CRITICAL PROCESS FILTRATION, INC.

Particle Removal in Chemical Processing

Removing particles is critical to the protection of downstream chemical processes, to the quality of the final product and for your brand reputation.

Removing particles also includes clarification, the removal of smaller, particles that can cause visible haze or cloudiness in chemicals. Your customers want purity in the products you make. Improving the visible characteristics of your product will be perceived as improved purity, improved quality and, perhaps, improved value. This simple filtration procedure may be critical to product acceptance by customers.

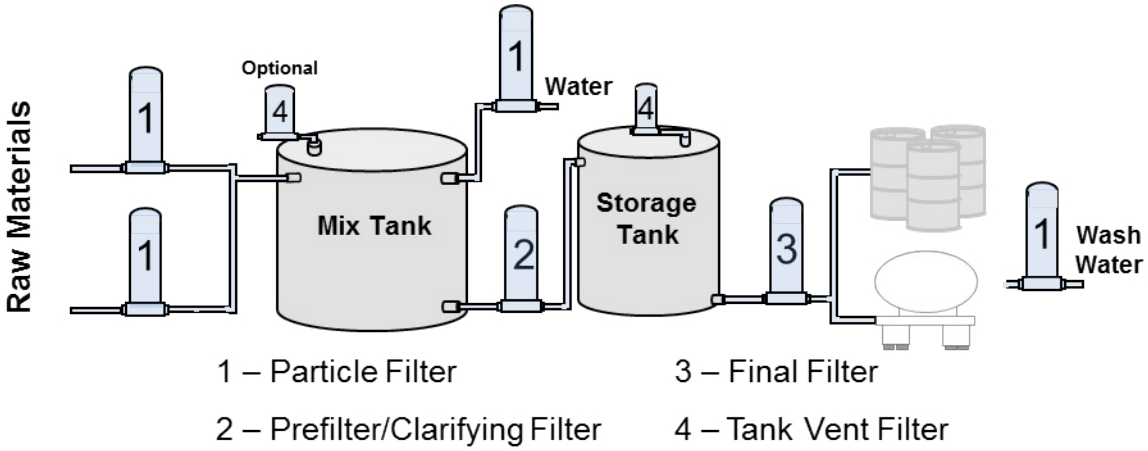
Particles can also affect the efficiency of your system. Particle filtration is usually performed early in the process, though it may also be required if a processing step creates particles.

Clarification is usually performed later in the process before preparation of the product for final filtration and packaging.

The housings marked "1" and "2" in the schematic below show the possible locations of particle removal and clarifying filters. A common first step in filtration is assuring that raw ingredients, including process water and container wash water, do not contribute particles to the process. Another common step is particle filtration and/or clarification after the mixer/reactor. Though only one filter housing is shown performing clarification in the schematic, multiple filters may be needed based on the filtration goal, the quantity of particles in the stream at that point, and the size distribution of those particles.

Each chemical component or raw material has its own unique characteristics. Filters are used to assure that the ingredients are free of harmful particulates and must be chosen based on those characteristics plus, of course, their compatibility with the chemical.

Common Filtration Steps in Chemical Processing



1 – Particle Filter
2 – Prefilter/Clarifying Filter
3 – Final Filter
4 – Tank Vent Filter

The figure above is an example of a simplified chemical processing system. There are many possible filter system configurations, and this simplified version shows particle removal (housings marked "1") just as raw materials, process water or wash water are being supplied to the process. There is also only 1 clarification filter shown (housing marked "2"), through there may be more clarification filters required in some processes.

Particles can certainly be introduced with ingredients from outside sources. But, if a powdered ingredient is added during the process, undissolved powder and impurities in the solid ingredients can be carried further downstream. Similarly, the processes themselves can generate particles either because of chemical reactions or due to normal wear and tear on system components such as pumps and valves.

Removing particles and improving product clarity, no matter the source of the particles, is critical to protecting process efficiency and the quality of your final product.

Application Summary

Choosing the Right Filters

Almost all particle removal filtration applications are done using depth filtration media. Cartridge filters use two forms of depth media. Standard depth filters are thick, self-supporting tubes of fibrous media material made using a polymer. They are most often made of polypropylene, but are also available in nylon. The tube is formed using the melt-blown or nano-spun process.

The other form of cartridge depth filter uses pleated flat sheet media, available in polypropylene or fiberglass. Polypropylene is the most widely used material for water and chemical filtration, but fiberglass has better filter efficiency and generally allows higher flows and throughput than polypropylene in many applications, as long as the fiberglass media is compatible with the chemistry.

Standard depth filters will capture a range of particle sizes through the thickness of the media. Pleated media filters have the advantage of a large surface area that can hold a higher quantity of particles on that surface than the standard depth filters.

Filter Options

Depth filtration products such as Critical Process Filtration Melt-Blown Polypropylene, Melt Blown Nylon or Nano-Spun Polypropylene cartridges are commonly used for particulate removal. These products will hold a large quantity of particulates before requiring replacement.

If finer particles need to be removed from the fluid stream as part of product clarification, an economical alternative to standard depth filters is pleated media filters. Pleated filtration products, such as pleated polypropylene depth filters, have several times more surface area than melt-blown or nano-spun depth filters and will hold a much higher quantity of particles. While pleated filters do generally cost more, the increased life in high-particle-load applications and savings from the reduced number of cartridges required for batch processes may make pleated filters economically advantageous.

Contact Critical Process Filtration for help determining the best filter options for you, or visit us at www.criticalprocess.com for more information and to access data sheets with more detailed information on all of our products.

Figure 2 – Critical Process Filtration's Melt-Blown and Nano-Spun Polypropylene filters and pleated depth media filters are available in a wide variety of configurations to fit existing housings.

Filter Media Options for Particle Filtration in Chemical Processing

Process Area	Filter Application	Filter Function	Critical Process Media*
Particle Filtration	Particle Reduction	Reduce particulate load to protect performance of downstream processes	MB, NMMB, NS, PD, GD
Clarification	Small Particle Reduction	Remove particles that may cause haze or visible cloudiness in the solution	MB, NMMB, NS, PD, GD

*Media Codes
MB = Melt-Blown Polypropylene Depth Media
NMMB = Melt-Blown Nylon Depth Media
NS = Nano-Spun Polypropylene Depth Media
PD = Pleated Polypropylene Depth Media
GD = Pleated Fiberglass Depth Media

Visit our website or contact us for more information and to access data sheets on all of our products.

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