Where There's Smoke There Doesn't Have to Be Fire

by Richard Wilhelm

It is a scenario that plays out time and again, rarely with a positive outcome. A lit cigarette falls onto a bed or a piece of upholstered furniture. Within minutes, a fire has begun that may destroy lives, devastate families and cause catastrophic amounts of property damage.

According to statistics compiled by the National Fire Protection Association, smoking material was the major cause of an average of 14,000 fires a year in the U.S. from 2000 to 2004. These fires resulted in 700 to 900 fatalities each year, along with over 1,000 injuries and upwards of $350 million in property damage. Now, an ASTM standard, E2187, Test Method for Measuring the Ignition Strength of Cigarettes, is a crucial part of an ongoing effort to lower these statistics and lessen the misery created by cigarette-generated fires.

NIST Tests Lead to Development, Approval of E2187

ASTM test method E2187 was originally approved in 2002 by ASTM International Committee E05 on Fire Standards (click here for sidebar on ASTM Committee E05). According to Richard Gann, Ph.D., "A cigarette that goes out more readily in the test is less likely to have enough energy to start a chair or bed burning." Gann, a senior research scientist with the Building and Fire Research Laboratory at the National Institute of Standards and Technology, Gaithersburg, Md., led the team that researched the interaction of cigarettes with soft furnishings and which developed the test on which E2187 is based.

As stated in its scope, E2187 “provides a standard measure of the capability of a cigarette, positioned on one of three standard substrates, to generate sufficient heat to continue burning and thus cause ignition of bedding or upholstered furniture." While all lit cigarettes, especially those left unattended, have the potential to start a fire, cigarettes that conform to E2187 have a reduced ignition propensity that makes them less fire-prone. Accordingly, such cigarettes have been branded “fire-safe,” but they still pose a threat and should be properly attended at all times.

The importance of E2187 became apparent within a year of its approval, when it was cited as the test method to assess a cigarette’s relative fire safety in a landmark New York state regulation, the first to mandate the sale of less fire-prone cigarettes, was issued in 2003.
“Fire-Safe Cigarettes” — What They Are and How They Work

The quest for a fire-safe cigarette pre-dates the history of E2187. Although some evidence points to patents for “self-extinguishing” or “self-snubbing” cigarettes as far back as the 1850s, the first serious attempt to develop safer cigarettes can be traced to 1929. Following a well-publicized cigarette-ignited fire in her district, Edith Nourse Rogers, one of the first women elected to the U.S. Congress, sponsored a bill that directed the National Bureau of Standards (now NIST) to develop the first less fire-prone cigarette, which NBS introduced in 1932.

Like Congresswoman Rogers, however, the idea of cigarettes with reduced ignition strength was somewhat ahead of its time. It wasn’t until much later, in the late 1970s, that serious attempts were made to create a viable cigarette with a lower propensity to ignite a fire. Since that time, there has been a slow but steady interest in making such cigarettes the industry standard, which ultimately led to the development and approval of E2187.

What makes cigarettes with a reduced ignition propensity less likely to cause a fire? While various forms of technology have been used over the years to lower the likelihood of an unattended cigarette burning, the most commonly used method now is to wrap the cigarette with two or three thin bands of less porous paper. This extra wrapping creates a series of “speed bumps.” A flame that reaches one of these bumps will be extinguished before it has the chance to burn through the length of the cigarette and ignite other materials.

Coalition Encourages State Legislation

In order to promote the cause of fire-safe cigarettes, the National Fire Protection Association coordinated the creation of the Coalition for Fire-Safe Cigarettes in 2006 (click here for sidebar on CFSC). The coalition, comprised of many national and local organizations, including ASTM International, calls on manufacturers to produce and market cigarettes that comply with ASTM E2187 and encourages states to pass legislation similar to the 2003 New York state law.

Working at the state level has proven to be a successful strategy for the CFSC. Fire-safe cigarette laws are currently in effect, have been passed or have been filed in more than 40 states. In addition to legislative success, the R.J. Reynolds Tobacco Co. announced in October 2007 that it would manufacture all of its cigarette brands using fire-safe technology by the end of 2009. More recently, the Liggett Group LLC announced that it will voluntarily convert the production of all of its domestic cigarette brands to comply with state cigarette fire safety standards beginning in January 2009.

