CONSUMER PRODUCT SAFETY COMMISSION

16 CFR Parts 1112 and 1261

[Docket No. CPSC–2017–0044]

Safety Standard for Clothing Storage Units

AGENCY: Consumer Product Safety Commission.

ACTION: Final rule.

SUMMARY: The U.S. Consumer Product Safety Commission (Commission or CPSC) has determined that there is an unreasonable risk of injury and death, particularly to children, associated with clothing storage units (CSUs) tipping over. To address this risk, the Commission is issuing a rule regarding the stability of CSUs. This rule requires CSUs to be tested for stability, exceed minimum stability requirements, bear labels containing safety and identification information, and display a hang tag providing performance and technical data about the stability of the CSU. The Commission issues this rule under the authority of the Consumer Product Safety Act (CPSA).

DATES: This rule is effective on May 24, 2023. The incorporation by reference of the publication listed in this rule is approved by the Director of the Federal Register as of May 24, 2023.

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SUPPLEMENTARY INFORMATION:

I. Background

CSUs generally are freestanding furniture items, typically used for storing clothes. Examples of CSUs include chests, bureaus, dressers, chests of drawers, drawer chests, door chests, chifforobes, armoires, and wardrobes. CPSC is aware of numerous deaths and injuries resulting from CSUs tipping over, particularly onto children. To address the hazard associated with CSU tip overs, the Commission has taken several steps.

In June 2015, the Commission launched the Anchor It! campaign. This educational campaign includes print and broadcast public service announcements; information distribution at targeted venues, such as childcare centers; social media; blog posts; videos; and an informational website (*www.AnchorIt.gov*). The campaign explains the nature of the risk, provides safety tips for avoiding furniture and television tip overs, and promotes the use of tip restraints to anchor furniture and televisions.

In addition, CPSC's Office of Compliance and Field Operations has investigated and recalled CSUs.[1] Between January 1, 2000 and July 1, 2022, 43 consumer-level recalls occurred to address CSU tip-over hazards. The recalled products were responsible for 341 tip-over incidents, including reports of 152 injuries and 12 fatalities.[2] These recalls involved 38 firms and affected approximately 21,530,000 CSUs.

In 2016, CPSC staff prepared a briefing package on furniture tip overs, looking at then-current levels of compliance with the voluntary standards, and the adequacy of the voluntary standards.[3] In 2017, the Commission issued an advance notice of proposed rulemaking (ANPR), discussing the possibility of developing a rule to address the risk of injuries and death associated with CSU tip overs. 82 FR 56752 (Nov. 30, 2017).[4] The ANPR began a rulemaking proceeding under the CPSA (15 U.S.C. 2051–2089). In 2022, after considering comments received on the ANPR and extensive additional testing and analysis, the Commission issued a notice of proposed rulemaking (NPR), proposing to establish requirements regarding CSU stability. 87 FR 6246 (Feb. 3, 2022). The Commission is now issuing a final rule, establishing requirements regarding CSU stability.[5]

This preamble provides key information to explain and support the rule, derived from the following materials. For more detailed information, see these additional materials:

- CPSC staff's briefing package supporting the NPR; [6]
- CPSC staff's public briefing to the Commission regarding the NPR briefing package, which includes a video demonstration of stability testing proposed in the NPR; [7]
- the NPR; [8]
- information provided in the docket for this rulemaking; [9]
- information obtained at a public hearing on the NPR; [10] and
- CPSC staff's briefing package supporting this final rule.[11]

II. Statutory Authority

CSUs are ''consumer products'' that the Commission can regulate under the authority of the CPSA. *See* 15 U.S.C. 2052(a)(5). In this document, the Commission issues a final rule under sections 7 and 9 of the CPSA, regarding performance requirements, warnings, and stockpiling, and under section 27(e) of the CPSA, regarding performance and technical data.

A. Performance and Warning Requirements

Section 7 of the CPSA authorizes the Commission to issue a mandatory consumer product safety standard that consists of performance requirements or requirements that the product be marked with, or accompanied by, warnings or instructions. *Id.* 2056(a). Any requirement in the standard must be ''reasonably necessary to prevent or reduce an unreasonable risk of injury'' associated with the product. *Id.* Section 7 requires the Commission to issue such a standard in accordance with section 9 of the CPSA. *Id.*

Section 9 of the CPSA specifies the procedure the Commission must follow to issue a consumer product safety standard under section 7. *Id.* 2058. Under section 9, the Commission may initiate rulemaking by issuing an ANPR

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[1] For further information about recalls, see Tab J of the briefing package supporting this final rule.

[2] For the remaining incidents, either no injury resulted from the incident, or the report did not indicate whether an injury occurred.

[3] Massale, J., Staff Briefing Package on Furniture Tipover, U.S. Consumer Product Safety Commission (2016), available at: *https://www.cpsc.gov/s3fs-public/Staff%20Briefing%20Package%20on%20Furniture%20Tipover%20-%20September%2030%202016.pdf.*

[4] The briefing package supporting the ANPR is available at: *https://www.cpsc.gov/s3fs-public/ANPR%20-%20Clothing%20Storage%20Unit%20Tip%20Overs%20-%20November%2015%202017.pdf?5IsEEdW_Cb3ULO3TUGJiHEl875Adhvsg.* After issuing the ANPR, the Commission extended the comment period on the ANPR. 82 FR 2382 (Jan. 17, 2018).

[5] The Commission voted 3–1 to approve this document.

[6] The briefing package supporting the NPR is available at: *https://www.cpsc.gov/s3fs-public/Proposed%20Rule-%20Safety%20Standard%20for%20Clothing%20Storage%20Units.pdf.*

[7] A recording of the public briefing is available at: *https://www.youtube.com/watch?v=LIY1wfyOwDk.*

[8] The NPR is available at: *https://www.federalregister.gov/documents/2022/02/03/2022-01689/safety-standard-for-clothing-storage-units.*

[9] The docket for this rulemaking, CPSC–2017–0044, is available at: *www.regulations.gov.*

[10] A public hearing was held on April 6, 2022. Submissions forwarded to the agency by presenters before the public hearing, and the transcript of the hearing are available in the docket for this rulemaking, CPSC–2017–0044, at *www.regulations.gov.* The public hearing is available for viewing at: *https://www.cpsc.gov/Newsroom/Public-Calendar/2022-04-06-100000/Public-Hearing-Safety-Standard-for-Clothing-Storage-Units.*

[11] The briefing package supporting the final rule is available at: *https://www.cpsc.gov/s3fs-public/Final-Rule-Safety-Standrd-for-Clothing-Storage-Units.pdf?VersionId=X2prG3G0cqqngUwZh3rk01mkmFB40Gjf.*

or NPR; must promulgate the rule in accordance with section 553 of the Administrative Procedure Act (5 U.S.C. 553); and must publish an NPR that contains the text of the proposed rule, alternatives the Commission considered, and a preliminary regulatory analysis. The Commission also must provide an opportunity for interested parties to submit written and oral comments on the proposed rule. *Id.* 2058(a), (c), (d)(2). Accordingly, the Commission initiated this rulemaking with an ANPR in November 2017 and published an NPR in February 2022, which included the required content and sought written comments on all aspects of the proposed rule. The Commission also provided the opportunity for interested parties to make oral presentations of data, views, or arguments on the proposed rule at an online public hearing on April 6, 2022.

To issue a final rule under section 9 of the CPSA, the Commission must make certain findings and publish a final regulatory analysis. 15 U.S.C. 2058(f). Under section 9(f)(1) of the CPSA, the Commission must consider, and make appropriate findings to be included in the rule, concerning the following issues:

- the degree and nature of the risk of injury the rule is designed to eliminate or reduce;
- the approximate number of consumer products subject to the rule;
- the need of the public for the products subject to the rule and the probable effect the rule will have on the cost, availability, and utility of such products; and
- the means to achieve the objective of the rule while minimizing adverse effects on competition, manufacturing, and commercial practices.

Id. 2058(f)(1). Under section 9(f)(3) of the CPSA, the Commission may not issue a consumer product safety rule unless it finds (and includes in the rule):

- the rule, including the effective date, is reasonably necessary to eliminate or reduce an unreasonable risk of injury associated with the product;
- that issuing the rule is in the public interest;
- if a voluntary standard addressing the risk of injury has been adopted and implemented, that either compliance with the voluntary standard is not likely to result in the elimination or adequate reduction of the risk or injury, or there is unlikely to be substantial compliance with the voluntary standard;
- that the benefits expected from the rule bear a reasonable relationship to its costs; and
- that the rule imposes the least burdensome requirement that prevents or adequately reduces the risk of injury.

Id. 2058(f)(3). The final regulatory analysis must include:

- a description of the potential benefits and costs of the rule, including benefits and costs that cannot be quantified, and those likely to receive the benefits and bear the costs;
- a description of alternatives to the final rule that the Commission considered, a summary description of their potential benefits and costs, and a brief explanation of the reason the alternatives were not chosen; and
- a summary of any significant issues raised by commenters in response to the preliminary regulatory analysis, and a summary of the Commission's assessment of those issues.

Id. 2058(f)(2).

B. Stockpiling

Section 9(g)(2) of the CPSA allows the Commission to prohibit manufacturers of a consumer product from stockpiling products subject to a consumer product safety rule to prevent manufacturers from circumventing the purpose of the rule. 15 U.S.C. 2058(g)(2). The statute defines ''stockpiling'' as manufacturing or importing a product between the date a rule is promulgated and its effective date at a rate that is significantly greater than the rate at which the product was produced or imported during a base period ending before the date the rule was promulgated. *Id.* The Commission is to define what constitutes a ''significantly greater'' rate and the base period in the rule addressing stockpiling. *Id.*

C. Performance and Technical Data

Section 27(e) of the CPSA authorizes the Commission to issue a rule to require manufacturers of consumer products to provide ''such performance and technical data related to performance and safety as may be required to carry out the purposes of [the CPSA].'' *Id.* 2076(e). The Commission may require manufacturers to provide this information to the Commission or, at the time of original purchase, to prospective purchasers and the first purchaser for purposes other than resale, as necessary to carry out the purposes of the CPSA. *Id.* Section 2(b) of the CPSA states the purposes of the CPSA, including:

- protecting the public from unreasonable risks of injury associated with consumer products; and
- assisting consumers in evaluating the comparative safety of consumer products.

Id. 2051(b)(1), (b)(2).

III. The Product and Market

A. Description of the Product

This rule defines a ''CSU'' as a consumer product that is a freestanding furniture item, with drawer(s) and/or door(s), that may be reasonably expected to be used for storing clothing, that is designed to be configured to greater than or equal to 27 inches in height, has a mass greater than or equal to 57 pounds with all extendable elements filled with at least 8.5 pounds/cubic foot times their functional volume, and that has a total functional volume of the closed storage greater than 1.3 cubic feet and greater than the sum of the total functional volume of the open storage and the total volume of the open space. Definitions of many of the terms used in this definition are provided in the rule. Common names for CSUs include, but are not limited to: chests, bureaus, dressers, armoires, wardrobes, chests of drawers, drawer chests, chifforobes, and door chests. CSUs are available in a variety of designs (*e.g.,* vertical or horizontal dressers), sizes (*e.g.,* weights and heights), dimensions, and materials (*e.g.,* wood, plastic, leather, manufactured wood or fiber board). Consumers may purchase CSUs that have been assembled by the manufacturer, or they may purchase CSUs as ready-to-assemble (RTA) furniture.

The CSU definition includes several criteria to help distinguish CSUs from other furniture. Details regarding these criteria are discussed in section IX. Description of and Basis for the Rule. Key features include that, as freestanding furniture items, CSUs remain upright without needing to be attached to a wall or other structure, when fully assembled and empty, with all extendable elements and doors closed. As such, built-in units are not considered freestanding. In addition, CSUs typically are intended and used for storing clothing and, therefore, they are commonly used in bedrooms. However, consumers may also use CSUs in rooms other than bedrooms and to store items other than clothing in them. For this reason, whether a product is a CSU depends on whether it meets the criteria in the definition, rather than what the name of the product is or the marketed use for the product. The criteria in the definition regarding height and closed storage volume aim to address the utility of a unit for holding multiple clothing items. Some examples of furniture items that, depending on their design, may not meet the criteria

in the definition and, therefore, may not be considered CSUs are: shelving units, office furniture, dining room furniture, laundry hampers, built-in closets, and single-compartment closed rigid boxes (storage chests).

CSUs may be marketed, packaged, or displayed as intended for children 12 years old and younger. Examples of such products include CSUs with pictures or designs on them that would appeal to children; CSU designs that would be useful for children; or CSUs that are part of a matching set with a crib, or similar infant product. However, CSUs are more commonly general-use products that are not specifically intended for children 12 years old and younger. This rule applies to both children's products and non-children's products.

B. The Market [12]

Retail prices of CSUs vary substantially. The least expensive units retail for less than $100, while more expensive units may retail for several thousand dollars. Based on information provided by large furniture associations during the NPR comment period, the estimated average price of a CSU is approximately $338.

CPSC staff used multiple sources of information to estimate annual revenues from CSU sales. Considering U.S. Census Bureau estimates of retail sales by industry classification, revenue estimates for retail sales from furniture stores, and estimates of the portion of furniture sales that consist of CSUs that fall within the scope of this rule, CPSC estimates that retail sales of CSUs in 2021 totaled approximately $6.99 billion.

Based on the estimated retail sales revenue of $6.99 billion in 2021, and the average estimated CSU price of approximately $338, CPSC estimated that there were approximately 20.64 million units sold in 2021. On average, CPSC assumes that there are approximately 10,000 individual CSUs of each model that are sold. Accordingly, staff estimates that there were 2,064 different models of CSUs sold in 2021.

CPSC also estimated the number of CSUs in use, based on historic sales estimates and statistical distribution of CSU failure rates, and adjusted these estimates iteratively to reflect the decreasing number of CSUs that would remain in use over time. Based on this information, CPSC estimates that the average lifecycle of a CSU is 15 years, that there were approximately 229.94 million CSUs that were in use in 2021, and that there were approximately 6,365 different models of CSUs that were in use in 2021.

IV. Risk of Injury

A. Incident Data [13]

For the NPR, CPSC staff analyzed reported fatalities, reported nonfatal incidents and injuries, and calculated national estimates of injuries treated in U.S. hospital emergency departments (EDs) that were associated with CSU instability or tip overs. For this final rule, staff updated the analysis to include information CPSC received after staff prepared the NPR briefing package. These updates include new incidents (that occurred during or after the time frames included in the NPR) as well as recharacterizations of incidents that were included in the NPR, when warranted by new information.

Each year, CPSC issues an annual report on furniture instability and tip overs.[14] The information provided for this rulemaking is drawn from a subset of data from those annual reports, as well as from the National Electronic Injury Surveillance System [15] (NEISS), which includes reports of injuries treated in EDs, and the Consumer Product Safety Risk Management System [16] (CPSRMS). For this rulemaking, staff focused on incidents that involved products that would be considered CSUs.[17] Staff considered incidents that involved the CSU tipping over, as well as incidents of CSU instability with indications of impending tip over. Tip-over incidents are a subset of product instability incidents, and involve CSUs actually falling over. Product instability incidents are a broader category that includes tip-over incidents, but may also include incidents where CSUs did not fully tip over. Staff considered instability incidents relevant because product instability can lead to a tip over, and the same factors can contribute to instability and tip overs.[18]

Staff used the same information sources and inclusion criteria as the NPR for the updated information. These data represent the minimum number of incidents or fatalities during the time frames described. Data collection is ongoing for CPSRMS and is considered incomplete for 2020 and after; CPSC may receive additional reports for those years in the future.[19]

1. Fatal Incidents

Based on NEISS and CPSRMS, CPSC staff identified 199 reported CSU tip-over fatalities to children (*i.e.,* under 18 years old), 11 reported fatalities to adults (*i.e.,* ages 18 through 64 years), and 24 reported fatalities to seniors (*i.e.,* ages 65 years and older) that were reported to have occurred between January 1, 2000 and April 30, 2022.[20] Of the 199 reported CSU tip-over child fatalities, 95 (48 percent) involved only a CSU (with no television) [21] tipping over. Of the child fatalities, 196 (98 percent) involved a chest, bureau, or dresser; 2 involved a wardrobe; and 1 involved an armoire. Of the 35 reported adult and senior fatalities, 34 (97 percent) involved only a CSU tipping over. Of the adult and senior fatalities, 31 (89 percent) involved a chest, bureau, or dresser; 2 involved a wardrobe; 1 involved an armoire; and 1 involved a portable storage closet.

For the years for which reporting is considered complete—2000 through

[12] For more details about market information, see Tab H of the final rule briefing package.

[13] For details about incident data, see Tab A of the NPR and final rule briefing packages.

[14] These annual reports are available at: *https://www.cpsc.gov/Research--Statistics/Furniture-and-Decor-1.*

[15] Data from NEISS is based on a nationally representative probability sample of about 100 hospitals in the United States and its territories. NEISS data can be accessed from the CPSC website under the ''Access NEISS'' link at: *https://www.cpsc.gov/Research--Statistics/NEISS-Injury-Data.*

[16] CPSRMS is the epidemiological database that houses all anecdotal reports of incidents received by CPSC, ''external cause''-based death certificates purchased by CPSC, all in-depth investigations (IDI) of these anecdotal reports, as well as investigations of select NEISS injuries. Examples of documents in CPSRMS include: hotline reports, internet reports, news reports, medical examiner's reports, death certificates, retailer/manufacturer reports, and documents sent by state/local authorities, among others.

[17] Staff considered incidents that involved chests, bureaus, dressers, armoires, wardrobes, portable clothes lockers, and portable closets.

[18] This preamble refers to tip-over incidents and instability incidents collectively as tip-over incidents.

[19] Among other things, CPSRMS houses all IDI reports, as well as the follow-up investigations of select NEISS injuries. As such, it is possible for a NEISS injury case to be included in the national injury estimate, while its investigation report is counted among the anecdotal nonfatal incidents, or for a NEISS injury case to appear on both the NEISS injury estimate and fatalities, if the incident resulted in death while receiving treatment.

[20] Different time frames are presented for NEISS, CPSRMS, fatal, and nonfatal data because of the timeframes in which staff collected, received, retrieved, and analyzed the data. One reason for varied timeframes is that staff drew data from previous annual reports and other data-collection reports (which used varied start dates), and then updated the data set to include more recent data. Another reason is that CPSRMS data are available on an ongoing basis, whereas NEISS data are not available until several months after the end of the previous calendar year.

[21] Although televisions are involved in CSU tip overs, this rule does not focus on television involvement because, in recent years, there has been a decline in CSU tip-over incidents that involve televisions and nearly all television incidents involved a box or cathode ray tube television, which are no longer common.

2019—there have been from 2 to 21 child fatalities each year from CSU tip overs, and from 0 to 5 fatalities each year to adults and seniors. Although reporting is considered incomplete for 2020 and later years, CPSC is already aware of 1 child fatality in 2020 and 5 child fatalities in 2021 associated with CSU tip overs without televisions.

Of the 199 reported child fatalities from tip overs, 171 involved children 3 years old or younger; 12 involved 4-year-olds; 7 involved 5-year-olds; 4 involved 6-year-olds; 2 involved 7-year-olds; and 3 involved 8-year-olds. Therefore, most reported CSU tip-over fatalities involved children 3 years old or younger.

CSU tip-over fatalities to children were most commonly caused by torso injuries when only a CSU was involved, and were more commonly caused by head injuries when both a CSU and television tipped over. For the 95 child fatalities not involving a television, 60 resulted from torso injuries (chest compression); 14 resulted from head/torso injuries; 12 resulted from head injuries; 6 involved unknown injuries; and 3 involved a child's head, torso, and limbs pinned under the CSU. For the 104 child fatalities that involved both a CSU and television tipping over, 91 resulted from head injuries (blunt head trauma); 6 resulted from torso injuries (chest compression resulting from the child being pinned under the CSU); 4 involved unknown injuries; 2 resulted from head/torso injuries; and 1 involved head/torso/limbs.

2. Reported Nonfatal Incidents

CPSC staff identified 1,154 nonfatal CSU tip-over incidents for all ages that were reported to have occurred between January 1, 2005 and April 30, 2022. CPSRMS reports are considered anecdotal because, unlike NEISS data, they cannot be used to identify statistical estimates or year-to-year trend analysis, and because they include reports of incidents in which no injury resulted. Although these anecdotal data do not provide for statistical analyses, they provide detailed information to identify hazard patterns, and provide a minimum count of injuries and deaths.

Of the 1,154 reported incidents, 67 percent (776 incidents) involved only a CSU, and 33 percent (378 incidents) involved both a CSU and television tipping over. Of the 1,154 incidents, 99.5 percent (1,148 incidents) involved a chest, bureau, or dresser; less than 1 percent (5 incidents) involved an armoire; and less than 1 percent (1 incident) involved a wardrobe.

For the years for which reporting is considered complete—2005 through 2019—there were from 6 to 260 reported nonfatal CSU tip-over incidents each year, with 2016 (260 incidents), 2017 (103 incidents), and 2018 (92 incidents) reporting the highest number of incidents.

Of the 1,154 nonfatal CSU tip-over incidents reported, 423 did not mention any specific injuries; 719 reported one injury; and 12 reported two injuries, resulting in a total of 743 injuries reported among all of the reported nonfatal incidents. Of these 743 reported injuries, 67 (9 percent) resulted in hospital admission; 318 (43 percent) were treated in EDs; 36 (5 percent) were seen by medical professionals; and the level of care is unknown [22] for the remaining 322 (43 percent).

Of the victims whose ages were known, there were far more injuries suffered by children 3 years old and younger than to older victims and the injuries suffered by these young children tended to be more severe, compared to older children and adults/seniors, as indicated by hospital admission and ED treatment rates.

3. National Estimates of ED-Treated Injuries [23]

According to NEISS, there were an estimated 84,100 injuries,[24] for an annual average of 5,300 estimated injuries, related to CSU tip overs for all ages that were treated in U.S. hospital EDs from January 1, 2006 to December 31, 2021. Of the estimated 84,100 injuries, 60,100 (72 percent) were to children, which is an annual average of 3,800 estimated injuries to children over the 16-year period.

For all ages, an estimated 82,600 (98 percent) of the ED-treated injuries involved a chest, bureau, or dresser. Similarly, for child injuries, an estimated 59,500 (99 percent) involved a chest, bureau, or dresser.[25] Of the ED-treated injuries to all ages, 92 percent were treated and released, and 4 percent were hospitalized. Among children, 93 percent were treated and released, and 3 percent were hospitalized.

For each year from 2006 through 2021, there were an estimated 1,800 to 5,900 ED-treated injuries to children from CSU tip overs. The estimated annual number of ED-treated injuries to adults and seniors from CSU tip overs is fairly consistent over most of the 16-year period, with an overall yearly average of 1,500 estimated injuries, although data were insufficient to support reliable statistical estimates for adults and seniors for 2014, 2015, 2019, and 2020.[26]

Of the estimated ED-treated injuries to children, most involved 2- and 3-year-olds, followed by 1- and 4-year-olds. An estimated 8,500 ED-treated injuries involved 1-year-olds; an estimated 15,700 involved 2-year-olds; an estimated 14,000 involved 3-year-olds; and an estimated 7,900 involved 4-year-olds. There were an estimated 2,600 injuries to 5-year-olds that involved only a CSU, and an estimated 1,900 injuries to 6-year-olds that involved only a CSU, but data were insufficient to support reliable statistical estimates for incidents involving CSUs and televisions for these ages. For children 7 to 17 years old,[27] there were an estimated 6,800 ED-treated injuries.

Of an estimated 60,100 ED-treated CSU tip-over injuries to children, an estimated 22,000 (37 percent) resulted in contusions/abrasions; an estimated 15,900 (26 percent) resulted in internal organ injury (including closed head injuries); an estimated 8,300 (13 percent) resulted in lacerations; an estimated 5,500 (9 percent) resulted in fractures; and the remaining estimated 8,400 (14 percent) resulted in other diagnoses.

Overall, an estimated 35,800 (60 percent) of ED-treated tip-over injuries to children were to the head, neck, or face; and an estimated 11,000 (18 percent) were to the leg, foot, or toe. The injuries to children were more likely to be head injuries when a television was involved than when no television was involved. Of the estimated number of ED-treated injuries to children involving a CSU and a television, 74 percent were head injuries, compared to 54 percent of injuries involving only a CSU. Of the

[22] These reports include bruising, bumps on the head, cuts, lacerations, scratches, application of first-aid, or other indications of at least a minor injury that occurred, without any mention of aid rendered by a medical professional. There were three NEISS cases in which the victim went to the ED, but then left without being seen.

[23] Estimates are rounded to the nearest hundred and may not sum to total, due to rounding. NEISS estimates are reportable when the sample count is greater than 20, the national estimate is 1,200 or greater, and the coefficient of variation (CV) is less than 0.33.

[24] Sample size = 2,869, coefficient of variation = .0638.

[25] Data on armoires, wardrobes, portable closets, and clothes lockers were insufficient to support reliable statistical estimates.

[26] Consistent with the NPR, for 2012 through 2021, there was a statistically significant linear decline in child injuries involving all CSUs (including televisions). Unlike in the NPR, there was also a statistically significant linear decline in injuries to children involving CSU-only tip overs for 2012 through 2021. Nevertheless, data indicate that substantial numbers of child injuries and fatalities continue to result from CSU tip overs.

[27] These ages are grouped together because data were insufficient to generate estimates for any single age within that range.

estimated injuries to children involving only a CSU, 20 percent were leg, foot, or toe injuries, and 14 percent were trunk or torso injuries. Data were insufficient to generate estimates of trunk/torso or arm/hand/finger injuries when both a CSU and television tipped over.

B. Details Concerning Injuries [28]

To assess the types of injuries that result from CSU tip overs, CPSC staff focused on incidents involving children, because the vast majority of CSU tip overs involve children. The types of injuries resulting from furniture tipping over onto children include soft tissue injuries, such as cuts and bruises (usually a sign of internal bleeding); skeletal injuries and bone fractures to arms, legs, and ribs; and potentially fatal injuries resulting from skull fractures, closed-head injuries, compressional and mechanical asphyxia, and internal organ crushing leading to hemorrhage. These types of injuries can result from tip overs involving CSUs alone, or CSUs with televisions.

As explained above, head injuries and torso injuries are common in CSU tip overs involving children. The severity of injuries depends on a variety of factors, but primary determinants include the force generated at the point of impact, the entrapment time, and the body part impacted. The head, neck, and chest are the most vulnerable. The severity of injury can also depend on the orientation of the child's body or body part when it is hit or trapped by the CSU. Sustained application of a force that affects breathing can lead to compressional asphyxia and death. In most CSU tip-over cases, serious injuries and death are a result of blunt force trauma to the head and intense pressure on the chest causing respiratory and circulatory system impairment.

Head injuries are produced by high-impact forces applied over a small area and can have serious clinical consequences, such as concussions and facial nerve damage. Such injuries are often fatal, even in cases where the child is immediately rescued and there is rapid intervention. An incident involving blunt head trauma can result in immediate death or loss of consciousness. Autopsies from CSU tip-over fatalities to children reported crushing injuries to the skull and regions of the eye and nose. Brain swelling, deep scalp hemorrhaging, traumatic intracranial bleeding, and subdural hematomas were often reported. These types of injuries are typical of crush injuries caused by blunt head trauma and often have a fatal outcome. Children who survive such injuries may suffer neurological deficits, require neurosurgical interventions, and can face lifelong disabilities.

Compressional and mechanical asphyxia is another potential cause of injury and death in CSU tip-over incidents. Asphyxia can be fatal within minutes. In multiple CSU tip-over incidents, there was physical evidence of chest compression visible as linear marks or abrasions across the chest and neck, consistent with the position of the CSU. Compressional and mechanical asphyxia can result from mechanical forces generated by the sheer mass of an unyielding object, such as furniture, acting on the thoracic and abdominal area of the body, which prevents thorax expansion and physically interferes with the coordinated diaphragm and chest muscle movement that normally occurs during breathing. Torso injuries, which include compressional and mechanical asphyxia, are the most common form of injury for non-television CSU fatalities. External pressure on the chest that compromises the ability to breathe by restricting respiratory movement or on the neck can cause oxygen deprivation (hypoxia). Oxygen deprivation to the brain can cause unconsciousness in less than three minutes and may result in permanent brain damage or death when pressure is applied directly on the neck by the CSU or a component of the CSU (such as the edge of a drawer). The prognosis for a hypoxic victim depends on the degree of oxygen deprivation, the duration of unconsciousness, and the speed at which cardiovascular resuscitation attempts are initiated relative to the timing of cardiopulmonary arrest. Rapid reversal of the hypoxic state is essential to prevent or limit the development of pulmonary and cerebral edema that can lead to death or other serious consequences. The sooner the CSU (compression force) is removed and resuscitation initiated, the greater the likelihood that the patient will regain consciousness and recover from injuries.

