REFERENCE INFORMATION

Relative Size of Particles

Substance	Size in microns (μ)	Size in inches (in.)
Grain of Table Salt	100	0.00400
Human Hair	70	0.00270
Lower Limit of Visibility	40	0.00158
White Blood Cells	25	0.00100
Talcum Powder	10	0.00040
Red Blood Cells	8	0.00030
Bacteria (avg.)	2	0.00008

$$1 \text{ micron} = \frac{1}{1,000,000} \text{ meters} = 0.000004 \text{ inches}$$

Measurement of Filter Efficiency

The measure of filter efficiency is determined by comparing the number of upstream particles (N_U) of a determined size (x) vs. the downstream number (N_D). This ratio is defined as the Beta Ratio ($ß_x$).

N_U N_D

$$ß_x = \frac{N_U}{N_D} \quad \text{where x = size of particles in microns (μ)}$$

$$\text{Efficiency}_x = 100 \left(1 - \frac{1}{ß_x}\right)$$

Example:

$$\frac{37,500 \text{ Particles } 10\mu \text{ Upstream}}{500 \text{ Particles } 10\mu \text{ Downstream}} = 75.00$$

Beta Ratio:

$$ß_{10} = 75.00 \quad \text{Stated as "Beta 10 equal to 75"}$$

$$\text{Efficiency}_{10} = 100 \left(1 - \frac{1}{75.00}\right) = 98.7\%$$

ß	Efficiency
1.01	1.0 %
1.10	9.0 %
1.50	33.3 %
2.00	50.0 %
10.00	90.0 %
75.00	98.7 %
100.00	99.0 %
200.00	99.5 %
1000.00	99.9 %

APPENDIX

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