



Designation: D6157 – 97 (Reapproved 2024)

Standard Practice for Determining the Performance of Oil/Water Separators Subjected to a Sudden Release¹

This standard is issued under the fixed designation D6157; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This practice describes the testing procedure, any necessary related apparatus, and the sampling technique to be used in determining the performance characteristics of an oil/water separator subjected to the sudden release of a relatively large quantity of hydrocarbons that may appear in its influent in pure form or at high concentration.

1.2 This practice does not address the determination of the performance characteristics of an oil/water separator subjected to surface run-off resulting from rain water draining from improved or unimproved land. In this case, refer to Practice **D6104**.

1.3 This practice does not address the determination of the performance characteristics of an oil/water separator subjected to a *mechanically emulsified influent such as provided by a pump*.

1.4 This practice does not investigate the ability of the separator to handle debris or suspended solids, that is, grit or tree leaves.

1.5 While the effluent may meet code requirements for total oil and grease content, this practice does not address the presence of soluble organics, that is, benzene, toluene, ethylbenzene, and xylene (BTEXs) that may be detected in the effluent. It also does not make any provisions for the effects of detergents, surfactants, soaps or any water soluble matter (that is, salts) or any portion of an essentially insoluble matter that may be found in solution on separation. (Effects of certain water soluble chemicals or solids may be investigated by adding them to the water at predetermined constant concentrations.)

1.6 In order to estimate the effect of water temperature on the performance of the separator, the tests described in this practice must be performed at two water temperatures. The selected temperatures must be at least 10 °C (18 °F) apart, with

the temperature ranging from a minimum of 0 °C (32 °F) to a maximum of 50 °C (122 °F).

1.7 This practice does not make any provisions for the variation of pH or temperature during a test run. Refer to **Appendix X1** for further detail.

1.8 This practice can be used with a variety of hydrocarbons. It adopts No. 2 fuel oil with a density² of 845 kg/m³ (52.73 lb_m/ft³) and a viscosity² of 1.9 to 4.1 centistokes at 40 °C (104 °F) and SAE 90 lubricating oil with a density (see SAE J313) of 930 kg/m³ (58 lb_m/ft³) at 15.5 °C (60 °F) and a viscosity (see SAE J306) of 13.5 to <24 centistokes at 100 °C (212 °F) as the comparative testing media. It is understood that the results obtained from this practice are only directly applicable to No. 2 fuel oil and SAE 90 lubricating oil for the tested concentrations and only careful interpolation or extrapolation, or both, is allowed to other hydrocarbons. Low viscosity or high density hydrocarbons or hydrocarbons that contain a larger fraction of highly soluble compounds may need to be tested separately.

NOTE 1—No extrapolation outside the range of the tested influent or effluent oil concentrations is allowed as performance may not be linear. Hence, to establish performance at a higher or lower concentration, the separator shall be tested for that specific condition. In addition, linearity must be established prior to using linear interpolation.

1.9 Since regulations are based on effluent total hydrocarbon content, this practice does not set forth any lower limits on oil particle size for the evaluation of separator efficiency. However, a standardized means for mixing oil and water shall be specified to ensure repeatability. It must be noted however that smaller particles, having a greater surface area to volume ratio, rise at a slower rate than their larger counterparts. (Guide **F933** requires that 20 % of all oil particles be smaller than or equal to 50 µm and IMO MEPC 60 (30) does not mention any particle size requirements but asks the user to avoid emulsion causing chemicals.)

1.10 Although the tests described in this practice intend to simulate the performance of a separator subjected to a sudden release, they do not cover all possible applications. It is the end

¹ This practice is under the jurisdiction of ASTM Committee **D19** on Water and is the direct responsibility of Subcommittee **D19.06** on Methods for Analysis for Organic Substances in Water.

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² Bolz, R. E., and Tuve, G. L., *CRC Handbook of Tables for Applied Engineering Science*, 2nd Edition, CRC Press, 1991.