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## **Control of Microbiological Contaminants in Mineral Oils and Petrolatum**

It is well known that mineral oils and petrolatum do not support the growth of microorganisms since they are totally hydrocarbon systems. We have an environmental monitoring program in place, and we have an outside lab perform annual microbial testing on our various petrolatums and mineral oils.

There are, of course, circumstances under which microorganisms develop and thrive. Given sufficient time, organisms will grow at a water-oil interface. Therefore, Calumet Refining takes great pains to exclude water from our products. This includes storage tanks for finished products, tank trucks for bulk shipments as well as drums and pails. A specification of 35 ppm maximum water content exists for white oils and petrolatum. Routine tests on finished products consistently show water contents below 20 ppm.

### **Processing Conditions**

Several processing steps involved in white oil and petrolatum production are severe enough to destroy nearly all viable organisms. Hydrotreating for example occurs at temperatures in excess of 600°F (315°C) and at high hydrogen pressures. This processing step is used for both white oils and petrolatum. In addition to hydrotreating, some white oils are also subjected to contact with fuming sulfuric acid. This strong acidic environment is sufficient to destroy proteins and nucleic acids in any biological system.

### **Storage Tanks**

Products from the processes described above are pumped into storage tanks that are closed to the atmosphere.

### **Shipping Containers**

Bulk shipments are made in stainless steel tanks trucks. Each tank truck is washed and dried before it comes into Calumet Refining's facility. A typical cleaning solution used at a tank truck wash consist of a sodium or potassium hydroxide solution. Following washing the tank trucks are flushed with hot water until the effluent is clear. The vessel is then dried with ambient air that is blown through the trailer.

It is the responsibility of the carrier to provide clean, dry tank trucks that are appropriate for loading. They must meet the requirements of the Penreco prior products list. When tank trucks arrive on site, the driver must provide the wash ticket to the on-site transportation group. Once all documentation is in place, the tank trucks are sent to the loading rack. The loader confirms with the driver that that bottom valves are closed and sealed, and they perform a visual inspection through the top man head. They pay particular attention to locate any residual moisture or odor before the tanks truck are



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considered suitable for loading. They confirm that all fittings on the top of the trailer are tight and in a good state of repair.

Drums and pails used for white oils and petrolatum are manufactured to Calumet Refining specifications. During fabrication they are subjected to curing temperatures in excess of 250°F (122°C) for at least 15 minutes.

### **Filters**

Bag filters of five (5) micron (micrometer) pore size are used to filter white oils and petrolatum prior to loading into tank trucks, railcars, drums, and pails. Unfortunately, this size is not small enough to filter out microorganisms, but it is effective in eliminating miscellaneous particulate matter.

### **Conclusions**

Calumet Refining's emphasis on controlling microorganisms is to limit our products exposure to water and to maintain the cleanest environment possible. No attempt is made to use specific disinfectants or sterilization procedures. This precludes the possibility that residual quantities of these agents may end up in our finished products.

Calumet Refining's USP/NF grade white mineral oils and petrolatum are free of contaminants (when loaded at our plant) whether they are, particulates, water, or viable microorganisms as described in USP/ NF (61) Microbial Limit Tests. But from a practical point of view our products are shipped in commercial transports that are not maintained in sterile conditions. Therefore, it is important that customers take whatever precautions they feel necessary to reduce the possibility of contamination with microorganisms.

Sincerely,

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