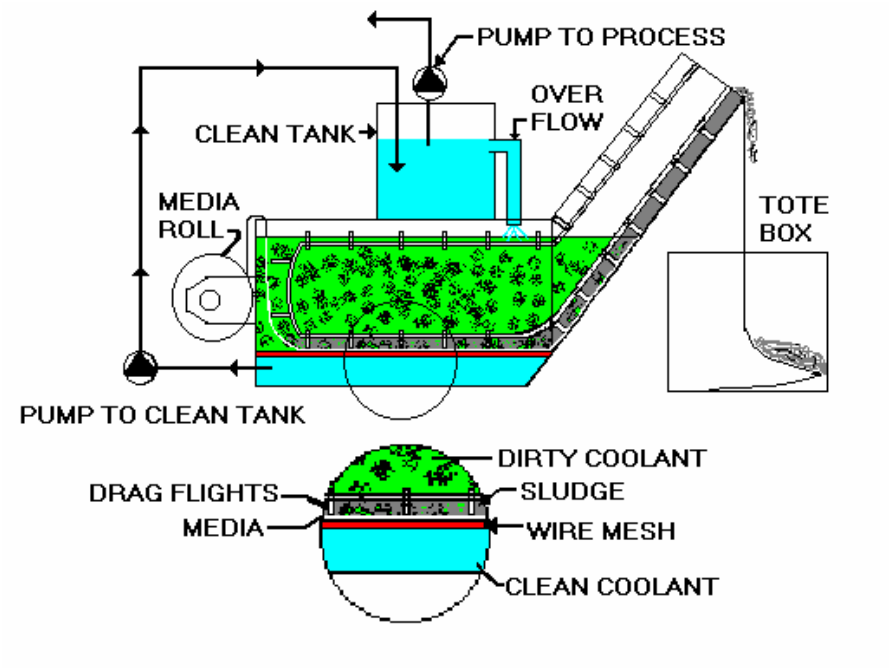
Vacuum Filters Principle of Operation

VACUUM FILTERS



General Information:

Vacuum Filters are designed to provide a nominal 10 to 20 micron coolant clarity. Like paperbeds, vacuum filters are sized by gallons per square foot through put. Unlike paperbeds this style of filter can handle up to fifteen gallons per square foot, dependant on coolant viscosity and application. The vacuum is a fairly forgiving filter and has a wide range of usage. Generally a vacuum is used on grinding but can be used on machining applications where larger chips and fines are present. Vacuums have been a workhorse in larger plants where multiple or central filtration systems are the most economic approach to keeping coolants clean. Because of their large tank design, vacuums make benefit of settling and a wide range of filter media. Typically they are also fairly cheap to maintain and can last in excess of twenty years. They can be pumped to or gravity fed (if pit mounted). Draw backs to this style of filter is wet sludge, complete pump out when maintenance is required and tearing of media when not properly maintained.

Principle of Operation:

Vacuum filters are easier to explain in a step by step logic. The underlying premise in regards to vacuums is that they use hydraulic vacuum to maximize cake generation. Simply put, liquid is drawn through a supported media which in turn creates an ideal medium (thick cake) to remove finer particulate compared to gravity based filtration systems. How does it work?

1. Contaminated coolant is either gravity fed our pumped to the filter.
2. Particulate or dirt settles to the bottom of the tank where media resides.
3. A pump draws the liquid through the supported media (supported by either wire mesh, perforated sheet or wedge wire).
4. Coolant is essentially sucked hydraulically through the lower section of the tank.
   a. Remember as contaminants settle on to the media a filter cake is formed. As the cake builds a matrix of finer and finer particulate conglomeration to capture even smaller particles.
5. The coolant that has been drawn through the media barrier is the usually sent directly to the overflow clean tank then to process namely the grinders or machining process.
6. Eventually the media is blinded or unable to permit coolant to pass through. At that time a pressure differential switch reads a pressure drop and sends the filter into index.

(Note, vacuums index by either time or pressure.

Typical Applications:

- Grinding of all types. Centerless, Thru Feed, Cylindrical, Roll Grinding, Surface, Belt, Double Disc, Honing.
- Tube Mills and Saws
- Chip Applications (Aluminum, Steel, Cast Iron)
- Plating
- Parts Washers
- Central Systems

Coolants Used on Pressure Filters:

- Water Soluble
- Synthetic
- Semi-Synthetic
- Mineral Seal
- Water
- Straight Oil (viscosity over 100 @ 100?F)

Media Used on Vacuum Filters:

- Brigade
- Regiment
- Pureflo
- Meltblown
- Hydroguard
- PET Laminate
- Ultraloft ™

Note: Tensile strength plays a part in success of this media. The media is also the conveyor belt to remove the cake at the end of the cycle.