Lenz Contamination Control Information

Beta Ratio is a numeric formula used to represent the filtration efficiency of a filter obtained from multipass testing approved by ANSI, NFPA, and ISO.

In a multipass test, a predetermined amount of particulate contaminant, AC Fine Test Dust, is continuously circulated through the filter similar to what occurs in a typical system. If the contaminant is not captured on the first pass through the filter it will pass through the filter several times (multipass). The efficiency is calculated by measuring the number of particles of various sizes upstream and down stream of the filter at specific moments. A particle counter measures the number of various sized particles entering and leaving the system. A Beta Ratio is then delivered by dividing the number of upstream particles of a given size by the number of same sized particles downstream.

In the example below 10,000 particles greater than 10 micron were counted upstream, and 5000 downstream

Lenz efficiency rating for elements are detailed in the replacement element data in a Beta X = 2/20/75 expression. A 2/20/75 rating means 50% efficient on 2 micron particles or greater, 95% efficient on 10 micron particles or greater . and 98.7% efficient on 20 micron or greater.

$$\frac{10{,}000 \text{ particles 10 micron or greater upstream}}{5{,}000 \text{ particles 10 micron or greater downstream}} = 2$$

$$\frac{10{,}000}{5{,}000} = 2 \quad \text{(filter removed 50\% of particles 10 micron or greater in one pass)}$$

$$\beta_X = \frac{\text{Number of Particles greater than X microns upstream}}{\text{Number of particles greater thatn X Microns downstrem}}$$

$$\beta_5 = {}^{10}/_1 = 10$$

FILTRATION EFFICENCY RATIO CHART

BETA X	EFFICIENCY	
1.0	1.0%	
1.1	9.0%	
1.5	33.3%	
2.0	50.0%	NOMINAL
4.0	75%	
5.0	80%	
10.0	90%	
20	95%	
75	98.7%	ABSOLUTE
100	99%	
1000	99.9%	

40 micron = lower limit of Visibility of (Naked Eye)
1 micron = .000039 inches
60 microns = size of a grain of salt

Fluid Out

1 particle >5 microns (downstream)

Fluid In

10 particle >5 microns (Upstream of filter)

Filter

HYDRAULICS WITH A GLOBAL REPUTATION