LOG OF MEETING

DIRECTORATE FOR ENGINEERING SCIENCES

SUBJECT: ASTM Subcommittee F15.45 for Candle Products- Fire Safety Task Group

DATE OF MEETING: October 8-9, 2003

DATE OF LOG ENTRY:

SOURCE OF LOG ENTRY: Allyson Tenney, Engineering Sciences

LOCATION: Columbus Courtyard by Marriott, Columbus, Ohio

CPSC ATTENDEES: Allyson Tenney, Engineering Sciences

NON-CPSC ATTENDEES: ASTM F 15.45 Fire Safety Task Group members

SUMMARY OF MEETING:

Members of the ASTM F15.45 Fire Safety Task Group (Candle Products) met at the Courtyard by Marriott in Columbus, Ohio and conducted by Chairman Jim Becker. The group continued developing a fire safety standard for candles. Minutes from the meeting are attached.

The next meeting of the task group is scheduled for December 3-4, 2003 in Columbus, Ohio.

AMERICAN SOCIETY FOR TESTING AND MATERIALS

FIRE SAFETY TASK GROUP
OF SUBCOMMITTEE FOR CANDLE PRODUCTS (45)
OF F-15 COMMITTEE ON CONSUMER PRODUCTS
Courtyard by Marriott Downtown Columbus, Columbus, OH
Wednesday-Thursday, October 8-9, 2003

Minutes

Wednesday, October 8, 2003

The Task Group is meeting for the fifteenth time since its organization.

Chairperson Jim Becker welcomed the Group. The Group thanks the National Candle Association for providing the room and refreshments for this meeting. Members of the Group introduced themselves.

The Group reviewed the minutes of the last meeting held August 13-14, 2003 in Columbus. The minutes were approved on a motion made and seconded.

Bob Moss reviewed the progress of the accessories subgroup. He distributed a revision of the draft accessories standard. The subgroup will meet later this afternoon to further discuss the document. The hope still is to ballot the document by mid-Spring 2004.

Jim Becker brought up the issue of tealight/potpourri burner combinations. It was his understanding that this would be addressed in the accessories standard, for completeness, as well as in the candle fire safety standard, where they are addressed in ensembles. George Pappas asked if the combinations are dealt with in the accessories standard, what candle should be used for testing, as there would be a need to specify a standard candle. Bob Moss indicates that, generally, the burners are not flammable accessories, so a separate test method would be required. This might, logically, also require another separate standard. John Witham points out that claims involving burners invariably are made against the candle manufacturer, even when the burner may be at fault, at least partly because it is usually easier to find the candle manufacturer. Tom Mazurek points out that there is precedent for specifying a standard candle in some CPSC regulations. Jim Becker indicates that the current accessories draft specifies a candle as an ignition source, but Bob replied that this is not exactly the same as specifying a candle that will be used to test a burner for end of life situations. George asked Allyson Tenney or Jim Hoebel how this is handled by CPSC in other situations, such as lamps that could use multiple light bulbs. Jim indicates that, in the case of flammability of cloth in furniture that covers foam, standard foam is specified. Allyson doesn't see a problem specifying a standard candle. Bob Moss mentioned the issue of sample population size. Bill Hartke stated that votives may have to be addressed as well, since they may be used in some types of burners, as well as with wax chip and scented oil warmers. Tom Mazurek

questioned whether other trade groups, such as ones representing glass and ceramic dealers, might need to be contacted for guidance.

Bob Moss suggests the subgroup could work on one document for flammable accessories, and another for the potpourri burners. The IDI data, as well as product recalls, indicate that the burners may be a bigger problem than flammable accessories. Mark Gerwitz asks whether the performance the product should conform to should be addressed or whether there just needs to be a method to do the testing. Bob Moss believes that both should be addressed. Jim Becker doesn't believe either needs to be complicated, and Allyson believes that any testing that is done will likely improve the incidence situation. Guidance for possible design remedies could appear in a non-mandatory note. There was discussion as to whether a worst-case scenario, which may involve scented tealights, should be used, or whether testing with any type of candle might be sufficient. Jim asked the Group to vote on whether the burner issue needs to be addressed in the accessories standard currently being developed. A majority currently believes it should not. **Bob Moss will go back to the subgroup with the idea of a potential separate standard.** Jim Hoebel asked if that decision on separation needs to be made now, and Bob Moss indicates there is a timing issue with regard to balloting of the flammable accessories standard. **The subgroup will try to provide a copy of the accessories revisions prior to the next meeting of the Task Group.**