In addition to chest compression, pressure on the neck by a component of the CSU can also result in rapid strangulation due to pressure on the blood vessels in the neck. The blood vessels that take blood to and from the brain are relatively unprotected in the soft tissues of the neck and are vulnerable to external forces. Sustained compression of either the jugular veins or the carotid arteries can lead to death. Petechial hemorrhages of the head, neck, chest, and the periorbital area were reported in autopsy reports of CSU tip-over incidents.

Pediatric thoracic trauma has unique features that differ from adult thoracic trauma, because of differences in size, structure, posture, and muscle tone. While the elasticity of a child's chest wall reduces the likelihood of rib fracture, it also provides less protection from external forces. Impact to the thorax of an infant or small child can produce significant chest wall deflection and transfer large kinetic energy forces to vital thoracic organs such as the lungs and heart, which can cause organ deflection and distention and lead to traumatic asphyxia, or respiratory and circulatory system impairment or failure. In addition, a relatively small blood volume loss in a child, due to internal organ injuries and bleeding, can lead to decreased blood circulation and shock.

The severity of the injury or likelihood of death can be reduced if a child is quickly rescued. However, children's ability to self-rescue is limited because of their limited cognitive awareness of hazards, limited skills to react quickly, and limited strength to remove the fallen CSU. Moreover, many injuries can result in immediate death or loss of consciousness, making self-rescue impossible.

C. Hazard Characteristics [29]

To identify hazard patterns associated with CSU tip overs, CPSC focused on incidents involving children and CSUs without televisions because the majority of fatal and nonfatal incidents involve children and, in recent years, there was a statistically significant decrease in the number of ED-treated CSU tip-over incidents that appeared to be driven by a decline in tip overs involving CSUs with televisions. Staff used NEISS and CPSRMS reports to identify hazard patterns, including IDI reports, and also considered child development and capabilities, as well as online videos of real-life child interactions with CSUs and similar furniture items (including videos of tip-over incidents).

For this final rule, staff updated this analysis to include incident information that CPSC received after staff prepared the NPR briefing package. This update is consistent with the new incident information included in the analysis in section IV. Risk of Injury, although the totals in this section may be lower than

[28] For details about injuries, see Tab B of the NPR and final rule briefing packages.

[29] For additional information about hazard patterns, see Tab C of the NPR and final rule briefing packages.

those above. This is, in part, because this section focuses only on incidents involving children and no television. This is also because this section aims to assess hazard characteristics associated with tip overs resulting from child interactions; as such, for this assessment, staff did not focus on incidents in which there was no indication of a child's interaction leading to the tip over. The new information added to this section since the NPR consists of 6 fatal and 97 nonfatal CPSRMS tip-over incidents and 168 nonfatal NEISS tip-over incidents that involved children and CSUs without televisions. Overall, staff did not identify any new hazard patterns or interaction scenarios in the new data.

1. Filled Drawers

Of the 95 fatal CPSRMS incidents involving children and only CSUs, 56 provided information about whether the CSU drawers contained items at the time of the tip over. Of those 56 incidents, 53 (95 percent) involved partially filled or full drawers. Of the 366 nonfatal CPSRMS tip overs involving children and only CSUs, drawer fill level was reported for 78 incidents. Of these 78 incidents, 70 (90 percent) involved partially filled or full drawers.[30] CPSRMS incidents indicate that most items in the drawers were clothing, although a few mentioned other items along with clothing (*e.g.,* diaper bag, toys, papers).

2. Interactions

Of the 95 fatal CPSRMS tip overs involving children and only a CSU, 49 reported the type of interaction the child had with the CSU at the time of the incident. Of these 49 incidents, the most commonly reported interaction was a child climbing on the CSU (37 incidents or 76 percent); followed by a child sitting, laying or standing in a drawer (8 incidents or 16 percent); and a child opening drawers (4 incidents or 8 percent). Climbing was the most common reported interaction for children 3 years old and younger.

Of the 366 nonfatal CPSRMS tip-over incidents involving children and only CSUs, the type of interaction was reported in 226 incidents. Of these, the most common interaction was opening drawers (123 incidents or 54 percent); followed by climbing on the CSU (59 incidents or 26 percent); and putting items in/taking them out of a drawer (18 incidents or 8 percent). Opening drawers and climbing were also the most common reported interactions for children 3 years old and younger.

Of the 1,630 nonfatal NEISS incidents involving children and only CSUs, the type of interaction was reported in 646 incidents. Of these, the child was injured because of another's interaction with the CSU in 26 incidents; the remaining 620 incidents involved the child interacting with the CSU. Of these 620 incidents, the most common interaction was children climbing on the CSU (475 incidents or 77 percent), followed by opening drawers (49 incidents or 8 percent). For children 3 years old or younger, climbing constituted 80 percent of reported interactions.

Thus, in fatal incidents, a child climbing on the CSU was, by far, the most common reported interaction; and in nonfatal incidents, opening drawers and climbing were the most common reported interactions. These interactions are examined further, below.

To learn more about children's interactions with CSUs during tip-over incidents, CPSC staff also reviewed videos, available from news sources, articles, and online, that involved children interacting with CSUs and similar products, and CSU tip overs. Videos of children climbing on CSUs and similar items show a variety of climbing techniques, including stepping on the top of the drawer face, stepping on drawer knobs, using the area between drawers as a foothold, gripping the top of an upper drawer with their hands, pushing up using the top of a drawer, and using items to help climb. Videos of children in drawers of CSUs and other similar products include children leaning forward and backward out of a drawer; sitting, lying, and standing in a drawer; and bouncing in a drawer. Some videos also show multiple children climbing a CSU or in a drawer simultaneously.

a. Climbing

As discussed above, climbing on the CSU was one of the primary interactions involved in CSU tip overs involving children and only a CSU. It was the most common reported interaction (76 percent) in fatal CPSRMS incidents; it was the most common reported interaction (77 percent) in nonfatal NEISS incidents; and it was the second most common reported interaction (26 percent) in nonfatal CPSRMS incidents. Fatal and nonfatal climbing incidents most often involved children 3 years old and younger.

The prevalence of children climbing during CSU tip overs is consistent with the expected motor development of children. Between approximately 1 and 2 years old, children can climb on and off of furniture without assistance, use climbers, and begin to use playground apparatuses independently; and 2-year-olds commonly climb. The University of Michigan Transportation Research Institute (UMTRI) focus groups on child climbing (the UMTRI study is described in section VII. Technical Analysis Supporting the Rule demonstrated these abilities, with child participants showing interest in climbing CSUs and other furniture.

b. Opening Drawers

Opening the drawers of a CSU also was a common interaction in CSU tip overs involving children and only a CSU. It was the most common reported interaction (54 percent) in nonfatal CPSRMS incidents; it was the second most common reported interaction (8 percent) in nonfatal NEISS incidents; and it was the third most common reported interaction (8 percent) in fatal CPSRMS incidents.

In fatal CPSRMS incidents, opening drawer interactions most commonly involved children 2 years old and younger. Nonfatal CPSRMS incidents with opening drawers most commonly involved 3-year-olds, followed by 2-year-olds, then 5-year-olds, then 4-year-olds, then 6-year-olds, then children under 2 years old. Nonfatal NEISS incidents with opening drawers most commonly involved 3-year-olds, followed by 2-year-olds, then 4-year-olds, then children under 2 years old.

Children of all ages were able to open at least one drawer and incident data indicates that children commonly were able to open multiple drawers. For the NPR data set, looking at both fatal and nonfatal CPSRMS tip overs involving children and only CSUs, where the interaction involved opening drawers, overall, about 53 percent involved children opening one drawer; 10 percent involved opening two drawers; and almost 17 percent involved opening ''multiple'' drawers. In 23 incidents, children opened ''all'' of the drawers and it is possible that additional incidents, mentioning a specific number of open drawers (between 2 and 8), also involved all the drawers being opened. In incidents where all of the drawers were open, the CSUs ranged from 2-drawer to 8-drawer units. The youngest child reported to have opened all drawers was 13 months old.

For the 6 new fatal and 97 new nonfatal CPSRMS incidents identified after the NPR data set, the fatal incidents did not report the number of open drawers, but 30 of the nonfatal incidents reported information about the number of open drawers. Of these 30

[30] Nonfatal NEISS incident reports did not contain information on drawer fill level or contents.

incidents, 1 had no drawers open; 11 involved 1 open drawer; 7 involved half or fewer of the drawers open; 1 involved more than half of the drawers open; 7 involved all of the drawers open; and 3 involved multiple open drawers without specifying the number or proportion. Consistent with these incident data, the UMTRI child climbing study found that caregivers commonly reported that their children opened and closed drawers when interacting with furniture.

It is possible for CSUs to tip over from the forces generated by open drawers and their contents, alone, without additional interaction forces. However, pulling on a drawer to open it can apply increased force that contributes to instability. Once a drawer is fully opened, any additional pulling is on the CSU as a whole. The pull force, and the height of the drawer pull location, relative to the floor, are relevant considerations. To examine this factor, staff assessed 15 child incidents in which the height of the force application could be calculated based on descriptions of the incidents. Force application heights ranged from less than one foot to almost four feet (46.5 inches), and children pulled on the lowest, highest, and drawers in between.

c. Opening Drawers and Climbing Simultaneously

CPSC staff also examined incidents in which both climbing and open drawers occurred simultaneously using the NPR data set. Of the 35 fatal CPSRMS climbing incidents, 13 reported the number of drawers open. In all of these incidents, the reported number of drawers open was 1, although, based on further analysis, the number of open drawers could be as high as 8 in one incident.[31] Of the 32 nonfatal CPSRMS climbing incidents, 15 gave some indication of the number of open drawers. Of these, 7 reported that one drawer was open; 2 reported that half or less of the drawers were open; 4 reported that multiple drawers were open; and 2 reported that all the drawers were open. In the 2 cases where all drawers were open, the children were 3 and 4 years old. Of the 412 climbing incidents in the nonfatal NEISS data, 28 gave some indication of the number of open drawers. Of these, 11 reported that one drawer was open; 12 reported that multiple drawers were open; 1 reported that two drawers were open; and 2 reported that all drawers were open. These data are consistent with the videos staff reviewed, which show a range of drawer positions when children climbed on units, including all drawers closed, one drawer open, multiple drawers open, and all drawers fully open.

Incidents involving CSUs with doors also indicate that children are able to open the doors at which point they can further interact with the CSU, such as through climbing. Using the NPR data set, staff found two fatal CPSRMS and four nonfatal CPSRMS tip-over incidents involving wardrobes and armoires, which include doors. In one of the fatal incidents, the victim was found inside a wardrobe that had two doors and one drawer, suggesting that the child opened the doors of the wardrobe. In the other fatal incident, the victim was found under a two-door wardrobe. In most of the nonfatal incidents involving wardrobes or armoires, children were reportedly interacting with items inside the unit, which would require them to open the doors. The ages of the children in these incidents ranged from 3 to 11 years, although opening doors is easily within the physical and cognitive abilities of younger children.

These incidents indicate that children can and do open CSU doors, at which point it is reasonable to conclude, based on child capabilities and climbing behavior in other incidents, that children would put their body weight on the door (*i.e.,* climb) or other extendable elements behind the doors, such as drawers.

d. Differences in Interactions by Age

Based on the incident data, children 3 years old and younger climb, open drawers without climbing, get items in and out of drawers, lean on open drawers, push down on open drawers, sit or lie in bottom drawers, or stand on open bottom drawers. Among fatal CPSRMS tip-over incidents involving children and only CSUs, climbing was the most common interaction for children 3 years old and younger; this drops off sharply for 4-year-olds. Among nonfatal CPSRMS tip-over incidents involving children and only CSUs, opening drawers was, by far, the most common interaction for children 7 years old and younger; and climbing was also common among 3-year-olds and, to a lesser extent, among 2- and 4-year-olds. Among nonfatal NEISS tip overs involving children and only CSUs, climbing was common for 2- and 3-year-olds, slightly less common for 4-year-olds and children under 2 years, and dropped off further for children 5 years and older.

3. Flooring

Of the 95 fatal CPSRMS tip overs involving children and only CSUs, the type of flooring under the CSU was reported for 58 incidents. Of these, 47 (81 percent) involved carpeting, which includes rugs; 9 (15 percent) involved wood, hardwood, or laminate wood flooring; and 2 (3 percent) involved tile or linoleum flooring. The reports for 32 of the fatal CPSRMS tip-over incidents involving carpet included photos with visible carpet. All carpet in these pictures appeared to be typical wall-to-wall carpeting. Four appeared to be a looped pile carpet, and 28 appeared to be cut pile. Staff also identified 2 incidents with reported ''shag'' carpeting, including 1 fatal incident. Staff found one report mentioning a rug, although the thickness of the rug is unknown.

Of the 366 nonfatal CPSRMS tip overs involving children and only CSUs, the type of flooring under the CSU was reported for 91 incidents. Of these, 67 (74 percent) involved carpeting, which includes rugs; 21 (23 percent) involved wood, hardwood, or laminate wood flooring; 2 (2 percent) involved tile or linoleum flooring; and 1 (1 percent) indicated that the front legs of the CSU were on carpet while the back legs were on wood flooring.[32]

Thus, for incidents where flooring type was reported, carpet was, by far, the most prevalent flooring type.

4. Characteristics of Children in Tip-Over Incidents

a. Age of Children

Children in fatal CPSRMS tip-over incidents involving only CSUs were 11 months through 7 years old. A total of 36 fatal incidents involved children under 2 years old; 31 involved 2-year-old children; 22 involved 3-year-olds; 2 involved 4-year-olds; 1 incident involved a 5-year old; 1 incident involved a 6-year old; and 2 incidents involved 7-year-olds. Overall, 94 percent of children in fatal CPSRMS incidents involving only CSUs were 3 years old or younger.

Among the nonfatal CPSRMS tip-over incidents involving children and only CSUs where age was reported, 3-year-olds were involved in the highest number of incidents (68 incidents), followed by 2-year-olds (62 incidents).

Nonfatal NEISS tip-over incidents involving children and only CSUs follow a similar distribution, with the highest number of reported incidents involving 2-year-olds (430 incidents),

[31] CPSC staff analysis suggests that 7 or more drawers of an 8-drawer unit were open and the child was in a drawer leaning out over the edge in a fatal incident. This analysis is described in Tab M of the NPR briefing package, as Model E.

[32] Flooring type was not reported in nonfatal NEISS incident reports.

followed by 3-year-olds (367 incidents), and children less than 2 years (282 incidents). Overall, 66 percent (1,079 of 1,630) of children involved in these incidents were 3 years old or younger.

b. Weight of Children

Among the 95 fatal CPSRMS tip-over incidents involving children and CSUs without televisions, the child's weight was reported in 49 incidents and ranged from 18 pounds to 45 pounds. Where weight was not reported, staff used the most recent Centers for Disease Control and Prevention (CDC) Anthropometric Reference to estimate the weight of the children.[33] Staff used the 50th percentile values of weight that correspond to the victims' ages to estimate the weight range of the children. For the remaining 46 fatal CPSRMS incidents without a reported weight, the estimated weight range was 19.6 pounds to 57.7 pounds.

Among the 366 nonfatal CPSRMS incidents involving children and only CSUs, the weights of 60 children were reported, ranging from 20 pounds to 125 pounds. Where it was not reported, staff again estimated the weight of the children using the 50th percentile values of weight that correspond to the victims' ages from the most recent CDC Anthropometric Reference. The estimated child weights for the 195 nonfatal CPSRMS incidents without a reported child weight, but with a reported age (which included a 17-year-old), ranged from 19.6 pounds to 158.9 pounds.

Although nonfatal NEISS incident data did not include the children's weights, staff again estimated the children's weights by age, determining that for tip overs involving only CSUs, the estimated weights of the children ranged from 15.8 pounds to 158.9 pounds (this covered children from 3 months to 17 years old).

Overall, the mean reported children's weight for CPSRMS incidents was 34.7 pounds and the median was 32.0 pounds; the mean estimated children's weight was 38.7 pounds and the median was 32.8 pounds. For nonfatal NEISS incidents, the mean estimated children's weight was 40.1 pounds and the median was 32.8 pounds.

The weight of a child is particularly relevant for climbing incidents because weight is a factor in determining the force a child generates when climbing. For this reason, in the NPR, CPSC staff looked at the weights of children involved in climbing incidents, specifically. Of the 35 fatal CPSRMS child climbing incidents, the weight of the child was reported for 23 incidents, and ranged from 21.5 to 45 pounds. For the remaining 12 climbing incidents in which the child's weight was not reported, CPSC staff estimated their weights, based on age, and the weights ranged from 23.8 to 39 pounds. New fatal incidents CPSC identified since the NPR data set involved 2 additional climbing incidents, one of which involved a 29-pound child and the other involved a 31-pound child.

For the NPR data set, of the 32 nonfatal CPSRMS child climbing incidents, the weight of the child was reported in 8 incidents, and ranged from 26 to 80 pounds. For the remaining 24 incidents, staff estimated the weights based on age, and the weights ranged from 25.2 to 45.1 pounds. Weight was not reported in the nonfatal NEISS data, however, using the ages of the children in the 412 nonfatal NEISS child climbing incidents (9 months to 13 years old), staff estimates that their weights ranged from 19.6 to 122 pounds.

V. Relevant Existing Standards[34]

In the United States, the primary voluntary standard that addresses CSU stability is ASTM F2057–19, *Standard Consumer Safety Specification for Clothing Storage Units.* In addition, CPSC staff identified three international consumer safety standards and one domestic standard that are relevant to CSUs:

- AS/NZS 4935: 2009, the Australian/New Zealand Standard for *Domestic furniture—Freestanding chests of drawers, wardrobes and bookshelves/bookcases—determination of stability;*
- ISO 7171 (2019), the International Organization for Standardization *International Standard for Furniture—Storage Units—Determination of stability;*
- EN14749 (2016), the European Standard, *European Standard for Domestic and kitchen storage units and worktops—Safety requirements and test methods;* and
- ANSI/BIFMA X6.5–2022, *Home Office and Occasional-Use Desk, Table and Storage Products.*[35]

This section describes these standards and provides CPSC staff's assessment of their adequacy to address CSU tip-over injuries and deaths.

A. ASTM F2057–19

ASTM first approved and published ASTM F2057 in 2000 and has since revised the standard seven times. The current version, ASTM F2057–19, was approved on August 1, 2019, and published in August 2019. ASTM Subcommittee F15.42, Furniture Safety, is responsible for this standard. Since the first publication of ASTM F2057, CPSC staff has participated in the F15.42 subcommittee and task group meetings and worked with ASTM to improve the standard. In recent years, ASTM Subcommittee F15.42 has discussed and balloted changes to ASTM F2057–19. However, ASTM has not updated the standard.

1. Scope

ASTM F2057–19 states that it is intended to reduce child injuries and deaths from hazards associated with CSUs tipping over and aims ''to cover children up to and including age five.'' The standard covers CSUs that are 27 inches or more in height, freestanding, and defines CSUs as: ''furniture item[s] with drawers and/or hinged doors intended for the storage of clothing typical with bedroom furniture.'' Examples of CSUs provided in the standard include: chests, chests of drawers, drawer chests, armoires, chifforobes, bureaus, door chests, and dressers. The standard does not cover ''shelving units, such as bookcases or entertainment furniture, office furniture, dining room furniture, underbed drawer storage units, occasional/accent furniture not intended for bedroom use, laundry storage/sorting units, nightstands, or built-in units intended to be permanently attached to the building, nor does it cover 'Clothing Storage Chests' as defined in Consumer Safety Specification F2598.''

2. Stability Requirements

ASTM F2057–19 includes two performance requirements for stability. The first is in section 7.1 of the standard, *Stability of Unloaded Unit.* This test consists of placing an empty CSU on a hard, level, flat surface; opening all doors (if any); and extending

[33] Fryar, C.D., Carroll, M.D., Gu, Q., Afful, J., Ogden, C.L. (2021). Anthropometric reference data for children and adults: United States, 2015–2018. National Center for Health Statistics. Vital Health Stat 3(46). The CDC Anthropometric Reference is based on a nationally representative sample of the U.S. population, and the 2021 version is based on data collected from 2015 through 2018. CPSC staff uses the CDC Anthropometric Reference, rather than the CDC Growth Chart, because it is more recently collected data and because the data are aggregated by year of age, allowing for estimates by year. CDC growth charts are available at: *https://www.cdc.gov/growthcharts/clinical_charts.htm.*

[34] For additional information about relevant existing standards, see Tabs C, D, F, and N of the NPR briefing package, and Tab F of the final rule briefing package.

[35] The NPR discussed ANSI/SOHO S6.5–2008 (R2013), *Small Office/Home Office Furniture—Tests American National Standard for Office Furnishings.* Since the NPR, ANSI updated this standard; the revised version is ANSI/BIFMA X6.5–2022.

all drawers and pull-out shelves to the outstop [36] or, in the absence of an outstop, to two-thirds of the operational sliding length. If the CSU tips over in this configuration, or is supported by any component that was not specifically designed for that purpose, it does not meet the requirement.

The second stability requirement is in section 7.2 of the standard, *Stability with Load.* This test consists of placing an empty CSU on a hard, level, flat surface, and gradually applying a test weight of 50 ± 2 pounds. The test weight is intended to represent the weight of a 5-year-old child. For this test, only one door or drawer is open at a time and the test weight is applied to that open feature. Each drawer or door is tested individually, and all other drawers and doors remain closed. If the CSU tips over in this configuration, or is supported by any component that was not specifically designed for that purpose, it does not meet this requirement.

3. Tip Restraint Requirements

ASTM F2057–19 requires CSUs to include a tip restraint that complies with ASTM F3096–14, *Standard Performance Specification for Tipover Restraint(s) Used with Clothing Storage Unit(s).*[37] ASTM F2057–19 and F3096–14 define a ''tipover restraint'' as a ''supplemental device that aids in the prevention of tip over.'' ASTM F3096–14 provides a test protocol to assess the strength of tip restraints, but does not evaluate the attachment to the wall or CSU. The test method specifies that the tester attach the tip restraint to a fixed structure and apply a 50-pound static load.

4. Labeling Requirements

ASTM F2057–19 requires CSUs to be permanently marked in a conspicuous location with warnings that meet specified content and formatting. The warning statements address the risk of children dying from furniture tip overs; not allowing children to stand, climb, or hang on CSUs; not opening more than one drawer at a time; placing the heaviest items in the bottom drawer; and installing tip restraints. For CSUs that are not intended to hold a television, this is also addressed in the warning. Additionally, units with interlock systems must include a warning not to defeat or remove the interlock system. An interlock system is a device that prevents simultaneous opening of more drawers than intended by the manufacturer (like is common on file cabinets). The standard requires that labels be formatted in accordance with ANSI Z535.4, *American National Standard for Product Safety Signs and Labels.*

The standard also includes a performance requirement and test method for label permanence, which are consistent with requirements in other ASTM juvenile furniture product standards. The warning must be ''in a conspicuous location when in use'' and the back of the unit is not considered conspicuous; the standard does not define ''conspicuous location when in use.''

5. Assessment of Adequacy

The Commission concludes that the stability requirements in ASTM F2057–19 are not adequate to address the CSU tip-over hazard because they do not account for multiple open and filled drawers, carpeted flooring, and dynamic forces generated by children's interactions with the CSU, such as climbing or pulling on a drawer. As discussed earlier in this preamble, these factors are commonly involved in CSU tip-over incidents, often simultaneously; and, as discussed later in this preamble, testing indicates that these factors decrease the stability of CSUs.

Although the test in section 7.1 includes a test with all drawers/doors open, the unit is empty and no additional force is applied during this test. As such, this test does not reflect the added factors of open and filled drawers, even though consumers are likely to open drawers and fill CSUs with clothing; and it does not reflect dynamic forces generated by interactions. In addition, although the test in section 7.2 includes a test with a static weight applied to the top of one open drawer or door, it does not include the added factor of multiple open and filled drawers. Also, the 50-pound weight is intended to represent the static weight of a 5-year-old child and does not reflect the additional moment [38] due to the forces when a child climbs the front of a CSU, even when only considering the forces generated by very young children. As the UMTRI study (described in the NPR and later in this preamble) found, the forces children can exert while climbing a CSU exceed their static weights. Finally, neither test accounts for the effect of carpeting, which is common flooring in homes (particularly in bedrooms), is commonly present in tip-over incidents, and decreases CSU stability. Thus, by testing CSUs with open drawers empty, a 50-pound static weight, and without accounting for the effect of carpeting, ASTM F2057–19 does not reflect real-world use conditions that decrease the stability of CSUs.

Staff also looked at whether CSUs involved in tip-over incidents comply with ASTM F2057–19 because it would give an indication of whether F2057 is effective at preventing tip overs and, by extension, whether it is adequate.[39] Staff updated its analysis from the NPR to account for additional incidents and information identified after the NPR. With these adjustments, staff determined that, of the 95 fatal CPSRMS tip-over incidents involving children and only CSUs, 2 of the CSUs complied with the ASTM F2057–19 stability requirements, 1 CSU met the stability requirements when a test weight at the lower permissible weight range was used, and 11 units did not meet the stability requirements. For the remaining 81 units, staff was unable to determine whether they met the ASTM F2057–19 stability requirements, although staff did determine that an exemplar of one of these CSUs complied with the requirements. With the adjusted information for nonfatal CPSRMS tip-over incidents involving children and only CSUs, staff determined that, of the 361 incidents for which staff assessed the compliance of the CSU, 50 met the ASTM F2057–19 stability requirements, 106 did not, and staff was unable to determine the compliance of the remaining 205 units. The number of CSUs that comply with the stability requirements in ASTM F2057–19, but were involved in tip overs, further demonstrates that the voluntary standard does not adequately reduce the risk of tip overs.

As noted in the NPR, CPSC also has some concerns with the effectiveness of the content in the warning labels required in ASTM F2057–19. For example, the meaning of ''tipover restraint'' may not be clear to consumers, and directing consumers not to open more than one drawer at a time is not consistent with consumer use. In addition, focus group study indicated that consumers had trouble understanding the child climbing symbol required by the standard. CPSC staff also believes that greater clarity about the required placement of the

[36] An outstop is a feature that limits outward motion of drawers or pull-out shelves.

[37] Approved October 1, 2014 and published October 2014.

[38] Moment, or torque, is an engineering term to describe rotational force acting about a pivot point, or fulcrum.

[39] Staff did not assess whether NEISS incidents involved ASTM-compliant CSUs because the reports do not contain specific information about the products.

label would make the warning more effective.[40]

For these reasons, the Commission finds that compliance with ASTM F2057–19 is not likely to adequately reduce the risk of injury associated with CSU tip overs.

6. Compliance With ASTM F2057

CPSC also assessed whether there is adequate compliance with the stability requirements in ASTM F2057–19. In 2016,[41] staff tested 61 CSU samples and found that 50 percent (31 of 61) did not comply with the stability requirements in ASTM F2057.[42] In 2018, CPSC staff assessed a total of 188 CSUs, including 167 CSUs selected from among the best sellers from major retailers, using a random number generator; 4 CSU models that were involved in incidents; [43] and 17 units assessed as part of previous test data provided to CPSC.[44] Of the 188 CSUs, 171 (91 percent) complied with the stability requirements in ASTM F2057. One CSU (0.5 percent) did not comply with the Stability of Unloaded Unit test, and 17 (9 percent) did not meet the Stability with Load test. The unit that did not meet the requirements of the Stability of Unloaded Unit test also did not meet the requirements of the Stability with Load test.

B. AS/NZS 4935: 2009

AS/NZS 4935 is a voluntary standard prepared by Standards Australia's and Standards New Zealand's Joint Technical Committee CS–088/CS–091, Commercial/Domestic Furniture. There is only one version of the standard, the current version AS/NZA 4935:2009, which was approved on behalf of the Council of Standards Australia on August 28, 2009, and on behalf of the Council of Standards New Zealand on October 23, 2009. It was published on November 17, 2009.

1. Scope

AS/NZS 4935 aims to address furniture tip-over hazards to children. It describes test methods for determining the stability of domestic freestanding chests of drawers over 500 mm (19.7 inch) high, freestanding wardrobes over 500 mm high (19.7 inch), and freestanding bookshelves/bookcases over 600 mm (23.6 inch) high. It defines ''chest of drawers'' as containing one or more drawers or other extendible elements and intended for the storage of clothing, and may have one or more doors or shelves. It defines ''wardrobe'' as a furniture item primarily intended for hanging clothing that may also have one or more drawers, doors or other extendible elements, or fixed shelves. It defines bookshelves and bookcases as sets of shelves primarily intended for storing books, and may contain doors, drawers or other extendible elements.

