

ATTACHMENT 3**APPENDIX 1 TO SUBPART A OF PART 435 – STATIC SHEEN TEST**

1. Scope and Application

This method is to be used as a compliance test for the “no discharge of free oil” requirement for discharges of drilling fluids, drill cuttings, produced sand, and well treatment, completion and work over fluids. “Free oil” refers to any oil contained in a waste stream that when discharged will cause a film or sheen upon or a discoloration of the surface of the receiving water.

2. Summary of Method

15-mL samples of drilling fluids or well treatment, completion, and work over fluids, and 15-g samples (wet weight basis) of drill cuttings or produced sand are introduced into ambient seawater in a container having an air-to-liquid interface area of 1000 cm² (155.5 in²). Samples are dispersed within the container and observations made no more than one hour later to ascertain if these materials cause a sheen, iridescence, gloss, or increased reflectance on the surface of the test seawater. The occurrence of any of these visual observations will constitute a demonstration that the tested material contains “free oil,” and therefore results in a prohibition of its discharge into receiving waters.

3. Interferences

Residual “free oil” adhering to sampling containers, the magnetic stirring bar used to mix the sample, and the stainless steel spatula used to mix the sample will be the principal sources of contamination problems. These problems should only occur if improperly washed and cleaned equipment are used for the test. The use of disposable equipment minimizes the potential for similar contamination from pipettes and the test container.

4. Apparatus, Materials, and Reagents

4.1 Apparatus

- 4.1.1 Sampling Containers: 1-liter polyethylene beakers and 1-liter glass beakers
- 4.1.2 Graduated cylinder: 100-mL graduated cylinder required only for operations where predilection of mud discharges is required.
- 4.1.3 Plastic disposable weighing boats.
- 4.1.4 Triple-beam scale
- 4.1.5 Disposable pipettes: 25 mL disposable pipettes
- 4.1.6 Magnetic stirrer and stirring bar.
- 4.1.7 Stainless steel spatula

- 4.1.8 Test container: Open plastic container whose internal cross-section parallel to its opening has an area of $1000 \text{ cm}^2 \pm 50 \text{ cm}^2$ ($155.5 \pm 7.75 \text{ in}^2$), and a depth of at least 13 cm (5 inches) and no more than 30 cm (11.8 inches).
- 4.2 Materials and Reagents.
- 4.2.1 Plastic liners for the test container: Oil-free, heavy-duty plastic trash can liners that do not inhibit the spreading of an oil film. Liners must be of sufficient size to completely cover the interior surface of the test container. Permittees must determine an appropriate local source of liners that do not inhibit the spreading of 0.05 mL of diesel fuel added to the lined test container under the test conditions and protocol described below.
- 4.2.2 Ambient receiving water.
5. Calibration
- None currently specified.
6. Quality Control Procedures
- None currently specified.
7. Sample Collection and Handling
- 7.1 Sampling containers must be thoroughly washed with detergent, rinsed a minimum of three times with fresh water, and allowed to air dry before samples are collected.
- 7.2 Samples of drilling fluid to be tested shall be taken at the shale shaker after cuttings have been removed. The sample volume should range between 200 mL and 500 mL.
- 7.3 Samples of drill cuttings will be taken from the shale shaker screens with a clean spatula or similar instrument and placed in a glass beaker. Cuttings samples shall be collected prior to the addition of any washdown water and should range between 200 g and 500 g.
- 7.4 Samples of produced sand must be obtained from the solids control equipment from which the discharge occurs on any given day and shall be collected prior to the addition of any washdown water; samples should range between 200 g and 500 g.
- 7.5 Samples of well treatment completion and work over fluids must be obtained from the holding facility prior to discharge; the sample volume should range between 200 mL and 500 mL.
- 7.6 Samples must be tested no later than 1 hour after collection.
- 7.7 Drilling fluid samples must be mixed in their sampling containers for 5 minutes prior to the test using a magnetic bar stirrer. If predilection is imposed as a permit condition, the sample must be mixed at the same ratio with the same prediluting water as the discharged muds and stirred for 5 minutes.
- 7.8 Drill cuttings must be stirred and well mixed by hand in their sampling containers prior to testing, using a stainless steel spatula.

8. Procedure
 - 8.1 Ambient receiving water must be used as the “receiving water” in the test. The temperature of the test water shall be as close as practicable to the ambient conditions in the receiving water, not the room temperature of the observation facility. The test container must have an air-to-liquid interface area of $1000 \pm 50 \text{ cm}^2$. The surface of the water should be no more than 1.27 cm (.5 inch) below the top of the test container.
 - 8.2 Plastic liners shall be used, one per test container, and discarded afterwards. Some liners may inhibit spreading of added oil; operators shall determine an appropriate local source of liners that do not inhibit the spreading of the oil film.
 - 8.3 1 15-mL sample of drilling fluid or well treatment, completion, and workover fluids must be introduced by pipette into the test container 1 cm below the water surface. Pipettes must be filled and discharged with test material prior to the transfer of test material and its introduction into test containers. The test water/test material mixture must be stirred using the pipette to distribute the test material homogeneously throughout the test water. The pipette must be used only once for a test and then discarded.
 - 8.4 Drill cuttings or produced sand should be weighed on plastic weighing boats; 15-g samples must be transferred by scraping test material into the test water with a stainless steel spatula. Drill cuttings shall not be prediluted prior to testing. Also, drilling fluids and cuttings will be tested separately. The weighing boat must be immersed in the test water and scraped with the spatula to transfer any residual material to the test container. The drill cuttings or produced sand must be stirred with the spatula to an even distribution of solids on the bottom of the test container.
 - 8.5 Observations must be made no later than 1 hour after the test material is transferred to test container. Viewing points above the test container should be made from at least three sides of the test container at viewing angles of approximately 60° and 30° from the horizontal. Illumination of the test container must be representative of adequate lighting for a working environment to conduct routine laboratory procedures. It is recommended that the water surface of the test container be observed under a fluorescent light source such as a dissecting microscope light. The light source shall be positioned above and directed over the entire surface of the pan.
 - 8.6 Detection of a “silvery” or “metallic” sheen or gloss, increased reflectivity, visual color, iridescence, or an oil slick on the water surface of the test container surface shall constitute a demonstration of “free oil.” These visual observations include patches, streaks, or sheets of such altered surface characteristics. If the free oil content of the sample approaches or exceeds 10%, the water surface of the test container may lack color, a sheen, or iridescence, due to the increased thickness of the film; thus, the observation for an oil slick is required. The surface of the test container shall not be disturbed in any manner that reduces the size of any sheen or slick that may be present.

If an oil sheen or slick occurs on less than one-half of the surface area after the sample is introduced to the test container, observations will continue for up to 1 hour. If the sheen or slick increases in size and covers greater than one-half of the surface area of the test container during the observation period, the discharge of the material shall cease. If the sheen or slick does not increase in size to cover greater than one-half of the test container surface area after one hour of observation, discharge may continue and additional sampling is not required. If a sheen or slick occurs on greater than one-half of the surface area of the test container after the test material is introduced, discharge of the tested material shall cease. The permittee may retest the material causing the sheen or slick. If subsequent tests do not result in a sheen or slick covering greater than one-half of the surface area of the test container, discharge may continue.