POWER BEHIND WATER

Total Water Management in the Hotel Industry

For a hotel, the continuous availability of good quality water is a basic requirement for guest satisfaction. The average per capita water consumption is 1,500 litres/guest room/day; assuming a 50 room hotel, the requirement would be 75,000 litres/day. Water is needed for:

- Rooms and restaurants for drinking
- Central and satellite kitchens – drinking, beverages, cooking and washing of utensils and equipment
- Bathrooms and toilets
- Launderettes, for washing of linen and clothes
- Air conditioning and refrigeration
- Cooling tower
- Boilers
- Gardening
- Swimming pools

However, acute scarcity of water, its deteriorating quality and high costs pose problems for the industry. Here, we look at two aspects – water treatment and water conservation through waste water management.

Water Treatment

Raw water is generally from municipal supplies or borewells, in some cases supplemented by tanker water usually drawn from ground water sources. These supplies can have impurities in the form of suspended and dissolved solids, organics, bacteria and viruses, heavy metals, etc. It is important therefore to treat this water keeping in mind the health of guests as well as economics.

Various processes are available to treat any quality and quantity of water to the required quality. Water treatment has undergone radical changes in terms of technology, design, materials of construction, etc. Equipment is made of FRP (fibre reinforced plastic), the obvious advantage being that FRP vessels are lighter, corrosion resistant, and more aesthetic. Membrane technologies have revolutionised water treatment. Ultrafiltration, nanofiltration, and reverse osmosis (RO) improve the quality of treated water, give greater operational flexibility and require less chemicals.

Drinking Water: Surface water can be filtered with sand filters and disinfected with ozone, UV, chlorine or MIOX (mixed oxidants) disinfection processes.

ION EXCHANGE (INDIA) LTD
THE POWER BEHIND WATER

TOTAL WATER SOLUTIONS

FOR THE HOSPITALITY INDUSTRY

Assured quality of water for every use - from drinking water and cooking, bathing, laundry and air-conditioning... to swimming pools and gardening. And complete assurance against water shortage too.

- Drinking water that's bacteria-free, crystal clear and absolutely safe
- Water for kitchens that adds flavour to tea and taste to food
- Soft water for varied applications. Water that's
  - tender on skin & hair and soft on clothes
  - avoids scum and stains; prevents scale build-up in boilers and geysers
  - saves on energy consumption, maintenance and ensures longer appliance life
- Hygienic and sparkling clear pool
- Water recycle that reduces fresh water requirement by upto 60%

New generation, modular, compact water treatment equipment - ISO 9001 production facility - All-India service company network

POWER BEHIND WATER

If the water contains total hardness >50 ppm, dissolved solids >500 ppm and excess iron, it is not fit for human consumption. Food and water also taste different due to excess hardness in water, cooking takes longer and cooking gas consumption increases by 30%. Hard water causes deposition on utensils. Iron causes tissue damages, loss of appetite and constipation. Softening and reverse osmosis systems help to overcome these problems, ensuring that the treated water quality is within permissible limits. An iron removal filter can be used to eliminate excess iron in water.

Bathing: Water containing suspended impurities, hardness >100 ppm, dissolved solids >500 ppm, or iron will also affect the skin and hair of guests. Due to excess hardness in water, soaps and shampoos do not lather easily. Moreover, hardness and/or dissolved solids can also cause scaling and corrosion in water lines, showers and taps and spots on walls, floors, bathtubs and mirrors. Not only does all this require heavy maintenance, it also reflects poorly on the hotel image.

Simple filtration with sand and activated carbon removes suspended impurities and associated problems. A softener or a reverse osmosis system eliminates excess hardness and dissolved solids, while iron removal filters eliminate problems caused by excessive iron content in water. The time required by the housekeepers to clean the room will reduce by upto 30%, thereby reducing labour and maintenance costs.

Laundry: Hard water reduces the cleaning power of detergents, leads to deterioration and fading of fabrics, and reduces life of fabrics by 15%. It also reacts adversely with detergents, turning soft towels and sheets rough. Use of soft water will eliminate all these problems as well as reduce detergent requirement by 70%.

Swimming Pool: A crystal clear and hygienic swimming pool invites guests to take a refreshing dip. Most swimming pools get contaminated with bacteria and virus, cysts like cryptosporidium and the presence of algae, bio-films and slime in the distribution system. Superior disinfection using MIOX process creates more, long lasting free available residual chlorine than traditional chlorination.

