



Designation: D 1739 – 98

Standard Test Method for Collection and Measurement of Dustfall (Settleable Particulate Matter)¹

This standard is issued under the fixed designation D 1739; 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 test method covers a procedure for collection of dustfall and its measurement. This test method is not appropriate for determination of the dustfall rate in small areas affected by specific sources. This test method describes determination of both water-soluble and insoluble particulate matter.

1.2 This test method is inappropriate for industrial hygiene use except where other more specific methods are also used.

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:

B 57 Specifications for Copper-Alloy Condenser Tube Plates²

D 1193 Specification for Reagent Water³

D 1356 Terminology Relating to Sampling and Analysis of Atmospheres⁴

E 11 Specification for Wire Cloth Sieves for Testing Purposes⁵

E 380 Practice for the Use of the International System of Units (SI) (the Modernized Metric System)⁶

3. Terminology

3.1 *Definitions*—For definitions of terms used in this test method, refer to Terminology D 1356. An explanation of units, symbols, and conversion factors may be found in Practice E 380.

¹ This test method is under the jurisdiction of ASTM Committee D-22 on Sampling and Analysis of Atmospheres, and is the direct responsibility of Subcommittee D22.03 on Ambient Atmospheres and Source Emissions.

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² Discontinued, see 1942 *Annual Book of ASTM Standards*, Vol 02.01—Replaced by B 171.

³ *Annual Book of ASTM Standards*, Vol 11.01.

⁴ *Annual Book of ASTM Standards*, Vol 11.03.

⁵ *Annual Book of ASTM Standards*, Vol 14.02.

⁶ Discontinued; see 1997 *Annual Book of ASTM Standards*, Vol 14.02—Replaced by IEEE/ASTM SI 10.

3.2 Definition of Terms Specific to This Standard:

3.2.1 *settleable particulate material*—any material composed of particles small enough to pass through a 1-mm screen (see Specification E 11) and large enough to settle by virtue of their weight into the container from the ambient air.

4. Summary of Test Method

4.1 Containers of a standard size and shape are prepared and sealed in a laboratory and then opened and set up at appropriately chosen sites so that particulate matter can settle into them for periods of about 30 days. The containers are then closed and returned to the laboratory. The masses of the water-soluble and -insoluble components of the material collected are determined. The results are reported as grams per square metre per 30 days $\text{g}/(\text{m}^2 \cdot 30 \text{ d})$.

5. Significance and Use

5.1 This test method has the advantage of extreme simplicity. It is a crude and non-specific test method, but it is useful in the study of long-term trends. It requires very little investment in equipment and can be carried out without a large technically-skilled staff.

5.2 This test method is useful for obtaining samples of settleable particulate matter for further chemical analysis (**1**)⁷.

6. Interferences

6.1 The results from this test method are obtained by weighings. Any material that gets into the container and passes through the sieve used in analysis, but which did not settle into the container after air entrainment can be considered an interferent.

7. Apparatus

7.1 *Container*—An open-topped cylinder not less than 150 mm (6 in.) in diameter with height not less than twice its diameter. Containers should be made of stainless steel or weatherproof plastic. They shall be capable of accepting legible, weatherproof, identification markings. A tight-fitting lid is needed for each container.

⁷ The boldface numbers in parentheses refer to the list of references at the end of this test method.

7.2 *Stand, for the container*, which will hold the top of the container at a height of 2 m above ground. It will also include a wind shield constructed according to Figs. 1 and 2. Experiments reported in Kohler and Fleck (2) indicate that much better precision is obtained when this simple aerodynamic shield is provided, and that there is a wide variability in the concentration of particles subject to settling at heights of less than 2 m.

7.3 *Sieve*, 1 mm (No. 18), stainless steel.

7.4 *Drying Oven*, with temperature controlled at 105°C.

7.5 *Buchner Funnel*, and 2 L filtering flask.

7.6 *Filter Paper*, fast filtering type, circles to fit the Buchner funnel.

7.7 *Evaporating Dishes*, 100-mL capacity, capable of being unambiguously identified.

7.8 *Desiccators*.

7.9 *Analytical Balance*, to weigh with a precision of ± 0.1 mg.

7.10 *Flexible Spatula*.

7.11 *Crate*, or frame in which to carry the containers.

7.12 *Graduated Cylinder*, 1 L capacity, whose graduations have been checked for calibration accuracy, ± 5 mL, using, for example, volumetric flasks or pipettes.

