



Designation: D1901 – 10 (Reapproved 2020)

Standard Test Method for Relative Evaporation Time of Halogenated Organic Solvents and Their Admixtures¹

This standard is issued under the fixed designation D1901; 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.

This standard has been approved for use by agencies of the U.S. Department of Defense.

1. Scope

1.1 This test method covers the measurement of the relative evaporation time of halogenated organic solvents and their admixtures. This test method is not applicable in the presence of excessive drafts or high-velocity air currents.

1.2 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.4 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*²

B209 Specification for Aluminum and Aluminum-Alloy Sheet and Plate

3. Terminology

3.1 *Definitions:*

3.1.1 *admixture*—a blend of a halogenated hydrocarbon with a nonhalogenated hydrocarbon (for example, mineral spirits).

¹ This test method is under the jurisdiction of ASTM Committee D26 on Halogenated Organic Solvents and Fire Extinguishing Agents and is the direct responsibility of Subcommittee D26.04 on Test Methods.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

4. Summary of Test Method

4.1 The evaporation rate is determined by measuring the time required for complete evaporation of a thin film of the solvent from a sheet-metal panel in comparison with a reference standard solvent.

5. Significance and Use

5.1 This test method gives valid comparisons of the evaporation rates of the subject materials. These comparisons are required for the determination of the suitability of a proposed material for specific cleaning applications.

6. Apparatus

6.1 *Test Panel*—A 1 mm by 100 mm by 150 mm panel of aluminum, AA Alloy 6061,³ Temper T4 or T6, having a horizontal scribe mark across the width of the panel 25 mm from one 100 mm edge.

6.2 *Support Base* to hold the panel at $60 \pm 1^\circ$ from the horizontal.

6.3 *Stopwatch*, or electric interval timer.

6.4 *Graduate*, 10 mL, with pouring lip.

7. Reagents

7.1 *Perchloroethylene*, initial boiling point 121°C , boiling range 2°C , purity 99 %.

7.2 *p-Xylene*, 99 %.

8. Procedure

8.1 Place a clean, water-break-free test panel on the support base at an angle of $60 \pm 1^\circ$ from the horizontal, with the scribe mark at the lower end of the panel (**Note 1**). Using the graduate, pour 10 mL of the material under test over the test panel, being sure to get complete coverage of the entire exposed surface. As soon as the 10 mL of test material has been poured, observe the upper edge of the panel for a break in the

³ Aluminum Association alloy designation in accordance with ASTM Specification B209, for Aluminum-Alloy Sheet and Plate, *Annual Book of ASTM Standards*, Vol 02.02.

continuity of coverage. Start the timing at the first sign of a break in liquid film coverage on the upper edge of the panel. Stop the timing when the last portion of film has receded below the scribe mark (**Note 2**). This interval between the first sign of incomplete coverage and the receding of the last portion of film below the scribe mark is referred to as the “dry time.”

NOTE 1—By placing a double thickness of paper toweling under the test panel and support base, solvent runoff from the panel is absorbed. The use of fresh paper toweling after each individual test prevents saturation of the test area with solvent vapors and gives more reproducible results.

NOTE 2—Stray intermittent drafts *must* be avoided during the timing interval if reproducible results are to be obtained. Slight, steady air motion will not appreciably affect results. The operator must avoid exposure to excessive concentrations of the test solvent.

8.2 Run the test in triplicate, with alternate runs of the material under test and the referenced standard solvent (*p*-xylene or perchloroethylene). The choice of reference solvent shall be subject to agreement between the purchaser and the seller, but the results reported shall indicate which one was used.

NOTE 3—By running the test material against a reference standard, and thereby making the results a measure of relative evaporation time, the influences of changes in temperature, relative humidity, and slight drafts are minimized.

9. Calculation

9.1 Calculate the relative evaporation time of the test material as follows:

$$\begin{aligned} \text{Relative evaporation time versus reference solvent} & \quad (1) \\ & = \frac{\text{dry time of test material}}{\text{dry time of reference solvent}} \end{aligned}$$

10. Precision and Bias

10.1 *Repeatability*—Duplicate results by the same operator should not be considered suspect unless they differ by more than $\pm 4\%$.

10.2 *Reproducibility*—The result submitted by each of two laboratories should not be considered suspect unless the two results differ by more than $\pm 5\%$.

NOTE 4—The significance of this test method is not lessened by a lack of extreme precision.

10.3 *Bias*—The bias for this test method has not yet been determined due to a lack of known standards.

11. Keywords

11.1 evaporation time; relative evaporation time; water-break test

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