MIOX (mixed oxidants) process provides simple, economical and safe disinfection. Effective against all types of microbial contamination, it also eliminates problems of taste and odour in the treated water. Moreover, in swimming pool disinfection, it prevents problems of burning eyes, skin irritation and faded clothing associated with chlorine use. It cleans the distribution system and bio-films, prevents re-growth and eliminates slime. It eliminates the hazard of handling chlorine, caustic and other chemicals. MIOX systems are listed under ANSI/ NSF 50 standards for pool and spa applications.

Cooling Tower: Use of speciality chemicals for cooling water treatment along with specific treatment programmes eliminate problems of scaling, corrosion, fouling and microbiological growth. It reduces energy losses, increases life of costly upstream equipment, saves water and pumping costs, optimises plant efficiency, and reduces maintenance costs. (An ordinary scale of $CaCO_3$ with thickness of 0.6 mm can contribute to energy losses of about 20%.)

Cooling water is mostly used in upstream equipment like heat exchangers. Untreated cooling water can cause similar problems in these. For example, corrosion at a rate of 20 mpy (mils per year, 1 mil = 1/1000 inch) can reduce the heat exchanger life to three years. With proper water treatment the depreciation cost of a heat exchanger can be reduced from 16% to 4%, resulting in a savings of 75%.

Boiler Feed: Salts of calcium and magnesium, and silica can cause scaling in the boiler. Operating conditions viz. temperature and pressure, in a boiler are also conducive to scaling and corrosion. These in turn cause a loss of precious metal, inefficient heat transfer (higher fuel consumption), reduction of equipment life, uneven temperature spots, increased maintenance cost, steam leaks and accidents. In addition to scaling and fouling, foaming/carryover is another problem which can cause water hammers in pipes and bends, resulting in damaged pipes and

POWER BEHIND WATER

pipe hangers. The effect of scaling on fuel consumption is shown below:

Scale thickness (mm)	½	2	4	8	16	30
Increase in fuel consumption (%)	2	6	10	20	40	80

Speciality boiler water chemicals prevent corrosion in boilers and deposition of salts on the tube surface. Fireside chemicals increase fuel efficiency and prevent post-combustion problems. A proper water treatment scheme can reduce cleaning and maintenance costs of a boiler by 10–20%.

Waste Water Treatment and Recycle

It is essential to conserve water by reducing consumption of water, minimising wastage, recycling and re-using waste water, sullage and sewage. Treatment systems now available are very effective with respect to treatment costs, quantity of treated effluent which can be easily recycled, and elimination of hazardous chemicals in the treatment process. They are compact, modular and easy to operate, have lower operational and maintenance costs, lower power consumption, reduce or eliminate use of chemicals and still provide right quality of treated water.

Laundry Waste: An emerging technology is ultrafiltration, which can remove fibre, dirt and detergents from laundry and washing waste water. Surplus detergent can be concentrated for re-use.

Treatment of Effluents with High Dissolved Solids: Cooling tower blowdown, softener regenerants, filter backwash water, scrubber bleed water and swimming pool bleed off can be recovered using reverse osmosis which can take high loads of dissolved solids in these waste waters.

Sullage Reycle System treats sullage – waste water from kitchen and bathrooms, also called grey water – and recycles it for toilet flushing, gardening, etc. reducing the requirement of fresh water by upto 60%. Compact, easy to install, operate and maintain, it is very cost-effective, with a payback period that is often less than a year.

Packaged Sewage Treatment System combines activated sludge technology with a rotating bio reactor, and even includes lamella clarifiers. Compact, modular and simple to operate, it is available in capacities from 5-100 m^3/day. It requires very little maintenance and the operating cost is low. It has a three month sludge storage capacity.

For higher flow rates, the **C-Mem Submersed Membrane System** is another technology suitable for the hotel industry. (See page 5).

Reed Bed: An eco-friendly system resembling a beautiful garden which can be used by guests, it consists of acclimatised wetland plants grown on specially engineered soil. Combining physico-chemical and biological processes into a single operation, it treats sullage and sewage which, after disinfection, can be used for toilet flushing, gardening and irrigation or to recharge the ground water.

An integrated approach and treatment processes can provide effective total water management for hotels, insuring the industry against water shortages as well as deteriorating water quality.