



UNITED STATES
CONSUMER PRODUCT SAFETY COMMISSION
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This document has been electronically
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DATE: October 7, 2015

BALLOT VOTE SHEET:

TO: The Commission
Todd A. Stevenson, Secretary

THROUGH: Stephanie Tsacoumis, General Counsel
Patricia H. Adkins, Executive Director

FROM: Patricia M. Pollitzer, Assistant General Counsel
Meridith L. Kelsch, Attorney, OGC

SUBJECT: Proposed Rule: Safety Standard for High Chairs
Ballot Vote Due - October 14, 2015

The Office of the General Counsel is providing for Commission consideration the attached draft notice of proposed rulemaking for publication in the *Federal Register*. The proposed rule would establish a safety standard for high chairs under the Danny Keysar Child Product Safety Notification Act, section 104 of the Consumer Product Safety Improvement Act of 2008.

Please indicate your vote on the following options:

- I. Approve publication of the attached document in the *Federal Register*, as drafted.

(Signature)

(Date)

II. Approve publication of the attached document in the *Federal Register*, with changes.
(Please specify.)

(Signature)

(Date)

III. Do not approve publication of the attached document in the *Federal Register*.

(Signature)

(Date)

IV. Take other action. (Please specify.)

(Signature)

(Date)

Attachment: Draft *Federal Register* Notice: Proposed Rule to Establish a Safety Standard for High Chairs

Billing Code 6355-01-P

CONSUMER PRODUCT SAFETY COMMISSION

16 CFR Parts 1112 and 1231

[Docket No. CPSC-2015-XXXX]

Safety Standard for High Chairs

AGENCY: Consumer Product Safety Commission.

ACTION: Notice of proposed rulemaking.

SUMMARY: The Danny Keysar Child Product Safety Notification Act, section 104(b) of the Consumer Product Safety Improvement Act of 2008 (“CPSIA”; Pub. L. No. 110-314, 122 Stat. 3016), requires the United States Consumer Product Safety Commission (“Commission” or “CPSC”) to promulgate consumer product safety standards for durable infant or toddler products. These standards must be substantially the same as applicable voluntary standards or more stringent than the voluntary standard if the Commission determines that more stringent requirements would further reduce the risk of injury associated with a product. In response to the direction under section 104(b) of the CPSIA, the Commission is proposing a safety standard for high chairs. The proposed rule would incorporate by reference ASTM F404-15, *Standard Consumer Safety Specification for High Chairs* (“ASTM F404-15”) into 15 CFR part 1231 and impose more stringent requirements for rearward stability and warnings on labels and in instructional literature. In addition, the Commission proposes to amend 16 CFR part 1112 to include proposed 16 CFR part 1231 in the list of notice of requirements (“NORs”) issued by the Commission.

DATES: Submit comments by [INSERT DATE 75 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

ADDRESSES: Comments related to the Paperwork Reduction Act aspects of the labeling and instructional literature requirements of the proposed mandatory standard for high chairs should be directed to the Office of Information and Regulatory Affairs, the Office of Management and Budget, Attn: CPSC Desk Officer, FAX: 202-395-6974, or e-mailed to oir_submission@omb.eop.gov.

Other comments, identified by Docket No. CPSC-2015-XXXX, may be submitted electronically or in writing:

Electronic Submissions: Submit electronic comments to the Federal eRulemaking Portal at: <http://www.regulations.gov>. Follow the instructions for submitting comments. The Commission does not accept comments submitted by electronic mail (e-mail), except through www.regulations.gov. The Commission encourages you to submit electronic comments by using the Federal eRulemaking Portal, as described above.

Written Submissions: Submit written comments by mail/hand delivery/courier to: Office of the Secretary, Consumer Product Safety Commission, Room 820, 4330 East West Highway, Bethesda, MD 20814; telephone (301) 504-7923.

Instructions: All submissions received must include the agency name and docket number for this proposed rulemaking. All comments received may be posted without change, including any personal identifiers, contact information, or other personal information provided, to: <http://www.regulations.gov>. Do not submit confidential business information, trade secret information, or other sensitive or protected information that you do not want to be available to the public. If furnished at all, such information should be submitted by mail/hand delivery/courier.

Docket: For access to the docket to read background documents or comments received, go to: <http://www.regulations.gov>, and insert the docket number, CPSC-2015-XXXX, into the “Search” box, and follow the prompts.

FOR FURTHER INFORMATION CONTACT: Stefanie C. Marques, Project Manager, Directorate for Health Sciences, U.S. Consumer Product Safety Commission, 5 Research Place, Rockville, MD 20850; telephone: 301-987-2581; e-mail: smarques@cpsc.gov.

SUPPLEMENTARY INFORMATION:

I. Background and Statutory Authority

The CPSIA was enacted on August 14, 2008. Section 104(b) of the CPSIA, part of the Danny Keysar Child Product Safety Notification Act, requires the Commission to: (1) examine and assess the effectiveness of voluntary consumer product safety standards for durable infant or toddler products, in consultation with representatives of consumer groups, juvenile product manufacturers, and independent child product engineers and experts; and (2) promulgate consumer product safety standards for durable infant or toddler products. Any standard the Commission adopts under this directive must be substantially the same as the applicable voluntary standard or more stringent than the voluntary standard if the Commission determines that more stringent requirements would further reduce the risk of injury associated with the product.

The term “durable infant or toddler product” is defined in section 104(f)(1) of the CPSIA as “a durable product intended for use, or that may be reasonably expected to be used, by children under the age of 5 years.” Section 104(f)(2)(C) of the CPSIA specifically identifies high chairs as a durable infant or toddler product.

Pursuant to section 104(b)(1)(A) of the CPSIA, the Commission consulted with representatives of manufacturers, consumer groups, consultants, retailers, industry trade groups, and government agencies in reviewing and assessing the effectiveness of the existing voluntary standard for high chairs, ASTM F404-15, largely through ASTM International's ("ASTM"; formerly the American Society for Testing and Materials) standard-development process. The standard the Commission is proposing in this notice of proposed rulemaking ("NPR") is based on ASTM F404-15 with more stringent requirements for rearward stability and warnings in labels and instructional literature.

The testing and certification requirements of section 14(a) of the Consumer Product Safety Act ("CPSA"; 15 U.S.C. 2051-2089) apply to the standards promulgated under section 104 of the CPSIA. Section 14(a)(3) of the CPSA requires the Commission to publish an NOR for the accreditation of third party conformity assessment bodies (*i.e.*, test laboratories) to assess whether a children's product conforms to applicable children's product safety rules. If adopted, the proposed rule for high chairs would be a children's product safety rule that requires the issuance of an NOR. For this reason, this NPR also proposes to amend 16 CFR part 1112 to include proposed 16 CFR part 1231, the section in which the high chair standard would be codified.

II. The Product

A. Definition

ASTM F404-15 defines a "high chair" as "a free standing chair for a child up to 3 years of age which has a seating surface more than 15 in. above the floor and elevates the child normally for the purposes of feeding or eating." The ASTM standard further specifies that a high chair may be sold with or without a tray, have adjustable heights, and recline for infants.

There are various designs and construction materials for high chairs. Typical high chairs consist of a plastic, wood, or metal frame, often with a padded fabric seat. Some models fold for storage and transport or convert for continued use as a child grows. Some high chairs include a removable snack tray or mounted toy accessories and some have no trays. High chairs may have a passive crotch restraint (*i.e.*, two separate bounded openings for the occupant's legs), a rigid front torso support, a three-point restraint system, or a five-point restraint system with shoulder harnesses. High chair designs include restaurant-style chairs, four-legged A-frame styles, single-leg pedestals, and Z-frame styles. Restaurant-style high chairs are discussed further in section VII. of this preamble.

B. Market Description

In 2013, the CPSC conducted a Durable Nursery Product Exposure Survey (“DNPES”) of U.S. households with children under the age of 6. Data from DNPES indicate that there are approximately 9.74 million high chairs in U.S. households with children under the age of 6 and about 7.14 million high chairs actually in use in those households. High chairs range in price from \$35 to \$650.

Staff identified 62 firms supplying high chairs to the U.S. market. Fifty-one of these are domestic, including 27 manufacturers, 19 importers, and five wholesalers. The remaining 11 firms are foreign, including nine manufacturers, one importer, and one retailer. Of these 62 firms, 48 market their high chairs to consumers. The remaining 14 firms market their high chairs for use in commercial settings, primarily in restaurants, but these products generally also are available to consumers.

III. Incident Data

The Commission receives data regarding product-related injuries from several sources. One such source is the National Electronic Injury Surveillance System (“NEISS”), from which CPSC can estimate the number of injuries associated with specific consumer products that are treated in U.S. hospital emergency departments (“EDs”) nationwide, based on a probability sample. Other sources include reports from consumers and others through the Consumer Product Safety Risk Management System (which also includes some NEISS data) and reports from retailers and manufacturers through CPSC’s Retailer Reporting System (collectively referred to as Consumer Product Safety Risk Management System data (“CPSRMS”)).

Through CPSRMS sources, the Commission has received 1,296 reports of incidents related to high chairs that occurred between January 1, 2011 and December 31, 2014. Because several of these reports include more than one incident or issue, the total number of incidents is 1,308. These reports include one fatality and 138 injuries; for the remaining incidents, no injury occurred, or no injury was reported. Table 1 provides the number of incidents, injuries, and fatalities by year for 2011 to 2014.

TABLE 1.—*CPSRMS Incident Reports Involving High Chairs between January 1, 2011 and December 31, 2014*

Incident Year	Total	Injuries	Fatalities
2011	276	44	0
2012*	360	51	0
2013*	491	28	0
2014*	169	15	1
Total	1,296	138	1

Source: CPSC’s Consumer Product Safety Risk Management System

* data collection is ongoing

Of the 1,296 reports CPSC received from CPSRMS sources, 923 provided the age of the child involved. For incidents in which age was reported, the majority involved children between 7 and 18 months old.

EDs participating in NEISS reported 1,078 injuries and no deaths related to high chairs between January 1, 2011 and December 31, 2014. Extrapolating from this probability sample, there were approximately 31,300 injuries and no fatalities related to high chairs treated in EDs between January 1, 2011 and December 31, 2014. Approximately 75 percent of injuries reported through NEISS involved children between 7 and 23 months old.

A. Fatalities

The Commission received a report in 2014 of one fatality associated with a high chair. Apart from indicating that the high chair involved had broken, the report provided little information about the decedent or the circumstances of the incident. The Commission has been unable to obtain additional information regarding this incident.

B. Nonfatal Injuries

Of the 138 CPSRMS injuries related to high chairs that occurred between 2011 and 2014, three resulted in moderate injuries treated in EDs. These injuries included a puncture wound to the forehead, a broken collarbone, and a lacerated finger. There were no severe injuries, and the remaining injuries primarily resulted in contusions, abrasions, and lacerations. Many of the incident descriptions in the remaining 1,157 reports that did not state that an injury had occurred, nevertheless, indicated the potential for injury.

For injuries reported through NEISS, 94 percent were treated and released. The most commonly injured body parts were the head (65 percent) and face (17 percent). The most common types of injuries were injuries to internal organs (48 percent), contusions and abrasions (22 percent), and lacerations (11 percent). In 1,540 of the estimated 31,300 injuries treated in U.S. EDs, severe head injuries, such as fractured skulls and concussions, occurred.

C. Hazard Pattern Identification

CPSC staff reviewed NEISS and CPSRMS data to identify hazard patterns associated with high chairs. Because CPSRMS data sources generally provide greater detail about incidents, staff was able to identify more distinct hazard patterns using this data than NEISS data. CPSC staff identified several hazard patterns associated with high chairs in reviewing the 1,308 CPSRMS incidents. Approximately 96 percent of the 1,308 incidents involved issues with specific components of the high chair, including the frame, seat, restraint system, armrest, tray, toy accessories, wheels, footrest, and other features. Approximately 4 percent involved general problems with the high chair, including the design and stability, and less than 1 percent fell into other categories, including consumer observations and incidents in which reports provided insufficient information to identify a hazard pattern (*i.e.*, undetermined). Staff was unable to identify the hazard pattern for the one fatality because there was insufficient information in the report. Table 2 provides the frequency of each hazard pattern and category.

TABLE 2.—*Hazard Patterns for CPSRMS Incidents Involving High Chairs between January 1, 2011 and December 31, 2014*

Hazard Pattern	Total Incidents	Injuries	Fatalities
Frame	650	20	0
Seat	205	41	0
Restraint System	139	12	0
Armrest	81	2	0
Tray	75	33	0
Toy Accessories	70	1	0
Wheels	21	1	0
Footrest	14	0	0
Miscellaneous Issues	8	1	0
Design	22	13	0
Stability	16	12	0
Consumer Observations	3	0	0
Undetermined	4	2	1
Total	1,308	138	1

Issues with frames account for the greatest number of incidents. Examples of these incidents include broken frames, legs, seat supports, and loose screws. Issues with seats are associated with the greatest number of injuries. Examples of these incidents include torn, cracked, or peeling seat pads and seat-reclining issues. Examples of restraint system incidents include broken buckles and prongs, jamming, easy release, torn or fraying straps, pinching, and ineffective restraints. Examples of issues with armrests include cracking or breaking. Examples of tray incidents include trays failing to lock or remain locked, trays releasing too easily, difficulty releasing trays, and pinching. Examples of toy accessory incidents include cracked or broken toy accessories. Examples of incidents involving wheels include broken or loose wheels or wheels not locking. Examples of footrest incidents include cracked or broken footrests. Examples of other miscellaneous issues include unclear assembly instructions, excessive lead content in paint, finish coming off, poor construction quality, and loose hardware.

General issues with the design and stability of high chairs also contributed to incidents and injuries. Examples of incidents related to design issues include children's limbs, fingers, and toes becoming entrapped in spaces or openings. In two separate incidents, children were entrapped by the neck in the seatback opening and leg opening of high chairs. Examples of incidents involving stability issues include a high chair actually or nearly tipping over.

CPSC identified two additional categories that do not represent particular hazard patterns. First, several incident reports included consumer observations that did not indicate an incident with a high chair had occurred. Examples of these include perceived safety hazards and unauthorized sales of recalled high chairs. Second, several reports, including a fatality report, provided insufficient information for CPSC to determine the circumstances or cause of the incident.

One issue that relates to several of these hazard patterns is prevalent in both NEISS and CPSRMS incidents—namely, falls from high chairs. Many of the incidents reported through NEISS and CPSRMS sources involved children falling from high chairs. Within NEISS data, 78 percent of incidents involved falls but did not specify the cause, and an additional 18 percent involved mainly falls that occurred when a component of a high chair failed, a high chair tipped over, or a child climbed in or out of a high chair. Many of the CPSRMS incidents also involved falls from a high chair. Fall incidents are particularly evident in the stability, restraint system, tray, and frame hazard patterns. Falls often occurred when these features fail or the restraint system is not used properly. Fall incidents have the potential to result in serious injuries, including severe head injuries, which can cause brain damage and impact a child’s development and cognitive skills. Of the 1,308 CPSRMS incidents, 79 fall incidents showed the potential for serious injuries, and in many of these incidents, the child sustained a head injury. Of the 31,300 estimated NEISS incidents, 1,540 resulted in severe head injuries.

D. Product Recalls

Since January 1, 2010, there have been 10 recalls of high chairs involving eight firms. The recalled high chairs were responsible for a total of 72 injuries, including 44 injuries involving bumps and bruises, 11 lacerations requiring medical closure (stitches, tape, or glue), one scratched cornea, and one hairline fracture to the arm. These injuries were primarily due to falls from the high chair.

IV. International Standards for High Chairs

CPSC is aware of four international standards that apply to high chairs:

- ASTM F404-15;
- EN 14988: 2006, *Children’s High Chairs—Safety Requirements and Test Methods* (“European standard”);

- AS 4684-2009, *High Chairs – Safety Requirements* (“Australian standard”); and
- ISO 9221: 1992, *Furniture—Children’s High Chairs* (“ISO standard”).

CPSC staff reviewed the provisions in these four standards and believes that ASTM F404-15 best addresses the hazard patterns indicated in the incident data CPSC has received. In most areas, ASTM F404-15 includes more stringent requirements than the other three international standards. For example, to test forward stability, the European standard requires testing with an 11-pound load and 5.6 foot-pound force, while ASTM F404-15 requires testing with a 40-pound load and 14 foot-pound force, making it the more stringent standard.

In reviewing the provisions in which one of the other international standards includes more stringent requirements than ASTM F404-15, CPSC found that incident data do not indicate that the more stringent standard is necessary to reduce the risk of injury, and the requirements in ASTM F404-15 are sufficient. For example, the European standard has height requirements for the sides of high chairs, while ASTM F404-15 does not. However, incident data do not indicate that side height is a factor in fall hazard patterns. Similarly, the Australian standard requires castors or gliders to be in specific configurations, and the ISO standard only allows castors for convertible high chairs, while ASTM F404-15 has no requirements for castors. However, incident data do not indicate that castors are a common cause of injury.

Based on these comparisons, CPSC believes that ASTM F404-15 is, in general, a more stringent standard than the other three international standards and is better tailored to address the hazard patterns shown in the incident data.

V. ASTM F404-15

A. History of ASTM F404-15

ASTM first approved and published a standard for high chairs in 1975, as ASTM F404-75, *Standard Consumer Safety Specification for High Chairs*. ASTM has revised the voluntary

standard many times since then, adding and modifying requirements. Some of the more substantial additions over the past 5 years include requirements for tray-release mechanisms, visibility and permanency of labels, restraint system installation, and restraint anchor integrity. ASTM approved the current version, ASTM F404-15, on May 15, 2015.

B. Description of ASTM F404-15

CPSC staff, together with stakeholders on the ASTM subcommittee task group for high chairs, developed modified and new requirements for ASTM F404-15 to address the hazards associated with high chairs. ASTM F404-15 includes the following key provisions: scope, terminology, calibration and standardization, general requirements, performance requirements, test methods, labeling and warnings, and instructional literature. The following provides an overview of these provisions; to view the complete standard, see the instructions in section X. of this preamble.

1. Scope

This section states the scope and intent of the standard.

2. Terminology

This section provides definitions of terms specific to the standard.

3. Calibration and Standardization

This section provides general instructions for conducting tests.

4. General Requirements

This section includes general requirements regarding various issues, such as components of a high chair, conversion kits, accessories, threaded fasteners, sharp edges and points, small parts, wood parts, latching or locking mechanisms, labels, openings, toy components, and lead in paint.

5. Performance Requirements and Test Methods

These sections contain performance requirements and associated test methods for high chairs. The following summarizes key requirements in these sections.

- a. **Protective Components:** These requirements provide for testing protective components such as caps and plugs.
- b. **Tray or Front Torso Support—Drop Test:** Each removable tray and front torso support must be dropped from a specified height in multiple orientations. The purpose of this requirement is to test whether high chair components continue to function or exhibit mechanical hazards (*e.g.*, sharp edges) after the drop test.
- c. **Tray or Front Torso Support—Pull Tests:** The tray or front torso support must be pulled multiple times from multiple sides and directions with a specified force. The purpose of this requirement is to test whether frontal support can withstand kicking or pulling.
- d. **Static Load:** A high chair must support specified weights on the seat, tray, step, and footrest. The purpose of this requirement is to test whether the high chair seat and step can support more than the weight of a child and whether the tray can withstand overloading.
- e. **Stability:** A high chair must not tip over when pulled forward, backward, or sideways by a specified force. The purpose of this requirement is to test the high chair's resistance to falling over if an occupant leans forward, pushes off a nearby surface, or the high chair is otherwise pushed.

- f. Exposed Coil Springs: Any exposed coil springs that reach a specified distance from each other during static load testing must be designed to prevent pinching or entrapment.
- g. Scissoring, Shearing, and Pinching: Each accessible point at which components move (*e.g.*, fastening points, pivots) must admit a probe with a specified diameter. The purpose of this requirement is to prevent scissoring, shearing, and pinching of an occupant.
- h. Restraint System: The standard requires an active restraint system, such as a belt, to secure a child in the high chair. The restraint system must include waist and crotch restraints. In addition, the restraints must withstand upward and downward force tests as well as testing to pull on restraint system attachments. The purpose of these requirements is to ensure that the restraint system and its closing means remain anchored and functional under various forces.
- i. Completely-Bounded Openings: This section requires high chairs with completely-bounded openings in front of the occupant to have a passive crotch restraint with specified maximum sizes for gaps and openings. The crotch restraint must be installed or tethered in place to prevent consumers from mis-installing or not installing it and tethers must withstand specified forces. The purpose of these provisions is to reduce the likelihood of injury or death from an occupant sliding through and being entrapped in an opening.
- j. Structural Integrity: A high chair must withstand dynamic cycle testing, involving repeated drops of a weight on the seat, without any structural components breaking or the seat height or angle changing beyond a set limit. The purpose of

this requirement is to test whether the high chair can withstand the dynamic loads to which it will be subjected.

- k. Tray Latch Release Mechanisms: The standard includes requirements for tray latches to prevent unintentional or accidental release. These requirements include specific types and placements for latch release mechanisms and testing to ensure they can withstand a specified force. The purpose of these requirements is to address incidents in which occupants fell from high chairs that had passive restraints integrated into the tray.
- l. Side Containment: Any completely-bounded openings on the sides of the seat must meet specified maximum dimensions for gaps and openings. The purpose of this requirement is to reduce the likelihood of injury or death from an occupant sliding through and being entrapped in an opening.
- m. Protrusions: Protrusions must meet certain dimensional requirements if they are located on the outside of high chair legs at a height a toddler is susceptible to falling into. The purpose of this requirement is to address the incidents in which children outside of high chairs sustained injuries from falling into tray storage hooks or other protrusions.
- n. Locking Mechanisms: Locking mechanisms must be able to withstand a specified force.
- o. Permanency of Labels and Warnings: This section specifies testing and criteria for determining the permanency of labels.

6. Labeling and Warnings

This section contains various requirements related to warnings and labels, including content, format, and prominence requirements.

7. Instructional Literature

This section requires that instructions be provided with high chairs and be easy to read and understand. The instructions must comply with content, format, and prominence requirements.

VI. Assessment of ASTM F404-15

CPSC considered the fatalities, injuries, and non-injury incidents associated with high chairs that occurred between January 1, 2011 and December 31, 2014, and staff evaluated ASTM F404-15 to determine whether the voluntary standard addresses these hazards or whether more stringent standards would reduce the risk of injury associated with high chairs. CPSC believes that ASTM F404-15 effectively addresses the hazards indicated in the incident data, with the exception of two areas. CPSC believes that more stringent requirements than those in ASTM F404-15 would further reduce the risk of injury associated with high chairs regarding rearward stability and warnings on labels and in instructional literature. Consequently, CPSC proposes additional requirements for those areas.

This section provides CPSC's assessments of how ASTM F404-15 addresses the hazard patterns in the incident data. In its analysis, CPSC identified broad categories into which the incidents fall. One category is components of high chairs, including issues with frames, seats, restraint systems, armrests, trays, toy accessories, wheels, footrests, and miscellaneous issues. Another category is general problems with high chairs, including design and stability issues. And the final category includes incidents that did not clearly fall within any of the above groupings—these are listed below as consumer observations and undetermined. This section discusses each

of these hazard patterns, in descending order of frequency of incidents within each of the three categories (see Table 2, above). Section VIII. discusses the additional requirements that CPSC proposes for rearward stability and warnings.

A. Frame

There were 650 CPSRMS incidents involving the frame of a high chair, resulting in a total of 20 injuries. Common incidents included cracked frames or height adjusters, loose screws, and buckling legs. More than 80 percent of frame-related incidents involved cracked components on two similar high chair models from one manufacturer and resulted in only a few minor injuries.

ASTM F404-15 contains two separate requirements intended to provide structural integrity to high chair frames—a static load test and a drop test. Several general requirements also address the hazards associated with frame failures, such as the requirements regarding the use of certain screws for key structural elements to provide for proper installation and durability over time. Since frame-related incidents are not an industry-wide problem, CPSC believes that the ASTM F404-15 requirements for structural integrity, load tests, and fasteners effectively address the safety hazards related to high chair frames.

B. Seat

There were a total of 205 incidents involving the seat of a high chair, resulting in 41 injuries. Seat-related issues include cracked or peeling seat pads, broken seat reclining hardware, seat backs detaching, and loose screws. Nearly 60 percent of seat issues involved a single manufacturer's seat pads cracking or peeling after multiple washings. Eighty-three percent of seat-related injuries involved cracked or peeling seat pads scratching occupants' legs.

ASTM F404-15 contains two requirements that address the integrity of structural components of a high chair, including the seat. These are the static load test and drop test. General requirements, such as those regarding sharp points and small parts, also address the risk of laceration or choking on pieces that detach from the seat. CPSC believes that ASTM F404-15 effectively addresses the hazards associated with high chair seats.

C. Restraint System

There were 139 incidents involving the restraint system of a high chair, resulting in 12 injuries. These issues generally fall into two categories—restraint systems that failed and unused restraint systems.

Within the first category, incidents included buckles breaking or separating from straps, straps tearing or pulling out of anchor points, and other issues. To address these issues, ASTM F404-15 requires all high chairs to be shipped with two types of restraint systems—a pre-attached “active” crotch and waist belt restraint system and a “passive” crotch restraint—that have undergone testing to ensure they work as intended. ASTM F404-15 also requires the restraint anchors to withstand a pull test. CPSC believes that ASTM F404-15 effectively addresses the hazard pattern associated with restraint system failures.

As for the second category, unused restraint systems, CPSC believes that a more stringent standard for labels and instructional literature than ASTM F404-15 would further reduce the risk of injuries associated with this issue. CPSRMS and NEISS data indicate that, in many incidents, caregivers did not use the restraint system. CPSC believes more effective warnings would increase consumer use of restraint systems and reduce these incidents.

CPSC’s review of CPSRMS data revealed that of the 1,308 incidents involving high chairs, there were numerous cases in which the caregiver did not use the high chair restraints,

resulting in the child falling or nearly falling from the high chair. Although many incident reports have limited detail, CPSC noted that several incidents involved a child falling from a high chair when the tray disengaged, suggesting the tray was used as the sole restraint. Several reports also indicated that a caregiver's attention was elsewhere when the incident occurred. And several other reports suggested that the restraint system was ineffective at restraining the child or was used improperly.

CPSC's review of NEISS data revealed a similar pattern. The vast majority of NEISS incidents involved falls, which suggests that restraints were unused or ineffective. Although NEISS data provide limited details, many reports state that the child was not restrained or that the restraint had just been removed when the incident occurred. In some cases, the incident happened when a caregiver turned away from the child, and some reports stated the child was strapped in before the fall, suggesting the restraint fit poorly or was not adjusted properly.

CPSC believes that the requirements in ASTM F404-15 do not adequately address the risk of injury associated with unused or improperly used restraint systems. ASTM F404-15 includes three types of requirements relevant to this hazard. First, the standard requires the passive crotch restraint to arrive attached or tethered to its manufacturer's recommended use position to reduce the chances that the restraint is not installed before use. Second, section 8 of ASTM F404-15 requires warnings about the risk of serious injury or death from falling or sliding out of a high chair, instructions to use the restraint system, and a warning never to leave a child unattended. Some of these warnings must be visible to a person standing near the high chair at any one position when a child is in the high chair, but not necessarily visible from all positions. Other warnings must be visible to a caregiver while placing a child in the high chair, but not necessarily visible when the child is in the high chair. Third, section 9 of ASTM F404-15

specifies that instructional literature provided with a high chair must include the same warning statements that are on the high chair; state that only children capable of sitting upright unassisted should use a high chair; advise consumers to use the restraint system; inform consumers that the tray is not a restraint system.

CPSC believes that more stringent content, form, and placement requirements for warnings than ASTM F404-15's would further reduce the risk of injury associated with unused restraint systems. Section VIII. discusses CPSC's proposed labeling and instructional literature requirements in greater detail.

D. Armrest

Eighty-one high chair incidents involved armrests and resulted in two injuries. Many of the reports indicate armrests broke as users removed the tray. All but one of the armrest incidents involved a single high chair model.

ASTM F404-15 includes several performance tests that address this hazard. For example, the static load and pull tests for trays also evaluate the durability of armrests because trays are typically attached to armrests. CPSC believes that ASTM F404-15 effectively addresses the armrest hazard pattern. The incident reports indicate this is not an industry-wide problem; there were only a small number of minor injuries associated with armrests, and ASTM F404-15 includes tests for armrest durability.

E. Tray

A total of 75 high chair incidents involved trays and resulted in 33 injuries. Common tray incidents included pinching, and in addition, falls that occurred when trays unexpectedly detached or released too easily.

ASTM F404-15 contains several performance requirements that address tray incidents, including pull tests, a static load test, and specific tray-latching requirements. Provisions on tray latch accessibility and latch actuation that ASTM adopted in 2007 and 2010 have been effective at reducing tray-related incidents, as data show a decline in incidents for models manufactured after those revisions. General requirements, such as those for sharp edges and scissoring, shearing, and pinching, also address these hazards. CPSC believes that ASTM F404-15 effectively addresses the tray hazard pattern.

F. Toy Accessories

Toy accessories were involved in 70 high chair incidents, resulting in one injury. These reports indicate toy accessories cracked or broke.

ASTM F404-15 includes requirements for toy accessory durability, requiring manufacturers to attach toy accessories to the high chair for testing, including tray drop testing and load cycle testing. CPSC believes ASTM F404-15 effectively addresses the toy accessory hazard pattern. CPSC expects the toy durability requirements in ASTM F404-15, as well as the general requirement in ASTM F404-15 calling for compliance with ASTM's toy standard, ASTM F963, *Standard Consumer Safety Specification for Toy Safety*, to reduce hazards related to cracked or broken toy accessories.

G. Wheels

Wheels were involved in 21 high chair incidents, resulting in one injury. Common incidents involved wheels becoming loose, breaking, or not locking. All but two of these incident reports cited cracked or broken components of high chairs from one manufacturer and almost all of these were the same model. In the single incident that resulted in an injury, the wheel was only a minor contributing factor.

ASTM F404-15 evaluates wheel durability through a static load test and drop test. CPSC believes that ASTM F404-15 effectively addresses this hazard pattern, as wheel issues do not appear to be an industry-wide hazard pattern, do not contribute to a substantial number of injuries, and ASTM F404-15 contains provisions that evaluate wheel integrity.

H. Footrests

Fourteen high chair incidents involved footrests and resulted in no injuries. All of the incident reports cited footrests cracking on a single high chair model.

ASTM F404-15 includes a static load test to evaluate the durability of footrests. CPSC believes that ASTM F404-15 effectively addresses this hazard pattern, as this is not an industry-wide issue, and ASTM F404-15 includes requirements for footrest durability.

I. Miscellaneous Issues

High chair incident reports included various additional issues, such as paint with excessive lead content, cracked wood finish, loose screws, and assembly problems. Eight high chair incident reports cited these miscellaneous issues and resulted in one injury.

ASTM F404-15 contains several requirements that address these various issues, such as issues with screws on consumer-assembled structural components, sharp edges, small parts, exposed wood, and compliance with 16 CFR part 1303 (banning lead-containing paint). ASTM

F404-15 also includes requirements for instructional literature, intended to provide clear assembly instructions. CPSC believes that ASTM F404-15 effectively addresses these issues.

J. Design

Design issues were involved in 22 high chair incidents, resulting in 13 injuries. Incident reports relating to the design of a high chair primarily cited designs that create entrapment hazards. These hazards commonly resulted in children's arms being entrapped between the back of a high chair and the tray or children's legs catching in the gap between the bottom of the tray and the top of the passive crotch restraint. In the most severe cases, children slid into leg hole openings under the tray and hung by their necks.

To address these "submarining" cases, ASTM F404-15 contains several performance tests that specifically address openings, including a probe test for gaps and completely bounded openings in front of occupants, around the passive crotch restraint, and between horizontal portions and the tray. The standard also includes a test for leg openings and openings around the sides of the high chair seat to ensure that occupants cannot slide through and become entrapped. ASTM F404-15 requires manufacturers to attach passive crotch restraints to the high chair to increase the likelihood that consumers will use restraints and reduce submarining incidents. ASTM F404-15's requirements on openings and scissoring, shearing, and pinching address less serious entrapment hazards. CPSC believes that ASTM F404-15 effectively addresses the design hazard pattern.

K. Stability

Stability issues played a role in 16 high chair incidents, resulting in 12 injuries. This hazard pattern includes forward tip-overs, side tip-overs, and rearward tip-overs. Tip-overs generally occur when a child leans out of the high chair or pushes off a nearby surface. In NEISS

reports that included enough detail to identify the cause of the incident, the vast majority of the incidents were falls resulting from tip-overs, mostly rearward tip-overs. CPSC data also included reports of many injuries resulting from high chairs tipping over, also frequently rearward tip-overs.

ASTM F404-15 requires forward, sideways, and rearward tip-over testing. The standard also contains a stability requirement to simulate the load applied by a child climbing into the chair. CPSC believes that ASTM F404-15 effectively addresses forward and sideways tip-overs. However, based on the frequency of rearward tip-over incidents, CPSC believes that ASTM F404-15 does not adequately address rearward tip-over hazards and a more stringent standard is necessary. Section VIII. discusses CPSC's proposed rearward stability standard.

L. Consumer Observations

Three incident reports involved consumers' perceived safety hazards or complaints about high chairs, but none of the incidents resulted in injuries. These reports did not provide enough information for CPSC to assess the adequacy of ASTM F404-15 regarding the reported concerns.

M. Undetermined

Four high chair incident reports did not provide sufficient information for CPSC to determine how the incidents, including the one reported death and two injuries, occurred. The lack of information available in these incident reports made it impossible for CPSC to assess the effectiveness of ASTM F404-15 in addressing these issues.

VII. Restaurant-Style High Chairs

ASTM F404-15 applies to high chairs without distinguishing where consumers use them. However, many high chairs are designed to be used in commercial settings, primarily restaurants ("restaurant-style high chairs"). These high chairs generally include features that are particularly

useful in commercial or restaurant settings and may not present the same hazards as high chairs used in the home. Based on CPSC's review of incident data and the potential economic impact of the requirements proposed in this NPR, it is possible that, due to the unique environmental factors in restaurant settings, high chairs used in these settings may present lesser hazards and warrant fewer requirements to reduce the risk of injury associated with high chairs. The following describes the factors that weigh in favor of and against distinguishing restaurant-style high chairs from other high chairs and possible options for distinguishing them.

Of the 1,296 CPSRMS incident reports, three explicitly state that the incidents occurred in restaurants while consumers used the establishments' high chairs. Restaurant-style high chairs have several distinct features. This style of chair is generally constructed from robust materials, such as wood or plastic and do not have trays. Therefore, restaurant-style high chairs can be pulled up to a table. In addition, restaurant-style high chairs are designed to be compact and stackable for easy storage and have little space available for labels. Restaurant-style high chairs are also generally designed to be lower to the ground and narrower than high chairs intended for home use. Additionally, restaurant-style high chairs are designed not only to accommodate a wide range of ages, from infants to toddlers, but also accommodate bulky outerwear and shoes. These design attributes are desirable in a restaurant setting to adapt to the environment and be versatile and compact. However, these features also make it difficult for these high chairs to comply with the requirements in ASTM F404-15 and the additional requirements proposed in this NPR.

There are several requirements that restaurant-style high chairs frequently do not follow. Contrary to ASTM F404-15, wedge blocks can generally pass through the leg openings of restaurant-style high chairs. The large side and back openings also do not meet ASTM F404-15.

The belt used as a passive restraint often fits loosely over the top rail of the high chair and does not meet the passive restraint requirements of ASTM F404-15. The lower and narrower stance of these high chairs also may impact the chairs' compliance with the stability requirements in ASTM F404-15. Moreover, there is little space on these high chairs to accommodate the label requirements in ASTM F404-15 or the additional requirements CPSC proposes.

There are several reasons it may be appropriate to apply different requirements to restaurant-style high chairs. First, the environment in which restaurant-style high chairs are used may not present the same hazards that are common in the home. In a restaurant environment, caregivers sit next to the child seated in the high chair, are unlikely to leave a child unattended in the high chair, and are not distracted by the tasks that may divert the caregiver's attention in a home environment. For these reasons, a caregiver would likely be able to prevent an incident from occurring, or correct any issue quickly, before serious injury or death could occur. None of the three incidents involving restaurant-style high chairs reported to CPSC involved children who were unattended and entrapped in the openings of the high chair. Because caregivers are likely to be nearby and attentive, it is likely to be less necessary for warnings regarding attending the child to be visible when the child is in the high chair. Second, modifying restaurant-style high chairs to comply with ASTM F404-15 would likely reduce their utility because these high chairs would no longer accommodate larger children or bulky clothes, would be less compact and not stackable. Finally, given the possible lesser safety issues, the proposed requirements in this NPR impose proportionately high costs on restaurant-style high chair suppliers because these products require more changes to come into compliance.

There are also several reasons to apply the same requirements to restaurant-style high chairs and other high chairs. First, restaurant-style high chairs are readily available to consumers

and are also used in homes. Two of the firms that market their products to consumers produce high chairs identical to the wooden high chairs used in restaurants. This negates the environmental factors that support distinguishing high chairs used in restaurants. Second, there is minimal incident data to indicate whether high chairs actually pose lesser safety risks in restaurant settings. It is also possible that, although caregivers in restaurants are near the child, caregivers may be less likely to attend to the child or use the restraint system because caregivers assume they are near enough to the child to prevent an incident. As the incident data indicate, this may not be correct, as incidents can happen quickly. Finally, because high chairs are readily available to consumers, it may be difficult, practically, to apply different requirements to these high chairs.

Some options for treating restaurant style-high chairs differently than other high chairs include excluding restaurant-style high chairs from the proposed standard or modifying individual requirements, such as label placement and bounded-openings, to reflect the features and lesser safety issues associated with restaurant-style high chairs.

CPSC requests comments on the following factors: whether it is appropriate to distinguish these high chairs, which requirements should differ, and how CPSC could apply those distinctions.

VIII. Description of Proposed Changes to ASTM Standard

The proposed rule would create part 1231, titled, *Safety Standard for High Chairs*. As explained above, the Commission believes that ASTM F404-15 effectively addresses the safety hazards associated with high chairs, with the exception of rearward stability and warnings in labels and instructional literature. For this reason, the Commission proposes to incorporate by

reference ASTM F404-15, with modified requirements for rearward stability and warnings. This section discusses the proposed changes to ASTM F404-15.

A. Rearward Stability

Based on the incident data discussed above, CPSC believes that a more stringent standard than ASTM F404-15 for rearward stability would further reduce the risk of injury. CPSC staff has tested the high chair models involved in incidents and found that the tested models passed the requirements of ASTM F404-15. To develop a performance test to measure and improve the rearward stability of high chairs, CPSC worked with an ASTM task group to develop an alternative rearward stability test, based on CPSC staff's and manufacturers' testing. Although this test is not included in ASTM F404-15, ASTM may adopt the test in future revisions. CPSC proposes to adopt this test, in lieu of the rearward stability test in ASTM F404-15.

The proposed standard is based on a rearward stability index ("SI") rating that evaluates the factors that contribute to rearward tip-overs and sets a minimum SI score for high chairs. The task group developed the SI based on a review of various stability requirements, the incident data, and testing numerous high chair models, including those involved in rearward tip-over incidents and those not reported to be involved in such incidents. The SI measures the elements associated with high chair occupants pushing back from a surface. The SI rates high chairs based on two characteristics associated with rearward tip-overs—the force ("F") required to tip the chair over in the rearward direction and the distance ("D") that a reference point on the seat travels as the chair tilts from the manufacturer's recommended use position to the point of instability just before tipping over. A chair design will score well if it requires a large push-off force and/or a long distance to reach its tipping point. CPSC's and manufacturers' tests

determined that the tip force is a more critical factor in identifying unstable chairs. As such, the SI weights F twice as heavily as D: $SI = 2F + D$.

