pH Correction

The Problems

When rain falls, the water has a naturally aggressive, slightly acidic nature. This water then dissolves chalk and/ or metallic deposits present in the local rock strata which leads to the contamination of the water. This results in ground and borehole water containing a number of elements that would not otherwise be present in mains water. These contaminants (such as Iron and Manganese) then cause problems when the water is put into use.

Acidic water results in corrosion of pipework, heating cylinders and equipment. Any Iron and Manganese present will result in poor tasting water, in addition to staining baths, basins and any appliances with which the water may come into contact.

A pH value of below 7 is considered to be acidic, and corrosion accelerates at pH levels below 6.5, with levels below 6.0 considered to be extremely aggressive. It is usually difficult to remove Iron and Manganese from acidic water, so often the first step in the process is to raise the

An example of how pH correction can be used as

The Solutions

The simplest and safest way to raise the pH is to run the water through a pressure vessel containing a bed of specially activated limestone. This is a mixture of Calcium and Manganese salts, which are the salts found in waters of pH greater than 7. This limestone gradually dissolves, increasing the pH level of the water. As the limestone dissolves, it will need refilling periodically. Refilling is straightforward as the media is inert and easy to handle.

To treat waters that are otherwise clean and pure, a basic manual (up-flow) is all that is required. For water with Iron, Manganese or turbidity problems, an automatic backwashing downflow system will be needed to remove accumilated debris.

The head on a manual (up-flow) pH correction

Juraperle pH correction media.

Specifying and Sizing

The contact time of the water with the pH correction media is important in achieving consistent results. The recommended maximum service flows and other technical information for each system is shown in the tables overleaf.

For every 10mg/L CO2 present in the water, the alkalinity and total hardness will be raised 18mg/L as CaCO3. For each 10mg/L CO2 removed, there will be a consumption of approximately 12 mg/L of media. In reality it's quite difficult to determine how much media will be used and it's worth checking the level of the media bed regularly and replenishing as required.

pH Correction

System Management-Manual

Upflow 'manual' pH correction units are used for raising the pH of otherwise clean water, or for the re-mineralising of pure water produced by reverse osmosis or desalination. For water with significant Iron and Manganese levels an auto-backwashing or combination system will be required. Domestic units upto 13" include a service flow controller and quick release couplings for ease of refilling. Larger industrial systems of 14" diameter and above use a top and bottom entry vessel for maximum flow. These do not include flow controllers or quick release couplings.

System Management-Automatic

Backwashing systems include service and drain line flow controllers. NB. Backwash flow per vessel is 1.5 times the service flow. It is sometimes beneficial to use two or more small systems in paralell instead of one large one to reduce the pumping requirement. In areas of high media usage, special vessels can be required with an additional filling port. This eliminates the need to remove the backwashing valve during media replenishment. There are a number of backwashing valves available from Fleck and Clack.

Manual pH Correction

pH Correction Model	1054	1248	1354	1465	1665
Flow Rate m3/h	0.6	0.85	1.00	1.20	1.50
Connections	3/4" BSP	3/4" BSP	3/4" BSP	2" Socket	2" Socket
Total Height (mm)	1455	1296	1445	1768	1772
Diameter (mm)	270	315	335	370	410

Automatic pH Correction

pH Correction Model	1054	1248	1354	1465	1665	1865	2160	2469
Flow rate m3/h	0.60	0.85	1.00	1.20	1.50	1.90	2.60	3.40
Backwash Flow Rate m3/h	0.90	1.28	1.50	1.80	2.25	2.85	3.90	5.10
Connections	1"BSP	1"BSP	1"BSP	1"BSP	1"BSP	1"BSP	1.5"BSP	1.5"BSP
Total Height (mm)	1607	1458	1601	1984	1988	2088	2098	2288
Diameter (mm)	270	315	335	370	410	510	560	620

The diagram below shows a typical system for re-mineralising RO water using a pH correction system.