2. Stability Requirements

Similar to ASTM F2057–19, AS/NZS 4935 includes two stability requirements. The first requires the unit, when empty, to not tip over when a 29-kilogram (64-pound) test weight is applied to a single open drawer. The 64-pound test weight is intended to represent the weight of a 5-year-and-11-month-old child, adjusted upward to reflect trends of increasing body mass. The test weight is applied to the top face of a drawer, with the drawer opened to two-thirds of its full extension length. The second test requires the unit not tip over when all of the extension elements are open and the unit is empty. Each drawer or extendible element is open to two-thirds of its extension length, and doors are open perpendicular to the furniture. Units do not pass the stability requirements if they cannot support the test weight, if they tip over, or if they are only prevented from tipping by an extendible element.

3. Tip Restraint Requirements

The standard does not require, but recommends, that tip restraints be included with units, along with attachment instructions.

4. Labeling Requirements

The standard requires a warning label and provides example text that addresses the tip-over hazard. The standard also requires a warning tag with specific text and formatting. The label and tag include statements informing consumers about the hazard, warning of tip overs and resulting injuries, and indicating how to avoid the hazard. These requirements do not address the use of televisions. The standard includes label permanency requirements and mandates that the warning label be placed ''inside of a top drawer within clear view when the drawer is empty and partially opened, or on the inside face of a drawer'' for chests of drawers and wardrobes.

5. Assessment of Adequacy

The Commission concludes that the stability requirements in AS/NZS 4935 are not adequate to address the CSU tip-over hazard because they do not account for multiple open and filled drawers, carpeted flooring, and dynamic forces generated by children's interactions with the CSU, such as climbing or pulling on the top drawer. As discussed in this preamble, these factors are commonly involved in CSU tip-over incidents and testing indicates that they decrease the stability of CSUs.

AS/NZS 4935 requires drawer extension to only two-thirds of extension length for both stability tests. This partial extension does not represent real-world use because children are able to open drawers fully, incidents involve fully open drawers, and opening a drawer further decreases the stability of a CSU. In addition, it does not account for filled drawers, which are expected during real-world use, are common in tip-over incidents, and contribute to instability when multiple drawers are open. It also does not account for carpeted floors, which are common in incidents and contribute to instability. Although AS/NZS 4935 uses a heavier test weight than ASTM F2057–19, it is inadequate because neither stability test accounts for the moments children can exert on CSUs during interactions, such as climbing. Considering additional moments, the 64 pounds of weight on the drawer face is approximately equivalent to a 40-pound child climbing the extended drawer. A 40-pound weight corresponds to a 75th percentile 3-year-old child, 50th percentile 4-year-old child, and 25th percentile 5-year-old child.[45]

For these reasons, the Commission finds that compliance with AS/NZS 4935 is not likely to adequately reduce the risk of injury associated with CSU tip overs.

[40] The NPR also explained CPSC's concerns with the tip restraint requirements in ASTM F2057–19 and ASTM F3096–14. These include that the 50-pound weight does not represent the force on a tip restraint from child interactions, and the standards do not assess the connection between the tip restraint and the wall or CSU, which are potential points of failure. However, CPSC did not review tip restraint requirements in detail because staff determined that CSUs should be inherently stable to account for lack of consumer use of tip restraints and additional barriers to proper installation and use of tip restraints.

[41] Although this testing involved ASTM F2057–14, the stability requirements were the same as in ASTM F2057–19. The test results are available at: *https://www.cpsc.gov/s3fs-public/2016-Tipover-Briefing-Package-Test-Results-Update-August-16-2017.pdf?yMCHvzY_YtOZmBAAj0GJih1lXE7vvu9K.*

[42] This testing also found that 91 percent of CSUs (56 of 61) did not comply with the labeling requirements in ASTM F2057–14, and 43 percent (26 of 61) did not comply with the tip restraint requirements.

[43] Staff tested exemplar units, meaning the model of CSU involved in the incident, but not the actual unit involved in the incident.

[44] The CSUs were identified from the Consumer Reports study ''Furniture Tip-Overs: A Hidden Hazard in Your Home'' (Mar. 22, 2018), available at: *https://www.consumerreports.org/furniture/furniture-tip-overs-hidden-hazard-in-your-home/.*

[45] Fryar, C.D., Carroll, M.D., Gu, Q., Afful, J., Ogden, C.L. (2021). Anthropometric reference data for children and adults: United States, 2015–2018. National Center for Health Statistics. Vital Health Stat 3(46).

C. ISO 7171 (2019)

The International Organization for Standardization (ISO) developed the voluntary standard ISO 7171 through the Technical Committee ISO/TC 136, *Furniture* and published the first version in May 1988. The current 2019 version was published in February 2019.

1. Scope

ISO 7171 (2019) describes methods for determining the stability of freestanding storage furniture, including bookcases, wardrobes, and cabinets, but the standard does not define these terms.

2. Stability Requirements

ISO 7171 (2019) includes three stability tests, all of which occur on a level test surface. The first uses a weight/load on an open drawer. The second involves all drawers being filled and a load/weight placed on a single open drawer. In the loaded test, one drawer is opened to the outstop, and if no outstops exist, the drawer is opened to two-thirds of its full extension length. The test weight is either 44 or 55 pounds, depending on the height of the unit, and is applied to the top face of the opened drawer. The fill density ranges from 6.25 pounds per cubic foot to 12.5 pounds per cubic foot, depending on the clearance height and volume of the drawer. The third test is an unloaded test with all drawers open. For this test, doors are open and drawers and extendible elements are open to the outstop or, if there are no outstops, to two-thirds of their extension length. Existing interlock systems are not bypassed for this test.

An additional unfilled, closed drawer test is required for units greater than 1000 mm in height, where a vertical force of 350 N (77 pounds) along with a simultaneous 50 N (11 pounds) outward horizontal force is applied to the top surface of the unit.

ISO 7171 (2019) does not include criteria for determining whether a unit passed or failed the loaded stability test. However, it includes a table of ''suggested'' forces, depending on the height of the unit.

3. Tip Restraint Requirements

ISO 7171 (2019) does not require tip restraints to be provided with units, but does specify a test method for them. The tip restraints are installed in both the wall and unit during the test and a 300 N (67.4 pounds) horizontal force is applied in the direction most likely to overturn the unit.

4. Labeling Requirements

The standard does not have any requirements or test methods related to warning labels.

5. Assessment of Adequacy

The Commission concludes that the stability requirements in ISO 7171 (2019) are not adequate to address the CSU tip-over hazard because they do not account for carpeted flooring, or dynamic and horizontal forces generated by children's interactions with the CSU, such as climbing or pulling on the top drawer. In addition, although ISO 7171 (2019) includes a stability test with filled drawers, the multiple open drawer test does not include filled drawers, and the simultaneous conditions of multiple open and filled drawers during a child interaction are not tested. As discussed in this preamble, these factors are commonly involved in CSU tip-over incidents and testing indicates that they decrease the stability of CSUs. Finally, test weights are provided only as recommendations and there are no criteria for determining whether a unit passes.

For these reasons, the Commission finds that compliance with ISO 7171 (2019) is not likely to adequately reduce the risk of injury associated with CSU tip overs.

D. EN 14749: 2016

EN 14749: 2016 is a European Standard that was prepared by Technical Committee CEN/TC 207 ''Furniture.'' This standard was approved by the European Committee for Standardization (CEN) on November 21, 2015, and supersedes EN 14749:2005, which was approved on July 8, 2005, as the original version. EN 14749:2016 is a mandatory standard and applies to all CEN members.

1. Scope

EN 14749: 2016 describes methods for determining the stability of domestic and non-domestic furniture with a height ≥600 mm (23.6 inches) and a potential energy, based on mass and height, exceeding 60 N-m (44.25 pound-feet). Kitchen worktops and television furniture are the only furniture types defined. The test methods in this standard are taken from EN 16122: 2012, *Domestic and non-domestic storage furniture-test methods for the determination of strength, durability and stability,* which covers ''all types of domestic and non-domestic storage furniture including domestic kitchen furniture.''

2. Stability Requirements

EN 14749: 2016 includes three stability tests, which are conducted with the units freestanding. In the first loaded test, a 75 N (16.9 pounds) test weight is applied to the top of the drawer face, when pulled to the outstop or, if no outstops exist, to two-thirds of its full extension length. In the second test, doors are open and all drawers and extendible elements are open to the outstop or, if no outstops are present, to two-thirds of their extension lengths. Existing interlock systems are not bypassed for this test. The third test involves filled drawers and a load; all storage areas are filled with weight and the loaded test procedure (above) is carried out but with a test weight that is 20 percent of the mass of the unit, including the drawer fill, not exceeding 300 N (67.4 pounds). Similar to ISO 7171, an additional unfilled, closed drawer test is required for units greater than 1000 mm in height, where a vertical force of 350 N (77 pounds) along with a simultaneous 50 N (11 pounds) outward horizontal force are applied to the top surface of the unit.

Relevant to the portions of stability testing that involve opening drawers, the standard also accounts for interlock systems, requiring one extension element to be open to its outstop, or in the absence of an outstop, two-thirds of its operational sliding length, and a 100 N (22 pounds) horizontal force to be applied to the face of all other extension elements. This is repeated multiple times on each extension element and all combinations of extension elements are tested.

3. Tip Restraint Requirements

EN 14749: 2016 does not include any requirements regarding tip restraints.

4. Labeling Requirements

EN 14749: 2016 does not include any requirements regarding warning labels.

5. Assessment of Adequacy

The Commission concludes that the stability requirements in EN 14749: 2016 are not adequate to address the CSU tip-over hazard because they do not account for carpeted flooring, or dynamic and horizontal forces generated by children's interactions with the CSU, such as climbing or pulling on the top drawer. In addition, although the standard includes a stability test with filled drawers, the multiple open drawer test does not include filled drawers, and the simultaneous conditions of multiple open and filled drawers during a child interaction are not tested. Moreover, the fill weight ranges from 6.25 pounds per

cubic foot to 12.5 pounds per cubic foot, which includes fill weights lower than staff identified for drawers filled with clothing (discussed in section VII. Technical Analysis Supporting the Rule). As discussed in this preamble, these factors are commonly involved in CSU tip-over incidents and testing indicates that they effect the stability of CSUs.

For these reasons, the Commission finds that compliance with EN 14749: 2016 is not likely to adequately reduce the risk of injury associated with CSU tip overs.

E. ANSI/BIFMA SOHO X6.5–2022

In the NPR, staff reviewed the requirements in ANSI/SOHO S6.5–2008 (R2013), *Small Office/Home Office Furniture—Tests American National Standard for Office Furnishings.* The standard does not address CSUs, but rather, applies to office furniture, such as file cabinets. However, CPSC considered the standard because it addresses interlock systems, which some CSUs include and are relevant to stability testing. On April 5, 2022, ANSI/BIFMA published a new version of the standard, ANSI/BIFMA X6.5–2022. Although this update included several revisions, the interlock strength test requirements remained unchanged.

This standard specifies tests for ''evaluating the safety, durability, and structural adequacy of storage and desk-type furniture intended for use in the small office and/or home office.'' ANSI/BIFMA X6.5–2022 includes testing to evaluate interlock systems. The test procedure calls for one extendable element to be fully extended while a 30 pound horizontal pull force is applied to all other fully closed extendable elements. Every combination of open/closed extendable elements [46] must be tested. The interlock system must be fully functional at the completion of this test and no extendable element may bypass the interlock system.

As discussed in section IX. Description of and Basis for the Rule, child strength studies show that children between 2 and 5 years old can achieve a mean pull force of 17.2 pounds. Therefore, CPSC considers a 30-pound horizontal pull force adequate to evaluate the strength of an interlock system. However, because ANSI/BIFMA X6.5–2022 does not include stability tests or requirements reflecting the real-world factors involved in CSU tip overs, the Commission finds that compliance with ANSI/BIFMA X6.5–2022 is not likely to adequately reduce the risk of injury associated with CSU tip overs.

VI. Technical Background

This preamble and the NPR and final rule briefing packages include technical discussions of engineering concepts, such as center of gravity (also referred to as center of mass), moments, and fulcrums. Tab D of the NPR briefing package provides detailed background information on each of these terms, including how staff applies them to CSU tip-over analyses. This section provides a brief overview of that information; for further information, see Tab D of the NPR briefing package.

A. Center of Gravity and Center of Mass

Center of Gravity (CG) or Center of Mass (CM) [47] is a single point in an object, about which its weight (or mass) is located . In terms of freestanding CSUs, if the CSU's CG is located behind the front foot, the CSU will not tip over due to its own weight. Alternatively, if the CSU's CG is in front of the front foot, the CSU is unstable and will tip over. The CG (and CM) of an object is dependent on the CG and the weight of each component that makes up the object. For example, CSU drawers typically have a front that is thicker and larger than the back, which causes the drawer's CG to be closer to the front. The CSU's CG is defined by the position and weight of the CSU cabinet, without doors or extendable elements (*i.e.,* drawers or pull-out shelves), combined with the position and weight of each door and extendable element. A CSU's CG is equal to the sum of the products of the CG position and the weight of each component, divided by the total weight.

The CG of a CSU will change as a result of the position of the doors and extendable elements (open or closed). Opening doors and extendable elements shifts the CG towards the front of the CSU. The closer the CG is to the front leg, the easier it is to tip forward if a force is applied to the door or extendable element. Therefore, CSUs will tip more easily as more doors and extendable elements are opened. The CG of a CSU will also change depending on the position and amount of clothing in each extendable element. Closed extendable elements filled with clothing tend to stabilize a CSU, but as each filled extendable element is pulled out, the CSU's CG will shift further towards the front.

B. Moment and Fulcrum

Moment, or torque, is an engineering term to describe rotational force acting about a pivot point, or fulcrum. The moment is created by a force or forces acting at a distance, or moment arm, away from a fulcrum. One simple example is the moment or torque created by a wrench turning a nut. The moment or torque about the nut is due to the perpendicular force on the end of the wrench applied at a distance (moment arm) from the fulcrum (nut). Likewise, a downward force on an open CSU door or extendable element creates a moment about the fulcrum (front leg) of the CSU. A CSU will tip over about the fulcrum due to a force (*e.g.,* weight of a child positioned over the front of a drawer) and the moment arm (*e.g.,* extended drawer).

Downward force or weight applied to the door or extendable element tends to tip the CSU forward around the fulcrum at the base of the unit, while the weight of the CSU opposes this rotation. The CSU's weight can be modeled as concentrated at a single point: the CSU's CG. The CSU's stability moment is created by its weight, multiplied by the horizontal distance of its CG from the fulcrum. A child can produce a moment opposing the weight of the CSU, by pushing down or sitting in an open drawer. This moment is created by the vertical force of the child, multiplied by the horizontal distance to the fulcrum. The CSU becomes unbalanced and tips over when the moments applied at the front of the CSU exceed the CSU's stability moment.

Horizontal forces applied to pull on a door or extendable element also tend to tip the CSU forward around the front leg (pivot point or fulcrum) at the base of the unit, while the weight of the CSU opposes this rotation. In this case, the moment produced by the child is the horizontal pull force transmitted to the CSU (for example, through a drawer stop), multiplied by the vertical distance to the fulcrum. The CSU becomes unbalanced and tips over when the moments applied at the front of the CSU exceed the CSU's stability moment.

When a child climbs a CSU, both horizontal forces and vertical forces acting at the hands and feet contribute to CSU tip over. Figure 1 shows a typical combination of forces acting on a CSU while a child is climbing, and it describes how those forces contribute to a tip-over moment. Note that when the horizontal force at the hands and feet are approximately equal, which will occur when the child's CM is balanced in front of the drawers, the height of the bottom drawer becomes irrelevant when

[46] Excluding doors, writing shelves, equipment surfaces, and keyboard surfaces.

[47] For CSU-sized objects, CG and CM are effectively the same. Therefore, CG and CM are used interchangeably in this preamble.

determining the tip-over moment. In this case, only the height of the hands above the feet matters. As Figure 1 shows, a child climbing on drawers opened distance A1 from the fulcrum, with feet at height B1 from the ground and hands at height B2 above the feet, will act on the CSU with horizontal forces F_H and vertical forces F_V. The CSU's weight at a distance A2 from the CSU's front edge touching the ground creates a stabilizing moment. The CSU will tip if Moment 1 is greater than Moment 2.

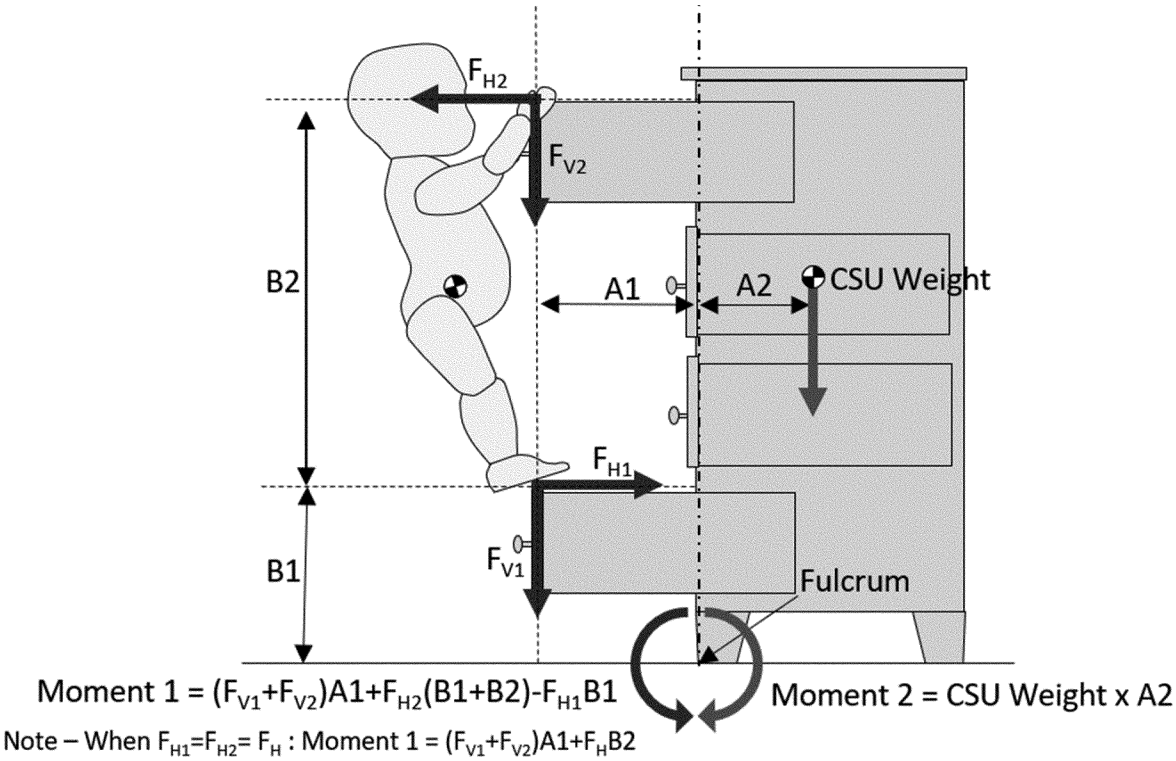


Figure 1: An example of opposing moments acting on a CSU.

VII. Technical Analysis Supporting the Rule

In addition to reviewing incident data, CPSC staff conducted testing and analyses, analyzed tip-over incidents, and commissioned several contractor studies to further examine factors relevant to CSU tip overs. This section provides an overview of that testing and analysis; for additional details see the NPR and NPR briefing package.

A. Multiple Open and Filled Extendable Elements [48]

Staff's technical analysis, as confirmed by testing, indicates that multiple open extendable elements [49] decrease the stability of a CSU, and filled extendable elements further decrease stability when more than half of the extendable elements by volume are open, but increase stability when more than half of the extendable elements by volume are closed. Thus, while multiple open extendable elements, alone, can make a unit less stable, whether the extendable elements are full when open is also a relevant consideration. When filled extendable elements are closed, the clothing weight contributes to the stability of the CSU, because the clothing weight is behind the front legs (fulcrum). However, open extendable elements contribute to the CSU being less stable because the clothing weight is shifted forward in front of the front legs (fulcrum).

To assess the effect of open extendable elements and filled extendable elements on CSU stability, CPSC staff conducted testing to evaluate the effect of various combinations of open/closed and filled/empty drawers using a convenience sample of CSUs.[50] Before this testing, staff assessed the appropriate fill weight to use for testing. Then staff conducted two phases of testing (Phase I and Phase II). The purpose of the testing was to assess the weight at which a CSU became unstable and tipped over with various configurations of drawers open/closed and filled/empty. This section provides an overview of the results; for more details regarding the study, see the NPR and NPR briefing package.

1. Fill Weight

To determine the appropriate method for simulating CSU drawers that are partially filled or fully filled, staff considered previous analyses and conducted additional testing. In working on ASTM F2057, the ASTM F15.42 subcommittee has considered a ''loaded'' (filled) drawer requirement and test method using an assumed clothing weight of 8.5 pounds per cubic foot. Kids in Danger and Shane's Foundation found a similar density (average of 8.9 pounds per cubic foot) when they filled CSU drawers with boys' t-shirts in a 2016 study on

[48] Further details about the effect of open and filled drawers on CSU stability is available in Tabs D, L, and O of the NPR briefing package.

[49] Although staff's testing focused on CSUs with drawers, rather than pull-out shelves, the same effects on stability would apply to pull-out shelves because both drawers and pull-out shelves are extendable elements that hold contents. See section VII. Technical Analysis Supporting the Rule for more details regarding pull-out shelves and why they can hold the same content capacity as drawers.

[50] Staff used the stability test methods in ASTM F2057–19, with some alterations to collect information about variables ASTM does not address (*e.g.,* open/closed drawers, filled/empty drawers, tip weight). Because of the limited number of units tested, this study provides useful information, but the results are limited to the tested units.

furniture stability.[51] Staff conducted testing to assess whether 8.5 pounds per cubic foot reasonably represents the weight of clothing in a drawer.

As part of this assessment, staff looked at four drawer fill conditions. Staff considered folded and unfolded clothing with a total weight equal to 8.5 pounds per cubic foot of functional drawer volume in the drawer; and the maximum amount of folded and unfolded clothing that could be put into a drawer that would still allow the drawer to open and close. For these tests, staff used an assortment of boys' clothing in sizes 4, 5, and 6. Staff used a CSU with a range of drawer sizes to assess small, medium, and large drawers; the functional drawer volume of these 3 drawer sizes was 0.76 cubic feet, 1.71 cubic feet, and 2.39 cubic feet, respectively. Staff determined the calculated clothing weight for the 8.5 pounds per cubic foot drawer fill conditions by multiplying 8.5 by the drawer's functional volume, defined as:[52]

$$Functional\ Volume = \left\{[Interior\ Area](ft^2)\left[Clearance\ Height - \frac{1}{8}\right](in)\left[\frac{1}{12}\right]\left(\frac{ft}{in}\right)\right\}$$

For all three drawer sizes, staff was able to fit 8.5 pounds per cubic foot of folded and unfolded clothing in the drawers. When the clothing was unfolded, the clothing fully filled the drawers, but still allowed the drawer to close. Because the unfolded clothing was stuffed into the drawer fairly tightly, it was not easy to see and access clothing below the top layer. When the clothing was folded, the clothing also fully filled the drawers and still allowed the drawer to close. The folded clothing was tightly packed, but allowed for additional space when compressed. The maximum unfolded clothing fill weight was 6.52, 14.64, and 21.20 pounds for the three drawer sizes, respectively; and the maximum folded clothing fill weight was 7.72, 16.08, and 22.88 pounds for the three drawer sizes, respectively.

Staff also compared the calculated clothing weight (*i.e.,* using 8.5 pounds per cubic foot), maximum unfolded drawer fill weight, and maximum folded drawer fill weight for each drawer. The maximum unfolded clothing fill weight was slightly higher than the calculated clothing fill weight for all tested drawers. The difference between the maximum unfolded clothing fill weight and the calculated clothing weight ranged from 0.08 pounds to 0.87 pounds. The maximum folded clothing fill weight was higher than both the maximum unfolded clothing fill weight and the calculated clothing fill weight for all tested drawers; however, the differences were relatively small. The difference between the maximum folded clothing fill weight and the calculated clothing weight ranged from 1.28 to 2.55 pounds. The maximum unfolded clothing fill density was slightly higher than 8.5 pounds per cubic foot for all tested drawers; and the maximum unfolded clothing fill density ranged from 8.56 to 8.87 pounds per cubic foot, depending on the drawer. The maximum folded clothing fill density was higher than both the maximum unfolded clothing fill density and 8.5 pounds per cubic foot for all tested drawers. The maximum folded clothing fill density ranged from 9.40 to 10.16 pounds per cubic foot, depending on the drawer. Thus, there does not appear to be a large difference in clothing fill density based on drawer size.

Based on this testing, staff found that 8.5 pounds per cubic foot of clothing will fill a drawer; however, this amount of clothing is less than the absolute maximum amount of clothing that can be put into a drawer, especially if the clothing is folded. The maximum amount of unfolded clothing that could be put into the tested drawers was only slightly higher than 8.5 pounds per cubic foot. Although staff achieved a clothing density as high as 10.16 pounds per cubic foot with folded clothing, staff considers it unlikely that consumers would fill a drawer to this level because it requires careful folding, and it is difficult to remove and replace individual pieces of clothing. Therefore, staff concluded that 8.5 pounds per cubic foot of functional drawer volume is a reasonable approximation of the weight of clothing in a fully filled drawer.

The NPR raised the possibility that fill weight for pull-out shelves may be lower than for drawers (*e.g.,* 4.25 pounds per cubic foot or half that of drawers) if consumers are less likely to fill the open area of a pull-out shelf because it is less contained than a drawer. Accordingly, staff conducted further assessment after the NPR and found that pull-out shelves can hold the same volume of clothing as drawers and still remain fully functional and sufficiently contain the clothing content during moving of the shelf. Moreover, requirements ASTM is considering use the same fill weight as in the final rule for both drawers and pull-out shelves.[53]

2. Phase I and II Testing

Phase I of the study focused on CSUs with a single column of drawers and drawers of the same size. Results showed that CSUs tipped over under the same weights with the same configuration of open/closed, regardless of which drawers were opened and on which drawer the tip weight was applied.

Phase II of the study included more complex CSUs with multiple columns of drawers and more combinations of open/closed and filled/empty drawers. Staff also supplemented this data with results from other CSU testing staff had performed. In general, the results indicated that CSUs were less stable as more drawers were opened, and that filled drawers have a variable effect on stability. A filled closed drawer contributes to stability, while a filled open drawer decreases stability. Depending on the percent of drawers that are open and filled, having multiple drawers open decreased the stability of the CSU.

B. Forces and Moments During Child Interactions With CSUs[54]

As indicated above, some of the common themes that staff identified in CSU tip-over incident data involve children interacting with CSUs, including climbing on them and opening drawers. To determine the forces and other relevant factors that exist during these expected interactions between children and CSUs, CPSC contracted with UMTRI to conduct research. The researchers at UMTRI, in collaboration with CPSC staff, designed a study to collect information about children's measurements and

[51] Kids in Danger and Shane's Foundation (2016). Dresser Testing Protocol and Data. Data set provided to CPSC staff by Kids in Danger, January 29, 2021.

[52] ''Clearance height'' is the height from the interior bottom surface of the drawer to the closest vertical obstruction in the CSU frame. ''Functional height'' is clearance height minus ⅛ inch.

[53] For details regarding staff's assessment of clothing fill in pull-out shelves, see Tab C of the final rule briefing package.

[54] Further information about the study described in this section, and forces and moments generated by children's interactions with CSUs, is available in Tabs C, D, and R of the NPR briefing package.

proportions, interest in climbing and climbing behaviors, and the forces and moments children can generate during various interactions with a CSU. The study consisted of an interactive portion and a focus group portion. Forty children, age 20 months to 65 months old, participated in the study. This section provides and overview and key results of this study. For additional details about the study, including the test apparatus, data acquisition, additional behaviors assessed, and analyses, see the NPR and UMTRI's full report in Tab R of the NPR briefing package.

1. Overview of Interaction Portion of UMTRI Study

The interaction portion of the study included children interacting with a CSU test apparatus with instrumented handles and a simulated drawer and tabletop (to simulate the top of a CSU or other tabletop or furniture unit). Researchers measured the forces of the children acting on the test apparatus and calculated moments generated by the children based on the location of the CSU's front leg tip point (fulcrum). The researchers based the fulcrum's location on a dataset of CSU drawer extensions and heights provided by CPSC staff.[55]

The interaction portion of the study looked at forces associated with several climbing-related interactions of interest, which staff and researchers selected based on CSU tip-over incidents, videos of children interacting with CSUs and similar furniture items, and plausible interactions based on children's developmental abilities. Staff focused on the ascent/climbing[56] interaction for this rulemaking because climbing incidents were the most common interaction among fatal CPSRMS incidents and nonfatal NEISS incidents, where the interaction was reported, and they were the second most common interaction in nonfatal CPSRMS incidents, where the interaction was reported.