The test method CPSC developed through this testing and proposes in this NPR includes the following elements:

- Attach a force gauge to the center line of the back of the seat, 7.25" above the seating surface and preload it with 3 pounds of force (to eliminate any slack in fabric or loose seats);
- Establish an initial reference point along the plane of the force gauge;
- Gradually apply a rearward, horizontal force until the point at which the chair becomes unstable and begins to tip over backward;
- Record the maximum force applied during the tip test, along with the total distance the reference point moved from its predetermined position; and
- Calculate the SI by multiplying the force by a factor of two and adding the distance.

Based on the product testing conducted, CPSC proposes requiring high chairs to have an SI of 50 or more.

CPSC also proposes to include requirements for the test surface and positioning of the high chair for rearward stability testing. These requirements are based on CPSC staff's testing initiative and aim to reduce variation in test results. First, CPSC proposes to require the high chair seat back, tray, seat, and wheels to be in specific positions for rearward stability testing. This will decrease variability in test methods and results, and based on testing, CPSC believes that these positions are the most effective for assessing high chair stability.

Second, CPSC proposes to require a specific test surface, including 60-grit sandpaper to prevent sliding and maximum parameters for the stop block placed behind a high chair with

wheels to instigate tipping. Without these requirements, test results vary because test surfaces differ and the height of a stop block affects the amount of force necessary to tip over a high chair.

The proposed rearward stability requirement and test procedure are effective at identifying high chairs that have been involved in rearward tip-over incidents. As such, CPSC believes this more stringent standard would further reduce the risk of injury associated with rearward high chair tip-overs, and proposes requiring this modification to ASTM F404-15.

B. Warnings in Labels

Based on incident data discussed above and research on effective warnings, CPSC believes that the on-product warning requirements in ASTM F404-15 do not adequately address the safety risks associated with high chairs; therefore, CPSC proposes more stringent requirements that would further reduce the risk of injury associated with falls from high chairs. Specifically, CPSC proposes additional content, form, and placement provisions for on-product warnings labels. Tab E of CPSC staff's briefing package for this proposed rule includes additional details about these proposed requirements and the rationale behind them. The briefing package is available at: [insert link when available].

1. Content

CPSC proposes to require high chairs to bear labels that address the following statements:

Children have suffered **skull fractures after falling** from high chairs. Falls can happen **quickly** if child is not restrained properly.

- **Always use restraints**, and adjust to **fit snugly**. Tray is not designed to hold child in chair.
- **Stay near and watch** your child during use.

CPSC believes this language would be more effective than ASTM F404-15's language at reducing the risk of injury associated with falls from high chairs. CPSC developed the proposed warning language from information developed through research on the content of warnings. The proposed rule refers to ANSI Z535.4, *Product Safety Signs and Labels* ("ANSI Z535.4"), for guidance on warning label designs. ANSI Z535.4 is the primary U.S. voluntary consensus standard for product safety signs and labels. The standard is available at: <http://www.ansi.org/>. ANSI Z535.4 addresses the design, application, use, and placement of on-product warning labels. CPSC's Division of Human Factors regularly uses ANSI Z535.4.

As the staff briefing package discusses, literature and guidelines about warnings consistently recommend that on-product warnings include:

- a description of the hazard;
- information about the consequences of exposure to the hazard; and
- instructions about appropriate hazard-avoidance behaviors.

The warning statements in ASTM F404-15 lack important details regarding the hazard and its consequences, providing only a vague description of the types of injuries that may occur. As staff's briefing package for this proposed rule indicates, providing more detailed and vivid information in a warning increases its effectiveness. Accordingly, CPSC developed the proposed language, describing the specific hazard, consequent injuries, and precise actions that can help reduce the likelihood of the hazard.

As Tab E of CPSC staff's briefing package for this proposed rule discusses, incident data and other research reveals the following:

- falls can happen quickly;
- falls occur when caregivers are not close by or watching a child;

- falls occur when caregivers do not use the restraint system;
- falls occur when caregivers do not use the restraint system properly; and
- receiving information about a hazard, its consequences, and mitigating actions, motivates appropriate behavior.

As discussed in further detail in Tab E of CPSC staff’s briefing package, CPSC does not believe that ASTM F404-15 includes adequately detailed requirements to address many of these factors. To increase the effectiveness of warnings and further reduce the risk of injury, CPSC proposes the following for high chair warnings:

- a statement describing the speed with which incidents can occur;
- a detailed description of what “attending” means, including staying near and watching a child;
- an instruction to use the restraint system and a statement that the tray is not part of the restraint system;
- an instruction to adjust the restraints to fit the child snugly; and
- a warning statement regarding the hazard, consequences, and appropriate actions to appear together on a label.

Similarly to ASTM F404-15, CPSC proposes that for high chairs that have a seating component that is also used as a seating component for a stroller, the content of the labels must comply with ASTM F833, *Standard Consumer Safety Performance Specification for Carriages and Strollers* (“ASTM F833”). However, although ASTM F404-15 only requires compliance with section 8.2.2.2 of ASTM F833, CPSC also proposes to require the additional warning provided in section 8.2.2.1. CPSC incorporated the most recent revision of this standard (ASTM

F833-13b) into 16 CFR part 1227 as the safety standard for carriages and strollers, with some modifications, effective September 10, 2015. 79 FR 13,208 (Mar. 10, 2014).

2. Form

Research indicates that the form of a warning can affect the extent to which consumers notice and read the warning. The form of a warning can also communicate the seriousness of a hazard, which can affect compliance with recommended behavior. CPSC considered research on effective forms for warnings, including the requirements in ANSI Z535.4, in developing the proposed form requirements. ASTM F404-15 does not include several of the features that have been found to be effective, including colors, contrast, typeface, and layout.

As discussed in Tab E of CPSC staff's briefing package for this proposed rule, research indicates the following points about the format of warnings:

- certain colors, particularly red, orange, and yellow, attract attention and help convey the presence of a hazard;
- the degree of contrast contributes to readability;
- certain typeface styles, such as sentence capitalization (*i.e.*, mixed upper and lowercase) and boldface, are easier to read and more effective at highlighting information than extensive capitalization;
- left-justified text is easier to read than fully justified text;
- condensed or narrow typeface is less effective at conveying information; and
- lists and outline formats provide for better absorption and retention of information than continuous paragraph text.

ASTM F404-15 does not include specific requirements for many of these factors. To increase the effectiveness of warnings and further reduce the risk of injury, based on this research, CPSC proposes the following for high chair warnings:

- red, orange, or yellow on-product warnings;
- highly contrasting colors, such as black and white;
- sentence capitalization, with key phrases emphasized in boldface;
- left-justified text;
- non-condensed typeface; and
- outline format.

3. Placement

As discussed above, the warning placement and visibility requirements in ASTM F404-15 permit different portions of warning information to appear on separate labels. CPSC believes that to be most effective, all of the warning information should appear together because the hazard description and potential injuries help motivate caregivers to take the recommended actions. Similarly, CPSC believes that it is important for caregivers to be able to see the warnings when putting a child into a high chair and when the child is in it. This will remind users to use the restraint system when putting the child into the high chair and to stay near and watch the child once the high chair is in use. ASTM F404-15 only requires certain warning information to be visible when a caretaker is placing a child in the high chair, not once the chair is occupied; and the standard requires other warning information to be visible when the child is in the chair. Based on the incident data, CPSC believes it would more effectively reduce the risk of injury associated with falls from high chairs if users could see the warning after putting a child in the high chair and before leaving the child unattended. As such, CPSC proposes requiring warning

labels to be visible when placing the occupant in the high chair and once the child is in the high chair.

4. Additional Guidance

CPSC also proposes to include a note in the regulatory text referencing ANSI Z535.4 for optional additional guidance. CPSC would not require compliance with ANSI Z535.4, but the standard may offer regulated entities additional useful information for developing effective labels.

C. Warnings in Instructional Literature

For reasons similar to using warnings in on-product labels, CPSC proposes more stringent requirements for warnings in instructional literature than ASTM F404-15 provides. CPSC believes that more stringent requirements will further reduce the risk of injury associated with high chairs by providing more effective warnings regarding the hazard, potential injuries, and recommended behavior. This includes requirements about the content and form of warnings in instructional literature. The discussion below provides the rationale for these more-stringent requirements, and the requirements are discussed in additional detail in Tab E of CPSC staff's briefing package for this proposed rule.

1. Content

Section 9.2 of ASTM F404-15 requires that instructional literature contain the same warnings as the warnings required on the high chair. CPSC believes that this requirement is appropriate. However, because CPSC proposes to require different on-product warning label content than ASTM F404-15, the more-stringent warning requirements also would apply to instructional literature. The Commission agrees with the additional content requirement listed in section 9.2.1 of ASTM F404-15. Therefore, CPSC does not propose to modify that requirement.

2. Form

Unlike on-product warning labels, ASTM F404-15 does not specify the form in which warning statements in instructional literature must appear. Similarly to on-product warning labels, research and guidance indicate that specific forms are more effective at conveying information. The proposed rule refers to ANSI Z535.6, *Product Safety Information in Product Manuals, Instructions, and Other Collateral Materials* (“ANSI Z535.6”) for guidance on the design and location of product safety messages in instructional literature. The standard is available at: <http://www.ansi.org/>.

CPSC proposes to require the same form requirements for warnings in instructional literature as the requirements proposed for on-product warning labels, with one exception. CPSC believes that these form requirements will further reduce the risk of injury associated with high chairs for the same reasons discussed for on-product warning labels. However, CPSC does not propose to require the use of specific colors (*i.e.*, red, orange, yellow) for warnings in instructional literature unless a manufacturer opts to use color, in which case the same color requirements as on-product labels would apply.

3. Additional Guidance

Similar to ANSI Z535.4, CPSC also proposes to include a note in the regulatory text referencing ANSI Z535.6 for optional additional guidance. CPSC would not require compliance with ANSI Z535.6, but the standard may offer regulated entities additional useful information for developing effective warnings in instructional literature.

IX. Amendment to 16 CFR part 1112 to Include NOR for High Chair Standard

Section 14 of the CPSA establishes requirements for product testing and certification. Manufacturers of products that are subject to a consumer product safety rule under the CPSA or

another rule the Commission enforces must certify, based on product testing, that their product complies with all such rules. 15 U.S.C. 2063(a)(1). Additionally, manufacturers of children's products that are subject to a children's product safety rule must have these products tested by a third party conformity assessment body that CPSC has accredited, and manufacturers must certify that their products comply with all applicable children's product safety rules. *Id.* at 2063(a)(2). The Commission must publish an NOR for the accreditation of third party conformity assessment bodies to assess conformity with a children's product safety rule. *Id.* at 2063(a)(3). Because the proposed rule is a children's product safety rule, if the Commission issues 16 CFR part 1231, *Safety Standard for High Chairs*, as a final rule, the CPSC must also issue an NOR.

The Commission published a final rule, codified at 16 CFR part 1112, titled, *Requirements Pertaining to Third Party Conformity Assessment Bodies*, which established requirements for accreditation of third party conformity assessment bodies to test for conformity with children's product safety rules in accordance with the CPSA. 78 FR 15836 (Ma. 12, 2013). Part 1112 also codifies all of the NORs the Commission previously issued.

NORs for new children's product safety rules, such as the high chair standard, require the Commission to amend part 1112. To accomplish this, as part of this NPR, the Commission proposes to amend part 1112 to add high chairs to the list of children's product safety rules for which CPSC has issued an NOR.

Test laboratories applying for acceptance as a CPSC-accepted third party conformity assessment body to test for compliance with the proposed standard for high chairs would be required to meet the third party conformity assessment body accreditation requirements in part 1112. When a laboratory meets the requirements of a CPSC-accepted third party conformity

assessment body, the laboratory can apply to CPSC to have 16 CFR part 1231, *Safety Standard for High Chairs*, included in the laboratory's scope of accreditation of CPSC safety rules listed for the laboratory on the CPSC website at: www.cpsc.gov/labsearch.

X. Incorporation by Reference

Section 1231.2(a) of the proposed rule incorporates by reference ASTM F404-15. The Office of the Federal Register ("OFR") has regulations concerning incorporation by reference. 1 CFR part 51. Under these regulations, in the preamble of the NPR, an agency must summarize the incorporated material and discuss the ways the material is reasonably available to interested parties or how the agency worked to make the materials reasonably available. 1 CFR 51.5(a).

In accordance with the OFR's requirements, section V.B. of this preamble summarizes the provisions of ASTM F404-15 that the Commission proposes to incorporate by reference. ASTM F404-15 is copyrighted. By permission of ASTM, interested parties may view the standard as a read-only document during the comment period of this NPR at:

<http://www.astm.org/cpsc.htm>. Interested parties may also purchase a copy of ASTM F404-15 from ASTM International, 100 Bar Harbor Drive, P.O. Box 0700, West Conshohocken, PA 19428; <http://www.astm.org/cpsc.htm>. You may also inspect a copy at CPSC's Office of the Secretary, U.S. Consumer Product Safety Commission, Room 820, 4330 East West Highway, Bethesda, MD 20814, telephone 301-504-7923.

XI. Effective Date

The Administrative Procedure Act (5 U.S.C. 551-559) generally requires that the effective date of a rule be at least 30 days after publication of the final rule. 5 U.S.C. 553(d). To allow time for high chairs to come into compliance with the standard, the Commission proposes that the standard become effective 6 months after publication of the final rule in the *Federal*

Register. Without evidence to the contrary, CPSC generally considers 6 months to be sufficient time for suppliers to come into compliance with a new standard, and 6 months is typical for other CPSIA section 104 rules. Six months is also the period that the Juvenile Products Manufacturers Association (“JPMA”) typically allows for products in the JPMA certification program to transition to a new standard once that standard is published. We also propose that the amendment to part 1112 become effective 6 months after publication of the final rule. We ask for comments on this proposed effective date.

XII. Regulatory Flexibility Act

A. Introduction

The Regulatory Flexibility Act (“RFA”; 5 U.S.C. 601–612) requires agencies to consider the impact of proposed rules on small entities, including small businesses. Section 603 of the RFA requires the Commission to prepare an initial regulatory flexibility analysis (“IRFA”) and make it available to the public for comment when the NPR is published. The IRFA must describe the impact of the proposed rule on small entities and identify significant alternatives that accomplish the statutory objectives and minimize any significant economic impact of the proposed rule on small entities. Specifically, the IRFA must discuss:

- the reasons the agency is considering the action;
- the objectives and legal basis of the proposed rule;
- the small entities that would be subject to the proposed rule and, when possible, an estimate of the number of small entities that would be impacted;
- the projected reporting, recordkeeping, and other compliance requirements of the proposed rule, including the classes of small entities subject to it and the professional skills necessary to prepare the reports or records; and

- the relevant federal rules that may duplicate, overlap, or conflict with the proposed rule.

5 U.S.C. 603.

This section summarizes the IRFA for this proposed rule. Based on CPSC's analysis, staff cannot rule out a significant economic impact for 20 of the 38 firms (53 percent) operating in the U.S. market for high chairs.

B. Market Description

CPSC identified 62 firms that supply high chairs to the U.S. market. The majority of these firms are domestic (including 27 manufacturers, 19 importers, and 5 wholesalers). The remaining 11 firms are foreign (including 9 manufacturers, 1 importer, and 1 retailer). Forty-eight of these firms market their products to consumers, while 14 firms market their products for use in commercial settings, such as restaurants, hotels, and day care centers. However, consumers are able to purchase high chairs that are generally designed and marketed for use in commercial settings; two of the firms that market their products to consumers also produce high chairs identical to the wooden high chairs used in restaurants.

C. Reason for Agency Action, Objectives, and Legal Basis for Proposed Rule

Section 104 of the CPSIA requires the CPSC to promulgate a mandatory standard for high chairs that is substantially the same as the voluntary standard or more stringent than the voluntary standard if the Commission determines that more stringent requirements would further reduce the risk of injury associated with the product.

D. Description of the Proposed Rule

CPSC proposes to adopt ASTM F404-15 with modifications to the rearward stability test and requirements for warnings on labels and instructional literature. Section V. of this preamble discusses key provisions of ASTM F404-15.

CPSC believes that the high chairs of 37 firms comply with ASTM F404. This is because JPMA has certified the high chairs supplied by 12 firms, and the remaining 25 firms state that they comply with the voluntary standard. As such, these firms will not incur additional costs to comply with the provisions of ASTM F404-15, which CPSC proposes to adopt.

In addition to incorporating ASTM F404-15 by reference, CPSC proposes to adopt modified requirements for rearward stability and warnings in labels and instructional literature because CPSC believes that more stringent standards in these areas would further reduce the risk of injury. Section VIII. of this preamble discusses these proposed provisions.

Preliminary testing by CPSC staff and other members of the ASTM task group indicates that most high chairs would pass the proposed rearward stability test, and therefore, would not require any modifications to meet the proposed standard. Through testing high chairs and other market research, staff identified only three high chairs that might not pass the modified rearward stability test, based on their design. However, CPSC expects that the cost of modifying the design change to increase rearward stability would be low, and that this could likely be accomplished by adding flat supports to the bottom of each back leg.

The Commission is also proposing more stringent requirements for warnings in labels and instructional literature. All firms would be affected by the proposed requirements for warnings in labels and instructional literature. Each firm would need to modify the text and formatting of the warnings for both the product and the instructional literature. Firms would need to move warning labels to the specified location, ensuring that the warnings are visible when the child is placed in the high chair and when the child is in the high chair. If the high chair can be used with and without padding, this would require placing the warning on both the high chair and the padding.

Section XII.F. of this preamble discusses staff’s assessment of the impact of these proposed requirements on small entities.

E. Other Relevant Federal Rules

CPSC staff has not identified any federal or state rules that duplicate, overlap or conflict with the proposed rule.

F. Impact of the Proposed Rule on Small Businesses

CPSC is aware of approximately 62 firms currently marketing high chairs in the United States, 51 of which are domestic firms. Under U.S. Small Business Administration (“SBA”) guidelines, a high chair manufacturer is “small” if it has 500 or fewer employees, and importers and wholesalers are small if they have 100 or fewer employees. CPSC limited its analysis to domestic firms because SBA guidelines and definitions pertain to U.S. entities. Based on these guidelines and available information about the firms, staff has identified 38 of the 51 domestic suppliers as small (21 manufacturers, 13 importers, and 4 wholesalers). There may be additional small domestic high chair suppliers that CPSC is not aware of who are operating in the U.S. market. Table 3 lists the number of firms by category:

TABLE 3.—*Firms that Market High Chairs in the U.S.*

Category	Number of Firms
Domestic	51
Small	38
Manufacturers	21
Compliant with ASTM F404	12
Not Compliant with ASTM F404	9
Importers and Wholesalers	17
Compliant with ASTM F404	9
Not Compliant with ASTM F404	8
Large	13
Foreign	11
Total	62

1. Small Manufacturers with Compliant High Chairs

Of the 21 small manufacturers, 12 produce high chairs that comply with ASTM F404-14. In general, CPSC expects small manufacturers that already comply with the voluntary standard will continue to comply with the standard as the standard evolves because they follow, and in three cases, actively participate in ASTM's standard-development process. As such, compliance with the voluntary standard is part of these firms' established business practice. Because ASTM approved ASTM F404-15 on May 15, 2015, these firms would likely be in compliance with the standard before the proposed rule would take effect.

For this reason, the economic impact of the proposed rule should be small for 10 of the 12 small domestic manufacturers. These 10 firms include one firm that may need to modify its high chair to meet the proposed rearward stability test; as discussed above, the cost associated with this modification is likely small.

However, the proposed warning label requirements may create a significant economic impact for two small manufacturers. Both firms produce high chairs with compact designs, with one serving the commercial restaurant market. Redesigning the seat back would provide additional space for warning labels, but may reduce the chairs' compactness, which may be an important feature for marketability. For one firm, high chairs represent a small part of its product line, but it is unclear whether the firm could stop producing high chairs because CPSC was unable to obtain sales revenue information. For the second firm, high chairs represent an integral part of its commercial product line, so discontinuing that product line could create a significant economic burden. CPSC requests input on consumer preferences for compact high chairs, how compact high chair manufacturers would respond to the proposed warning label requirements, and the costs of developing a compliant product.

2. Small Manufacturers with Non-Compliant High Chairs

Nine small manufacturers produce high chairs that do not comply with the voluntary standard, five who market their products for use in commercial settings, primarily in restaurants. CPSC believes it is possible that there would be a significant economic impact on some of these manufacturers. The five producers of restaurant-style high chairs would need to make several changes to meet the base requirements of ASTM F404-15. As discussed previously, different circumstances and needs exist for restaurant-style high chairs. Complying with the proposed rule may undermine some of the characteristics that make certain high chair features desirable in restaurant settings. For example, leg holes tend to be larger for restaurant-style high chairs to accommodate children clothed in outerwear and children of varied ages and sizes. The proposed standard would preclude some features.

Manufacturers of restaurant-style high chairs may also need to make changes to meet the proposed warning label requirements. For example, two firms manufacture plastic high chairs that may need to be redesigned to comply with the proposed warning label requirements.

Four firms that do not currently comply with the ASTM standard produce high chairs for home use. One of these four firms likely would need to make significant changes to its product to meet the proposed warning label requirements, given the compact design of its product. The three remaining firms appear to have sufficient room on their high chairs to accommodate the proposed warning labels without redesign, and any modifications to the high chairs would be due to the requirements of ASTM F404-15. However, CPSC staff could not determine the extent or cost of the changes that may be necessary, so we cannot rule out a significant economic impact.

CPSC requests comments on the differences between restaurant-style high chairs and high chairs produced for home use, as well as the desirability of particular features in these respective environments. CPSC also requests information about the changes that would be

necessary to meet the proposed requirement, including whether redesign or retrofitting would be necessary and whether there would be any associated costs.

3. Third Party Testing Costs for Small Manufacturers

Under section 14 of the CPSA, if CPSC adopts the proposed high chair requirements, all manufacturers will be subject to the third party testing and certification requirements under 16 CFR part 1107. Third party testing would include any physical and mechanical test requirements specified in a final high chair rule. Manufacturers and importers should already be conducting required lead testing for high chairs. Third party testing costs would be in addition to the direct costs of meeting the high chair standard.

More than half of small high chair manufacturers (11 out of 21) are already testing their products to verify compliance with the ASTM standard, although not necessarily by a third party laboratory. For these manufacturers, the impact on testing costs would be limited to the difference between the cost of third party tests and the cost of current testing regimes. The suppliers that CPSC staff contacted estimate that obtaining third party testing for high chairs would cost about \$600 to \$900 per model sample. For manufacturers that are already testing, the incremental costs will be lower than that.

Based on CPSC staff's examination of firm revenues from recent Dun & Bradstreet or ReferenceUSAGov reports, the impact of third party testing, alone is unlikely to be economically significant for small manufacturers of noncompliant high chairs. Even without knowing how many samples would be needed to meet the "high degree of assurance" criterion in part 1107, more than 12 units per model would be required before testing costs exceed 1 percent of gross revenue for the small manufacturer with the lowest gross revenue. CPSC could not obtain revenue information for one small manufacturer, and therefore, could not evaluate the impact on

that firm. CPSC requests comments on testing costs and incremental costs of third party testing (*i.e.*, how much does moving from a voluntary to a mandatory third party testing regime add to testing costs, in total, and on a per-test basis). In particular, CPSC requests comments on the preliminary determination that third party testing is unlikely to lead to significant economic impacts for small high chair manufacturers. In addition, CPSC would like comments about the number of high chair units that typically need to be tested to provide a “high degree of assurance.”

4. Small Importers and Wholesalers with Compliant High Chairs

CPSC considered the economic impact to importers and wholesalers together, because both rely on outside firms to supply the products they distribute to the U.S. market. Importers distribute products made by foreign firms and are often closely related to the firms producing their products. CPSC was unable to determine the source of wholesalers’ high chairs, but the sources are likely from other suppliers that may be foreign or domestic.

In the absence of a mandatory regulation, the nine firms (seven small importers and two small wholesalers) currently in compliance with the voluntary standard likely would remain in compliance with new versions. However, the high chairs these firms supply would require modifications to meet the proposed requirements. There are two firms that may require modifications to meet the rearward stability requirement (one importer and one wholesaler) but, as discussed above, these costs are likely to be low. The cost of modifying the wording and format of the warnings should be small, as well, given that such changes typically add only a few cents per unit to production costs.

The proposed placement requirements for warnings, however, could be more costly, possibly requiring firms to retrofit or redesign their high chairs. Four of the nine firms likely

would have to modify the design of their high chairs to meet the proposed warnings label visibility requirement. The high chairs of two firms have compact designs, making the display of warning labels difficult. The remaining two firms provide information in a number of languages that would exceed the space available on their high chairs. Finding an alternative supply source would not be a viable alternative for three of the four firms, due to close relationships with their suppliers; however, all three firms supply a sufficient number of other products that could probably allow these firms to eliminate high chairs from their product line entirely. The fourth firm is a commercial supplier, and high chairs are an integral part of this firm's product line; therefore, exiting the high chair market would likely cause this firm to go out of business. CPSC requests comments on how importers would respond to the proposed rule and what are the costs of developing a compliant product.

5. Small Importers and Wholesalers with Noncompliant High Chairs

There is insufficient information to rule out a significant impact for any of the eight importers and wholesalers of noncompliant high chairs. Whether there would be a significant economic impact would depend upon the extent of the changes required for these firms to come into compliance and the response of their suppliers. Their suppliers may pass on to the importers and wholesalers any increase in production costs that result from the proposed changes.

Six of the eight importers and wholesalers with noncompliant high chairs do not appear to have direct ties to their product suppliers. Therefore, these firms may choose to switch to alternative suppliers or manufacture other products, rather than bear the costs of complying with the proposed standard. It is unclear whether the costs of complying with the proposed requirements would be significant for these firms. Three firms supply restaurant-style high chairs, including one plastic high chair. As such, although the three firms may find compliant

high chairs from alternative supply sources, these firms would share the same concerns as restaurant-style high chair manufacturers regarding the desirability of their product to their customers. Two of the six firms supply high chairs to the consumer market that are identical to several supplied to the commercial market. Although the costs of complying with the proposed standard could be significant for these two firms, high chairs make up only a small part of their product lines. Therefore, the two firms may eliminate high chairs from their product lines or select compliant high chairs from another supplier. However, CPSC was unable to obtain sales revenue for high chairs and could not determine whether exiting the high chair market would generate significant economic impacts.

The remaining two firms are directly tied to their foreign suppliers. Therefore, finding an alternative supply source would not be a viable alternative. However, these foreign suppliers may wish to comply with the proposed requirements to continue to market their products in the United States. Although it is possible that these firms could stop selling high chairs, it is unlikely for two of these firms because high chairs represent one of only a few products in their lines. Again, CPSC could not determine whether exiting the high chair market would generate significant economic impacts, given the lack of sales revenue for high chairs.

6. Third Party Testing Costs for Small Importers and Wholesalers

As with manufacturers, all importers and wholesalers would be subject to third party testing and certification requirements, if CPSC adopts a final high chair standard. Consequently, importers and wholesalers would be subject to costs similar to manufacturers' costs if the foreign suppliers of importers and wholesalers do not obtain third party testing. Just over half of high chair importers and wholesalers (9 out of 17) already test their products to verify compliance

with the ASTM standard. Any additional costs associated with a final high chair rule thus would be limited to the incremental costs of third party testing over the current testing regime.

There may be significant costs for two or three firms that do not comply with the ASTM standard to obtain third party certification. Specifically, for two firms, the cost of testing as few as three units per model could exceed 1 percent of their gross revenue. A third firm would need to test about six units per model before testing costs would exceed 1 percent of its gross revenue. CPSC was unable to obtain revenue data for one small, noncompliant importer, and therefore, could not examine the size of the impact on that firm.

7. Summary of Impacts

CPSC staff is aware of 38 small firms that currently market high chairs in the United States, of which 21 are domestic manufacturers and 17 are domestic importers or wholesalers. Of the 21 small manufacturers, 10 are unlikely to experience significant economic impacts as a result of the proposed rule. However, CPSC cannot rule out a significant economic impact for the remaining 11 manufacturers. For eight of the small importers and wholesalers, it is unlikely the proposed rule would have a significant economic impact, based on a review of firm revenues and the options available to each firm. However, it is possible that the proposed rule would have a significant economic impact on the remaining nine small importers and wholesalers. Therefore, in total, based on current information, CPSC cannot rule out a significant economic impact for 20 of the 38 firms (53 percent) operating in the U.S. high chair market.

8. Impacts of Test Laboratory Accreditation Requirements on Small Laboratories

In accordance with section 14 of the CPSA, all children's products that are subject to a children's product safety rule must be tested by a third party conformity assessment body that has been accredited by CPSC. These third party conformity assessment bodies test products for

compliance with applicable children's product safety rules. Testing laboratories that want to conduct this testing must meet the NOR for third party conformity testing. CPSC has codified NORs in 16 CFR part 1112. CPSC proposes to amend 16 CFR part 1112 to establish an NOR for testing laboratories to test for compliance with the proposed high chair standard. This section assesses the impact of this proposed amendment on small laboratories.

CPSC conducted a Final Regulatory Flexibility Analysis ("FRFA") when it adopted part 1112. 78 FR 15836 (Mar. 12, 2013). The FRFA concluded that the accreditation requirements would not have a significant adverse impact on a substantial number of small laboratories because no requirements were imposed on laboratories that did not intend to provide third party testing services. The only laboratories that were expected to provide such services were laboratories that anticipated receiving sufficient revenue from the mandated testing to justify accepting the requirements as a business decision.

For the same reasons, including the NOR for high chairs in part 1112 would not have a significant adverse impact on small laboratories. Moreover, CPSC expects that only a small number of laboratories would request accreditation to test high chairs, based on the number of laboratories that have applied for CPSC accreditation to test for conformance to other juvenile product standards. Most laboratories would already have accreditation to test for conformance to other juvenile product standards, and then the only costs would be to add the high chair standard to their scope of accreditation. Test laboratories have indicated that this cost is extremely low when they are already accredited for other CPSIA section 104 rules. Therefore, the Commission certifies that the NOR for the high chair standard will not have a significant impact on a substantial number of small entities.

G. Alternatives

At least four alternatives are available to minimize the economic impact on small entities supplying high chairs while also complying with the direction of section 104 of the CPSIA: (1) adopt ASTM F404-15 with no modifications; (2) adopt ASTM F404-15 with the proposed modifications, except for requirements on the placement of warning labels; (3) adopt ASTM F404-15 with the proposed modifications, but exclude restaurant-style high chairs from the scope of the rule; and (4) provide a later effective date for some or all high chairs.

First, section 104 of the CPSIA directs the Commission to promulgate a standard that is either substantially the same as the voluntary standard or more stringent if the Commission determines that would further reduce the risk of injury associated with the product. Therefore, adopting ASTM F404-15 with no modifications is the least stringent rule CPSC could adopt. This alternative would reduce the economic impact on all of the small businesses supplying high chairs to the U.S. market. Although, choosing this alternative would not reduce the testing costs associated with the rule, this option would eliminate the economic impact of complying with the requirements that CPSC proposes in addition to ASTM F404-15 for many firms. Specifically, this option would eliminate the cost of complying with the additional requirements for the 10 small domestic manufacturers and 9 small importers and wholesalers with compliant high chairs, all of whom would likely comply with ASTM F404-15 by the time a CPSC final rule for high chairs would take effect. However, the requirements that CPSC proposes in addition to ASTM F404-15 would reduce the risk of injuries associated with backward tip-over incidents and fall incidents where caregivers did not use restraints or used the restraints improperly. Adopting ASTM F404-15 with no modifications would not meet these objectives.

Second, the Commission could reduce impacts to small businesses by adopting ASTM F404-15 with the proposed modifications, except for the requirement regarding the placement

and visibility requirements for warning labels. One option is to require warning labels to be visible only as a child is being placed into the high chair. This would reduce the proportion of high chair models with backs that would need to be redesigned and expanded to accommodate labels that are visible when the high chair is occupied. Another option would be to allow duplicate labels. Manufacturers could place one label on the front seat back, which would be visible when the child is placed in the seat, and manufacturers could place a second label in a location that is visible when the child is in the high chair. This alternative would reduce the economic impact on compact high chairs or high chairs with smaller backs.

Third, because a substantial portion of the economic impact of the proposed rule would fall on small, restaurant-style high chair suppliers, CPSC could exclude restaurant-style high chairs from this rule. Restaurant settings have unique requirements, including a need for smaller high chairs and to accommodate children of various sizes. It would be difficult to retain these features and comply with the proposed requirements. Moreover, CPSC has identified only a few injuries that involved high chairs in restaurant settings. Therefore, the reduction in safety benefits associated with limiting the rule's scope likely would be minimal.

If restaurants could no longer provide high chairs with the desirable attributes, restaurants may stop providing high chairs for customers, which could result in customers using less safe options, such as placing infant carriers on tables or chairs, or using booster seats for children under the appropriate age. CPSC requests comments on the potential impact of excluding restaurant-style high chairs from the proposed rule, including cost and safety impacts.

Because restaurant-style high chairs are also available to consumers for home use, CPSC could take steps to reduce the potential safety risks of these high chairs through other means. For example, CPSC could require restaurant-style high chair suppliers to label their products: “not

intended for home use.” Additionally, CPSC could develop separate warning label requirements for these products to inform users of the specific hazard patterns related to restaurant-style high chairs. ASTM could also develop requirements specific to restaurant-style high chairs. CPSC requests comments on the possibility of excluding restaurant-style high chairs from the proposed requirements, including the implications for safety and costs.

Fourth, the Commission could reduce the economic impact of the proposed rule on small businesses by setting a later effective date for some or all high chairs. A later effective date would reduce the economic impact on firms in two ways. First, firms would be less likely to experience a lapse in production or imports that could result if they are unable to come into compliance and secure third party testing within the required timeframe. Second, firms could spread costs over a longer period, thereby reducing annual costs, as well as the present value of total costs. CPSC requests comments on the 6-month effective date, as well as feedback on how firms likely would address the proposed rule. CPSC could also consider a longer effective date for firms that supply restaurant-style high chairs. However, this may not reduce the economic impact on these firms because the primary cost issue for them is the utility of their high chairs, not the time needed to comply with the standard. Nevertheless, CPSC requests comments, particularly from restaurants and other commercial establishments, on the validity of this conclusion.

XIII. Environmental Considerations

The Commission’s regulations outline the types of agency actions that require an environmental assessment (“EA”) or environmental impact statement (“EIS”). Rules that have “little or no potential for affecting the human environment” fall within a “categorical exclusion” under the National Environmental Policy Act (“NEPA”; 42 U.S.C. 4231-4370h) and the

regulations implementing NEPA (40 CFR Parts 1500-1508) and do not normally require an EA or EIS. As stated in 16 CFR 1021.5(c)(1), rules or safety standards that provide design or performance requirements for products fall within that categorical exclusion. Because this proposed rule would create design and performance requirements for high chairs, the proposed rule falls within the categorical exclusion, and thus, no EA or EIS is required.

XIV. Paperwork Reduction Act

This proposed rule contains information collection requirements that are subject to public comment and review by the Office of Management and Budget (“OMB”) under the Paperwork Reduction Act of 1995 (“PRA”; 44 U.S.C. 3501–3521). Under 44 U.S.C. 3507(a)(1)(D), an agency must publish the following information:

- a title for the collection of information;
- a summary of the collection of information;
- a brief description of the need for the information and the proposed use of the information;
- a description of the likely respondents and proposed frequency of response to the collection of information;
- an estimate of the burden that shall result from the collection of information; and
- notice that comments may be submitted to the OMB.

In accordance with this requirement, the Commission provides the following information:

Title: Safety Standard for High Chairs

Description: The proposed rule would require each high chair to comply with ASTM F404-15, with additional requirements regarding rearward stability and warnings in labels and instructional literature. Sections 8 and 9 of ASTM F404-15 contain requirements for labels and

instructional literature. These requirements fall within the definition of “collection of information” provided in the PRA at 44 U.S.C. 3502(3).

Description of Respondents: Persons who manufacture or import high chairs.

Estimated Burden: CPSC estimates the burden of this collection of information as follows:

TABLE 4.—*Estimated Annual Reporting Burden*

16 CFR Section	Number of Respondents	Frequency of Responses	Total Annual Responses	Hours per Response	Total Burden Hours
1231.2	62	2	124	1	124

CPSC’s estimate is based on the following:

Section 8.1 of ASTM F404-15 requires that the name and address (city, state, and zip code) of the manufacturer, distributor, or seller be marked on each high chair. Section 8.2 of ASTM F404-15 requires a code mark or other product identification on each high chair and the high chair’s package that indicates the date (month and year) of manufacture.

Sixty-two known entities supply high chairs to the U.S. market and may need to modify their existing labels to comply with ASTM F404-15. CPSC estimates that the time required to make these modifications is about 1 hour per model. Based on an evaluation of supplier product lines, each entity supplies an average of two models of high chairs. Therefore, the estimated burden associated with labels is 1 hour per model × 62 entities × 2 models per entity = 124 hours. CPSC estimates the hourly compensation for the time required to create and update labels is \$30.19 (U.S. Bureau of Labor Statistics, “Employer Costs for Employee Compensation,” Mar. 2015, Table 9, total compensation for all sales and office workers in goods-producing private industries: <http://www.bls.gov/ncs/>). Therefore, the estimated annual cost associated with the

proposed labeling requirements is \$3,743.56 ($\$30.19 \text{ per hour} \times 124 \text{ hours} = \$3,743.56$). No operating, maintenance, or capital costs are associated with the collection.

Section 9.1 of ASTM F404-15 requires instructions to be supplied with a high chair. High chairs are products that generally require use and assembly instructions. As such, high chairs sold without use and assembly instructions would not be able to compete successfully with high chairs that supply this information. Under OMB's regulations, the time, effort, and financial resources necessary to comply with a collection of information incurred by parties in the "normal course of their activities" are excluded from a burden estimate when an agency demonstrates that the disclosure activities required are "usual and customary." 5 CFR 1320.3(b)(2). CPSC is unaware of high chairs that generally require use or assembly instructions but lack such instructions. Therefore, CPSC estimates that no burden hours are associated with section 9.1 of ASTM F404-15, because any burden associated with supplying instructions with high chairs would be "usual and customary," and thus, excluded from "burden" estimates under OMB's regulations.

Based on this analysis, the proposed standard for high chairs would impose a burden to industry of 124 hours at a cost of \$3,743.56 annually.

CPSC has submitted the information collection requirements of this rule to OMB for review in accordance with PRA requirements. 44 U.S.C. 3507(d). CPSC requests interested parties submit comments regarding information collection to the Office of Information and Regulatory Affairs, OMB (see the ADDRESSES section at the beginning of this notice).

Pursuant to 44 U.S.C. 3506(c)(2)(A), the Commission invites comments on:

- whether the proposed collection of information is necessary for the proper performance of CPSC's functions, including whether the information will have practical utility;

- the accuracy of CPSC's estimate of the burden of the proposed collection of information, including the validity of the methodology and assumptions used;
- ways to enhance the quality, utility, and clarity of the information the Commission proposes to collect;
- ways to reduce the burden of the collection of information on respondents, including the use of automated collection techniques, when appropriate, and other forms of information technology; and
- the estimated burden hours associated with modifying labels and instructional literature, including any alternative estimates.

