



U.S. CONSUMER PRODUCT SAFETY COMMISSION  
5 Research Place, Rockville MD 20850

Stephen Harsanyi  
Engineering Psychologist  
Division of Human Factors

(301) 987-2209  
sharsanyi@cpsc.gov

October 18, 2019

TRANSMITTED VIA EMAIL

Ms. Nancy Nord  
Subcommittee Chairman for ASTM F15.77,  
Magnet Sets Containing Small Loose, Powerful Magnets with a Flux Index  $\geq 50$   
c/o ASTM International  
100 Barr Harbor Drive, P.O. Box C700  
West Conshohocken, PA 19428-2959

Dear Ms. Nord:

U.S. Consumer Product Safety Commission (CPSC) staff appreciates the effort of the 15.77 subcommittee members to mitigate the hazard associated with children swallowing or inhaling small, powerful magnets.<sup>1</sup> CPSC staff is writing to explain its participation in the development of the ASTM F15.77 standard, *Magnet Sets Containing Small Loose, Powerful Magnets with a Flux Index  $\geq 50$* , and state its position regarding the effectiveness of warning information concerning the magnet ingestion hazard.

Staff believes that relying only on warning information will not effectively reduce the hazard associated with the ingestion of small, powerful magnets from magnet sets.

Warning information, in general, has limited effectiveness because it depends on persuading consumers to alter their behaviors in some way to avoid the hazard. This is in contrast to an engineering solution, such as a performance requirement, which could prevent the hazard or access to the hazard. Magnet sets, in particular, present unique challenges to persuading consumers to alter behavior to avoid the hazard.

CPSC staff's concerns are listed below:

- Staff estimates that there have been thousands of emergency department-treated ingestions since 2009, involving, or possibly involving, magnets from magnet sets. There have been at least two deaths involving magnets possibly from magnet sets. More specifically, staff is aware of two

---

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

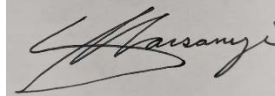
deaths involving magnets with characteristics similar to magnets typically found in magnet sets, but in each case, the source of the magnets was not reported.

- Consumers are unlikely to consult and heed warning information for this product, which, in appearance, is simple, familiar, and non-threatening. Incident data and consumer reviews of magnet sets demonstrate that consumers commonly recognize magnet sets as suitable for children; this hinders the perceived credibility of warning information arguing to the contrary. Studies have found that the more familiar consumers are with a product, the less likely they are to look for, or read, a warning (Wogalter et al., 1999); consequently, it is more likely consumers will discredit or ignore the warning (Ayres et al., 1986). Sedney and Smith (2012) posited that if caregivers have observed either their child, or their child's peers using the product or a similar product without incident, caregivers may conclude that their child can use the product safely, regardless of what the warnings state (*cf.* Vredenburgh & Zackowitz, 2006). Similarly, recommendations from others, including online reviews of magnet sets, can influence the likelihood of consumers disregarding the hazard.
- Consumers are unlikely to repackage the sets in their entirety after each use. Magnet sets are designed and marketed to make complex sculptures and jewelry, and for other purposes that dissuade consumers from dismantling, repackaging, and keeping the entire set together. Magnet sets can have upwards of 1,000 tiny magnets, making finding and collecting each magnet after every use, difficult and time-consuming to accomplish. Research shows that increased costs of compliance with a warning (*e.g.*, time and effort) can quickly drive compliance rates to zero (Dingus et al., 1991).
- Magnets are often acquired without packaging, which makes any warning information on the package irrelevant. The incident data include many cases of victims acquiring magnets that were found in their environment or received from their friends and school mates.
- Consumers are particularly unlikely to anticipate and appreciate the vulnerability of children and teens who do not have a history of mouthing inedible objects. Therefore, consumers are unlikely to keep the magnets away from these populations, regardless of warning information.
- Older children and teens are unlikely to comply with warnings. Sedney and Smith (2012) discussed that even though older children presumably comprehend the danger better than younger children due to their more advanced cognitive ability, they are likely to give in to peer pressure, test limits, bend rules, and underestimate the risk or consequences (Brown & Beran, 2008; Vredenburgh & Zackowitz, 2006). Therefore, warnings about keeping magnet sets away from children could have the unintended effect of making the product more appealing to some of these children.
- Incidents are continuing that involve products with warning labels, 14+ age labels, instructions, marketing, and packaging that address the ingestion hazard.

Staff concludes that magnet sets present a significant hazard to children and teens, primarily due to the hidden nature of the hazard and the difficult-to-control chain of events that lead to injury and death. Staff is participating in this subcommittee, in part, to make these concerns known to the subcommittee. Although staff is assisting the subcommittee in making the warnings as strong and credible as possible, staff continues to believe that warning information, alone, is unlikely to effectively alleviate the hazard. Instead, the hazard should be eliminated, perhaps through a performance requirement, thereby preventing the hazard, rather than attempting to persuade consumers to avoid it.

Thank you for the opportunity to participate in ASTM F15.77 activities. CPSC staff looks forward to continuing to work with ASTM to improve the safety of magnet sets.

Sincerely,



Stephen Harsanyi  
Engineering Psychologist,  
Division of Human Factors

CC: Molly Lynyak, Manager, Technical Committee Operations, ASTM International  
Susan Bathalon, Magnet Sets Project Manager, CPSC  
Patricia L. Edwards, CPSC Voluntary Standards Coordinator

#### *References*

- Ayres T. J., Gross M. M., Wood C. T., Horst D. P., Beyer R. R., & Robinson J. N. (1989). What is a warning and when will it work? *Proceedings of the Human Factors Society Annual Meeting*, 33, 426-430.
- Brown, T., & Beran, M. (2008). Developmental Stages of Children. In R. Lueder & V. J. B. Rice (Eds.), *Ergonomics for Children: Designing Products and Places for Toddlers to Teens* (pp. 13–30). New York: Taylor & Francis.
- Sedney, C. A., & Smith, T. P. (2012). *Human factors assessment of strong magnet sets*. CPSC memorandum to Jonathan D. Midgett, Project Manager, U.S. Consumer Product Safety Commission, Bethesda, MD.
- Vredenburgh, A. G., & Zackowitz, I. B. (2006). Expectations. In M. S. Wogalter (Ed.), *Handbook of Warnings* (pp. 345–354). Mahwah, NJ: Lawrence Erlbaum Associates.
- Wogalter, M.S., DeJoy, D., & Laughery, K. R. (Eds.). (1999). *Warnings and risk communication*. Philadelphia, PA: Taylor & Francis.