



Industrial Applications...

Test metal, concrete & other surfaces for residual oil contamination

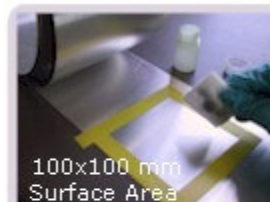
Surficial sampling and analysis is used to assess the existence and/or extent of oil contamination on various surfaces, rather than in soil, sediment or water. Applications include testing wipe samples for residual oils coated on aluminum, steel or other metal parts after the manufacturing process. This includes ventilation ducts, fans, AC coils and other metal working processes to see how well the surfaces are washed off. Testing concrete surfaces for TPH or PCBs is another such application. In the food and medical industries, testing metal parts or other components for residual oils can also be performed for quality control, to ensure the parts are clean and oil free prior to use. Sample points should be carefully chosen and should be based on site history, manufacturing processes, personal practices, obvious contamination, migration pathways and available surface area. Once the sample location has been determined, it is important to know the surface area in order to calculate the final results.

How it Works...

A sample is collected by wiping off a surface using a gauze pad and then extracting the pad in solvent. The sample extract is then measured on the UVF analyzer, which is calibrated using the oil of interest. A blank should always be collected and tested in order to ensure the quality of the data. The blank is used to set the detection limit and helps identify background interferences caused by the gauze pad, gloves, solvent and other materials used. For quality control, the sampling area can be wiped again and retested to check for residual contamination.

For maximum performance, be sure the calibration standards made from the oil are prepared properly. Alternatively, you can ship your oil sample to Sitelab Corporation and we'll prepare certified calibration standards specific for your project.

Performance Evaluation: Cutting Oils on Metal



100x100 mm
Surface Area
Sheet metal is spiked with cutting oil, wiped with a gauze pad and then extracted in solvent for analysis on Sitelab's UVF-3100 instrument.



Sitelab Oil Results
shown in mg/sq-meter

Clean surface sample (no oil)	= 10.2
Spiked oil concentration: 1,250	
Contaminated surface sample (with oil)	= 1,350
Sample with residual contamination	= 42
Wipe sample extraction blank	= 0.5*
*Used as TPH detection limit	

Testing Medical Implant Parts for Oil Residue:

A manufacturer in the medical industry coats it's stainless steel parts with lubricating oil after the manufacturing process to prevent the parts from corroding. The parts must be free of oil prior to use. Sitelab helped the client develop a quick and reliable test method, using the TD-500 for quality control purposes, by testing parts rinsed in solvent. Many samples of different oils were sent to Sitelab to see which oils fluoresced the most and which ones produced the lowest detection limits.



Instead of wipe tests, small parts (above) are submerged in hexane and each rinse is tested.

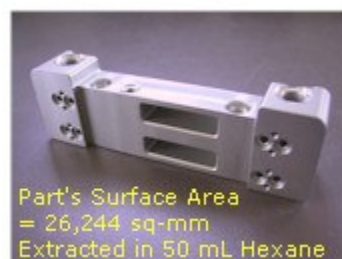


Clean parts were also spiked with oils to check solvent extraction efficiency and test instrument sensitivity.



Applications for Air & Oxygen Pump Devices:

A customer was required to test small components imported from a foreign manufacturer for potential oil residues. The parts are used to make oxygen pumps for hospitals for patients having respiratory problems. Naturally, the parts must be free of any oil prior to use. The type of oil was unknown and not available. As such, Sitelab tested the samples using both the UVF-3100 and TD-500 analyzers calibrated to it's TPH-Oil Calibration Kit as a substitute. The TD-500 detected no hydrocarbons, but the UVF-3100 did, illustrating the importance of choosing the right instrument for these types of applications.