XV. Preemption

Under section 26(a) of the CPSA, no state or political subdivision of a state may establish or continue in effect a requirement dealing with the same risk of injury as a federal consumer product safety standard under the CPSA unless the state requirement is identical to the federal standard. 15 U.S.C. 2075(a). States or political subdivisions of states may, however, apply to the Commission for an exemption, allowing them to establish or continue such a requirement if the state requirement provides a significantly high degree of protection from the risk of injury and does not unduly burden interstate commerce. *Id.* at 2075(c).

One of the functions of the CPSIA was to amend the CPSA, adding several provisions to CPSA, including CPSIA section 104 in 15 U.S.C. 2056a. As such, consumer product safety standards that the Commission creates under CPSIA section 104 are covered by the preemption provision in the CPSA. Consequently, the rule proposed in this NPR would be a federal consumer product safety standard, and the preemption provision in section 26 of the CPSA would apply.

XVI. Request for Comments

This NPR begins a rulemaking proceeding under section 104(b) of the CPSIA to issue a consumer product safety standard for high chairs and to amend part 1112 to add high chairs to the list of children's product safety rules for which CPSC has issued an NOR. We invite all interested persons to submit comments on any aspect of the proposed mandatory safety standard for high chairs and on the proposed amendment to part 1112. Specifically, the Commission requests comments on the following:

- the requirements in ASTM F404-15, including their effectiveness in addressing the risk of injury associated with high chairs and the costs of complying with these requirements;

- the additional requirements proposed for rearward stability, including its effectiveness in addressing the risk of injury associated with rearward tip-overs and the costs of complying with these requirements;
- the additional requirements proposed for warnings in labels and instructional literature, including their effectiveness at addressing the risk of injury associated with falls from high chairs and the costs of complying with these requirements;
- whether application of different requirements to restaurant-style high chairs is appropriate, relevant safety implications, and options for applying distinct standards;
- the costs to small businesses associated with the requirements proposed in this NPR, including the costs to comply with the proposed rearward stability requirements, content and form requirements for labels and instructional literature, and placement requirements for labels;
- alternatives to the proposed standard that would reduce impacts on small businesses;
- the proposed effective date and whether an extended effective date would further mitigate the impact on small businesses and to what extent; and
- any additional information relevant to the issues discussed in this NPR and the proposed requirements.

During the comment period, ASTM F404-15 is available for review. Please see section X. for instructions on viewing it.

Please submit comments in accordance with the instructions in the **ADDRESSES** section at the beginning of this NPR.

List of Subjects

16 CFR Part 1112

Administrative practice and procedure, Audit, Consumer protection, Reporting and recordkeeping requirements, Third party conformity assessment body.

16 CFR Part 1231

Consumer protection, Imports, Incorporation by reference, Infants and children, Labeling, Law enforcement, and Toys.

For the reasons discussed in the preamble, the Commission proposes to amend Title 16 of the Code of Federal Regulations as follows:

PART 1112—REQUIREMENTS PERTAINING TO THIRD PARTY CONFORMITY ASSESSMENT BODIES

1. The authority citation for part 1112 continues to read as follows:

Authority: 15 U.S.C. 2063; Pub. L. No. 110-314, section 3, 122 Stat. 3016, 3017 (2008).

2. Amend § 1112.15 by adding paragraph (b)(42) to read as follows:

§ 1112.15 When can a third party conformity assessment body apply for CPSC acceptance for a particular CPSC rule and/or test method?

* * * * *

(b) * * *

(42) 16 CFR part 1231, Safety Standard for High Chairs.

* * * * *

3. Add part 1231 to read as follows:

PART 1231-SAFETY STANDARD FOR HIGH CHAIRS

Sec.

1231.1 Scope.

1231.2 Requirements for high chairs.

Authority: The Consumer Product Safety Improvement Act of 2008, Pub. L. 110-314, § 104, 122 Stat. 3016 (August 14, 2008); Pub. L. No. 112-28, 125 Stat. 273 (August 12, 2011).

§ 1231.1 Scope.

This part establishes a consumer product safety standard for high chairs.

§ 1231.2 Requirements for high chairs.

(a) Except as provided in paragraphs (b) through (e) of this section, each high chair must comply with all applicable provisions of ASTM F404-15, Standard Consumer Safety Specification for High Chairs, approved on May 15, 2015. The Director of the Federal Register approves this incorporation by reference in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. You may obtain a copy from ASTM International, 100 Bar Harbor Drive, P.O. Box 0700, West Conshohocken, PA 19428; <http://www.astm.org/cpsc.htm>. You may inspect a copy at the Office of the Secretary, U.S. Consumer Product Safety Commission, Room 820, 4330 East West Highway, Bethesda, MD 20814, telephone 301-504-7923, or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030, or go to:

http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html.

(b) Instead of complying with section 6.5 of ASTM F404-15, comply with the following:

(1) 6.5.1 *Forward and sideways stability*—A chair shall not tip over when forces are applied in accordance with 7.7.2.4 and 7.7.2.5.

(2) 6.5.2 *Rearward stability*—When tested in accordance with 7.7.2.6 (paragraph (c)(3) of this section), a high chair shall not have a Rearward Stability Index of 50 or more.

(c) For rearward stability testing, instead of complying with sections 7.7.2.1, 7.7.2.2, and 7.7.2.6 of ASTM F404-15, comply with the following:

(1) 7.7.2.1 Place the high chair in a manufacturer's recommended use position with all legs on a level floor and with the seat back adjusted into the most upright position. Attach the tray in the rear position, closest to the high chair seat back. For high chairs with height-adjustable seats, adjust the seat into the highest manufacturer's recommended use position or the position deemed most likely to fail. If a high chair has lockable wheels, those wheels shall be locked during stability testing.

(2) 7.7.2.2 Place the high chair on a rigid, horizontal test surface covered with 60 grit sandpaper or equivalent to prevent the chair from sliding on the test surface during the test. If a high chair slides on the test surface during the test or has wheels that do not lock, place a stop on the test surface to prevent sliding during the test. The stop shall be low profile, minimum height required to prevent sliding, and shall not inhibit the tipping of the high chair or affect the test results.

(3) 7.7.2.6 *Rearward stability* –

(i) 7.7.2.6.1 Attach a force gauge to the rear surface of the seat back at the lateral centerline and 7 1/4 in. (184 mm) above the occupant seating surface as shown in Figure 1. For high chairs with a seat back 7 1/4 in. (184 mm) high or less, attach the force gauge at the lateral centerline and top surface of the seat back.

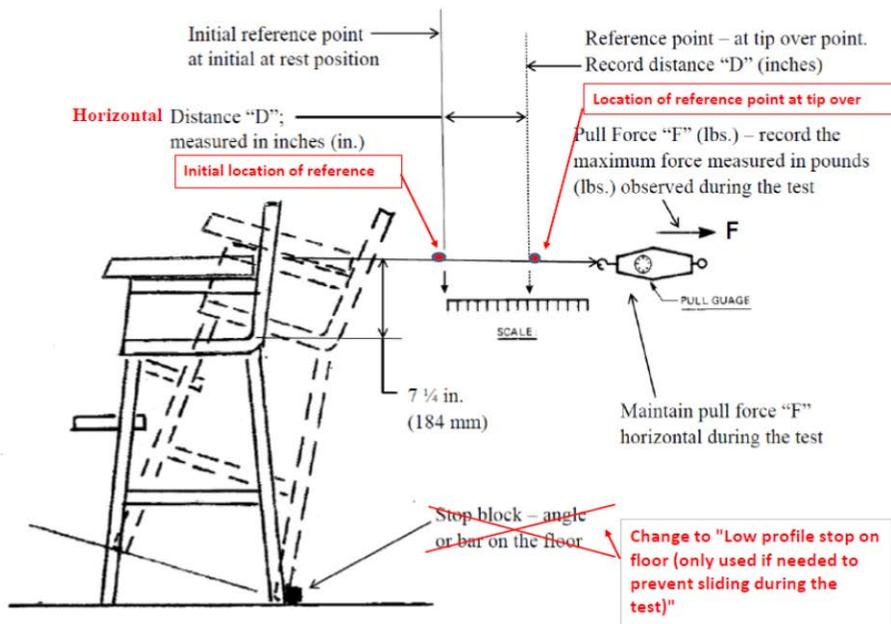


FIGURE 1.—*Rearward Stability Test*

(ii) 7.7.2.6.2 With the high chair in the at rest position, gradually apply a preload force "F" of 3 lbf (13 N) to the seat back surface of the high chair and while maintaining the force, establish the initial location of a reference point some distance away from the force gauge as shown in Figure 1.

(iii) 7.7.2.6.3 Gradually increase the horizontal force over a period of at least 5 seconds and continue to pull the high chair rearward until the high chair reaches the point that it becomes unstable and is on the verge of tipping over. Record the maximum force "F" in pounds (lbs.) applied during the test and the horizontal distance "D" in inches (in.) from the initial location of the reference point to the location of the reference point where the high chair becomes unstable and is on the verge of tipping over. Force "F" shall be maintained in a horizontal direction throughout the test.

(iv) 7.7.2.6.4 Calculate the Rearward Stability Index using the formula shown below.

$$\text{Rearward Stability Index} = 2F + D$$

Force "*F*" is measured in pounds (lbs.).

Distance "*D*" is measured in inches (in.)

(d) Instead of complying with section 8.4 of ASTM F404-15, comply with the following:

(1) 8.4 *Warning Statements—Each Product Shall Have Warning Statements:*

(i) 8.4.1 The warnings shall be easy to read and understand and be in the English language at a minimum.

(ii) 8.4.2 Any labels or written instructions provided in addition to those required by this section shall not contradict or confuse the meaning of the required information, or be otherwise misleading to the consumer.

(iii) 8.4.3 The warning statements shall be conspicuous, in highly contrasting color(s) (e.g., black text on a white background), permanent, and in non-condensed sans serif style type.

(iv) 8.4.4 Each warning statement or group of warning statements shall be preceded by the Safety Alert Symbol “” and the signal word “WARNING” in bold uppercase letters. If warnings are placed directly under or adjacent to one another, then the safety alert symbol and the signal word WARNING need to be displayed only once. The Safety Alert Symbol “” and the signal word “WARNING” shall not be less than 0.2 in. (5 mm) high and the remainder of the text shall be in characters whose uppercase shall not be less than 0.1 in. (2.5 mm) high. The height of the safety alert symbol shall equal or exceed the signal word height.

(v) 8.4.5 The safety alert symbol “” and the signal word “WARNING” shall be in contrasting color to the background and delineated with solid black line borders. The background color behind the safety alert symbol “” and the signal word “WARNING” shall be orange,

red, or yellow, whichever provides the best contrast against the product background. The signal word “WARNING” and the solid triangle portion of the safety alert symbol “” shall be black. The exclamation mark of the safety alert symbol “” shall be the same color as the background. The remainder of the text shall be black, with key words highlighted using boldface, on a white background surrounded by a solid black line border. This text also shall be left-justified, in upper and lowercase letters (*i.e.*, sentence capitalization), and in list or outline format, with precautionary statements indented from hazard statements and preceded with bullet points. An example label in the format described in this section is shown in Figure 2.



FIGURE 2.—*Label Format Example*

NOTE: For optional additional guidance on the design of warnings, see the most-recent edition of ANSI Z535.4, *Product Safety Signs and Labels*, American National Standards Institute, Inc., available at <http://www.ansi.org/>.

(vi) 8.4.6 The warning statements shall be in a location that is visible by the caregiver while placing the occupant into the high chair in each of the manufacturer’s recommended use positions.

(vii) 8.4.7 High chairs that do not have a seating component that is also used as a seating component of a stroller, shall, in the same label, address the following warning statements:

Children have suffered **skull fractures after falling** from high chairs. Falls can happen **quickly** if child is not restrained properly.

- **Always use restraints**, and adjust to **fit snugly**. Tray is not designed to hold child in chair.
- **Stay near and watch** your child during use.

(viii) 8.4.8 High chairs that have a seating component that is also used as a seating component of a stroller shall use the warning statements as specified in subsections 8.2.2.1 and 8.2.2.2 of the version of the standard that is incorporated by reference in part 1227 of this subchapter, in place of the warning statements in 8.4.7 (paragraph (d)(vii) of this section).

(e) Instead of complying with section 9.2 of ASTM F404-15, comply with the following:

(1) 9.2 The instructions shall contain the warnings as specified in section 8.4 (paragraph (d)(1) of this section). Additional warnings similar to the statements included in this section shall also be included. These required warning statements shall meet the requirements described in section 8.4 (paragraph (d)(1) of this section), except for the color requirements (*i.e.*, the background of the signal word panel need not be orange, red, or yellow). However, the warning statements still must be in highly contrasting color(s) (*e.g.*, black text on a white background), and if color is used, those colors must meet the color requirements specified in section 8.4 (paragraph (d)(1) of this section).

(2) Reference to section 9.2 of ASTM F404-15 in paragraph (e) of this section includes only the introductory paragraph of section 9.2 and does not include subsections 9.2.1 or 9.2.2 of ASTM F404-15.

NOTE: For optional additional guidance on the design of warnings for instructional literature, see the most-recent addition of ANSI Z535.6, *Product Safety Information in Product*

Manuals, Instructions, and Other Collateral Materials, American National Standards Institute, Inc., available at <http://www.ansi.org/>.

Dated: _____

Todd A. Stevenson,
Secretary, Consumer Product Safety Commission

DRAFT



Staff Briefing Package

Notice of Proposed Rulemaking for High Chairs

October 7th, 2015

CPSC Hotline: 1-800-638-CPSC (2772) CPSC's Web Site: <http://www.cpsc.gov>

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Briefing Memorandum



UNITED STATES
CONSUMER PRODUCT SAFETY COMMISSION
4330 EAST WEST HIGHWAY
BETHESDA, MARYLAND 20814

This document has been electronically
approved and signed.

Memorandum

October 7, 2015

TO: The Commission
Todd Stevenson, Secretary

THROUGH: Stephanie Tsacoumis, General Counsel
Patricia H. Adkins, Executive Director
Robert J. Howell, Deputy Executive Director for Safety Operations

FROM: George A. Borlase, Ph.D., P.E.
Assistant Executive Director
Office of Hazard Identification and Reduction

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Division of Pharmacology and Physiology Assessment
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SUBJECT: Notice of Proposed Rulemaking for High Chairs

I. INTRODUCTION

Section 104 of the Consumer Product Safety Improvement Act 2008 (“CPSIA”) is the Danny Keysar Child Product Safety Notification Act. This act requires the U.S. Consumer Product Safety Commission (“CPSC” or “Commission”) to: (1) examine and assess voluntary safety standards for certain infant or toddler products; and (2) promulgate mandatory consumer product safety standards that are substantially the same as the voluntary standards or more stringent than the voluntary standards if the Commission determines that more stringent standards would further reduce the risk of injury associated with these products. The list of products in section 104 includes high chairs.

The Danny Keysar Child Product Safety Notification Act also requires the Commission to consult with representatives of consumer groups, juvenile product manufacturers, and independent child product engineers and experts to examine and assess the effectiveness of the relevant voluntary standards. This consultation process has been ongoing with staff’s

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participation in the juvenile products subcommittee meetings of ASTM International (“ASTM”). ASTM subcommittees consist of members who represent producers, users, consumers, government, and academia.¹ In September 2013, staff began this consultation process for high chairs and became involved in high chair task groups.

This briefing package pertains to products included within the scope of the current voluntary standard, ASTM F404-15, *Standard Consumer Safety Specification for High Chairs* (“ASTM F404-15”). The briefing package reviews the relevant incident data and assesses the standard’s effectiveness. In addition, the briefing package discusses the potential impact of staff’s recommendations on small businesses and reviews recent recalls associated with high chairs. Finally, this briefing package recommends that the Commission publish a notice of proposed rulemaking (“NPR”) incorporating by reference the voluntary standard, ASTM F404-15, with certain modifications to improve requirements addressing rearward stability testing and warning labels, as the new consumer product safety standard for high chairs.

II. BACKGROUND

A. Product Review

ASTM F404-15 defines a high chair as:

A free standing chair for a child up to 3 years of age which has a seating surface more than 15 inches above the floor and elevates the child normally for the purposes of feeding or eating . . . A high chair may be sold with or without a tray and may be height adjustable to higher or lower use positions. It may also include a recline position for infants not able to sit up unassisted.

Typical high chair construction consists of a plastic, wooden, or metal frame, often with a padded fabric seating area. Some models fold for easy storage or transport, and some include a removable snack tray or toy accessories mounted on the main tray. The voluntary standard requires that high chairs have a passive crotch restraint and a 3-point restraint system; some products employ a full, 5-point restraint system with shoulder harnesses. In addition to the required restraining systems, many chairs also have a rigid, front torso support to help contain the occupant in the seating area, even when the caretaker removes the tray. Other design variations include tray-less chairs for use at standard dining room tables and conversion chairs

¹ASTM International website: www.astm.org, About ASTM International.

that can be used as the child grows from infancy through young adulthood. A variety of frame constructions exist in today's marketplace, including: restaurant style chairs, four-legged "A-frame" styles, single "leg" pedestals, as well as "Z" frames (shown respectively in Figure 1).



Figure 1: High Chair Examples

B. Incident Data

1. Reported Incidents

The Directorate for Epidemiology's Division of Hazard Analysis ("EPHA") staff identified 1,296 incidents, including 138 injuries and one fatality involving high chairs reported to CPSC between January 1, 2011 and December 31, 2014 (Tab A). EPHA staff searched the: (1) Injury or Potential Injury Incident ("IPII") file, (2) In-Depth Investigation ("INDP") file, (3) Death Certificate file ("DTHS"), and (4) CPSC Retailer Reporting System of manufacturer/retailer reports to the Office Compliance." A large proportion (1,179 out of 1,296, or 91 percent) of the incident reports were submitted to CPSC by retailers and manufacturers through CPSC's "Retailer Reporting System." The one fatality associated with a broken high chair was submitted through CPSC's "Retailer Reporting System." Due to the limited information provided in the report, the circumstances of the fatality are unknown. CPSC staff made considerable efforts to track down the necessary contact information to conduct an in-depth follow-up investigation, but was unsuccessful.

2. National Injury Estimates (NEISS data)

From January 1, 2011 through December 31, 2014, U.S. hospital emergency departments treated an estimated total of 31,300 injuries (sample size=1,078, coefficient of variation=0.14) related to high chairs. Staff did not observe a statistically significant increase or decrease in the estimated injuries from one year to the next; nor did staff observe any statistically significant trend over the 2011 to 2014 period.

C. Hazard Patterns

Of the 1,296 incident reports CPSC staff received, 11 reports contained complaints of multiple issue-related incidents with a high chair, for a total of 1,308 incidents considered for the characterization of the hazard pattern associated with the use of a high chair. EPHA staff identified eight hazard patterns associated with specific high chair components, and three hazard patterns involving more general problems with the product, including one catch-all hazard pattern that involved miscellaneous incidents that did not fit into the two hazard patterns involving more general problems. In addition, EPHA staff identified incidents associated with consumer comments and observations. Staff characterized incidents in which the hazard pattern could not be clearly identified as “undetermined” (Tab A). Staff identified the hazard patterns, in order of descending frequency of incidents, below:

1. Specific component-related

- a. Of the 1,308 incidents, staff attributed 650 (50%) to the ***frame***, which supports the seat. Examples of complaints included: broken or cracked frame, legs, base, height adjusters, or seat supports; failure of frame-release latch; protruding storage pegs; loose screws; and frame folding inwards or collapsing outwards, among others. Staff reported 20 injuries (14% of injuries) in this category.
- b. The high chair ***seat***-related issues constituted 205 (16 percent) of the 1,308 reported incidents. Examples of incidents included: seat pads tearing, cracking, and/or peeling; failure of the lock/latch that controls the seat-recline function; seat back detaching altogether; and loose screw(s). This category included 41 (30%) of the reported injuries.
- c. ***Restraint*** failures were reported in 139 (11%) of the 1,308 reported incidents. Problems included: buckles/prongs breaking, jamming, releasing too easily, or separating from straps; straps tearing or fraying, pinching, or coming undone; and inadequacy or ineffectiveness of restraints, for example. Twelve reported injuries (9%) were associated with restraint problems.
- d. Problems with high chair ***armrests*** cracking or breaking accounted for 81 (6%) of the 1,308 reported incidents. Staff reported two injuries (1%) in this category.
- e. ***Tray***-related issues accounted for 75 (6%) of the 1,308 reported incidents. Staff reported trays failing to lock/stay locked, releasing too easily, too tight/difficult to release, or pinching fingers, among some of the more common problems. Staff reported 33 injuries (24%), including one ED-treated broken collarbone injury due to a fall, in this category.

- f. **Toy accessory**-related issues were reported in 70 (5%) of the 1,308 reported incidents. Most of these complaints were related to cracked or broken toy accessories. One of the incidents reported an injury (1%).
- g. Problems with **wheels**, such as wheels breaking, coming loose, or not locking were reported in 21 (2%) of the 1,308 reported incidents. One injury (1 percent) was reported in this category.
- h. The **footrest** cracking or breaking was the problem reported in 14 (1%) of the 1,308 incidents. Staff reported no injuries associated with this problem.

2. General product-related

- i. Staff reported potential entrapment hazard due to the **design** of the high chair in 22 (2%) of the 1,308 reported incidents. Staff described most injuries to limbs, fingers, and toes entrapped in spaces/openings in a high chair (between armrest and backrest, or between passive restraint bar and seat, for example). One reported a child getting entrapped by the neck in the upper seatback opening of a high chair; another reported a child slipping through a leg opening and ending up suspended by her head. In both cases, presence of the caregiver nearby prevented any serious injury. Staff reported 14 injuries (9%) in this category.
- j. **Stability**-related issues were reported in 16 (1%) of the 1,308 reported incidents. Most of these incidents reported the high chair actually or nearly tipping over; one incident reported a problem with the anti-tip-over mechanism. Staff reported 12 injuries (9%), including one ED-treated forehead puncture wound, in this category.
- k. **Miscellaneous other** product-related issues, such as unclear assembly instructions, paint with excessive lead content or finish coming off easily, poor quality construction, and loose hardware from unspecified sites were reported in eight (1%) of the 1,308 reported incidents. Staff reported that one of these incidents involved an injury (1%).

3. Other

- l. **Undetermined** issues were reported in four (less than 0.5 percent) of the 1,308 reported incidents. Insufficient information was available for CPSC staff to determine how the incidents occurred. One of these incidents was a fatality (100%); two injuries (1%), including an ED-treated laceration injury, were reported in the other incidents.

- m. *Consumers' comments/observations* of perceived safety hazards or complaints about unauthorized sale of recalled high chairs accounted for three (less than 0.5%) of the complaints. None of these reports indicated that any incident had actually occurred.

D. ASTM F404, Standard Consumer Safety Specifications for High Chairs

1. History of ASTM F404

ASTM first approved and published the voluntary standard for high chairs in 1975 as ASTM F404-75, *Standard Consumer Safety Specification for High Chairs*. ASTM has revised the voluntary standard many times since this original version, including 10 revisions published since 1999. A summary of the most recent six revisions from 2010-2015 is captured below, beginning with ASTM F404-10 (approved on May 15, 2010) through the most recent version, F404-15 (approved on May 15, 2015). A more complete history of ASTM F404 can be found in the Directorate for Engineering Sciences Mechanical Engineering Memorandum (Tab B).

ASTM F404-10 (approved on May 15, 2010) included a minor editorial revision and:

- A revision clarifying the double action tray release mechanism requirement (both actions must be carried out for any one side of the tray to be released).

ASTM F404-13 (approved on July 1, 2013) included several minor editorial changes.

ASTM F404-13a (approved on November 1, 2013) included a minor revision and editorial change, as well as the following:

- A revision to require all labels to be permanent and to add clarity to the pull force application on labels attached by seams (force must be applied gradually over 5 seconds and maintained for an additional 10 seconds).
- A revision to require the restraining system to be attached in one of the manufacturer's recommended use positions prior to shipment so no assembly is required by the user.

ASTM F404-14 (approved January 1, 2014) included a minor revision in addition to the following:

- A revision to broaden the standard to include performance requirements and testing on chair designs having a component other than a tray to provide the primary frontal support for the torso (defined as "front torso support"). Drop testing, pull testing, and passive restraint testing were all edited to include reference to front torso supports.

- An editorial revision to clarify that only tray latch release mechanisms which fully release trays should be tested (tray latches allowing only for positional adjustments of trays do not need to be tested).

ASTM F404-14a (approved September 1, 2014) included revisions regarding the following:

- A revision requiring all components or accessories needed for the high chair to comply with the standard to be shipped with the high chair.
- A revision requiring that key structural elements requiring assembly by the user shall not be fastened with wood screws or sheet metal screws.

ASTM F404-15 (approved May 15, 2015) included a number of revisions in addition to the following:

- A revision requiring certain warning statements to be visible while the child is being placed in the high chair, but not necessarily while the child is occupying the chair.
- A revision to include a new test for protrusions within a specified zone around the base of the high chair (to help prevent laceration injuries associated with falls into the hooks and other tray storage attachment protrusions on the outside legs of the chairs).
- A revision to require the passive crotch restraint to be either permanently attached or tethered to its usage position prior to product shipment.
- A new requirement to add a pull test on each of the restraint anchors to ensure restraining system attachment integrity.

In August 2015, ASTM balloted two additional provisions to improve the warnings/labeling and stability testing requirements of standard. The ballots on these requirements closed on September 14, 2015. The results of these ballots will be discussed further in section III below.

2. Significant provisions of ASTM F404

ASTM F404-15 addresses numerous hazards with several general requirements, most of which are also found in the other ASTM juvenile product standards. The following are the general requirements contained in ASTM F404-15:

- All necessary components for ASTM compliance must be shipped together (including high chair conversion kits).
- All accessories specified for use with the high chair must also comply with the standard.
- Threaded fasteners must meet specific requirements if used in the assembly of key structural components.
- High chairs must comply with requirements regarding:
 - Sharp points
 - Small parts

- Wood parts
- Latching and locking mechanisms
- Labeling
- Openings
- Toy compliance
- Lead paint
- Protective components
- Exposed coil springs
- Scissoring, shearing, and pinching

In addition to the general requirements listed above, ASTM F404-15 contains requirements for marking, labeling, and instructional literature. The standard also contains several performance requirements and test methods specific to high chairs:

- Removable Tray or Front Torso Support Integrity
- Tray or Front Torso Support Pull Test
- Static Load
- Stability
- Restraint Systems
- Passive Crotch Restraint
- Structural Integrity
- Tray Latch Release Mechanisms
- Side Containment
- Protrusions

Descriptions of these requirements and their associated test methods can also be found in Tab B, the Directorate for Engineering Sciences Mechanical Engineering Memorandum.

E. Other relevant standards

Staff found three international standards, which address children’s high chairs in a fashion similar to ASTM F404-15:

- The European standard, EN 14988:2006, *European/British Standard for Children’s high chairs—Part 1: Safety requirements and Part 2: Test methods* (“EN standard”)
- The Australian standard, AS 4684-2009, *High Chairs – Safety Requirements*
- The ISO standard, ISO 9221: 1992, *Furniture-Children’s high chairs—Part 1: Safety Requirements and Part 2: Test Methods* (“ISO standard”)

Tab B provides a detailed comparison of these standards to ASTM F404. Based on a comparison of the standards, staff believes the ASTM standard is more stringent in most areas and addresses the hazard patterns seen in the incident data reported to the CPSC.

F. Compliance Recalls

The memorandum from the Office of Compliance in Tab C discusses the recalls related to high chairs since January 1, 2010. During that time frame, there have been 10 high chair recalls involving eight different firms. The recalled products referenced were responsible for 72 injuries, including 11 lacerations requiring medical closure (stitches, tape or glue), 44 injuries of bumps and bruises, one scratched cornea, and one hairline fracture to the arm. These injuries were primarily related to falls from the high chair.

III. ADEQUANCY OF THE CURRENT ASTM F404 REQUIREMENTS

A. Stability

ESME staff believes that F404-15 adequately addresses all of the high chair hazards related to components and the general design hazard identified in section II; however ESME staff found that the current standard is not stringent enough to address the hazards associated with rearward stability. The current ASTM standard contains a rearward stability performance requirement, but staff believes it is not adequate to address the known incidents. A review of the incident data by Health Sciences (“HS”) staff (Tab D) revealed that within NEISS data, numerous incidents involved severe head injuries resulting from rearward tip-overs. Even though the incidents reported through sources other than NEISS included only minor injuries associated with tip-over incidents, that rearward tip over incidents, nevertheless, had the potential to result in a severe head injury that could have long-term effects for the victim.

To address the issue of rearward stability, ASTM established a task group in the fall of 2013. The current requirement states that the rearward stability test is to be conducted by gradually applying a horizontal force of 14 lbf. at the center seat back at a height of the upper most surface of the tray. Based on a review of the incident data and testing of various models of high chairs, including those reported to be involved in rearward tip over incidents, and those not reported in rearward stability incidents by ESME staff and several manufacturers, the task group developed a stability index (“SI”). The SI is used to rate high chairs based on two characteristics associated with a rearward tip over: the force (“F”) required to tip the chair over in the rearward direction, and the distance (“D”) that a reference point on the seat travels as the chair tilts from the manufacturer’s recommended use position to the point of instability just before tipping over. Through testing completed by ESME staff and several manufacturers, the tip force was

determined to be the more critical factor in eliminating unstable chairs; accordingly, it is weighted twice as heavily in the stability index calculation: $SI = 2F + D$. The task group's proposed requirement is that high chairs must have a stability index of 50 or higher. Staff believes that this SI value is appropriate and a better testing requirement than the current standard. Staff believes that the SI value will help to identify potentially unstable products and is sufficiently stringent to fail chairs involved in rearward tip over incidents.

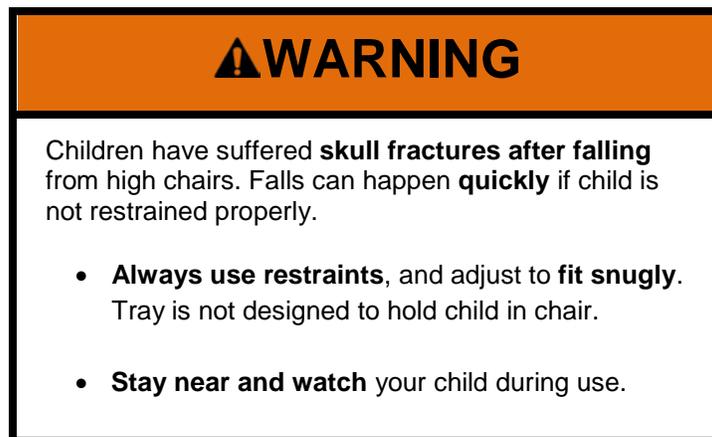
The recommended revised test method to assess a high chair's rearward stability contains the following new elements:

- A force gauge is attached to the centerline of the back of the seat, 7.25" above the seating surface and is preloaded with 3 pounds of force (to eliminate any slack in fabric or loose seats)
- An initial reference point is established along the plane of the force gauge
- A rearward, horizontal force is gradually applied until the point at which the chair becomes unstable and begins to tip over backward
- The maximum force applied during the tip test is recorded along with the total distance the reference point moved from its predetermined position
- The stability index is calculated by multiplying the force by a factor of 2 and adding the distance

To reduce variation in test results, ASTM added several other testing set-up modifications to the revision and balloted the modifications in August 2015. In the revised standard, all stability tests are specified to be carried out on 60 grit sandpaper (previously, stop blocks of unspecified height were placed behind the legs of the chairs to instigate tipping and since the height of a stop block affects how much force is required to tip a chair, variation was introduced depending on what a test lab selected to use for a stop block.) The new standard also specifies the exact positioning for adjustable chairs: the seat backs must be in the most upright positions and the chairs shall be tested in their highest possible height setting (or whatever position is deemed most likely to fail). The ballot on the improvements to the stability test requirement closed on September 14, 2015; the ballot received one negative from a manufacturer that did not pertain specifically to staff's proposed revisions to the rearward stability test. There were also two comments regarding wording and miscellaneous issues that staff believes do not warrant changes to staff's recommendations at this time. The results of the ballot will be discussed in the upcoming October 8, 2015 ASTM subcommittee meeting. Because the requirement has not yet been approved by ASTM, staff is recommending that the Commission include the revised requirement as a modification to ASTM F404-15 for the NPR. The exact language for the modification can be found in Appendix B of the Directorate for Engineering Sciences Mechanical Engineering memorandum (Tab B).

B. Warnings/Labeling

Engineering Sciences Human Factors (“ESHF”) staff determines that the current on-product warning requirements in ASTM F404 – 15 do not adequately address the risk of injuries and deaths associated with high chairs. ESHF staff recommends that these requirements be replaced or revised with warning requirements that would produce the following warning label:



ESHF staff also recommends that the resulting label be required to be visible to the caregiver while placing the occupant into the high chair in each of the manufacturer’s recommended use positions, and while the occupant is sitting in the high chair in these recommended use positions. The rationale behind the proposed revisions to the warning label content, form, and placement can be found in the ESHF Memorandum Tab E.

In addition to the revised warning requirements recommended by ESHF staff above, an ASTM Ad Hoc Wording Task Group has developed recommended wording for sections of ASTM standards that are common to multiple standards to improve consistency among standards. As the Ad Hoc Task Group reaches consensus, the final recommendations are made available to all ASTM subcommittees to consider for adoption into their standards. The Ad Hoc recommendations include proposed changes to the marking and labeling sections of ASTM standards, some of which are similar to ESHF staff’s recommendations. In June 2015, the ASTM high chair subcommittee established a task group to address the warning and labeling recommendations by ESHF staff (“Warning/labeling Task Group”) and the Ad Hoc Task Group. A meeting of the Warning/labeling Task Group resulted in a ballot to revise the warning and labeling requirements based on the Ad Hoc Task Group recommendations; the Warning/labeling Task Group felt that more time was needed to discuss the ESHF staff-specific recommendations. The ballot closed on September 14, 2015, and received one negative from a manufacturer and several comments. Some of ESHF staff’s recommendations (Tab E) were based on the Ad Hoc Task Group’s recommendations; however the ballot did not include any of ESHF staff’s additional recommendations. For this reason, and because ESHF staff finds the negative non-

persuasive, staff believes that the ballot results do not warrant any changes to their recommendations at this time. ESHF staff's warning and labeling recommendations were discussed at a Warning/labeling Task Group meeting on September 25th. While many of ESHF staff's recommendations regarding changes to the format of the warning label were resolved at the Warning/labeling Task Group meeting, the Task Group decided that ESHF staff's recommendations regarding changes to the location and wording should be discussed along with results of the ballot on the Ad-Hoc Task Group warning and labeling changes at the upcoming October 8, 2015, ASTM high chair subcommittee meeting.

IV. HIGH CHAIRS INTENDED FOR USE IN A COMMERCIAL SETTING

High chairs intended for use in a commercial setting such as restaurants (“restaurant-style high chairs”) are designed to accommodate different usage scenarios than those that occur during home use. Restaurant-style high chairs typically do not have a tray and are designed to be pulled up directly to the table; they tend to have larger leg openings to accommodate a wide range of children sizes and children clothed in outer wear; and they tend to be compact in design and stackable to conserve space. Figure 2a shows an example of a typical restaurant-style high chair, and Figure 2b shows a typical high chair used in a home (“home-use high chairs”).

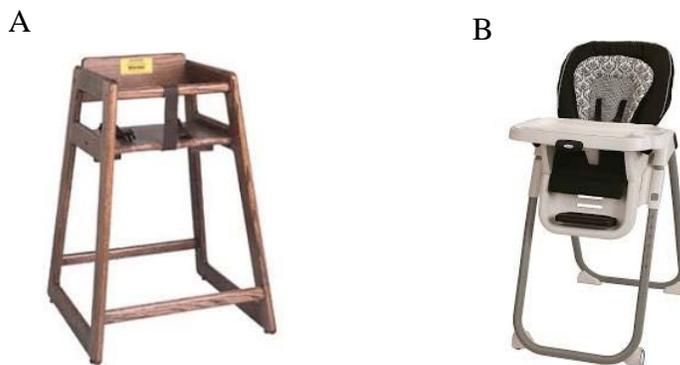


Figure 2. Typical Restaurant-Style High Chair (A) and Home-Use High Chair (B).

Due to these features, some models of high chairs used in restaurant settings fail the leg opening requirements of the current standard. However, there are limited incident data involving high chairs used in restaurant settings, and none of the incidents that occurred in restaurants involved an unsupervised child becoming entrapped in a bounded opening between the tray and the seat of

the high chair. As such, HS staff believes that it is less likely for a child in a restaurant to be left unsupervised long enough for a head entrapment to result in a serious injury or even death.

Restaurant-style high chairs also have limited space to accommodate the recent revisions to the standard and staff's recommended improvements to the standard regarding the placement of the warning labels. In fact, according to the analysis conducted by Directorate for Economic Analysis ("EC") staff (Tab F), some plastic restaurant-style high chairs may require a complete redesign to comply with the warning label requirements, even if sufficient space is available on the product to display the label. One firm contacted by EC staff that exclusively manufactures plastic restaurant-style high chairs estimates that the cost of such an effort would be \$400,000 minimum for such chairs and would take around 2 years to complete.

Although the ASTM high chair subcommittee has considered how the voluntary standard might be adjusted to cover the specific circumstances and needs surrounding the use of consumer products in commercial settings the ASTM high chair standard does not specifically exclude restaurant-style high chairs. Moreover, ASTM has not made changes to the ASTM standard's requirements for this subset of chairs. Consequently, at this point, ASTM F404-15 implicitly covers restaurant-style high chairs. The staff-recommended proposed rule follows this approach, but requests comments regarding restaurant-style high chairs. The underlying rationale for including restaurant-style high chairs within the proposed rule is that children in such high chairs are potentially susceptible to similar hazard patterns as high chairs in general, when restaurant-style high chairs are purchased for home use or when consumers use such high chairs in public establishments. Restaurant style high chairs used in public establishments expose a large number of children to hazards on a daily basis, compared to consumer high chairs used at home by a single child. EC staff's analysis found two firms that market high chairs for use in the home that are identical to the wooden high chairs used in restaurants.

Staff requests comments on whether the final high chair standard promulgated by the Commission should include restaurant-style high chairs as recommended by CPSC staff.

V. POTENTIAL IMPACT ON SMALL BUSINESS

Staff identified 62 firms supplying high chairs to the U.S. market. Fourteen suppliers produce high chairs intended for use predominately in commercial establishments, with the majority sold to restaurants. The remaining 48 firms market their products to consumers. Consumers are able to purchase high chairs intended for use in commercial settings, and in fact, two firms that market high chairs for use in the home also produce high chairs identical to the wooden high chairs used in restaurants. Based on U.S. Small Business Administration guidelines, 38 of the 62 firms are small domestic businesses, including 21 manufacturers and 17 importers/wholesalers.

As described in Tab F, staff cannot rule out a significant economic impact for 20 of the 38 (53 percent) known small suppliers of high chairs to the U.S. market. Accordingly, staff prepared an Initial Regulatory Flexibility Analysis (“IRFA”).

Suppliers of high chairs that do not conform to the current voluntary standard (nine firms) are likely to require the most significant changes to meet the draft proposed rule. Two small manufacturers of conforming high chairs may require redesign, due to the compact design of their product and the potential difficulty meeting the staff-recommended warning label requirements.