UMTRI researchers created the test apparatus shown in Figure 2, which used a padded force plate to measure interactions with the floor and included a column to which the various instrumented test fixtures were attached. Tests were conducted with a pair of handlebars (simulating drawer handles or fronts), a simulated drawer, and a simulated top. In preparation for the study, CPSC staff worked with UMTRI researchers to develop a test fixture that modeled the climbing surfaces of a CSU. CPSC staff provided information to UMTRI researchers on drawer extension and heights from the sample of dressers used in CPSC staff's evaluation (Tab N of the NPR briefing package). Researchers selected and constructed a parallel bar test fixture, representing a lower foothold and an upper handhold. These bars represent a best-case CSU climbing surface, similar to the top of a drawer.

UMTRI researchers configured the test fixtures based on each child's anthropometric measurements. Researchers set the upper bar to three different heights relative to the padded floor surface: low (50 percent of the child's upward grip reach), mid (75 percent of the child's upward grip reach), and high (100 percent of the child's upward grip reach). Researchers set the lower bar to two different heights: low (4.7 inches from the padded floor surface) and high (the child's maximum step height above the padded floor). The heights for the bars were within plausible heights for CSU drawers. Researchers set the horizontal position of the upper bar to two different positions: ''aligned'' with the lower bar, or ''offset'' from the lower bar, at a distance equal to 20 percent of the child's upward grip height. Tabs C and R of the NPR briefing package contain more information about the test fixture configurations. The bars, drawer, and tabletop, as well as the floor in front of the test fixture, had force measurement instrumentation that recorded forces over time in the horizontal (fore-aft, x) and vertical (z) directions.

[55] CPSC staff provided UMTRI researchers with a dataset of drawer extensions and drawer heights from the ground from a sample of approximately 180 CSUs. The researchers selected the 90th percentile drawer extension (12 inches) and drawer height (16 inches) as the basis for placing the moment fulcrum in most of their analysis.

[56] Ascending is a subcategory of climbing, and is described as a child's initial step to climb up on to a CSU. Therefore, ascending is an integral part of climbing. The UMTRI study provided information about forces children generate during ascent, because that testing measured forces children generate during an initial step onto the CSU test fixture. Those forces can be used to model children climbing because ascent is the first and integral step to climbing, but not all climbing interactions can be modeled with ascent, as forces associated with some other behaviors can exceed those for ascent. The term ''climbing'' is often used in this preamble and the NPR and final rule briefing package because that is the general behavior described in many incidents. Both climbing and ascending are used to refer to the force children generate on a CSU, for purposes of the rule.

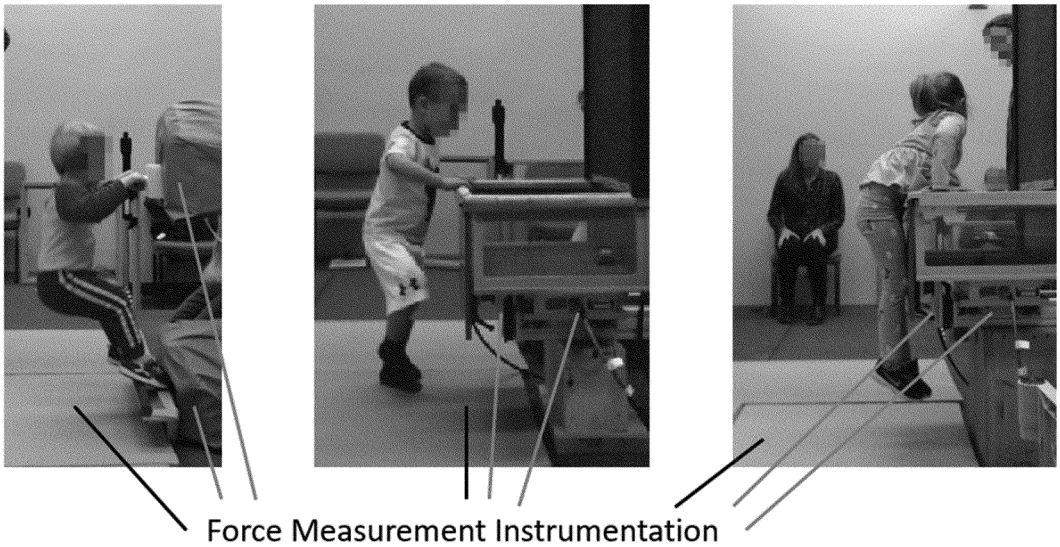


Figure 2: The test setup and location of instruments used to measure force during handle trials (left), box/drawer trials (center), and table trials (right).

CPSC staff worked with UMTRI researchers to develop a set of scripted interactions. Staff focused on realistic interactions in which the child's position and/or dynamic interactions were the most likely to cause a CSU to tip over. The interactions were based on incident data and online videos of children interacting with CSUs and other furniture items. The interactions UMTRI researchers evaluated included:

- *Ascend:* climb up onto the test fixture;
- *Bounce:* bounce vigorously without leaving the bar;
- *Lean back:* lean back as far as possible while keeping both hands and feet on the bars;
- *Yank:* from the lean back position, pull on the bar as hard as possible;
- *1 hand & 1 foot:* take one hand and foot (from the same side of the body) off the bars and then lean as far away from the bars as possible;
- *Hop up:* hold the upper bar and try to jump from the floor to a position where the arms are straight and the hips are in front of the upper bar, an action similar to hoisting oneself out of a swimming pool;
- *Hang:* hold onto the upper bar, lift feet off the floor by bending knees, hang still for a few seconds, and then straighten legs to return to the floor; and
- *Descend:* climb down from the test fixture.

As described above, the ascend interaction best models the climbing behavior commonly seen in incidents, and is analogous to a child's initial step to climb up on to the CSU, which is an integral climbing interaction. The other, more extreme interactions, such as bounce, lean, and yank, were identified as plausible interactions, based on child behavior; but these interactions were not directly observed in the incident data.

After the children performed the interaction, the researchers reviewed video from each trial to isolate and characterize interactions of interest. Researchers analyzed forces from each extracted behavior to identify peak forces and moments. Participant postures have strong effects on the horizontal forces exerted by the child and the subsequent calculated moments, due to the location of the child's CM during each behavior. Thus, the CM of the child is important when evaluating the stability or tip-over propensity of the child/CSU-combined system. UMTRI researchers used the images of the subjects to estimate the location of the child's CM. The UMTRI researchers extracted video frames at time points of interest (typically when the child produced the maximum moment during the interaction) and manually digitized the series of landmarks on the image of the child. The location of the CM was estimated, based on anthropometric information on children,[57] as 33 percent of the distance from the buttock landmark to the top-of-head landmark.

The UMTRI researchers estimated the location of the child's CM by examining the side-view images from the times of maximum moment, as shown in Figure 3. The children in the study extended their CM an average of about 6 inches from the handle/foothold while ascending.

[57] Snyder, R.G., Schneider, L.W., Owings, C.L., Reynolds, H.M., Golomb, D.H., Schork, M.A., Anthropometry of Infants, Children and Youths to Age 18 for Product Safety Design (Report No. UM–HSRI–77–17), prepared for the U.S. Consumer Product Safety Commission (1977).

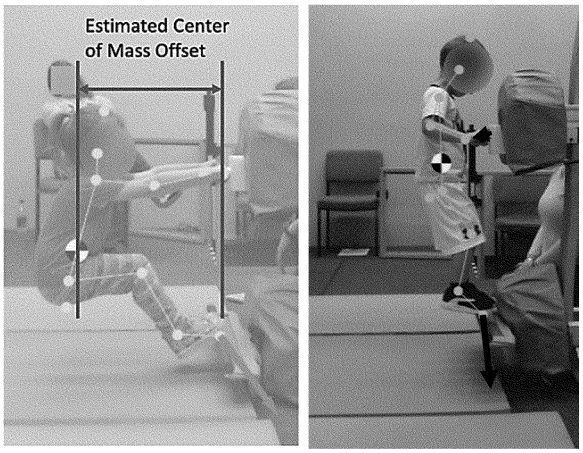


Figure 3. Example of digitized frame with estimated CM location and offset from upper handle. The lean behavior is shown on the left, and the ascend behavior is shown on the right. Forces at the hands and feet are shown with scaled arrows.

Figure 4 shows side-view images of examples of children interacting with the handle fixture. The frames were taken at the time of peak tip-over moment. Forces exerted by the child at the hands and feet are illustrated using scaled vectors (longer lines indicate greater force magnitude; arrow direction indicates force direction). Digitized landmarks and estimated CM locations are shown. The images demonstrate that forces at both the hands and feet often have substantial horizontal components, and usually, but not always, the foot forces are larger than the hand forces. The horizontal components at the hands and feet are also in opposite directions: the horizontal foot forces are forward (toward the test fixture), while the hand forces are rearward (toward the child).

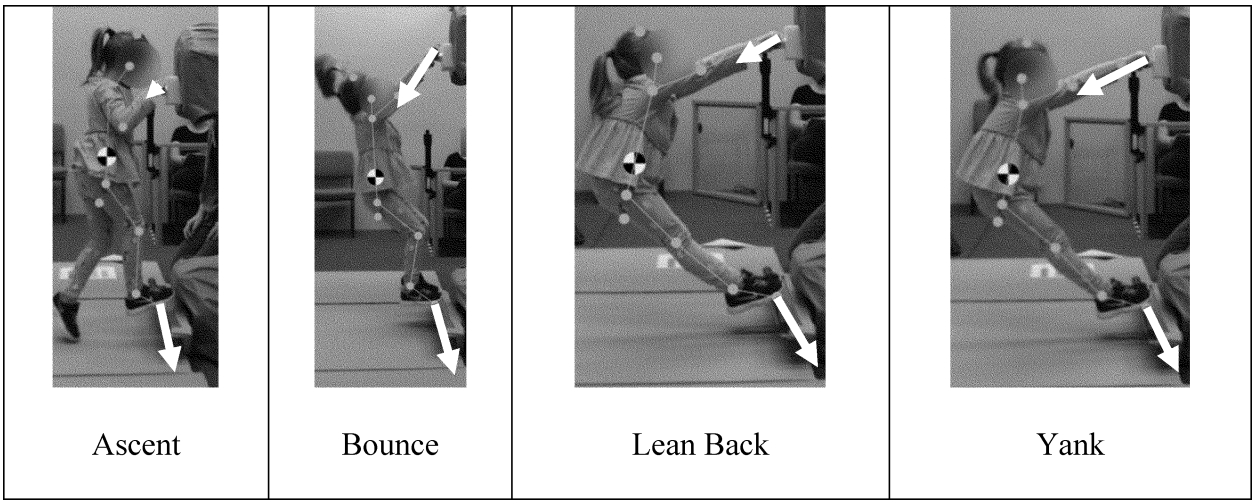


Figure 4: Depicts examples of interactions. Arrows illustrate the directions and relative magnitudes of forces at the hands and feet.

UMTRI researchers modeled a child interacting with a CSU with opened drawers, by measuring forces at instrumented bars representing a drawer front or handle. Figure 5 is the free-body diagram of the child climbing the CSU. The horizontal and vertical forces at the hands and feet correspond to the positive direction of the measured forces. The CSU drawers were modeled using the top handle and bottom handle height, and the drawer extension was modeled from 0 inches to 12 inches.[58] The UMTRI researchers calculated the moment about the CSU's front foot or fulcrum, using the measured forces, vertical location of the top and bottom handles, and the defined drawer extension length (Fulcrum X).

[58] Here, 0 inches corresponds with a closed drawer when the fulcrum lines up with the drawers. Additionally, 12 inches represents the 90th percentile drawer extension length in a dataset of approximately 180 CSUs.

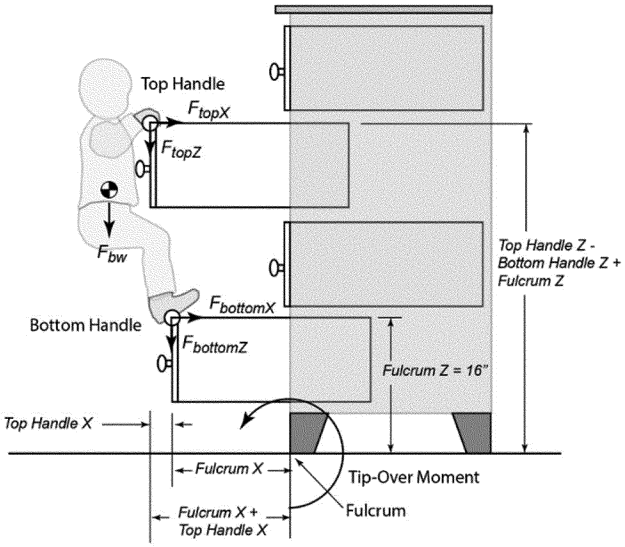
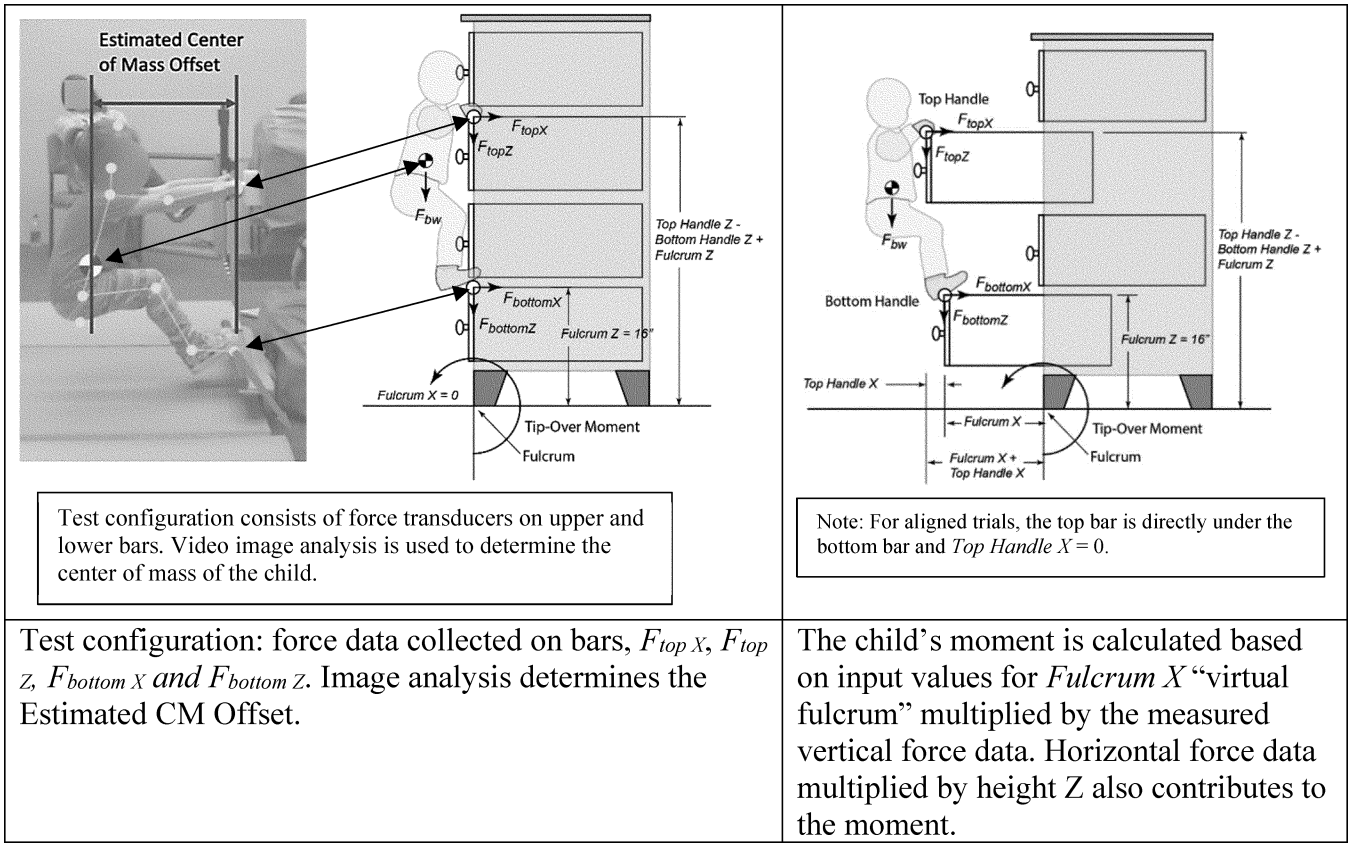


Figure 5. Free-body diagram of a child climbing a CSU.

Figure 5 shows that the child's body weight will generally be distributed between the two bars, but that the child's CM location will also typically be outboard of the bars (farther from the fulcrum than the bars). The quasi-static climbing moment is approximately equal to the location of the child's CM (the horizontal distance of the CM to the fulcrum), multiplied by the child's weight. In reality, the moment created by dynamic forces generated by the child during the activities in the UMTRI study, such as during ascend, exceed the moment created by body weight alone as a result of the greater magnitude horizontal and vertical forces.

UMTRI researchers analyzed the force data as generating a moment around a tip-over fulcrum. The UMTRI researchers calculated the maximum moment about a virtual fulcrum, based on the measured force data for each test and the location of the force. Figure 6 shows the test setup and the forces measured. Note that the test setup mimics a CSU with the drawers closed and the *Fulcrum X = 0.* UMTRI researchers defined the horizontal *Fulcrum X* distance of 1-foot (based on the 90th percentile drawer extension) to simulate a 1-foot drawer extension. The bottom handle vertical *Fulcrum Z* was set to 16 inches (based on the 90th percentile drawer height from the floor), and the *Top Handle Z* varied, depending on the size of the child.[59] Researchers calculated the moment that would be generated for a child interacting on a 1-foot extended CSU drawer, where Fulcrum X = 1 foot.

[59] The top handle varied from 7.4 to 47.3 inches above the bottom handle.



Test configuration: force data collected on bars, $F_{top\ X}$, $F_{top\ Z}$, $F_{bottom\ X}$ *and* $F_{bottom\ Z}$. Image analysis determines the Estimated CM Offset.	The child's moment is calculated based on input values for *Fulcrum X* "virtual fulcrum" multiplied by the measured vertical force data. Horizontal force data multiplied by height Z also contributes to the moment.

Figure 6. These diagrams illustrate how the test configuration was used to determine the child's moment acting on the CSU.

Figure 20 in Tab D of the NPR briefing package (also Figure 44 in Tab R) shows the calculated maximum moment for each interaction of interest versus the child's body weight, and shows that the maximum moment tends to increase with body weight. UMTRI researchers normalized the moment by dividing the calculated moment by the child's body weight to enable the effects of the behaviors to be examined independent of body weight, as shown in Figure 21 in Tab D of the NPR briefing package (also Figure 46 in Tab R). As the figure illustrates, the greatest moments were generated in the Yank interaction, followed in descending order by Lean, Bounce, 1 Hand, and Ascend. As the weight of the child increased, so did the maximum moment. For all of the interactions, the maximum moment exceeded the weight of the child.

The preceding analysis was based on a 12-inch (one foot) horizontal distance between the location of force exertion and the fulcrum. The following analysis shows the effects of varying the *Fulcrum X* value, which is equivalent to a CSU's drawer extension from the fulcrum.

The net moment can be calculated using a *Fulcrum X* = 0 position, as shown in Figure 7, to bound the effects of drawer extension. Placing the fulcrum directly under the hands and feet in the aligned conditions eliminates the effects of vertical forces on moment, while amplifying the relative effects of horizontal forces.

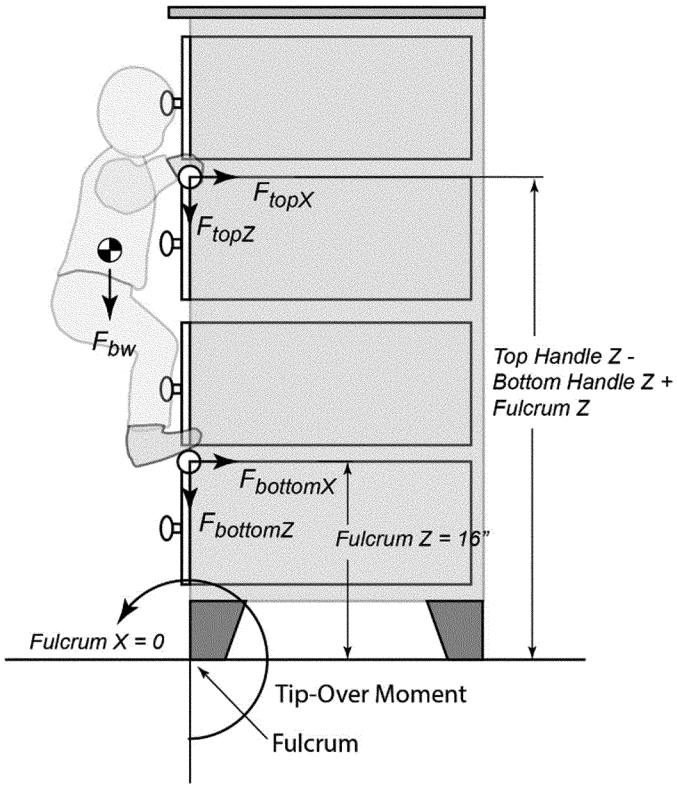


Figure 7. Depicts a schematic of effects of reducing *Fulcrum X* to zero (compare with Figure 5, which depicts a non-zero *Fulcrum X* distance).

UMTRI researchers analyzed the effects of the *Fulcrum X* (which corresponds to the drawer extension [60]) on the tip-over moment for the targeted behaviors. Since the moment about the fulcrum was calculated based on measured force data and input values for *Fulcrum X* distance, the researchers were able to analyze the effects of the fulcrum position by varying the *Fulcrum X* value from 0 to 12 inches. UMTRI researchers used this virtual *Fulcrum X* value to calculate the corresponding maximum moment.

Figure 23 in Tab D of the NPR briefing package (also Figure 51 in Tab R) shows the maximum moments versus the *Fulcrum X* values of 0 and 12 inches across behaviors for aligned conditions. For example, the calculated moment for Ascend at X = 0 is about 17.5 pound-feet. The moment when X = 0 is due entirely to horizontal forces. These horizontal forces exerted by the children on the top and bottom handles of the test apparatus are necessary to balance their outboard CM. UMTRI researchers concluded that the children's CM due to their postures have strong effects on the horizontal forces exerted and the calculated moments. Consequently, the location of the child's CM during the behavior is an important variable.

As previously discussed, the UMTRI researchers normalized the moment by dividing the calculated moment of each trial by the child's body weight to enable the effects of the behaviors to be examined independent of body weight. The graphs of Figure 23 in Tab D of the NPR briefing package show how the moments and the normalized moments increase with the fulcrum distance (which corresponds to the drawer extension). For the normalized moments shown in the bottom graph, this can be interpreted as the effective CM location outboard of the front foot of the CSU (fulcrum), in feet. For example, a child climbing on a drawer extended 12 inches (1 foot) from the front foot fulcrum will have an effective CM that is about 19 inches (1.6 feet) from the fulcrum. At *Fulcrum X* = 0, the contribution of vertical forces to the moment are eliminated, and only the horizontal forces exerted at the hands and feet contribute to the moment. The horizontal forces exerted by the child on the top and bottom handles are necessary to balance his/her outboard CM. The effective moment where the fulcrum = 0 is about 6 inches (0.5 feet) for the Ascend behavior, and it is primarily due to the outboard CM position of the child about 6 inches (0.5 feet) from the fulcrum.[61]

As the drawer is pulled out farther from the fulcrum, vertical forces have a greater impact on the total moment contribution. UMTRI researchers reported that at the time of peak moment during ascent, the average (median) vertical force, divided by the child's body weight, was close to 1 (staff estimates this value is approximately 1.08 for aligned handle trials).[62] This suggests child body weight is the most significant vertical force, although dynamic forces also contribute. Based on the Normalized Moment for Ascend shown in the bottom graph of Figure 23 in Tab D of the NPR briefing package, CPSC staff estimated the Ascend line with the following equation 1:

Equation 1. *Normalized Moment for Ascend = 1.08 × [Fulcrum X (ft)] + 0.52 ft.*

Equation 1 can be multiplied by a child's weight to estimate the moment *M* generated by the child ascending, as shown in Equation 2:

[60] Drawer extension data provided by CPSC staff to UMTRI researchers was measured from the extended drawer to the front of the CSU, and did not account for how the fulcrum position will vary with foot geometry and position. UMTRI researchers assumed that the fulcrum was aligned with the front of the CSU to simplify their analysis.

[61] UMTRI researchers reported that the average CM offset was 6.1 inches (0.51 feet) during ascent at the time the maximum moment was measured.

[62] Refer to Figure 48 in the UMTRI report (Tab R of the NPR briefing package).

Equation 2. $M = \{1.08 \times [1\ ft] + 0.52\ ft\} \times child\ body\ weight\ (lb)$

For example: for a 50-pound child *ascending* the CSU with a 1-foot drawer extension, the moment at the fulcrum is:

$M = \{1.08 \times [1\ ft] + 0.52\ ft\} \times 50\ lb$
$= 54\ lb\text{-}ft + 26\ lb\text{-}ft$
$M = 80\ lb\text{-}ft$

The child in the example above produces a total moment of 80 pound-feet about the fulcrum. The contribution to the total moment from vertical forces, such as body weight and vertical dynamic forces, is 54 pound-feet. The contribution to the total moment from horizontal forces, such as the quasi-static horizonal force used to balance the child's CM in front of the extended drawer and dynamic forces, is 26 pound-feet.

Similar climbing behaviors for drawer and tabletop trials (*e.g.,* climbing into the drawer or climbing onto the tabletop) generated lower moments than ascent. Therefore, the equation for ascend is expected to cover those behaviors as well.

To summarize the findings from the UMTRI study, researchers found that the moments caused by children climbing furniture exceed the effects of body weight alone. CPSC staff used the findings to develop an equation that could be used to calculate the moment generated by children ascending a CSU, based on the child's body weight and the drawer extension from the CSU fulcrum, shown in Equation 2. This equation, combined with the weight for the children involved in CSU tip-over incidents, is the basis for the moment requirements in this rule.

2. Focus Group Portion of UMTRI Study

In addition to examining the forces children generate when interacting with a CSU, in the UMTRI study, the researchers also asked participants and their caregivers questions about participants' typical climbing behaviors. This portion of the study identified many household items that children showed interest in climbing, including: CSUs, tables, desks, counters, cabinets, shelves, windows, sofas, chairs, and beds. In the same study, six children climbed dressers, based on caregivers' reports. Caregivers described various tactics the children used for climbing, such as ''jumped up,'' ''hands and feet,'' ''ladder style,'' and ''grab and pull up,'' but the most common strategy was stepping into or onto the lowest drawer. Caregivers also mentioned children using chairs, stools, and other objects to facilitate climbing, including pulling out dresser drawers.

C. Flooring[63]

To examine the effect of flooring on the stability of CSUs, staff reviewed existing information and conducted testing. As background, staff considered a 2016 study on CSU stability, conducted by Kids in Danger and Shane's Foundation.[64] In that study, researchers tested the stability of 19 CSUs, using the stability tests in ASTM F2057–19 on both a hard, flat surface, and on carpeting. The results showed that some CSUs that passed on the hard surface, tipped over when tested on carpet.

To further examine the effect of carpeting on the stability of CSUs, staff tested 13 CSUs, with a variety of designs and stability, on a carpeted test surface. For this testing, staff used a section of wall-to-wall tufted polyester carpeting with polypropylene backing from a major home-supply retailer and typical of wall-to-wall carpeting, based on staff's review of carpeting on the market. Staff installed and secured the carpet, with a carpet pad, on a plywood platform, and conditioned the CSU and carpeting by weighting the unit for 15 minutes. Staff then tested the unit using the same methods and CSU configurations (*i.e.,* number and position of open and filled drawers) as used with these units in the Multiple Open and Filled Drawers testing conducted on the hard surface (Tab O of the NPR briefing package).

Using the 1,221 pairs of tip weights (*i.e.,* tip weight on the flat surface and on the carpet, with various configurations of multiple open and filled drawers), staff calculated the difference in tip weight when on the hard surface, compared to the carpeted surface for each CSU (tip weight difference). A CSU had a positive tip weight difference if the tip weight was higher on the hard surface than on the carpet, indicating that CSUs are less stable on carpet. The testing showed the CSUs tended to be more stable on the hard surface than they were on carpet. Of the 1,221 tip-over weight differences, the tip weight difference was positive for 1,149 (94 percent) of them; negative for 33 (3 percent) of them; and was zero (*i.e.,* the tip-over weights were equal) for 39 (3 percent). For all 1,221 combinations, the mean tip weight difference was 7.6 pounds, but for individual units, the mean tip weight difference ranged from 4.1 to 16.0 pounds. For all 1,221 combinations, the median tip weight difference was 7 pounds, but for individual units, the median ranged from 2 to 16 pounds. The standard deviation for the entire 1,221 data set was 5.1 pounds, but was smaller for individual units, ranging from 1.8 to 4.7 pounds, indicating that most of the variability in tip weight differences was between units, as opposed to within units, which suggests that some units are affected more than others by carpeting.

