Science.
Applied to Life.™

Customer Application Brief
Customer Success Story

Improving pre-RO filtration with 3M™ High Flow HFR Series filters.

Improved filtration leads to improved performance.

Reverse osmosis (RO) pre-treatment is used in industrial water filtration to protect the RO membranes, high pressure pumps and other hardware. The performance of pre-filters matters and can impact your operation, in terms of efficiency and water quality.

The filter surface area, the depth vs. pleated configuration and the nominal vs. absolute rating all play a role in the overall performance of your filtration system. With some pre-RO treatments, such as multi-media filters and activated carbon filters, there is a chance for a variety of contaminants to remain in the water.

Other filters, like traditional melt blown filters, have lower flow per cartridge compared to large format cartridges. Conventional melt blown filters are also usually nominally rated, even though consistent and reproducible contaminant reduction can best be provided by the use of absolute-rated filters.

Ineffective pre-treatment can lead to downstream problems with contaminants. For example, the downstream RO elements may be damaged permanently, or require more frequent cleaning.

Those contaminants include:

- Particles coming from raw water but also from the multi-media filtration and carbon beds
- Organic natural compounds such as natural organic matter (NOM) or microorganisms
- Overdose chemicals (PAC, NaClO, anti-sludging agent, non-oxidizing bactericides, reducing agents, etc.)
- Corrosion products from the pipes and hardware

Achieving optimum performance and reducing costs translates to finding a consistently efficient, high-capacity filter.

Increase performance, efficiency and confidence.

The 3M™ High Flow HFR Series Filter Cartridges are a high-performance, long-lasting and cost-effective filter option that offers absolute-rated particle retention and fits into existing Pall® Ultipleat® High Flow HFU Housings. These pleated polypropylene filters are designed to provide contaminant reduction in water treatment systems.

The filter media and its pleating design are what makes the difference in performance and filter life.

The 3M lofted microfiber filtration media, composed of non-woven layers that run coarser to finer in the direction of flow, provides an optimal combination of particle removal efficiency and contaminant holding capability. Our Advanced Pleat Technology (APT) design maximizes the usable filtration surface area and helps limit blinding effect of the filter media, resulting in longer filter life. The large diameter, pleated depth media filter design allows flow rates of up to 100 m3/hr (440 gpm) in a single 60" length filter. When compared to standard 2.5" diameter filters, these cartridge properties mean significantly fewer required filters for a given flow, reduced filter handling and fewer seal points to minimize the chance of fluid bypass (see the difference in Figure 1).

Pre-RO filtration can be challenging and costly. Selecting the right solution can save on changeouts, including labor costs, downtime expense and disposal fees for cartridges. Plus, using 3M's HFR absolute rated filters can provide additional protection for downstream equipment.

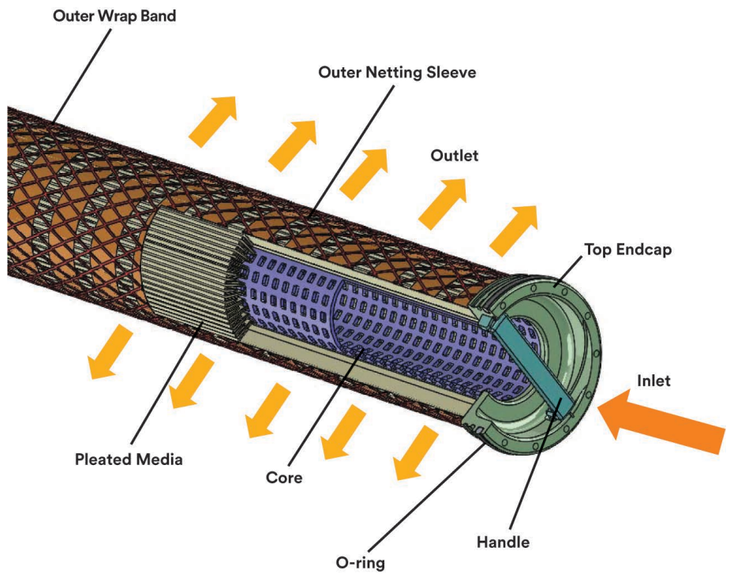

Figure 1. 3M™ High Flow HFR Series Filters are constructed with continuous polypropylene microfiber media and polypropylene support upstream of media for high particle removal efficiency, optimum flow characteristics and long service life. Available in absolute removal ratings from 5 to 100 micron, HFR Series filter cartridges ensure consistent performance over the life of the filter.