The impact on small importers and wholesalers will depend upon how they, in concert with their supplier(s), respond to the rule and how much of any cost increase is borne by the importers/wholesalers. Based on a review of firm revenues and the options available to each firm, the impact of the staff-recommended proposed rule should not be significant for eight small importers. However, staff cannot rule out a significant economic impact for the remaining nine small importers and wholesalers.

Suppliers of high chairs intended for use in commercial establishments will most likely experience a significant economic impact. Such high chairs tend to be compact, which would make meeting the staff-recommended warning label requirements difficult. Additionally, most suppliers of restaurant-style high chairs do not comply with the voluntary standard, and compliance could be incompatible with the characteristics that make the product desirable for use in commercial settings. For example, leg holes tend to be larger for restaurant-style high chairs, perhaps because they need to accommodate children clothed in outerwear, or children of a wide range of ages and sizes. As described in Tab E, high chair use in a restaurant setting, in particular, is likely to differ from use in the home. One of the most obvious differences, as it relates to the required warning information, is that caregivers may be less likely to leave their children “unattended” in a restaurant setting.

The economic impact on small domestic suppliers could be reduced in at least four ways:

1. Adopt the voluntary standard with no modifications, which would reduce the impact on all small firms and eliminate costs for firms supplying compliant high chairs.
2. Adopt the staff-recommended proposed rule, except for the warning label location recommendation. This could mean having the warning only visible when the child is placed in the chair, or using multiple labels. This would reduce the proportion of high chair models with backs that would need to be redesigned.
3. Exclude high chairs intended for use in commercial settings from the proposed rule, coupled with other efforts to ensure the safety of children using high chairs in homes, such as separate warning labels for restaurant-style high chairs, emphasizing their

distinct hazards and/or that they are not intended for home use. This would reduce the impact on small commercial suppliers.

4. Allow a later effective date for all high chairs, or only restaurant-style high chairs, which would reduce the impact on all small firms by reducing the likelihood of a supply lapse and allow firms to spread costs over a longer time period.

In addition to the requirements of the proposed rule, there will be additional costs associated with third party testing, which is triggered when the rule goes into effect. Firms with compliant high chairs are currently employing testing to verify compliance with the ASTM standard, although not necessarily via third party. Therefore, for compliant firms additional testing costs alone are unlikely to be economically significant. For two or three firms whose high chairs are not believed to comply with the voluntary standard, third party certification could result in significant costs if as few as two samples per model are required to provide a “high degree of assurance.” Staff could not rule out a significant economic impact for any of these firms; the third party testing costs would be an additional impact.

VI. NOTICE OF REQUIREMENTS

Section 14(a) of the CPSA requires that any children’s product subject to a consumer product safety rule under the CPSA must be certified as complying with all applicable CPSC-enforced requirements. The children’s product certification must be based on testing conducted by a CPSC-accepted third party conformity assessment body (test laboratory). The CPSA requires the Commission to publish a notice of requirements (“NOR”) for the accreditation of third party test laboratories to determine compliance with a children’s product safety rule to which a children’s product is subject. A proposed rule for high chairs, if issued as a final rule, would be a children’s product safety rule that requires issuing an NOR.

The Commission published a final rule regarding *Requirements Pertaining to Third Party Conformity Assessment Bodies*, codified in 16 C.F.R. part 1112 (“part 1112”). 78 Fed. Reg. 15836 (March 12, 2013). This rule became effective on June 10, 2013. Part 1112 establishes the requirements for accreditation of third party testing laboratories to test for compliance with a children’s product safety rule. The final rule also codifies all of the NORs that the CPSC has published, to date, for children’s product safety rules. All new children’s product safety rules, such as the proposed high chairs standard, would require an amendment to part 1112 to create an NOR. Therefore, staff recommends that the Commission propose to amend part 1112 to include high chairs in the list of children’s product safety rules for which the CPSC has issued NORs.

VII. EFFECTIVE DATE

Staff is recommending that the Commission propose an effective date of 6 months following publication of the final rule to allow high chair manufacturers time to bring their products into compliance after a final rule is issued. A 6-month effective date is consistent with the amount of time that has been given to a number of other section 104 rules. Staff recommends proposing incorporation of the voluntary standard with changes. Manufacturers who already comply with the voluntary standard and have demonstrated they routinely comply with changes to the voluntary standard will be able to be in compliance with the regulation within 6 months. The majority of small manufacturers already comply with the voluntary standard currently in effect for testing purposes. It is expected that they will remain compliant with the voluntary standard as the standard evolves because these manufacturers follow, and in three cases, actively participate in the standard development process. Six months will also allow time for manufacturers and importers to arrange for third party testing.

Staff recognizes that the requirements of ASTM F404-15 and staff's additional proposed changes may have a greater economic impact on suppliers of restaurant-style high chairs. Therefore, staff recommends requesting specific comments, feedback, and/or solutions in the NPR to identify how the economic impact to suppliers of restaurant-style high chairs may be minimized. One possible solution may be to have a longer effective date for these suppliers.

VIII. STAFF RECOMMENDATIONS

Staff recommends that the Commission publish an NPR that incorporates by reference ASTM F404 – 15, *Standard Consumer Safety Specification for High Chairs*, with the modifications to the rearward stability requirement and to the warning label requirements discussed in section III. Staff also recommends that the NPR propose to amend the Commission's rule that establishes requirements for testing laboratories, 16 C.F.R. part 1112, to include high chairs.

TAB A: High Chair-Related Deaths, Injuries, and Potential Injuries; January 1, 2011 – December 31, 2014

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UNITED STATES
CONSUMER PRODUCT SAFETY COMMISSION
4330 EAST WEST HIGHWAY
BETHESDA, MARYLAND 20814

Memorandum

August 31, 2015

TO : Stefanie C. Marques
High Chairs Project Manager
Division of Pharmacology and Physiology Assessment
Directorate for Health Sciences

THROUGH: Kathleen Stralka
Associate Executive Director
Directorate for Epidemiology

Stephen Hanway
Division Director, Division of Hazard Analysis
Directorate for Epidemiology

FROM : Risana Chowdhury
Division of Hazard Analysis
Directorate for Epidemiology

SUBJECT : High Chair-Related Deaths, Injuries, and Potential Injuries; January 1, 2011 –
December 31, 2014²

I. Introduction

This memorandum characterizes the number of deaths and injuries and the types of hazards related to high chairs over a period of 4 years from January 1, 2011 through December 31, 2014.³ These characterizations are based on incident reports received by Consumer Product Safety Commission (“CPSC” or “Commission”) staff. Due to the large number of injury reports received through emergency departments (“ED”) during this timeframe, the estimates of ED-treated injuries associated with high chairs are presented separately from the rest of the incident data.

² This analysis was prepared by CPSC staff. It has not been reviewed or approved by, and may not necessarily reflect the views of, the Commission.

³ Not all of these incidents are addressable by an action the CPSC could take. It is not the purpose of this memorandum, however, to evaluate the addressability of the incidents, but rather, to quantify the number of fatalities and injuries reported to CPSC staff and to provide, when feasible, estimates of ED-treated injuries.

The ASTM voluntary standard for high chairs, F404, addresses safety issues related to high chairs. According to the ASTM standard, a “high chair” is defined as:

a free standing chair that elevates a child to standard dining table height. The high chair is made for the purpose of holding a child, up to 3 years of age, who can remain in a sitting position due to the child’s own coordination, and normally for the purposes of feeding or eating. A high chair may be height adjustable and include a reclined position for infants not able to remain in a sitting position due to the child’s own coordination.

ASTM F404-15, revised in 2015, was the last version of the voluntary standard on high chairs and was developed primarily based on incident data provided by CPSC staff. This memorandum discusses the data from the years 2011 through 2014.

II. Incident Data⁴

CPSC staff has received a total of 1,296 reports of incidents related to high chairs that occurred from January 1, 2011 through December 31, 2014. While most of incidents occurred in home settings, staff identified three incidents that explicitly mentioned a restaurant where an infant was using a highchair provided by the establishment. A large proportion (1,179 out of 1,296, or 91 percent) of the incident reports was submitted to CPSC by retailers and manufacturers through CPSC’s “Retailer Reporting System.” Because reporting is ongoing, the number of reported injuries and non-injury incidents may change in the future. Table 1 provides the breakdown of the incident reports by year. Given that these reports are anecdotal and that reporting is incomplete, CPSC staff strongly discourages drawing any inferences from the year-to-year increase or decrease shown in the reported data.

⁴ The data discussed in this section comes from CPSC’s database entitled the Consumer Product Safety Risk Management System (“CPSRMS”). These reported deaths and incidents do not provide a complete count of all that occurred during this time period. However, they do provide a minimum number of incidents occurring during this time period and illustrate the circumstances involved in the incidents related to high chairs.

CPSC staff extracted the reported incident data on January 21, 2015. All data coded under product codes 1555 (*high chairs*) was extracted. Upon careful joint review with CPSC’s Directorates for Engineering Sciences, Economics, and Health Sciences staff, many cases were considered out of scope for the purposes of this memorandum. For example, cases involving attachable highchairs or booster seats (which were coded as high chairs) or cases where the child involved was older than the manufacturer-recommended age of 3 years, were excluded from this analysis. With the exception of incidents occurring on U.S. military bases, all incidents that occurred outside of the United States have been excluded. To prevent any double-counting, when staff identified multiple reports of the same incident, they consolidated and counted them as one incident.

Table 1: Reported High Chair-Related Incident Data 01/01/11 – 12/31/14

<i>Incident Year</i>	<i>Number of Incident Reports</i>		
	<i>Total</i>	<i>Injuries</i>	<i>Fatalities</i>
2011	276	44	--
2012*	360	51	--
2013*	491	28	--
2014*	169	15	1
Total	1,296	138	1

Source: CPSC epidemiological database CPSRMS.

Note: * indicates data collection is ongoing

Age was unreported in 373 incident reports because no injury was involved or age was unknown. Among the 923 reports where age was documented, 86 reported ages 6 months old or younger; 265 reported ages between 7 months and 12 months old; 322 between 13 and 18 months; 119 between 19 and 23 months; 113 reported ages of children to be 2 years; and 18 incidents reported ages to be 3 years. Table 2 provides the age breakdown as available from the 1,296 incident reports.

Table 2: Age Distribution in High Chair-Related Incident Reports 01/01/11 – 12/31/14

<i>Age of Child</i>	<i>All Incidents</i>		<i>Injuries and Fatalities</i>	
	<i>Frequency</i>	<i>Percentage</i>	<i>Frequency</i>	<i>Percentage</i>
Unreported*	373	29	31	22
One – Six Months	86	7	11	8
Seven – Twelve Months	265	20	36	26
Thirteen – Eighteen Months	322	25	33	24
Nineteen – Twenty-Three Months	119	9	10	7
Two Years	113	9	14	10
Three Years	18	1	4	3
Total	1,296	100	139	100

Source: CPSC epidemiological database CPSRMS.

*Age may be “unreported” under two circumstances: age was unknown or age was not reported because the incident involved no injury. Following the ASTM F404 user age recommendations, 3 years was set as the upper age limit in the incident data for this analysis.

A. Fatal Incidents

One fatality reportedly occurred between 2011 and 2014. In 2014, a reported death was attributed to a broken high chair, but very little information was available about the decedent or the circumstances leading up to the incident. To date, CPSC staff has been unable to track down the necessary contact information to conduct an in-depth follow-up investigation.

B. Nonfatal Injuries

One hundred and thirty-eight of the 1,296 reports associated with high chair-related incidents with a date of occurrence between January 1, 2011 and December 31, 2014 involved a nonfatal injury. Age was unreported for 30 of the 138 (22 percent) of the injured children; a majority of the injured (93 out of 138 or 67 percent) were between 7 months and up to 3 years of age (Table 2).

Among the 138 reported injury incidents, there were three injuries—a forehead puncture wound, a broken collarbone, and a lacerated finger—that were treated in a hospital ED. The other injuries resulted mostly in contusions, abrasions, and lacerations, due to falls or entrapment of limbs/extremities.

The remaining 1,157 incident reports specified that no injury had occurred or provided no information about any injury. However, many of the descriptions indicated the potential for a serious injury or even death.

III. Hazard Patterns

Of the 1,296 incident reports received by CPSC staff, 11 reports contained complaints of multiple issue-related incidents with a high chair. As such, the 1,296 incident reports consisted of complaints about 1,308 *incidents*. CPSC staff considered the 1,308 incidents (rather than the 1,296 incident reports) for the characterization of the hazard pattern associated with the use of a high chair.⁵ A majority (about 96 percent) of the reported incidents was related to problems with specific components of the high chair; about 4 percent cited more general problems with the product; and a handful (less than 1 percent) reported other problems. The hazard patterns identified from the data are presented within these broad categories, with multiple sub-categories within each. In order of descending frequency of incidents, the hazard patterns were as follows:

B. Specific component-related

- a. Of the 1,308 incidents, 650 (50 percent) were attributed to the *frame*, which supports the seat. Examples of complaints included broken or cracked frame, legs, base, height adjusters, or seat supports; failure of frame-release latch; protruding storage pegs; loose screws; and frame folding inwards or collapsing outwards, among others. Twenty injuries (14 percent) were reported in this category.

⁵ CPSC staff identified each of the 139 reports of injury and fatality as being associated with a single issue.

- b. The high chair *seat*-related issues constituted 205 (16 percent) of the 1,308 reported incidents. Examples of incidents included seat pads tearing, cracking, and/or peeling; failure of the lock/latch that controls the seat-recline function; seat back detaching altogether; and loose screw(s). This category includes 41 (30 percent) of the reported injuries.
- c. **Restraint** failures were reported in 139 (11 percent) of the 1,308 reported incidents. Problems included buckles/prongs breaking, jamming, releasing too easily, or separating from straps; straps tearing or fraying, pinching, or coming undone; and inadequacy or ineffectiveness of restraints, for example. Twelve reported injuries (9 percent) were associated with restraint problems.
- d. Problems with high chair *armrests* cracking or breaking accounted for 81 (6 percent) of the 1,308 reported incidents. Two injuries (1 percent) were reported in this category.
- e. **Tray**-related issues accounted for 75 (6 percent) of the 1,308 reported incidents. Trays failing to lock/stay locked, releasing too easily, too tight/difficult to release, or pinching fingers, were some of the more common problems. Thirty-three injuries (24 percent), including one ED-treated broken collarbone injury due to a fall, were reported in this category.
- f. **Toy accessory**-related issues were reported in 70 (5 percent) of the 1,308 reported incidents. Most of these complaints were related to cracked or broken toy accessories. One of the incidents reported an injury (1 percent).
- g. Problems with *wheels*, such as wheels breaking, coming loose, or not locking were reported in 21 (2 percent) of the 1,308 reported incidents. One injury (1 percent) was reported in this category.
- h. The **footrest** cracking or breaking was the problem reported in 14 (1 percent) of the 1,308 incidents. There were no reported injuries associated with this problem.

C. General product-related

- a. Potential entrapment hazard due to the **design** of the high chair was reported in 22 (2 percent) of the 1,308 reported incidents. Most descriptions were of limbs, fingers, and toes entrapped in spaces/openings in a high chair (between armrest and backrest, or between passive restraint bar and seat, for example). One reported a child getting entrapped by the neck in the upper seatback opening of a high chair; another reported a child slipping through a leg opening and ending up

suspended by her head. In both cases, presence of the caregiver nearby prevented any serious injury. Thirteen injuries (9 percent) were reported in this category.

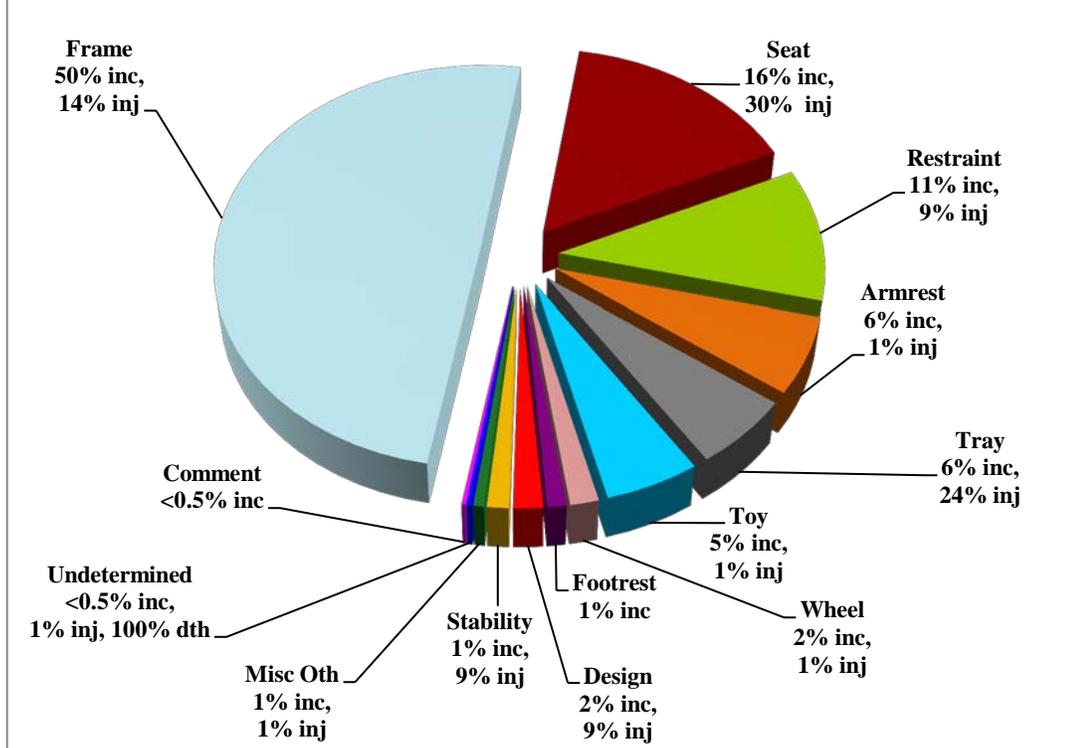
- b. **Stability**-related issues were reported in 16 (1 percent) of the 1,308 reported incidents. Most of these incidents reported the high chair actually or nearly tipping over; one incident reported a problem with the anti-tip over mechanism. Twelve injuries (9 percent), including one ED-treated forehead puncture wound, were reported in this category.
- c. **Miscellaneous other** product-related issues, such as unclear assembly instructions, paint with excessive lead content or finish coming off easily, poor quality construction, and loose hardware from unspecified sites were reported in 8 (1 percent) of the 1,308 reported incidents. One of these incidents reported an injury (1 percent).

D. Other

- a. **Undetermined** issues were reported in 4 (less than 0.5 percent) of the 1,308 reported incidents. Insufficient information was available for CPSC staff to determine how the incidents occurred. One of these incidents was a fatality (100 percent); two injuries (1 percent), including an ED-treated laceration injury, were reported in the other incidents.
- b. **Consumers' comments/observations** of perceived safety hazards or complaints about unauthorized sale of recalled high chairs accounted for 3 (less than 0.5 percent) of the complaints. None of these reports indicated that any incident had actually occurred.

The distribution of the incidents, injuries, and death by the hazard patterns described above are shown in Figure 1.

Figure 1: Distribution of High Chair-Related Incidents, Injuries, and Deaths by Hazard Pattern Characterizations 2011-2014



Source: CPSC epidemiological database CPRMS.

Note: Percentages do not always add to 100 due to rounding. Additionally, “inc”=incidents, “inj” = injuries, and “dth” = “deaths”; labels for hazard categories with no mention of injury or death indicate that there were no injuries or deaths in that category.

IV. National Injury Estimates⁶

An estimated total of 31,300 injuries (sample size=1,078, coefficient of variation=0.14) related to high chairs were treated in U.S. hospital EDs over the 4-year period from 2011 to 2014. The injury estimates for individual years are shown in Table 3. There was no statistically significant increase or decrease observed in the estimated injuries from one year to the next, nor was there any statistically significant trend observed over the 2011 to 2014 period.

⁶ The source of the injury estimates is the National Electronic Injury Surveillance System (“NEISS”), a statistically valid injury surveillance system. NEISS injury data are gathered from EDs of hospitals selected as a probability sample of all the U.S. hospitals with EDs. The surveillance data gathered from the sample hospitals enable the CPSC staff to make timely national estimates of the number of injuries associated with specific consumer products.

All data coded under product code 1555 (*high chairs*) for patients ages 3 years and under was extracted. Certain records were considered out of scope for the purposes of this memorandum. For example, an infant sustained a skull fracture while he was being carried down the stairs in a high chair by a parent and the back of the chair fell off. Another example was of an older sibling stepping onto the back of the high chair and causing the chair to tip over with the infant in it. These records were excluded before deriving the statistical injury estimates.

Table 3: High Chair-Related Injuries Treated in U.S. Hospital EDs 2011–2014

<i>Calendar Year</i>	<i>Estimated Injuries</i>	<i>Sample Size</i>	<i>Coefficient of Variation</i>
2011	7,400	281	0.15
2012	8,800	260	0.14
2013	6,700	246	0.18
2014	8,400	291	0.19
<i>2011-2014 Combined</i>	<i>31,300</i>	<i>1,078</i>	<i>0.14</i>

Source: NEISS, CPSC. Injury estimates rounded to nearest 100.

No deaths were reported through the NEISS. About 75 percent of the injured were between 7 months and 23 months of age. For the ED-treated injuries related to high chairs, the following characteristics occurred most frequently:

- Hazard – falls (with no cause specified) out of the high chair to a lower level (78 percent); a substantial number (18 percent) of additional injuries, mostly falls, were sustained when one of the following occurred: a child attempted to climb into/out of the high chair; when the chair tipped over as a child pushed back or rocked back and forth while seated in the high chair; or some component (such as the restraint, tray, or lock) of the high chair failed.
- Injured body part – head (65 percent) and face (17 percent).
- Injury type – internal organ injury (48 percent), contusions/abrasions (22 percent), and lacerations (11 percent).
- Disposition – treated and released (nearly 94 percent).

TAB B: ESME Staff’s Review and Evaluation of ASTM F404-15, Standard Consumer Safety Specification for High Chairs

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UNITED STATES
CONSUMER PRODUCT SAFETY COMMISSION
4330 EAST WEST HIGHWAY
BETHESDA, MARYLAND 20814

Memorandum

September 16, 2015

TO: Stefanie Marques, Ph.D.
High Chairs Project Manager
Division of Pharmacology and Physiology Assessment
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THROUGH: Joel R. Recht, Ph.D.
Associate Executive Director
Directorate for Engineering Sciences

Mark Kumagai, P.E., Director
Division of Mechanical Engineering
Directorate for Engineering Sciences

FROM: Shaina Donahue and John Murphy
Division of Mechanical Engineering
Directorate for Engineering Sciences

SUBJECT: ESME Staff's Review and Evaluation of ASTM F404-15, *Standard Consumer Safety Specification for High Chairs*, for Incorporation by Reference into Staff's Draft Proposed Rule

I. INTRODUCTION

CPSC's Directorate for Engineering Sciences' Division of Mechanical Engineering ("ESME") staff was asked to assess the effectiveness of ASTM F404-15, *Standard Consumer Safety Specification for High Chairs*, for rulemaking activity under Section 104 of the Consumer Product Safety Improvement Act. This evaluation covers the evolution of the F404 standard and how effectively the current edition addresses common hazard patterns found in reported incident data. The assessment also compares the ASTM standard to other international high chair standards. This memorandum substantiates ESME staff's recommendation to incorporate by reference the F404-15 standard into the proposed mandatory rule for high chairs, with one modification.

II. PRODUCT

ASTM F404-15 defines a “high chair” as:

A free standing chair for a child up to 3 years of age which has a seating surface more than 15 inches above the floor and elevates the child normally for the purposes of feeding or eating . . . A high chair may be sold with or without a tray and may be height adjustable to higher or lower use positions. It may also include a recline position for infants not able to sit up unassisted.

Typical high chair construction consists of a plastic, wooden, or metal frame, often with a padded fabric seating area. Some models fold for easy storage or transport, and some include a removable snack tray or toy accessories mounted on the main tray. To meet the requirements of the voluntary standard, the chairs must have a passive crotch restraint and a three-point restraint system; some products employ a full, five-point restraint with shoulder harnesses. In addition to the required restraining systems, many chairs also have a rigid, front torso support to help contain the occupant in the seating area even when the caretaker removes the tray. Other design variations include tray-less chairs for use at standard dining room tables and conversion chairs that can be used from infancy through young adulthood. A variety of frame constructions exist in today’s marketplace, including: restaurant style chairs, four-legged “A-frame” styles, single “leg” pedestals, as well as “Z” frames (shown in respective order in Figure 1).



Figure 1: High Chair Examples

III. SIGNIFICANT PROVISIONS OF ASTM F404-15

ASTM F404-15 addresses numerous hazards with several general requirements, most of which are also found in the other ASTM juvenile product standards. The following are the general requirements contained in ASTM F404-15:

- All necessary components for ASTM compliance are shipped together (including high chair conversion kits)
- All accessories specified for use with the high chair must also comply with the standard
- Threaded fasteners must meet specific requirements if used in the assembly of key structural components
- Sharp points

- Small parts
- Wood parts
- Latching and locking mechanisms
- Labeling
- Openings
- Toy compliance
- Lead paint
- Protective components
- Exposed coil springs
- Scissoring, Shearing, and Pinching

In addition to the general requirements listed above, ASTM F404-15 contains requirements for marking, labeling, and instructional literature. The standard also contains several performance requirements and test methods specific to high chairs. Below is a discussion of each performance requirement.

- **Removable Tray or Front Torso Support Integrity**

Each removable tray and/or front torso support is dropped from a height of 36 inches on four different surfaces, one of which includes the attachment mechanism. The purpose of this performance requirement is to test whether removable trays and torso support attachment mechanisms remain functioning after being dropped and to test whether these components exhibit any mechanical hazards (sharp points, sharp edges, or small parts) after the drop test has been performed.

- **Tray or Front Torso Support Pull Test**

The tray or front torso support is pulled horizontally five times with a 45 pound force from all four sides. A 45 pound upward force is also applied five times to each side. The purpose of this performance requirement is to test whether the primary support in front of the occupant is attached strongly enough to withstand being inadvertently pulled or kicked off.

- **Static Load**

The high chair must support a weight of 100 pounds on the seat and 50 pounds on the step or foot rest as well as 50 pounds on the tray. The purpose of this performance requirement is to test whether the high chair seat is strong enough to support approximately three times the weight of a child expected to be in the seat. It is also intended to reduce the likelihood of the product tipping over or lacerations due to component breakage when a child uses the step to climb into the chair or when the tray is overloaded.

- **Stability**

The high chair must not tip over when pulled forward by an 18 pound force, and it must not tip over backward or to either side when a 14 pound force is applied in each of those directions. The force applied in the forward direction is greater than all other directions because children are able to lean forward (especially when trays are removed on some chair designs) while the sides and backs of chairs typically constrain this type of shift in the child's center of gravity. The purpose of this performance requirement is to ensure the high chair is resistant to being knocked over if the occupant pushes off a nearby table or wall (or if another child pushes on the outside of an occupied high chair).

- **Restraint Systems**

The standard requires an active restraint system, such as a belt, be provided to secure a child in the seated position in each of the manufacturer's-recommended use positions. In addition, the restraint system shall include both a waist and a crotch restraint designed to require the crotch restraint to be used when the active restraint system is used. The restraint system must be attached to the chair before shipment so the system does not become released during normal use. In addition, the restraints must

retain a CAMI Infant Dummy Mark II⁷ when the dummy is pulled five times downward as well as upward with a 45 pound force. The most recent standard includes a new requirement that tests whether the restraints remain anchored when pulled at their attachment points by a 45 pound force. The purpose of these performance requirements is to ensure that the restraint system and its closing means remain anchored to the chair, do not break, separate, or release the occupant when various forces are applied.



Figure 2: CAMI Infant Dummy Mark II (17 pounds)

- **Passive Crotch Restraint**

This section requires all high chairs having completely bounded openings (in any configuration, with or without a tray) in front of the occupant to include a passive crotch restraint. In addition, to prevent consumer mis-installation or non-installation, the passive crotch restraint is required be installed or tethered to its recommended use position at the time of shipment. The passive crotch restraint must not be further than 8.5 inches from the seat back. The leg openings and any other completely bounded openings forward of the occupant must be tested using a wedge block (see Figure 3), to ensure the openings do not present an entrapment hazard. The tapered end of the wedge block is inserted, and a 25 lb. (111 N) force is applied to the wedge block to push (or pull) the wedge block through the opening. The leg openings should not allow for the complete passage of the wedge block, which is modeled from the hip/torso dimensions of the youngest expected user.⁸ The purpose of these provisions is to reduce the likelihood of children getting injured or dying as a result of sliding through or becoming entrapped in an opening.

⁷ CAMI Infant Dummy Mark II (shown in Figure 2) Department of Transportation, Federal Aviation Administration, April 29, 1974, and CAMI Infant Dummy, Drawing No. SA-1001, Memorandum Report AAC-119-74-14, Revision 11, by Richard F. Chandler, July 2, 1994.

⁸ Per the 1975 SAE report, *Anthropometry of U.S. Infants and Children*, the 5th percentile 5- to 6-month-old's buttock depth is 3.0 in. (actually reported as 2.99 in.). Per the 1977 University of Michigan report, *Anthropometry of Infants, Children, and Youths*, the 5th percentile 6- to 8-month-old's hip breadth is 5.5 inches.



Figure 3: Wedge Block

- **Structural Integrity**

A 50 pound weight is dropped onto the seating surface 500 times from a height of 3 inches. The high chair must be able to withstand this dynamic cycle test without any breakage to structural components or instantaneous changes to seat height more than 3 inches. Additionally, the angle of the seating surface must not change more than 10° and all locking/latching mechanisms must remain engaged. The purpose of this performance requirement is to determine whether the high chair structure is durable enough to hold up to the dynamic loads it is expected to undergo over its intended lifespan.

- **Tray Latch Release Mechanisms**

Latches allowing for the removal of trays must meet certain performance requirements depending on where the tray latch release is located. Latches on the front of a tray must meet one of three conditions: 1) the latch must not be accessible to the occupant's foot,⁹ 2) the latch must have a double action release mechanism, or 3) the latch release must actuate by pressing *towards* the occupant to release the tray. Latches on the side of a tray must meet one of four conditions: 1) Single action releases must not allow tray detachment when 15 pounds of force is applied, 2) both tray latches on each side of the tray must have double action release mechanisms, 3) two or more latch release mechanisms must be interconnected such that the tray does not release from either side unless both latch releases are activated simultaneously, or 4) the latches are not visible to the occupant and the direction of the actuation of latch release is less than 85° from the direction of tray removal. The purpose of this performance requirement is to address the fall incidents that were occurring on chairs where the passive restraint was integrated into the tray. These latch requirements are intended to decrease the likelihood of fall injuries by preventing the accidental removal of trays by the occupant. (NOTE: If the chair has completely bounded openings on each side of the passive crotch restraint when the tray is removed, then the tray latches are exempt from these requirements since the occupant will still be contained in the seating area.)

- **Side Containment**

Any completely bounded openings in the side of the seating area are tested in the same manner as the leg openings tested in the passive crotch restraint requirement. To comply with the side containment requirement, when pushed with a 25 pound force, the wedge block shall not pass completely through any opening in the side of the high chair seat (with the seat tested in any possible configuration that creates a side opening). The purpose of these provisions is to reduce the likelihood of children getting injured or dying as a result of sliding through or becoming entrapped in an opening.

- **Protrusions**

Projections must meet certain dimensional requirements if they are located on the outside of high chair legs at a height a toddler is susceptible to falling into (see Figure 4 for the protrusion evaluation zone). Protrusions must not extend beyond the 1/8 inch thick ring gauge (Figure 5) or be contactable by the

⁹ Two foot probes are used to determine accessibility in this test: one for the smallest child expected to occupy the chair (5th percentile 6-8 month old) and one for the largest expected occupant (95th percentile 20-23 month old).

protrusion accessibility gauge¹⁰ (Figure 6). The purpose of this performance requirement is to address the laceration incidents resulting from children outside of high chairs falling into tray storage hooks or other protrusions extending outward from the legs of the high chair.

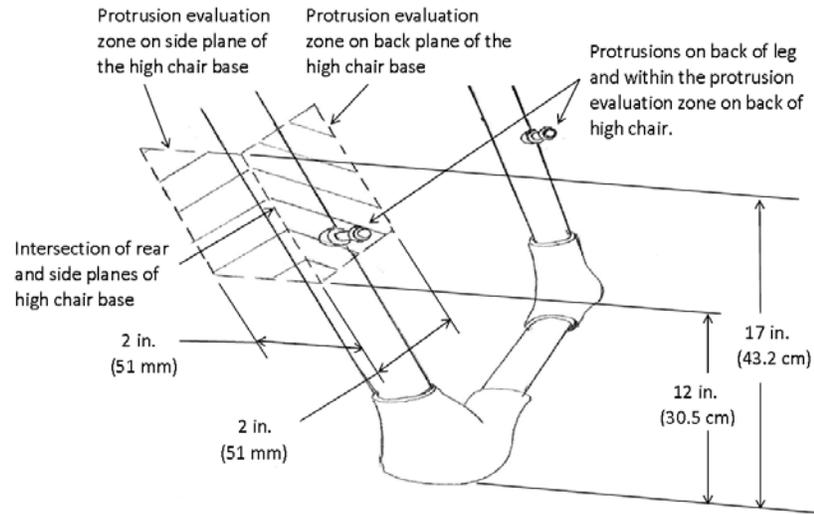
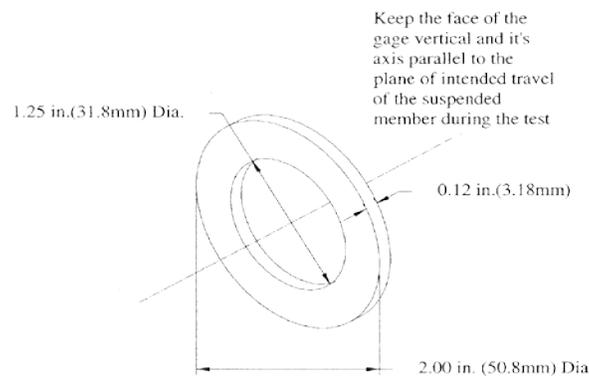


Figure 4: Protrusion Evaluation Zone



NOTE: Gage made of any rigid material.

Figure 5: Protrusion Ring Gauge

¹⁰ The 2.5 inch radius of the protrusion accessibility gauge is based on the anthropomorphic measurement data for the head width and length of a 50th percentile 12-month-old child.

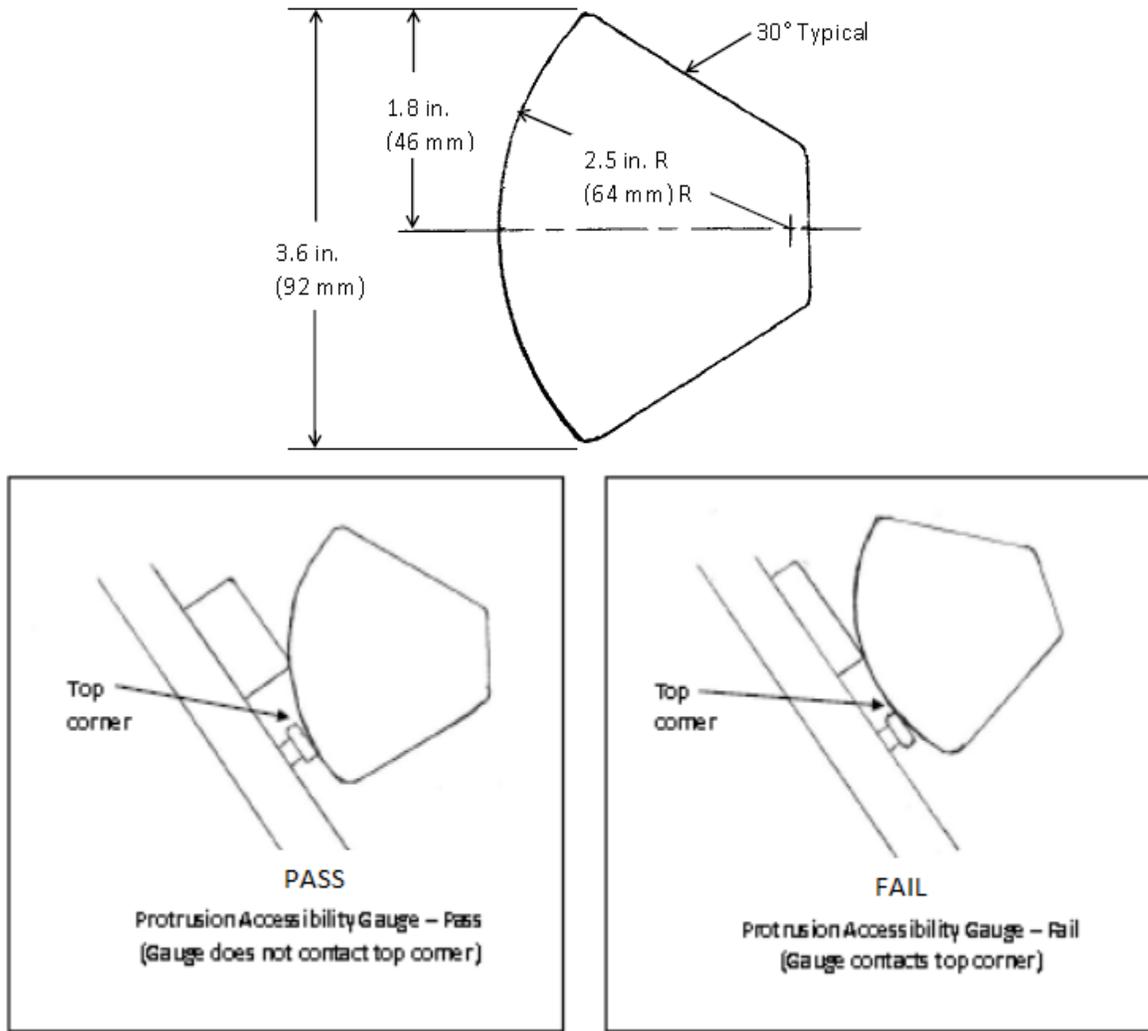


Figure 6: Protrusion Accessibility Gauge & Pass Fail Examples

IV. HISTORY OF ASTM F404

ASTM first approved and published the voluntary standard for high chairs in 1975 as F404-75, *Standard Consumer Safety Specification for High Chairs*. ASTM has revised the voluntary standard many times since this original version. The history of the 10 most recent revisions is captured below, beginning with F404-99a (published July 1999) through the most recently approved version, F404-15.

ASTM F404-99a contained requirements to address the following topics:

- Sharp edges/points
- Small parts
- Wood parts
- Latching or locking mechanisms (to help prevent unintentional disengagement/folding)
- Labels (to help prevent choking hazards)
- Openings
- Protective components

- Tray performance (functionality after dropping as well as attachment security when pulled)
- Static load (ensures the seat can support 100 pounds, and the footrest and tray are capable of supporting 50 pounds)
- Stability (to help prevent tip-overs while child is in the chair and while the child climbs into the chair)
- Exposed coil springs
- Scissoring, shearing, and pinching
- Restraint system must be supplied
- Passive crotch restraint system (specified for any chair and/or tray combination that creates a completely bounded opening to help prevent smaller occupants from falling out of the chair through a single leg opening)
- Structural integrity (to ensure chair is structurally sound enough to withstand 50 pounds being dropped on it 500 times)
- Labeling and warnings, and
- Instructional literature.

ASTM F404-04 (approved on July 1, 2004) included editorial and minor revisions in addition to the following:

- A revision clarifying that the crotch restraint is mandatory when the lap belt is in use *and* the passive crotch restraint is mandatory while tray is in use.

