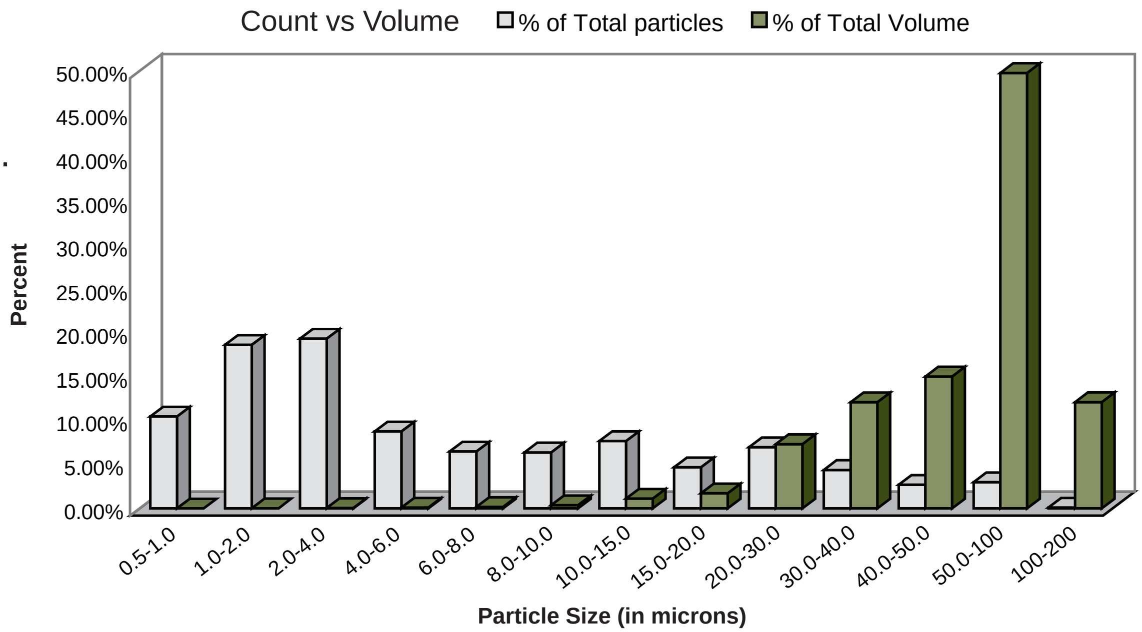
Particle Count vs Particle Volume

Be careful about the sales approach that suggests the **greatest number** of particles is your primary filtration concern. Often, sophisticated particle counters are employed to support such claims, focusing on the greater number of particles to determine the type of filtration needed. However, spray nozzles, heat exchangers, pits and other fluid process systems suffer typically from the **total volume** of space that particles occupy, thus causing the clogging, fouling and/or accumulation that create process fluid problems. In fact, even a very small percentage of larger particles is the bigger concern.

EXAMPLE #1
The chart on the right offers a logical "real world" example. It compares total particles in a system, arranged by **numerical count** of particles with the same particle count arranged according to **particle size.** This reveals that the very small percentage of larger particles in the system actually represent by far the greatest overall volume (which indicates a completely different approach to filtration needs). Get rid of the solids that represent the greatest threat to a system's operating efficiency. **Volume is the threat, not numerical count.**



