	268/WS1	7.5	125	432 ^R	839	334	1374
14-65	3.5	2.5	1.9	29.7	1.5	39.5	268/WS1	10.5	200	670	830	380	1660
16-65	4.5	3.0	2.5	38	1.9	50.8	278/WS1¼	14	300	760	1000	420	1660
18-65	6	4.0	3.2	51	2.4	67.8	278/WS1¼	17	300	760	1000	510	1750
21-60	7	5.5	4.4	59	3.3	79	298/WS15	21	400	870	930	552	1640
24-69	11	7.0	5.7	93	4.3	124	298/WS2	32	400	870	930	610	1890
30-72	19	11	8.9	161	6.7	214	298/WS2	55	750	1000	1100	770	2050
36-72	26	15	13	203	9.6	293	298/WS2	74	750	1000	1100	927	2150

Cap m³ – is the capacity ie the amount of water produced between regenerations based upon an apparent hardness of 100ppm as CaCO₃.



Autotrol Valves			
Valve	Inlet/ outlet	Drain	HV
255	¾"	½"	200
268 /278	1"	¾"	210
298	2"	1½"	291

Clack Valves			
Valve	Inlet/ outlet	Drain	HV
WS1	1"	1"	180
WS125	1¼"	1"	180
WS15	1½"	1"	182
WS2	2"	1½"	217
WS2H	2"	2"	295
WS3	3"	3"	320



Duplex Crystal Right

Vessel Ø X h	Vol (bag)	Flow m3/h	CR100		CR200		Valve Option	Salt (Kg)	BT Vol	BT (B2)	BT (H2)	Ves (B1)	Ves (H1)
			BW m3/hr	Cap m ³ *	BW m3/hr	Cap m ³ *							
10-54	1.5	1.5	1.0	13.4	0.8	20.7	255/WS1	5.2	125	432 ^R	839	257	1387
12-52	2	1.8	1.4	17.4	1.1	26	255/WS1	6.7	125	432 ^R	839	315	1338
13-54	2.5	2.0	1.7	21.8	1.3	31.2	278/WS1	7.5	125	432 ^R	839	334	1374
14-65	3.5	2.5	1.9	29.7	1.5	39.5	278/WS1	10.5	200	670	830	369	1660
16-65	4.5	3.0	2.5	38	1.9	50.8	278/WS1¼	14	300	760	1000	406	1660
18-65	6	4.0	3.2	51	2.4	67.8	278/WS1¼	17	300	760	1000	469	1750
21-60	7	5.5	4.4	59	3.3	79	298/WS1.5	21	400	870	930	552	1640
24-69	11	7.0	5.7	93	4.3	124	298/WS2	32	400	870	930	610	1890
30-72	19	11	8.9	161	6.7	214	298/WS2	55	750	1000	1100	770	2050
36-72	26	15	13	203	9.6	20.7	298/WS2	74	750	1000	1100	927	2150

Cap m³ – is the capacity ie the amount of water produced between regenerations based upon an apparent hardness of 100mg/l as CaCO₃
Softeners, Birm, Manganese dioxide kits are also available as are other medias such as pH correction, sand, carbon etc.

^R – rectangular brine tank with this as the size of the largest side. Vol is in litres, and height and width in mm unless otherwise stated
Sizes and dimensions are for indication purposes only and may change without notice.