

REDUCED IGNITION PROPENSITY CIGARETTE TESTING

WHATMAN GRADE 2 STATED IN STANDARD

Introduction



Over the last few years a number of US states and Canada have introduced legislation requiring cigarette manufacturers to sell Reduced Ignition Propensity (RIP) cigarettes (also commonly called Fire Safe Cigarettes).

The impetus for such regulation is the high number of fatalities caused by smoking related fires. For example in 2001, smoking related fires caused 840 civilian deaths in the USA alone (this accounts for ~25% of fire deaths

in the USA in 2001). A large proportion of victims are either young children or the elderly. The societal cost of cigarette fires is estimated to be \$ 4 billion/year (USA).

By making the cigarettes self-extinguishing, the aim is to reduce the number of fires and fatalities caused by carelessly discarded or abandoned cigarettes as well as those caused by the smoker falling asleep.

Such self-extinguishing cigarettes are known as Reduced Ignition Propensity cigarettes.

Cigarettes can be made to self-extinguish in many different ways. The technology that is most widely used is to include cellulosic bands at given distances along the length of the cigarette (some times referred to as "speed bumps"). When the cigarette burns down to one of the bands, it will self-extinguish unless the smoker is actively drawing on the cigarette.

Regulatory Requirement

The first US state to introduce legislation requiring the sale of RIP cigarettes was New York. Since 28th July 2003, all cigarettes sold in the State of New York have to be of the RIP type. Since then, California and Vermont have also passed such legislation. In 2005, Canada passed the world's first nationwide law requiring the sale of RIP cigarettes. In the future, other US states as well as other countries are likely to introduce legislation requiring the sale of RIP cigarettes. Currently, Australia has a working group looking at this issue. In the US, groups in Massachusetts and Oregon are actively pursuing such legislation.

Testing and Certification of Reduced Ignition Propensity Cigarettes

RIP cigarettes must be tested and certified according to American Society for Testing and Materials (ASTM) standard E 2187-04.

Currently, USA is the only country that has a standard for testing RIP cigarettes. As a consequence, Canadian legislation also refers to the ASTM standard. It is likely that countries which introduce RIP legislation in the future will also depend on this ASTM standard, as it is a lengthy and expensive process to establish an alternative standard.

The opportunity for Whatman arises from the fact that the ONLY substrate approved by ASTM standard E 2187-04 for testing of RIP cigarettes is Whatman Grade 2 paper:

“Filter Paper—The substrates consist of nominal 150 mm (6 in.) diameter circles of Whatman #2 ash-free cellulosic filter paper.”

Essentially, the test determines the likelihood of the cigarette to set upholstery or bedding on fire. The sole purpose of the Grade 2 paper is to act as a heat sink (the paper is not set alight during the test).

The apparatus used for the test is shown in the photograph above. The test apparatus is loaded with conditioned (see below for explanation) Whatman Grade 2 paper. A lit cigarette is placed on

top of the filter paper (in between metal pins to prevent the cigarette from rolling). To pass the test, only 10% of the tested cigarettes (40 cigarettes per test) must exhibit full length burns. In other words, 90% of the cigarettes must self-extinguish before the end of the cigarette.

The standard allows the testing to be carried out using fifteen, ten or three layers of Grade 2. The number of layers to be used in the test depends on the characteristic of the cigarette and must be experimentally determined. Currently, a majority of the tests are done using either ten or fifteen layers.

Grade 2 Batch Testing Requirements

According to ASTM Standard E 2187-04, before a batch of Grade 2 paper can be used in the RIP test, two different tests must be carried out to assess the suitability of the filter paper batch. These tests are detailed in Sections 9.3.1 and 9.3.2 of the standard. The relevant sections are reproduced below.

Section 9.3.1: “For paper from a manufacturer’s batch to be used in testing, the mean mass of 15 sheets of the conditioned filter paper shall be 26.1 ± 0.5 g. This shall be determined by weighing five samples of 15 sheets, each sample being from a different box from the manufacturer’s batch. The standard deviation of the five samples shall be no more than 0.3 g.”

Section 9.3.2: “For paper from a manufacturer’s batch to be used in testing, the mean mass of 15 sheets of the dried filter paper shall be 24.7 ± 0.5 g. This shall be determined by weighing five samples of 15 sheets, each sample being from a different box from the manufacturer’s batch. Each set of 15 sheets shall have been stored at $60 \pm 2^\circ\text{C}$ for at least 16 h, placed in a sealed plastic bag upon removal from the oven, cooled to $23 \pm 3^\circ\text{C}$, and weighed within 3 min of opening the bag. The standard deviation of the five samples shall be no more than 0.3g”

According to the standard, conditioning of the filter paper is carried out by storing the filter paper at a relative humidity of $55 \pm 5\%$ (@ $23 \pm 3^\circ\text{C}$) for at least one week prior to testing.

Current & Future Products for RIP Testing

The product in current use for this application is Grade 2, 150mm circles (Catalog number: 1002-150). The customer is responsible for carrying out the tests required under the ASTM Standard.

In the future, a certified version of the product will be introduced. With this future product, the customer will be able to just condition the paper and use it in the RIP testing without having to do the tests detailed in section 9.3.1 & 9.3.2 of the Standard.

Until the certified version is available, standard Grade 2 (150 mm) circles is the product that should be sold for this application.

Grade 2 Ordering Information

Catalog Number	Grade	Diameter (mm)	Quantity/Pack
1002-150	Grade 2	150	100