George asks if the issue of plastic tealight cups is a separate issue, and the Group seemed to indicate that it is. Ed started the discussion on plastic cups by stating that they are a bad idea. Tom modified that sentiment by stating that flammable or combustible materials are a problem. George points out that deformation has also been agreed to be a problem and that plastic containers for other types of candles are likely also to be an issue that will need to be addressed. The question was asked of the manufacturers, "Why use plastic?" It was replied that it is an issue of aesthetics. Plastic is, however, more expensive than metal for cups. Tom points out that plastic shields are sometimes used in candles to separate botanicals from the candle flame, and banning plastics in cups would present a liability problem for other potentially viable uses. Walter indicates the plastic should be fire retardant, meeting V0. Dave Buri and Robert Harrington described ways their companies try to prevent problems with plastic cups and believe their products are safe. Dan Zipes indicates the problems his company has seen relate to use of tealights in secondary containers that then resulted in temperature buildup and various failures. It was pointed out that a plastic that has a flash point lower than that of wax used in candles is potentially a problem. It was explained that the V0 tests materials in a standard configuration and not in finished forms. Jim Hoebel indicates that when plastics that meet the V0 test are used in appliances, those appliances have reduced fire incidences. Walter indicates he would be comfortable specifying that materials used must meet V0. Tom believes that other potential issues such as guttering or deformation must also be addressed.

The Group previously agreed at the January 2003 meeting that deformation of cups is a problem. Bill Hartke asks if this is, indeed, a fire safety issue. The Group sees this as an issue representing a foreseeable potential problem. George believes the Group has a

responsibility to raise alerts on potential problems for which no data exists. Thomas points out that other problems, such as carbon heads, could be viewed in much the same way. Allyson believes that tealights need to be covered in the end of useful life provisions, but how the Group deals with it is open. It was suggested that deformation that leads to fuel spillage should be considered a failure. The Group still agrees, as at the January meeting, that tealights should be included in the end of useful life provisions. It was also agreed that a tealight container catching on fire is a failure under secondary ignition provisions, which somewhat precludes the need for a specification of combustibility, such as V0. Jim Hoebel would like clarification in the standard on this point. **Jim Becker will work with the Terminology Task Group to ensure that the container of a tealight is considered an integral part of the tealight.** The Group agrees that deformation that leads to fuel spillage is a problem. Walter would like information with regard to specific plastic performance, but Jim Hoebel indicates that the information may not be necessary if failure is defined in terms of candle performance. Dave Buri points out that spillage of fuel is common in pillars, but is not necessarily considered a problem for fire safety. George points out that deformation of pillars is a necessary component of proper candle performance. Allyson will consider the issue overnight, and present draft language for tealights to the Group tomorrow.

Discussion moved to end of useful life scorch tests. Bill Comber and David Morrison have been investigating potential temperature measurement surrogates. Bill showed temperature indicator strips comprised of bubbles that turn colors as the indicated temperature is reached. A variation is a sheet of bubbles that change at a specific temperature (a sheet of 21 bubbles indicating 300°F costs slightly more than $6). These bubble indicators may be reused until they change color. Bill distributed information on his testing. David showed similar materials of the Thermax brand (www.t-m-c.com). The products appear to be available in several sizes. There was discussion about how the indicators would be used (stuck to the candle or to the test surface, for instance) and whether a test protocol would have to be developed. Tom asked if the Group had considered cheesecloth as an indicator, but, according to Jim Hoebel, CPSC has not found it to be a good indicator in the past. According to Tom, this may be changing. George would like some confirmation that these items maintain temperature sensing ability through several cycles. David and Bill will do further investigations. Mark wants to be sure that other indicator methods, such as thermocouples, would not be excluded and was assured that this is not the intention.

Jim Becker asked what the pass/fail temperature should be. The Group decided in March 2003 that 300°F was a temperature that provided a reasonable safety margin in relation to measured scorch or discoloration temperatures of several materials. Jim posed the question as to which candles should be subject to the test. It was pointed out that the original intention was to find a way to include freestanding candles in the end of life provisions. There was considerable discussion as to whether the temperature provision should apply to other types of candles as well. It appeared to be agreed that candles that are to be used in a holder, such as tapers, should be excluded. David wants to investigate the situation with regard to gel candles, and Ed believes that 300°F may be a problem for

tealights, but the Group appears to be in general consensus that the holder-type candles should be the only ones excluded. **Geoffrey Faires will take a stab at draft verbiage.**

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Allyson suggested adding verbiage to section 4.3.2.1 of the provisional fire safety standard to the effect that, for tealights, the container should not become unstable or deform. Walter suggested that the tealight container should not deflect or deform and should maintain the original design. He also suggested two other definitions, derived from fire codes, one of which gives a 10% "deformation" leeway. Tom Mazurek would agree with wording that would disallow fuel discharge, but would not be in favor of other requirements that may not necessarily relate to safety problems. Jim Hoebel echoed this. George is concerned that test sample populations may not be sufficient to catch potential problems if deformation is not ruled out in the specification. Ed pointed out that, if a secondary ignition failure occurs, a plastic cup adds more fuel to the fire. While he does not want to stifle creativity, he thinks use of plastic tealight cups is a bad idea. Jim Hoebel suggests discussions with Dave Edenburn to obtain comments. Dan Zipes is against ruling out alternative containers. George believes the industry should take a stand to bring about positive change. Ed suggested that tealight containers should meet the requirements of the accessories standard being developed. George added that he would not have a problem with all containers having to meet that requirement. **Jim Becker will talk with Dave Edenburn, and the Group will revisit the issue at its next meeting.** Jim Hoebel and Allyson want to avoid design standards that would necessarily preclude plastics. He suggests that, if Dave Edenburn is not available to come to the next meeting, perhaps Dave could join on a conference call.