Actual Data From Sample for EXAMPLE # 1

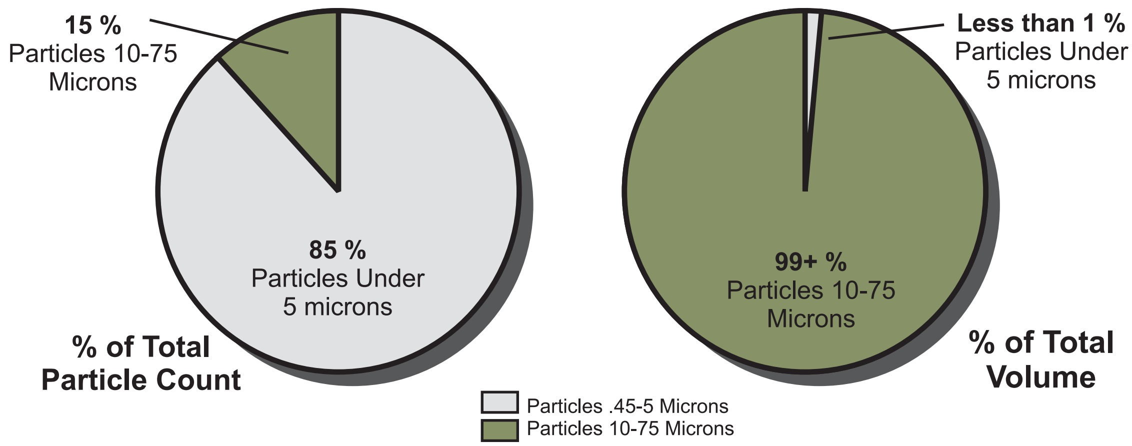
Particle Size (microns)	Particles per ml	% of Total Particles	Volume ppm (mg/1)	% of Total Volume	Particle Volume
0.5-1.0	1730.3	10.5%	0.0004	0.00%	16105
1.0-2.0	3088.1	18.7%	0.0056	0.01%	253541
2.0-4.0	3194.9	19.4%	0.0378	0.04%	1699275
4.0-6.0	1448.2	8.8%	0.0780	0.09%	3509908
6.0-8.0	1074.2	6.5%	0.1439	0.17%	6477501
8.0-10.0	1054.7	6.4%	0.3073	0.36%	13829402
10.-15.0	1271.4	7.7%	0.9576	1.11%	43098694
15.0-20.0	775.9	4.7%	1.4835	1.72%	66768234
20.0-30.0	1153.7	7.0%	6.3425	7.35%	285468124
30.0-40.0	720.0	4.4%	10.4737	12.14%	471403253
40.0-50.0	448.5	2.7%	13.0024	15.08%	585217656
50-100	498.1	3.0%	42.9249	49.77%	1931982727
100-200	19.5	0.1%	10.4819	12.15%	471776560
Total	16477.6	100%	86.2393	100%	

See the reverse side for another example.

EXAMPLE: #2
Take an initial particle count of one trillion particles (numerical count). Assume that the particles fall into the following range of sizes (shown as both a percentage and total numerical count):

21.25% of the particles (212.5 billion particles) are .45 micron in size (total volume of .0006 cubic in.)
21.25% of the particles (212.5 billion particles) are 1 micron in size (total volume of .007 cubic in.)
21.25% of the particles (212.5 billion particles) are 3 microns in size (total volume of .190 cubic in.)
21.25% of the particles (212.5 billion particles) are 5 microns in size (total volume of .890 cubic in.)
3.75% of the particles (37.5 billion particles) are 10 microns in size (total volume of 1.26 cubic in.)
3.75% of the particles (37.5 billion particles) are 25 microns in size (total volume of 18.48 cubic in.)
3.75% of the particles (37.5 billion particles) are 50 microns in size (total volume of 150.11 cubic in.)
3.75% of the particles (37.5 billion particles) are 75 microns in size (total volume of 504.08 cubic in.)

According to the above, 85% of the total number of particles (850 billion particles) takes up only 1.0876 cubic inches of space, while the remaining 15% of the larger particles (150 billion particles) takes up 673.93 cubic inches. Size matters!



NOTE

If these particles were all simply sand, a LAKOS Separator would predictably remove 98% of the 75 micron particles and about 90% of the 50 micron particles for a total performance of 93% of the overall particle volume. Not bad for only removing about 7% of the overall number of particles in the system! Within pits, sumps or cooling tower basins, a LAKOS Separator can be even MORE effective at removing even smaller particles by installing a unit for multiple-pass filtration. In fact, LAKOS Separators can be expected to remove 98% of 44 micron particles in these recirculation installations.