

Plastic Injection Molding Fluid Cleanliness

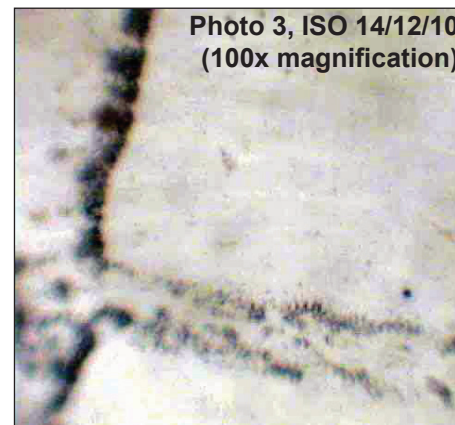
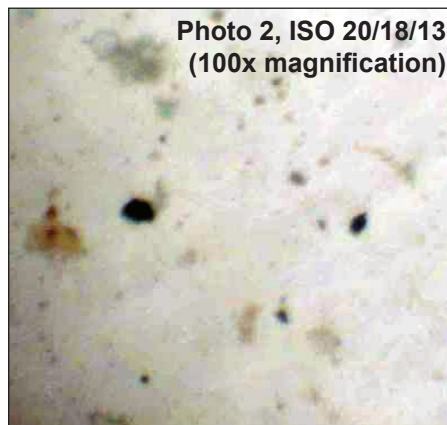
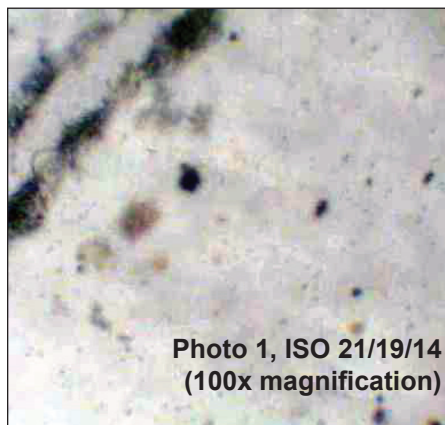
The Problem:

A plastic injection molding manufacturer was experiencing frequent equipment failures due to hydraulic fluid contamination.

The Solution:

A PM-1 particle monitor was used to identify the most contaminated system. This system contained approximately 110 gallons of hydraulic fluid with an ISO cleanliness code of 21/19/14 (photo 1).

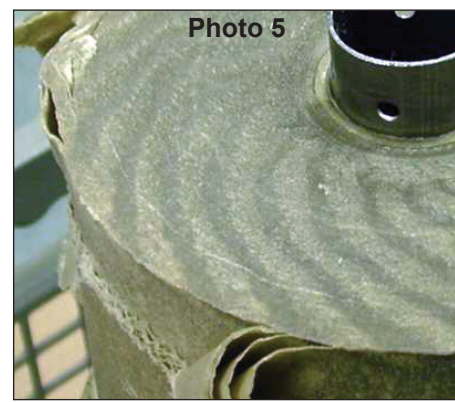
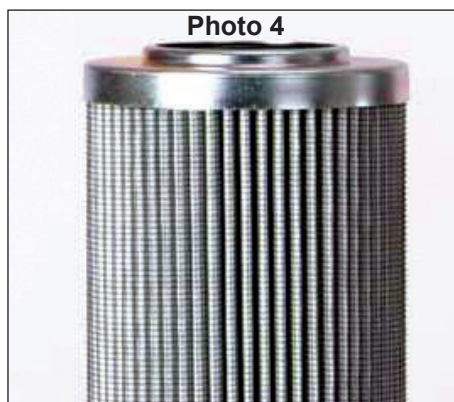
A competitor's filter cart and elements were previously installed on the system. The installed elements were rolled paper with cardboard support tube. The rolled paper element flow path is axial flow and there is very little open area in the support tube thus the elements cannot handle much flow. Because of the low flow capability of the rolled paper element the filter cart diverter/bypass valves must always be open. It is estimated that only 15~25% of the fluid passing through the filter cart actually passes through a filter element. This lengthens the time required to clean up the system. The flow rate of the filter cart is approximately 3~5 gpm depending on filter element restriction.



The cart with the competitors elements was allowed to run on the system for 1.5 hours. In this time the ISO cleanliness code of the system dropped from 21/19/14 to 20/18/13. Subsequently Hy-Pro HP709L20-1MB elements were installed in place of the rolled paper elements. Hy-Pro's full-flow design including pleated media and radial flow-path allow the diverter/bypass valves to be closed. Thus, 100% of the flow going through the filter cart was also passing through the filter elements. After 13 minutes of flushing with the Hy-Pro element the ISO code had dropped to 18/15/11 and after 30 minutes the ISO code reached 16/14/10 which is an acceptable cleanliness code for systems operating with servo valves. After one hour the ISO code was 14/12/10 (see photo 3). After 3 hours of flushing the ISO code plummeted to 10/9/1.

The Conclusion:

The rolled cellulose elements are not capable of handling the full flow of the filter cart. The cellulose media does not remove particles efficiently enough to clean the fluid to an acceptable fluid cleanliness level.



In rolled axial flow elements (see photo 5) the fluid enters the element through the end and must turn to pass through the media. The effective area through which the fluid must pass in a rolled media element is exponentially smaller than the flow area of a pleated, radial flow element (see photo 4).