Discussions moved to gel candles. David has examined the IDIs, and has been unable to reach any conclusions whether the gel candle fire incidences involved Penreco-produced gels.

As the standard exists now, none of the current provisions are fuel specific. The question is whether there may need to be special requirements for gel candles. Charles Moses indicates that the IDIs show the problems related to gel candles are secondary ignition or container breakage, and the current standard addresses these problems. David Morrison discussed the potential relation of fragrance flash point to fire incidence problems, but is unsure that the Group would want to put a requirement for fragrance flash point in the standard. Allyson spoke to her colleagues at CPSC, and they are generally concerned with carbon ball formation and wick centering. They are unsure whether there is an issue with embedded objects in candles. George points out that embedded objects close to the wick and flame may absorb energy that normally goes upward and result in extra heating of the fuel pool. Tom Mazurek indicates his company's experience has been that gel candles appear more prone to problems with extended burn periods and wick trimming effects, due to fuel pool heating, than wax candles. Bill Hartke and Mark suggest that gel candles should be tested for flash point and fragrance polarity, and Bob Moss indicates his lab suggests testing gel candles more aggressively than wax candles. George suggests that the more gradual temperature/viscosity change for gels vs. wax may present

problems for proper wick selection. Jim Becker asks if syneresis, or fragrance bleed, may be a problem, particularly in instances when gel candles flash fairly quickly after lighting, and David and Julie believe this could be the case. Charles believes that fragrance miscibility is an important property. Tom Mazurek and Bob Moss believe a longer test burn cycle should be required for gel candles. Julie points out that fuel consumption rates for gels tend to be lower, so a longer cycle would tend to even out the amount of fuel burned. **There appears to be consensus that an 8-hour cycle should be used on gel candles.** Ed questions whether wicks should be trimmed with gel candles. David Morrison does not believe that leaving the wick untrimmed would be a problem, but he does not have evidence to that effect. Ed points out that the data suggests problems as consumers use the candles, and consumers generally do not trim wicks. Charles is not necessarily in disagreement, but suggests that the Group has generally ruled out not trimming wicks because that constituted abuse testing. **David and Charles will develop data, involving potential problem fragrances, by doing comparative testing with trimmed and untrimmed wicks.**

Thomas suggests that polarity of fragrances in gel systems should be discussed. Ed would like it to be called a solubility or miscibility test, as that is the property that is actually being measured. Jim Hoebel believes, on the basis of the discussions, there may need to be a flash point requirement. Bob Moss believes an open cup flash test may not be a good indicator of potential problems. Tom Mazurek would be in favor of general guidelines, but might not support hard specifications. Jim Hoebel questions whether flash or solubility requirements may be approaching design, rather than performance, criteria. George and Ed believe that solubility has been pointed out as an important property by the gel manufacturers, and should be formalized. Dave Buri suggested putting flash point considerations in a non-mandatory note, and Tom Mazurek believes that solubility should be dealt with in that way as well. Ed, however, strongly believes that would be acceptable for flash point, but that solubility should be a formalized requirement. There was discussion as to whether CPSC considers notes in ASTM standards to be mandatory for enforcement. Jim Becker asked the Group if solubility should be a requirement, and no one disagreed. **Solubility will be drafted as a test requirement for gel candles.** Discussion on flash points seems to indicate that the differential between fuel pool temperature and flash point of the fuel/fragrance system is the important parameter. **Ed will work with Charles and David to develop a general note on raw material considerations for all types of candles. Charles and David will work on verbiage for the solubility test.** David asked if candles that are gel/wax hybrid candles should be tested for 8 or 4 hours. The consensus is that a candle that contains a gel should be tested for 8 hours.

Jim Becker asked that any verbiage being developed be passed to him by Thanksgiving for dissemination prior to the next meeting in December. The March meeting should be primarily reserved for going over the language of the standard that will be proposed going forward.

Jim asks about timing for meetings next year. He proposes meetings in January and March. The group agreed to meeting on January 14-15 and March 24-25. It was also

agreed that members should reserve February 11-12 on their calendars for a possible extra meeting.

