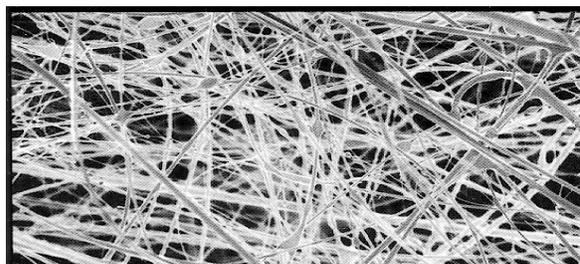


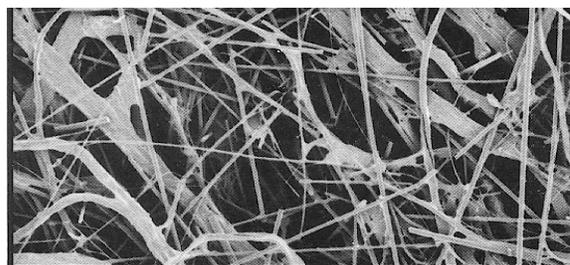
Fiberglass vs. Cellulose

Fiberglass filter media offers high efficiency and high dirt holding capacity. Fiberglass utilizes thin glass rods to create a porous and uniform filter media. The high number of pores provides more locations where particles can be trapped, which corresponds to higher dirt holding capacity. In addition, initial pressure drops are lower. Since fiberglass elements have a high porosity, they work well with high viscosity oils. The uniformity of the pores creates a consistent filter media that can be reliably duplicated; therefore a β ratio of 1000 is repeatable and achievable.



Fiberglass filter media

Cellulose (paper) filter media is an inconsistent filtration media that cannot be reliably duplicated. The cellulose fibers have inconsistent diameters, which create unpredictable pore sizes and low porosity. Random size pores makes it impossible to duplicate and achieve a reliable micron rating, other than a nominal rating. In addition, with large diameter fibers, the numbers of pores are reduced, which results in low dirt holding capacities, and higher initial pressure drops. Consequently, cellulose media does not work well with high viscosity oils.



Cellulose filter media

Comparisons

Media	Dirt Holding Capacity	Beta(β) Ratio*	Fiber Consistency	Life Cycle Costs*	Shelf Life
Fiberglass	high	$\beta_x=200$ { $\beta_{x(c)} = 1000$ }	consistent & uniform	low	5-10 years
Cellulose	low	β ratio not achievable	random & non-uniform	high	1-year

* **Beta(β) Ratio** — The β ratio is a ratio of the upstream particles for a specific micron (and larger) compared to the downstream particles for the same specific micron (and larger). Fiberglass elements can be labeled with a β ratio because of its fiber consistency. Cellulose cannot be labeled with a β ratio because of its fiber inconsistency.

* **Life Cycle Costs** — This is the true cost associated with the use of a filter element. This takes into account cleanliness of oil, filter life, change-out frequencies, and operator involvement. The cost of the filter element alone does not give a true evaluation of the overall cost.



GLOBAL ENGINEERED SOLUTIONS

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