

Analytical Report

Earth Care Products

NWL Lot: 347827
NWL Report: 632192
Report Date: 2004-12-10

Project: Curde Oil Absorbent Efficiency
Project ID: Sphag Sorb
Samples: Sphag Sorb

Objective:

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

Sample Requirements:

| | |
|--------------------|--------------------------------|
| Peat/Oil Ratio | = 0.23 g/mL (0.5 lb/1 L Water) |
| Water | = 500 g |
| Supplied Crude Oil | = 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 peat required based on Peat/Oil ratio.
5. Add peat 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 (peat/oil mixture).
11. Calculate % solids, % water, % oil in peat.
12. Calculate mass balance and calculate recovery.
13. Calculate peat efficiency. (% Recovery of Oil Product)

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

Observations:

- 2.70 cm oil layer measured on water surface
- 5.20 cm peat layer measured after 4 minute contact with oil/water mixture.
- 2.70 cm high dark region in peat from water oil interface after 4 minute contact.
- No other visible changes from 4 to 10 minutes from first contact.
- No color change from original observed in remaining 1.50cm layer. Remaining peat appears dry.

Physical Property Data

| | | |
|-------------------------|-------------|--|
| Density of Oil @ 15°C | 0.8446 g/mL | Sample ID: 1358567 NWL De-ionized Water |
| Density of Water @ 15°C | 1.0000 g/mL | |
| Volume of Oil | 178.2 mL | |
| Volume of Water | 507.9 mL | |
| Total Volume | 686.1 mL | |
| % Oil by Volume | 26.0% | |
| % Water by Volume | 74.0% | |
| Depth of Oil Layer | 2.70 cm | |
| Depth of Peat Layer | 5.20 cm | |

Experimental Data

| Pre-Treatment | | | | | | |
|--------------------------|--------------|--------------|--------------|---------------|-----------|---------|
| | Total | Oil (g) | Peat (g) | Water (g) | | |
| Initial Mass of Sample | 690.9 g | 150.5 | 32.5 | 507.9 | | |
| Post Treatment | | | | | | |
| | Total | % Oil | % Peat | % Water | Sample ID | Lot Ref |
| Peat Analysis | 100.0 % | 46.1 | 13.1 | 40.8 | 1358565 | -1 |
| Light End Loss | 10.0 | 10.0 | 0.0 | 0.0 | 1358565 | -1 |
| Water | 100.000 % | 0.001 | 0.000 | 99.999 | 1358566 | -2 |
| Mass of Residue Peat/Oil | 3.1 g | 1.7 | 0.4 | 1.3 | | |
| Mass of Filtrate Water | 439.5 g | 0.003 | 0.00 | 439.5 | | |
| Mass of Solids (Wet) | 243 g | 136.3 | 31.7 | 99.2 | | |
| Total Mass Recovered | 685.6 g | 138.1 | 32.1 | 540.0 | | |
| % Recovery | 99.2% | 91.7% | 98.9% | 106.3% | | |

Conclusion:

The efficiency of the Sphag sorb was 91.7% on supplied crude oil as per the experimental parameters. The % recovery of Oil after treatment indicates the absorbency of the product. The loss of peat may be due to dissolution of the peat into the oil and/or solvents used in extraction. The loss of crude oil can be partially attributed to light end loss during reflux extraction with toluene.

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 5520 B Oil and Grease: Partition-Gravimetric Method

Oil in soil by Dean-Stark

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

* Norwest method(s) is 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 (1358566) was low in volume for oil and grease analysis which may affect the accuracy of the results.

Approved by:  Dave Murray *Manager, Oil & Gas Operations*