To further assess the effect of flooring on stability, staff also analyzed the relationship between tip weight difference and open/closed drawers and filled/empty drawers. The mean tip weight difference was 7.6 pounds (median was 7 pounds) when most of the drawers on the unit were open, and 8.5 pounds (median was 8 pounds) when most of the drawers were closed, indicating that the units were more stable (required more weight to tip over) when more drawers were closed. The mean tip weight difference was 7.2 pounds (median was 6 pounds) when most of the drawers on the unit were empty, and 7.7 pounds (median was 7 pounds) when most of the drawers were filled.[65] This shows that, in general, CSUs are less stable on carpet. All units tested, under various conditions, tended to tip with less weight on the carpet than on the hard surface.

Staff used the results from this study to determine a test method that approximated the effect of carpet on CSU stability by tilting the unit forward (Tab D of the NPR briefing package). Using the CSUs that were involved in CSU tip-over incidents (Tab M of the NPR briefing package), staff compared 9 tip weights on carpet with tip weights for the same units in the same test configuration when tilted at 0, 1, 2, and 3 degrees in the forward direction on an otherwise hard, level, and flat surface.

The tip weight of CSUs on carpet corresponded with tilting the CSUs 0.8 to 3 degrees forward, depending on the CSU; the mean tilt angle that corresponded to the CSU tip weights on carpet was 1.48 degrees. This suggests that a forward tilt of 0.8 to 3 degrees replicated the test results on carpet. Staff also conducted a mechanical analysis of the carpet and pad used in

[63] Details regarding staff's assessment of the effect of flooring on CSU stability is available in Tabs D and P of the NPR briefing package.

[64] *Furniture Stability: A Review of Data and Testing Results* (Kids in Danger and Shane's Foundation, August 2016).

[65] To further assess whether the effect of carpet changed based on the CSU's stability—that is, to determine if the results reflected the change in flooring, or the overall stability of the unit—staff calculated the percent tip weight difference, as: percent tip weight difference = (hard surface tip weight − carpet tip weight)/hard surface tip weight. This revealed that, as the weight to tip the unit on a hard surface increased, shifting to a carpeted surface had less of an impact in terms of the percentage of the tip-over weight.

the test assembly and found a similar forward tilt of 1.5 to 2.0 degrees would replicate the effects of carpet for one CSU.

D. Incident Recreation and Modeling[66]

CPSC staff analyzed incidents and tested products that were involved in CSU tip-over incidents to better understand the real-world factors that contribute to tip overs. Staff analyzed 7 CSU models, associated with 13 tip-over incidents. The CSUs ranged in height from 27 to 50 inches and weighed between 45 and 195 pounds. One of these CSU models did not comply with sections 7.1 or 7.2 in ASTM F2057–19; three models complied with the requirements in section 7.1, but not section 7.2; two models complied with both sections 7.1 and 7.2; and one was borderline.[67] Through testing and analysis, staff recreated the incident scenarios described in the investigations and determined the weight that caused the unit to tip over in a variety of use scenarios, such as a child climbing or pulling on the dresser, multiple open drawers, filled and unfilled drawers, and the flooring under the CSU.

Based on this analysis and testing, staff identified several factors that contributed to the tip-over incidents. One factor was whether multiple drawers were open simultaneously. Opening multiple drawers decreased the stability of the CSU. A related factor was whether the drawers of the CSU were filled, and to what extent. Staff's testing indicated that the weight of filled drawers increases the stability of a CSU when more drawers are closed, and reduces overall stability when more drawers are open. Generally, when more than half of filled drawers were open (by volume), the CSU was less stable.

Another factor was the child's interaction with the CSU at the time of the incident. In some incidents, the child was likely exerting both a horizontal and vertical force on the CSU. Staff found that, for some CSUs, either a vertical or horizontal force, alone, could cause the CSU to tip over, but that the presence of both forces significantly increased the tip-over moment acting on the CSU. These forces, in combination with the other factors staff identified, further contributed to the instability of CSUs. Some of the incident recreations indicated that the force on the edge of an open drawer associated with tipping the CSU was greater than the static weight of the child standing on the edge of an open drawer of the CSU. The equivalent force consists of the child's weight, the dynamic force on the edge of the drawer due to climbing, and the effects of the child's CG extending beyond the edge of the drawer. Some of the incident recreations indicated that a child pulling on a drawer could have contributed to the CSU tipping over.

Another factor that contributed to instability was flooring. Staff's testing indicated that the force needed to tip a unit over was less when the CSU was on carpet/padding than when it was on a hard, level floor.

E. Consumer Use Study[68]

In 2019, the Fors Marsh Group (FMG), under contract with CPSC, conducted a study to assess factors that influence consumer attitudes, behaviors, and beliefs regarding CSUs. The study consisted of two components. In the first component, the researchers conducted six 90-minute in-home interviews (called ethnographies). Three of the participants had at least one child between 18 and 35 months old in the home, and three participants had at least one child between 36 and 72 months old in the home. In this phase of the study, the researchers collected information about family interactions with and use of CSUs in the home.

In the second component of the study, FMG conducted six 90-minute focus groups, using a total of 48 participants. Each focus group included eight participants with the same caregiver status (parents of a child between 1 and 5 years old, people who are visited regularly by a child between 1 and 5 years old, and people who plan to have children in the next 5 years) and homeowner status (people who own their home, and people who rent their home). Participants included parents of children 12 to 72 months old, people without young children in the home who were planning to have children in the next 5 years, and people without young children in the home who are visited regularly by children 12 to 72 months old. The focus groups assessed consumer perceptions of and interactions with CSUs, perceptions of warning information, and factors that influence product selection, classification, and placement.

In describing CSUs, participants mentioned freestanding products; products that hold clothing; features to organize or protect clothing (*e.g.,* drawers, doors, and dividers); and named, as examples, dressers, armoires, wardrobes, or units with shelving or bins. Participants noted that whether storage components were large enough to fit clothing was relevant to whether a product was a CSU. However, participants also noted that they may use smaller, shorter products, with smaller storage components as CSUs in children's rooms so that children can access the drawers, and because children's clothes are smaller. In distinguishing nightstands from CSUs, participants noted the size and number of drawers, and some reported storing clothing in them. Some participants reported that how products were displayed in stores or in online marketing did not influence how they used the unit in their homes and indicated that although a product name may have some influence on their perception of the product, they would ultimately choose and use a product based on its function and ability to meet their needs.

Focus group participants were provided with images of various CSU-like products, and asked what they would call the product, what they would put in it, and where they would put it. Participants provided diverse answers for each product, with products participants identified as buffets, nightstands, entry/side/hall tables, or entertainment/TV/media units also being called dressers or armoires by other participants. Products that participants were less likely to consider a CSU or use for clothing had glass doors, removable bins/baskets, or a small number of small drawers.

Participants primarily kept CSUs in bedrooms and used them to store clothing. However, they also noted that they had products that could be used as CSUs in other rooms to store non-clothing and had changed the location and use of products over time, moving them between rooms and storing clothing or other items in them, depending on location.

Focusing on units that the participants' children interacted with the most, the researchers noted that CSUs in children's rooms held clothing and were 70 to 80 percent full of folded clothing. Participants reported that the children's primary interaction with CSUs was opening them to reach clothing, but also reported children climbing units to reach into a drawer or

[66] Details about staff's incident recreation and modeling are in Tabs D and M of the NPR briefing package.

[67] Staff tested the borderline model two separate times. In one case, the tip weight just exceeded the ASTM F2057–19 minimum acceptable test fixture weight. In another case, the model tipped over just below the minimum allowed test fixture weight. These results are consistent with earlier staff testing that found that the model tipped when tested with a 49.66-pound test fixture; but did comply when tested with a 48.54-pound test fixture.

[68] The full report from FMG, *Consumer Product Safety Commission: Furniture Tipover Report* (Mar. 13, 2020), is available in Tab Q of the NPR briefing package.

to reach something on top of the unit. A few participants reported having anchored a CSU. As reasons for not anchoring furniture, participants stated that they thought the unit was unlikely to tip over, particularly smaller and lighter units used in children's rooms, and they do not want to damage walls in a rental unit.

F. Tip Weight Testing[69]

As discussed earlier in this preamble, in 2016 and 2018–2019, CPSC staff tested CSUs to assess compliance with requirements in ASTM F2057. As part of the 2018–2019 testing, staff also assessed whether CSUs could hold weights higher than the 50-pound weight required in ASTM F2057, testing the CSUs with both a 60-pound test weight, and to the maximum test weight they could hold before tipping over. For this testing, staff assessed 188 CSUs, including 167 CSUs selected from among the best sellers from major retailers, using a random number generator; 4 CSU models that were involved in incidents;[70] and 17 units assessed as part of previous test data provided to CPSC.[71] Appendix A to Tab N in the NPR briefing package describes the test procedure staff followed. To summarize, after recording information about the weight, dimensions, and design of the CSU, staff used a test procedure similar to section 7.2 in ASTM F2057–19 (loaded weight testing), but with a 60-pound test fixture, and with test fixtures that allowed staff to add additional weight, in 1-pound increments, up to a maximum of 134 pounds.

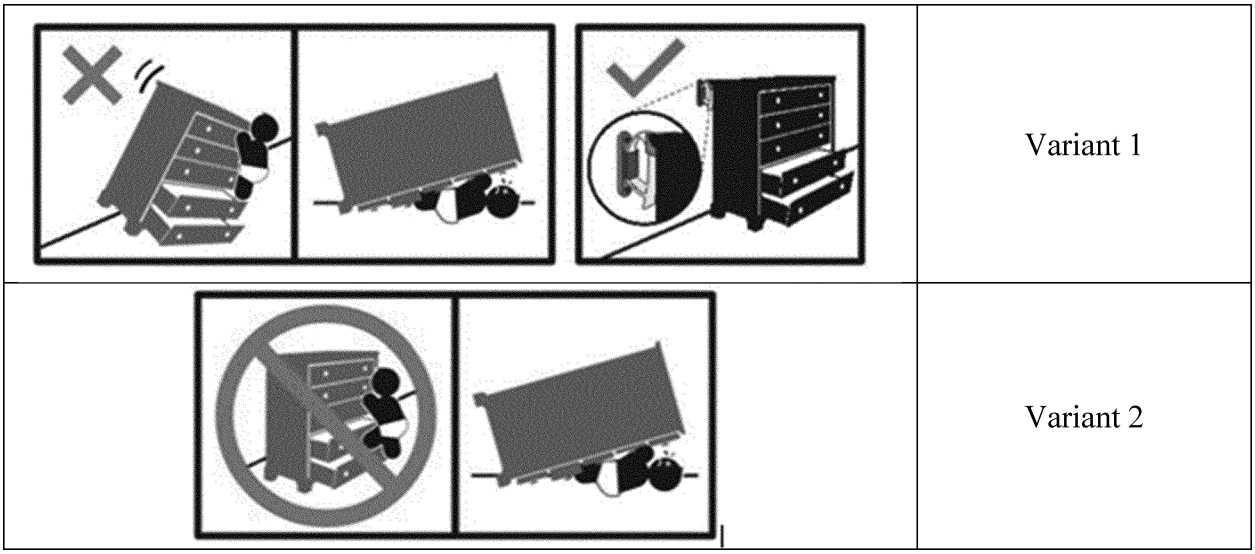
Of the 188 CSUs staff tested, 98 (52 percent) held the 60-pound weight without tipping over. The mean weight at which the CSUs tipped over was 61.7 pounds and the median was 62 pounds.[72] The lowest weight that caused a CSU to tip over was 12.5 pounds. The next lowest tip weights were 22.5 pounds (2 CSUs), 25 pounds (6 CSUs), and 27.5 pounds (3 CSUs). One CSU did not tip over when the maximum 134-pound test weight was applied. The next highest tip weights were 117.5 pounds (1 CSU), 112.5 pounds (1 CSU), 102.5 pounds (1 CSU), 97.5 pounds (1 CSU), 95 pounds (1 CSU), and 90 pounds (4 CSUs). Most CSUs tipped over with between 45 and 90 pounds of weight.

G. Warning Label Symbols[73]

In 2019, CPSC contracted a study to evaluate a set of 20 graphical safety symbols for comprehension, in an effort to develop a family of graphical symbols that can be used in multiple standards to communicate safety-related information to diverse audiences.[74] The contractor developed 10 new symbols for the project, including one showing the CSU tip-over hazard and one showing the CSU tip-over hazard with a tip restraint; the remaining 10 symbols already existed. The contractor recruited 80 adults and used the open comprehension test procedures described in ANSI Z535.3, *American National Standard Criteria for Safety Symbols* (2011). ANSI Z535.3 defines the criteria for ''passing'' as at least 85 percent correct interpretations (strict), with fewer than 5 percent critical confusions (*i.e.,* the opposite action is conveyed).

One of the existing symbols the contractor evaluated is the child climbing symbol from the warning label in ASTM F2057–19. The symbol showed passing comprehension (87.5 percent) when scored with lenient (*i.e.,* partially correct) scoring criteria, but poor comprehension (63.8 percent) when scored with strict scoring criteria. There was no critical confusion with the symbol.

The contractor conducted focus groups consisting of 40 of the 80 comprehension study participants. Based on the feedback received in the comprehension study and in focus groups, the contractor developed two new symbol variants, shown in Figure 8.



[69] A full discussion of this testing and the results is available in Tab N of the NPR briefing package.

[70] Staff tested exemplar units, using the model of CSU involved in the incident, but not the actual incident unit.

[71] The CSUs were identified from the Consumer Reports study ''Furniture Tip-Overs: A Hidden Hazard in Your Home'' (Mar. 22, 2018), available at: *https://www.consumerreports.org/furniture/furniture-tip-overs-hidden-hazard-in-your-home/.*

[72] This is based on the results for 185 of the units; staff omitted the test weight for 3 of the CSUs because of data discrepancies.

[73] Details regarding staff's analysis of warning label symbols are available in Tab C of the NPR and final rule briefing packages.

[74] Kalsher, M., CPSC Gather Consumer Feedback: Final Report (2019), available at: *https://www.cpsc.gov/s3fs-public/CPSC%20Gather%20Consumer%20Feedback%20-%20Final%20Report%20with%20CPSC%20Staff%20Statement%20-%20REDACTED%20and%20CLEARED.pdf?GTPK5CxkCRmftdywdDGXJyVIVq.GU2Tx.*

Figure 8: Two variant symbols being tested (one showing the importance of anchoring the CSU, the other demonstrating the tip-over hazard as a result of climbing). Note: the symbols are reproduced in grayscale here, but the color version includes a red ''x'' and prohibition symbol, and a green check mark. See Tab C of the final rule briefing package for the color version.

The NPR explained that staff was working with the contractor to test these new symbol variants using the same methodology applied in the previous study; would assess whether one of the two variants performed better in comprehension testing than the F2057 child climbing symbol; and would consider requiring the use of these symbols as part of the warning requirements in the final rule.

In November 2021, CPSC released the contractor report on the assessment of Variants 1 and 2.[75] The results indicated that Variant 1 passed ANSI Z535.3 comprehension testing with both lenient (95.0 percent) and strict (87.5 percent) scoring criteria, with no critical confusions. The comprehension scores for Variant 2 were lower than those for Variant 1 and the ASTM symbol.

H. Tip Restraints and Anchoring[76]

CPSC considered several studies regarding consumer anchoring of furniture to evaluate the potential effectiveness of tip restraints to help address the tip-over hazard. These studies indicate that many consumers do not anchor furniture, including CSUs, in their homes, and that there are several barriers to anchoring, including consumer beliefs, and lack of knowledge about what anchoring hardware to use or how to properly install it.

A CPSC Consumer Opinion Forum survey in 2010, with a convenience sample of 388 consumers, found that only 9 percent of those who responded to the question on whether they anchored the furniture under their television had done so (27 of 295).[77] Although a majority of respondents reported that the furniture under their television was an entertainment center, television stand, or cart, 7 percent of respondents who answered this question (22 of 294) reported using a CSU to hold their television.[78] The consumers who reported using a CSU to hold their television had approximately the same rate of anchoring the CSU, 10 percent (2 of 21[79]), as the overall rate of anchoring furniture found in the study.

In 2018, Consumer Reports conducted a nationally representative survey[80] of 1,502 U.S. adults, and found that only 27 percent of consumers overall, and 40 percent of consumers with children under 6 years old at home, had anchored furniture in their homes. The study also found that 90 percent of consumers have a dresser in their homes, but only 10 percent of those with a dresser have anchored it. Similarly, although 50 percent of consumers have a tall chest or wardrobe in their homes, only 10 percent of those with a tall chest or wardrobe have anchored it. The most common reasons consumers provided for not anchoring furniture, in declining order, included that their children were not left alone around furniture; they perceived the furniture to be stable; they did not want to put holes in the walls; they did not want to put holes in the furniture; the furniture did not come with anchoring hardware; they did not know what hardware to use; and they had never heard of anchoring furniture.

As discussed earlier in this preamble, the Commission launched the education campaign—Anchor It!—in 2015 to promote consumer use of tip restraints to anchor furniture and televisions. In 2020, a CPSC-commissioned study assessed consumer awareness, recognition, and behavior change as a result of the Anchor It! campaign.[81] The study included 410 parents and 292 caregivers of children 5 years or younger from various locations in the United States. The survey sought information about whether participants had ever anchored furniture in their homes, and their reasons for not anchoring furniture. The study found that 55 percent of respondents reported ever having anchored furniture, with a greater percentage of parents reporting anchoring furniture (59 percent) than other caregivers (50 percent), and a greater percentage of homeowners reporting ever having anchored furniture (57 percent) than renters (51 percent). For participants who did not report anchoring furniture or televisions, the most common reasons respondents gave for not anchoring, in declining order, were that they did not believe it was necessary, they watch their children, they have not gotten to it yet, it would damage walls, and they do not know what anchors to use.

These results indicate that one of the primary reasons parents and caregivers of young children do not anchor furniture is a belief that it does not need to be anchored if children are supervised. However, research shows that 2- to 5-year-old children are out of view of a supervising parent for about 20 percent of the time that they are awake, and are left alone significantly longer in bedrooms, playrooms, and living room areas.[82] CSUs are likely to be in bedrooms, where children are expected to have unsupervised time, including during naps and overnight. Many of the CSU tip-over incidents occurred in children's bedrooms during these unsupervised times. According to the Consumer Reports study, 76 percent of consumers with children under 6 years old reported that dressers are present in rooms where children sleep or play; and the UMTRI study found that nearly all (95 percent) of child participants had dressers in their bedrooms. Notably, among the 89 fatal incidents, 55 occurred in a child's bedroom, 11 occurred in a bedroom, 2 occurred in a parent's bedroom, and 2 occurred in a sibling's bedroom. None of the fatal incidents occurred when the child was under direct adult supervision. However, some nonfatal incidents occurred during supervised time when parents were in the room with the child. As this indicates, supervision is neither a practical, nor

[75] Kalsher & Associates, LLC. *CPSC Warning Label Safety Symbol Research: Final Report.* Oct. 27, 2021. Available at: *https://www.cpsc.gov/s3fs-public/CPSC-Warning-Label-Safety-Symbol-Research-Final-Report-with-CPSC-Staff-Statement.pdf?VersionId=qCnIivtD0HRs3dEW69p.UVSDxTxvvESq.*

[76] Further information about tip restraints and anchoring is in Tab C of the NPR briefing package.

[77] Butturini, R., Massale, J., Midgett, J., Snyder, S. Preliminary Evaluation of Anchoring Furniture and Televisions without Tools, Technical Report CPSC/EXHR/TR—15/001 (2015), available at: *https://www.cpsc.gov/s3fs-public/pdfs/Tipover-Prevention-Project-Anchors-without-Tools.pdf.*

[78] Three consumers identified the furniture as an ''armoire,'' and 19 consumers identified the furniture as a ''dresser, chest of drawers, or bureau.''

[79] Although 22 respondents reported using a CSU under their television, one of these respondents answered ''I don't know'' to the question about whether they anchored the furniture.

[80] Consumer Reports, Furniture Wall Anchors: A Nationally Representative Multi-Mode Survey (2018), available at: *https://article.images.consumerreports.org/prod/content/dam/surveys/Consumer_Reports_Wall_Anchors_Survey_2018_Final.*

[81] The report for this study, Fors Marsh Group, CPSC Anchor It! Campaign: Main Report (July 10, 2020), is available at: *https://www.cpsc.gov/s3fs-public/CPSC-Anchor-It-Campaign-Effectiveness-Survey-Main-Report_Final_9_2_2020....pdf?gC1No.oOO2FEXV9wmOtdJVAtacRLHIMK.*

[82] Morrongiello, B.A., Corbett, M., McCourt, M., Johnston, N. Understanding unintentional injury-risk in young children I. The nature and scope of caregiver supervision of children at home, Journal of Pediatric Psychology, 31(6): 529–539 (2006); Morrongiello, B.A., Ondejko, L., Littlejohn, A. Understanding Toddlers' In-Home Injuries: II. Examining Parental Strategies, and Their Efficacy, for Managing Child Injury Risk. Journal of Pediatric Psychology, 29(6), pp. 433–446 (2004).

effective way to prevent tip-over incidents.

Another common reason caregivers provided for not anchoring furniture was the perception that the furniture was stable. CPSC staff testing and modeling found that there is a large difference in stability of CSUs, depending on the number of drawers open. Adults are likely to open only one or a couple of drawers at a time on a CSU; as such, adults may only have experience with the CSUs in their more stable configurations and may underestimate the tip-over hazard. In contrast, incident analysis shows that some children open multiple or all drawers on a CSU simultaneously, potentially putting the CSU in a much less stable configuration; and children contribute further to instability by climbing the CSU.

CPSC staff also has concerns about the effectiveness of tip restraints and identified tip-over incidents in which tip restraints detached or broke. Overall, given the low rates of anchoring, the barriers to anchoring, and concerns about the effectiveness of tip restraints, CPSC concludes that tip restraints are not effective as the primary method of preventing CSU tip overs. Effective tip restraints may be useful as a secondary safety system to enhance stability, such as for interactions that generate particularly strong forces (*e.g.,* bouncing, jumping), or to address interactions from older/heavier children. In addition, tip restraints may help reduce the risk of tip overs for CSUs that are already in homes, since this rule only applies to CSUs manufactured after the effective date. In future work, CPSC may evaluate appropriate requirements for tip restraints, and will continue to work with ASTM to update its tip restraint requirements.

VIII. Response to Comments

CPSC received 66 written comments during the NPR comment period and 8 oral comments during the public hearing. The comments are available on: *www.regulations.gov,* by searching under docket number CPSC–2017–0044. This section describes key comments CPSC received on the substantive requirements in the NPR and responds to them. For more details about the comments CPSC received on the NPR, and CPSC's response to them, see Tab K of the final rule briefing package.

A. Incident Data

Comment: CPSC received comments regarding the rates of CSU tip-over incidents. Some commenters noted the decline in tip-over injuries reported in the NPR and most recent stability report, while others noted that the number of incidents is still too high.

Response: Although there has been a statistically significant decline in NEISS incidents, a high number of fatalities and nonfatal incidents continue and present an unreasonable risk of injury that necessitates rulemaking. As indicated in the NPR, when considering fatalities by year, other than 2010, there were at least three reported CSU tip-over fatalities to children without a television involved, each year, for the years 2001 through 2017. In 2018, there was one CSU tip-over fatality to a child without a television involved; and in 2019, there were two. Although reporting is considered incomplete for fatalities occurring in 2020 and later years, CPSC is already aware of one CSU tip-over fatality with no television involved to a child in 2020, and five child fatalities with no television involved in 2021. Similarly, between 2000 and 2019, there was at least one CSU tip-over death to an adult or a senior in each year, without a television involved, with the exception of 2006 and 2018. In addition, CPSC notes that the estimated number of injuries treated in EDs were likely influenced by the COVID–19 pandemic for the years 2020 and 2021.[83]

B. Scope and Definitions

Comment: Several commenters requested that specific products be excluded from the scope of the rule. These included comments to exclude wardrobes from the rule because they are covered by an ANSI standard, to exclude file cabinets, and to exclude nightstands.

Response: The final rule does not exclude wardrobes from the definition of a CSU because wardrobes have been involved in tip-over incidents and it is reasonable to address children putting their body weight on doors and drawers of such units, based on physical and cognitive abilities and demonstrated interactions in incidents. Moreover, staff reviewed existing standards and determined that they do not adequately reduce the hazard and the ANSI standard is not mandatory. The final rule does not explicitly exclude file cabinets from the scope, although some file cabinets may not meet the criteria in the CSU definition (*e.g.,* reasonably expected to be used for storing clothing). The rule does not exclude file cabinets generally because some may meet the criteria in the definition and, as consumer studies indicate, consumers use products as CSUs when they serve the functions identified for such products. The final rule also does not exclude nightstands because staff has identified products that are sold as nightstands but feature all of the characteristics of a CSU; consumer studies found that consumers identified and would use such products as CSUs; and CPSC is aware of incidents in which children climbed on nightstands. However, any nightstands that do not meet the criteria in the CSU definition (*e.g.,* under 27 inches tall, insufficient closed storage, reasonable expected use, or extendable elements/doors) would not fall within the scope of the rule.

As explained, the criteria for determining whether a product is a CSU are based on specific factors that contribute to instability and indicate that consumers are likely to perceive and use the product as a CSU. As explained, products that look and function just like a CSU may be marketed as something else, but consumers will still use it as a CSU. Accordingly, the final rule relies on criteria, rather than product names, to determine scope.

Comment: A commenter suggested excluding pull-out shelves from the scope of the rule because of a lack of reported tip-over incidents involving CSUs with such features. The commenter also suggested that, if included in the rule, the fill weight for pull-out shelves should be reduced to 4.25 pounds per cubic feet, representing half of the 8.5 pounds used for a drawer's fill weight.

Response: The final rule includes testing of pull-out shelves because these are elements that extend outward from the case of the CSU and are reasonably likely to be loaded with a clothing weight. As such, when open and loaded, a pull-out shelf would increase the instability of a CSU like an open and filled drawer.

As explained above, the NPR proposed to use the same fill weight of 8.5 pounds per cubic foot of functional volume for drawers and pull-out shelves, but raised the possibility that fill weight for pull-out shelves may be lower than for drawers (*e.g.,* 4.25 pounds per cubic foot) if pull-out shelves can hold less clothing fill than a drawer while remaining operable and containing the clothing when the shelf moves. CPSC did not receive any data regarding this in comments on the NPR. However, staff has further assessed this possibility and found that pull-out shelves can hold the same volume of

[83] Schroeder, T., Cowhig, M. (2021). Effect of Novel Coronavirus Pandemic on 2020 NEISS Estimates (March–December, 2020), available at: *https://www.cpsc.gov/s3fs-public/Covid-19-and-final-2020-NEISS-estimates-March-December-6b6_edited20210607_0.pdf.*

clothing as drawers and remain fully functional and sufficiently contain the clothing content when moving the shelf.[84] Accordingly, the final rule retains the 8.5 pounds per cubic foot of functional volume fill density for pull-out shelves.

Comment: One commenter suggested adding to the definition of a CSU that it includes ''a top surface and side panels that are rigid and solid'' and specifying that they are ''typically found in a bedroom environment.''

Response: Most CSUs are made of rigid and solid materials because these features are generally necessary to enable the unit to stand upright and hold extension elements. However, there are CSUs that have some non-rigid elements, retain extension elements, and present the same tip-over hazard. As such, these features are not included in the definition. The final rule also does not include ''typically found in a bedroom environment'' in the definition of a CSU because consumers use CSUs in rooms other than bedrooms and use as CSUs in a bedroom furniture that looks and functions just like a CSU but is marketed for non-bedroom use. As the studies discussed in the NPR indicate, consumers use products as CSUs based on their functionality, not where they are typically located in a residence.

Comment: One commenter suggested changing the CSU volume criterion from 1.3 cubic feet to 3 cubic feet, which the commenter believed better represents a volume that consumers associate with a CSU.

Response: The final rule retains the 1.3 cubic feet minimum proposed in the NPR. As explained in the NPR, the minimum drawer size that can reasonably accommodate clothing is fairly small. The smallest total functional volume of the closed storage for a CSU involved in a nonfatal incident without a television was 1.38 cubic feet; this unit was advertised to hold about five pairs of folded pants or 10 t-shirts in each of its two drawers.[85] As such, 1.3 cubic feet is a reasonable closed storage volume threshold, and a larger threshold would exclude from the scope of the rule products likely to be used as CSUs that pose the same tip-over hazard.

Comment: One commenter requested clarification of the terms ''open storage'' and ''open space'' that are relevant to the definition of a CSU.

Response: The final rule retains the same meaning of these terms, but includes wording modifications and the addition of examples to clarify the definitions. These revisions are discussed in section IX. Description of and Basis for the Rule.

