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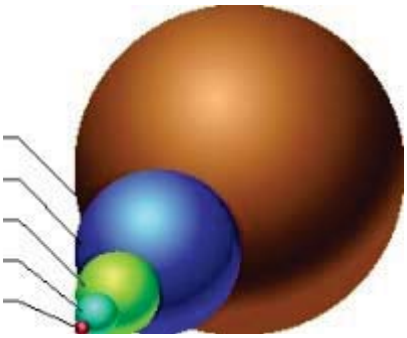
The last time you suffered from the flu, did you think about the size of the virus that was shutting you down? Relate that to a hydraulic system, and you'll find that at least 70% of system failures are caused by something so small that it cannot be seen. In fact, a particle as small as 5 to 10 µm in a critical component can easily shut down a hydraulic system.

Now think back to the last time your plant had a system shut down and ask three questions:

- how expensive were the parts needed to make the repair?
- how much money was lost in production and revenue?
- how expensive was the filter that could have been installed during scheduled maintenance?

Proper filtration can be a cost-effective insurance policy against system failure and the resultant downtime, repair expense, and lost revenue. A $20 filter element can prevent the failure of a system component that can end up costing $2000 when the cost of replacement and downtime are considered. In addition, properly sized and placed filters can help prevent heat build-up and leakage and their associated costs.



Relative sizes of some common items put the micron designation into perspective.

Filtration basics

The most common rating factors for filters are dirt-holding capacity, beta ratio, and particle size. **Dirtholding capacity** (given in grams) is a measure of the amount of contaminant a filter can trap. It is a gross rating based on the weight of particulate a filter can capture.

Beta ratio indicates how many particles of a particular size can pass through an element. For example, a filter with a beta ratio of ß100 = 2 retains 1/2 of all particles 100 µm and larger in size. Filters with a higher beta ratio retain more particles and have higher efficiency. Most manufacturers recommend the proper filtration for each component. The system's filtration requirements should be based on the component with the finest filtration needs.

Beta ratio	Efficiency
1	0%
2	50.00%
5	80.00%
10	90.00%
20	95.00%
75	98.70%
100	99.00%
200	99.50%
1000	99.90%
5000	99.98%

Particle size is measured in µm, where 1 µm equals one millionth of a meter. To put that into perspective, a human hair is about 80 µm, and particles smaller than 35 µm are not visible to the naked eye.

Sizing filters

It is generally accepted that at least 70% of all fluid power system failures are due to contamination. Contamination can be in the form of particles or water, and can easily be controlled with a few wellplaced filters and regular preventive maintenance. A high-quality filter with the correct particle size rating can extend the life of the entire system and keep a plant in good operating condition.

When selecting filters, first check the component manufacturer's literature for filtration requirements of pumps, valves, and actuators. When in doubt, use a filter rated for a smaller particle size. A typical hydraulic system requires the filtration of 5 to 10-µm particles. Systems containing servovalves or proportional valves require 1 to 3-µm filtration.