

## High Viscosity Filter Elements to Maintain Oil Cleanliness

It is recognized that oil cleanliness prolongs the life of mechanical systems. Hard, solid contaminants contribute to abrasive wear and ultimately catastrophic failure. Filtration of gearboxes and bearings in high load applications can be problematic due to the high viscosity oils used. Achieving relatively low particle counts (<6-micron) on high viscosity oils (>280 cSt) can be difficult. Filters installed on a sump recirculation will initially remove particles below 6-micron, and over time stop removing small particles. Often, particle counts remain constant and the filter does not build additional differential pressure.

The flow of high viscosity oils through the filter media can distort conventional filter medias. Loss of internal integrity creates channeling. Conventional filter medias display distortion of pore size and shape after limited runtime. It is generally recognized that high viscosity filters require greater open area with ultrafine fiber diameters.

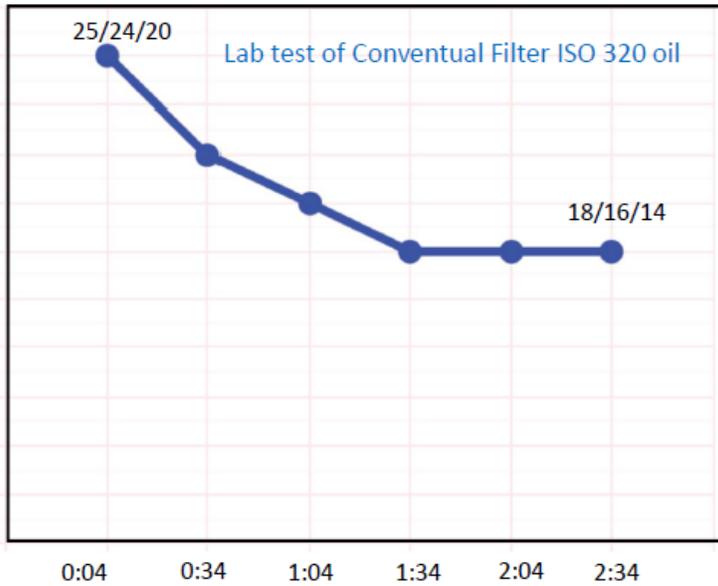


Ultrafine fiber medias were evaluated in conjunction with support materials. By combining ultrafine, moderate, and course fiber layers, overall media integrity was increased, media void volume was enhanced, and pore structure was maintained. When pleated in cartridge form, the element displayed enhanced filtration qualities in high viscosity oils.

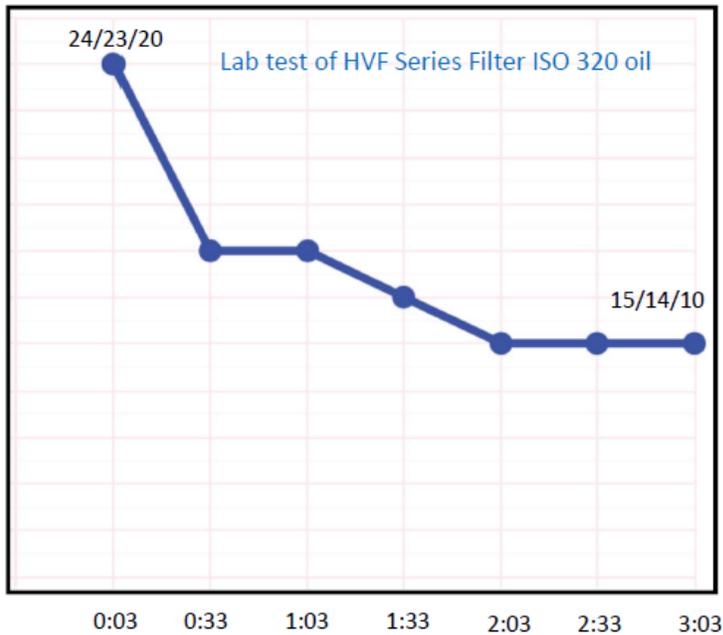


Laboratory testing was conducted utilizing ISO 12103-1 A2 fine test dust, and ISO320 gear oil. After an initial run time to stabilize flow, particle counts were taken at 30-minute intervals. The results of conventual and HVF filters are as follows:

