



Designation: D 6801 – 02

Standard Test Method for Measuring Maximum Spontaneous Heating Temperature of Art Materials¹

This standard is issued under the fixed designation D 6801; 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 small-scale laboratory procedure to determine the self heating tendency of oil-based art materials by exposure to elevated temperatures in air in a controlled semi-adiabatic system.

1.2 This test method has been developed to address an urgent need to identify oil-based art materials that may require labeling for spontaneous heating tendency. Studies based on this method may allow the development of a practice to identify such oil-based art materials.

1.3 The values stated in SI units are to be regarded as the standard. The inch-pound values given in parentheses are for information only.

1.4 *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.* For safety concerns specific to disposal of solvent-soaked rags, see the appendix.

2. Referenced Documents

2.1 ASTM Standards:

E 633 Guide for Use of Thermocouples in Creep and Stress Rupture Testing to 1000°C (1800°F) in Air²

E 771 Test Method for Spontaneous Heating Tendency of Materials³

3. Terminology

3.1 Definitions:

3.1.1 *maximum spontaneous heating temperature, n* —maximum temperature reached during spontaneous heating under the specified test conditions.

3.1.2 *oil-based art materials, n* —vegetable oils that are used as art materials or art materials that contain vegetable oils.

3.1.3 *spontaneous heating, n* —exothermic reaction of a material due to slow or incomplete reaction that results in a

temperature rise above that of its surroundings (see Test Method E 771); also called *self heating*.

3.2 Symbols:

3.2.1 T_D —difference between maximum spontaneous heating temperature and control temperature.

3.2.2 T_S —maximum spontaneous heating temperature.

3.2.3 T_C —control temperature or maximum spontaneous temperature measured over 1 h immediately preceding the beginning of an experiment.

4. Summary of Test Method

4.1 A non-woven paper cloth is soaked in 1.2 to 1.5 times its weight in a oil-based art material mixed with 6 % manganese drier at a 1:45 to 1:50 ratio, drier to art material. This soaked pad is then put in a small aluminum holder with air holes in the sides. This holder is placed in a larger chamber, which is opened to the air from the top and heated for 7 to 15 h in a 70°C water bath. The maximum spontaneous heating temperature inside the soaked paper cloth is recorded with a K thermocouple and maximum temperature recorder.

5. Significance and Use

5.1 This test method provides a means of accelerating the tendency of a material toward spontaneous heating that may eventually lead to a fire. It is applicable to liquids and pastes.

5.2 The spontaneous heating behavior of an oil-based art material is affected by such factors as the availability of oxygen, the amount of driers present, the degree of polymerization of oils, the surface area of the cellulose material, measures to prevent heat dissipation, and the amount of oil in contact with cellulose material. The rate and magnitude of spontaneous heating bears little relationship to the type of cellulose material to which an oil-based art material comes in contact or whether or not oil soaked materials are first air dried.⁴

6. Apparatus

6.1 *Constant Temperature Water Bath*—water bath that can maintain water temperature at $70 \pm 2^\circ\text{C}$, see Fig. 1.

6.2 *K Thermocouple*, as described in Guide E 633.

¹ This test method is under the jurisdiction of ASTM Committee D01 on Paint and Related Coatings, Materials and Applications, and is the direct responsibility of Subcommittee D01.57 on Artist Paints and Related Materials.

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² *Annual Book of ASTM Standards*, Vol 03.01.

³ *Annual Book of ASTM Standards*, Vol 14.02.

⁴ Supporting data are available from ASTM International Headquarters. Request RR: D01-1115.

Spontaneous Combustion Apparatus

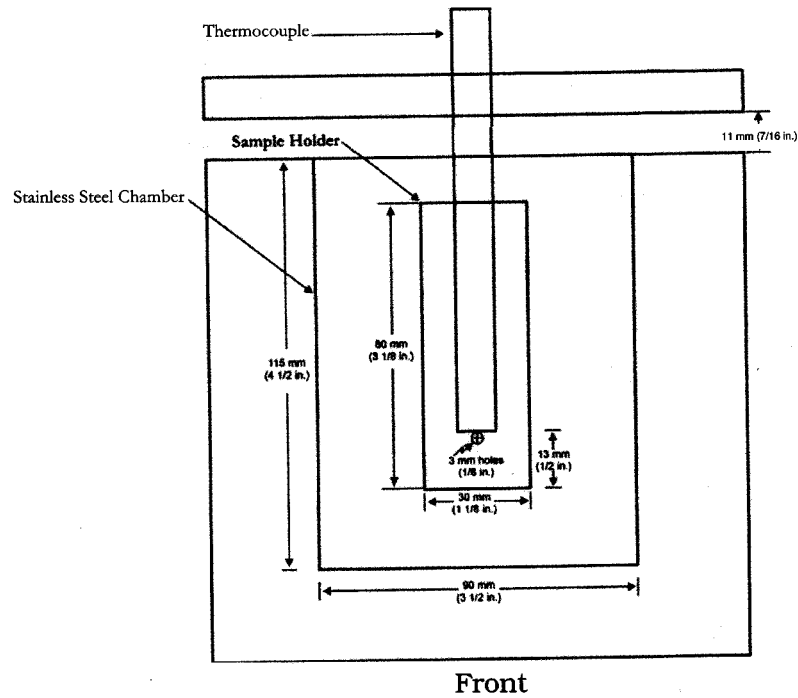


FIG. 1 Spontaneous Combustion Apparatus

Aluminum Sampler Holder Detail

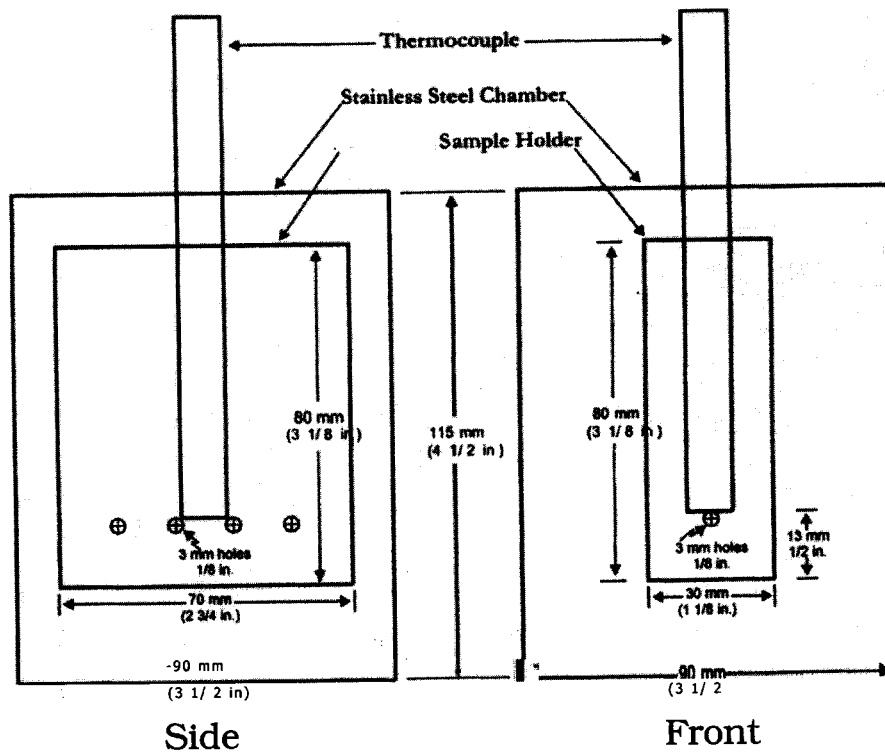


FIG. 1 (continued)