8. Reagents

8.1 *Purity of Water*—Unless otherwise indicated, reference to water shall be understood to mean reagent water as defined by Type II of Specification D 1193.

9. Sampling

9.1 *Sites (3, 4)*; for general sampling strategy, see Specifications B 57.

9.1.1 *Location:*

9.1.1.1 These recommendations are a guide to the selection of a site. In cases where these guidelines cannot be followed, results should only be presented accompanied by an appropriate caveat.

9.1.1.2 The sampling site should be in an open area, free of structures higher than 1 m within a 20-m radius of the container stand. It should be away from local sources of pollution and objects that could affect the settling of particulate matter, such

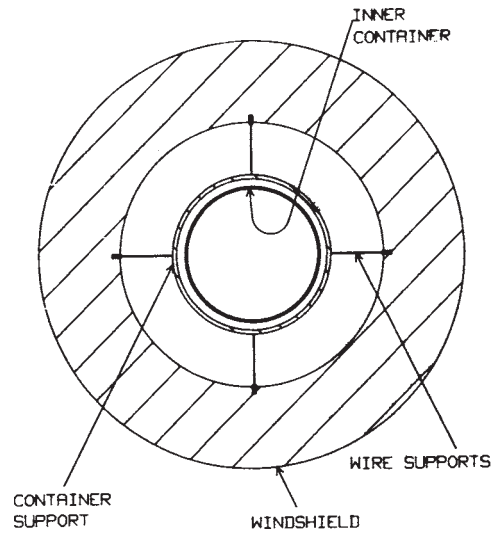


FIG. 2 Plan View of Wind Shield

as trees, and air exhausts and intakes. Accessibility and security from vandalism are major considerations in the selection of a site.

9.1.1.3 Elevations to higher objects within 20 m should not exceed 30° from the horizontal.

9.1.1.4 Open areas around police and fire stations and libraries are often suitable because of their accessibility and security.

9.1.1.5 Avoid sitting the containers near chimneys. Whenever possible, the sampling site shall be more than ten stack-lengths from an operating stack and upwind from it according to the most frequent wind direction.

NOTE 1—Do not assume that stacks are unused without making direct inquiry.

9.1.2 *Number of Sites (5)*—For each region to be surveyed, a minimum of four sampling sites shall be provided, to allow for rejected samples and to provide some evidence for quality assurance checks. An orderly spacing of the stations should be made approximately at the vertices of an equilateral triangular grid. The availability of staff will often be a constraining factor, but it is suggested that the spacing between sites be between 5 and 8 km.

9.1.3 *Site Records*—A file which will contain physical information specific to each site, such as the approximate elevation above sea level, map co-ordinates, and so forth, should be maintained for each site. It should include a detailed description, or photographs of the container stand that include its surroundings. Also included should be photographs or detailed descriptions of the surrounding area in the four compass point directions from the container stand. Unusual activities occurring in the neighborhood of the site that emit large amounts of particulate matter into the air should be recorded in the site file. Such events are fires, construction and demolition work, traffic diversions, and so forth. Records of these events will greatly increase the value of the data gathered from this test method. Records of rain and snowfall for the sites may also be helpful in interpreting the results from this test method.

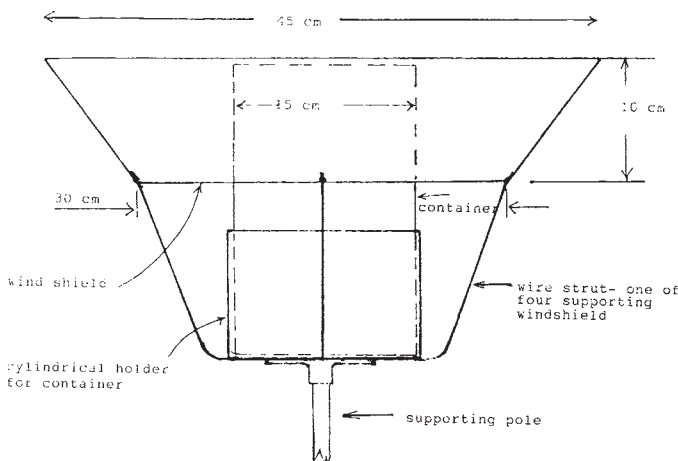


FIG. 1 Wind Shield for Dustfall Container