



U.S. CONSUMER PRODUCT SAFETY COMMISSION
BETHESDA, MARYLAND 20814

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November 18, 2014

Paul E. Lloret
Project Manager for STP 0217
Underwriters Laboratories Inc.
333 Pfingsten Road
Northbrook, IL 60062

Re: Request for Comments on the Proposed Requirements: 1. New Lower Limits for Proposed Flaming Polyurethane Foam Test and 3. Smoldering Polyurethane Foam Test for the *Standard for Single and Multiple Station Smoke Alarms*, UL 217

Dear Mr. Lloret:

This letter presents comments from U.S. Consumer Product Safety Commission (CPSC) staff regarding proposed new requirements in UL 217, *Single and Multiple Station Smoke Alarms*.¹ Reducing the fire death rate requires alerting occupants with enough time to exit the home safely before the conditions become untenable. This has become particularly important because today's homes are furnished with increasing numbers of synthetic materials, including polyurethane foam, which can produce thick, dark smoke. CPSC staff has been concerned that the present UL 217 standard for performance tests for fires may not be sufficient in adequately addressing today's fire hazards. As a member of the task group that participated in helping develop the foundation for the proposed flaming polyurethane and smoldering polyurethane tests, CPSC staff agrees that the present proposed tests will increase the overall performance of residential smoke alarms by subjecting smoke alarms to new smoke characteristics (small and large particle sizes, counts, rates, and colors) that are not captured in the present UL 217 performance tests.

CPSC staff is concerned that the Standards Technical Panel (STP) failed to reach consensus on the first proposal (July 2014) through the voluntary standard process for the flaming and smoldering polyurethane foam tests. Consequently, CPSC staff is hopeful that the STP will reach consensus on the second attempt to adopt the flaming and smoldering polyurethane foam tests for smoke alarms and neither is rejected. CPSC staff is aware of incidents where functional residential smoke alarms did not activate in sufficient amount of time for both flaming and smoldering fires to allow occupants to escape the home. Shortening smoke alarm reaction times to flaming and smoldering polyurethane foam fires can reduce the risk of injury to consumers.

¹ The views expressed in this letter are those of the CPSC staff, and they have not been reviewed or approved by, and may not necessarily reflect the views of, the Commission.

CPSC staff supports that both recommended changes (Polyurethane Flaming and Smoldering Tests) be incorporated into the UL 217 standard. The absence of one of the tests would not achieve the goal of improving smoke alarm performance. The proposals should incorporate obscuration thresholds that improve the performance of smoke alarms for both flaming polyurethane and smoldering polyurethane fires, thus allowing occupants a successful escape rate of at least 80 percent.

The following is the rationale for incorporating flaming and smoldering polyurethane foam tests to UL 217. The United States has one of the highest fire death rates in the industrialized world. While its standing has improved, in 2007 the United States had the tenth highest fire death rate per million people.² CPSC staff estimates in 2011, there were 365,500 fires attended by fire services, resulting in 2,240 deaths, 13,400 injuries, and \$6.46 billion in property losses.³

According to a report by the National Fire Protection Association (NFPA)⁴, the death rate per 1,000 home fires was 8.1 in 1977 and 6.5 in 2012 for a decrease of only 20 percent. Even though the number of home fire deaths decreased from 5,865 in 1977 to 2,380 in 2012 (a 59 percent reduction in fire deaths), the overall rate of fire deaths changed little because the number of home fire incidents also declined 50 percent. This may suggest that the risk of fire death has not changed as much as expected since 1977. According to NFPA, home fire deaths still account for 83 percent of all civilian deaths. According to NFPA,

- A civilian fire death occurs in the U.S. about every 3 hours and 4 minutes
- A civilian fire-related injury occurs about every 32 minutes

Over the years, reducing the number of fires, fire deaths, and injuries has been a consistent goal for CPSC staff. CPSC staff has approached the fire problem by advocating improvements to voluntary standards for electrical products and smoke alarm performance and installation code. The CPSC staff has participated in standards and codes improvement to make consumer products safer, to allow better coverage through smoke alarm installations, and enhance the performance of smoke alarms. Continuing efforts in these areas will further reduce fires and therefore fire deaths and injuries. Reducing the overall fire death rate also requires increasing the probability of occupants escaping a fire. Smoke alarms play a key role in providing the occupants enough time to exit the home without injury. Smoke alarms that sound too late do not provide enough escape time and put occupants at risk.