ASTM F404-07 (approved on February 1, 2007) included:

- A new requirement for accessories to conform with F963 Consumer Safety Specification for Toy Safety, and
- New tray latch release mechanism performance and test requirements for high chairs that do not have fully bounded leg hole openings when the tray is removed (latch accessibility and latch actuation requirements).

ASTM F404-08 (approved on November 1, 2008) included editorial and minor revisions, in addition to the following:

- A note and editorial revision to clarify that the passive restraint requirement is independent from (and in addition to) the crotch restraint that is required as part of the active restraint system, and
- New side containment requirements including a probe test to address completely bounded openings in the sidewalls of the occupant's seating area.

ASTM F404-10 (approved on May 15, 2010) included a minor editorial revision and:

- A revision clarifying the double action tray release mechanism requirement (both actions must be carried out in order for any one side of the tray to be released).

ASTM F404-13 (approved on July 1, 2013) included several minor editorial changes.

ASTM F404-13a (approved on November 1, 2013) included a minor revision and editorial change, as well as the following:

- A revision to require all labels to be permanent and to add clarity to the pull force application on labels attached by seams (force must be applied gradually over 5 seconds and maintained for an additional 10 seconds); and
- A revision to require the restraining system to be attached in one of the manufacturer's recommended use positions prior to shipment so no assembly is required by the user.

ASTM F404-14 (approved January 1, 2014) included a minor revision in addition to the following:

- A revision to broaden the standard to include performance requirements and testing on chair designs having a component other than a tray to provide the primary frontal support for the torso (defined as "front torso support"). Drop testing, pull testing, and passive restraint testing were all edited to include reference to front torso supports.
- An editorial revision to clarify that only tray latch release mechanisms which fully release trays should be tested (tray latches allowing only for positional adjustments of trays do not need to be tested).

ASTM F404-14a (approved September 1, 2014) included revisions regarding the following:

- A revision requiring all components or accessories needed for the high chair to comply with the standard to be shipped with the high chair, and
- A revision requiring that key structural elements requiring assembly by the user shall not be fastened with wood screws or sheet metal screws.

ASTM F404-15 (approved May 15, 2015) includes a number of revisions in addition to the following:

- A revision requiring certain warning statements to be visible while the child is being placed in the high chair, but not necessarily while chair is occupied
- A revision to include a new test for protrusions within a specified zone around the base of the high chair (to help prevent laceration injuries associated with falls into the hooks and other tray storage attachment protrusions on the outside legs of the chairs)
- A revision to require the passive crotch restraint to be either permanently attached or tethered to its usage position prior to product shipment, and
- A new requirement to add a pull test on each of the restraint anchors to ensure restraining system attachment integrity.

In addition, ASTM has an open ballot item relating to rearward stability. This ballot item was issued in August 2015, containing a revision to enhance the rearward stability test and include a stability index, which measures the amount of force and horizontal distance needed to bring a chair to its tipping point.

V. STAFF RECOMMENDATIONS TO ASTM

In September 2013, CPSC suggested several areas for improvement to the ASTM high chair subcommittee to help address incident hazard patterns that were apparent in the incident data. Specifically, staff presented a pattern of rearward tip over incidents, as well as issues related to passive crotch restraints not always being attached per manufacturer's recommendation. Since the time these safety hazards were presented in 2013, the ASTM subcommittee task groups have been working

cooperatively with staff to improve the effectiveness of ASTM F404. Many revisions to strengthen the standard were published in the 2015 version, including the more stringent passive crotch restraint attachment provision (and the updates to protrusions and restraint anchoring integrity). The adequacy of these changes is discussed in detail below. However, staff's technical recommendation to revise the rearward stability requirement has not been included in the latest ASTM standard. At this time, ASTM is still actively working on this provision and staff's recommendations were balloted in August 2015. The need for this recommendation and details concerning the requirement are discussed later in this memorandum.

VI. OTHER RELEVANT STANDARDS

ESME staff found three international standards that address children's high chairs in a fashion similar to ASTM F404-15:

- The European standard, EN 14988:2006, *European/British Standard for Children's high chairs—Part 1: Safety requirements and Part 2: Test methods* ("EN standard")
- The Australian standard, AS 4684-2009, *High Chairs – Safety Requirements*
- The ISO standard, ISO 9221: 1992, *Furniture-Children's high chairs—Part 1: Safety Requirements and Part 2: Test Methods* ("ISO standard")

Although there are differences, ESME staff believes the ASTM standard is more stringent in most areas and addresses the hazard patterns seen in the incident data reported to the CPSC. A detailed matrix of how the ASTM standard compares to each international standard is presented in Appendix A to this memorandum. The relevant differences of each international standard are summarized below:

1. Europe

In summary, the relevant differences between the ASTM standard and the European standard, as well as their relative merits, are:

- The EN standard includes a 300-cycle durability test for all locks and/or attachment mechanisms. ASTM does not include lock durability cyclic testing, and the data reveal no evidence to indicate such requirements are needed.
- Both ASTM and EN standards require the tray to be pulled horizontally in all directions (forward, backward, to each side), but only ASTM requires the tray to also be pulled vertically, thereby making ASTM a more stringent standard.
- Both the ASTM standard and EN standard require trays to continue functioning after drop testing on their latching mechanisms (ASTM from a height of 36 in. and EN from 39 in.); however, only the ASTM standard also requires removable front torso supports to undergo this drop testing, thereby making it a more stringent test.
- The static load tests differ slightly between the two standards in that ASTM requires the chair to withstand a 100-lb. load for 1 minute, while the EN standard calls for carrying an 88-lb. load for 1 minute, plus an additional minute when the high chair is being held up in the air by the chair's lateral protection (arms or whatever component serves as lateral protection). The heavier load requirement makes the ASTM test the more stringent test. Additionally, there is no evidence in the incident data to indicate testing the chair up in the air would help reduce injuries.

- The EN standard stability testing differs from the ASTM test procedures in several ways. For EN forward stability testing, the chairs are loaded with much less weight (11 lbs. versus 40 lbs. in ASTM) and also pushed with far less force (5.6 lbf. versus 14 lbf. in ASTM). In the EN standard, sideways and rearward stability are tested by attaching a beam to the top of the chair and applying a downward force a specified distance along that test beam outward from the chair. Because the ASTM sideways and rearward tests simply call for pushing on the chair (whether from the sides or back), there is no clear basis for comparison between the ASTM and EN standards. Despite the lack of clear comparison, staff believes that the rearward stability test ASTM intends to send to ballot is more stringent because a known incident chair does not pass the ASTM test, while the same chair readily passes EN testing.
- The EN standard has specific height requirements for the sides and back of a high chair, while ASTM does not. Incident data do not indicate that side height is a factor in fall hazard patterns; therefore, staff believes that the ASTM standard is adequate.
- EN standard provisions allow for chairs to have either active *or* passive restraints (unless the seat back reclines, in which case the EN standard requires an integral harness). ASTM has a stricter mandate requiring that *all* chairs must have active restraints *and*, all chairs with fully bounded openings must also have passive crotch restraints.
- The EN standard limits the number of wheels or castors to two. ASTM has no limit; however, CPSC incident data pertaining to wheels show no pattern of injuries or hazards that would be reduced if the number of wheels were reduced.
- The ASTM structural integrity test calls for a 50-pound shot bag to be dropped into the seat 500 times; while the EN standard uses a 14-pound impact hammer that strikes five different locations on the chair 10 times each. While these tests are too dissimilar to provide a basis for comparison, data indicate that the ASTM standard is adequate.

2. Australia

The current Australian standard (AS 4684-2009) calls for compliance with its own clauses for retention systems, stability, castors, and labeling, as well as compliance with the EN, the ASTM, or the ISO standards. The Australian standard has several specific differences that include its own particular labeling requirements (summarized in the Human Factors memorandum), as well as the following unique performance requirements:

- High chairs shall have an adjustable, permanently attached restraint system. The buckling device of any safety restraint system shall not include a quick-release mechanism, and shall be constructed so as to prevent removal of the buckling device from the strap.
- When castors or glides are provided, these shall be limited to one of the following arrangements:
 - (a) Two castors.
 - (b) Two glides.
 - (c) Two castors, both having brakes, and two glides.
 - (d) Four castors, of which at least two have brakes.

Although ASTM currently includes no specific requirements for castors or glides, the incident data do not show a pattern of injuries that would be reduced if limitations were placed on the configuration of such devices on high chairs. In addition, staff believes that the ASTM F404-15 restraint requirements overall, are more stringent than the Australian standard requirements.

3. ISO Standard:

In summary, the relevant differences between the ASTM standard and the ISO standard, as well as their relative merits, are:

- The ISO standard requires fastening devices to be inoperable by the occupant (with a minimum operating force of 4.5 lbf. for all attachment/locking mechanisms). Based on the existing incident data, staff believes the current ASTM standard restraint requirements adequately address hazards associated with restraints releasing too easily; however, staff will continue to monitor incidents and work with ASTM to make any necessary future changes.
- The ISO standard includes a backrest durability test that calls for no slippage of adjustable seat recline mechanisms when a 22.5 pound (100 N) force is applied. Based on the existing incident data, it is ESME staff’s opinion that the ASTM standard is adequate with its 500-cycle structural integrity drop test, in combination with the other various tests that impart loads on the chair. (Of the backrest-related incidents reported to the CPSC, 75 percent are associated with one manufacturer’s high chairs that failed to operate correctly. Staff will continue to monitor incident data to evaluate whether requirements should be added in the future.)
- The ISO standard only allows castors if the high chair can be converted into a baby walker, and then the castors must not allow the chair to move while in use in high chair mode. The incident data reported to the CPSC do not indicate castors are a common cause of injury. Therefore, ESME staff believes that the ASTM standard is adequate, despite having no specific limitations on the use of castors. (The only injury reported under the “wheels” classification was an anomaly and resulted mainly from other contributing factors than the high chair in which the child was seated happened to have wheels.)

The incident data reported to the CPSC do not indicate fastening devices, backrest durability, or castors are industry-wide common causes of injury. Therefore, ESME staff believes that the ASTM standard is adequate in relation to these aspects.

VII. ADEQUACY OF ASTM F404-15 REQUIREMENTS

This section will review the identified hazard patterns associated with the incident data collected by CPSC between January 1, 2011 and December 31, 2014, and the applicable requirements found in ASTM F404-15. The hazard patterns found in the incident reports and general frequency of hazard patterns extrapolated from the NEISS data are summarized in Table 1 and are presented in order of frequency.¹¹ After reviewing the incident data, staff considered each pattern as staff assessed the adequacy of ASTM F404-15.

TABLE 1: Hazard Patterns Found in Incident Data

	Hazard	Total Incidents	Total Injuries	NEISS Injury Cases*	Fatalities
A	Frame	650	20	★	0
B	Seat	205	41	-	0
C	Restraint	139	12	-	0

¹¹ Data source: the Memorandum from the Directorate for Epidemiology.

D	Armrests	81	2	-	0
E	Tray	75	33	★★	0
F	Toy Accessories	70	1	-	0
G	Design (Entrapment)	22	13	★	0
H	Wheels	21	1	-	0
I	Stability	16	12	★★★	0
J	Footrest	14	0	-	0
K	Miscellaneous	8	1	-	0
L	Undetermined**	4	3	★★★★★	1
M	Consumer Observations	3	0	-	0

* The hazard patterns that staff was able to distinguish from NEISS data are represented in this chart by their general frequency, with the number of stars simply representing a visual scale as to the regularity with which each hazard pattern occurs (with more stars indicating more frequent appearances in NEISS reports).

** Causes of specific hazards cannot be determined due to lack of detail in these injury reports.

More detailed descriptions of each hazard pattern, along with the applicable ASTM F404-15 requirements are presented below:

- a. **Frame:** Common frame incident reports include cracked frames or height adjusters, loose screws, and buckling legs. Over 80 percent of frame-related incidents are consumer observations of cracked components on two similar A-frame high chair models from one manufacturer. There were only a few minor injury reports of scrapes and bumps associated with these chairs, and the Office of Compliance is aware of these two models. ASTM F404-15 contains two separate requirements intended to reduce the likelihood of breakage to any structural components of a high chair frame: a 100-pound static load test, as well as a 500-cycle, 50-pound drop test. Several general requirements are also included to reduce hazards associated with frame component failures. Included in the 2015 version of the standard is a new provision that key structural elements requiring assembly by the user shall not be fastened with wood screws or sheet metal screws because these can easily be installed improperly or loosen over time with each assembly attempt, thereby causing frame weakness. Because this is not an industry-wide problem, staff is not recommending modifications to the frame durability provisions in the standard at this time. It is ESME staff’s opinion that the current F404-15 structural integrity and load tests, along with the new fastener requirements, are adequate to address serious safety hazards related to high chair frames.

ESME staff believes these performance requirements, including the recent additions, adequately address this hazard pattern.

- b. **Seat-related** issues include cracked or peeling seat pads, broken seat recline hardware, seat backs detaching, and loose screws. Nearly 60 percent of the seat issues are consumer reports (from the same single manufacturer mentioned above) of seat pads cracking or peeling after many washes. Eighty-three percent of seat-related injuries are reports of occupant’s legs being scratched as a result of cracked/peeling seat pads. ASTM F404-15 contains two separate requirements intended to reduce the likelihood of breakage to any structural components of a high chair, including the seat: a 100-pound static load test, as well as a 500-cycle, 50-pound drop test. General

requirements, such as sharp points and small parts, also help reduce hazards associated with potential laceration or choking on pieces that might detach from the seat over time. Aside from the high percentage of consumer observations of seat pads breaking down after frequent washing, the incident data indicate the existing ASTM requirements are adequate. Nevertheless, staff will continue to monitor incidents for an indication any future performance standard enhancements that could be beneficial.

ESME staff believes that the ASTM F404-15 performance requirements adequately address the serious safety concerns related to this hazard pattern.

- c. **Restraint** failures include buckles breaking or separating from straps, and straps tearing or pulling out of their anchor points, among other issues. ASTM F404-15 requires all high chairs to be shipped with two types of restraint systems: an “active” crotch and waist belt restraint system pre-attached in a manufacturer’s recommended use position, as well as a “passive” crotch restraint. The restraint systems undergo testing to ensure they work as intended. A revision appearing in the F404-15 version of the standard requires the passive crotch restraint to arrive attached or tethered to its manufacturer’s-recommended use position to reduce the chances of the restraint not being installed before use. This will help prevent incidents where children submarine under the tray. Another performance test added in 2015 requires the restraint anchors to withstand a 45-pound pull test. This will help address incidents where straps pull out of the anchors. The requirements contained in F404-15 pertaining to restraints are basically the same as those required in ASTM F1235-15, *Standard Consumer Safety Specification for Portable Hook-On Chairs*.

ESME staff believes the recent additions to the standard, along with the existing provisions, adequately address this hazard pattern.

- d. **Arm Rest** problems: Many of the broken arm rest reports indicate that the arm rests broke when the tray was being removed. All but one of the armrest incidents came from a single high chair model. ASTM F404-15 includes several performance tests that help address the hazards associated with cracked or broken armrests. Because trays are typically attached to the arm rests, the 50-pound tray, static-load test, as well as the horizontal and vertical tray pull tests evaluate the durability of the arm rests. ESME staff is not making any recommendations to change the standard at this time because this is not an industry-wide problem, and there were only a couple of minor injuries reported.

ESME staff believes that the ASTM F404-15 performance requirements adequately address the safety issues related to this hazard pattern.

- e. **Tray:** While not the most common cause of incident, tray issues were one of the most common factors in injury and hospital reports. Falls were common when trays unexpectedly detached or released too easily from the chairs. Many reports also described pinching incidents. Another report indicated that the tray pushed too far into the child’s rib cage, causing anoxia. ASTM

F404-15 contains several tray performance requirements, including horizontal and vertical pull tests, a 50-pound static-load test, and many specific tray latching requirements. General requirements, such as those addressing sharp edges and scissoring, shearing, and pinching also help reduce hazards associated with trays. Significant revisions regarding tray latch accessibility and latch actuation were added to the ASTM standard in 2007, and were made even more stringent in the version published in November 2010. The incident data reveal tray-related incidents are on the decline on chair models manufactured after these revisions were published. As shown in Figure 7, there were 31 tray-related incidents reported in 2011; there were only three reported in 2014. Twenty-five of the 31 incidents reported in 2011 pertained to chairs manufactured before the latest 2010 performance standard revision. Given this recent decline in tray-related incidents, staff believes that the current standard has been effective in reducing tray-related hazards, and incident reports will continue to decline as older chair models filter out of their expected use lifecycle.

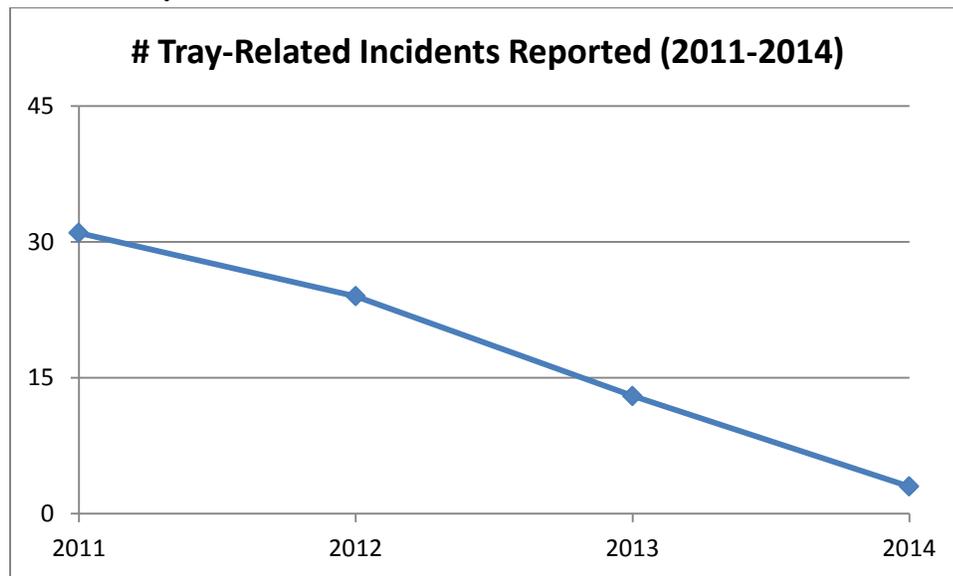


Figure 7: Declining Tray-Related Incidents

ESME staff believes these performance requirements adequately address this hazard pattern.

- f. **Toy accessory**-related incidents include reports of cracked or broken toy accessories. An addition to the 2015 version of the standard will further reduce toy-related incidents in the requirement for all manufacturer-supplied accessories to be attached to the chair during testing. (Thus, toy integrity will be tested during tray drop testing and load cycle testing.) ESME staff expects this new addition, along with the general requirement in ASTM F404-15 calling for compliance with the toy standard, ASTM F963, to prove successful in reducing hazards related to cracked or broken toy accessories.

ESME staff believes these performance requirements, including the recent accessory addition, adequately address this hazard pattern.

- g. The **Design** nuances of some high chairs leave high chairs susceptible to entrapment hazards. Commonly, these hazards include arms getting stuck between the back of the chair and the tray or legs catching in the gap between the bottom of the tray and the top of the passive crotch restraint. The worst cases involve children sliding down into the leg hole opening under the tray until their heads got caught and then hanging there from their necks. To address these more serious “submarining” cases, ASTM F404-15 contains several performance tests that specifically address openings, including a recent clarification to a probe test for any gaps or completely bounded openings forward of the occupant, around the passive crotch restraint, or between any horizontal member and the tray. The leg openings, as well as openings around the sides of the seat, are tested to ensure an occupant cannot slide through or become entrapped. The new revision appearing in the F404-15 version of the standard requiring the passive crotch restraint to arrive attached or tethered to its manufacturer’s recommended use position will reduce the chances of the crotch restraint not being installed before use, thereby, helping to further reduce the chances of a submarining incident. Additional, less severe injuries were associated with the other incidents involving limb entrapment; and currently, these incidents are addressed the same way many juvenile product safety standards address them: via the general requirements, such as openings and scissoring, shearing, and pinching requirements.

ESME staff believes these performance requirements, along with the recent revisions, effectively address this hazard pattern.

- h. **Wheels:** Wheels coming loose, breaking, or not locking are examples of incidents falling into this hazard pattern. All but two of these incident reports were consumer observations of cracked or broken components related to chairs made by a single manufacturer (almost exclusively related to a single model). The only injury captured under this hazard pattern was an anomaly involving other extenuating circumstances (with the wheels being a minor contributing factor). Wheel durability is evaluated by ASTM F404-15 through the course of the 100-pound static load test, as well as the dynamic 500-cycle, 50-pound drop test. Currently, staff is not recommending any changes to the standard because wheels do not appear to be the cause of an industry-wide hazard pattern. However, staff will continue to monitor data to see if a stricter standard could be beneficial in the future.

ESME staff believes the existing performance requirements adequately address this hazard pattern.

- i. **Stability:** This hazard pattern includes front tip overs (when a child leans forward in the high chair and the high chair falls forward); side tip overs (when a child leans over the side of the high chair); and rear tip overs (when a child pushes off with either hands or feet from a table or other surface in front of the high chair). The majority of the NEISS injuries were due to falls from the high chair (Tab A). However, due to the limited information in the NEISS reports, it is difficult to determine the cause of the fall for most of the injuries. There were numerous emergency department-treated injuries in CPSC’s NEISS system that specifically mentioned the child falling out of the high chair was the result of a tip-over (mostly rearward tip overs). There were also

many injuries reported as a result of high chairs tipping over in the incidents reported to CPSC (frequently due to the child pushing back off of a table). F404-15 includes forward tip-over testing (the chair must withstand an 18-pound tip-over force), as well as sideways and rearward tip-over testing (14-pound tipping forces applied in each respective direction). The standard also contains a stability requirement to simulate the load applied by a child climbing into the chair (a 40-pound force applied on the footrest).

Although staff believes forward and sideways tip overs are adequately addressed, based on the frequency of rearward tip over incidents, staff finds the existing standard inadequate in addressing rearward tip-over hazards. The reasons why the standard is inadequate, staff's recommended modification of the standard, and the rationale for staff's changes are discussed in detail at the end of this section. ASTM is currently working to ballot staff's recommendation to improve the effectiveness of the F404-15 rearward stability requirement (see Appendix B for the drafted ballot).

- j. **Footrest:** All incident reports involved the footrest cracking and were related to a single high chair model. No injuries were reported. ASTM F404-15 includes a 50-pound static load test on the foot rest. Because this is not an industry-wide problem, staff believes the existing performance requirement has been successful in limiting hazardous conditions associated with footrests.

ESME staff believes these performance requirements adequately address this hazard pattern.

- k. **Miscellaneous:** Miscellaneous issues found in the incident reports include concerns of paint with excessive lead content, cracking wood finishes, loose screws, and assembly issues. ASTM F404-15 contains revised requirements for the use of screws on consumer-assembled structural components. Additionally, the latest 2015 revision has updated requirements for marking, labeling, and instructional literature. These improvements are outlined in the memorandum from the Division of Human Factors, and the improvements are intended to help reduce various product-related issues, including unclear assembly instructions. Many of the general requirements, such as sharp edges, small parts, exposed wood, and compliance with 16 C.F.R. part 1303 address various other concerns.

ESME staff believes the existing performance requirements, in combination with the recent updates, adequately address the miscellaneous hazard patterns captured in this category.

- l. **Undetermined** issues were cases in which insufficient information was available for CPSC staff to determine how the incidents (and the one reported death) occurred. The lack of information available in these incident reports made it impossible to do an adequacy assessment for these cases.

- m. *Consumers' comments/observations* involved perceived safety hazards or complaints about high chairs. Due to the lack of clear information in these reports, it was not possible to assess the adequacy of F404-15 regarding any specific concern in these incident reports.

As a result of staff's review of the standard as it relates to the data, one of the recommendations staff made to ASTM concerned rearward stability. Staff believes the current requirement is not stringent enough because staff tested incident high chairs and found that the tested chairs passed the F404-15 requirement. Z frame-style high chairs seem to be particularly susceptible to this rearward tip-over hazard pattern. ASTM formed a task group in fall 2013, and over a 21-month period, the task group developed an alternative requirement, based high chair testing by ESME staff and several manufacturers. The task group efforts resulted in a robust and comprehensive revised requirement that clearly differentiates unstable high chairs from stable ones. At the task group meeting on June 24, 2015, the group decided to ballot the revised requirement, which will call for all high chairs to surpass a lower limit on a rearward stability index rating. The stability index score is comprised of two characteristics of a high chair as it tips over backwards: (1) the force required for rearward tip over, and (2) the distance the back of the chair moves before tip over. ASTM issued this ballot in August 2015.

The task group developed the stability index ("SI") based on a review of various stability requirements, the incident data, and testing of various models of high chairs, including high chairs reportedly involved in rearward tip over incidents and high chairs not reported in rearward stability incidents. The SI will be used to rate high chairs based on two characteristics associated with a rearward tip over: (1) the force ("F") required to tip the chair over in the rearward direction, and (2) the distance ("D") that a reference point on the seat travels as the chair tilts from the manufacturer's recommended use position to the point of instability just before tipping over. This index is meant to measure the elements associated with an occupant pushing backward off of a table in front of them: force and distance. A chair design will score well if it requires a large amount of push-off force, and/or a very long distance (arm or leg reach) to reach its tipping point. Through testing completed by ESME staff and several manufacturers, the tip force was determined to be the more critical factor in weeding out unstable chairs. Therefore, the tip force is weighted twice as heavily in the stability index calculation: $SI = 2F + D$. The task group's revised requirement dictates that high chairs must have a stability index of 50 or higher.

The revised test method to determine a high chair's rearward stability index contains the following new elements:

- A force gauge is attached to the centerline of the back of the seat, 7.25" above the seating surface and is preloaded with 3 pounds of force (to eliminate any slack in fabric or loose seats)
- An initial reference point is established along the plane of the force gauge
- A rearward, horizontal force is gradually applied until the point at which the chair becomes unstable and begins to tip over backward
- The maximum force applied during the tip test is recorded along with the total distance the reference point moved from its predetermined position
- The stability index is calculated by multiplying the force by a factor of 2 and adding the distance

To reduce variation in test results, several other testing set up modifications were also added to the revision being balloted. In the revised standard, all stability tests are specified to be carried out on 60-grit sandpaper (previously, stop blocks of unspecified height were placed behind the legs of the chairs to instigate tipping and since the height of a stop block affects how much force is required to tip a chair,

variation was introduced depending on what a test lab selected to use for a stop block.) The new standard also specifies the exact positioning for adjustable chairs: the seat backs must be in the most upright position and the chairs shall be tested in their highest possible height setting (or whatever position is deemed most likely to fail).

These recommended improvements to the rearward stability test were balloted in August 2015. The ballot closed on September 14, 2015, and received one negative from a manufacturer that did not pertain specifically to staff's proposed revisions to the rearward stability test. There were also two comments regarding wording and miscellaneous issues that staff believes do not warrant changes to their recommendations at this time. The results of the ballot will be discussed in the upcoming ASTM subcommittee meeting on October 8, 2015.

The revised rearward stability requirement and test procedure, as developed by staff and the ASTM task group, are sufficiently stringent to fail chairs involved in rearward tip over incidents. Staff believes this new requirement will improve high chair rearward stability, and thus, improve safety. Because the requirement has not yet been approved by ASTM, staff is recommending that the Commission include the revised requirement as a modification to ASTM F404-15 for the NPR. The exact language for the modification can be found in Appendix B of this memorandum.

VIII. ADDITIONAL COMMENTARY ON RESTAURANT-STYLE HIGH CHAIRS

High chairs used in restaurants ("restaurant-style high chairs") are generally robustly constructed with wood or plastic and are designed to be stackable for easy and compact storage (Figure 8). Typically, these restaurant-style high chairs do not have trays because they are intended to be used next to the eating table, allowing children to sit at the table with the adults. Another common characteristic of restaurant-style high chairs is that they are designed to accommodate a wide range of occupants, from infants to toddlers. The intended use environment, as well as the compact and versatile design features characteristic of restaurant-style high chairs, leave these chairs susceptible to not meeting every requirement in the ASTM F404-15, *Standard Consumer Safety Specification for High Chairs*.

Frequently, the leg openings on restaurant-style high chairs are large enough to allow the complete passage of the wedge block and can allow a young child to slip through. Due to the large leg openings, most restaurant-style high chairs do not meet the requirements of ASTM F404-15. In addition to large leg hole openings, restaurant-style high chairs also have large side and back openings, which also do not meet the requirements of ASTM F404-15. The passive restraint in many restaurant-style high chairs is a simple belt that fits loosely over the top rail. Often this belt does not meet the requirements for a passive restraint of ASTM F404-15.



Figure 8: A Typical Restaurant-style High Chair

Restaurant-style high chairs are generally lower to the ground than high chairs intended for home use, and the compact designs of restaurant-style highchairs are not as wide from front to back and side to side. As a result of the narrower base, restaurant-style high chairs may not meet the stability requirements of ASTM F404-15. Often, restaurant-style high chairs do not meet the labeling requirements of the ASTM F404-15 standard, due to a lack of space on which to put the required labels.

Commercial environments necessitate a variety of design attributes that are not as critical for high chairs used in consumers' homes. However, sometimes this versatility comes at the cost of not meeting ASTM F404-15's performance standards. Use patterns also vary for commercial environments, as described in Tab E.

IX. CONCLUSION

ESME staff recommends that the Commission propose to incorporate by reference, ASTM F404-15, as the mandatory safety standard for high chairs, with a modification to the rearward stability requirement and with labeling modifications, as described in Tab E. Staff recommends revising the current requirement and test procedure to increase the stability of some high chair designs. Staff believes this increase in stability will help reduce incidents and potential injuries associated with rearward stability. The staff-recommended rearward stability modification (Appendix B) is identical to the revision balloted by ASTM, which closed on September 14, 2015. The staff recommendations will be discussed at the upcoming October 8, 2015 ASTM high chair subcommittee meeting.

APPENDIX A: International Standard Comparisons

#	Provision	F404-15 Requirements	EN 4988:2006 Plus 2012 Amendment Requirements	Australian AS 4684 – 2009 Requirements	ISO 9221 1992 Requirements	Most Stringent Requirement
1	Hazardous Sharp Edges <i>Intended to reduce laceration and puncture injuries to children.</i>	There shall be no hazardous sharp edges or points before or after testing in accordance with this consumer safety specification.	Exposed edges and protruding parts shall be rounded or chamfered and free from burrs and sharp edges.	None	Same as EN	ASTM substantially equivalent to EN and ISO
2	Splinters <i>Intended to reduce laceration and puncture injuries to children.</i>	Before the application of any test methods, any exposed wood parts shall be smooth and free of splinters.	Materials shall be visually clean and free of infestation.	None	Timber and timber-based materials used in the high chair shall be free from decay and insect attack.	ASTM substantially equivalent to EN and ISO
3	Latching or Locking Mechanisms <i>This test is intended to reduce injuries caused by unintentional folding or unlocking.</i>	Apply a force of 45 lbf (200 N) to the high chair in the direction normally associated with folding the high chair. Perform this procedure five times within a 2 min period.	<ul style="list-style-type: none"> - With a test dummy loaded in the seat, apply a force of 45 lbf (200 N) at the point and in the direction considered most likely to fold the high chair. - All locking or attachment mechanisms shall be operated 300 times. - Unintentional release or operation by a child of the locking mechanisms shall be considered to be prevented if <ul style="list-style-type: none"> a) at least one locking mechanism requires a minimum force of 11 lbf (50 N) before and after test, or b) at least one locking mechanism requires the use of a tool to be released, or c) folding is only possible when two independent locking mechanisms are operated simultaneously, or d) there are two or more automatically engaging locking devices that cannot be released by one single action, or e) folding of the high chair requires two consecutive actions, the first of which must be maintained while 	None	<ul style="list-style-type: none"> - With a test dummy in the seat, apply a force of 45 lbf (200 N) at the outer end of the tray or the point and in the direction considered most likely to fold the high chair. Repeat for a total of 10 times. Repeat the test with the load in any other position or direction likely to fold the chair. - The minimum force to operate a fastening or attachment device shall be 4.5 lbf (20 N). - Fastening devices shall be inoperable by the child when seated in the high chair. 	EN

#	Provision	F404-15 Requirements	EN 4988:2006 Plus 2012 Amendment Requirements	Australian AS 4684 – 2009 Requirements	ISO 9221 1992 Requirements	Most Stringent Requirement
			the second is carried out			
4	Openings <i>Intended to reduce the likelihood of openings that can trap a child's finger.</i>	Includes the ASTM general requirements and test procedures for openings in all children's product standards.	The EN 14988 standard has requirements and a test procedure for openings.	None	There shall be no open-ended tubes. There shall be no projections, holes, loose washers, speed fixings, nuts or crevices in which a child's finger or flesh could become trapped when the high chair is in use.	ASTM is substantially equivalent to EN and ISO
5	Toy Components <i>Intended to reduce injuries from accessory toys.</i>	Toy components provided with or attached to the high chair shall comply with the requirements of Consumer Safety Specification for toys (F963).	None	Toy components must comply with Australia's toy safety specification (AS 8124)	None	ASTM
6	Surface Coatings <i>Intended to reduce injury from harmful elements.</i>	All paints and surface coatings on the product shall comply with the lead paint spec (16 CFR 1303).	Materials shall be visually clean and free of infestation and accessible surfaces must meet Europe's chemical/ toxin requirements for toys (EN 71-3).	All material and coatings accessible to an occupant shall comply with max element migration levels when tested in accordance with AS/NZS ISO 8124.3.	None	ASTM is substantially equivalent to EN and AS
7	Protective Components <i>Intended to prevent injuries from underlying sharp edges, points, or entrapment of fingers or toes.</i>	If the child can grasp protective components between the thumb and forefinger, or teeth. Then pull on the component with a 15 lbf force.	None	None	None	ASTM
8	Tray Performance (Pull) <i>Intended to ensure the tray remains attached during use and misuse (such as an adult picking the chair up by the tray)</i>	A 45 lbf (200N) is gradually applied to the tray in the horizontal direction and then maintained for 10s in the following locations: - Front center - Rear center - Side center (both sides) The same force application is carried out, except in a	Apply a horizontal force of 45 lbf (200 N) 10 times to the tray at the following tray locations: a) front center; b) rear center; c) side center (both sides) The test force shall be maintained for 30 s. Apply a downward vertical force of 45 lbf (200 N) at the	None	Same as EN	ASTM

		vertical force direction on the tray on the rear and the sides. Repeat all tests for a total of five applications per site.	geometric center of the tray. Maintain the load for 1 min.			
#	Provision	F404-15 Requirements	EN 4988:2006 Plus 2012 Amendment Requirements	Australian AS 4684 – 2009 Requirements	ISO 9221 1992 Requirements	Most Stringent Requirement
9	Tray Performance (Drop) <i>Intended to ensure the tray remains intact, safe, and operable even if it accidentally falls off and hits the floor.</i>	All removable trays and front torso supports shall remain functional and exhibit no sharp points or edges when dropped from a height of 36 in. (900 mm) once on each of four different surfaces, one surface of which shall include the attaching mechanism.	The requirements for edges, openings, locking mechanisms and stability shall be fulfilled and the functions of the high chair shall be unimpaired after removable trays are dropped through a height of 39 in. (1 m) on each of the following positions: - on one long edge - on one short edge, - on the bottom, - adjacent to the fastening points - 3 other points likely to be damaged by the test.	None	No part of the tray shall be detached or damaged when the tray is dropped through a height of 39 in. (1 m) onto the floor, on each of the following; one long edge, one short edge, the flat bottom, adjacent to the fastening points and any other point judged likely to be damaged by the test.	ASTM
10	Tray Latch Release Mechanisms <i>Intended to reduce injuries caused by trays which are too easily released by occupants.</i>	Tray release latches must meet various requirements depending on the type of latch and the accessibility of that latch to the occupant.	None	None	None	ASTM
11	Reclining Backrest Integrity	None	None	None	The mechanism allowing the back of the high chair to be adjusted shall not slip or allow any increase to the angle of seat back when a vertical force of 22.5 lbf (100 N) is applied to the top edge of the backrest for 1 h in the middle and the two extreme positions.	ISO
12	Static Load <i>Intended to reduce injuries associated with a chair or</i>	<u>Seat</u> : The chair shall remain functional and in compliance when a load of 100 lb is gradually applied to the seat	Position a mass of 88 lb (40 kg) on the center of the seat. Maintain the load for 1 min. Lift and hold the high chair clear of	Same as EN	No part of the high chair or any attachments shall be detached or damaged when a force of 20 lbf (90 N) is	ASTM

	<i>footrest collapsing under occupant load.</i>	and maintained for an additional 60 seconds. <u>Foot Rest:</u> The foot rest must remain intact when a 50 lb load is gradually applied and held for an additional 60 sec.	the floor for one minute at the point of balance on the lateral protection.		applied in any direction.	
#	Provision	F404-15 Requirements	EN 4988:2006 Plus 2012 Amendment Requirements	Australian AS 4684 – 2009 Requirements	ISO 9221 1992 Requirements	Most Stringent Requirement
13	Stability – Front <i>Intended to reduce injuries from the high chair tipping over in the forward direction.</i>	With a 40 pound weight in the seat, apply a force of 18 lb (80 N) at the center front edge of the tray at the upper most surface of the tray. Gradually apply the force over a period of 5 seconds. The chair shall not tip over when the forces are applied.	With an 11 lb (5 kg) mass loaded in the seat, apply a 5.6 lb (25 N) horizontal force is applied to the uppermost point of the front of the chair in the forward direction. The chair must not overturn.	Same as EN	Same as EN	No clear basis to compare
14	Stability - Rear <i>Intended to reduce injuries from the high chair tipping over in the rear direction during use.</i>	CPSC RECOMMENDATION GOING OUT TO BALLOT: The force required to tip the high chair over and the distance through which the force must be applied are measured. From the combined measurements, a stability factor is calculated. The stability factor equals 2xForce+Distance. The stability factor shall be greater than 50.	High chairs must not overturn when a 33 lb (15 kg) mass is applied to a horizontal test beam (the force is applied 140 mm horizontally outwards from the most forward point at which the unloaded test beam is supported by the backrest).	Same as EN	Same as EN	ASTM (as balloted)
15	Stability – Sides <i>Intended to reduce injuries from the high chair tipping over to either side during use.</i>	Apply a horizontal force of 14 lbf (62 N) at the center of each arm (or tray sides) of the high chair in a direction that is outward from the center of the high chair. Gradually apply the force over a period of 5 s. Conduct this test on both the left and right sides of the high chair.	High chairs must not overturn when a downward vertical force of 33 lbf (150 N) is applied to a test beam at a distance of 140 mm horizontally outward from the inside edge of one arm or lateral protection of the high chair.	Same as EN	Same as EN	No clear basis to compare
16	Exposed Coil Springs	Any exposed coil spring which	If shear and squeeze points are	None	None	ASTM is