In addition to the citation of E2187 in state legislation throughout the U.S., the standard is the basis of the fire-safe cigarette law that is now in place throughout Canada, and it is being considered for legislation in other parts of the world as well.

“The coalition continues to move forward to see that fire-safe cigarettes are sold in every state in the country and is also providing information on the U.S. and Canadian experience to other countries around the world,” says Lorraine Carli, NFPA vice president, communications. “In addition, NFPA is working on ways to support states that have or are about to implement the legislation to share best practices and discuss such issues as enforcement and data collection. Data collection will be a critical component so that we will be able to track success over time.”

Jeff Grove, ASTM vice president, global policy and industry affairs, thinks that the progress made on fire-safe cigarette legislation on a state level is encouraging. “By building grass roots support
and by making legislative progress state-by-state, a tipping point may soon be reached where all
cigarettes sold in North America will comply with the ASTM standard," says Grove. Grove notes
that, because Canada and large U.S. states on the West Coast (California), the Midwest (Illinois)
and the East Coast (New York) all require cigarettes to comply with E2187, the distribution network
for compliant and non-compliant cigarettes has become fragmented, which may lead producers to
voluntarily implement E2187 throughout North America, “I look forward to that day,” says Grove.

Carli is also optimistic. She notes that while it is too early to see numbers from states that have only
recently enacted legislation, indications from New York (where the law has been in effect the
longest) are that fire-safe cigarettes are having a positive impact. “Over time, we expect to see
significant reductions in what is now the leading cause of home fire fatalities — cigarette-related
fires,” says Carli. “Fire-safe cigarettes provide us the opportunity for the next big leap forward in
fire protection.”
Where There is Smoke...There Doesn't Have to be Fire:
Fire-Safety and ASTM E2187

<table>
<thead>
<tr>
<th>Proposed Question</th>
<th>How did the E2187 standard develop?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proposed Answer</td>
<td>For years, Dr. Richard Gann, Ph.D., led a team at NIST who worked on developing a method for testing a cigarette's ability to ignite bedding or upholstery. &quot;A cigarette that goes out more readily in the test is less likely to have enough energy to start a chair or bed burning,&quot; said Dr. Gann, a senior research scientist with NIST's Building and Fire Research Laboratory. Dr. Gann worked for over ten years to convince cigarette manufacturers to cooperate and agree to the type of cigarette that would pass his test. He then took his method to ASTM Committee E05 on Fire Standards. Cigarette companies who participated on Committee E05 helped to further develop the method and its documentation, which was approved and became known as E2187 in 2002.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Proposed Question</th>
<th>ASTM Standard E2187 is described in the case study. What aspects of this standard make it important and able to be used by cigarette manufacturing companies?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proposed Answer</td>
<td>As stated in the scope, E2187 “provides a standard measure of the capability of a cigarette, positioned on one of three standard substrates, to generate sufficient heat to continue burning and thus cause ignition of bedding or upholstered furniture.” This standard allows cigarette manufacturers to test the ignition propensity of their cigarettes, and ultimately reduce that propensity. In addition, a statement on precision in the standard allows potential users of the test method to assess in general terms its usefulness in proposed applications. By conforming to E2187, cigarette manufacturers can produce “fire-safe” cigarettes which may help prevent many of the 14,000 fires started by smoking material each year.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Proposed Question??</th>
<th>Why do legislatures use voluntary consensus standards in legislation? What are the benefits of this approach? How do these voluntary standards become mandatory when laws are passed? (Think outside the article and external research may be helpful.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proposed Answer</td>
<td>In 1995, the National Technology Transfer and Advancement Act was passed which deals with standards in legislation. The law “directs that all Federal agencies and departments shall use technical standards that are developed or adopted by voluntary consensus standards bodies, using such technical standards as a means to carry out policy objectives or activities determined by the agencies and departments.” According to the National Research Council (NRC), federal agencies adopt voluntary consensus standards because they are an “effective means of securing public interests.” The NRC also reports that voluntary standards-setting is faster than regulatory standards-setting. In a case such as the “fire-safe” cigarette, the voluntary consensus Standard E2187 was initially incorporated into the New York State law. It became mandatory for cigarette manufacturers in New York to comply with the standard. Other states followed their lead, and have cited E2187 in their state legislation of “fire-safe” cigarette laws.</td>
</tr>
</tbody>
</table>

www.astm.org