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SAND SAMPLING BY FILTRATION

01 INTRODUCTION

Sand present in crude oil may be quantified by using a simple sieving technique. A sample of crude oil (approximately 11 litres) is passed through the proserv sand sampling unit. All the collected suspended matter is estimated by weight and reported as the sand content.

02 SCOPE

This method is intended for the direct determination of sand content in crude oil from the wellheads. The standard size of filter in use is of a mesh 50 microns in size, although other size diameters may be utilised (e.g. 45, 75, 85 microns, depending on the parameters to be looked at).

Possible interference in the result may occur if solidified wax is collected on the sieve. Wax solids may be differentiated from sand by simply melting them in a hot water bath.

The sample is passed through a fine wire mesh screen to retain all solids. After washing with solvent to remove all traces of hydrocarbons, and water to remove any salt, the remaining sand is weighed and the sand content calculated.


03 TOOLS, EQUIPMENT AND REAGENTS

- 3.1 PROSERV SAND SAMPLING UNIT
- 3.2 11L IATA CAN
- 3.3 WEIGHING SCALES
- 3.4 CENTRIFUGE TUBES
If no scales are available
- 3.5 TOLUENE
- 3.6 METHANOL
- 3.7 DISTILLED WATER

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04 CALIBRATION

If using a balance to weigh the filters, this must be calibrated in accordance with the manufacturer's instructions.

05 SAMPLING

Ensure that all relevant clearances have been obtained and that there are no unauthorised personnel within the sampling vicinity.

Prior to going to the sample point ensure the sand sampling unit is correctly assembled- make sure the o rings are in the correct position and that the sieve is in the assembly.

Open the wellhead sample point to be tested and allow the line to flow until all remnants of previous oil and sediment has been displaced. This purging should take place for around five minutes to ensure that all residues have been removed.

Place the 11 litre IATA can under the wellhead sampling point and attach the sampling unit, ensuring that the drain point is over the IATA can set aside for waste. Ensure that earthing straps are attached prior to commencement of sampling.

Commence running the sampling point through the filtration unit into the can, at a rate that will avoid spillage and frothing. Collect around 10 Litres of the filtrate into the IATA can.


Ensure that the sampling point is left with all sampling valves closed and the appropriate pipe work is depressurised and isolated.

06 ANALYSIS

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Transport both the filter apparatus and the IATA can to the laboratory as soon as possible after sampling.

Carefully measure the volume of crude oil collected into the IATA can and note the figure.

Carefully weigh a clean, dry Petri dish and tare the balance to zero the weight of the dish. The filtrate obtained in the sand sieve must be washed in stages to remove Petroleum Products and entrained salts attached to the sand particles and this should be performed as follows:

Carefully rinse the sieve with around 500ml of Toluene, to remove all traces of hydrocarbon in the sieve and attached to the sand particles.

Similarly, rinse the sieve with around 500ml of Methanol to remove the water insoluble toluene.

Rinse again with around 500ml deionised / distilled water to remove indigenous salts.

Wash with a final rinse of methanol to remove the free water.

Place the sieve in the hot oven and allow it and the contents to dry for around half an hour.

CAREFULLY brush any solids and sediment on to a Petri or weighing dish, ensuring that nothing is lost to the surrounding bench work and that all traces of the residual solids are removed from the sieve.

CAREFULLY run a magnet across the top of the residue in the Petri dish to remove any traces of metal fragments, which are obviously not considered as sand or sediment.

Use tweezers to remove any further traces of debris such as paint chips etc.


Note: In the event of attempting this particular analysis on an FPSO where a balance is not available, the clean dry sand should be transferred into a centrifuge tube and the volume of sand produced noted. Samples of this sand should be sent on shore for calculation of density so that the weight of sand can then be calculated offshore.

07 REPORTING

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Weigh the Petri dish and sample – if taring has been performed, the weight showing in milligrams is the actual weight of the sand and sediment.

To report the result in grams per cubic metre, the following calculation should be performed.

$$\text{g/m}^3 = (W \div V) \times 1000000$$

Where W = Weight in MILLIGRAM'S of sand / sediment
V = Volume in LITRES of crude oil passed through filter.

In order to convert the figure to Pounds per Barrel, the result in g/m³ should be multiplied by 0.350507

08 DEFINITIONS

Refer to Procedure 1.4 – 'General Descriptions and Glossary' for definitions of terminology within this procedure.

09 REFERENCE DOCUMENTS

Refer to:
Proserv Manufacturer's Instruction manual.

10 HAZARDS

Refer to MSDSs and COSHH assessment for handling and waste disposal.

Appropriate protective equipment as stipulated by COSHH assessments must be worn.

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