	<i>Intended to reduce injuries caused by pinching the occupant of the high chair.</i>	is accessible to the occupant, having or capable of generating a space between coils of 0.210 in. (5.3 mm) or greater during static load testing shall be covered or otherwise designed to prevent injury from entrapment.	created by parts operated by spring force, the distance between moving parts shall not be less than 18 mm unless the distance is always less than 5 mm when tested.			substantially equivalent to EN
#	Provision	F404-15 Requirements	EN 4988:2006 Plus 2012 Amendment Requirements	Australian AS 4684 – 2009 Requirements	ISO 9221 1992 Requirements	Most Stringent Requirement
17	Scissoring, Shearing, and Pinching <i>Intended to reduce injuries caused by pinching the occupant of the high chair.</i>	A high chair, when in the manufacturer's recommended use position, shall be designed and constructed so as to prevent injury to the occupant from any scissoring, shearing, or pinching when members or components rotate about a common axis or fastening point, slide, pivot, fold, or otherwise move relative to one another.	Shear and squeeze points accessible only when the product is being set up or folded are permitted if they are not under the influence of a powered mechanism. Shear and squeeze points created by parts operated by spring force must comply with exposed coil spring requirements.	None	None	ASTM is substantially equivalent to EN
18	Active Restraint System <i>Intended to keep the child in the high chair.</i>	A restraint system including an adjustable waist restraint and a crotch restraint is required to be attached in one of the manufacturer's recommended use positions at the time of shipment. The restraints must remain intact and retain a CAMI test dummy when a 45 lbf force is used to pull the CAMI out of the chair. The adjustable waist restraint shall not slip more than 1 in. (25.4mm) when pulled with a 45 lbf. The restraint system anchors shall	Either an active restraint system or a passive restraint system shall be supplied with the high chair. An active restraint system shall comprise of at least one of the following: 1) an adjustable waist belt and a crotch strap, or 2) an adjustable, integral harness comprised of either: a) a crotch restraint, a waist strap and shoulder straps, or b) straps that pass over the child's shoulders and between the child's legs. The restraints must be capable	High chairs shall have an adjustable, permanently attached restraint system. The buckling device of any safety restraint system shall not include a quick-release mechanism, and shall be constructed so as to prevent removal of the buckling device from the strap.	Restraints must remain anchored when a force of 33.7 lbf (150 N) is applied for 1 min in the direction most likely to cause failure to each of the harness attachment points.	ASTM

		not separate from their attachment points when pulled with 45 lbf.	of remaining intact when a force of 33 lbf (150 N) is gradually applied to each component of the restraint system, and maintained for 1 min in the direction most likely to cause failure.			
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#	Provision	F404-15 Requirements	EN 4988:2006 Plus 2012 Amendment Requirements	Australian AS 4684 – 2009 Requirements	ISO 9221 1992 Requirements	Most Stringent Requirement
19	Passive Crotch Restraint System <i>Intended to reduce the likelihood of children sliding through or becoming entrapped if they are not using the active restraints.</i>	All high chairs with a completely bounded opening in front of the occupant must have a passive restraint.	All high chairs must have an active restraint system <u>or</u> a passive restraint.	None	None	ASTM
20	Installation of Passive Crotch Restraint <i>Intended to reduce the likelihood of a submarining incident in a fully bounded opening.</i>	The passive crotch restraint shall be permanently attached to the high chair or tray before shipment such that it cannot be removed without the use of a tool. Restraint must be installed or tethered to the use Position.	None	None	None	ASTM
21	Structural Integrity/ Dynamic Load <i>Intended to ensure the high chair will stand up to loads encountered in use.</i>	Perform a drop test using a 50lb. (23 kg) shot bag. The bag will be dropped from a height of 3 in. (75 mm) above the seat. The drop is to be repeated for 500 cycles. The chair must maintain compliance with all other requirements after	The chair must meet all other standard requirements after a 14 lb (6.5 kg) impact hammer strikes the seat from a distance of 4.6 in (116 mm) to hit the center of the uppermost point of the back, the front, and both sides of the chair as well as the inside of the backrest. The test	Same as EN or ASTM	Same as EN	No clear basis to compare

		completion of the test.	shall be carried out for a total of 10 times at each point. If the high chair overturns during the test, it shall be allowed to fall freely on the floor surface.			
22	Castors and Wheels	None	High chairs may be fitted with a maximum of two wheels or castors.	When castors or glides are provided, these shall be limited to one of the following: (a) Two castors. (b) Two glides. (c) Two castors, both having brakes, and two glides. (d) Four castors, of which at least two have brakes.	Castors shall not be provided, except when the high chair can be converted into a baby walking frame. In this case, the castors shall be fitted in such a way that the chair cannot move when the child is sitting in it when in the high chair mode.	EN
#	Provision	F404-15 Requirements	EN 4988:2006 Plus 2012 Amendment Requirements	Australian AS 4684 – 2009 Requirements	ISO 9221 1992 Requirements	Most Stringent Requirement
23	Wood Screws <i>Intended to prevent injuries associated with chair collapse or instability caused by screws being mis-installed (or loose/widening holes after multiple installations)</i>	No high chair shall require consumer assembly of key structural elements using wood screws or sheet metal fasteners directly into wood components. Factory assembly using wood screws on key structural elements is allowed if the wood screws are a second method of attachment or the wood screws include a lock washer, glue or other means to impede loosening or detachment.	None	None	Wood screws shall not be used for the assembly of any components intended to be removed by the consumer when disassembling the high chair for purposes of transportation or storage.	ASTM is substantially equivalent to ISO
24	Protrusions <i>Intended to prevent injuries such as lacerations that occur when a child falls against protrusions on the back legs of a high chair.</i>	ASTM F404-15 provides a test method to determine when a hazardous projection exists on the lower support of a high chair, 12-17 inches up from the floor.	None	None	None	ASTM



UNITED STATES
CONSUMER PRODUCT SAFETY COMMISSION
4330 EAST WEST HIGHWAY
BETHESDA, MARYLAND 20814

Memorandum

APPENDIX B: Rearward Stability Index Requirement

The rearward stability requirement ASTM is expected to send out to ballot in August 2015, reads as follows:

~~6.5 Stability—A chair shall not tip over when forces are applied in accordance with 7.7.~~

~~6.5.1 Forward and sideways stability - A chair shall not tip over when forces are applied in accordance with 7.7.2.4 and 7.7.2.5~~

~~6.5.2 Rearward stability - When tested in accordance with 7.7.2.6, the high chair shall have a Rearward Stability Index of 50 or more.~~

7.7 Stability Testing:

7.7.1 Test Equipment – Test Weight—Steel weight 4 in. high by 2.5 in. wide by 7.2 in. long (102 by 64 by 183 mm). Drill holes into the top surface of the weight or cut the corners of the weight to adjust the mass of the weight to 20 lb (9.1 kg). Two weights required to conduct the test.

NOTE 9—Steel test weight size is defined to allow use of standard cold rolled steel 1/2 in. (13 mm) thick by 2.5 in. (38 mm) wide and cut to a length of 7.2 in. (183 mm). These cut plates are stacked 8 plates high to yield a total height of 4 in. (102 mm) and a total mass slightly over 20 lb (9.1 kg). The sizes specified allow some extra mass to allow for drilling holes for fine tuning the total mass to 20 lb.

7.7.2 Stability with Child in Chair:

7.7.2.1 Place the chair in a manufacturer's recommended use position ~~an upright position~~ with all legs on ~~the~~ a level floor and with the seat back adjusted into the most ~~an upright position~~. Attach the tray in the rear position, closest to the high chair seat back. For high chairs with height adjustable seats, in each test 7.7.2.4, 7.7.2.5 and 7.7.2.6 adjust the seat into the highest manufacturer's recommended use position or the position deemed most likely to fail. If a high chair has lockable wheels, those wheels shall be locked during stability testing.

7.7.2.2 ~~Place an angle or bar on the floor against the leg or legs in a manner that will prevent the chair from sliding on the floor, but will not prevent it from tipping. Place the high chair on a rigid, horizontal test surface covered with 60 grit sandpaper or equivalent to prevent the chair from sliding on the test surface during the test. If a high chair slides on the test surface during the test or has wheels that do not lock, place a stop on the test surface to prevent sliding during the test. The stop shall be low profile, minimum height required to prevent sliding, and shall not inhibit the tipping of the high chair or affect the test results.~~

7.7.2.3 Center the test weights next to each other on the seat in both the front to back and lateral directions with the 2.5 in. dimension of the weight oriented horizontally as shown in Fig. 9-1. For high chairs with a passive crotch restraint that prevents placing the two weights together at the center of the seat laterally, place one weight on each side of the passive crotch restraint such

that they are equal distances from the center of the seat as shown in Fig. 9-2. Affix the test weights to the seat in such a manner that the weights will not move in relation to the seat. For non-rigid or conformable seat surfaces (for example, sling seats, foam seats), the weights shall be placed on a 6 by 6 by 3/4 in. thick (150 by 150 by 19 mm thick) wood block to ensure uniform distribution of the weight as shown in Fig. 9-3.

NOTE 10—For contoured seats, a block of material which has negligible weight, such as EPS foam, may be used to stabilize the weights during the test.

7.7.2.4 Forward Stability - Apply a horizontal force of 18 lb. (80 N) at the center front edge of the tray at the uppermost surface of the tray. Apply the horizontal force perpendicular to the front plane of the high chair and in a direction that is outward from the center of the high chair. Gradually apply the force over a period of 5 s. For a high chair designs that does not include a tray, conduct the forward stability testing in 7.7.1.4 and 7.7.1.6 by applying the horizontal force on the outermost member at a height of 7 1/4 in. (184 mm) above the occupant seating surface estimated to be the uppermost surface of a tray.

7.7.2.5 Sideways stability - Apply a horizontal force of 14 lb. (62 N) at the center of each arm of the high chair at the uppermost surface of the tray or arm, if a tray is not provided. Apply the horizontal force perpendicular to the side plane of the high chair and in a direction that is outward from the center of the high chair. Gradually apply the force over a period of 5 s. Conduct this test on the both the left and right sides of the high chair. For a high chair that does not include a tray or arm, conduct the sideways stability test by applying the horizontal force on the outermost member at a height of 7 1/4 in. (184 mm) above the occupant seating surface.

7.7.2.6 Rearward stability ~~Apply a horizontal force of 14 lb. (62 N) at the center of the seat back at the height of the uppermost surface of the tray. Apply the horizontal force perpendicular to the rear plane of the high chair and in a direction that is outward from the center of the high chair. Gradually apply the force over a period of 5 s.~~

7.7.2.6.1 Attach a force gauge to the rear surface of the seat back at the lateral centerline and 7 1/4 in. (184 mm) above the occupant seating surface as shown in Fig X. For high chairs with a seat back 7 1/4 in. (184 mm) high or less, attach the force gauge at the lateral centerline and top surface of the seat back.

7.7.2.6.2 With the high chair in the at rest position, gradually apply a preload force "F" of 3 lbf (13 N) to the seat back surface of the high chair and while maintaining the force, establish an the initial location of a reference point location some distance away from the force gauge as shown in Fig. X.

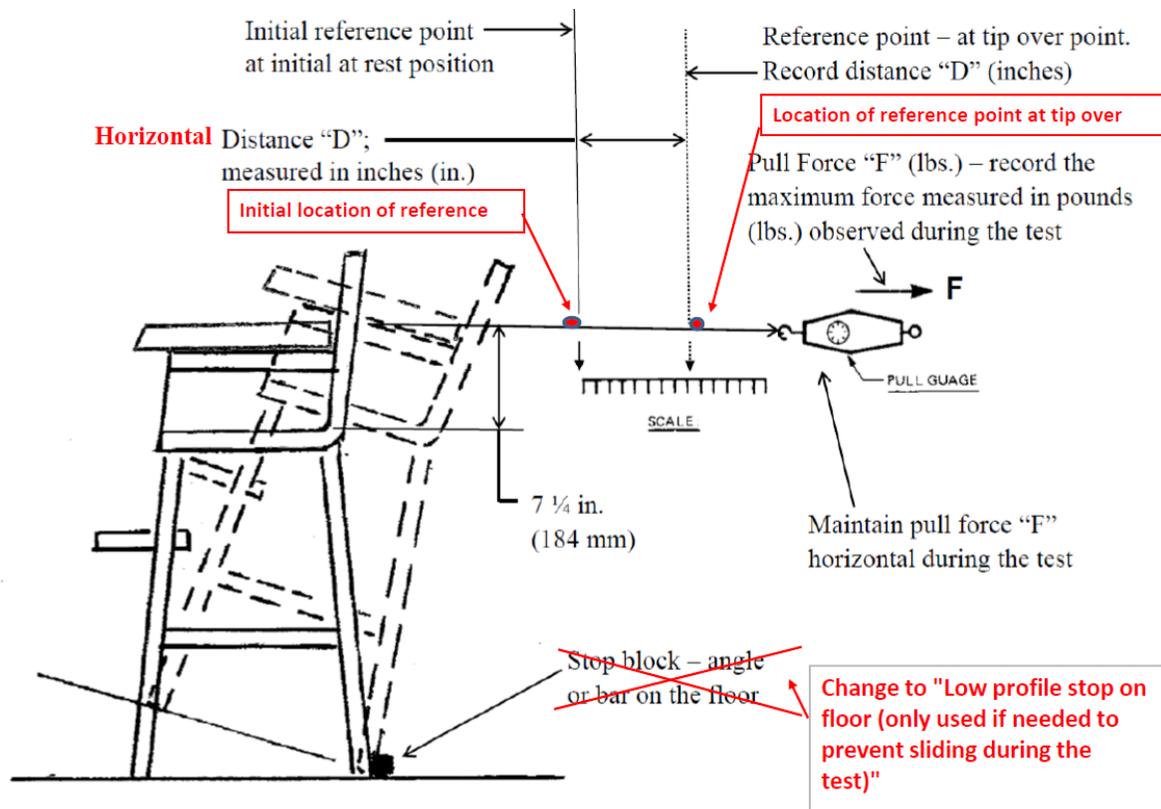


Fig X Rearward Stability Test

7.7.2.6.3 Gradually increase the horizontal force over a period of at least 5 seconds and continue to pull the high chair rearward until the high chair reaches the point that it becomes unstable and is on the verge of tipping over. Record the maximum force "F" in pounds (lbs.) applied during the test and the horizontal distance "D" in inches (in.) from the initial reference point location of the reference point to the location of the reference point where the high chair becomes unstable and is on the verge of tipping over. Force "F" shall be maintained in a horizontal direction throughout the test.

7.7.2.6.4 Calculate the Rearward Stability Index using the formula shown below.

$$\text{Rearward Stability Index} = 2 * F + D$$

Force "F" is measured in pounds (lbs.).

Distance "D" in measured in inches (in.)

7.7.2.7 For high chair designs that do not include a tray, conduct stability testing in 7.7.1.4 and 7.7.1.6 by applying the horizontal force on the outermost member at a height estimated to be the uppermost surface of a tray.

TAB C: Summary of High Chair Recalls from January 2010 to Present

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UNITED STATES
CONSUMER PRODUCT SAFETY COMMISSION
4330 EAST WEST HIGHWAY
BETHESDA, MARYLAND 20814

Memorandum

August 31, 2015

TO : Stefanie Marques
High Chair Project Manager
Directorate for Health Sciences

THROUGH: Howard N. Tarnoff, Acting Executive Director,
Office of Compliance and Field Operations

Marc Schoem, Deputy Director,
Office of Compliance and Field Operations

Mary F. Toro, Director, Regulatory Enforcement Division,
Office of Compliance and Field Operations

Carolyn Manley, Team Lead, Regulatory Enforcement Division,
Office of Compliance and Field Operations

FROM : Keysha L. Walker, Compliance Officer, Regulatory Enforcement Division,
Office of Compliance and Field Operations

SUBJECT : Summary of High Chair Recalls from January 2010 to Present

NOTE: This document is for "Official Use Only" and should not be publicly released.

PURPOSE

The purpose of this memorandum is to summarize the product safety recalls conducted by the Office of Compliance and Field Operations ("Compliance") related to high chairs. This information is being provided to support the CPSC staff in the drafting of a proposed rule for a mandatory high chair standard for the Commission's consideration. The information covers recalls conducted on high chairs from January 1, 2010 to present.

COMPLIANCE INVESTIGATION INFORMATION

Since January 1, 2010, there have been 10 high chair recalls involving eight different firms (see Table I). The recalled products referenced were responsible for 72 injuries, including 11 lacerations requiring medical closure (stitches, tape or glue), 44 injuries of bumps and bruises,

one scratched cornea, and one hairline fracture to the arm. These injuries were primarily related to falls from the high chair.

Table I
Summary of High Chair Recalls
January 1, 2010 to Present

Recall Date	Firm	Reason	# Recalled Units	# Incidents/Injuries Reported	Press Release Number
09/30/2010	Fisher-Price	Laceration Hazard	950,000	14	10-361 ¹²
03/18/2010	Graco	Fall Hazard	1.2 Mil	464	13-006 ¹³
01/05/2012	IKEA	Fall Hazard	169,000	8	12-079 ¹⁴
06/05/2012	Evenflo	Fall Hazard	35,000	18	12-192 ¹⁵
07/12/2012	Artsana USA	Laceration Hazard	455,000	21	12-221 ¹⁶
10/09/2012	Graco	Fall Hazard	86,000	58	13-006 ¹⁷
10/18/2012	Dream On Me	Strangulation Hazard	90	0	13-013 ¹⁸
03/28/2013	Baby Home USA	Strangulation Hazard	1,100	0	13-155 ¹⁹
07/23/2014	Dream On Me	Strangulation	2,800	0	14-237 ²⁰
02/05/2015	Mima International Ltd.	Fall/Impact	1,470	14	15-075 ²¹
Total	10		2,900,460	597	

¹² CPSC Link to press release - <http://www.cpsc.gov/en/Recalls/2010/Fisher-Price-Recalls-Healthy-Care-Easy-Clean-and-Close-to-Me-High-Chairs-Due-to-Laceration-Hazard/>

¹³ CPSC Link to press release - <http://www.cpsc.gov/en/Recalls/2010/Graco-Recalls-Harmony-High-Chairs-Due-to-Fall-Hazard/>

¹⁴ CPSC Link to press release - <https://www.cpsc.gov/en/Recalls/2012/IKEA-Recalls-to-Repair-High-Chairs-Due-to-Fall-Hazard/>

¹⁵ CPSC Link to press release - <http://www.cpsc.gov/en/Recalls/2012/Evenflo-Recalls-Convertible-High-Chairs-Due-to-Fall-Hazard/>

¹⁶ CPSC Link to press release - <http://www.cpsc.gov/en/Recalls/2012/Chicco-Polly-High-Chairs-Recalled-Due-to-Laceration-Hazard/>

¹⁷ CPSC Link to press release - <https://www.cpsc.gov/en/Recalls/2013/Graco-Recalls-Classic-Wood-Highchairs-Due-to-Fall-Hazard/>

¹⁸ CPSC Link to press release - <http://www.cpsc.gov/en/Recalls/2013/Dream-On-Me-Recalls-High-Chairs-Due-to-Strangulation-Hazard/>

¹⁹ CPSC Link to press release - <http://www.cpsc.gov/en/Recalls/2013/BabyHome-USA-Recalls-High-Chairs/>

²⁰ CPSC Link to press release - <http://www.cpsc.gov/en/Recalls/2014/Dream-On-Me-Recalls-High-Chairs/>

²¹ CPSC Link to press release - <http://www.cpsc.gov/en/Recalls/2015/Mima-Recalls-Moon-3-In-1-High-Chairs/>

TAB D: Health Sciences Assessment of High Chair-Related Injuries

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UNITED STATES
CONSUMER PRODUCT SAFETY COMMISSION
4330 EAST WEST HIGHWAY
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Memorandum

September 16, 2015

TO: Stefanie C. Marques, Ph.D.
Division of Pharmacology and Physiology Assessment
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THROUGH: Alice M. Thaler, D.V.M., MS Bioethics
Associate Executive Director
Directorate for Health Sciences

Jacqueline Ferrante, Ph.D.
Division Director
Division of Pharmacology and Physiology Assessment
Directorate for Health Sciences

FROM: Stefanie C. Marques, Ph.D.
Division of Pharmacology and Physiology Assessment
Directorate for Health Sciences

SUBJECT: Health Sciences Assessment of High Chair-related Injuries

Introduction

Health Sciences (“HS”) staff reviewed and analyzed incident data associated with high chairs to determine whether the current ASTM voluntary standard (“F404-15”) for high chairs sufficiently addresses potential hazards associated with these products.

ASTM F404-15 applies to chairs with a seat height of 15 inches or more that are designed to be used by a child 3 years and younger for the purposes of dining; the high chair may be height adjustable and include a recline position to support children who are unable to sit up on their own.

Based on the Directorate for Epidemiology Division of Hazard Analysis (“EPHA”) staff’s review of 1,296 incidents that occurred from January 1, 2011 to December 31, 2014 (Tab A), there were eight major hazard patterns associated with specific high chair components, such as the frame, tray, restraints, seat, armrests, toy attachments, wheels, and foot rest. EPHA staff also determined that there were hazards associated with the high chair’s overall design and stability. In addition, there were miscellaneous incidents in which the hazard pattern did not fit into those

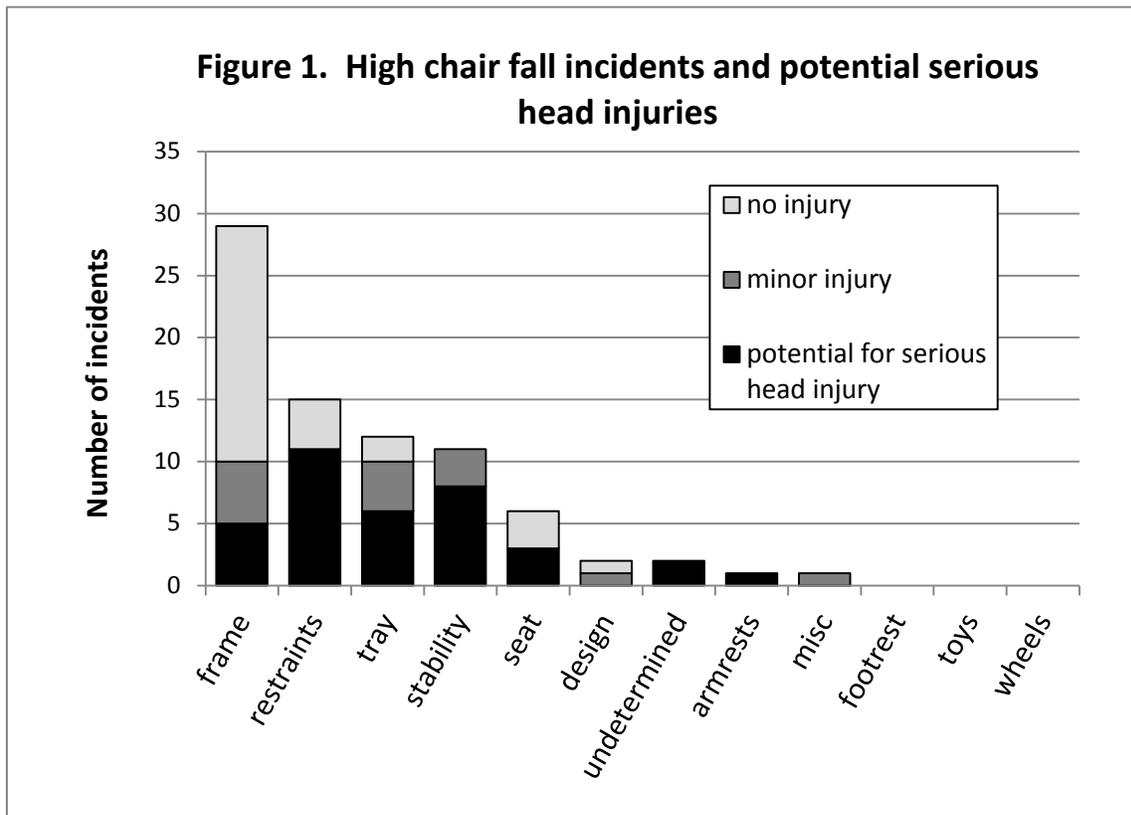
hazards described above, and incidents in which the specific hazard could not be determined. Of the 1,296 incidents, there were 138 injuries and one death. The hazard pattern for the fatality could not be established due to the limited information in the incident report.

Health Sciences staff’s analysis of reported injury incidents

HS staff reviewed the incident data and determined that the majority of the incidents resulted in minor injuries, such as bruises, bumps, and abrasions. According to HS staff’s analysis, there were only three moderate injuries, which involved a laceration requiring stitches, a puncture wound requiring stitches, and a broken clavicle. In two of the moderate-injury incidents, the child was outside the high chair when injured. There were no high chair incidents that resulted in a severe injury.

High chair falls and head injuries

Despite the fact that there were no serious injuries involving high chairs reported to CPSC, HS staff believes that due to the typical high chair height and the hard surfaces of the rooms in which they are usually placed, such as the kitchen and the dining room, falls from the high chair seating surface have the potential to cause serious head injuries. HS staff reviewed the incident data and identified 79 cases in which a child seated in a high chair fell to the floor below (Figure 1). Most of the fall incidents were associated with the frame, restraint, stability, and tray hazard patterns.



The frame hazard pattern was associated with 29 fall incidents, but only five of the falls resulted in the child striking their head and having the potential for a serious head injury. Most of the frame fall incidents involved the child falling with the chair, due to the chair collapsing. In these incidents the back of the chair and seat structure protected the child and reduced the potential for a serious head injury.

HS staff believes that falls associated with the restraint, stability, and tray hazard patterns present the greatest potential for a serious head injury. There were 15 falls associated with the restraint hazard pattern; 11 of the falls resulted in the child striking their head and sustaining a minor head injury. These falls occurred when the restraint system failed because the child was able to disengage the restraint lock; the restraint was loosely fitted, and the child could have maneuvered out of the restraint; or the components of the restraint broke or failed, causing the child to fall from the high chair at a seated height or at the child's height standing on the high chair seat, which presents the potential for a serious head injury.

There were 12 falls associated with the tray hazard pattern, six resulted in the child striking their head and sustaining a minor head injury. Falls associated with the tray hazard occurred when the child was usually placed in the high chair unrestrained. and either the caregiver or the child removed the tray, resulting in the child falling forward out of the high chair to the floor below, presenting the potential for a serious head injury.

There were 11 falls associated with the stability hazard pattern; eight of these resulted in the child striking their head and sustaining a minor head injury. Falls associated with the stability hazard pattern involve the child and the chair falling when the chair tips over due to its instability. Usually, the chair tips over as the result of the child pushing off the table or rocking the high chair. HS staff believes that due to the momentum at which the child strikes their head and the possibility that the child can hit nearby objects, such as a table, these types of falls present the potential for a serious head injury.

High chair head entrapments

If a child falls through a bounded opening between the tray and the seat of the high chair and becomes entrapped by their head, the pressure from the sides of the bounded opening on the child's neck could potentially block blood flow to and/or from the brain, resulting in unconsciousness and eventually death if the child is not found immediately. There were two incidents associated with the design hazard pattern involving children falling through a bounded opening between the tray and the seat and becoming entrapped by their heads. In both cases, the caregiver was nearby and able to free the child immediately, resulting in only minor injuries to their necks.

According to Engineering Sciences Mechanical Engineering ("ESME") staff (Tab B), some models of high chairs used in restaurant settings fail the leg opening requirements of the current standard, ASTM F404-15. HS staff believes that it is less likely for a child in a restaurant to be left unsupervised long enough for a head entrapment to result in a serious injury or even death.

Notably, none of the incidents that occurred in restaurants involved an unsupervised child becoming entrapped in a bounded opening between the tray and the seat of the high chair.

Health Sciences staff analysis of NEISS injuries

A total of 1,078 high chair-related cases were treated in emergency departments in NEISS member hospitals from 2011 to 2014. These cases project nationally to 31,300 high chair-related injuries treated in U.S. hospital emergency departments. According to EPHA staff, most of the NEISS cases were the result of unspecified falls from high chairs; the injuries sustained in these falls were mostly to the head and face. HS staff determined that 70 of the 1,078 NEISS cases (5 % of the national estimate). In six of these cases, the severe head injury was sustained due to a rearward tip over of the high chair.

In four of the severe head injury cases, the child was reported to be either climbing down from the high chair or standing up on the high chair just before a fall. While NEISS case narratives do not provide sufficient details to quantify the use of restraints in these incidents, the injuries involving climbing down and standing in a high chair suggest that the lack and/or ineffectiveness of a restraint could be a possible contributing factor in these falls.

Health Sciences staff conclusion

Based on the review and analysis of incidents reported to CPSC, the four hazard patterns most commonly associated with falls from high chair incidents involved issues with the frame, restraints, tray, and stability. Although none of the fall incidents reported to CPSC resulted in severe injuries, falls from high chairs involving restraints, tray, and stability issues have the greatest potential for severe head injuries. Severe head injuries, such as concussions and fractured skulls, could cause extensive brain damage and affect the child's motor development, emotional development, speech, ability to think and learn, and overall quality of life long after the incident has occurred.

HS staff believes that falls associated with the restraint and tray hazards could be reduced if warnings were improved to remind caregivers to use the restraints at all times and advise that the tray portion of the high chair is not an alternative to a safety restraint, and that placement of these warnings in an area that would be seen by the caregiver while the child was in the high chair as suggested by Engineering Sciences Human Factors ("HF") staff in Tab E. Improvement in the rearward stability testing, as suggested by ESME staff in Tab B, could greatly reduce the number of high chair-related injuries associated with the stability hazard pattern. In many of the incidents, the child was able to push off from a nearby dining table and propel the high chair backwards. HS staff believes that a child striking the back of its head with this momentum could potentially sustain a severe head injury, which is corroborated by incidents in the NEISS database.

Recent improvements to the voluntary standard regarding testing all bounded openings between the tray and the seat with the wedge probe and requiring that the passive restraint be permanently attached when the products ship will greatly reduce the likelihood that a child occupant would

become entrapped by the head and suffer serious injury or even death. Although there were no deaths from a child becoming entrapped in a bounded opening, there were two incidents in which a nearby caregiver immediately rescued an entrapped child. As such, HS staff believes that the recent additions to the voluntary standard are beneficial. In contrast, HS staff believes that it is less likely for a child to sustain a serious injury if the child is entrapped in a high chair used in a restaurant (that does not meet the bounded opening requirements of the current standard) because caregivers would always be nearby to rescue the child. Therefore, additional requirements for these high chairs may not be necessary.

**TAB E: Human Factors Assessment of ASTM F404 – 15
Requirements for High Chairs (CPSIA Section 104)**

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UNITED STATES
CONSUMER PRODUCT SAFETY COMMISSION
ROCKVILLE, MD 20850

MEMORANDUM

September 16, 2015

TO: Stefanie C. Marques, Project Manager, High Chairs Rulemaking,
Division of Pharmacology and Physiology Assessment,
Directorate for Health Sciences

THROUGH: Bonnie B. Novak, Director,
Division of Human Factors, Directorate for Engineering Sciences

FROM: Timothy P. Smith, Senior Human Factors Engineer,
Division of Human Factors, Directorate for Engineering Sciences

SUBJECT: Human Factors Assessment of ASTM F404 – 15 Requirements for High Chairs
(CPSIA Section 104)

BACKGROUND

The ASTM International (“ASTM”) voluntary standard ASTM F404, *Standard Consumer Safety Specification for High Chairs*, establishes requirements for high chairs in the United States and is intended to minimize the hazards associated with the reasonably foreseeable use and misuse, or abuse, of these products. ASTM developed this voluntary standard in response to incident data supplied by staff of the U.S. Consumer Product Safety Commission (“CPSC” or “Commission”). The most current, published version of the voluntary standard is ASTM F404 – 15.

Section 8 of the voluntary standard specifies marking and labeling requirements, which include warning statements that must appear on each high chair. Section 9 specifies the instructional literature that must be provided with each high chair. This memorandum, prepared by staff of CPSC’s Directorate for Engineering Sciences, Division of Human Factors (“ESHF”), assesses the adequacy of these sections of the voluntary standard in addressing the risk of injuries and deaths associated with the use of high chairs and proposes revised requirements that research suggests are likely to reduce the risk of injury or death with these products.

DISCUSSION

ESHF STAFF REVIEW OF INCIDENT DATA

REPORTED INCIDENTS

As staff of CPSC’s Directorate for Epidemiology, Division of Hazard Analysis (“EPHA”) discusses in Tab A, staff has identified 1,296 high chair-related incidents that reportedly occurred from January 1, 2011 through December 31, 2014. These incidents consist of one

fatality and 1,295 nonfatal incidents. Most (1,157) of the nonfatal incidents reported no injury or provided no information about an injury.

ESHF staff's review of these incident data identified numerous cases in which the caregiver was known not to have used the high chair restraint or in which the incident details suggest that the child might not have been restrained. These incidents typically resulted in a fall or near-fall (*e.g.*, victim was caught mid-fall). Although most of the available incident reports have limited details, ESHF staff observed the following scenarios multiple times among those cases in which the caregiver was known not to have used the restraint:

- The child fell from the high chair after the tray disengaged.²² In one case, the restraint was missing from the high chair, and in another case the caregiver reportedly forgot to use the restraint that was present.
- The caregiver was attending to something else (*e.g.*, another child, washing dishes) at the time the incident occurred.²³ Some cases occurred in a daycare setting where other children were present.
- The caregiver previously found the restraint to be ineffective at restraining the child.²⁴

Numerous additional incidents involved a fall that occurred immediately after the tray disengaged from the high chair,²⁵ which suggests that the child might not have been restrained at the time. Other fall-related incidents occurred after the seat suddenly reclined or the armrest broke off, and also might have involved a failure to use the restraints.²⁶ Some of these incidents may not have been a failure to use the restraints; but rather, the incidents might have involved the use of a restraint that fit poorly or was improperly adjusted, because the incident data also include incidents in which the child was wearing the restraint but still escaped and stood up or fell from the high chair.²⁷ These latter incidents are in line with those incidents cited above that involved the restraint not being used because the caregiver previously found it to be ineffective at restraining the child.

NEISS INCIDENTS

From National Electronic Injury Surveillance System ("NEISS") data, EPHA staff estimates that 31,300 high chair-related injuries were treated in U.S. hospital emergency departments from 2011 through 2014. Seventy-eight percent of these injuries involved an unspecified fall, and another 18 percent included injuries primarily sustained from hazard scenarios that involved a fall.

²² For example, doc. nos. I1280169A and I1310650A, and IDI no. 121130CCC1273.

²³ For example, IDI nos. 111213CCC3219, 120501CBB2694, and 121130CCC1273.

²⁴ For example, IDI nos. 120424CBB3620 and 120501CBB2694.

²⁵ For example, doc. nos. I1260130A, I1260404A, and I1280151A.

²⁶ For example, doc. nos. I1260288A, I1280148A, and Y1456075A.

²⁷ For example, IDI no. 111107CCC3106 and doc. nos. I1290079A, I12C0343A, and I1310217A.

The NEISS data provide very limited details about the circumstances surrounding these incidents. Nevertheless, ESHF staff identified numerous incidents that specifically stated that the injured child was not strapped or restrained, or that the restraint had just been removed when the incident occurred. In some of these cases, the incident appeared to happen quickly after the caregiver turned his back to the child. In one case, the caregiver reported not knowing that the child was not strapped in; in another case, the caregiver reportedly forgot to strap in the child. Some fall-related incidents report that the child was strapped in before the fall, which suggests that some of these cases might have involved a restraint that fit poorly or was not adjusted properly, thereby allowing the child to escape or slip through the restraint.²⁸ These findings are consistent with ESHF staff's findings in the reported incidents, described earlier.

CURRENT ASTM WARNING AND INSTRUCTIONAL REQUIREMENTS

ON-PRODUCT WARNING REQUIREMENTS

Section 8 of ASTM F404 – 15 specifies labeling and warning requirements for high chairs. In short, all high chairs must include warnings on the high chair about the risk of serious injury or death from falls or sliding out of the high chair, and the need to always use the restraint system and never leave the child unattended. The specific warning language required differs, depending on whether the seat of the high chair is intended to be used as the seat for a stroller, because strollers require similar, but specific, warning statements (see 16 C.F.R. part 1227 and section 8.2.2.2 of ASTM F833 – 13b, *Standard Consumer Safety Performance Specification for Carriages and Strollers*). Thus, high chairs that do *not* have a seating component that also is used as a seating component for a stroller must state the following, exactly:²⁹

▲WARNING: Prevent serious injury or death from falls or sliding out. Always use the restraint system.

High chairs that have a seating component that also is used as a seating component for a stroller must use the warning statement specified in section 8.2.2.2 of ASTM F833 – 13b in place of the warning statement specified above; in other words, the following statement:

▲WARNING: Avoid serious injury from falling or sliding out. Always use seat belt (or manufacturer may insert another word(s) to describe their restraint system).

In either case, the warning statement above must be in a location that is visible to the caregiver while placing the occupant into the high chair in each of the manufacturer's recommended use positions, but not necessarily visible when the occupant is in the high chair.

High chairs also must include a warning statement about never leaving the child unattended. The previous version of ASTM F404 (14a) presented this as one of the precautionary statements of the previously mentioned warning; all of these warning statements were required to be visible to

²⁸ One incident specifically stated that the child was able to climb out of the high chair strap.

²⁹ The version of the safety alert symbol shown here is based on the default symbol used in the ANSI Z535 series of standards. For consistency, CPSC staff uses this version throughout the memorandum for all instances of the safety alert symbol.

a person standing near, and at any one position around, the high chair, but not necessarily visible from all positions. In contrast, the current version of the standard (ASTM F404 – 15) has a different placement requirement for the “unattended” warning statement relative to the other warning statements about the fall hazard and the need to always use the restraint system. Specifically, the statement about never leaving the child unattended must be “conspicuous,” which the standard defines as a “label that is visible, when the high chair is in a manufacturer’s recommended use position and an occupant is sitting in the high chair, to a person standing near the high chair at any one position around the high chair but not necessarily visible from all positions.” Given its different placement requirements relative to the other required warning statements, the warning about never leaving the child unattended is likely to be separate from the other warning statements, unless the manufacturer chooses to combine the labels and have the combined label meet both placement requirements.

In terms of their design or form, the warning statements must be “in contrasting color(s),” permanent, and in sans serif type. The safety alert symbol (▲) and the signal word, “WARNING,” must be at least 0.2 inches (5 mm) high, and the remainder of the warning message text must be in characters whose uppercase is at least 0.1 inches (2.5 mm) high. The following examples illustrate the types of warning labels that would be permitted on high chairs, based on the warning requirements of the current standard:

In a location that is visible to the caregiver while placing the occupant into the high chair, but not necessarily visible when the occupant is in the high chair (*e.g.*, front of the seatback):

▲WARNING: Prevent serious injury or death from falls or sliding out. Always use the restraint system.

In a location that is visible, while the occupant is sitting in the high chair, to a person standing near the high chair at any one position around the high chair, but not necessarily visible from all positions (*e.g.*, back of the high chair):

▲WARNING: Never leave child unattended.

In a location that is visible to the caregiver while placing the occupant into the high chair, and while the occupant is in the high chair:³⁰

▲WARNING: Prevent serious injury or death from falls or sliding out. Always use the restraint system. Never leave child unattended.

INSTRUCTIONAL REQUIREMENTS

Section 9 of ASTM F404 – 15 specifies the instructional literature that must be provided with the high chair. Section 9.2 states that the instructions must include all of the warning statements that

³⁰ This represents the case in which the manufacturer combines all of the warning statements into a single label, which would have to meet both placement requirements.

are required to appear on the high chair, as well as a statement “similar to” the following, depending on whether the high chair has a reclining feature:

High chairs without a reclining feature:

▲WARNING: The child should be secured in the high chair at all times by the restraining system. The tray is not designed to hold the child in the chair. It is recommended that the high chair be used only by children capable of sitting upright unassisted.

