



U.S. CONSUMER PRODUCT SAFETY COMMISSION  
4330 EAST WEST HIGHWAY  
BETHESDA, MD 20814

June 24, 2008

Ms. Joan Lawrence  
Chair, ASTM F15.22 Toy Standard Subcommittee  
VP, Standards and Regulatory Affairs  
Toy Industry Association, Inc.  
1115 Broadway, Suite 400  
New York, NY 10010

Subject: Subcommittee Concurrent Letter Ballot F15 (08-06)

Dear Ms. Lawrence:

This letter presents U.S. Consumer Product Safety Commission (CPSC) staff comments\* on the proposed revisions to ASTM International (ASTM) F963 – *Standard Consumer Safety Specification for Toy Safety*, WK 19961, Item 1. CPSC staff supports the proposed small parts, age-grading, and use/abuse requirements and believes that they will help prevent injuries.

CPSC staff notes, however, that the possibility remains that deterioration of components due to aging materials or extended use may allow liberation of a magnet of a swallowable size. Staff believes that requiring a label on all toys that contain hazardous magnets may be warranted due to the potential severity of the injuries caused by magnets and the relatively non-intuitive injury pattern associated with bowel injuries. CPSC staff suggests that the Subcommittee consider the following requirements. CPSC staff stresses that it does not intend for this consideration to delay approval of the important safety requirements being addressed in this ballot.

- Add a new subsection 4.39.4, under section 4.39 Magnets, as follows:
  - 4.39.4 Toys containing hazardous magnets shall comply with the requirements for safety labeling described in 5.17.
- Adding a new subsection 5.17.1, under section 5.17 Magnets, as follows:
  - 5.17.1 The packaging and instructions for toys containing hazardous magnets shall carry safety labeling in accordance with 5.3.

\* These comments are those of CPSC staff, have not been reviewed or approved by, and may not necessarily reflect the views of, the Commission.

For clarity, CPSC staff notes that the language currently contained in section 5.17 could be presented in two separate subsections as follows:

- 5.17.2 The packaging and instructions of hobby and crafts items and science kit-type items for children over 8 years of age which contain a loose as received hazardous magnet or a loose as received hazardous magnetic component shall carry safety labeling in accordance with 5.3.
- 5.17.3 The labeling shall consist of the signal word “WARNING” and contain, at a minimum, the following text or equivalent text which clearly conveys the same warning: “This product contains (a) small magnet(s). Swallowed magnets can stick together across intestines causing serious infections and death. Seek immediate medical attention if magnet(s) are swallowed or inhaled.”

CPSC staff believes that the language required for the warning label should be reviewed. As a result of a negative vote by the American Academy of Pediatrics (AAP) on the F15 (06-05) ballot revision of F963, the F15.22 subcommittee agreed to take action to review the warning label wording. This action has not been accomplished. CPSC staff believes the current label wording may not convey an accurate mechanism of injury to the consumer.

As discussed below, the staff believes that additional work is needed to define hazardous magnets and hazardous magnetic components, as covered in sections 3.1.33, 3.1.34, and 8.25.1. These issues should be addressed in future revisions to ASTM F963.

While CPSC staff believes that using the current flux index method to assess magnet strength will screen the majority of magnets that are known to be hazardous, staff recommends future research be conducted in three areas.

- The relationship between magnet strength, flux index, and the physiological parameters underlying magnet injuries needs to be determined. This would better define the limits for injuries from hazardous magnets. The flux index value of a magnet is proportional to its attractive force. Selecting a flux index value of 50 to define a hazardous magnet was based on a convenience sampling of magnetic toys on the market. The flux index value of the magnets in these toys was compared to values for magnets that have not been known to cause injury, such as ferrite refrigerator magnets, which typically have flux index values under 50. Although weak ferrite-type refrigerator magnets are not known to have caused injuries, it is not clear that all magnets with a flux index value under 50 will not cause injury. Based on comparative estimates of interface pressures created between interacting magnets separated by negligible distances (considered representative of compressed intestinal walls), staff cannot rule out the possibility of injury caused by small magnets made from more powerful magnet materials (such as neodymium-iron-boron (NIB)) that have flux index values below 50.

- Future research should address stacked magnets. The method for calculating the flux index does not account for several magnets stacking (or connecting) together in the bowel, which can occur when several magnets are ingested. The attraction force of multiple connected magnets can be significantly higher than a single magnet. The flux index of multiple connected magnets may be over 50 even if the individual magnets that make up the stack are under 50. These connected magnets could, therefore, pose the same hazard as larger, more powerful single magnets.
- The current method for determining flux index uses a magnet's pole surface area. A method should be developed for calculating the pole surface area for magnets that have irregular shapes, such as magnetic "stones" that were involved in a recent intestinal injury.

Thank you for this opportunity to comment. If you have any questions or need any additional information, please feel free to contact me.

Sincerely,



Vincent J. Amodeo  
Mechanical Engineer  
Directorate for Engineering Sciences  
U.S. Consumer Product Safety Commission

cc: Colin Church, Voluntary Standards Coordinator, CPSC