

# Analytical Report of Engine Oil on Water

## Earth Care Products

NWL Lot: 347827  
NWL Report: 632192

Project: Crude Oil Absorbent Efficiency  
Project ID: Sphag Sorb

### Objective:

To determine the efficiency of Sphag Sorb absorbent material on oil products.

### Sample Requirements:

Sphag Sorb/Oil Ratio	=0.23 g/mL (0.5 lb/1 L Water)
Water	=500 g
10W30 Motor Oil (~30%)	=150 g

### Experimental Protocol:

1. Determine and record oil density.
2. In 1000ml beaker weigh (~500 g) and record mass of water.
3. Add oil to water (~150 g) and record mass of oil.
4. Calculate mass of peak required based on Sphag Sorb/Oil ratio.
5. Add Sphag Sorb to water/oil mixture and record mass.
6. Let stand 10 minutes.
7. Gravity filter mixture and collect filtrate.\*\*
8. Weigh filtrate collected.
9. Perform O/G analysis on filtrate.
10. Perform Dean Stark analysis on filtered solids (Sphag Sorb/Oil Mixture).
11. Calculate % solids, % water and % oil in Sphag Sorb.
12. Calculate mass balance and calculate recovery.
13. Calculate Sphag Sorb efficiency. (% Recovery of Oil Product)

*\*\*Filter is water wetted prior to filtration to avoid oil absorption.*

### Observation:

- 1.85 cm oil layer measured on water surface
- 3.75 cm Sphag Sorb layer measured after 4 minute contact with oil/water mixture.
- 1.75 cm high dark region in Sphag Sorb from water oil interfaced after 4 minute contact.
- No other visible changes from 4 to 10 minutes from first contact.
- No color change from original observed in remaining 2.00 cm layer. Remaining Sphag Sorb appears dry.



**Physical Property Data**

Density of Oil @ 15°C	0.8756 g/mL	Sample ID:	1313721
Density of Water @ 15°C	0.9998 g/mL	NWL De-ionized Water	
Volume of Oil	111.9 mL		
Volume of Water	505.9 mL		
Total Volume	617.8 mL		
% Oil by Volume	18.1%		
Water by Volume	81.9%		
Depth of Oil Layer	1.85 cm		
Depth of Sphag Layer	3.75 cm		

**Experimental Data**

Pre-Treatment						
	Total	Oil (g)	Sphag Sorb (g)	Water (g)		
Initial Mass of Sample	627.3 g	98.0	23.5	505.8		
Post Treatment						
	Total	% Oil	% Sphag Sorb	% Water	Sample ID	Lot Ref
Sphag Sorb Analysis	100.0 %	59.1	13.3	27.5	1308803	-1
Water	100.000 %	0.002	0.0	99.998	1308804	-2
Mass of Residue Peat/Oil	1.6 g	0.9	0.2	0.4		
Mass of Filtrate Water	459.4 g	0.009	0.00	459.4		
Mass of Solids (Wet)	165.2 g	97.7	22.0	45.5		
Total Mass Recovered	626.2 g	98.7	22.2	505.3		
Recovery	99.8%	100.7%	94.5%	99.9%		

**Conclusion:**

The efficiency of the Sphag Sorb was 100% on Esso Protec Extra 10W30 Oil as per the experimental parameters. The % recovery of the oil after treatment indicates the absorbency of the product.

The Loss of the Sphag Sorb Product may be due to dissolution of the Sphag Sorb into the oil and/or solvents used in the extraction. It is also assume that the greater then 100% recovery is the result of Sphag Sorb dissolution and therefore the additional mass in the oil recovered.



**Methodology and Notes:**

Method of Analysis:

Density of Liquid – ASTM D 4052-96

Standard Test Method for Density and Relative Density of Liquids by Digital Density Method

Oil and Grease in water

\*APHA 5220 B Oil and Grease: Partition-Gravimetric Method

Oil in Soil by Dean-Stark

\*ACOSA Determination of the Bitumen, Water and Solids in Oil Sand,

\*North method(s) in based on reference method

References:

APHA Standard Methods for the Examination of Water and Wastewater

ASTM Annual Book of ASTM Standards

Dean-Stark ACOSA Reference Method

Comments:

Sample 2 (Filtrate) was given an extra aliquot of hexane during extraction.

The sample volume used for O/G extraction did not meet the sample requirement of 950 ml. Only 447 ml was provided for analysis.

Approved by: \_\_\_\_\_

Dave Murray

*Manager, Oil & Gas Operations*