High chairs with a reclining feature:

▲WARNING: The child should be secured in the high chair at all times by the restraining system, either in the reclining or upright position. The tray is not designed to hold the child in the chair. It is recommended that the high chair be used in the upright position only by children capable of sitting upright unassisted.

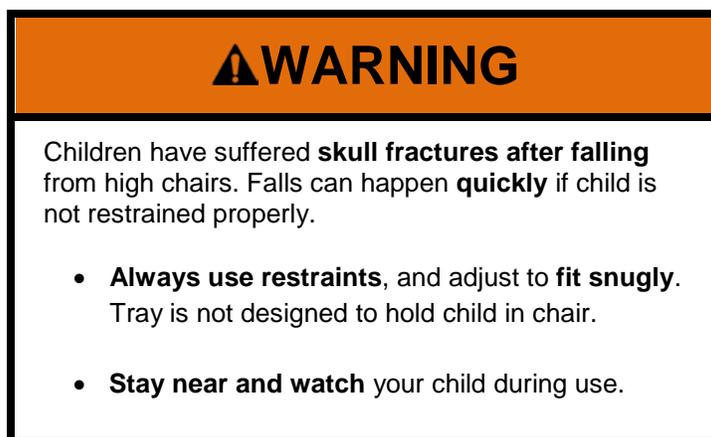
Section 9 of the standard does not specify any design or form requirements for the warning statements in the instructional literature.

ESHF STAFF ASSESSMENT OF WARNING AND INSTRUCTIONAL REQUIREMENTS

ON-PRODUCT WARNING REQUIREMENTS

Summary of ESHF Staff Recommendations

ESHF staff concludes that the on-product warning requirements in ASTM F404 – 15 do not adequately address the risk of injuries and deaths associated with high chairs, and therefore, recommends that these requirements be replaced or revised with warning requirements that would produce the following warning label:



ESHF staff also recommends that the resulting label be required to be visible to the caregiver while placing the occupant into the high chair in each of the manufacturer’s recommended use positions, as well as while the occupant is sitting in the high chair in these recommended use positions. The following subsections detail the rationale behind these proposed revisions, and the

appendix to this memorandum includes staff's proposed revisions to the current ASTM F404 – 15 requirements to produce the recommended warning above.

Content

The primary U.S. voluntary consensus standard for product safety signs and labels, ANSI Z535.4, *American National Standard for Product Safety Signs and Labels*, as well as other literature and guidelines on warnings (*e.g.*, Robinson, 2009; Wogalter, 2006; Wogalter, Laughery, & Mayhorn, 2012) consistently recommend that on-product warnings include:

- a description of the hazard,
- information about the consequences of exposure to the hazard, and
- instructions regarding appropriate hazard-avoidance behaviors.

The requirements in ASTM F404 – 15 do not adequately address these warning elements.

As staff discussed earlier, ASTM F404 – 15 has different placement requirements for the warning statement about never leaving the child unattended, relative to the warning statements about the potential for serious injury or death from falls and the need to always use the restraint system. These differing requirements mean that the warning statements could—and most likely would—appear as two separate warning labels on a high chair. The allowance for two separate warning labels means that the label about never leaving the child unattended would not have to include a description of the hazard or of the consequences of exposure to the hazard that the statement about unattended use is intended to address. Although consumers might correctly infer this information, which might warrant its exclusion, there is no evidence to suggest that this is the case. Furthermore, the lack of this information precludes the opportunity to present hazard and consequence information in a way that might enhance compliance (see next paragraph). Thus, staff recommends that all of the warning statements be required to appear in a single label, so that consumers can receive all of the necessary information. Staff's recommended placement requirements for this combined label will be discussed later in this memorandum; however, these recommended requirements are consistent with the requirements currently in ASTM F404 – 15, which requires a combined label to meet both placement requirements specified in the standard.

Even with the current warning statements combined into a single label, the warning lacks important details regarding the hazard and consequences of exposure to the hazard. For example, the current requirements identify the hazard and consequences as “serious injury or death from falls or sliding out,” which, although accurate, is vague regarding the types of potential injuries. Providing more explicit or detailed information in a warning has been found to increase warning effectiveness (Laughery & Smith, 2006), and vividness has been found to increase message salience, which triggers one's motivation to act (Murray-Johnson & Witte, 2003). Thus, research suggests that a more explicit description of the injuries that have occurred will improve the likelihood that consumers will comply with the recommended hazard-avoidance behavior.³¹

³¹ Injury severity strongly determines perceived hazard or risk (Wogalter, Brelsford, Desaulniers, & Laughery, 1991; Wogalter, Brems, & Martin, 1993; Young & Wogalter, 1998), which research has found to increase warning effectiveness by affecting a consumer's motivation or intent to comply (DeJoy, 1999; Murray-Johnson & Witte, 2003; Riley, 2006).

Moreover, the available incident data suggest that incidents can happen quickly, with several having occurred right after the tray disengaged from the high chair, or soon after the caregiver turned away from the child. Consumers may be unaware of the speed with which incidents can occur; and therefore, consumers might overestimate their ability to prevent an incident by their mere presence. In fact, consumers previously have reported that the use of restraints on high chairs might not be needed because emerging incidents will be noticed and stopped in time (Lerner, Huey, & Kotwal, 2001). Thus, a statement that describes the speed with which incidents can occur may further reduce the risk of injury.

The current warning requirements specify two hazard-avoidance behaviors with which consumers should comply to avoid the fall hazard: (1) always use the restraint system, and (2) never leave the child unattended. ESHF staff has several concerns with the standard's reliance on these statements alone:

- Consumers have reported that they consider the tray of a high chair to be functionally part of its restraint system (Lerner, Huey, & Kotwal, 2001). The incident data, which include numerous incidents of falls immediately after the tray disengaged, and some of which involved non-use of the restraint, seem to support this finding. A statement about the tray not being intended to restrain the child could prevent consumers from misunderstanding its function or role. A statement like this already is required in the instructions, but including such a statement on the product as well would improve the likelihood that all users of the product—not just those who read the instructions—will have access to this important piece of information.
- The incident data show that falls can occur even when a child is restrained, if the restraint is loose or otherwise allows the child to wriggle out. Thus, consumers should be instructed to adjust the restraint to fit the child snugly.
- The warning statement, “never leave child unattended,” is essentially a double-negative, and positive statements are easier to understand than negative ones, particularly negative statements that contain double-negatives (Robinson, 2009; also see Neuhauser & Paul, 2011).³² The common use of this phrase might not render the statement confusing to consumers, but the statement does require consumers to infer what qualifies as “unattended.” As staff discussed earlier, explicitness improves warning effectiveness. Thus, ESHF staff recommends that this statement be replaced with a more positive description of the actions that a consumer should take to attend to the child properly, such as, “stay near and watch your child during use.”

Form

When assessing the adequacy of a warning, one must consider not only the content of a warning, but also its design or “form” (Laughery & Wogalter, 2006; Madden, 1999; Madden, 2006). ESHF staff previously showed an example of the form that the primary warning specified in

³² Robinson (2009) also notes that positive statements tend to be easier to translate into other languages.

ASTM F404 – 15 would be permitted to take, based on the current requirements of the standard.³³

⚠WARNING: Prevent serious injury or death from falls or sliding out. Always use the restraint system.

Even if the content of the warning was revised to reflect staff’s recommendations, the current warning-format requirements of the standard would allow the warning to take on an appearance similar to the warning presented above. Yet, the form of a warning can affect the extent to which consumers will notice and read a warning; content becomes irrelevant if the warning goes unnoticed or unread. Furthermore, the form of a warning can communicate the hazardousness of the scenario being warned about, which can affect compliance with the recommended behavior.

Earlier, when discussing warning content, ESHF staff referred to ANSI Z535.4, *American National Standard for Product Safety Signs and Labels*. ESHF staff regularly uses this standard—the primary U.S. voluntary consensus standard for the design, application, use, and placement of on-product warning labels—when developing or assessing the adequacy of warning labels. Literature on the design and evaluation of on-product warnings regularly cites ANSI Z535.4 as the minimum set of requirements that products containing such labels that are sold in the United States should meet (*e.g.*, Vredenburg & Zackowitz, 2005; Wogalter & Laughery, 2005). This has been reaffirmed by the U.S. courts, who have accepted the ANSI Z535 series of standards in general, and the ANSI Z535.4 standard in particular, as the benchmark against which warning labels are evaluated for adequacy, because these standards are seen as the state of the art (Hellier & Edworthy, 2006; Peckham, 2006; also see Laughery & Wogalter, 2006).³⁴ Furthermore, the scope of ANSI Z535.4 is broad enough to encompass nearly all products, including children’s products and toys (see Kalsher & Wogalter, 2008; Rice, 2012).

The findings above suggest that the warning requirements for high chairs should meet or exceed the requirements specified in ANSI Z535.4, even if conformance with the ANSI Z535.4 standard is not expressly required. The most recent published version of the Z535.4 standard is dated 2011 (ANSI Z535.4 – 11). The form-related warning requirements specified in ASTM F404 – 15, on the whole, are considerably less stringent than the requirements specified in ANSI Z535.4 – 11. The table below illustrates some key differences between the form requirements and recommendations of the two standards.

³³ For high chairs that do not have a seating component that is also used as a seating component for a stroller.

³⁴ Also, per G. Peckham, personal communication, June 12, 2015.

Color Contrast:	The warning statements must be “in contrasting color(s).”	<p>The warning must have a signal word panel and message panel (Section 6.1), each of which has a distinctive background color different than adjacent areas or is clearly delineated by a line, border, or white space (Section 4.8).</p> <p>The signal word panel for a “WARNING” must have black text on an orange background (Section 7.2.2). The solid triangle portion of the safety alert symbol (“▲”) must be in black, and the exclamation mark must be the same orange color as the panel background (Section 7.2.6).</p> <p>The message panel must be black text on a white background, or white text on a black background (Section 7.3).</p>
Typeface Style:	The warning statements must be in sans serif style.	<p>The signal words must be in sans serif uppercase letters only (Section 8.1.1).</p> <p>The message panel text should be mixed case (<i>i.e.</i>, sentence capitalization), and can use occasional uppercase text for emphasis (Section 8.1.2).</p>
Text Layout:	(No relevant requirements.)	<p>Multiple messages should be provided with sufficient space between them, when feasible (Section 6.5.1).</p> <p>The message panel text should be arranged in list or outline format, possibly with the addition of bullets (Section B3.3.5).</p> <p>The message panel text should be left-justified (Section B3.3.6).</p>

ASTM F404 – 15 does not include any warning requirements related to *color contrast*, such as the use of colors, panels, or borders, aside from stating that the warning statements must be “in contrasting color(s).” This requirement is deficient for several reasons. First, the use of a color, such as orange, not only can aid in attracting attention (Wogalter & Vigilante, 2006), but color also can communicate the seriousness of the hazard to consumers. For example, research has shown that consumers tend to associate warnings using red, orange, and yellow with hazards, and perceive warnings in other colors, or monochromatic warnings, to be less hazardous or nonhazardous (*e.g.*, Braun & Silver, 1995; Chapanis, 1994). Research also has shown that warnings using color tend to result in higher rates of compliance than black and white warnings (Kalsher & Williams, 2006). For these reasons, ESHF staff recommends that the warning requirements for ASTM F404 specify that orange be used as the background color for the signal word and safety alert symbol. However, use of red or yellow in place of orange may be acceptable, if one of those colors provides better contrast on the product.

Second, colors that merely “contrast” are not necessarily attention-grabbing because that term alone tells very little about the degree of contrast between two items. For example, black text contrasts with a dark gray background, but the level of contrast between the two colors is low

and most likely would hamper readability severely. Thus, staff recommends that the warning message be black text on a white background, or at least specify that elements must contrast *highly* to increase legibility (see Wogalter & Vigilante, 2006). In addition, a “highly contrasting color(s)” requirement is consistent with recent recommendations by the ASTM Ad Hoc Wording Task Group, in which ESHF staff participates. The task group’s purpose is to develop recommended wording for sections of the ASTM standards that are common to multiple standards.³⁵

In terms of *typeface style*, ASTM F404 – 15 only requires that the warning statements be “in sans serif style.” Thus, the current requirements allow for the use of all-uppercase lettering for the entire warning message. Literature on the design of warnings, instructions, and other documents consistently recommends against the use of all-uppercase lettering for long texts (*i.e.*, longer than a few words), because the block-like appearance of such lettering is less legible and readable than mixed-case text (*e.g.*, Frascara, 2006; Robinson, 2009; Schriver, 1997; Wogalter & Vigilante, 2006; also see Singer, Balliro, & Lerner, 2003). Text that is more challenging to read is less likely to maintain a caregiver’s attention or motivate a caregiver to read the message in the first place. Either of these responses could prevent the caregiver from receiving the full warning message. In addition, Coles and Foster (1975) have found boldface to be a better cue than all-uppercase lettering when extra emphasis is needed (as cited in Schriver, 1997). Thus, ESHF staff recommends requiring that the warning message’s text be presented in mixed case, or sentence capitalization, with key terms and phrases in boldface for emphasis. The ASTM Ad Hoc Wording Task Group also recommends requiring that warning statements be in “non-condensed” type. Condensed or narrow typefaces have letters with widths that are proportionally narrow relative to their heights, particularly when compared to the standard typeface of the same family. Such typefaces or fonts generally have “narrow,” “condensed,” or a similar word in its name (*e.g.*, Arial Narrow, Gill Sans Condensed). ESHF staff supports this recommendation because condensed type tends to be less legible than non-condensed type. Wogalter and Vigilante (2006) have stated that dense “compressed” text may dissuade reading because too much effort is required to read such text, and this might suggest to the reader that the message probably is not important.

ASTM F404 – 15 does not include any warning requirements related to the *text layout* or organization of the warning message. This means that the current warnings may be presented as a single, continuous paragraph of text, as illustrated previously. Research has found that warnings and instructions presented in list or outline format, possibly with bullet points, facilitate visual search for information, improve memory of the information, and are perceived to be more effective than such material presented as a continuous paragraph of text (Desaulniers, 1987; Frascara, 2006; Lesch, 2006). Paragraph formatting is likely to dissuade consumers from reading, particularly if the reader is short on time, and warning statements that are organized into a list format with bullets allows the warning to communicate to the reader how various pieces of information relate to one another (Wogalter & Vigilante, 2006). Research also has shown that fully justified text can slow reading relative to left-justified (ragged right) text because of the variable spacing that is required between words to align the left and right sides of the text (see

³⁵ Although the phrase “highly contrasting color(s)” is not defined, black text on a white background is presented as an example of what would constitute highly contrasting colors.

Trollip & Sales, 1986; Singer, Balliro, & Lerner, 2003; Wogalter & Vigilante, 2006). Thus, ESHF staff agrees with ANSI Z535.4's recommendations that warning messages should be left-justified and presented in outline format.

Lastly, one of the ASTM Ad Hoc Wording Task Group's recommendations is to reference ANSI Z535.4 within the labeling sections of ASTM standards as a "note" to the standard. Specifically, the ASTM Ad Hoc Wording Task Group developed the following language to appear as a note in such standards: "For additional guidance on the design of warnings, please refer to ANSI Z535.4, American National Standard for Product Safety Signs and Labels, or equivalent." ESHF staff agrees with this suggested addition, but does not believe that the phrase "or equivalent" is necessary. "Notes" are not mandatory requirements but can be provided to offer informative suggestions (ASTM International, 2015, Section A27). ESHF staff agrees with the recommended language and recommends that this language be included in Section 8 of ASTM F404.

Placement

Earlier, when discussing the adequacy of the warning content, ESHF staff recommended that all on-product warning statements be required to appear in a single label. Based on the placement requirements of ASTM F404 – 15, a single warning label that includes all of the warning statements would have to meet both of the placement requirements specified in the standard. In other words, the label would have to be visible to the caregiver not only while placing the occupant into the high chair in each of the manufacturer's recommended use positions, but also while the occupant is sitting in the high chair in these recommended use positions. ESHF staff agrees that such a requirement would be appropriate for staff's revised warning label, and recommends revising ASTM F404 – 15 accordingly.

This recommendation is consistent with the placement requirements for a warning about the potential for strangulation in loose or partially buckled restraints on hand-held infant carriers, specified in ASTM F2050 – 13a, *Standard Consumer Safety Specification for Hand-Held Infant Carriers*, which is largely incorporated by reference in 16 C.F.R. part 1225, *Safety Standard for Hand-Held Infant Carriers*. Specifically, that warning is required to be affixed to the outer surface of the cushion or padding "in or adjacent to the area where a child's head would rest, so that the label is plainly visible and easily readable."

In addition, this recommendation is consistent with ANSI Z535.4, which states that warnings must be placed so they are "readily visible to the intended viewer" and will "alert the viewer to the hazard in time to take appropriate action" (Section 9.1).³⁶ As the warnings describe, avoiding the fall hazard associated with high chairs demands that consumers always use and properly adjust the restraints, and stay near and watch the child during use. Thus, ideal placement of a warning that instructs consumers to perform these behaviors must be readily visible to the caregiver:

- just before, or immediately after, the child is seated in the high chair (to instruct consumers to use and properly adjust the restraints); and

³⁶ But not presented so far in advance of a hazard that the consumer might forget the warning when presented with the hazard.

- just before the caregiver would leave the seated child unattended in the high chair (to instruct or remind consumers to stay near and watch the child).

Either of the current placement requirements for warnings in ASTM F404, in isolation, would be inadequate to render the recommended warning label readily visible in time for the caregiver to take the appropriate action. Specifically, a label that is visible to the caregiver as he or she is placing the child into the high chair, but not visible once the child is in the high chair, would be inappropriate for a warning statement about unattended use. A label that is visible while the child is seated in the high chair, but is “not necessarily visible from all positions,” would permit the label to be located on the back of the high chair; such a location is unlikely to be readily visible to a caregiver who is about to leave a child unattended or who needs to be alerted to the importance of always restraining the child.

As staff of CPSC’s Directorate for Economic Analysis (“EC”) points out in Tab F, some high chairs are marketed to, and used primarily in, commercial settings, such as restaurants, day care centers, and hotels. High chair use in a restaurant setting, in particular, is likely to differ from use in the home. One of the most obvious differences, as it relates to the required warning information, is that caregivers may be less likely to leave their children “unattended” in a restaurant setting. In such a setting, one or more caregivers tend to be seated next to, or near the child, and would not be engaged in the type of household activities (*e.g.*, cooking, washing dishes, caring for another child elsewhere) that may lead a caregiver to leave the child. Given this, the prominence or visibility of the warning statement, “Stay near and watch your child during use,” may be less important in a restaurant setting. Nevertheless, such a warning statement should be part of a single warning label that includes the hazard and consequence information, as staff recommended earlier; and this warning label, as a whole, should be readily visible to consumers.

This may be especially important in a restaurant setting because the reduced likelihood of leaving the child unattended in this setting could have the effect of discouraging restraint use. As ESHF staff discussed earlier, focus group research has indicated that consumers may believe the use of restraints is not needed if emerging incidents will be noticed and stopped in time (Lerner, Huey, & Kotwal, 2001). Thus, the incidence of restraint use in a restaurant setting, in which one or more caregivers may be almost continuously near the child, could be lower than in non-restaurant settings. Although staff acknowledges that the proximity of caregivers in a restaurant setting may very well allow consumers to prevent emerging incidents even if the child is not restrained, the speed with which incidents can occur³⁷ suggests that restraint use is still needed and reinforces the importance of making sure that the warnings on the product are prominent and visible to caregivers, as staff recommends above.

Arguably, a placement requirement that is less stringent than ESHF staff is recommending—for example, one that requires the label to be visible to the caregiver only as he or she is placing the child into the high chair, but not once the child is in the high chair—could be acceptable for a high chair that is primarily used in or intended for a restaurant setting, because a readily visible

³⁷ See staff’s earlier discussion of this in the context of warning content.

reminder about unattended use is not as important in a restaurant setting compared to a home setting. However, these high chairs might be used in home settings, for which such placement of the warning label is not appropriate. In addition, for a label that is affixed in a location that the child will cover once the child is seated, caregivers would have to notice and attend to the warning during the brief time during which the child is being placed in the seat. Once the child is seated, the warning could not be read and could not serve as a reminder if the caregiver failed to read it before placing the child into the seat. Placement on the back of the high chair most likely would suffer from many of the same visibility problems described earlier for high chairs in general. Thus, ESHF staff does not believe that less stringent or alternative placement requirements for “restaurant-style” high chairs would be appropriate.

INSTRUCTIONAL REQUIREMENTS

Summary of ESHF Staff Recommendations

ESHF staff concludes that the instructional requirements in ASTM F404 – 15 do not adequately address the risk of injuries and deaths associated with high chairs, primarily because the instructional requirements do not specify any design or form for the required warning statements. Therefore, staff recommends revising ASTM F404 to require warnings in the instructional literature to meet the same form requirements as the on-product warnings, except that the warnings need not be in color. The appendix to this memorandum includes staff’s specific recommended revisions to address this issue and related issues.

Content

As staff discussed earlier, Section 9.2 of ASTM F404 – 15 specifies that the instructional literature provided with the high chair must include all warning statements that are required to appear on the high chair (*i.e.*, from Section 8 of the standard). The instructions must include an additional warning statement that varies, depending on whether the high chair has a reclining feature. This additional warning statement includes the following elements:

- A safety alert symbol (▲) and the signal word “WARNING.”
- A sentence recommending that the child be secured at all times by the restraints. For high chairs with a reclining feature, consumers are told to use the restraints “either in the reclining or upright position.”
- A sentence about the tray not being designed to hold the child in the chair.
- A sentence recommending that the high chair be used only by children capable of sitting upright unassisted. For high chairs with a reclining feature, this recommendation is specific to use of the chair in the upright position.

The first three elements are already addressed in ESHF staff’s recommended on-product warning label, so these elements would already be required to appear in the product instructions.³⁸ Thus,

³⁸ Although the on-product warning does not specify that the restraints be used “either in the reclined or upright position,” the fact that the reclined and upright positions are the only positions that a reclining high chair can take suggests that this statement is equivalent to saying that the restraints must always be used.

these elements seemingly would not need to be reiterated expressly in Section 9.2 of ASTM F404 – 15. Despite the apparent redundancy, repeating this information within Section 9 of the standard would not seem to render the standard deficient in any way. The final element of the additional warning, regarding the use of the high chair only with children who are capable of sitting upright unsupported, does not appear in the on-product warning; thus, including this warning in the instructional requirements seems reasonable. Given the findings noted above, and presuming that staff’s recommended revisions to the required warning content in Section 8 of the standard are adopted, revisions to the required warning content in Section 9 of the standard do not seem warranted.

Form

As staff noted earlier in this memorandum, Section 9 of the standard does not specify any design or form requirements for the required warning statements in instructional literature. In much the same way that ANSI Z535.4 sets forth minimum performance requirements for on-product warning labels, ANSI Z535.6, *American National Standard: Product Safety Information in Product Manuals, Instructions, and Other Collateral Materials*, sets forth requirements for the design and location of product safety messages in instructional literature and similar materials for a wide variety of products. This standard is the primary U.S. voluntary consensus standard of its kind, and ESHF staff regularly relies upon this standard when assessing the adequacy of instructional materials. For the reasons stated above, and for reasons similar to those previously discussed in this memorandum regarding ANSI Z535.4, warnings in instructional literature for high chairs ideally should meet or exceed the requirements outlined in ANSI Z535.6. However, product instructions can vary substantially in purpose, content, length, and other characteristics, and depend on the specific product in question. Thus, for simplicity, staff recommends that Section 9 of the standard state that the required warnings in the instructional literature must meet the same form requirements as the on-product warnings (Section 8), except that the warnings need not be in color. In addition, to be consistent with staff’s proposed revisions to Section 8, staff recommends that Section 9 include a similar note referencing ANSI Z535.6. The appendix to this memorandum includes staff’s recommended revisions to address the issues above.

CONCLUSIONS

ESHF staff concludes that the warning and instructional requirements specified in Sections 8 and 9 of ASTM F404 – 15, do not adequately address the risk of injuries and deaths associated with the use of high chairs. Staff recommends that the Commission adopt ESHF staff’s revised requirements in these two sections of the proposed rule for high chairs to reduce the risk of injury or death with these products.

REFERENCES

American National Standards Institute. (2011). *ANSI Z535.4. American national standard: Product safety signs and labels*. Rosslyn, VA: National Electrical Manufacturers Association.

- American National Standards Institute. (2011). *ANSI Z535.6. American national standard: Product safety information in product manuals, instructions, and other collateral materials*. Rosslyn, VA: National Electrical Manufacturers Association.
- ASTM International. (2015). *Form and Style for ASTM Standards*. Retrieved from: http://www.astm.org/COMMIT/Blue_Book.pdf.
- Braun, C. C., & Silver, N. D. (1995). Interaction of signal word and colour on warning labels: differences in perceived hazard and behavioural compliance. *Ergonomics*, 38(11). 2207–2220.
- Chapanis, A. (1994). Hazards associated with three signal words and four colours on warning signs. *Ergonomics*, 37(2). 265–275.
- Chowdhury, R. (2015). *High Chair-Related Deaths, Injuries, and Potential Injuries: January 1, 2011 – December 31, 2014*. CPSC Memorandum to S. Marques, High Chairs Project Manager, U.S. Consumer Product Safety Commission, Bethesda, MD.
- DeJoy, D. M. (1999). Motivation. In M. S. Wogalter, D. M. DeJoy, & K. R. Laughery (Eds.), *Warnings and Risk Communication* (pp. 221–243). Philadelphia: Taylor & Francis.
- Desaulniers, D. R. (1987). Layout, organization, and the effectiveness of consumer product warnings. In *Proceedings of the Human Factors Society 31st Annual Meeting* (pp. 56–60). Santa Monica, CA: Human Factors Society.
- Frascara, J. (2006). Typography and the Visual Design of Warnings. In M. S. Wogalter (Ed.), *Handbook of Warnings* (pp. 385–405). Mahwah, NJ: Lawrence Erlbaum Associates.
- Hellier, E., & Edworthy, J. (2006). Signal Words. In M. S. Wogalter (Ed.), *Handbook of Warnings* (pp. 407–417). Mahwah, NJ: Lawrence Erlbaum Associates.
- Kalsher, M. J., & Williams, K. J. (2006). Behavioral Compliance: Theory, Methodology, and Results. In M. S. Wogalter (Ed.), *Handbook of Warnings* (pp. 313–331). Mahwah, NJ: Lawrence Erlbaum Associates.
- Kalsher, M. J., & Wogalter, M. S. (2008). Warnings: Hazard Control Methods for Caregivers and Children. In R. Lueder & V. J. B. Rice (Eds.), *Ergonomics for Children: Designing Products and Places for Toddlers to Teens* (pp. 509–539). New York: Taylor & Francis.
- Laughery, Sr., K. R., & Smith, D. P. (2006). Explicit Information in Warnings. In M. S. Wogalter (Ed.), *Handbook of Warnings* (pp. 419–428). Mahwah, NJ: Lawrence Erlbaum Associates.
- Laughery, Sr., K. R., & Wogalter, M. S. (2006). The Warning Expert in Civil Litigation. In M. S. Wogalter (Ed.), *Handbook of Warnings* (pp. 605–615). Mahwah, NJ: Lawrence Erlbaum Associates.

- Lerner, N. D., Huey, R. W., & Kotwal, B. M. (2001). *Product Profile Report*. Interim report prepared under contract CPSC-S-00-5205 for the U.S. Consumer Product Safety Commission, Bethesda, MD.
- Lesch, M. F. (2006). Consumer Product Warnings: Research and Recommendations. In M. S. Wogalter (Ed.), *Handbook of Warnings* (pp. 137–146). Mahwah, NJ: Lawrence Erlbaum Associates.
- Madden, M. S. (1999). The Law Relating to Warnings. In M. S. Wogalter, D. M. DeJoy, & K. R. Laughery (Eds.), *Warnings and Risk Communication* (pp. 315–330). Philadelphia: Taylor & Francis.
- Madden, M. S. (2006). The Duty to Warn in Products Liability. In M. S. Wogalter (Ed.), *Handbook of Warnings* (pp. 583–588). Mahwah, NJ: Lawrence Erlbaum Associates.
- Murray-Johnson, L., & Witte, K. (2003). Looking Toward the Future: Health Message Design Strategies. In T. L. Thompson, A. Dorsey, K. I. Miller, & R. Parrott (Eds.), *Handbook of Health Communication* (pp. 473–495). New York: Routledge.
- Neuhauser, L., & Paul, K. (2011). Readability, Comprehension, and Usability. In B. Fischhoff, N. T. Brewer, & J. S. Downs (Eds.), *Communicating Risks and Benefits: An Evidence-Based User's Guide* (pp. 129–148). Silver Spring, MD: Food and Drug Administration, U.S. Department of Health and Human Services.
- Peckham, G. M. (2006). An Overview of the ANSI Z535 Standards for Safety Signs, Labels, and Tags. In M. S. Wogalter (Ed.), *Handbook of Warnings* (pp. 437–443). Mahwah, NJ: Lawrence Erlbaum Associates.
- Rice, V. J. B. (2012). Designing for Children. In G. Salvendy (Ed.), *Handbook of Human Factors and Ergonomics* (4th ed.) (pp. 1472 - 1483). Hoboken, NJ: Wiley.
- Riley, D. M. (2006). Beliefs, Attitudes, and Motivation. In M. S. Wogalter (Ed.), *Handbook of Warnings* (pp. 289–300). Mahwah, NJ: Lawrence Erlbaum Associates.
- Robinson, P. A. (2009). *Writing and Designing Manuals and Warnings* (4th ed.). Boca Raton, FL: CRC.
- Schrivver, K. A. (1997). *Dynamics in Document Design*. New York: Wiley.
- Singer, J. P., Balliro, G. M., & Lerner, N. D. (2003). *Manufacturer's guide to developing consumer product instructions* (T. P. Smith, Ed.). Washington, DC: U.S. Consumer Product Safety Commission.
- Trollip, S. R., & Sales, G. (1986). Readability of computer-generated fill-justified text. *Human Factors*, 28(2). 159–163.

- Vredenburg, A. G., & Zackowitz, I. B. (2005). Human Factors Issues to be Considered by Product Liability Experts. In Y. I. Noy & W. Karwowski (Eds.), *Handbook of Human Factors in Litigation* (Chapter 26). Boca Raton, FL: CRC Press.
- Witte, K., Meyer, G., & Martell, D. (2001). *Effective Health Risk Messages: A Step-by-Step Guide*. Thousand Oaks: Sage.
- Wogalter, M. S. (2006). Purposes and Scope of Warnings. In M. S. Wogalter (Ed.), *Handbook of Warnings* (pp. 3–9). Mahwah, NJ: Lawrence Erlbaum Associates.
- Wogalter, M. S., Brelsford, J. W., Desaulniers, D. R., & Laughery, K. R. (1991). Consumer product warnings: The role of hazard perception. *Journal of Safety Research*, 22, 71–82.
- Wogalter, M. S., Brems, D. J., & Martin, E. G. (1993). Risk perception of common consumer products: Judgments of accident frequency and precautionary intent. *Journal of Safety Research*, 24, 97–106.
- Wogalter, M. S., & Laughery, K. R. (2005). Effectiveness of Consumer Product Warnings: Design and Forensic Considerations. In Y. I. Noy & W. Karwowski (Eds.), *Handbook of Human Factors in Litigation* (Chapter 31). Boca Raton, FL: CRC Press.
- Wogalter, M. S., Laughery, Sr., K. R., & Mayhorn, C. B. (2012). Warnings and Hazard Communications. In G. Salvendy (Ed.), *Handbook of Human Factors and Ergonomics* (4th ed.; pp. 868–894). Hoboken, NJ: Wiley.
- Wogalter, M. S., & Vigilante, Jr., W. J. (2006). Attention Switch and Maintenance. In M. S. Wogalter (Ed.), *Handbook of Warnings* (pp. 245–265). Mahwah, NJ: Lawrence Erlbaum Associates.
- Young, S. L., & Wogalter, M. S. (1998). Relative importance of different verbal components in conveying hazard-level information in warnings. In *Proceedings of the Human Factors and Ergonomics Society 42nd Annual Meeting* (pp. 1063–1067). Santa Monica, CA: Human Factors Society.



UNITED STATES
 CONSUMER PRODUCT SAFETY COMMISSION
 4330 EAST WEST HIGHWAY
 BETHESDA, MARYLAND 20814

Memorandum

APPENDIX: PROPOSED REVISIONS TO ASTM F404 – 15

ASTM F404 – 15	ESHF Staff Proposed Revisions (marked up)	ESHF Staff Proposed Revisions (changes applied)
<p>8.4 Each high chair shall be labeled with warning statements. The warning statements shall be in contrasting color(s), permanent in sans serif style type, and located as defined in the sections below.</p>	<p>8.4 Each high chair shall be labeled with warning statements. <u>Warning Statements—Each Product Shall Have Warning Statements:</u></p> <p><u>8.4.1 The warnings shall be easy to read and understand and be in the English language at a minimum.</u></p> <p><u>8.4.2 Any labels or written instructions provided in addition to those required by this section shall not contradict or confuse the meaning of the required information, or be otherwise misleading to the consumer.</u></p> <p><u>8.4.3 The warning statements shall be conspicuous, in highly contrasting color(s) (e.g., black text on a white background), permanent, and in non-condensed sans serif style type, and located as defined in the sections below.</u></p>	<p>8.4 <i>Warning Statements—Each Product Shall Have Warning Statements:</i></p> <p>8.4.1 The warnings shall be easy to read and understand and be in the English language at a minimum.</p> <p>8.4.2 Any labels or written instructions provided in addition to those required by this section shall not contradict or confuse the meaning of the required information, or be otherwise misleading to the consumer.</p> <p>8.4.3 The warning statements shall be conspicuous, in highly contrasting color(s) (e.g., black text on a white background), permanent, and in non-condensed sans serif style type.</p>

ASTM F404 – 15

ESHF Staff Proposed Revisions
(marked up)

ESHF Staff Proposed Revisions
(changes applied)

8.4.1 Each warning statement or group of warning statements shall be preceded by the Safety Alert Symbol “▲” and the signal word “WARNING”. If warnings are placed directly under or adjacent to one another, then the safety alert symbol and the signal word WARNING, need to be displayed only once.

8.4.2 The Safety Alert Symbol “▲” and the signal word “WARNING” shall not be less than 0.2 in. (5 mm) high and the remainder of the text shall be in characters whose uppercase shall not be less than 0.1 in. (2.5 mm) high.

~~8.4.1~~8.4.4 Each warning statement or group of warning statements shall be preceded by the Safety Alert Symbol “▲” and the signal word “WARNING” in bold uppercase letters. If warnings are placed directly under or adjacent to one another, then the safety alert symbol and the signal word WARNING, need to be displayed only once.~~8.4.2~~ The Safety Alert Symbol “▲” and the signal word “WARNING” shall not be less than 0.2 in. (5 mm) high and the remainder of the text shall be in characters whose uppercase shall not be less than 0.1 in. (2.5 mm) high. The height of the safety alert symbol shall equal or exceed the signal word height.

8.4.4 Each warning statement or group of warning statements shall be preceded by the Safety Alert Symbol “▲” and the signal word “WARNING” in bold uppercase letters. If warnings are placed directly under or adjacent to one another, then the safety alert symbol and the signal word WARNING, need to be displayed only once. The Safety Alert Symbol “▲” and the signal word “WARNING” shall not be less than 0.2 in. (5 mm) high and the remainder of the text shall be in characters whose uppercase shall not be less than 0.1 in. (2.5 mm) high. The height of the safety alert symbol shall equal or exceed the signal word height.

(None)	<p>8.4.5 The safety alert symbol “▲” and the signal word “WARNING” shall be in contrasting color to the background and delineated with solid black line borders. The background color behind the safety alert symbol “▲” and the signal word “WARNING” shall be orange, red, or yellow, whichever provides best contrast against the product background. The signal word “WARNING” and the solid triangle portion of the safety alert symbol “▲” shall be black. The exclamation mark of the safety alert symbol “▲” shall be the same color as the background. The remainder of the text shall be black, with key words highlighted using boldface, on a white background surrounded by a solid black line border. This text also shall be left-justified, in upper- and lowercase letters (<i>i.e.</i>, sentence capitalization), and in list or outline format, with precautionary statements indented from hazard statements and preceded with bullet points. An example label in the format described in this section is shown in Fig. X.</p> <p>NOTE: For additional guidance on the design of warnings, please refer to ANSI Z535.4, American National Standard for Product Safety Signs and Labels.</p>	<p>8.4.5 The safety alert symbol “▲” and the signal word “WARNING” shall be in contrasting color to the background and delineated with solid black line borders. The background color behind the safety alert symbol “▲” and the signal word “WARNING” shall be orange, red, or yellow, whichever provides best contrast against the product background. The signal word “WARNING” and the solid triangle portion of the safety alert symbol “▲” shall be black. The exclamation mark of the safety alert symbol “▲” shall be the same color as the background. The remainder of the text shall be black, with key words highlighted using boldface, on a white background surrounded by a solid black line border. This text also shall be left-justified, in upper- and lowercase letters (<i>i.e.</i>, sentence capitalization), and in list or outline format, with precautionary statements indented from hazard statements and preceded with bullet points. An example label in the format described in this section is shown in Fig. X.</p> <p>NOTE: For additional guidance on the design of warnings, please refer to ANSI Z535.4, American National Standard for Product Safety Signs and Labels.</p>
<p>8.4.3 The warning statement in this section shall be in a location that is visible by the caregiver while placing the occupant into the highchair in each of the manufacturer’s recommended use positions but not necessarily visible when the occupant is in the high chair.</p>	<p>8.4.38.4.6 The warning statements in this section shall be in a location that is visible by the caregiver while placing the occupant into the highchair in each of the manufacturer’s recommended use positions but not necessarily visible when the occupant is in the high chair.</p>	<p>8.4.6 The warning statements shall be in a location that is visible by the caregiver while placing the occupant into the highchair in each of the manufacturer’s recommended use positions.</p>

ASTM F404 – 15	ESHF Staff Proposed Revisions (marked up)	ESHF Staff Proposed Revisions (changes applied)
<p>8.4.3.1 For a high chair that does not have a seating component that is also used as a seating component of a stroller, the following warning statement shall be included exactly as stated below:</p> <p>“▲WARNING: Prevent serious injury or death from falls or sliding out. Always use the restraint system.”</p>	<p>8.4.3.18.4.7 For a high chair that does <u>High chairs that do</u> not have a seating component that is also used as a seating component of a stroller; <u>shall address</u> the following warning statements shall be included exactly as stated below:</p> <p><u>Children have suffered skull fractures after falling from high chairs. Falls can happen quickly if child is not restrained properly.</u></p> <ul style="list-style-type: none"> • <u>Always use restraints, and adjust to fit snugly. Tray is not designed to hold child in chair.</u> • <u>Stay near and watch your child during use.</u> 	<p>8.4.7 High chairs that do not have a seating component that is also used as a seating component of a stroller, shall address the following warning statements:</p> <p>Children have suffered skull fractures after falling from high chairs. Falls can happen quickly if child is not restrained properly.</p> <ul style="list-style-type: none"> • Always use restraints, and adjust to fit snugly. Tray is not designed to hold child in chair. • Stay near and watch your child during use.
<p>8.4.3.2 For a high chair that has a seating component that is also used as a seating component of a stroller, the following warning statement shall be included exactly as stated below:</p> <p>“▲WARNING: Avoid serious injury from falling or sliding out. Always use seat belt (or manufacturer may insert another word(s) to describe their restraint system).”</p>	<p>8.4.3.28.4.8 For a high chair that has <u>High chairs that have</u> a seating component that is also used as a seating component of a stroller; <u>shall use</u> the following warning statements <u>as specified in Consumer Safety Performance Specification F833, subsections 8.2.2.1 and 8.2.2.2, in place of the warning statements in 8.4.7.</u> shall be included exactly as stated below:</p> <p>“▲WARNING: Avoid serious injury from falls or sliding out. Always use seat belt (or manufacturer may insert another word(s) to describe their restraint system.”</p>	<p>8.4.8 High chairs that have a seating component that is also used as a seating component of a stroller shall use the warning statements as specified in Consumer Safety Performance Specification F833, subsections 8.2.2.1 and 8.2.2.2, in place of the warning statements in 8.4.7.</p>
<p>8.4.4 The additional warning statement in this section shall be conspicuous and shall address the following:</p> <p>8.4.4.1 Never leave child unattended.</p>	<p>8.4.4 The additional warning statement in this section shall be conspicuous and shall address the following:</p> <p>8.4.4.1 Never leave child unattended.</p>	
(None)	<u>(Fig. X. Label Format Example. See below.)</u>	(Fig. X. Label Format Example. See below.)