CPSC has been endorsing the use of dual sensor (ionization and photoelectric) smoke alarms to offer occupants the best protection. A 2009 CPSC report on a survey of unreported fire incidents⁵ estimated 96.7 percent of U.S. households have at least one smoke alarm in their residence, an increase from the 1984 survey where only 62 percent of households had a smoke alarm. Ensuring that these smoke alarms perform more effectively when a fire occurs in the home is crucial in providing the occupants enough time to exit the home. Improving smoke alarm response time will require re-designing them to respond to the smoke characteristics of flaming and smoldering polyurethane material.

² United States Fire Administration (July 2011), *Fire Death Rate Trends: An International Perspective*, Topical Fire Report Series, Volume 12, Issue 8.

³ Miller D., (July 2013), *2009–2011 Residential Fire Loss Estimates U.S. National Estimates of Fires, Deaths, Injuries, and Property Losses from Unintentional Fires*, Division of Hazard Analysis, Directorate for Epidemiology, U.S. Consumer Product Safety Commission, Bethesda, Maryland.

⁴ Karter, M., Jr., (September 2013), *Fire Loss in The United States During 2012*, Fire Analysis and Research Division, Quincy, MA

⁵ Greene M. and Andres C., (July 2009), *2004-2005 National Sample Survey of Unreported Residential Fire*, U.S. Consumer Product Safety Commission, Division of Hazard Analysis, Directorate for Epidemiology, Bethesda, Maryland.

Table 10 in the National Institute of Standards and Technology (NIST) report on improving smoke alarm performance⁶ lists the average occupant successful escape rate for selected smoldering and flaming fire test criteria. The present UL proposal is for an alarm threshold of 7%/ft obscuration for the flaming polyurethane test and a 12 %/ft obscuration limit for the smoldering polyurethane test. According to Table 10, this corresponds to between 60 to 72 percent average occupant successful escape rate and 93 percent average occupant successful escape rate, respectively. This proposed test criterion would foster a marked performance improvement over today's typical single sensor smoke alarms, which have a 45 to 49 percent average occupant successful escape rate for selected fires, more so for the smoldering fires than flaming fires.

CPSC staff acknowledges that the UL 217 STP has a difficult task of weighing the tradeoffs in accepting the Polyurethane Flaming and Smoldering Tests with thresholds that challenge today's smoke alarms, but the importance of offering earlier fire detection cannot be overlooked. To adequately address today's fire hazards, CPSC staff encourages the STP to accept both recommended changes to UL 217 regarding the addition of the Polyurethane Flaming and Smoldering Tests to the UL 217 standard because it achieves the goal of improving smoke alarm performance. The proposals should incorporate obscuration thresholds that improve the performance of smoke alarms for both flaming polyurethane and smoldering polyurethane fires, thus allowing occupants a successful escape rate of at least 80 percent.

Thank you for the opportunity to make these comments. We look forward to participating in additional discussions on this matter.

Sincerely,

A handwritten signature in black ink, appearing to read 'Arthur Lee', with a stylized, flowing script.

Arthur Lee
Electrical Engineer
Directorate for Engineering Sciences

⁶ Cleary, T. (July 2014), NIST Technical Note 1837, *Improving Smoke Alarm Performance – Justification for New Smoldering and Flaming Test Performance Criteria*, U.S. Department of Commerce, National Institute of Standards and Technology, Gaithersburg, MD. <http://dx.doi.org/10.6028/NIST.TN.1837>.