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 <u>manganese</u> 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.
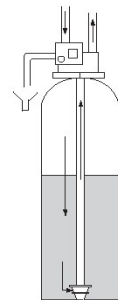
How to size.

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 $CaCO_3$) + 2 x sodium (mg/l) + iron & manganese in mg/l. The capacity or water produced between regenerations (Cap m^3) at 100 mg/l apparent hardness is shown as Cap m^3.in the table overleaf.

Eg for a 1252 CR100 system this is 17.4 m^3, or at 200ppm is 8.7m^3

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.

Crystal Right

Cap m^3 – is the capacity ie the amount of water produced between regenerations based upon an apparent hardness of 100ppm as $CaCO_3$.

CR100 Systems					Simplex			Duplex		
Volume	Service	Treated	Salt used	Connections	Max Footprint					
Litres	Flow	water m³ @	/ regen Kg	In / Out	Width	Depth	Height	Width	Depth	Height
	m3/h	100ppm CaCO₃			mm	mm	mm	mm	mm	mm
42	1.5	13.4	5	¾" or 1"	669	440	1587	948	440	1587
56	1.8	17.4	6.7	1"	715	440	1548	1040	440	1548
72	2	21.8	9	1"	741	440	1584	1092	440	1584
99	2.5	29.7	12	1"	1059	680	1870	1382	680	1870
127	3	38	15	1"	1176	760	1875	1592	760	1875
170	4	51	20	1"	1239	760	1997	1718	760	1997
198	5.5	59	24	2"	1442	880	1921	2004	880	1921
311	7	93	37	2"	1500	880	2171	2120	880	2171
538	11	161	65	2"	1752	1030	2341	2474	1030	2341
679	15	203	82	2"	2124	1084	2441	3218	1084	2441

CR200 Systems					Simplex			Duplex		
Volume	Service	Treated	Salt used	Connections	Max Footprint					
Litres	Flow	water m³ @	/ regen Kg	In / Out	Width	Depth	Height	Width	Depth	Height
	m3/h	100ppm CaCO₃			mm	mm	mm	mm	mm	mm
42	1.5	20.7	5	¾" or 1"	669	440	1587	948	440	1587
56	1.8	26	6.7	¾" or 1"	715	440	1548	1040	440	1548
72	2	31.2	9	1"	741	440	1584	1092	440	1584
99	2.5	39.5	12	1"	1059	680	1870	1382	680	1870
127	3	50.8	15	1"	1176	760	1875	1592	760	1875
170	4	67.8	20	1"	1359	880	1997	1838	880	1997
198	5.5	79	24	2"	1442	880	1921	2004	880	1921
311	7	124	37	2"	1650	1030	2171	2270	1030	2171
538	11	214	65	2"	1822	1100	2341	2544	1100	2341
679	15	293	82	2"	2194	1100	2441	3298	1100	2441
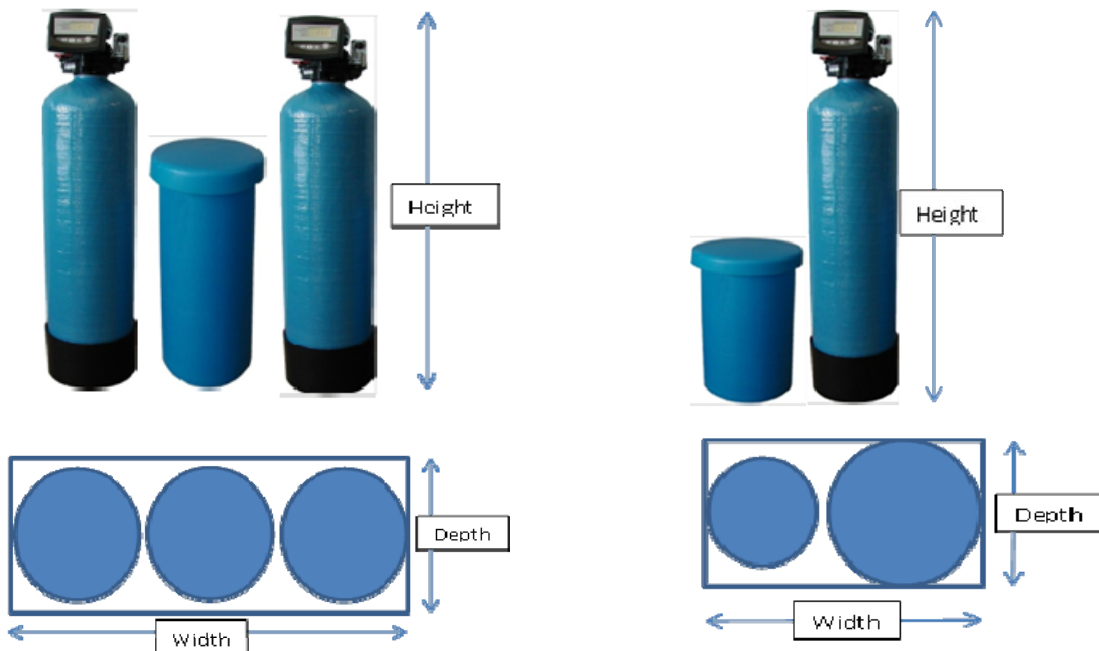
R – rectangular brine tank with this as the size of the largest side.   Vol is in litres, and height and width in mm unless otherwise stated
Sizes and dimensions are for indication purposes only and may change without notice.