Successes straight from the source: our customers.

We've shown the value of 3M™ High Flow HFR Series Filter Cartridges, working with customers to successfully install HFR in a variety of applications.

Coal Chemical Plant

A Shaanxi, China coal chemical plant's water treatment system previously used a competitor High Flow filter. After changing to 3M™ High Flow HFR Series Filter Cartridges (20µm absolute rating), they nearly doubled filter service life, from changing the competitor filters every 13 days to changing 3M HFR filters every 24 days. The RO pressure also increased 42% more with the competitor cartridges than with 3M High Flow HFR Cartridges, demonstrating that our filters could protect the downstream membranes better.

Results: Service life increase of 85%

Electronics Manufacturing Plant

At an electronics manufacturer in Shanghai, China, a competitor high flow cartridge was used as a pre-RO filter in their water treatment system. They were on the hunt for a better particle removal efficiency: ≥20 µm. When they changed to 3M High Flow HFR Series Filter Cartridges (20µm absolute rating), the particle removal efficiency increased.

Results: ≥20 µm particle removal efficiency increased by 8%

Power Plant

A Shandong, China power plant replaced their competitor high flow filter with a 3M High Flow HFR Series Filter Cartridge (5µm absolute rating), which could remove particulate and organic contaminant more effectively.

Results: ≥5 µm particle removal efficiency increased by 29%

Technical Information:
The technical information, guidance, and other statements contained in this document or otherwise provided by 3M are based upon records, tests, or experience that 3M believes to be reliable, but the accuracy, completeness, and representative nature of such information is not guaranteed. Such information is intended for people with knowledge and technical skills sufficient to assess and apply their own informed judgment to the information. No license under any 3M or third party intellectual property rights is granted or implied with this information.
Product Selection and Use:
Many factors beyond 3M's control and uniquely within user's knowledge and control can affect the use and performance of a 3M product in a particular application. As a result, customer is solely responsible for evaluating the product and determining whether it is appropriate and suitable for customer's application, including conducting a workplace hazard assessment and reviewing all applicable regulations and standards (e.g., OSHA, ANSI, etc.). Failure to properly evaluate, select, and use a 3M product and appropriate safety products, or to meet all applicable safety regulations, may result in injury, sickness, death, and/or harm to property.
Warranty, Limited Remedy, and Disclaimer:
Unless a different warranty is specifically stated on the applicable 3M product packaging or product literature (in which case such warranty governs), 3M warrants that each 3M product meets the applicable 3M product specification at the time 3M ships the product. 3M MAKES NO OTHER WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OR CONDITION OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR ARISING OUT OF A COURSE OF DEALING, CUSTOM, OR USAGE OF TRADE. If a 3M product does not conform to this warranty, then the sole and exclusive remedy is, at 3M's option, replacement of the 3M product or refund of the purchase price.
Limitation of Liability:
Except for the limited remedy stated above, and except to the extent prohibited by law, 3M will not be liable for any loss or damage arising from or related to the 3M product, whether direct, indirect, special, incidental, or consequential (including, but not limited to, lost profits or business opportunity), regardless of the legal or equitable theory asserted, including, but not limited to, warranty, contract, negligence, or strict liability.

Contact us for more information.

Dedicated 3M Separation and Purification Sciences Division technical support teams are available to provide application-specific guidance for the most effective and economical filtration. In addition to comprehensive testing and analyses at our facilities, 3M can also perform on-site support at customer facilities. Contact us at 1-800-243-6894 or visit our website at 3MPurification.com.

3M Purification Inc.
3M Separation and Purification Sciences Division
400 Research Parkway
Meriden, CT 06450 USA

Phone 1-800-243-6894
WW 1-203-237-5541
Web 3MPurification.com

Get to know High Flow at **3M.com/HFR**

70-2016-0049-4