

**Smoldering Test for Air Induction System Filter Media****Application**

This procedure is used where specified to test the smolder propagation properties of flammable filtration media.

Definitions and Concepts**Flammable Material**

A material that will combust by flame or smolder or both when contacted by a hot object or when exposed to an external flame.

Combustion Time

The time from the start of combustion as a glowing front or as a visible flame or both until test sample extinguishes.

Smolder

The combustion at a glowing edge on the material where the combustion proceeds without visible flame.

Smolder Propagation

The advancement of the glowing edge or front into the material.

Smoldering Time

The time that the smolder propagates until extinguished or covers a defined distance into the material.

Apparatus Required

Laboratory supports and clamps to hold the sample.

IR-12 Steady State Infrared Emitter (available at www.hawkeyetechnologies.com) with 4.5-volt 8-watt supply

Stop Watch (calibrated in seconds)

Exhaust Hood

Compass with lead pencil or an appropriately designed stamp to mark the pattern of circles required careful to choose marking material (ink) that does not interfere with combustion.

Scissors

Laboratory pan with water to extinguish burning specimens

Date	Action	Revisions
2004 05 26	Activated	

**Documents**

R. Carter

Document Sharing Hub



Sample Conditioning and Test Conditions

Test samples shall be conditioned in a controlled atmosphere of 23 +/- 2 °C and 50 + 5% relative humidity for 24 hours before testing and tested under the same conditions. For samples in supplier QA testing that are coming out of final processing, sample conditioning for 30 min at above conditions will be used.

Procedure

- Note 1: All necessary Good Laboratory Practices must be observed and all required fire protection provisions must be in place per OSHA, Federal, State, and local Fire Codes while conducting this test.
- Note 2: Do not use a lit candle or other source of flame to start the burning of the material. These are not controlled applications of heat and can increase the temperature of the test material to a level that will support rapid burning of the material.
- Note 3: This procedure is to be conducted twice on specimens taken from different places of the filter media.
- Note 4: Materials, parts and equipment referenced in this document must be used and handled properly. Each party is responsible for determining proper use and handling in its facility.
1. From pleated or flat sheet filter media processed to end-product form, cut a rectangular section approximately 100 - 150 mm per side. Trim off edges that have adhesive or sealant material. Draw a 12 mm diameter circle (or 5 mm larger than test probe longest dimension whichever is larger) in the middle of the test specimen, and then draw three additional concentric circles of 35, 50 and 70 mm diameter, respectively. (See Figure 1)
 2. Mount the test specimen vertically on a supporting stand with clamps and place in a ventilated exhaust hood. To hold the pleats flat, the clamped end of the test specimen can be first sandwiched between two flat and hard objects, such as plastic, wooden or metal rulers. Position the sample near eye level and about 40 cm away. Place a laboratory tray with water under the sample. (See Figure 2)
 3. Turn the power on to the IR-12 heat source and allow the active area (or tip) to reach 800 °C and maintain thermal equilibrium (heat for at least 2 minutes; the tip temperature will reach 800 °C when powered with 8 watts (4.5 volts, recommended) and 900 °C when powered with 9 watts (5 volts). (See Figure 3)
 4. Gently bring the hot tip in contact with center of the inner diameter circle on the test specimen until the paper burns through. Push the hot tip completely through to the other side of the test specimen and pull it back slowly, ensuring that the edges around the hole are fully exposed to the hot tip. When the material is burned through, start the stopwatch as you pull the heat source away, but leave the element powered until the test is completely over. (See Figure 4) Should an S2 rating result solely from test initiation at an off-center the results will be reported as a NON-test and a new sample may be used.
 5. Carefully observe the heat affected area on the sample for up to three (3) minutes or until smolder self-extinguishes. (See Figure 5)