

PROPER SELECTION OF VARIOUS FILTER MEDIAS FOR USE WITH CONTINUOUS BELT FILTERS

As a manufacturer of a complete line of gravity, vacuum, pressure and sludge filters, it is critical that the proper media be used to allow effective operation. To ensure maximum performance of our filters as well as other similar media type filters, Filtertech offers a comprehensive selection of disposable filter medias to meet the needs of a wide range of process liquid clarification applications.

Not all filter medias are the same; many media grades are non-filtration grade with poor uniformity. This leads to particle migration through the media and contamination of the clean process liquid. Filter media provided by Filtertech has been selected and evaluated to ensure that the media is of uniform consistency to provide the highest degree of filtration efficiency and filtrate clarity.

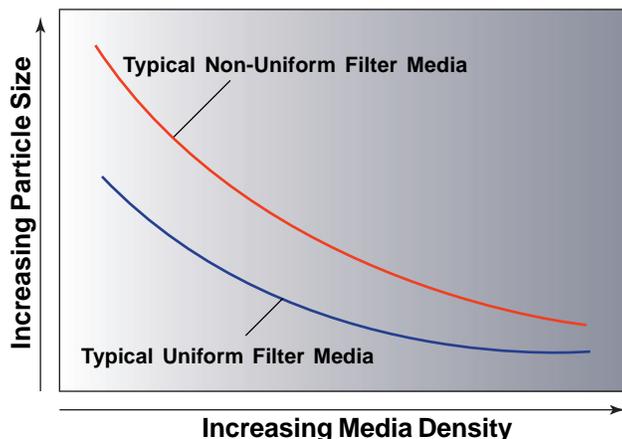
The right media for the application is what Filtertech strives for as different media types perform best from one application to another. Misapplying filter media can result in poor filtrate clarity, tramp oil buildup, increased media usage and operating cost as well as other undesirable results. Realizing this, Filtertech offers a complete range of filter media fabrics which include polyester, polypropylene, rayon, polyester-cellulose blends, wet laid and multilayer loft materials and others. These materials all exhibit different physical characteristics which affect their performance in various applications. Filtertech has materials available in a wide range of densities, widths and roll lengths to meet customers' needs. In addition, Filtertech offers many of the medias in custom widths and lengths when necessary.

Important factors to consider when selecting a filter media for your application include material type, density, nominal micron retention, wet strength, mullen burst and air permeability.

Figure 1
Filter media with uniform cake distribution and clean side seal edges



Figure 2
Particle Retention vs Media Density



MATERIAL TYPE

When selecting **material type** for a filter media, it is important to take into account the chemical compatibility of the media with the liquid being filtered. Also, when tramp oils are present, certain filter medias have a better affinity to absorb the oil for removal. Material type also affects uniformity of the media due to the process by which the media was made.

DENSITY

The **density** of the media gives an indication of how close or dense the media fibers are laid, laminated or weaved. Density is most often expressed in ounces per square yard of media (oz/yd²). Typically the nominal micron retention size decreases as the density of the media increases (see figure 2).

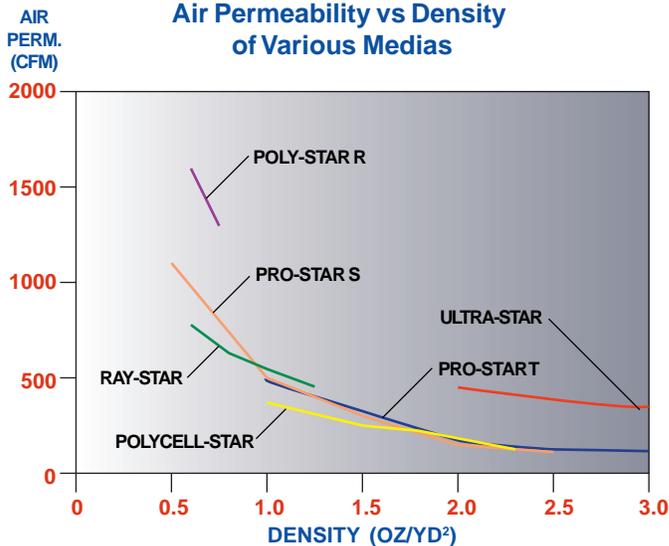
PARTICLE RETENTION

The average particle size removed is the **nominal micron retention** rating. This gives an indication of the smallest particle size which the media will retain prior to the development of a filter cake. For applications with very fine particulates being generated, a lower nominal micron rated media is recommended. Also, at these fine micron retentions, it is very important that the media being used has a uniform structure to minimize migration of solids through larger openings (defects) in the media.

AIR PERMEABILITY

To better determine the filtrate (flux) rate through the filter media an **air permeability** characteristic is used. This is a measure of how much air will pass through a filter media in a given area when a certain pressure differential is applied across the media. This value is directly proportional to liquid flowrate through the media so a filter media with a high air permeability will typically have a high liquid flowrate through it. Air permeability is typically measured in units of cubic feet per minute, CFM (see figure 3).

