Re-printed from Aquatics International –September 2006

Re-generating EXCITEMENT

Why indoor waterpark operators are so enthusiastic about regenerative media filter technology – and why you should be, too | by Barry Gertz, Neptune-Benson

Since the dawn of waterparks, public and private sector properties have relied upon high-rate sand filters for their water. But as waterparks become more popular and bather loads increase, many sand filters are being pushed to their limits, requiring costly backwashing nearly every day.

Cost issues aside, this has not been a problem for outdoor waterparks because air quality is not an issue and filtration systems usually can recover during the evening and inclement weather.

Indoor parks, however, are typically open 8 a.m. to 11 p.m.; weather is never a concern. And many parks operate at peak attendance from the time the doors open. So all mechanical components, including the filtration system, have to constantly contend with a workload that outdoor facilities experience only occasionally.

New products such as ultraviolet technology have helped to upgrade water and air quality in modern aquatics facilities. Variable frequency drives for pump motors have become more common to help control energy consumption. But the item that may have had the greatest impact on these indoor facilities is the regenerative media filter system.

The RMF system is not new, but its technology has recently been enhanced and redeveloped specifically to address the water quality demands of indoor waterparks. With many favorable features, functions and benefits, the product has become the filter system of choice – particularly for parks with large bodies of water and high flow rates.

Traditional high-rate sand filters operate on the premise of "depth filtration," with soil particles being trapped in the bed of silica sand. When the differential pressure across the bed elevates to a value around 10 to 15 psi, backwashing is performed to remove the trapped particulate. The filter cycle then starts over.

RMF systems operate on the premise of surface filtration and incorporate a tremendous amount of filter area in a relatively small space. The internal components of the RMF system include vertically supported "flex tubes." These tubes are composed of a high-strength, polyester-wrapped, stainless steel, spring-shaped frame and offer exceptional filter area. For instance, a 60-inch diameter RMF includes 2,460 flex tubes with 1,760 square feet of filter area that can circulate nearly 3,000 gallons per minute. Comparatively, a 3,000 gpm sand filter system would conservatively offer 200 square feet of filter area.

During RMF operation, the flex tubes are coated with a filter powder that serves as the actual filtering media. Unlike sand filters, there is no backwashing. When the filter powder becomes laden with collected dirt, the filter goes through a "bump" cycle. This cycle actually shakes the powder and collected dirt so that it is released from the flex tubes.

After bumping, the system enters a precoat cycle, which redeposits the powder back on the flex tubes. The bump cycle is typically performed automatically and does not waste any water.

After a number of these cycles, the filter powder will have to be discharged and the process of recharging will occur. Pressure differential provides the guideline in deter termining when the powder needs recharging. Most facilities are experiencing filter cycles of 30 days or longer.

The function of the RMF system generates a low pressure drop compared with sand. Starting pressures for a high-rate sand filter, depending on the media, could range from 4 to 6 psi. In contrast, the starting differential of the RMF is less than 1 psi. Converting this to head represents savings of nearly 12 feet total dynamic head, or TDH, which translates to horsepower and energy savings. Utilizing a 25hp motor instead of a 30hp unit would result in savings of more than $3,000 per year, assuming state codes allow a lower TDH.

More savings are derived from the smaller construction footprint for RMF – as little as one-fourth to one-sixth of the space required by an equivalently sized sand system. Plus, the operating weight of the RMF system usually is less than half that of sand. With building costs at an estimated $200 to $300 per square foot, the RMF selection could generate more than $30,000 in construction savings.

Another major benefit of the RMF is water savings. At 3,000 gpm, the sand system must backwash as often as every three to five days. It will discharge about 9,000 gallons (per backwash) approximately 100 times per year for a total of 900,000 gallons. The RMF system, based on field experience, will have to be dumped every 30 days for recoating. Each draining occurrence will require about 1,500 gallons for a total of 18,000 gallons annually. This water savings of more than 880,000 gallons is complemented by reduced sewer, chemical, fuel and labor costs. Several indoor waterparks have seen paybacks in as little as 12 months.

But the most important feature is the actual cleaning efficacy of the filter. The RMF system will filter out particles down to 4 microns, with media manufacturers believing that this number can be further improved. High rate sand filters may remove particles in the 8 to 10 micron range when operating at peak performance. With the growing concerns about waterborne illnesses such as cryptosporidiosis, the smaller the particle removal the better, which means better water quality.

While the RMF filters have been popular for indoor waterparks, they have frequently been installed on large-volume competition pools, often for renovation projects where access was limited. But the water quality achieved with RMF systems has prompted owners and designers to seek similar results for smaller aquatic attractions, and manufacturers are taking note. Watch for smaller, less expensive RMF systems soon. These will be a perfect fit for pools with water flows up to 600 gpm.