**Conventual Filter Element Testing**



**HVF Series Testing**



## Application

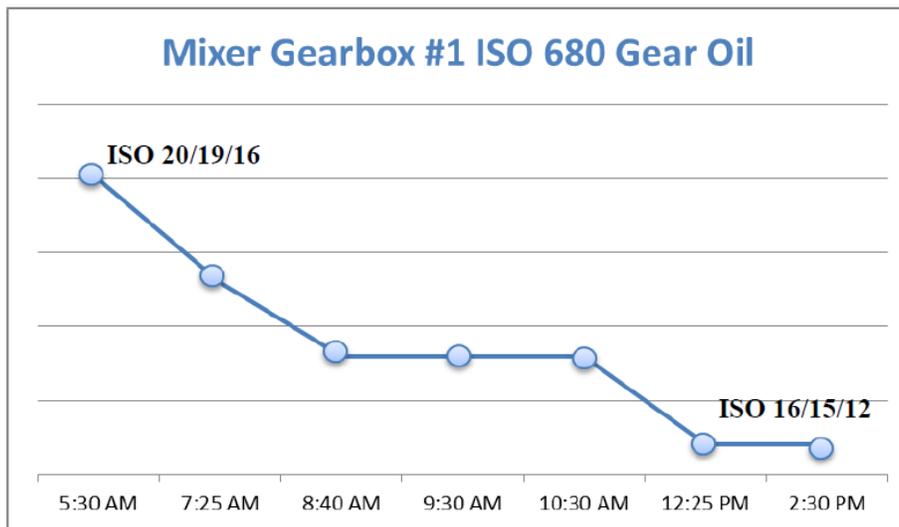
A tire manufacturer had been experiencing high particulate contamination in two gearboxes on mixers. The mixers are critical to the plant. Historically, a gearbox failure had cost them >\$1M in repairs and down-time. The failure was caused by high particulate contamination in the oil. The company instituted an aggressive oil management plan for the gearboxes but was having difficulty achieving the desired cleanliness of the ISO 680 and ISO 320 oils to ISO 18/16/13.

Using conventional filters to recirculate the gearbox oil; they were experiencing particle removal stall. The fresh elements would remove particles for a short period, and then no longer remove particles and would not build differential pressure. To achieve the required cleanliness of the gear oil, the customer was changing elements up to four times. Regular testing would indicate increases in particle counts and element change outs were required.

### Mixer Gearbox #1

Sump Volume	298 gallons
Gear Oil	ISO 680
Operating Temperature	140° F
Initial ISO cleanliness level	20/19/16

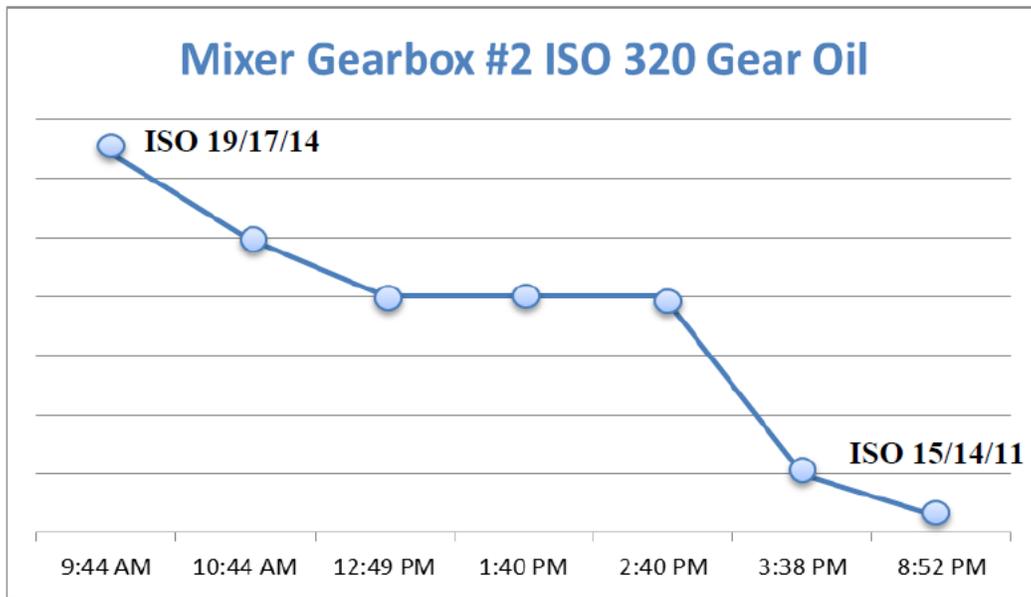
The sump was recirculated at 10 GPM, through a HFV-840-6B (6-micron) element  $\beta(6)=1,000$  for 8 hours. The results are provided below.



### Mixer Gearbox #2

Sump Volume	193 gallons
Gear Oil	ISO 320
Operating Temperature	120° F
Initial ISO cleanliness level	19/17/14

The sump was recirculated at 10 GPM, through a HFV-840-6B (6-micron) element  $\beta(6)=1,000$  for 10 hours. The results are provided below.



High viscosity oil (>ISO280) are used in heavy load application in dirty environments and inconvenient locations. Maintaining cleanliness levels below 18/16/13 is attainable with the selection of the correct filter and recirculation rate. The HVF Series filter elements and compact filtration skid from Oil Filtration Systems® has proven successful in protecting critical equipment.



## About Oil Filtration Systems®



Oil Filtration Systems® manufactures Oil Purification Equipment designed to remove contamination (water, particulate, varnish, and/or entrained gases) from a wide variety of fluids, including Turbine Oil, Hydraulic Oil, Gear Oil, and Fuel Oil (#2 Diesel Fuel). When used in conjunction with our high-efficiency filter elements rated Beta(c)>1000 in a variety of micron sizes, our systems will enable you to achieve optimal fluid cleanliness to meet or exceed the most stringent OEM cleanliness specifications.

### Author Profile



Tom Lisy, Corporate Sales Manager of the Purity Products group. Within the Purity Group, he oversees the sales, engineering, and R&D. He has worked in the filtration industry for 25 years and holds Four US Patents for filtration devices.

For more information, visit  
<http://crfiltrationsolutions.com/> or fill out  
the contact form [here](#).