Comment: CPSC received several comments suggesting that the scope of the rule should exclude CSUs that weigh less than 30 pounds when empty. A manufacturer of lightweight plastic CSUs stated that approximately 15 million such units over 27 inches tall were sold over the past 25 years and the rule would ban such products because they would be unable to meet the stability requirements. Commenters stated that such a ban would not serve a safety purpose, citing a lack of incident data involving lightweight CSUs. In support of the 30-pound threshold, commenters noted that ASTM is considering a similar limit in revising its CSU standard and that it aligns with the 34-pound CSU described in the NPR as being involved in a fatal tip-over incident and the 31-pound CSU involved in a nonfatal incident.

Response: The final rule includes in the definition of a CSU that it is limited to products that have a mass greater than or equal to 57 pounds with all extendable elements filled with at least 8.5 pounds/cubic foot times their functional volume (cubic feet). This will exclude some lighter weight CSUs from the scope of the rule, while continuing to cover CSUs that pose a risk of serious injuries and death when they tip over. This revision is discussed in detail in the section IX. Description of and Basis for the Rule.

Comment: CPSC received a comment stating that the ''closed storage'' definition should include both opaque drawers and doors, and not just opaque doors.

Response: The final rule includes ''opaque doors'' in the definition because consumer research showed that consumers perceive glass (non-opaque) doors to be for display instead of clothing storage. In contrast, there are CSUs on the market with clear drawers or drawer fronts, including lightweight plastic units, that have non-opaque drawers and that consumers use as CSUs. Consequently, the definition only applies to doors, and not opaque drawers to reflect consumer perceptions and use.

Comment: A commenter stated that the definition of ''drawer'' should include ''rigid, solid, and enclosed'' and exclude ''bins'' because such features do not appear to be involved in incident data.

Response: Although most drawers in CSUs are rigid, solid, and enclosed, some units have drawers with flexible sides (*e.g.,* cloth or mesh over rigid frames, cardboard, plastic) that are marketed and can be used as CSUs; can be loaded to sufficient weight to pose a hazard; and can present the same tip-over hazard as CSUs with rigid/solid drawers. For this reason, the final rule does not include ''rigid, solid, and enclosed'' as part of the definition of a drawer. However, staff also recognizes that the hazard presented by a drawer or similar feature is that it serves as an extension element that can bear forces/weight (*e.g.,* of clothing load or child interactions) that contribute to the instability of a CSU. For this reason, CPSC considers it appropriate to distinguish between such units and those for which the extendable element would not have this destabilizing effect. As such, the final rule defines a ''drawer'' as a furniture component intended to contain or store items that slides horizontally in and out of the furniture case and may be attached to the case by some means, such as glides. This is the same as in the NPR. However, the final rule also adds to the definition an explanation that only components that are retained in the case when extended up to ⅔ the shortest internal length, when empty, are included in this definition. This revision is discussed in section IX. Description of and Basis for the Rule.

Comment: Several comments suggested expanding the scope of the rule to include CSUs that are 24 inches or taller, instead of 27 inches or taller, and one commenter suggested a height limit of 12.1 inches, based on child heights.

Response: As discussed in the NPR, the shortest height determined for a CSU involved in a fatal incident without a television was 27.5 inches. Staff is aware of nonfatal incidents involving units shorter than 27 inches, but the number of incidents associated with shorter units is small and these incidents did not result in deaths or serious injuries. Therefore, the final rule retains the 27-inch height limit proposed in the NPR.

Comment: Several commenters suggested removing from the scope of the rule CSUs that have only doors and no drawers. They stated that these units are less susceptible to children climbing and less represented in incident data.

Response: Although the storage on CSUs with only doors does not extend, such CSUs typically have shelves or other features that children can use to climb or interact with, just like other CSUs. Moreover, it is easily within the physical and cognitive capabilities of children, including younger ones, to open doors, and it is consistent with

[84] For details regarding staff's assessment of clothing fill in pull-out shelves, see Tab C of the final rule briefing package.

[85] See Tab C of the NPR briefing package.

children's physical and cognitive abilities to expect that children will put their body weight on doors, creating a similar effect on instability as children putting their weight on drawers. The child climbing study (Tab R of the NPR briefing package) found that the vertical forces associated with a child hanging by the hands are close to the body weight of a child. In addition, CSUs with only doors have been involved in tip-over incidents. As discussed in the NPR, CPSC identified a fatal tip-over incident involving a unit with doors only (no drawers or other extension elements). For these reasons, CSUs with only doors present a similar tip-over hazard as CSUs with drawers or other extendable elements and the final rule retains these within the scope.

Comment: One commenter suggested only regulating CSUs that are children's products, while another commenter suggested requiring more stringent standards for children's products, and others suggested that the rule should apply to all CSUs.

Response: As explained in the NPR, general-use CSUs are more heavily represented in the incident data than children's products, and children's interactions are not limited to CSUs intended for children. In addition, general-use CSUs are commonly used in children's rooms, as indicated by the studies discussed in the NPR. Accordingly, focusing the rule on only children's products or requiring more stringent requirements only for children's products would not adequately address the hazard.

C. Stability Requirements

CPSC received comments regarding the stability requirements, including interlock requirements, in the rule, as well as definitions relevant to those requirements. Those comments are discussed in section IX. Description of and Basis for the Rule to explain revisions made to the rule in response to the comments. Additional details are also available in Tabs D and K of the final rule briefing package.

D. Marking and Labeling Requirements

Comment: Several commenters expressed concern that warnings are not an effective way to address the tip-over hazard, suggesting that consumers may not read or heed warnings.

Response: Warning labels, on their own, are a less effective way to address a hazard than performance or design requirements that reduce or eliminate a hazard, in part because warning labels rely on consumers seeing, understanding, and following the warnings. For this reason, the final rule includes requirements to provide for inherent stability of CSUs. However, there are steps consumers can take to further reduce the risk of CSU tip overs, and these steps are presented on the required warning labels. The content, format, and placement requirements are intended to improve the likelihood that consumers will notice, comprehend, and comply with the warnings.

Comment: Commenters suggested revisions to the warning label content requirements, including allowing manufacturers to determine what hazards to address on the label, and how; providing warnings about the use of CSUs on carpet; and including warnings in Spanish.

Response: CPSC staff developed the warning label requirements in the rule based on commonly used approaches in voluntary standards, ASTM's warning label requirements, consumer studies, research, human factors assessments, and staff's expertise. As such, the warning label requirements are designed to include content and format requirements that are likely to be effective. Allowing manufacturers to modify content may detract from the effectiveness of the label and would not benefit from staff's insights and expertise. To clarify that the warning label content must precisely match that in the final rule, the final rule also includes a statement that the content must not be modified or amended except as specifically permitted in the rule. However, nothing in the rule prevents manufacturers from placing a separate label on CSUs to communicate their desired content.

The final rule does not include in the warning label statements regarding the use of CSUs on carpet. This is because consumers commonly have carpet where they place CSUs and may not have the option to remove the carpet. As explained in the NPR, warnings that are inconsistent with expected consumer use are not likely to be effective.

Although the final rule does not require that warning labels be provided in languages other than English, manufacturers may include such labels, separate from the required label, and commonly do so for other products on the U.S. market.

Comment: As discussed above and in the NPR, CPSC contracted a focus group study to evaluate comprehension of potential variants to the symbol proposed for the warning label in the NPR. That study found that one of the variants performed better in comprehension than the alternatives under consideration; that variant is required in the final rule. One commenter noted that, although they support the variant, they are concerned about the type of anti-tip device shown in the symbol.

Response: The rationale for selecting the variant in the final rule is discussed below. However, to address the commenter's concern, the final rule specifies that the panel in the symbol that shows the anti-tip device may be modified to show a specific anti-tip device included with the CSU.

Comment: The rule requires that the identification label be legible and attached after it is tested using the methods specified in section 7.3 of ASTM F2057–19. A major manufacturer and retailer commented that the identification label should not be limited to a ''label'' because other means of applying the information to the product (*e.g.,* printing, etching, engraving, or burning) can also be sufficiently permanent and more cost-effective.

Response: The permanency testing requirements in section 7.3 of ASTM F2057–19 include requirements for paper labels, non-paper labels, and those applied directly to the surface of the product. As such, the rule does not prevent firms from applying the identification label in various ways that can be tested and comply with the requirements in section 7.3 of ASTM F2057–19. However, to make this clear, the final rule includes the term ''mark,'' in addition to ''label,'' to signal the availability of marking applied directly to the product for meeting the requirement.

E. Hang Tags

Comment: Several commenters expressed concerns with the rating scale, which the NPR proposed to range from 0 to 5, with a minimum score of 1 necessary to comply with the stability requirements in the rule. For the lower range of the scale, commenters noted that the scale need not start at 0 since CSUs may not have a rating below 1. For the upper limit of the scale, commenters stated that CPSC's and industry testing indicate that, even with modifications, CSUs that are currently on the market cannot exceed a stability rating of 2. Consequently, a scale that goes up to 5 may confuse consumers when they cannot find CSUs with ratings higher than 2 or may suggest that CSUs with a rating of 2 are unsafe. One commenter expressed concern that it will be costly to modify CSUs to achieve the required minimum rating of 1, let alone higher ratings. Commenters also requested clarification on whether the stability rating may be rounded, and suggested that CPSC use whole numbers, rather

than decimals, to avoid consumer confusion.

Response: As indicated in the NPR, CPSC staff's testing found that CSUs currently on the market do not exceed a stability rating of 2, even when modified to comply with the rule. Based on those test results and the above comments, the stability rating scale in this final rule ranges from 1 to ''2 or more.'' This is consistent with the minimum required rating of 1 and reflects realistic maximum stability ratings, while still allowing for designs to exceed a rating of 2. The final rule also specifies that stability ratings are to be rounded to one decimal place, which facilitates comparisons of CSUs with ratings between 1 and 2 and allows for easy comparison of CSUs (*e.g.,* a CSU with a rating of 2 is twice as stable as a CSU with a rating of 1). If CSUs increasingly achieve stability ratings greater than 2, the Commission can adjust the upper end of the scale in future rulemaking. As for costs, it is common in other product sectors with safety rating scales for manufacturers to offer products with a variety of ratings and prices to meet different consumer demands.

Comment: Some commenters stated that a stability rating hang tag may create a false sense of security in consumers, making them less likely to take added safety precautions, such as anchoring CSUs to a wall.

Response: The hang tag includes statements, such as ''no unit is completely safe from tip over'' and ''always secure the unit to the wall'' to warn consumers of the risk of tip overs and steps they can take to reduce those risks. Additional explanations on the back of the hang tag and on required warning labels provide further information about the hazard and ways to mitigate it.

Comment: Several commenters recommended places the hang tag information should be provided to ensure it is useful to consumers. Suggestions included at points of sale, including in showrooms and on sales websites; in instructions; on packages; on receipts; via emails provided by sellers upon purchase; and as permanent labels on CSUs so the information is visible to second-hand users. Some commenters recommended not requiring the hang tag appear on a CSU itself or on packaging, but only at points of sale, because that is when consumers make buying decisions.

Response: Consistent with the purpose of section 27(e) of the CPSA, the above comments, and the goal stated in the NPR of providing comparative safety information to consumers at the time they make buying decisions, the final rule requires that the hang tag information be provided at physical points of purchase, such as retail stores; on the CSU and package; and on manufacturer or importer websites where consumers may purchase the CSU directly. As the NPR discussed, requiring the hang tag be visible at a physical point of sale ensures the safety information is available to consumers when making a buying decision in stores. The final rule retains the requirement that the hang tag be provided on the CSU and its packaging because this ensures that the hang tag is visible to consumers at the time of purchase, regardless of how the product is displayed in a store (*e.g.,* assembled and displayed, or packaged). Because consumers also buy CSUs online, this is also a ''time of purchase'' where it is important for consumers to have the comparative safety information to make informed buying decisions. This requirement is limited to manufacturer and importer websites where the CSU can be purchased because section 27(e) of the CPSA only grants the Commission authority to require manufacturers (which includes importers) to provide performance and technical data, and it may only be required at the ''time of original purchase.'' Similarly, because section 27(e) only grants authority with respect to an ''original purchase'' and ''the first purchaser,'' the rule does not require the hang tag be placed in a way that would make it available to second-hand users. However, warning label requirements elsewhere in the rule make tip-over information available to second-hand users.

Comment: One commenter stated that the information on the back of the hang tag should be on the front to ensure consumers see an explanation of the rating. Another commenter expressed concern that using text is problematic for consumers who are not fluent in English.

Response: To ensure consumers can quickly understand the meaning of the stability rating, the final rule requires an additional statement on the front of the hang tag stating, ''This unit is [rating value] times more stable than the minimum required,'' with the stability rating of the CSU inserted for the bracketed text. Regarding English text, although the hang tag requirement only includes English, the rule does not prevent manufacturers from including a separate hang tag in another language.

F. Stockpiling Requirement

Comment: Several commenters expressed support for the anti-stockpiling provisions in the NPR, noting that industry members had sufficient notice of the rule given the duration of the rulemaking and that stockpiling limits are necessary to prevent industry members from increasing production of noncompliant CSUs. One commenter recommended a shorter and more limited stockpiling requirement and another recommended a limit based on the ''best'' year in the past 5 years, rather than the 13 months proposed in the NPR, because the previous 13 months are not representative due to supply chain issues during that period.

Response: The stockpiling provisions in the final rule balance the competing policy goals of addressing the hazard and preventing stockpiling and sales of noncompliant CSUs while accounting for realistic supply chain limits and the cost to businesses to comply with the rule. The Commission considers the provisions appropriate to balance these interests.

G. Economic Analyses

CPSC received numerous comments regarding the economic analyses in the NPR, including the preliminary regulatory flexibility analysis and the preliminary regulatory analysis. Comments addressed the costs of compliance for small businesses and ways to reduce those burdens, as well as the estimated costs and benefits of the rule, including: costs for manufacturers and importers, including for testing; costs to consumers; costs of interlocks; lost sales of matching furniture; the impact of the scope of products covered by the rule on benefits and costs; the Injury Cost Model and value of statistical life used to estimate benefits; the effective date; and alternatives. Comments from the U.S. Small Business Administration's Office of Advocacy are addressed in the final regulatory flexibility analysis in this preamble. A summary of comments and responses regarding the economic analyses are provided in Tabs H, I, and K of the final rule briefing package. As the briefing package explains, CPSC has updated the economic analyses for this final rule based on commenter input.

IX. Description of and Basis for the Rule

A. Scope and Definitions [86]

The final rule includes provisions regarding the scope of the standard and definitions of terms in the standard. The definition of a ''CSU'' is the basis for the

[86] For additional information about scope and definitions, see Tabs C and D of the NPR briefing package, and Tabs C, D, and K of the final rule briefing package.

scope of the rule and several terms within that definition are also defined in the standard. The final rule includes minor revisions to the application section of the rule and some definitions in the rule that do not alter the substance of these provisions. For example, the application section no longer includes the CPSA definition of a ''consumer product'' because the definitions section notes that CSUs are ''consumer products'' and refers to the definitions provided in the CPSA.

In addition, the final rule includes some substantive revisions to the definitions to address issues raised by commenters and identified by CPSC staff. This section focuses on the definition of a CSU and key terms used in that definition and defined in the standard, particularly terms for which the definitions have been revised since the NPR (*i.e.,* ''drawers,'' ''freestanding,'' ''open storage,'' and ''open space''). Additional definitions in the standard are discussed in the section below on stability requirements, where those terms are relevant.

1. Final Rule Requirements

The final rule applies to CSUs, defined as a consumer product that is a freestanding furniture item, with drawer(s) and/or door(s), that may be reasonably expected to be used for storing clothing, that is designed to be configured to greater than or equal to 27 inches in height, has a mass greater than or equal to 57 pounds with all extendable elements filled with at least 8.5 pounds/cubic foot times their functional volume (cubic feet), has a total functional volume of the closed storage greater than 1.3 cubic feet, and has a total functional volume of the closed storage greater than the sum of the total functional volume of the open storage and the total volume of the open space.

The rule specifically states that whether a product is a CSU depends on whether it meets this definition. However, to demonstrate which products may meet the definition of a CSU, the standard provides names of common CSU products, including chests, bureaus, dressers, armoires, wardrobes, chests of drawers, drawer chests, chifforobes, and door chests. Similarly, it names products that, depending on their design, generally do not meet the criteria in the CSU definition, including shelving units, office furniture, dining room furniture, laundry hampers, built-in closets, and single-compartment closed rigid boxes (storage chests).

Additionally, the rule exempts from its scope two products that generally would meet the definition of a CSU—clothes lockers and portable storage closets. It defines ''clothes locker'' as a predominantly metal furniture item without exterior drawers and with one or more doors that either lock or accommodate an external lock; and defines ''portable storage closet'' as a freestanding furniture item with an open frame that encloses hanging clothing storage space and/or shelves, which may have a cloth case with a curtain(s), flap(s), or door(s) that obscures the contents from view.

2. Basis for Final Rule Requirements

To determine the scope of products that the rule should address to adequately reduce the risk of injury from CSU tip overs, CPSC considered the nature of the hazard, assessed what products were involved in tip-over incidents, and assessed the characteristics of those products in relation to stability and children's interactions.

a. The Hazard

The CSU tip-over hazard relates to the function of CSUs, where they are used in the home, and their design features. A primary feature of CSUs is that typically they are used for clothing storage; however, putting clothing in a furniture item does not create the tip-over hazard on its own. Rather, the function of CSUs as furniture items that store clothing means that consumers and children are likely to have easy access to the unit and interact with it daily, resulting in increased exposure and familiarity. In addition, caregivers may encourage children to use a CSU on their own as part of developing independent skills. As a result, children are likely to know how to open drawers of a CSU, and are likely to be aware of their contents, which may motivate them to interact with the CSU. For this reason, one element of the definition of ''CSUs'' is that they are reasonably expected to be used for storing clothing.

CSUs are commonly used in bedrooms, an area of the home where children are more likely to have unsupervised time. As stated in the NPR, most CSU tip-over incidents occur in bedrooms: among the 89 fatal tip-over incidents reviewed in the NPR involving children and CSUs without televisions, 99 percent of the incidents with a reported location (70 of 71 incidents) occurred in a bedroom. This use means that children have more opportunity to interact with the unit unsupervised, including in ways more likely to cause tip over (*e.g.,* opening multiple drawers and climbing) that a caregiver may discourage.

Another primary feature of CSUs is closed storage, which is storage within drawers or behind doors. These drawers and doors are elements that can extend from the furniture case, which allow children to exert vertical force further from the tip point (fulcrum) than they would be able to without drawers and doors and that make it more likely that a child will tip the product during interactions. In addition, these features may make the product more appealing to children as a play item. Children can open and close the drawers and doors and use them to climb, bounce, jump, or hang; they can play with items in the drawers or get inside the drawers or cabinet. Children can also use the CSU drawers and doors for functional purposes, such as climbing to reach an item on top of the CSU. Accordingly, the definition of ''CSUs'' includes a minimum amount of closed storage and the presence of drawers and/or doors as an element. The element of the definition that indicates that a CSU has a total functional volume of the closed storage greater than 1.3 cubic feet and greater than the sum of the total functional volume of the open storage and the total volume of the open space is based on the total functional drawer volume for the shortest/lightest reported CSU involved in a nonfatal incident without a television. CPSC rounded the volume down, so that CSUs with this closed storage would be included in the definition.

The CSUs definition also states that the products are freestanding furniture items, which means that they remain upright, without needing attachment to the wall or other upright structures, in their normal use position. The lack of permanent attachment to the building structure means that CSUs are more susceptible to tip over than built-in storage items in the home.

b. Product Categories in Incident Data

For this rulemaking, staff focused on product categories that commonly meet the general elements of the definition of a CSU, in analyzing incident data; these included chests, bureaus, dressers, armoires, wardrobes, portable storage closets, and clothes lockers. As detailed in the discussion of incident data, of the child fatalities involving CSUs, 196 involved a chest, bureau, or dresser; 2 involved a wardrobe; 1 involved an armoire; and none involved a portable storage closet or clothes locker. Of the 1,154 reported CSU tip-over incidents (all ages), 1,148 incidents involved a chest, bureau, or dresser; 5 involved an armoire; 1 involved a wardrobe; and none involved a portable storage closet or clothes locker.

Based on these data, the definition of CSUs names chests, bureaus, dressers, wardrobes, and armoires as examples of CSUs that are subject to the standard. The rule exempts clothes lockers and portable storage closets from the scope of the standard because there are no reported tip-over fatalities or injuries to children that involved those products. Compared to chests, bureaus, and dressers, wardrobes and armoires have been involved in fewer tip-over incidents. However, the rule includes these products because there are some tip-over fatalities and injuries involving them, they are similar in design to the other CSUs included in the scope (unlike portable storage closets), and they are more likely to be used in homes than clothes lockers.

c. Product Height

As explained in the NPR, the height of the CSU was reported for 53 fatal and 72 nonfatal CPSRMS tip-over incidents involving children and CSUs without televisions. The shortest reported CSU involved in a fatal incident without a television was a 27.5-inch-tall, 3-drawer chest, which tipped over onto a 2-year-old child. Results from FMG's CSU focus group [87] suggest that consumers seek out low-height CSUs for use in children's rooms ''because participants would like a unit that is an appropriate height (*i.e.,* short enough) for their children to easily access their clothes.'' The average shoulder height of a 2-year-old is about 27.4 to 28.9 inches.[88] In the in-home interviews, researchers observed that CSUs in children's rooms typically were low to the ground and wide. Based on this information, children may have more access and exposure to low-height CSUs than taller CSUs.

For these reasons, the rule defines ''CSUs'' as including products that are designed to be configured to greater than or equal to 27 inches in height. The definition of a ''CSU'' in the NPR included that the unit be 27 inches tall or greater. The final rule retains this criteria, but also clarifies that this is determined by the height to which the CSU is designed to be configured. Staff has identified CSUs that are designed such that the height can be adjusted from below 27 inches to 27 inches or greater (such as by adjusting levelers or glides). Therefore, consistent with the NPR and to ensure that any units 27 inches tall or more are covered by the rule, the wording in the final rule has been adjusted accordingly.

d. Product Names and Marketed Use

The definition of ''CSUs'' relies on characteristics of the unit to identify covered products, rather than product names or the manufacturer's marketed use of the product. This is because, as the NPR and this preamble discuss, there are various products that consumers identify and use as CSUs and that pose the same tip-over hazard, regardless of how the product is named or marketed.

In the FMG CSU use study,[89] participants showed flexibility in how they used CSUs and other similar furniture in the home, depending on their needs, aesthetics, and where the unit was placed within the home. For example, one participant put a large vintage dresser in their living room and used it for non-clothing storage; one participant said that their dresser was used as a changing station and held diapers, wipes, creams, and medical supplies, but is now used to store clothes; and a participant said that the dresser in their child's room was originally used to store dishes.

Some participants in the in-home interviews and focus groups used nightstands for clothing storage, including for shirts; socks; pajamas; slippers; underwear; smaller/lighter items, such as tights or nightwear; seasonal items; and accessories. Participants also had a wide variety of interpretations of the marketing term ''accent piece,'' with some saying that they use accent pieces for clothing storage, and one identifying a specific accent piece in their home as a CSU.

As part of the study, researchers asked focus group participants to fill out a worksheet with pictures of unnamed furniture items with dimensions. Participants were asked to provide a product label (category of product) and answer the question: ''What would you store in this piece of furniture?'' ''Where would you put this piece of furniture in your home?'' Participants then discussed the items as a group. Results suggest that there is wide variety in how people perceive a unit. For example, one unit in the study was classified by participants as a cabinet, television stand, accent/occasional/entryway piece or table, side table/sideboard, nightstand, kitchen storage/hutch/drawer, and dresser. Another was classified as an accent piece, buffet/sideboard, dresser, entry/hall/side table, chest/chest of drawers, kitchen storage unit/cabinet, sofa table, bureau, and china cabinet. Overall, the results from the study suggest that there is not a distinct line between units that people will use for clothing storage, as opposed to other purposes; and even within a unit, the use can vary, depending on the consumer's needs at the time.

CPSC also is aware of products that are named and advertised as generic storage products with multiple uses around the house, or they are advertised without context suggesting a particular use. Many of these items clearly share the design features of CSUs, including closed storage behind drawers or doors. In addition, CPSC is aware of products that appear, based on design, to be CSUs, but are named and advertised for other purposes (*e.g.,* an ''accent piece'' with drawers staged in a foyer, and large multi-drawer ''nightstands'' over 27-inches tall). CPSC is also aware of hybrid products that combine features of CSUs with features of other product categories.

Using the criteria in the definition of a CSU, products typical of shelving units, office furniture, dining room furniture, laundry hampers, built-in units, and single-compartment closed rigid boxes likely would not be CSUs. The rule generally excludes these products, by including in the definition of ''CSUs'' that a CSU is freestanding; has a minimum closed storage functional volume greater than 1.3-cubic feet; has a closed storage functional volume greater than the sum of the open storage functional volume and open space volume; has drawer(s) and/or door(s); and is reasonably expected to be used for clothing. In contrast, some furniture, such as occasional/accent furniture, and nightstands could be CSUs. The criteria for identifying a CSU in the rule would keep some of these products within scope, and exclude others, depending on their closed storage, reasonable expected use, and the presence of doors/drawers, such that those products that may be used as CSUs and present the same hazard, would be within the scope of the standard, while those that would not, would be excluded.

Because consumers select units for clothing storage based on utility, rather than marketing, and there are products that are not named or advertised as CSUs but are indistinguishable from CSUs based on their design, the ''CSU'' definition does not rely on how a product is named or advertised by a manufacturer.

e. Product Weight

NPR and final rule. In the NPR, the Commission did not propose to include a weight criterion as part of the

[87] See Tab Q of the NPR briefing package.

[88] The mean standing shoulder height of a 2-year-old male is 28.9 inches and 27.4 inches for a 2-year-old female. Pheasant, S., Bodyspace Anthropometry, Ergonomics & Design. London: Taylor & Francis (1986).

[89] See Tab Q of the NPR briefing package.

definition of a CSU, noting that consumers use light weight units as CSUs and such units can be loaded to weigh as much as CSUs involved in fatal tip-over incidents when filled with 8.5 pounds per cubic foot of storage volume (*i.e.,* the load representative of normal clothing fill). However, the NPR did raise the possibility of excluding certain lightweight units that may not pose the same risk of death or serious injury in a tip-over incident. The NPR noted that CPSC did not identify any tip-over incidents involving lightweight plastic units, but also indicated that the type and weight of unit was undetermined in many incidents. The NPR explained that the lowest-weight non-modified [90] CSU involved in a fatal tip-over incident weighed 57 pounds total at the time of the incident (because the unit was reportedly empty), and other lower-weight units in fatal incidents weighed 57.5 pounds and 68 pounds. The NPR also requested comments on excluding certain lightweight units from the scope of the rule.

The final rule includes in the definition of a CSU the criterion that the unit have a mass greater than or equal to 57 pounds with all extendable elements (*i.e.,* drawers and pull-our shelves) filled with at least 8.5 pounds per cubic foot times their functional volume. This results in excluding certain lightweight units from the definition of a CSU and the scope of the rule. Specifically, if the weight of the empty CSU and a clothing fill weight of 8.5 pounds per cubic foot of functional storage volume totals 57 pounds or more, then the unit falls within the scope of the rule. If the total weight of the empty CSU and this clothing fill is less than 57 pounds, the unit is excluded from the definition of a CSU. This revision is based on comments received on the NPR, staff's assessment of the mechanism of injury with lightweight CSUs, lightweight CSU incidents discussed in the NPR, staff's assessment of the total weights such units can achieve, and the effect of a lightweight exception on the effectiveness of the final rule.

Comments on the NPR. Several comments on the NPR suggested that lightweight units with an empty weight of 30 pounds or less should be excluded from the scope of the rule. This suggestion is consistent with a change ASTM is considering for its standard on CSUs. Commenters noted that, for incidents in which the type/weight of the unit is known, there are no known incidents involving such lightweight units and that lighter weight units would not be able to meet the stability requirements in the rule, thereby removing such products from the market.

Mechanism of injury. CPSC staff assess that heavier CSUs pose a greater potential for injuries and for more severe injuries because the mass/weight of the CSU is a key component in the mechanisms that cause injury or death in a CSU tip-over. Accordingly, lighter weight CSUs may pose less of a risk of serious injury and death in a tip-over incident than heavier weight units. Head injuries, compressional and mechanical asphyxia, and strangulation are the leading causes of injuries in CSU tip-over incidents. The mass/weight of the CSU is one key factor that contributes to these injuries because higher mass CSUs create greater impact forces and compressional forces, thereby increasing the risk and severity of injuries. High mass/weight CSUs also make self-rescue more difficult because children are less likely to be able to move the fallen CSU or get out from under it.

