U.S. Consumer Product Safety Commission
LOG OF MEETING

SUBJECT: ASTM 15.10 task group on flame arresters for gasoline containers

DATE OF MEETING: May 31, 2007

LOG ENTRY SOURCE: John Murphy, ESME

CPSC ATTENDEE(S): John Murphy, ESME

NON-CPSC ATTENDEE(S):
Lori C. Hasselbring, Ph.D., P.E., C.F.I., CFEI, Stress Engineering Services, Inc.
J. Phillip Monckton, Scepter Corporation
Chuck Craig, Blitz USA
Grant Kernan, Blitz USA
Harold Cunningham, The Plastics Group, Inc.
Doug Carpenter, Combustion Science and Engineering
John Trippi, Midwest Can Co.
Roland Reigel, Underwriters Laboratories, conference call
Gant Grimes, The Anderson Law Firm, conference call

SUMMARY OF MEETING:

The meeting convened at 9:30 AM. A copy of the meeting agenda is attached. Dr. Hasselbring, Stress Engineering Services, Inc., started the meeting with a review of testing that was performed at Safety Engineering Laboratories, near Warren, Michigan. Dr. Hasselbring indicated that gasoline that has been exposed to the atmosphere so that the lighter factions have evaporated can explode inside a gasoline container, especially at lower temperatures. Saturated vapor of 40% evaporated winter-grade gasoline could achieve the explosive limits for gasoline (correct air fuel mixture for explosion) if the ambient temperature is about 43°F. The situation can be made worse if the gasoline container has a relatively large volume with relatively little gasoline. Tall gasoline containers can develop a wide continuum of air/fuel mixtures due to the higher density of gasoline vapors. If gasoline is being poured out of the gasoline container the turbulence created as air enters the container can increase the air/fuel mixture to the explosive limits. When atmosphere inside the container is within the explosive limits it can explode during exposure to a source of ignition. If the gasoline container ruptures from the explosion flaming gasoline can be sprayed to the surrounding area.

One possible solution to reduce the likelihood of combustion within the gasoline container is a flame arrester installed on the openings to the gasoline container. The flame arrester consists of a perforated metal plate that prevents flame from igniting the contents of the gasoline container. Flame arresters are

not a new technology. They have been installed in gasoline safety cans often used in occupational settings for many years.

John Murphy, CPSC, provided a brief description of CPSC's incident databases including the National Electronic Injury Surveillance System (NEISS), Death database, and the Injury and Potential Injury Incident database. The working group discussed the types of data that might be useful in evaluating the risk from gasoline container explosions.

Chuck Craig, Blitz USA, described some potential problems that could be created with flame arresters. If the flame arrester is not properly designed it could reduce the surface area of gas container inlet reducing the fill rate of the container. This could result in fuel spillage when the container is filled too fast. Gasoline safety cans are made of metal. Consumer gasoline cans are made from plastic. As a result, the flame arrester in the metal safety can is grounded to the metal body of the container. It might be possible for a static charge to build up on the flame arresters used in consumer gasoline containers as gasoline molecules pass through the arrester and into the container. This static charge could result in a spark when the static is discharged. It was also suggested that impurities may eventually clog the flame arrester rendering the gasoline container useless. There was some concern that a flame arrester could create a false sense of security and may encourage unsafe behaviors with gasoline.

The working group would like to conduct testing to better define the problem. The working group decided to solicit proposals for testing. Doug Carpenter volunteered to write up a first draft of a Request for Proposal. Roland Reigel, UL suggested that we should decide on a standard test fuel. It was decided that high octane gasoline was probably the most conservative fuel. Containers that will be tested should not have a self closing spout. The working group expressed a desire to obtain a test laboratory that was independent and unbiased. The meeting adjourned at 3:00 PM.

ASTM F15.10 Flame Arrester Task Group Agenda
May 31, 2007

1. **Introduction of members**

2. **Past Gasoline Containers and Flame Arrester Research (Lori Hasselbring)**

3. **CPSC Statistics regarding gasoline container fires and explosions (John Murphy)**

4. **Discussion of Proposal by Portable Fuel Container Manufacturer's Association (Phil Monckton)**
   a) **Define the problem**
   b) **Determine expected deliverables of research**
   c) **Develop test criteria and protocol**
   d) **Develop list of potential testing facilities**
   e) **Develop timetable**
   f) **Develop budget and funding requirements**

5. **Action Items**

6. **Next Meeting**