

OIL ON METAL ANALYSIS

Worthington Cylinders, Columbus, Ohio

Worthington Cylinders manufacturers steel pressure valves, which are coated with a special oil to lubricate the threads after they're made. Too much or too little oil can make them hard to turn. Quality control engineers submitted samples to Sitalab for hydrocarbon analysis to determine how much oil to use to improve the performance of their product.

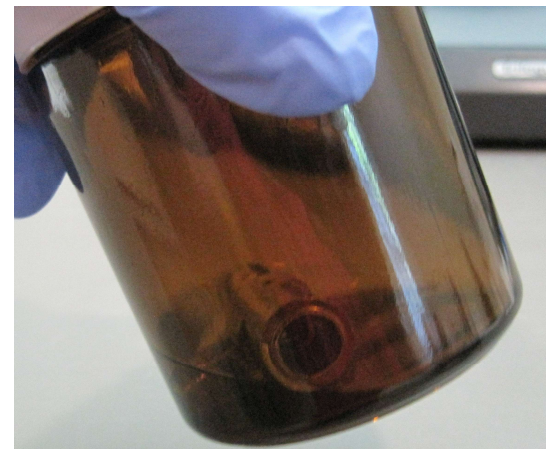
Customer uses KeyKote oil, made by MacDermid, Inc., which contains a mixture of petroleum distillates, glycol ether and other ingredients. The aromatic hydrocarbons in the oil fluoresces strongly using Sitalab's UVF-Trilogy instrument allowing it to detect very low concentrations.

Test Procedure

1. Place sample in a clean 8 oz. glass jar. Only use wide mouth laboratory grade jars (clear or amber) with a PTFE lined cap. The valves should lay flat inside the jar.
2. Add 20 mL hexane solvent to the jar, tighten cap and gently shake/swirl the contents for 3 minutes.
3. Remove the lid and transfer 2 to 3 mL of the extract into a glass cuvette using a pipette.
4. Insert the glass cuvette into the analyzer calibrated to the oil for Total Petroleum Hydrocarbon (TPH) analysis. Press the 'measure fluorescence' button and wait a few seconds for the reading to finish. Concentration is displayed in ppm (mg/Kg) units.
5. If preferred, report sample concentrations in mg/square meter using the valve's surface area. See examples of test results below.

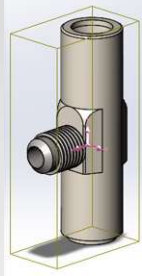


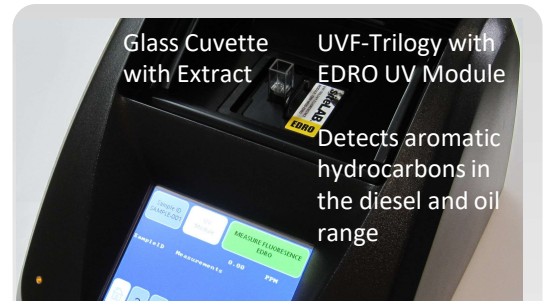
KeyKote 695K oil provided by customer was used to calibrate the UVF-Trilogy for analysis. The oil dissolves instantly in hexane solvent.



Valves are extracted in hexane solvent using 8 oz glass jars. Extracts are gently shaken for several minutes allowing ample time for the solvent to remove the oil from the surface.

Test Results Comparing Oil Content on Valve Samples

	TPH Result: (PPM)	TPH Result*: (mg/m ²)	 Surface area listed in valve design spec sheet: 9.490 square inches, or *6,122.568 sq-mm
High Oil Samples:			
Valve 1	50	163	
Valve 2	44	144	
Low Oil Samples:			
Valve 3	5.4	17.6	
Valve 4	2.3	7.5	
Optimal Oil Samples:			
Valve 5	26	85	
Valve 6	24	78	
Target Concentration:	20	65	



KeyKote Oil Calibration Curve:	Concentration (PPM)	Response (RFU)
Solvent Blank	0	13
Oil Standard	1	191
Oil Standard	10	1,579
Oil Standard	20	3,015