Incident analysis. Staff considered what weight limit would capture CSUs that are heavy enough to present an unreasonable risk of injury during a tip-over incident, while excluding lighter weight units that are unlikely to pose the same hazard. To identify an appropriate weight limit for CSUs, staff reexamined the incident data where the CSU weights were reported or where staff could determine the weight of the CSUs based on product information or other data sources. Table 1 shows the lightest weight CSUs involved in fatal and nonfatal incidents. Note that Table 1 includes units with heights less than 27 inches, which would result in them not meeting the definition of a CSU in the rule. However, staff included these in the analysis because they were the lightest weight units involved in incidents and, as such, indicate the lowest weights that may result in injuries.

TABLE 1—LIGHTEST WEIGHT CSUS INVOLVED IN FATAL AND NONFATAL TIP-OVER INCIDENTS

Injury	CSU empty weight (pounds)	CSU height (inches)	In scope under NPR	In scope under final rule
Fatal Incidents				
Death—chest compression	34 (with 3 bottom drawers missing from a 5-drawer unit).	42	Yes	Yes.
Death—neck compression	57 (empty at time of incident)	27.5	Yes	Yes.
Death—waist compression	57.5	39.5	Yes	Yes.
Death—chest compression	66.5	33	Yes	Yes.
Death—waist compression	68	30.8	Yes	Yes.
Death—neck compression	68	30.8	Yes	Yes.
Death—neck compression	68	30.8	Yes	Yes.
Nonfatal Incidents				
Minor bruise under eye	28.5 *	26.8	No	No.
Bruising to both legs	31 *	26	No	No.
Scratches and bruises	31 *	26	No	No.
Laceration to cheek	39.7 *	22.6	No	No.
Laceration requiring 3 stitches	39.7 *	22.6	No	No.
Laceration to top of foot and a bruise to calf	45	28.1	Yes	Yes.

* CPSC could not determine the weight of the CSU alone, so this is the package weight (*i.e.,* combined weight of the CSU and packing material), as listed on the manufacturer's website.

[90] There was a CSU identified in a fatal tip-over incident without a television that weighed 34 pounds, but that was missing several drawers at the time of the incident, and the drawer fill was unknown, making the total weight unclear.

As Table 1 indicates, the lightest weight CSU involved in a fatal incident was 34 pounds. However, the configuration and weight of this CSU at the time of the incident is uncertain. The CSU was a 5-drawer unit and, at the time the incident was investigated, the 3 bottom drawers of the unit were not with the CSU; 2 of the drawers were in another room and 1 was ''disassembled'' in a separate room. It is not clear whether these 3 drawers were installed at the time the unit tipped over and were moved out of the way after the incident, or if the drawers were removed at the time of the incident. With only the 2 drawers installed, the coroner's report indicates that the unit weighed 34 pounds. As such, CPSC does not know the total weight of the CSU or its weight at the time of the incident. For this reason, CPSC cannot rely on the weight reported for this incident and did not use this incident to determine an appropriate weight limit for the rule.

The next lightest CSU involved in a fatal tip-over incident weighed 57 pounds. This unit was intact (*i.e.,* not missing drawers) and reportedly empty at the time of the incident, making the total weight 57 pounds. In this incident, the victim was laying on her back with the CSU on top of her neck between the CSU drawers. The CSUs in the remaining fatal incidents weighed more than 57 pounds. Three of the remaining victims were found with the CSU on their necks and three were found with the CSU compressing their chests or waists. The mechanism for these injuries is the weight of the CSU and contents pressing against the victim's body, which provides further indication that the weight/mass of a CSU is a key factor in the potential occurrence and severity of injuries or death in a CSU tip over. As such, it is reasonable to account for CSU weight in determining the scope of the rule. Overall, these incidents indicate that the 57 pounds total weight is the lowest weight shown to result in fatality during a CSU tip over.

As Table 1 and the NPR indicate, lighter weight units have been involved in nonfatal incidents. The lightest weight CSU involved in a nonfatal incident was 45 pounds; the lighter units would not meet the definition of a CSU because they are not 27 inches tall, but staff considered these incidents as a possible indication of the lowest weights that could result in injuries during a tip-over incident. However, none of these lighter-weight nonfatal incident units resulted in serious injuries. All of the injuries were relatively minor, including bruising and lacerations. Staff also considered two incidents involving plastic units in the NEISS nonfatal data. Although the weight of these units was not reported, staff considered them because, as plastic units, they are likely to have been lightweight. In one incident, the unit tipped over, resulting in an unspecified head injury for which the child was treated and released, suggesting the injury was likely not serious. In the other incident, the unit caused a laceration to the right eye, which also resulted in the child being treated and released. Because of the minor nature of the injuries in these nonfatal incidents, CPSC does not consider these incidents a good representation of the weight of CSUs that have the potential to cause serious injuries or death in a tip-over incident. For this reason, the final rule relies on the lowest-weight unit involved in a fatal incident—57 pounds—because this indicates the lowest weight shown to pose a risk of serious injury or death.

Having identified an appropriate total weight at which to establish a threshold for the final rule, CPSC also considered how to determine the total weight. As explained, the 57-pound CSU involved in a fatal incident was empty at the time of the incident. Thus, its total weight at the time of the incident was 57 pounds. However, incident data indicates that for CSU tip-over incidents with a reported drawer fill, most involve partially or fully filled drawers (95 percent of fatal CPSRMS incidents and 90 percent of nonfatal CPSRMS incidents with reported drawer fill), and this use is expected because CSUs are intended to store clothing. As such, it is necessary to consider clothing fill weight, in addition to the empty weight of the CSU, when determining whether a CSU reaches the total weight of 57 pounds that poses a risk of severe injury or death. As discussed in this preamble, staff has determined that 8.5 pounds per cubic foot of functional storage volume represents a reasonable fill weight of clothing in CSUs. Consistent with this, the NPR explained that lightweight units that can reach the total weight, with clothing fill, that presents a hazard, need to be addressed in the rule. Therefore, the final rule uses this fill weight to determine whether a CSU can reach a total weight of 57 pounds and poses a risk of serious injury or death.

Effect of 57-pound criteria. To determine what effect this exclusion would have on units included in the scope of the rule and whether it would continue to address all known CSU tip-over incidents, staff assessed the filled weights of CSUs on the market and involved in incidents.

To assess units on the market, staff selected 3 lightweight CSUs, with a variety of designs (*i.e.,* number of drawers, configurations, and materials), all taller than 27 inches and weighing less than 30 pounds empty. Information about these units is shown in Table 2.

TABLE 2—LIGHTWEIGHT CSU TESTING

Unit	Description	Dimensions (width, height, depth) (inches)	Empty weight (pounds)	Calculated drawer fill weight * (pounds)	Total weight (pounds)
A	6 drawers in one column, plastic	33.75 × 48 × 15.5 ..	16.0	53.4	69.5
B	8 drawers in 2 columns (4 drawers per column), cloth drawer, metal frame, wooden top.	33.75 × 39.5 × 15.5	25.2	54.4	79.6
C	6 drawers arranged with 2 small drawers in the top row and 4 large drawers below in a single column, plastic.	23.75 × 38.75 × 15.75.	19.2	39.3	58.5

* Calculated using 8.5 pounds per cubic foot.

As Table 2 indicates, although all of these units weighed less than 30 pounds empty (which is the weight exclusion requested by commenters) and they all weighed more than 57 pounds when filled with a reasonable clothing fill density. This demonstrates why it is necessary to consider the total filled weight of a CSU, and not the empty weight of a CSU, in establishing a weight threshold for the scope of the rule.

Staff also reviewed information about lightweight units on the market to determine the extent to which they

would be excluded or included in the scope of the rule. Staff found that many lightweight units on the market are less than 27 inches tall and, as such, would not fall within the scope of the rule, regardless of their weight. Staff also noted that the lightest weight units in nonfatal tip-over incidents were almost all under 27 inches in height. Smaller units with lower capacities would be excluded from the scope of the rule. Overall, the number of lightweight units that are 27 inches or taller and weigh less than 57 pounds when filled is small, making the impact of the rule similar to that proposed in the NPR.

To ensure that the tip-over hazard would still be sufficiently addressed, CPSC also assessed whether any CSUs involved in tip-over incidents would be excluded from the scope of the rule as a result of this weight criterion. Staff found that the 57-pound filled weight criterion would not exclude from the scope of the rule any CSUs that were involved in fatal CPSRMS incidents or nonfatal CPSRMS incidents that were not already excluded from the scope based on height.[91] As such, the weight criterion retains within the scope of the rule CSUs that have been demonstrated to and are likely to present the risk of serious injuries or death in a tip-over incident, while excluding units that are not likely to and have not been demonstrated to present the same risk.

f. Definition of Drawers

The final rule defines a ''drawer'' as a furniture component intended to contain or store items that slides horizontally in and out of the furniture case and may be attached to the case by some means, such as glides. This is the same as in the NPR. However, the final rule also adds to the definition an explanation that only components that are retained in the case when extended up to ⅔ the shortest internal length, when empty, are included in this definition.

As the language in the NPR and final rule indicates, drawers may be attached to the case, but do not have to be. CPSC received a comment on the NPR indicating that bins should be excluded from the definition of a drawer. CPSC agrees that features that extend from the case of a CSU contribute to instability differently depending on their retention within the case. An extended element contributes to a CSU's instability by shifting the CG of the CSU forward, and this contribution to instability increases when the extended element is filled with clothing. As such, components that fall out of the case when extended will not shift the CG of the CSU forward because once the component falls out of the case, it is no longer part of the CSU and forces on it do not affect the CSU.

Staff examined how to distinguish between drawers and furniture components that are intended to contain or store items but are not usable as extendable elements that are likely to contribute to instability when extended. One way to capture attached and unattached components that can contribute to instability is provided in ANSI/BIFMA X6.5–2022, *Home Office and Occasional-Use Desk, Table and Storage Products,* which includes in the definition of ''extendible element,'' ''[e]xtendible elements have an outstop OR will remain in the drawer case/cabinet (in its normal use position) when it is extended up to ⅔ of its depth.'' Staff assessed this with CSUs with unattached extension features and found that for some units, these elements were retained within the case of the CSU when extended to ⅔ of their shortest internal length, which is the measurement used in the rule for drawer depth. Other such extension elements did not remain in the CSU case when extended to ⅔ of their depth. Staff found that the ⅔ extension criterion reasonably excludes components that are not usable as extendable elements and are unlikely to contribute to instability. Moreover, the ⅔ extension criterion aligns with the definition of ''maximum extension'' in the rule, which includes, ''[i]f the manufacturer does not provide a recommended use position by way of a stop, [maximum extension] is ⅔ the shortest internal length of the drawer measured from the inside face of the drawer front to the inside face of the drawer back.''

For these reasons, the definition of a ''drawer'' includes the clarification that the term includes components that are retained in the case when extended to ⅔ the shortest internal length, when empty. This retains the definition from the NPR, which includes components that are attached or unattached to the CSU case, while ensuring that the definition only captures those components that would contribute to instability, consistent with the purpose of the rule.

g. Definition of Freestanding

The final rule defines ''freestanding'' to mean that the unit remains upright, without needing attachment to the wall or other upright rigid structure, when it is fully assembled and empty, with all extendable elements and doors closed and specifies that built-in units are not considered freestanding. This definition remains the same as in the NPR, but with modifications to address comments and provide better clarity.

As discussed above, a CSU only includes freestanding products because the lack of permanent attachment to a building structure means that CSUs are susceptible to tip over, whereas built-in storage items are unlikely to pose a tip-over hazard. Examples of built-in/permanently attached items provided in the NPR were bathroom vanities and kitchen cabinets, which are typically permanently attached to walls and/or floors in a sufficiently secure manner to make it unlikely they will tip over. The NPR also explained that CSUs need to be inherently stable, rather than rely on tip restraints, because of various reasons tip restraints may not be used, installed properly, or be effective. The NPR also noted that how a manufacturer intends a product to be used/installed (*e.g.,* with tip restraints) is not determinative of whether it is a CSU because consumers will use products that function as CSUs as CSUs, regardless of marketing or manufacturer intent. As such, tip restraints and similar features, alone, would not make a unit non-freestanding.

However, CPSC received several comments seeking clarification of the term ''freestanding,'' including the meaning of permanent attachment to the building structure, confusion about reference to a tip restraint, and specific items that may be permanently installed in a home. To address these comments, the final rule adds ''other upright rigid structure'' to possible attachments since any attachment to such a structure, not just to the wall, could render a unit non-freestanding; removes reference to tip restraints, since that was confusing to commenters; and removes the examples provided in the NPR. Kitchen cabinets and bathroom vanities may have caused confusion as examples because they are unlikely to meet other criteria of the CSU definition (*e.g.,* use for clothing storage, sufficient closed storage).

These revisions retain the same meaning of ''freestanding'' as in the NPR and remain consistent with the purpose of including only freestanding items in the definition of a CSU by focusing on how consumers will foreseeably install and use products and whether they will be sufficiently attached to make them unlikely to tip over.

h. Definitions of Open Storage and Open Space

As described in the NPR, the definition of a CSU was developed, in

[91] Staff based their assessment on the available information, including reported product weights, identification, descriptions, and pictures. However, staff does not have details on all incident-involved units.

part, based on consumer perceptions, as indicated during the CSU use study focus group [92] One of the design features of a CSU that staff identified was that a CSU has more closed storage than display storage (*e.g.,* storage behind glass doors) and other open storage (*e.g.,* cubbies), and/or open space (*e.g.,* space under legs). This is because consumers reported using CSUs to protect clothing, whereas they perceive glass doors as typically used to display items, making them unlikely to be used as CSUs. Researchers also found that legs and the bottom of a product are features consumers often consider when classifying something as a CSU. To address this, the final rule definition of a CSU includes, as one element, that the total closed storage functional volume is greater than 1.3 cubic feet and greater than the sum of the open storage functional volume and the open space volume.

The final rule defines ''open storage'' as the space within the frame of the furniture, that is open (*i.e.,* is not in a drawer or behind an opaque door) and that can be reasonably used for storage (*e.g.,* has a flat bottom surface) and provides, as examples, open shelf space that is not behind a door, display space behind a non-opaque door, and framed open clothing hanging space. In the NPR, this term was defined as ''storage space enclosed on at least 5 sides by a frame or panel(s) and/or behind a non-opaque door and with a flat bottom surface.'' The final rule defines ''open space'' as space within the frame of the furniture, but without a bottom surface and provides, as examples, open space between legs, such as with a console table, or between separated storage components, such as with a vanity or a desk. The definition of ''open space'' further specifies that it does not include space inside the furniture case (*e.g.,* space between a drawer and the case) or any other space that is not visible to a consumer standing in front of the unit (*e.g.,* space behind a base panel). The NPR defined ''open space'' as space enclosed within the frame, but without a bottom surface.

CPSC received a comment on the NPR requesting clarification of how to classify certain spaces within or around a furniture piece for purposes of determining ''open storage'' and ''open space.'' To address this comment for ''open storage,'' the final rule replaces ''storage space enclosed on at least 5 sides by a frame or panel(s) and/or behind a non-opaque door'' with ''space within the frame of the furniture that is open (*i.e.,* is not in a drawer or behind an opaque door).'' These descriptions convey the same meaning but address the confusion expressed by the commenter. The final rule also replaces ''with a flat bottom surface'' with ''reasonably can be used for storage (*e.g.,* has a flat bottom surface)'' based on a comment that open storage may not have a flat bottom surface. The definition now also includes examples, based on descriptions and examples in the NPR and from the commenter. Overall, this definition remains consistent with the NPR and aligns with that of ''closed storage'' in the rule.

To address the comment for ''open space,'' the final rule slightly modifies wording and adds examples, consistent with the description in the NPR. The modification includes changing ''under legs'' to ''open space between legs,'' based on the commenter's suggestion. The definition also adds that ''open space'' does not include space inside the furniture case or space that is not visible to a consumer (with examples), which is consistent with the purpose of aligning the CSU definition with consumer perceptions.

B. Stability Requirements [93]

1. Final Rule Requirements

The requirements for stability of CSUs consist of configuring the CSU for testing, performing testing using a prescribed procedure, and determining whether the performance results comply with the criteria for passing the standard. There are several terms used in the stability requirements that are defined in the standard.

To configure the CSU for testing, the rule requires the CSU to be placed on a hard, level, flat surface in the orientation most likely to cause a tip over. If the CSU has levelling devices, the devices are adjusted to the lowest level and then according to the manufacturer's instructions. The CSU is then tipped forward using a test block that is at least 0.43 inches thick to simulate carpet. All doors, drawers, and pull-out shelves that are not locked by an interlock that withstood interlock testing (see below) are then open to the least stable configuration and fill weights are placed in drawers and pull-out shelves, depending on the proportion of drawers and pull-out shelves that are open. Because the test configuration differs, depending on the presence and effectiveness of interlocks, the rule requires testing the interlocks before conducting the stability testing.

The interlock testing consists of placing the CSU on a hard, level, flat surface; levelling to the lowest level and then according to manufacturer instructions; securing the unit to prevent sliding or tip over; and opening the number of doors, drawers, or pull-out shelves necessary to engage the interlock. A 30-pound horizontal pull force is then applied at the center of the pull area on each interlocked door, drawer, or pull-out shelf, one at a time, over a period of 5 seconds, and held for at least 10 seconds. This pull test is repeated until all possible combinations of doors, drawers, and pull-out shelves have been tested. If any interlocked door, drawer, or pull-out shelf opens without retracting the originally open element, or the interlock is damaged or does not function as intended during this testing, then the interlock is to be disabled or bypassed for the stability testing. In general, when interlocks are provided, they must be pre-installed and automatically engage as part of normal use.

For the stability testing, all doors, drawers, and pull-out shelves that are not locked by an interlock meeting the requirements of the interlock test are open to the maximum extension (as defined in the standard), in the configuration most likely to cause a tip over (typically the largest drawers in the highest position open). If 50 percent or more of the drawers and pull-out shelves by functional volume are open, a fill weight is placed in the center of each drawer or pull-out shelf, including those that remain closed. The fill weight of 8.5 pounds per cubic foot times the functional volume (cubic feet) is the minimum permitted in open drawers and pull-out shelves, and the maximum permitted in closed elements. If less than 50 percent of the drawers and pull-out shelves by functional volume are open, no fill weight is placed in any drawers or pull-out shelves.

The rule provides two test methods for the tip-over test. Test Method 1 must be used for CSUs with drawers or pull-out shelves that extend at least 6 inches from the fulcrum. It involves applying weights to the face of one or more extended drawers or pull-out shelves to cause the unit to tip over. At that point, the tip-over moment of the unit is calculated by multiplying the tip-over force (as defined in the standard) by the horizontal distance from the center of force application to the fulcrum (as defined in the standard).

Test Method 2 must be used for any CSU for which Test Method 1 does not apply. It involves applying a horizontal force to the CSU orthogonal (*i.e.,* at a right angle) to the fulcrum to cause the

[92] See Tab Q of the NPR briefing package.

[93] For additional information about the stability requirements in the rule, including interlock testing and relevant definitions, see Tabs C and D of the NPR and final rule briefing packages.

unit to tip over. The tip-over moment is then calculated by multiplying the tip-over force by the vertical distance from the force application point to the fulcrum.

If a failed component prevents the completion of either test method, then to continue testing, the failed components must be repaired or replaced to their original specifications and, if necessary, be secured to prevent the components from failing, as long as the modifications do not increase the tip-over moment.

Once the tip-over moment for the CSU has been determined, that value must be greater than several comparison moments, as applicable, depending on the design of the CSU. The first comparison moment applies to CSUs with drawers or pull-out shelves and is 55.3 pounds times the drawer or pull-out shelf extension from the fulcrum distance (as defined in the standard, in feet), plus 26.6 pounds feet. The second comparison moment is for units with doors and is 51.2 pounds times the door extension from fulcrum distance (as defined in the standard, in feet), minus 12.8 pounds feet. The third comparison moment applies to all CSUs and is 17.2 pounds times the maximum handhold height (as defined in the standard, in feet). The greatest of these three comparison tip-over moments is considered the threshold moment, which the tested CSU's tip-over moment must exceed.

2. Basis for Final Rule Requirements

As described in this preamble and the NPR, there are several factors that are commonly involved in CSU tip-over incidents that contribute to the instability of CSUs, and a number of these factors often occur simultaneously. These include multiple open and filled drawers or pull-out shelves, carpeting, and forces generated by children's interactions with the CSU (such as climbing and opening/pulling on drawers). The rule includes requirements to simulate or account for all of these factors, in order to accurately assess the stability of CSUs during real-world use.

The stability testing in the rule simulates these factors simultaneously (*e.g.,* all drawers and pull-out shelves open and filled, on carpet, and accounting for child interaction forces). This is because incident data indicate that these factors commonly exist at the same time. For example, incidents include children climbing on open drawers, filled with clothing.

This section discusses the basis for the stability requirements in the final rule as well as the definitions of terms relevant to those requirements. Based on comments received in response to the NPR, the final rule includes revisions to the stability requirements and relevant definitions. Accordingly, this section also notes the provisions and relevant definitions that have been revised and discusses the comments and justifications for those revisions.

a. Definitions

This section discusses definitions that are relevant to stability testing that have been revised or added since the NPR to address comments submitted on the NPR and staff's assessments. Additional terms that are defined in the standard are addressed in the discussion of the stability requirements, below.

Door extension from fulcrum distance. The NPR specified that, for purposes of determining the doors extension from fulcrum distance, the door was to be ''in a position where the center of mass of the door is extended furthest from the front face of the unit'' and that this is ''typically 90 degrees.'' As the NPR explained, all doors and extendable elements should be open to the maximum extension and least stable configuration for stability testing because this is consistent with the purpose of the testing provisions to assess CSUs in their least stable likely configuration during real-world use. CPSC received comments regarding the same wording in the stability requirements on how to open doors for testing; the comments indicated that testers misunderstood the requirement to mean that they must measure the CM of the door to determine what position to which to open it. To clarify the meaning of this provision, the final rule states that the door is to be in the least stable configuration, which is typically 90 degrees. This accomplishes the same purpose as the NPR provision, but should eliminate confusion on how to configure the door, and make clear that testers need not measure the CM of the door.

Extendable elements. The proposed rule included numerous requirements for ''drawers and pull-out shelves'' and those terms are both defined in the rule. Several furniture-related voluntary standards use the term ''extendable element'' to refer to drawers and pull-out shelves. Because the term ''extendable element'' has the same meaning as ''drawers and pull-out shelves,'' but is more concise and does not diminish understanding, the final rule replaces references to ''drawers and pull-out shelves'' with ''extendable elements.'' This does not change any requirements in the rule; it merely uses more concise terminology.

Fulcrum. Intuitively, the fulcrum is located at the front of the bottom-most surface of the CSU. This is the point or line about which the CSU pivots when it tips forward. Therefore, the rule defines the fulcrum as the bottom point or line of the CSU touching the ground about which the CSU pivots when a tip-over force is applied. The fulcrum is typically located at the line connecting the front feet. However, for CSUs without feet, or for CSUs with an atypical pattern of feet, the fulcrum may be in a different location. Some CSUs may have multiple fulcrums that will vary, depending on the direction the tip-over force is applied. The fulcrum that results in the smallest tip-over moment should be determined.

The proposed rule defined ''fulcrum'' as ''the point or line at the base of the CSU about which the CSU pivots when a tip-over force is applied (typically the front feet).'' The fulcrum position is used in four measurements within the stability requirements. The first is the *extendable element extension from fulcrum distance* and the second is the *door extension from fulcrum distance.* Both of these distance measurements are used to determine the threshold moment, which establishes the minimum stability requirement of the CSU. The third and fourth measurements for which the fulcrum position is used are to determine the tip-over moment in Test Methods 1 and 2, which determine whether the CSU meets the minimum stability requirement.

CPSC received several comments relating to consistent measurements to the fulcrum, some of which sought clarity on when to determine the fulcrum position. It is possible that the fulcrum position may shift forward as a CSU tilts or pivots forward during the test. For most CSUs, this positional shift is small and does not have a significant effect on measurements to the fulcrum. However, some CSUs with may extend the fulcrum forward significantly while they are tilting forward. Depending on when certain measurements to the fulcrum are made, a forward-shifted fulcrum could either result in a smaller threshold moment (making the test easier to pass) or in a reduced moment arm for the tip-over moment (making the test more difficult to pass). For this reason, the fulcrum position should be determined before a tip-over force is applied since the fulcrum position is used as a reference point for several measurements. Based on comments, this was not clear in the NPR. Because a lack of clarity on this could lead to potential inconsistencies in measurement, the final rule revisions to make clear at

what point to determine the fulcrum and at what stage of the stability test measurements to the fulcrum are to be made. Specifically, the fulcrum definition is revised to indicate that the fulcrum position is determined while the CSU is on a hard, level, flat test surface with all doors and extendable elements closed. This establishes a clear reference that can be used at any stage of testing, making the stability test repeatable and reproducible. In addition, Test Method 1 and Test Method 2 specify that the appropriate time to record the distance measurement to the fulcrum is before the load is applied.

Another comment asked what distance to use for determining the fulcrum for CSUs with drawers that extend to different lengths. The NPR regulatory text depicted in a figure a CSU with drawers extended to different lengths, and showed the drawer extension from fulcrum distance measured to the drawer with the longest extension. However, the comment suggests that may not be sufficiently explicit. Lack of clarity on this issue could lead to potential inconsistencies in measurement. To address this, the final rule adds to the stability test configuration requirements that, after the CSU has been leveled, to record the maximum handhold height and the longest extendable element extension from fulcrum distance and door extension from fulcrum distance, as applicable. This establishes a clear time when the appropriate measurements are to be taken, and makes clear that the longest extendable element extension from fulcrum distance is to be used, without relying on figures to express the intended measurement.

Interlock. In the NPR, ''interlock'' was defined as ''a device that restricts simultaneous opening of drawers. An interlock may allow only one drawer to open at a time, or may allow more than one drawer, but fewer than all the drawers, to open simultaneously.'' The rule addresses interlocks because they are an option for increasing the stability of a CSU by decreasing the mass that can be opened from the case of the CSU simultaneously. As such, the rule includes testing provisions that accommodate these features and assess the strength of these features to ensure they function during real-world use conditions.

One manufacturer commented that the definition should account for the fact that interlocks are not limited to drawers and could also be used for pull-out shelves and doors. Doors and extendable elements all extend from the case of a CSU, shifting the CG of the unit outward, thereby making the CSU less stable. As such, interlocks, which restrict the extension of any such extended elements, could be used to improve CSU stability, and it is important that the rule allow for these features for design flexibility and ensure that interlocks are strong enough to function as intended under real-world use conditions. Although the NPR did not explicitly include pull-out shelves and doors in the requirements regarding interlocks, the NPR did indicate that the purpose of the interlock requirements in the NPR was to ensure interlocks function effectively and are accommodated in the test requirements and that other similar standards that address interlock integrity apply to all extendable elements. To address these comments and provide design flexibility, the final rule includes doors and pull-out shelves in the definition of an ''interlock'' and adds these features to provisions regarding interlocks.

A commenter also stated that the second sentence of the definition in the NPR was unnecessary as it did not add to the explanation. Because the first sentence of the definition provides sufficient explanation of the term and the requirements in the standard address interlocks that do not affect all extendable elements, the final rule removes the second sentence from the definition. Another commenter requested that the term ''device'' be changed to ''feature'' to provide as much design flexibility as possible. Although CPSC does not believe this wording change affects the scope of products that meet the definition of an ''interlock,'' the final rule uses ''feature'' to address this comment and ensure adequate clarity about the range of features that can serve as an interlock.

Maximum handhold height. In the NPR, ''maximum handhold height'' was defined as ''the highest position at which a child may grab hold of the CSU. This includes the top of the CSU. This height is limited to a maximum of 4.12 feet from the ground, while the CSU is on a flat and level surface.'' The definition also included a reference to a figure, which indicated a maximum height of 4.12 feet.

CPSC received a comment on the NPR, asking to add to this definition that it is ''a handhold feature at or below 4.12 ft,'' which suggests that the commenter misunderstood the definition in the NPR. The maximum handhold height includes the top of the CSU, but is limited to a maximum of 4.12 feet from the ground, which is based on the overhead reach height for a 95th percentile 3-year-old male.[94] Therefore, the maximum handhold height is either: (1) the height of the unit, if the unit is under 4.12 feet tall, or (2) 4.12 feet if the unit is that tall or taller. Because the comment suggests some potential for misunderstanding this, the final rule rewords the definition to make it clear that maximum handhold height means the highest position at which a child may grab hold of the CSU, measured while the CSU is on a hard, level, and flat test surface. For units shorter than 4.12 feet, this is the top of the CSU. For units 4.12 feet or taller, this is 4.12 feet. The final rule also includes a revised figure to illustrate this.

Test block. To replicate the effects of carpet during stability testing, the NPR proposed to require that the CSU be tilted forward 1.5 degrees during testing by raising the rear of the unit, placing the CSU on an inclined surface, or using other means. The NPR explained the testing used to determine that 1.5 degrees was the average angle that replicates the effect of carpet (see discussion of tip angle below).