Discussion moved to wick centering and/or wick walking considerations. Wick walking might occur in containers with convex bottoms inside. The NCA technical committee took up this issue several years ago and considered several possibilities. Dave Buri asked about the problem of multi-wick candles. Tom Mazurek asks if the Group has dealt with the problem with end of use requirements, but suggests this could be another design note. Allyson doesn't have data to back that this is a problem, but she indicates she has gotten inquiries on the issue. Ed agrees with Tom. However, Robert Harrington believes this goes back to a sample size issues as to whether testing would actually catch a particular problem. There is division in the Group as to whether there should be a centering requirement. There was discussion with regard to a potential note. George feels strongly there should be a requirement – Robert believes a note is better than nothing. Tom wants to be sure a note deals with multiple wicks. The Group is divided on that issue as well. Allyson indicated that CPSC would be willing to see if the incidence data improves in absence of a centering inclusion. **The Group has agreed to table this issue for now.**

George raised the issue of whether wicks should be trimmed to the length specified in any wick trimming instructions included with a candle. Dave raised the question about whether wick trimming is important, given the end of life specifications, and that is uncertain. However, Ed pointed out that it appears consumers generally don't trim long wicks, and if a candle is going to be produced with a long wick, it should be tested that way. Thomas indicates that initial wick length does have an effect on fuel consumption rates, although that effect on candle fire safety is uncertain. Dave Buri points out that, while the Group considers not trimming wicks and/or using longer than prescribed burn periods more stringent, his company will eventually be forced to follow the standard rigorously to be in conformance. Ed asked if drafting a note containing testing variations considered to be more stringent would help. Jim Hoebel indicates that, based on the discussions today, since consumers don't trim wicks, that the current procedure is not realistic, in that it does not deal with reasonably foreseeable misuse. Arguments were made that it is not commercially feasible to provide a uniformly trimmed wick. **Dave Buri will draft language for a note regarding more stringent testing.** Tom sees a discrepancy between expecting manufacturers to trim wicks initially because consumers won't do it, and testing with wicks trimmed later. There was much further discussion on wick length issues. Jim Becker suggested changing the burn test procedure to lighting the wick as initially received, without trimming, but not changing the trim requirements otherwise. **This will be discussed further at the next meeting.**

Summary of Action Items – Individual

Jim Becker will work with the Terminology Task Group to ensure that the container of a tealight is considered an integral part of the tealight. He will talk with Dave Edenburn to solicit comments on plastics to be used as integral parts of candles.

Geoffrey Faires will develop verbiage regarding maximum allowable temperature at end of useful life.

David Morrison and Charles Moses will develop data for gel candles, using potential problem fragrances, by doing comparative testing with trimmed and untrimmed wicks. They will work on verbiage for a fragrance solubility test for gel candles.

Ed Calcote will work with Charles Moses and David Morrison to develop a general note on raw material considerations, particularly fragrance flash points, for all types of candles.

Dave Buri will draft language for a note regarding more stringent testing variations.

Summary of Action Items – Group

The accessories subgroup will work with the idea of a potential separate standard for tealight/burner combinations. The subgroup will try to provide a copy of the revisions prior to the next meeting of the Task Group.

The Group will further discuss the issue of plastic use as an integral part of a candle, particularly with regard to tealight cups, at its next meeting.

The Group appeared to have consensus that an end of useful temperature provision of 300°F should apply to all candles except those intended to be used in holders, such as tapers.

The Group had consensus that an 8-hour burn cycle should be used for gel candles, including gel/wax hybrid candles.

The Group agreed that fragrance solubility should be a test requirement for gel candles.

The Group agreed, for the present, to table the issues of wick walking or wick centering.

The Group will discuss wick trimming issues at the next meeting.

Task Group Member Company Meeting Attendees

Wednesday, October 8, 2003

Jim Becker, Candle Solutions
Dave Buri, S.C. Johnson & Sons
Ed Calcote, Shell Global Solutions (US)
Bill Comber, Libbey Glass
Thomas Dierker, Atkins & Pierce
Geoffrey Faires, Dial
Mark Gerwitz, MTL-ACTS Labs
Bill Hartke, MTL-ACTS Labs
Robert Harrington, Blyth Industries (Candle Corporation of America)
Jim Hoebel, consumer
Tom Mazurek, Limited Brands
David Morrison, Penreco
Charles Moses, Arizona Chemical Company
Bob Moss, FTI-SEA Consulting
George Pappas, Lumi-lite Candles
Walter Smittle, National Association of State Fire Marshals
Allyson Tenney, CPSC
Julie Thompson, Penreco
Christy Wheeler, Atkins & Pearce
John Witham, Candle-lite
Dan Zipes, Home Interiors & Gifts

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Valerie Cooper, National Candle Association

All of the attendees from the previous day, less Bill Comber and John Witham.