

PARTICULATE MATTER AND ASH CONTENT OF PETROLEUM DISTILLATE FUEL

1. OUTLINE OF METHOD

1.01 A 100-cubic centimeter specimen of fuel is filtered, and the residue is dried and weighed. The particulate matter content (the total contaminant) is calculated and the ash content is determined as necessary.

1.02 When this Appendix is reissued, the reason for reissue will be listed in this paragraph.

2. APPLICABILITY

2.01 This method is applicable to the determination of the particulate matter content and ash content of all petroleum distillate fuels. This procedure describes a gravimetric method of test considered convenient in the evaluation of the fuels used in auxiliary telephone system power generating equipment. Where a more precise method is desired, refer to ASTM D 2276 Methods A and B.

3. APPARATUS AND MATERIALS

3.01 *List of Apparatus and Materials:*

- (1) **Vacuum Filtration Apparatus:** The filter holder is available through Millipore Corporation, Bedford, Mass., under the name Pyrex Filter Holder, catalog number XX1C 047 00, together with MF Type AA 0.8-micron nominal pore size cellulose filter discs.
- (2) **Noncirculatory Oven:** Equipped with temperature control providing an accuracy to $\pm 2^{\circ}\text{C}$.
- (3) **Muffle Furnace:** Equipped with temperature control providing an accuracy to $\pm 25^{\circ}\text{C}$.
- (4) **Petroleum Ether:** Having a boiling range 30° to 60°C .

Caution: *Test specimens and reagent constitute hazardous substances as pertains to combustion, health, and disposal. The test procedure should be conducted with appropriate precautionary measures. At each location, existing in-house safety and disposal regulations should be followed in every detail.*

4. PROCEDURE

A. Particulate Matter

- 4.01 Pour fuel to be tested into a beaker taking care to include residue which may lie at the bottom of the container. This may be accomplished by rinsing sample cans with some of the sample. Divide fuel for test, about 500 to 600 cubic centimeters, into parts of 100 cubic centimeters each.
- 4.02 Repeat test for at least three of the 100 cubic centimeter specimens. Mark rim of filter discs using noncontaminating marker for identification of specimen. Prepare at least one extra control filter in addition to those required for the test specimens.
- 4.03 Carry the control filter through every stage of the procedure specified for the filter associated with a test specimen except for the introduction of the test specimen.
- 4.04 Handle filters only with tweezers. Place filters in a covered glass petri dish and heat in oven at $90^{\circ} \pm 5^{\circ}\text{C}$ for 30 minutes, leaving cover slightly ajar. Remove and cool in desiccator at room temperature.
- 4.05 Weigh the dried filters (W_0) to an accuracy of 0.4 milligram on an analytical balance and record the weight of each. Place one dried

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and weighed filter on filter holder and clamp funnel to filter holder. Pour entire test specimen into the filter funnel. Apply vacuum to the filter flask to draw specimen through the filter; maintain vacuum at 13 to 15 centimeters (or 5 to 6 inches) of mercury.

4.06 During filtration, rinse the specimen container and funnel with at least 100 cubic centimeters of petroleum ether. Remove funnel and rinse surface of filter top carefully with solvent. Rinse the accumulation of sediment toward the center of the filter while the vacuum is continued for 5 minutes after all of liquid has passed through the filter. Release vacuum. Using tweezers, carefully remove filter and place into a covered glass petri dish. Leaving the cover slightly ajar, place glass petri dish in the oven at $90^{\circ} \pm 5^{\circ}\text{C}$ for 30 minutes. Remove and cool at room temperature in desiccator.

4.07 Weigh the control filter first and then the series of test filters containing total contaminant (W_1). Reweigh the control filter to check that all weighings were conducted under similar conditions. If not, reweigh until the comparative weight of the control filter checks.

4.08 Subtract initial weight (W_0) from final weight (W_1). If gain in weight for control filter

is greater than 0.5 milligram, the indication is that flushing is inadequate or residual petroleum ether remains on the filter.

4.09 The particulate matter (W_2) is determined on the basis of the difference in weight of the test filter disc before and after filtering test specimen, namely $W_2 = W_1 - W_0$. (See Table B.)

B. Ash Content

4.10 Clean crucible (W_3) and fire at $750^{\circ} \pm 30^{\circ}\text{C}$ for 10 minutes. Cool in desiccator and weigh to an accuracy of 0.4 milligrams. Place filter disc with residue (W_1) in weighed crucible (W_3).

4.11 Soak filter disc with 1 to 2 cubic centimeters of mineral oil. Burn residue and filter disc in crucible for 3 to 5 minutes. Ignite residue in muffle furnace for 20 minutes at $750^{\circ} \pm 30^{\circ}\text{C}$. Cool crucible in desiccator and reweigh (W_4).

4.12 The ash content (W_5) is determined by the difference in the weight of the crucible when cleaned and dried before use, and after the filtered fuel residue has been ashed, namely $W_5 = W_4 - W_3$. (See Table B.)