9.2 The instructions shall contain the warnings as specified in 8.4.2 – 8.4.4. Additional warnings similar to the statements included in this section shall also be included.

9.2 The instructions shall contain the warnings as specified in 8.4.~~2~~ ~~–8.4.4~~. Additional warnings similar to the statements included in this section shall also be included. [These required warning statements shall meet the requirements described in 8.4, except for the color requirements \(e.g., the background of the signal word panel need not be orange, red, or yellow\). However, the warning statements still must be in highly contrasting color\(s\) \(e.g., black text on a white background\), and if color is used, those colors must meet the color requirements specified in 8.4.](#)

[NOTE: For additional guidance on the design of warnings for instructional literature, please refer to ANSI Z535.6, American National Standard: Product Safety Information in Product Manuals, Instructions, and Other Collateral Materials.](#)

9.2 The instructions shall contain the warnings as specified in 8.4. Additional warnings similar to the statements included in this section shall also be included. These required warning statements shall meet the requirements described in 8.4, except for the color requirements (e.g., the background of the signal word panel need not be orange, red, or yellow). However, the warning statements still must be in highly contrasting color(s) (e.g., black text on a white background), and if color is used, those colors must meet the color requirements specified in 8.4.

NOTE: For additional guidance on the design of warnings for instructional literature, please refer to ANSI Z535.6, American National Standard: Product Safety Information in Product Manuals, Instructions, and Other Collateral Materials.



[Fig. X. Label Format Example.](#)

TAB F: Initial Regulatory Flexibility Analysis of the Staff-Recommended Proposed Standard for High Chairs and the Accreditation Requirements for Conformity Assessment Bodies for Testing Conformance to the High Chairs Standard

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**UNITED STATES
CONSUMER PRODUCT SAFETY COMMISSION
BETHESDA, MD 20814**

Memorandum

September 30, 2015

TO : Stefanie C. Marques, Ph.D.
Project Manager, High Chairs
Division of Pharmacology and Physiology Assessment
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THROUGH: Gregory B. Rodgers, Ph.D.
Associate Executive Director
Directorate for Economic Analysis

Deborah V. Aiken, Ph.D.
Senior Staff Coordinator
Directorate for Economic Analysis

FROM : Jill L. Jenkins, Ph.D.
Economist
Directorate for Economic Analysis

SUBJECT : Initial Regulatory Flexibility Analysis of the Staff-Recommended Proposed Standard for High Chairs and the Accreditation Requirements for Conformity Assessment Bodies for Testing Conformance to the High Chairs Standard³⁹

I. Introduction

ASTM F404-15 is the current ASTM International (“ASTM”) standard for high chairs. Staff recommends that the U.S. Consumer Product Safety Commission (“CPSC” or “Commission”) issue a proposed rule under the requirements of the Danny Keysar Child Product Safety Notification Act (“section 104”) of the Consumer Product Safety Improvement Act (“CPSIA”) that incorporates by reference the most recent ASTM standard for high chairs, with modifications to the rearward stability test procedure and the requirements for warning labels and instructional literature.

This memorandum evaluates the potential economic impact of the staff-recommended high chair standard on small entities, including small businesses, as required by the Regulatory

³⁹ The material in this memorandum is based in part on the memorandum from Industrial Economics, Incorporated (“IEc”), dated July 28, 2015, Subject: Initial Regulatory Flexibility Analysis of the CPSC Staff-Recommended Proposed Standard for High Chairs and the Accreditation Requirements for Conformity Assessment Bodies for Testing Conformance to the High Chair Standard. IEc served as a contractor on this project and performed research and analysis to support Directorate for Economic Analysis (“EC”) staff.

Flexibility Act (“RFA”).⁴⁰ Section 603 of the RFA requires that agencies prepare an initial regulatory flexibility analysis (“IRFA”) and make it available to the public for comment when the general notice of proposed rulemaking (“NPR”) is published, unless the head of the agency certifies that the rule will not have a significant economic impact on a substantial number of small entities. As explained below, staff cannot rule out a significant economic impact for 20 of the 38 (53 percent) known small suppliers of high chairs to the U.S. market. Accordingly, we have prepared an IRFA and pose several questions for public comment to help us with our assessment.

The IRFA must describe the impact of the proposed rule on small entities and identify significant alternatives that accomplish the statutory objectives and minimize any significant economic impact. Specifically, the IRFA must contain:

1. a description of the reasons why action by the agency is being considered;
2. a succinct statement of the objectives of, and legal basis for, the proposed rule;
3. a description of and, where feasible, an estimate of the number of small entities to which the proposed rule will apply;
4. a description of the projected reporting, recordkeeping, and other compliance requirements of the proposed rule, including an estimate of the classes of small entities subject to the requirements and the type of professional skills necessary for the preparation of reports or records; and
5. an identification, to the extent possible, of all relevant federal rules which may duplicate, overlap, or conflict with the proposed rule.

II. The Product

A high chair is defined in ASTM F404-15, *Standard Consumer Safety Specification for High Chairs*, as “a free standing chair for a child up to 3 years of age which has a seating surface more than 15 in. above the floor and elevates the child normally for the purposes of feeding or eating.” It “may be sold with or without a tray and may be height adjustable to higher or lower use positions. It may also include a recline position for infants not able to sit up unassisted.” High chairs vary widely in price; they can be purchased for as little as \$35, but can also cost as much as \$650.

The standard does not cover booster seats, which are subject to a voluntary ASTM standard (F2640-14). The high chair standard also does not cover portable hook-on chairs, for which the Commission recently published a notice of proposed rulemaking (80 FR 38041) where the Commission proposed incorporating the voluntary standard, ASTM F1235-15, by reference without any modifications.⁴¹

Some high chairs fall into more than one product category. For example, a few firms produce high chairs that can recline to a flat or nearly flat position meant to enable napping, these

⁴⁰ 5 U.S.C. §§ 601-612.

⁴¹ See: <http://www.gpo.gov/fdsys/pkg/FR-2015-07-02/pdf/2015-16330.pdf>.

products may also be considered bassinets or inclined sleepers, respectively. Also, two firms make high chairs where the seat can be removed to act as a booster seat, and one firm makes a stroller where the seat can be used as a high chair when attached to a separate stand accessory. These products would be expected to meet the staff-recommended proposed rule when placed in a high chair configuration.

Some suppliers produce high chairs intended for use predominately in commercial establishments, with the majority sold to restaurants and, less frequently, to daycare centers and hotels. However, because consumers can purchase these products, consumer use can overlap with commercial use. Further, consumers use commercial high chairs in establishments open to the public. For purposes of our analysis of the small business impacts of the staff-recommended proposed rule, we use the terms high chairs intended for use in commercial settings or restaurant-style high chairs to refer to high chairs produced to accommodate the needs of commercial establishments such as restaurants. We differentiate “restaurant-style high chairs” from “home use high chairs” based on the manufacturers’ statements regarding their intended use. Figure 1a shows an example of a typical commercial high chair used in restaurant settings and Figure 1b shows a typical consumer high chair.

Figure 1. Typical Restaurant-style and Home-Use High Chairs



a. Typical restaurant-style high chair b. Typical home-use high chair

Restaurant-style high chairs are designed to accommodate different usage scenarios than those that occur during home use. For example, in a restaurant setting, the high chair is typically pulled up to the table and the child is seated next to the adult for the duration of use. Accordingly, a restaurant-style high chair is usually designed to be used without a tray. In a home setting, a child may be placed in the high chair for longer periods of time and the adult may be performing other activities while the child eats, such as cooking or cleaning up, whereas in a restaurant setting caregivers may be less likely to leave their children unattended. Additional differences in usage patterns are described in Tab E. Also, the leg holes tend to be larger for restaurant-style high chairs, perhaps because they need to accommodate children clothed in outerwear, or children of a wide range of ages and sizes. Restaurant-style high chairs are compact in design to minimize the space required for use, and almost always stackable (or able to be nested) to conserve space.

Although the ASTM high chair subcommittee has considered how the voluntary standard might be adjusted to cover the specific circumstances and needs surrounding the use of products used in commercial settings neither ASTM F404-15 nor the staff-recommended proposed high

chair standard excludes such products. Consequently, at this point, restaurant-style high chairs are implicitly covered by the staff-recommended proposed rule. The underlying rationale for including them within the rule is that such high chairs may potentially be susceptible to similar hazard patterns as high chairs intended for home use because consumers can purchase them for home use and because consumers use commercial high chairs in public establishments. Staff requests comments on whether the ASTM standard currently covers high chairs used in commercial settings. We also want comments on whether the final high chair standard promulgated by the Commission should include restaurant-style high chairs as recommended by CPSC staff.

III. The Market for High Chairs

About 62 firms supply high chairs to the U.S. market. The majority of these firms (48 firms) market their products to consumers, but 14 firms produce for commercial markets. As noted above, consumers are able to purchase high chairs intended for commercial use, and in fact, two firms that market to consumers produce high chairs identical to the wooden high chairs used in restaurants. The majority of the 62 known firms are domestic (including 27 manufacturers, 19 importers, and 5 wholesalers). The remaining 11 firms are foreign (including 9 manufacturers, 1 importer, and 1 retailer).⁴²

IV. Reason for Agency Action and Legal Basis for the Draft Proposed Rule

Based on National Electronic Injury Surveillance System (“NEISS”) injury estimates⁴³ and data on the number of high chairs in use from CPSC’s Durable Nursery Product Exposure Survey (“DNPES”),⁴⁴ staff found that the risk associated with high chair use in homes is approximately 11 emergency department-treated injuries per 10,000 high chairs in use annually [(7,825 injuries ÷ 7.14 million high chairs in use in U.S. households) x 10,000]. Additionally, staff has identified three injuries that occurred in restaurants and one incident involving a restaurant-style high chair used in a home environment from 2011 through 2014.

Section 104 of the CPSIA requires the CPSC to promulgate a mandatory standard for high chairs that is substantially the same as the voluntary standard or more stringent than the voluntary standard if the Commission determines that more stringent requirements would further reduce the risk of injury associated with the product.

CPSC staff recommends adopting the voluntary ASTM standard for high chairs (F404-15) with modifications to the rearward stability test and the warning label and instruction manual requirements. The modification to the rearward stability test is intended to reduce the risk of

⁴² Determinations were made using information from Dun & Bradstreet and ReferenceUSAGov, as well as firm websites.

⁴³ Ibid.

⁴⁴ Melia, K.L. and J.L. Jenkins (November 2014). *Durable Nursery Products Exposure Survey (DNPES): Final Summary Report*. U.S. Consumer Product Safety Commission, prepared by Westat.

backward tip over incidents. Modifications to the warning labels and instruction manuals are intended to reduce fall incidents where restraints were not used or were incorrectly used.

The scope of the staff-recommended proposed rule also implicitly covers restaurant-style high chairs to address the small number of incidents that are known to have occurred in commercial environments. The inclusion of such high chairs will also address the one known incident involving a restaurant-style high chair in a home environment and the potential for injury when consumers choose to purchase restaurant-style highchairs rather than high chairs produced specifically for home use.

V. Requirements of the Proposed Rule

CPSC staff recommends adopting the voluntary ASTM standard for high chairs (F404-15) with modifications to the rearward stability test and the warning label and instruction manual requirements. Firms whose high chairs do not comply will need to evaluate their products, determine what changes would be required to meet the standard, and decide how to proceed. Noncompliant products would need to be removed from the U.S. market or modified to meet the staff-recommended proposed standard.

A. ASTM F404-15

Some of the more significant requirements from ASTM F404-15 are presented below, with selected changes that were made since the staff review and consultation process began in September 2013 explained in italics.⁴⁵

- Locking and latching mechanisms—intended to prevent unintentional folding of the high chair while in use.
- Tray/*front torso support*—includes two tests that are intended to prevent disengagement while in use (pull test) and prevent small parts and sharp edges/points if the component is dropped (drop test). Both test for continued functionality. *Originally, the requirements and test procedures applied to trays only. However, given the existence of high chairs that do not (or do not always) use trays, front torso supports were added for version ASTM F404-14.*
- Static load—intended to prevent breaks/disengagement of the seat, step/footrest, and tray during use.
- Stability—intended to prevent high chairs from tipping over both while in use and while the child is climbing into the chair. Forward, rearward, sideward, and footrest (or forward most horizontal frame member) stability are all tested.

⁴⁵ Additional information on the ASTM standard and how it addresses various hazard patterns can be found in the memorandum from Shaina Donahue, Division of Mechanical Engineering, Directorate for Engineering Sciences, dated July 23, 2015, Subject: ESME Staff's Review and Evaluation of ASTM F404-15, *Standard Consumer Safety Specification for High Chairs*, for Incorporation by Reference into Staff's Draft Proposed Rule.

- Restraint system—intended to secure the child in the high chair during use with minimal slippage. *ASTM F404-13a added a requirement that the restraining system be attached in one of the manufacturer's recommended use positions prior to shipment so that no assembly is required by the user. ASTM F404-15 added a restraint system test of each attachment point and fastening device.*
- Completely bounded openings—intended to ensure that the occupant cannot slip through the openings in the front of the high chair and become entrapped. One way this can be accomplished is with a passive crotch restraint. *For high chairs that meet the completely bounded openings requirements using passive crotch restraints, ASTM F404-15 added a requirement that the passive crotch restraint be either permanently attached or tethered to its use position when shipped.*
- Side containment—similar to the completely bounded openings requirement, the side containment requirement and test procedure is intended to prevent children from slipping through openings in the side of high chairs.
- Structural integrity—intended to ensure that the high chair remains cohesive (*e.g.*, no breakage, edges that can scissor, shear, or pinch, exposed coil springs, sizable changes in high chair height or seat angle, or disengagement of latching or locking devices) after dynamic testing.
- Tray latch—intended to prevent occupants from releasing the tray while the high chair is in use. *ASTM F404-14 clarified that only trays that can be fully removed should be tested.*
- *Protrusions—intended to prevent incidents where children outside of the high chair have fallen onto certain protrusions on the back and side of high chair legs. This was added for version ASTM F404-15.*

The voluntary standard also includes: (1) torque and tension tests to ensure that components cannot be removed; (2) requirements to prevent entrapment and cuts (minimum and maximum opening size, coverage of exposed coil springs, small parts, hazardous sharp edges or points, smoothness of wood parts, and edges that can scissor, shear, or pinch); (3) marking and labeling requirements, including permanency requirements; (4) requirements for the permanency and adhesion of labels, *which were updated and made more stringent for version F404-13a*; (5) requirements for warning labels, *including several editorial changes and visibility requirements for ASTM F404-15*; (6) requirements for instructional literature; (7) *threaded fastener requirements, which were added for version ASTM F404-15*; and (8) toy accessory requirements. *The scope of the high chair standard was clarified and expanded for ASTM F404-15 to chairs that place the seating surface more than 15 inches above the floor, including high chair conversion kits.* ASTM F404-15 includes no reporting or recordkeeping requirements.

B. Staff-Recommended Changes

Staff is recommending two changes to the ASTM voluntary standard, ASTM F404-15: (1) a modification to the rearward stability test; and (2) several changes to the warning labels and instruction manuals.

1. Rearward Stability

A Directorate for Health Sciences (“HS”) review of the incidents reported to CPSC and the emergency department treated injuries cases in NEISS member hospitals indicates that incidents associated with rearward stability issues have the potential for severe head injuries which could have long term effects on the victims.⁴⁶ CPSC staff has been working with ASTM to modify the rearward stability test since the voluntary standard review and consultation process began.⁴⁷ Specifically, CPSC is recommending a revision to the test that would call for high chairs to surpass a lower limit on a rearward stability index (“SI”) rating. The SI rating is comprised of two characteristics of a high chair as it tips over backwards: the force required for rearward tip over and the distance the back of the chair moves before tip over. This contrasts with the test in the current ASTM standard, which is based solely on force.

The staff-recommended modifications will require each firm to change the procedure for testing for rearward stability. However, rearward stability testing is already part of the ASTM standard and preliminary testing by CPSC staff (as well as other members of the ASTM task group) indicates that very few high chairs would require modifications to pass the modified rearward stability test. Through testing high chairs and other market research, ES staff identified only three high chairs that might not pass the modified rearward stability test based on their design. However, the design change needed to increase rearward stability should not be costly, possibly involving only adding flat supports to the bottom of each back leg.

2. Warning Labels and Instruction Manuals

As noted in the Division of Human Factors (“HF”) memorandum (Tab E), falls are a common hazard associated with high chairs and many incidents are related to failure to use, or incorrect use of, restraints, including inappropriately using a tray as a restraint.⁴⁸ In order to address these hazards, HF staff is recommending a single warning label on the front of the high chair back where it will be visible when placing the child in the high chair *and* when the child is seated in the high chair. HF staff also recommends modified wording, formatting, and coloration.

All firms would be affected by the staff-recommended warning label changes. Each firm would need to modify the text and formatting of the warnings for both the product and the instruction manual. Warning label(s) would need to be moved to the specified location, ensuring that the warnings are visible when the child is placed in the high chair and when the child is in the high chair. If the high chair can be used with and without padding, this would require placing the warning on both the high chair and the padding.

⁴⁶ Memorandum from Stefanie C. Marques, Division of Pharmacology and Physiology Assessment, Directorate for Health Sciences, dated September 16, 2015, Subject: Health Sciences Assessment of High Chair-related Injuries.

⁴⁷ See Donahue (2015) for a thorough description of the recommendation and its development.

⁴⁸ Memorandum from Timothy P. Smith, Senior Human Factors Engineer, Division of Human Factors, dated September 16, 2015, Subject: Human Factors Assessment of ASTM F404-15 Requirements for High Chairs (CPSIA Section 104).

To assist in the evaluation of the economic impact of the draft proposed rule, EC staff contacted several ASTM members and supplier representatives. We contacted nine firms (two of which responded). Both firms were concerned that insufficient room exists on some high chair models to accommodate the proposed warning label in the recommended location. They thought that even one warning label might not be possible for some models and that multiple language warnings could be difficult for others. In sum, the supplier representatives who responded thought that the warning label changes might require that they reconsider the entire design of their high chairs in order to meet the requirements of the staff-recommended proposed rule while simultaneously meeting the needs of the consumers that purchase their products, thus incurring costs beyond what would typically be expected with a simple label change. This is consistent with staff's evaluation of high chairs on the U.S. market.

A number of high chairs have limited space available on the front seat back to accommodate the recommended warning labels. Even if the high chair has enough space for the warning labels, the warning label may be obstructed when the child is placed in the high chair, due to the small size of the seat back relative to the size of the typical child using the high chair. The problem may be compounded when the producer sells in international or other non-English speaking markets and supplies warnings in multiple languages. While the staff-recommended proposed rule only requires that the warnings are presented in English, affected firms may need to develop a unique product to meet U.S. requirements or, alternatively, redesign the product (by increasing the size of the seat back primarily) to accommodate warning labels in multiple languages if they choose to produce a single product that simultaneously conforms to U.S. and all other trading partners' requirements. The modifications could be considerable for very compact high chairs which are purchased by users with space limitations. Redesigning these products to provide more space for warning labels will reduce customer utility because presumably consumers purchase these products specifically for their compactness. One possible outcome could be that compact high chairs are eliminated from the market entirely.

At this time, we do not know how affected firms will respond and have no basis for estimating the costs due to the location of the warning labels. We welcome comments on this issue and, in particular, estimates of the costs of making these changes. Information specific to compact high chair models is also requested. We are further interested in receiving input on whether the costs would be considered "economically significant" as in constituting an impact greater than one percent of revenue (or a similar economic benchmark or criteria).

Also, according to industry contacts, some plastic high chairs used in commercial settings may require a complete redesign to comply with the warning label requirements, even if sufficient space is available on the product to display them. These plastic high chairs are designed with a textured surface except for those places intended to accommodate warning labels and it might not be possible to alter existing molds to meet the staff-recommended requirement. One industry contact said that the plastic under a warning label needs to be smooth in order for the label to adhere reliably. Therefore, if the size, shape, or number of warning labels changes, new molds for the plastic might need to be constructed. One firm estimates that the cost of such an effort would be \$400,000 minimum and take around two years to complete. We do not know at this time how many firms may require redesign versus alteration. We request information about the manufacturing process for plastic high chairs, particularly those used in commercial

settings. We also request information about whether redesign or alternation would be required and the costs of each approach.

Generally, a straightforward modification to an existing label would not generate costs that would be considered significant relative to any of the high chair firm's revenues. One firm estimated that the cost of modifying and printing the warning labels and instruction manuals should be about \$1,000, depending on the types of changes needed. However, as described above, the two firms that responded to our information request believe that the changes will go beyond a simple modification of the existing label; retrofitting or redesign might be required to provide sufficient space for the warning label(s) on the front of the high chair back, which could create significant economic costs. Staff is seeking information on the degree to which redesign or retrofitting will be necessary to meet the new warning label requirements, and any estimates of the costs associated with needed redesigns/retrofits.

VI. Other Federal or State Rules

CPSC staff has not identified any federal or state rule that either overlaps or conflicts with the staff-recommended proposed rule.

VII. Impact on Small Businesses

CPSC staff is aware of approximately 62 firms (large and small) currently marketing high chairs in the United States, 51 of which are domestic. Under U.S. Small Business Administration ("SBA") guidelines, a manufacturer of high chairs is considered small if it has 500 or fewer employees; and importers and wholesalers are considered small if they have 100 or fewer employees. Staff limited our analysis to domestic firms because SBA guidelines and definitions pertain to U.S.-based entities. Based on these guidelines, about 38 of the 51 firms are small—21 domestic manufacturers, 13 domestic importers, and 4 domestic wholesalers. Additional unknown small domestic high chair suppliers may be operating in the U.S. market. Table 1 describes the firms in the high chair market.

Table 1. Firms in the U.S. High Chair Market

CATEGORY	NUMBER OF FIRMS
Total Firms	62
Domestic	51
Small	38
Manufacturers	21
Compliant with ASTM Voluntary Standard	12
Not Compliant with ASTM Voluntary Standard	9
Importers or Wholesalers	17
Compliant with ASTM Voluntary Standard	9
Not Compliant with ASTM Voluntary Standard	8
Large	13
Foreign	11
Highlighted categories are the focus of this analysis.	

A. Small Manufacturers

1. Small Manufacturers with Compliant High Chairs

Of the 21 small manufacturers, 12 produce high chairs that comply with ASTM F404-14. In general, it is expected that small manufacturers whose high chairs already comply with the voluntary standard currently in effect for testing purposes will remain compliant with the voluntary standard as it evolves, because they follow and, in three cases, actively participate in the standard development process. Therefore, compliance with the voluntary standard is part of an established business practice. ASTM F404-15, the version of the voluntary standard upon which the staff-recommended mandatory standard is based, will be in effect by the time the mandatory standard becomes final and these firms are likely to be in compliance based on their history.

For this reason, the economic impact of the staff-recommended proposed rule should be small for the majority of the known small domestic manufacturers supplying compliant high chairs to the U.S. market (10 of 12 firms). This includes one firm that may require modifications to meet the proposed modification to the rearward stability test. As already noted, the cost associated with meeting this modified requirement is likely to be small.

However, staff cannot rule out a significant impact for two small manufacturers as a result of the staff-recommended warning label requirements. Both firms produce high chairs with compact designs, with one serving the commercial restaurant market. Redesign of the seat back is an option for providing additional space for warning labels, but such modifications could be met with customer resistance if compactness is the key attribute driving the purchasing decision. It is unclear whether discontinuing production of high chairs is an alternative for one firm even

though high chairs represent a small part of its overall product line. For this firm, sales revenue associated with high chairs was not available, and we cannot determine whether exiting the high chair market would generate significant economic impacts. For the second firm, high chairs represent an integral part of its commercial product line as a whole and exiting the market could create a significant economic burden. Staff requests input on consumer preferences for compact high chairs. We also ask for information on how manufacturers with compact high chairs will respond to the warning label requirements and the costs of developing a compliant product.

2. Small Manufacturers with Noncompliant High Chairs

Nine small manufacturers produce high chairs that do not comply with the voluntary standard, five of which produce for the commercial market. Staff cannot rule out a significant economic impact for any of the nine small manufacturers of noncompliant high chairs. The five producers of commercial products will require several changes to simply meet the base requirements of the voluntary ASTM standard. As discussed previously, commercial high chairs are used in different circumstances than those that occur during home use. Compliance with the draft proposed rule could be incompatible with the characteristics that make the product desirable for use in commercial settings. For example, leg holes tend to be larger for restaurant-style high chairs because they need to accommodate children clothed in outerwear perhaps, or children of a wide range of ages and sizes. The draft proposed standard would not allow high chairs to be produced to a number of these specifications.

Producers for the commercial market will also need to make changes to meet the warning label recommendations of CPSC staff. Two firms that manufacture plastic high chairs used in a commercial setting might need to be completely redesigned in order to comply with the staff-recommended warning label modifications.

Four firms with products that do not currently comply with the ASTM standard produce high chairs for home use. One of these four firms will probably require significant changes to its product to meet the staff's recommended warning label requirements, given the compact nature of their product. Any modifications to the high chairs of the other three firms would be entirely due to the requirements in the voluntary standard upon which the staff-recommended proposed rule is based; their high chairs appear to have sufficient room for the required warning labels without redesign. However, the extent and cost of the changes required cannot be determined and, therefore, staff cannot rule out a significant economic impact.

Staff requests input on the differences between high chairs produced for home use and those for commercial use, especially in restaurants, as well as the desirability of certain features in home versus commercial environments (particularly restaurants). We also request information on the changes that may be required to meet the staff-recommended proposed rule, in particular whether redesign or retrofitting would be necessary, as well as the associated costs.

3. Third Party Testing Costs for Small Manufacturers

Under section 14 of the CPSA, once new high chair requirements become effective, all manufacturers will be subject to the third party testing and certification requirements under the

1107 rule. Third party testing will include any physical and mechanical test requirements specified in the final high chairs rule. Manufacturers and importers should already be conducting required lead testing for high chairs. Third party testing costs are in addition to the direct costs of meeting the high chairs standard.

Over half of small high chair manufacturers (11 out of 21) are already testing their products to verify compliance with the ASTM standard, though not necessarily by a third party. For these manufacturers, the impact to testing costs will be limited to the difference between the cost of third party tests and the cost of current testing regimes. Contacted suppliers estimate that third party testing high chairs to the ASTM voluntary standard would cost about \$600-\$900 per model sample. For manufacturers that are already testing, the incremental costs will be lower than that.

Based on an examination of firm revenues from recent Dun & Bradstreet or ReferenceUSAGov reports, the impact of third party testing, by itself, is unlikely to be economically significant for small manufacturers of noncompliant high chairs. While it is unknown how many samples will be needed to meet the “high degree of assurance” criterion required in the 1107 rule, over 12 units per model would be required before testing costs exceed one percent of gross revenue for the small manufacturer with the lowest gross revenue. Revenue information was not available for one small manufacturer and, therefore, no impact evaluation could be made. We welcome comments regarding overall testing costs and incremental costs due to third party testing (*i.e.*, how much does moving from a voluntary to a mandatory third party testing regime add to testing costs, in total and on a per test basis). In particular, we are interested in our preliminary evaluation that third party testing alone is unlikely to lead to significant economic impacts for small high chair manufacturers. In addition, staff would like comments regarding the number of high chair units that typically need to be tested to provide a “high degree of assurance.”

B. Small Importers and Wholesalers

1. Small Importers and Wholesalers with Compliant High Chairs

The economic impact to importers and wholesalers are considered together as both rely on outside firms to supply the products that they distribute to the U.S. market. Importers distribute products made by foreign firms and are often closely related to the firm producing their product. Staff was unable to determine the source of the high chairs distributed by wholesalers, but they are likely purchased from other suppliers which may be foreign or domestic.

In the absence of a mandatory regulation, the nine firms (seven small importers and two small wholesalers of high chairs) currently in compliance with the voluntary standard would likely remain in compliance with new versions of the standard. However, the high chairs supplied by these firms would require modifications to meet the staff-recommended proposed rule. There are two firms that may require modifications to meet the rearward stability requirement (one importer and one wholesaler), but as already noted, these costs are likely to be low. The cost of modifications to the wording and format of the warnings should be small as well, given that such changes typically add only a few cents per unit to production costs.

The placement of the warnings, however, could be more costly, possibly requiring retrofitting or redesign. Four of the nine firms will probably require physical modifications to their products to meet the warning label location requirement. The high chairs of two firms have compact designs making the display of *any* warning labels difficult; the remaining two firms provide information in a number of languages that would exceed the space available on their high chairs. Finding an alternative supply source would not be a viable alternative for three of the four firms due to close relationships with their supplier; all three supply a sufficient number of other products that they could probably eliminate high chairs from their product line entirely, however. The fourth firm is a commercial supplier and high chairs are an integral part of its product line; exiting the high chairs market would likely mean going out of business entirely. Staff requests information on how importers will respond to the proposed rule, as well as the costs of developing a compliant product.

2. Small Importers and Wholesalers with Noncompliant High Chairs

There is insufficient information to rule out a significant impact for any of the eight importers and wholesalers with noncompliant high chairs. Whether there is a significant economic impact will depend upon the extent of the changes required to come into compliance and the response of their supplying firms. Any increase in production costs experienced by their suppliers as a result of changes made to meet the mandatory standard may be passed on to the importers and wholesalers. These costs would include those associated with coming into compliance with the voluntary standard, as well as those associated with the staff-recommended modifications to the voluntary standard.

Six of the eight importers/wholesalers with noncompliant high chairs do not appear to have direct ties to their product suppliers. These firms may opt to switch to alternative suppliers (or, in some cases, alternative products) rather than bear the cost of complying with the standard, which could potentially be significant given the relatively low revenue levels of these firms. However, it is unclear whether the costs associated with such a change and/or any resulting changes in revenue would be significant for these firms. Three firms supply restaurant-style high chairs, including one plastic high chair, so while they may be able to find a compliant high chair from an alternative supply source, they would share the same concerns as manufacturers of restaurant-style high chairs regarding the desirability of the product to their customers. Two of the six firms supply high chairs to the consumer market that are identical to several supplied to the commercial market. While the costs associated with coming into compliance with the staff-recommended proposed standard could be significant for these firms, high chairs make up a small part of their product line. Therefore, dropping their noncompliant high chairs in favor of another product or compliant high chairs from another supplier may be a reasonable alternative for these firms. However, sales revenue for high chairs was not available, and we cannot determine whether exiting the high chair market would generate significant economic impacts.

The remaining two firms are directly tied to their foreign suppliers and finding an alternative supply source would not be a viable alternative. However, the foreign suppliers to these firms may have an incentive to work with their U.S. subsidiaries/distributors to maintain an American market presence. Although it is possible that these firms could discontinue the sale of high chairs altogether, it seems unlikely for two of these firms as high chairs represent one of only a few

products in their lines. Again, we cannot determine whether exiting the high chair market would generate significant economic impacts given the lack of sales revenue for high chairs.

3. Third Party Testing Costs for Small Importers and Wholesalers

As with manufacturers, all importers and wholesalers will be subject to third-party testing and certification requirements, and consequently, will be subject to costs similar to those for manufacturers if their supplying foreign firm(s) does not perform third party testing. Just over half of high chair importers and wholesalers (9 out of 17) are already testing their products to verify compliance with the ASTM standard, and any costs would be limited to the incremental costs associated with third party testing over the current testing regime.

For firms with high chairs not believed to comply with the ASTM standard, moving to third party certification of the staff-recommended proposed rule could result in significant costs for two or three firms; testing costs could exceed one percent of gross revenue with as few as three units per model tested for two of those firms. A third firm would need to test about six units per model before testing costs would exceed one percent of gross revenue. There was no revenue data available for one small importer of high chairs not believed to comply with the voluntary ASTM standard. Therefore, we had no basis for examining the size of the impact on that firm.

C. Summary of Impacts

CPSC staff is aware of 38 small firms, 21 domestic manufacturers and 17 domestic importers/wholesalers, currently marketing high chairs in the United States. Of the 21 small manufacturers, it appears that ten are unlikely to experience significant economic impacts. However, we could not rule out a significant economic impact for the remaining 11. Based on a review of firm revenues for small importers and wholesalers as well as the options available to each firm, the impact of the staff-recommended proposed rule may not be significant for eight small importers. However, staff cannot rule out a significant economic impact on the remaining nine small importers and wholesalers. Based upon current information, we cannot rule out a significant economic impact for 20 of the 38 firms (53 percent) operating in the U.S. market for high chairs.

VIII. Alternatives

At least four alternatives are available to minimize the economic impact on small entities supplying high chairs while also meeting the statutory objectives: (1) adopt ASTM F404-15 with no modifications; (2) adopt ASTM F404-15 with the staff-recommended modifications, except for the warning label location specificity; (3) adopt the staff recommended standard, but exclude commercial products from the scope of the rule; and (4) allow a later effective date.

First, section 104 of the CPSIA requires that the Commission promulgate a standard that is either substantially the same as the voluntary standard or more stringent if the Commission determines that more stringent standards would further reduce the risk of injury. Therefore, adopting ASTM F404-15 with no modifications is the least stringent rule that could be

promulgated. This alternative would reduce the impact on all of the known small businesses supplying high chairs to the U.S. market. While it would not reduce the testing costs triggered by the rule, it would eliminate any economic impact related directly to complying with the staff-recommended proposed rule for the 10 small domestic manufacturers and the 9 small importers/wholesalers with compliant high chairs, all of whom are expected to comply with ASTM F404-15 by the time the final rule becomes effective. However, the staff-recommended modifications are intended to reduce the risk of backward tip over incidents as well as fall incidents where restraints were not used or were incorrectly used. Adopting ASTM F404-15 with no modifications would not meet these objectives.

Second, the Commission could reduce impacts to small businesses by adopting ASTM F404-15 with the staff-recommended modifications, except for the requirement that the warning labels on the product be located on the front of the seat back and visible with the child in the seat. One alternative would be to require that warning labels be visible *only* as the child is being put into the high chair. This alternative would reduce the proportion of high chair models with backs that would need to be redesigned and expanded to accommodate labels observable during use. It would also reduce somewhat the clutter of labels that some consumers might find unsightly. Another approach might involve duplicate labels: the first located on the front seat back that would be visible when the child is placed in the seat and the second in an alternative location (for example, the rear of the seat back) where it would be visible when the child is in the high chair. Some suppliers may object because duplication of labels could make the product appear cluttered. However, this alternative would help reduce the impact on compact high chairs or high chairs with smaller backs.

Third, given that a substantial proportion of the impact would be borne by small restaurant-style high chair suppliers, there are several options that could be tailored to address the issues specific to the use of such high chairs. The proposed rule could exclude high chairs used in restaurants and other commercial establishments, from its scope. Staff has identified only a few injuries involving these products in commercial establishments and the reduction in safety benefits due to limiting the rule's scope would be minimal. Moreover, there are reasons why high chairs developed for home use are not currently used in most commercial establishments, particularly restaurants. Specifically, commercial establishments need products with a smaller footprint and the ability to accommodate children of many sizes attributes which will at best be challenging to achieve under the staff-recommended proposed rule.

Without access to these necessary attributes, establishments like restaurants might be discouraged from offering high chairs for patron use, which could encourage the use of potentially less safe options like placing infant carriers on elevated surfaces such as tables or chairs, or using booster seats for children before they reach a developmentally appropriate age. Staff welcomes comments on the potential effect of excluding restaurant-style high chairs from the draft proposed rule.

Restricting the scope of the draft proposed rule to high chairs could be coupled with others efforts to promote the safety of high chairs used in homes. For example, one approach might be to require suppliers of restaurant-style high chairs to label their products as "not intended for home use." Additionally, separate warning labels could be developed for products used in

commercial settings to inform users of the specific hazard patterns related to those products. Restricting the scope would also allow ASTM (which includes suppliers of high chairs for both home and commercial use) additional time to develop requirements specific to commercial high chairs. Staff requests comments on the inclusion of restaurant-style high chairs and the alternatives that may be available to reduce the impact on these firms.

Fourth, the Commission could also reduce the staff-recommended proposed rule's impact on small businesses by setting a later effective date. A later effective date would reduce the economic impact on firms in two ways. Firms would be less likely to experience a lapse in production/importation, which could result if they are unable to comply and third party test within the required timeframe. Also, firms could spread costs over a longer time period, thereby reducing their annual costs, as well as the present value of their total costs. Staff specifically requests comments on the 6 month effective date, as well as feedback on how firms would likely address the proposed rule. Staff considered a longer effective date for firms supplying the commercial market, but it is unlikely that this would reduce the economic impact on these firms. The problem they face is that their customers would likely not be interested in a high chair that meets the staff-recommended proposed rule, not that they need additional time to meet the standard. Staff requests comments, particularly from restaurants and other commercial establishments, on the validity of this statement.

IX. Small Business Impacts of the Accreditation Requirements for Testing Laboratories

In accordance with section 14 of the CPSA, all children's products that are subject to a children's product safety rule must be tested by a CPSC-accepted third party conformity assessment body (*i.e.*, testing laboratory) for compliance with applicable children's product safety rules. Testing laboratories that want to conduct this testing must meet the NOR pertaining to third party conformity testing. NORs have been codified for existing rules at 16 C.F.R. part 1112. Consequently, staff is proposing an amendment to 16 C.F.R. part 1112 that would establish the NOR for those testing laboratories that want to test for compliance with the high chairs final rule. This section assesses the impact of the amendment on small laboratories.

A Final Regulatory Flexibility Analysis ("FRFA") was conducted as part of the promulgation of the original 1112 rule (78 FR 15836, 15855-58) as required by the RFA. Briefly, the FRFA concluded that the accreditation requirements would not have a significant adverse impact on a substantial number of small laboratories because no requirements were imposed on laboratories that did not intend to provide third party testing services. The only laboratories that were expected to provide such services were those that anticipated receiving sufficient revenue from the mandated testing to justify accepting the requirements as a business decision.

Based on similar reasoning, amending the rule to include the NOR for the high chair standard will not have a significant adverse impact on small laboratories. Moreover, based upon the number of laboratories in the U.S. that have applied for CPSC acceptance of the accreditation to test for conformance to other juvenile product standards, we expect that only a few laboratories will seek CPSC acceptance of their accreditation to test for conformance with the high chair

standard. Most of these laboratories will have already been accredited to test for conformance to other juvenile product standards, and the only costs to them would be the cost of adding the high chair standard to their scope of accreditation, a cost that test laboratories have indicated is extremely low when they are already accredited for other section 104 rules. As a consequence, the Commission could certify that the NOR for the high chair standard will not have a significant impact on a substantial number of small entities.