Figure 3
Air Permeability vs Density
of Various Medias



MEDIA THICKNESS

The **media thickness** is also an indication of the filtration characteristics of the media and is typically measured in units of mils. In many medias the thickness is inversely related to the amount of solids that the media will hold before indexing. This is because thicker medias tend to have lower air permeability and, therefore, lower filtration rates to start with so that as the solids begin to accumulate on the media, it does not take long for the filtration rate to drop and cause indexing to occur. However, with some of the multilayer medias, they can be quite thick and hold large amounts of solids due to their multilayer design.

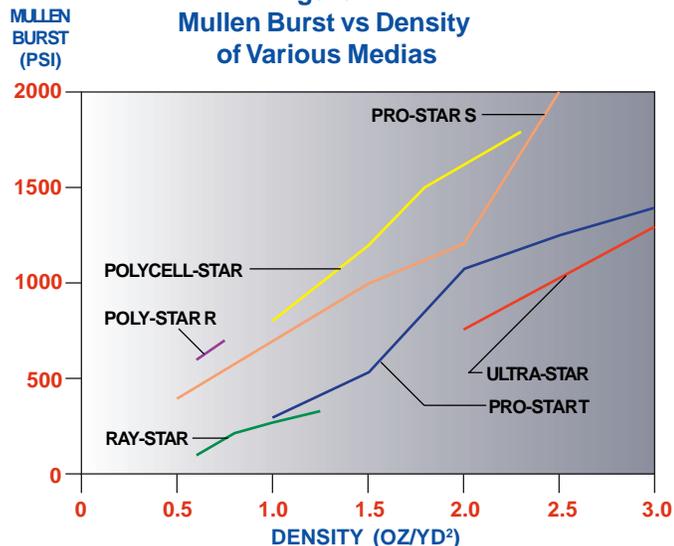
MULLEN BURST

The puncture strength of a filter media is determined by a **mullen burst** test and is a useful value to know in determining the strength of a particular media when a concentrated pressure is applied across the media. Mullen burst values are recorded in pounds per square inch, PSI (see figure 4).

GRAB TENSILE

In addition to puncture strength, it is important to know the tensile strength of the media known as **grab tensile** and is measured in pounds pull (lbs.). This is important in applications where the media is pulled through the filter such as pressure filters or liquid vacuum filters as opposed to filters which index the media using a conveyor belt. In the case of the media being pulled by a rewinder, it is important that the media be

Figure 4
Mullen Burst vs Density
of Various Medias



strong enough to pull its own wet weight but also have enough strength to pull the accumulated sludge or “filter cake” on the surface of the media and also overcome the inertia to unroll the unused media.

QUALITY

In addition to the physical characteristics of the media as described above, an important fact to consider is quality of the product. While undesirable, it is often common practice for suppliers to provide media rolls which are shorted the designated length or a lighter grade of media is substituted for a heavier grade which was purchased. Another practice is to provide media that includes splices within the roll, which create a weak spot where solids could migrate through the media. Seeing these industry problems and to ensure a quality product, every roll of Filtertech’s filter media products include a manufacturer’s tag certifying the media thickness, roll length and seam-free condition.

SUMMARY

In conclusion, the selection of the type of filter media to be used on a filter is as important as the type of filter being used. Many times a highly-efficient filter is purchased at added cost while at the same time a low cost, low quality media is applied which inevitably results in poor filtration performance. To help select the correct filter media which will give optimum filtration efficiency at minimal cost, Filtertech’s field engineers are available to discuss your particular application.

MEDIA COMPARISON TABLE

| Product Description † | Particle Retention | Wet Strength | | Air Permeability | Solids Holding Capacity | Tramp Oil Removal |
|---------------------------|--------------------|--------------|--------------|------------------|-------------------------|-------------------|
| | | Mullen Burst | Grab Tensile | | | |
| POLYCELL-STAR (POLY/CELL) | EXCELLENT | GOOD | GOOD | AVERAGE | AVERAGE | GOOD |
| POLY-STAR (POLYESTER) | AVERAGE | EXCELLENT | GOOD | EXCELLENT | AVERAGE | AVERAGE |
| RAY-STAR (RAYON) | AVERAGE | POOR | POOR | GOOD | AVERAGE | AVERAGE |
| PRO-STAR S (POLYPRO) | AVERAGE | GOOD | GOOD | GOOD | AVERAGE | GOOD |
| PRO-STAR T (POLYPRO) | EXCELLENT | EXCELLENT | EXCELLENT | AVERAGE | AVERAGE | GOOD |
| ULTRA-STAR (LOFT) | EXCELLENT | AVERAGE | AVERAGE | GOOD | EXCELLENT | AVERAGE |

Note † Filter media is available in various widths and lengths as well as custom sizes.