Part's Surface Area
= 26,244 sq-mm
Extracted in 50 mL Hexane




UVF-3100
TPH-Oil Results

Reading	= 2.7 ppm
Adjust using formula:	= 2.7 x 50 x 0.001
	+ 26,244 x 1,000,000
Final Concentration	= 5.1 mg/sq-meter

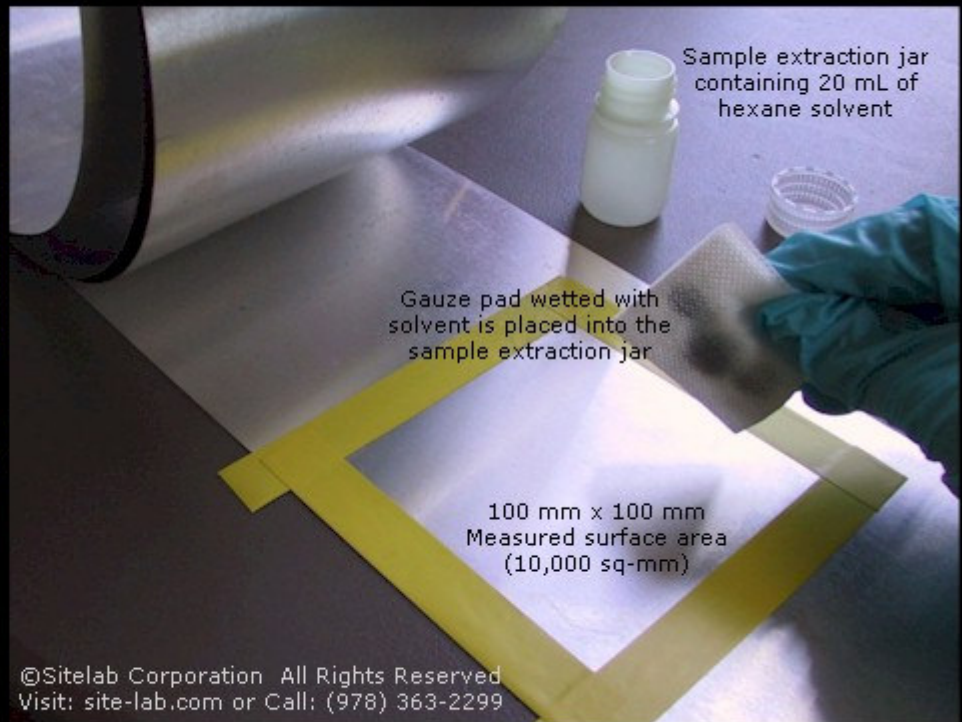


Calculating Surface TPH Concentrations Testing Cutting Oils on Sheet Metal

 UVF-3100 Results
Calibrated to Cutting Oil
Reading = 21 ppm (mg/L)
Report results in mg/sq-meter
units, using this formula:

= $21 \times 20 \times 0.001$
+ $10,000 \times 1,000,000$

Final concentration equals:
42 mg/sq-meter



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A wide range of different cutting oils are used in industry, which fluoresce differently from one another. The oil shown to the left (yellow) was diluted in solvent at 100 ppm and used to calibrate the analyzer. The oil to the right (blue), made by the same manufacturer, responded as 66 ppm when diluted and tested at the same concentration.

Measure Surface Area



Use a ruler and tape to measure a 100x100 mm square area on your metal, concrete or other surface area to be tested. Sitelab's TPH wipe sample test kits are also available.

Wipe Sample with Pad



Wearing protective gloves, wet the gauze pad with hexane solvent and wipe the surface clean. Turn the pad over, unfold or add more solvent if needed. Place the pad into a sample jar when finished.

Extract with Solvent



Using a test tube, measure out 20 mL of solvent from the solvent dispenser bottle and add to the jar containing the pad and then shake the jar for several minutes. Be sure the pad is submerged in solvent.

Test your Extract



Pour the sample extract into the glass cuvette and place into the UVF instrument for analysis. Record the concentration. If the readings are too high, prepare and test a dilution using the extract if necessary.

Calculate Results



Sample results are then adjusted using surface dimensions in order to report concentrations in mg/sq-meter. Contact Sitelab to see which analyzer is most suitable for your application.

Calibration is Key!



Cutting oils (above) fluoresce differently from one another. Be sure to use the proper instrument. Calibrate using the oil for accurate measurement. If oil is not available, use Sitelab's TPH-Oil calibration kit.