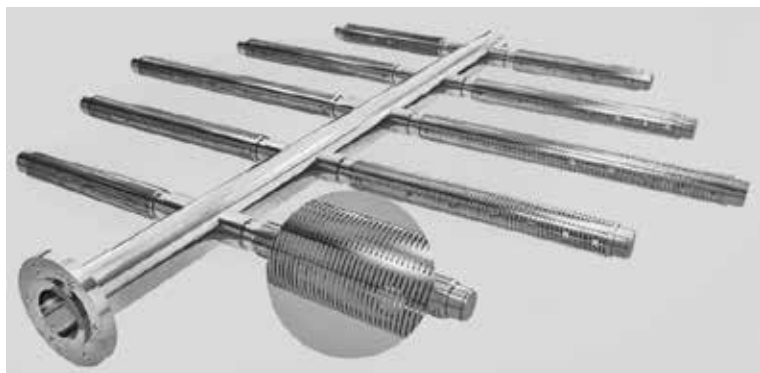


“SaniWedge”® Wedge Wire Design Considerations: Filter Media of Choice for Water and Waste Treatment Media Bed Filtration

Many industries utilize media-bed filtration. This use may take the form of ion exchange for water softening/demineralization, sand filtration, activated carbon or other media bed fluid treatment processes. However, whether the application is in a water utility, a power utility, pulp and paper, steel, or any industry, problems tend to be very similar. Time and again, the same common complaints arise in the media bed filtration process: leaking resin or media, excessive pressure drop, screen clogging and excessive backwash/rejuvenation requirements. These complaints can be relieved by the use of properly designed and specified equipment and equipment internals (arguably the most important investment in media bed filtration). Unfortunately, most new equipment and retrofit inquiries do not include enough hard and specific data to ensure the proper product selection.

To insure a proper design outcome, a design engineer needs to know the system pressures. Is it designed to avoid clogging? In the event of hydraulic failure, will it withstand the strain it is likely to experience and yet still retain the media? Is it sized to retain the particles in normal use? Will it pass the desired flow? Is it designed to provide a pressure differential to insure uniform flow? Has corrosion been considered? Are proper alloys available and specified? Can it be successfully back-washed on a repetitive basis without clogging?

A typical inquiry to the filtration product manufacturer might ask for a set of “Header Laterals” to form a distribution system for an activated carbon column or demineralizer tank. The manufacturer may be supplied with a request for a lateral distribution/collection system. Given flow data and vessel particulars, this data can certainly be used to produce a set of “Header Laterals”. In fact, a great variety of “Header Laterals” might be



“SANIWEDGE” PIPE BASED HEADER LATERAL SYSTEM

produced, all conforming to these specifications. The question is: Which design would do the best job for the specifier? Although the term “Header Lateral” is commonly used, the process may be better served and more economical with other configurations such as a “Hub Lateral” system, “Drop-Leg Nozzle” configurations as well as others. In the ideal situation, the manufacturer's application engineers will return to their customers with a set of questions designed to elicit more specific information about the customer's overall requirements. For example, they may want to discuss the media bed filtration process to make certain the process is understood and the critical areas are fully considered. Initial understanding of the process particulars like these are paramount to reduce overall maintenance and costs and obtaining an optimum product.



“SANIWEDGE” FILTER NOZZLE

“SaniWedge” Wedge Wire is often recommended for its characteristics of strength and cleaning ease. “SaniWedge” can be supplied in many various forms used in distribution/collection systems. Nozzle and lateral configurations being the most common. Laterals can be supplied with many end configurations to suit. Commonly, “SaniWedge” is applied over a drilled pipe. This design offers improved support and allows for engineered drill patterns insuring the best possible distribution and collection affording maximum bed utilization.

All of the above is based on an accurate determination of the media retention requirements. Slot size of the “Wedge Wire” product is crucial to insure all of the efforts of analysis, design and methods of fabrication are realized. Much of the “Wedge Wire” products on the market are still based upon the original well drilling usage as far as tolerances are considered. They are often manufactured with a retentive slot size tolerance of +/- .002” or even greater. The results are obvious when we are trying to retain Ion Exchange media of .010”. Modern CNC machinery and ISO quality procedures can result in tolerances of +/- .001” and better.

In any process where a fluid is being distributed through media, channeling must be eliminated. It is important to retain the uniform distribution as stated above, directing the fluid to flow uniformly through the bed and to maximize the media contact. Channeling is always the enemy. Channeling leads to the premature media exhaustion and need for premature regeneration. Vessel internals therefore determine flow characteristics and the ultimate performance of the process. Technology-oriented manufacturers use electronic design automation (EDA) to supply the answers. Specific considerations such as screen opening size in water treatment processes, as in ion exchange, are crucial. The function of the screen is to keep the resin beads in place, while facilitating fluid flow through the bed.

Materials of construction need to be addressed as well. The typical liquid “seen” by a filtration system is water. It can be waste water or boiler feed water, river water, brackish water, sea water or ultrapure water. In the process industries, filtration may also involve a variety of chemicals. Fortunately, most of these fluids can be handled by elements made of the appropriate stainless steel, nickel alloy or Duplex Alloys. The customer should make sure the supplier can provide a material that functions well with the specific system fluid used. Filtration systems are also supplied with PVC laterals slotted to retain the media. PVC offers good corrosion resistance but poor structural stability. Pressure variations tends to cause the plastic to flex, altering slot size and configuration. PVC is also subject to abrasion altering retention. Media loss or even total failure can result

Wire Cloth screening is also often used with good results in filtration applications, but does not provide the reliability of “Wedge Wire”. As the cross section of wires that make up the mesh are round, particles can lodge and there is always a tendency to clog. “Wedge Wire” is fabricated using a triangular shaped wire wrapped continuously over longitudinal support wires. The wires are welded at each intersection. The triangular cross-section “Wedge Wire” with a flat retention surface is easier and more effectively cleaned and backwashed. In addition, water pressures, system stresses and careless handling can cause abrasions or tears in the wire cloth. For these reasons, many engineers prefer the strength, clog resistance, ease of backwashing and dimensional stability of “Wedge Wire”.

Many systems also employ downstream protection in the form of Basket Strainers or Resin Traps. “SaniWedge” is also an ideal filter media for this application. Strong and rigid, retention is maintained as process conditions vary. The very nature of “Wedge Wire” construction lends itself to scrubbing, cleaning and washing without damage. Baskets can be designed to accommodate line size, pressure drop requirements and varying configurations and process conditions.

The result is that “SaniWedge” has provided engineers a superior retention media in which to design and manufacture vessel internals, resin traps as well as other filtration products offering long term savings and efficiencies.

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