CPSC received several comments recommending that a test block be used to achieve an appropriate angle, rather than specifying an angle, to make the test easier to conduct, aid repeatability and reproducibility, and because tilt angle could be affected by CSU attributes such as weight or depth. A manufacturer recommended that a 0.43-inch-thick test block would achieve the same purpose as the test angle in the NPR. To evaluate whether a test block could achieve a comparable tilt angle to that determined to simulate the effect of carpet, staff assessed the tilt angle that a 0.43-inch-thick test block would produce on most CSUs. Staff used the depth measurements for CSUs that were previously identified by staff[95] and calculated the angle that would be produced by raising the rear of the CSU 0.43 inches.[96] Staff determined that raising the rear of the CSU 0.43 inches tilted the CSU forward at an average angle of 1.5 degrees. The total range of angles produced by this test block was 1.2 degrees to 2.3 degrees, which is within the range of angles staff previously determined simulated the

[94] See Tab C of the NPR briefing package.

[95] See Tab N of the NPR briefing package.

[96] Staff reduced the measured depth by 1 inch for this calculation to account for feet placement. The depth of these units was measured at the top surface, and staff estimates the feet are inset at least 1 inch total from the top, on average. Because a test block would be placed under the feet of a CSU, staff adjusted the depth measurement accordingly.

effect of carpet, which was 0.8 degrees to 3.0 degrees.

Based on this assessment, using a 0.43 inch test block would provide an equivalent tilt angle to that in the NPR and adequately simulate the effect of carpet. In addition, using a test block would be easier than tilting the unit forward 1.5 degrees because it is easier for a test lab to create test blocks of a specific thickness than to create multiple blocks for individual units that will raise them 1.5 degrees, or to create a test platform that angles exactly 1.5 degrees. For these reasons, the final rule revises the tilt requirement and adds a definition of ''test block'' that states it is a block constructed of a rigid material such as steel or aluminum with the following dimensions: at least 0.43 inch thick, at least 1 inch deep, at least 1 inch wide. The final rule also includes a figure illustrating these dimensions. The final rule also updates the figures in the stability requirements to show the test block.

To ensure that a test block properly simulates the effect of carpet, the positioning of the block is important to achieve the correct angle. A block positioned too far toward the front of the CSU will increase the angle; a block positioned too far toward the rear of the CSU will decrease the angle. Therefore, to accommodate the requested change to a test block, the position of the block must be specified. For CSUs that have rear feet with glides or levelers smaller than the block, the entire glide or leveler should be over the block. Otherwise, the back of the block can be easily aligned with the back edge of the rear support. To ensure proper placement of the test block, the test configuration requirements are also updated in the final rule to state the unit must be tilted forward by placing the test block(s) under the unit's most rear floor support(s) such that either the entire floor support contact area is over the test block(s) or the back edge of the test block(s) is aligned with the back edge of the rear floor supports.

Tip over. The NPR defined ''tip over'' as ''the point at which a clothing storage unit pivots forward such that the rear feet or, if there are no feet, the edge of the CSU lifts at least ¼ inch from the floor and/or is supported by a non-support element.''

CPSC received several comments on this definition including that it does not allow for new designs that may intentionally use extension elements to stabilize the CSU; that one side of a CSU may lift from the floor before the other side; and that it is difficult to measure ¼ inch during testing. Commenters suggested using a definition like that in voluntary standards, such as an ''event at which a furniture unit pivots forward to the point at which the unit continues to fall'' or ''the condition where the unrestricted unit will not return to its normal upright position.''

As explained in the NPR, the definition of ''tip over'' in the NPR was based on staff's assessments and its utility for purposes of testing. However, based on these comments, staff reassessed the ¼ inch criteria and found that for most CSUs, the tip-over force, when measured with a force gauge, is determined immediately as the rear of the CSU lifts off the ground, before the rear of the CSU lifts at least ¼ inch off the ground, but for other CSUs, when measuring the tip-over force using weights, the rear may rise up to ¼ inch or more, but remain balanced. To address this and the comments, the final rule revises the definition of ''tip over'' to mean an event at which a clothing storage unit pivots forward to the point at which the CSU will continue to fall and/or be supported by a non-support element, which is similar to the commenters' suggested revisions.

This change allows the ''tip over'' assessment to be made without the CSU continuously falling forward and without simultaneous measurements of the tip-over force and the height that the rear of the CSU lifts. This also allows tip-over force measurements to be determined with weights, without potential confusion caused by the CSU balancing with the rear of the CSU raised. Additionally, the tip-over force measured with a force gauge is typically determined as the rear of the CSU lifts off the ground, before it reaches the ¼ inch height proposed in the NPR, and this change allows testers to make that determination, as appropriate. In addition, this revision allows for design flexibility, including features that prevent tip over but may permit the unit to lift ¼ inch from the floor. This change may, in some instances, result in tip-over forces being slightly higher when measured with weights, but is not expected to affect tip-over forces when measured with a force gauge and such slight increases are not expected to significantly affect stability test results.

b. Requirements for Interlocks

Because the fill level, as well as the stability of a CSU, depends on how many doors and extendable elements can open, the standard also includes a requirement that any interlock system must withstand a 30-pound horizontal pull force. Without such a requirement, consumers may disengage the interlock, or the interlock may break, resulting in more filled drawers being open during real-world use, and less stability, than assessed during stability testing.

General requirement. The NPR specified that for CSUs with interlocks, the interlocks must be pre-installed, automatically engage when the consumer installs the drawers in the unit, and must engage automatically as part of normal use. CPSC received a comment that misinterpreted this requirement to mean that CSUs are required to have interlocks. Although the NPR clearly indicated that interlocks are not required, the final rule clarifies this by adding to the interlock provisions that they only apply to CSUs with interlocks.

Configuration. For the interlock pull test, the NPR stated that the CSU was to be secured to prevent sliding or tip over. This is because the unit must remain stable to accurately assess the integrity of the interlock system. CPSC received a comment recommending that this provision specify that the CSU is to be secured without interfering with the interlock function. The purpose of this provision is to assess the strength of the interlock system and its ability to remain fully functional and effective during real-world use conditions. As such, the preliminary step of securing the unit from sliding or tip over clearly should not be done in a way that interferes with the effectiveness of the interlock. However, to ensure this is clear, the final rule adds that securing the CSU must not interfere with the interlock function.

The NPR also stated to adjust a levelling device to the lowest level and then in accordance with the manufacturer's instructions, for interlock testing. The purpose of this requirement is to ensure that the CSU is level for testing and is consistent with configuring the unit in accordance with manufacturer instructions. However, CPSC recognizes that CSUs may have more than one levelling device. To ensure this levelling is performed for all levelling devices on a CSU, which is consistent with the purpose in this NPR, this wording has been revised to include multiple levelling devices.

Interlock testing. Staff assessed the pull strength of children to determine an appropriate pull force requirement for the interlock test (and the comparison moment for pulling open a CSU), and found that the mean pulling strength of 2- to 5-year-old children on a convex knob (diameter 40 mm) at their elbow height is 59.65 Newton (13.4 pound-force) for males and 76.43 Newton (17.2 pound-force) for

females.[97] In the study from which staff drew these values, participants were asked to exert their maximum strength at all times, described as the highest force they could exert without causing injury. Participants were instructed to build up to their maximum strength in the first few seconds, and to maintain maximum strength for an additional few seconds. Participants were instructed to use their dominant hand. Based on this, children between 2 and 5 years old can achieve a mean pull force of 17.2 pounds. ANSI/BIFMA X6.5–22 includes a higher horizontal pull force of 30-pounds in its stability requirements. To ensure that the standard adequately assesses the integrity of interlock systems, the proposed rule includes a 30-pound horizontal pull force.

CPSC received a comment seeking clarity on where the force should be applied. The pull area is where a person would typically interact with or pull on the extendable element or door. Because the test requirements in the rule are intended to simulate real-world use conditions, the typical interaction area is a reasonable location to apply the force. A pull force test is typically applied where a pull (such as a knob, bar, handle, or other handhold) is already present; however, for long pulls or multiple pulls, it may not be clear where the pull force should be applied. Elements with multiple pulls or long continuous pulls should be tested an equal number of times as units with a single pull, rather than testing such units multiple times with each pull feature. The location where the pull force is applied may affect the outcome of the test, making it important that this force be applied consistently by testers. To address the comment, provide clarity, and ensure reliable test results, the final rule specifies that the pull force is to be applied ''at the center of the pull area.'' For elements with more than one pull area on a single extendable element or door (*e.g.,* 2 knobs on a single drawer), the center of the pull areas would typically mean at a knob, midway between two knobs, or at the center of a bar, handle, or other handhold and testers could determine how to apply the force to the center, such as by connecting them with rope or wire.

Performance criteria. The NPR specified that, if during interlock testing, a locked drawer opens or the interlock is damaged, then the interlock must be disabled or bypassed for stability testing. CPSC has become aware of interlocks which, rather than locking an extendable element in the case, instead allow the extendable element to extend while retracting already extended elements. These features restrict simultaneous extension of extendable elements, which addresses the hazard of multiple open drawers. The purpose of this requirement in the NPR was that, if the interlock does not function as intended or cannot withstand the real-world use conditions in the test, it should not be used during stability testing because it cannot be relied on to provide added stability for the CSU during real-world use. Consistent with this purpose and to provide design flexibility, the final rule has been modified to address the newly identified interlock type, such that it is also permissible as long as it withstands the required testing.

c. Stability Testing Configuration

Assembly. The test configuration provisions in the NPR required testers to assemble the unit according to the manufacturer's instructions. CPSC received a comment on the NPR seeking clarification of what this means for CSUs where the manufacturer's instructions direct consumers to attach the unit to the wall. As the NPR emphasized, the rule is intended to address the inherent stability of CSUs, without attachment to the wall, because staff's data and analysis (in Tab C of the NPR briefing package) demonstrated that consumers do not commonly attach CSUs to the wall and, even if they do, the attachment may not be effective or installed correctly. Consistent with this purpose and to clarify this requirement, the final rule adds that the unit must not be attached to the wall or other upright structure for testing. This will ensure CSUs are tested for inherent stability.

Orientation on test surface. The NPR proposed to require that testing occur on a hard, level, flat test surface, which the NPR defined as sufficiently hard to not bend or break under the weight of the CSU and testing loads, smooth and even, and with no more than 0.5 degrees of variation. CPSC received comments that the angle of the test surface is critical to the test and a test laboratory determined that the allowable tolerance on the test surface could result in a 4 percent overestimate or a 3 percent underestimate from the nominal test result. The final rule retains the definition of a ''hard, level, and flat test surface'' that was in the NPR, but adds to the stability test configuration requirements that, in placing the CSU on this surface, it must be placed in the orientation most likely to cause tip over. This is consistent with the aim stated in the NPR of generally testing CSUs in their least stable configurations to best ensure that stability testing assesses real-world worst-case conditions. This revision will address the possibility of overestimating stability by not allowing the CSU to be placed in a more stable orientation than level.

CPSC also received a comment that a CSU can slide during the stability test and affect test results. To address this, the final rule adds to the test configuration requirements that, if necessary, testers may secure the unit from sliding. Testers could prevent a unit from sliding using high friction surfaces or specially designed blocks, among other options. However, the addition also specifies that such securement must not prevent the CSU from tipping over. It is implicit in stability testing requirements that the unit should not be secured from tipping over during testing, as that would defeat the purpose of the testing. Thus, while securement may be appropriate to facilitate testing, it must not interfere with the accuracy of the stability assessment. Thus, the additional wording clarifies that testers may secure the unit from sliding, but remains consistent with the proposed configuration and the purpose of stability testing by making clear that such securement must not prevent the CSU from tipping over.

Leveling. Like for interlock testing, the NPR stated to adjust a levelling device to the lowest level and then in accordance with the manufacturer's instructions, for stability testing. As explained above, the purpose of this requirement is to ensure that the CSU is level for testing and is consistent with configuring the unit in accordance with manufacturer instructions. However, CPSC recognizes that CSUs may have more than one levelling device. To ensure this levelling is performed for all levelling devices on a CSU, which is consistent with the purpose in this NPR, this wording has been revised to include multiple levelling devices for the stability testing configuration as well.

In addition, for stability testing after configuring the CSU according to manufacturer instructions, leveling it, and tilting it to simulate carpet, the NPR further stated that, if the CSU has a levelling device intended for a carpeted surface, to adjust the level in accordance with the manufacturer's instructions for a carpeted surface. CPSC received several comments that allowing levelling devices to be adjusted for a carpeted surface would allow CSUs to be tested in a more stable position, although consumers may not make these levelling adjustments at home. As the

[97] DTI (2000). Strength Data for Design Safety—Phase 1 (DTI/URN 00/1070). London: Department of Trade and Industry.

NPR explains, the purpose of the rule is to assess the stability of CSUs under real-world use conditions that contribute to instability. This includes testing CSUs on a surface that simulates the effect of carpeting, since carpet is shown to be associated with increased instability. This also includes accounting for real-world conditions, such as consumers not leveling for carpet. Therefore, consistent with the purpose of the NPR and in consideration of these comments, the final rule does not include the direction to adjust the level for a carpeted surface in the stability test.

Carpeting. As incident data indicates, of the fatal CPSRMS tip-over incidents involving children and only CSUs that reported the type of flooring the CSU was on, 81 percent involved carpeting. Of the incidents that provided photos, the carpet was typical wall-to-wall carpet, with most being cut pile, and a few being looped pile. Of the nonfatal CPSRMS tip-over incidents involving children and only CSUs that reported the type of flooring, 74 percent involved carpeting. Thus, for incidents where flooring type was reported, carpet was by far the most prevalent flooring type.

As discussed earlier, staff testing showed that CSUs with a variety of designs and stability levels were more stable on a hard flooring surface than they were on carpeting. Consistent with incident data, staff used wall-to-wall carpet for this testing and tested the CSU stability with various configurations of open and filled drawers. For 94 percent of the comparison weights (including multiple variations of open and filled drawers), the units were more stable on the hard surface than on carpet, with a mean difference in tip weight of 7.6 pounds.

Therefore, based on incident data and testing, CSUs are commonly on carpet during CSU tip-over incidents, and carpet increases the instability of the CSU. Accordingly, the rule includes a requirement that simulates the effect of carpet in order to accurately mimic real-world factors that contribute to CSU instability. To determine how to simulate the effect of carpet, section VII. Technical Analysis Supporting the Rule explains that staff compared the tip weights of CSUs on carpet with the tip weights for the same units when tilted forward to various degrees on a hard, level, flat surface. Staff found that the tip weight of CSUs on carpet corresponded with tilting the CSUs forward 0.8 to 3 degrees, depending on the CSU, with the mean tilt angle that corresponded to the CSU tip weights on carpet being 1.48 degrees. Therefore, a forward tilt of 1.5 degrees replicates the effect of carpet on CSU stability, and this was included in the CSU configuration requirements for the stability testing in the NPR.

However, as discussed above (see discussion of ''test block'' definition), comments on the NPR indicated that requiring a test block that created a comparable angle to that in the NPR and equivalently simulated the effect of carpet was preferable to specifying an angle because it would make the test easier to conduct, aid repeatability and reproducibility, and because tilt angle could be affected by CSU attributes such as weight or depth. In addition, using a test block would be easier than tilting the unit forward 1.5 degrees because it is easier for a test lab to create test blocks of a specific thickness than to create multiple blocks for individual units that will raise them 1.5 degrees, or to create a test platform that angles exactly 1.5 degrees. To address this, staff assessed what height test block would provide a comparable requirement to the 1.5 degrees proposed in the NPR and determined that a 0.43-inch-thick test block would provide an equivalent tilt angle to that in the NPR and adequately simulate the effect of carpet. Accordingly, the final rule replaces the test angle with a test block of specified dimensions and require specific placement of that block to ensure they achieve the correct angle.

Multiple open and filled extendable elements. As incident data indicates, opening extendable elements of a CSU was a common interaction in CSU tip overs involving children and only a CSU. It was the most common reported interaction (54 percent) in nonfatal CPSRMS incidents; it was the second most common reported interaction (8 percent) in nonfatal NEISS incidents; and it was the third most common reported interaction (8 percent) in fatal CPSRMS incidents. Children as young as 11 months were involved in incidents where the child was opening one or more extendable elements of the CSU, and the incidents commonly involved 2- and 3-year-olds. In numerous incidents, the children opened multiple or all of the extendable elements. The youngest child reported to have opened all extendable elements was 13 months old.

The incident analysis also indicates that, of the CSU tip overs involving children and only CSUs for which the reports indicated the contents of the CSU, 95 percent of fatal CPSRMS incidents involved partially filled or full extendable elements; and 90 percent of the nonfatal CPSRMS incidents involved partially filled or full extendable elements. Most items in the extendable elements were clothing.

As this preamble explains, opening doors or extendable elements (*i.e.,* drawers or pull-out shelves) shifts the CG towards the front of the CSU, and the closer the CG is to the front leg, the easier it is to tip forward if a force is applied to the extended element. Therefore, CSUs will tip more easily as more extendable elements are opened. The CG of a CSU will also change depending on the position and amount of clothing in each drawer or pull-out shelf. Closed extendable elements filled with clothing tend to stabilize a CSU, but as each filled extendable element is pulled out, the CG of the CSU will further shift towards the front. Staff's testing demonstrates this principle, finding that multiple open drawers decrease the stability of a CSU, and filled drawers further decrease stability when more than half of the drawers by volume are open, but increase stability when more than half of the drawers by volume are closed.

Taken together, this information indicates that children commonly open multiple filled drawers simultaneously during CSU tip-over incidents, and that doing so decreases the stability of the CSU if half or more of the drawers by volume are open. Accordingly, the rule includes multiple open and filled extendable elements as part of the unit configuration for stability testing, and varies whether extendable elements are filled depending on how many of the extendable elements can open, as determined by an interlock system.

As staff testing showed, when all CSU extendable elements are pulled out and filled, the unit is more unstable. However, when CSU extendable elements have interlocks or other means that prevent more than half of the extendable elements by volume from being pulled out simultaneously, the CSU tips more easily with all extendable elements empty. Accordingly, when an interlock or other means prevents more than half of the extendable elements by interior volume from being opened simultaneously, the rule requires that no fill weight be placed in the extendable elements.

The rule requires that extendable elements be opened to the maximum extension for both interlock testing and stability testing, and defines ''maximum extension.'' The purpose of these requirements is that all extendable elements are opened fully, or if there is an interlock, the worst-case extendable elements that can be opened at the same time are opened fully. Maximum extension for extendable elements is the furthest manufacturer recommended use position, as indicated by way of a stop; if there are multiple stops, they are open

to the stop that allows the furthest extension; if there is no stop, they are open to ⅔ of the shortest internal length of the extendable element.

Open doors. The stability testing provisions also require that all doors be opened. Incident data indicates that, although there are fewer incidents involving CSUs with doors than extendable elements, children are able to open doors and there are fatal and nonfatal incidents involving wardrobes and armoires, which include doors. Based on these incidents and children's capabilities and climbing behavior demonstrated in incidents, the rule also includes opening all doors to simulate the least stable configuration of these units. Children may put their body weight on open doors or on extendable elements behind doors, both of which would contribute to instability in the same way as open extendable elements.

The NPR specified that doors were to be open outward or downward to the position where the CM of the door is extended furthest from the front face of the unit, which is typically 90 degrees. As the NPR explained, all doors and extendable elements should be open to the maximum extension and least stable configuration for stability testing, as this is consistent with the purpose of these testing provisions to assess CSUs in their least stable likely configuration during real-world use. CPSC received comments requesting that the test provisions be simplified, and staff identified the door position requirement as a potential point of confusion that could be simplified. Staff considered that testers may misunderstand the requirement to mean that they must measure the CM of the door. To clarify and simplify the meaning of this requirement, the final rule states to open all hinged doors that open outward or downward to the least stable configuration, which is typically 90 degrees. This accomplishes the same purpose as the NPR provision, but should eliminate confusion on how to comply, and make clear that testers need not measure the CM of the door.

Fill density. As discussed in section VII. Technical Analysis Supporting the Rule, staff assessed the appropriate method for simulating CSU drawers that are partially filled or fully filled.[98] To do this, staff looked at the standard that ASTM considered (8.5 pounds per cubic foot) and the results of the Kids in Danger and Shane's Foundation study [99] (which found an average density of 8.9 pounds per cubic foot). To assess whether the 8.5 pounds per-cubic-foot measure reasonably represents the weight of clothing in a drawer, CPSC staff conducted testing with folded and unfolded children's clothing on drawers of different sizes. For all three drawer sizes, staff was able to fit 8.5 pounds per cubic foot of unfolded and folded clothing fill in the drawers. When the clothing was folded and unfolded, the clothing fully filled the drawers, but still allowed the drawer to close. The maximum unfolded clothing fill density was slightly higher than 8.5 pounds per cubic foot for all tested drawers; and the maximum unfolded clothing fill density ranged from 8.56 to 8.87 pounds per cubic foot, depending on the drawer. The maximum folded clothing fill density ranged from 9.40 to 10.16 pounds per cubic foot, depending on the drawer. Although staff achieved a clothing density as high as 10.16 pounds per cubic foot with folded clothing, consumers may be unlikely to fill a drawer to this level because it requires careful folding, and it is difficult to remove and replace individual pieces of clothing. On balance, CPSC considers 8.5 pounds per cubic foot of functional drawer volume a reasonable approximation of the weight of clothing in a fully filled drawer.

Because CSUs are reasonably likely to be used to store clothing, and incident data indicates that CSUs involved in tip-over incidents commonly include drawers filled with clothing, the rule requires 8.5 pounds per cubic foot as fill weight when more than half of the drawers by volume are open.

As discussed above, staff assessed whether the same fill weight is appropriate for pull-out shelves and found that pull-out shelves can hold the same volume of clothing as drawers and still remain fully functional and sufficiently contain the clothing content during moving of the shelf. Accordingly, the same fill weight applies to drawers and pull-out shelves.[100]

The NPR specified that fill weights must consist of a uniformly distributed mass that is 8.5 (pounds/cubic feet) times the functional volume (cubic feet). The NPR did not specify a tolerance for the fill weight density. CPSC received comments stating that achieving precisely 8.5 pounds per cubic feet of functional volume would depend on the accuracy and precision of measurement instruments, which may affect stability results, decreasing a CSU's stability rating by as much as 3 percent to 6 percent. Accordingly, commenters recommended providing a tolerance for the fill weight density. To address these comments, the final rule specifies that the 8.5 pounds per cubic feet density is the minimum for open extendable elements and a maximum for closed extendable elements. This is because, as explained in the NPR, fill weight in closed extendable elements contributes to stability and fill weight in open extendable elements contribute to instability. Because the goal of the stability testing is to simulate the least stable likely configuration during real-world use of a CSU, the tolerance allows for heavier loads in open drawers, but not in closed drawers.

The NPR also specified that fill weights were to be placed in the center of the extendable element, meaning the center of the storage space. CPSC received comments requesting clarification and more specificity on where to place the fill weights, indicating that the position could be a source of testing error. Based on these comments, the meaning of the requirement in the NPR may not have been sufficiently clear and the final rule specifies that the fill weights are to be placed in the center of the bottom surface of the extendable element. This should eliminate potential confusion about what space to use to determine ''center.'' This is consistent with the direction in the NPR and the general approach of determining the volume of the storage space of an extendable element using the bottom surface of it.

CPSC received a comment recommending that the rule require that fill weights be secured to prevent sliding. Some provisions in the NPR included this, but some did not. The final rule specifies that fill weights are to be secured to prevent sliding, but only if necessary. It is not always necessary to secure fill weights to prevent sliding, though it can be helpful at times. Requiring the fill weights to be secured when it is not necessary could be more onerous than is necessary. Moreover, a sliding fill weight tends to slide forward and reduce the tip-over moment (and reduce the likelihood of passing the test), rather than increase the tip-over moment. As such, the final rule provides the flexibility to secure fill weights from sliding, when necessary.

The final rule also removes redundant requirements regarding fill weights. In the NPR, fill requirements were stated separately for units without an interlock and units with an interlock. However, the fill requirements for units without an interlock are the same as the requirements for units with interlocks where 50 percent or more extendable

[98] See Tab L of the NPR briefing package.

[99] Kids in Danger and Shane's Foundation (2016). Dresser Testing Protocol and Data. Data set provided to CPSC staff by Kids in Danger, January 29, 2021.

[100] See Tab C of the final rule briefing package.

elements are open. At this stage of the stability test, the interlock (if present) has already been tested and interlocks that do not meet the test criteria have been disabled or bypassed. As such, for the fill weights, it only matters whether 50 percent or more of the extendable elements by volume can be extended simultaneously. For this reason, the final rule streamlines these provisions to eliminate redundancy. Similarly, because the requirements for acceptable interlock systems are stated in the interlock testing provisions, it is not necessary to restate these in the stability testing section, and the final rule has been revised accordingly.

d. Stability Test Methods

Test Methods. The rule provides two test methods for applying force to a CSU to determine its tip-over moment. The first test method is required for CSUs with extendable elements that extend at least 6 inches from the fulcrum. The test involves applying weights to the face of an extended extendable element, causing the CSU to tip over. The second test is required for CSUs for which Test Method 1 does not apply and involves applying a horizontal force to the CSU orthogonal (*i.e.,* at a right angle) to the fulcrum, causing it to tip forward. Both test methods require the location of the fulcrum to be determined and the distance from the center of the force application the fulcrum to be measured. For both test methods, the tip-over moment of the unit is then calculated by multiplying the tip-over force by the distance from the force application to the fulcrum.

The NPR requirements were largely the same, but provided an option for which test method to use; it specified that Test Method 1 is more appropriate for CSUs with extendable elements, while Test Method 2 is appropriate for any CSU. In the NPR, Test Method 1 involved applying a vertical force to the face of the uppermost open extendable element to cause the unit to tip over and Test Method 2 involved applying a horizontal force to the back of the CSU orthogonal to the fulcrum to cause the unit to tip over. CPSC received numerous comments requesting revisions to these requirements.

One issue for which commenters sought clarity was when to measure the distance from the force application to the fulcrum. As discussed in the definition of a fulcrum, the fulcrum position should be determined before a tip-over force is applied because the fulcrum position is used as a reference point for several measurements. However, comments indicated that this was not clear in the NPR, and the wording in Test Methods 1 and 2 contributed to that confusion by stating to record the distance from the force application point to the fulcrum and the tip-over force at the same time. To address this confusion, the final rule specifies that the distance measurements to the fulcrum are to be taken before the force is applied in Test Method 1 and Test Method 2.

Comments also suggested that the force in Test Method 1 should be applied with weights. For Test Method 1, the NPR directed testers to gradually apply a vertical force to a specified location, leaving the option of how to apply that force open. However, several commenters stated that the test methods lacked repeatability and reproducibility, indicating that results may vary by tester and by how the force is applied (*e.g.,* with a force gauge by hand, with weights, by machine). Test reports provided with comments indicated that testing by hand yielded the most variable results; testing with weights yielded consistent results, but was limited to Test Method 1; and testing by machine yielded consistent results within a test method, but differed when comparing Test Method 1 to Test Method 2. CPSC reviewed the comments and the laboratory report and found that much of the subjectivity and variability in the results came from the testers applying the force by hand. To address these comments, ensure that stability testing results are reliable and consistent, and provide clarity for testers, the final rule specifies that Test Method 1 must be conducted using weights.

Because the final rule now specifies that weights are to be used, it also specifies where to place the weights and includes additional information about placement to address comments. In the NPR, the vertical force in Test Method 1 was applied to the face of the uppermost extended extendable element to cause the unit to tip over. However, commenters raised concerns that this would cause drawers to break during testing, implying that testers would not be able to complete the test as a result. The final rule states that weights are to be applied to the face of an extended extendable element, and are to be placed on a single drawer face or distributed evenly across multiple drawer faces or as adjacent as possible to the pull-out shelf face, all while not interfering with other extended extendable elements. Testers that choose to be precise can determine the exact CG of the applied weights. The top center of the drawer face is a reasonable approximation for linear drawer faces because the CG of the applied weights will be aligned with this location. For curved drawers, the center of the drawer face where the most rearward weight is to be placed is a conservative and reasonable approximation. These revisions allow the test weights to be distributed across multiple drawers, which reduces the risk of drawers breaking and preventing completion of testing.

The CG of the applied weight is equivalent to the force application point described in the NPR; while this change may slightly alter the measured tip-over force and the measured distance from the force application point to the fulcrum, it will not affect the tip-over moment determined by multiplying the required measurements. Additionally, the weights are not allowed to interfere with extended extendable elements so as to not alter the CG of the CSU. Therefore, this change will not affect the test results.

In the NPR, Test Method 2 required a horizontal force to be applied to the back of the unit orthogonal to the fulcrum to cause the unit to tip over. The NPR did not specify how to apply the force, allowing either a push or pull force for this purpose. Like Test Method 1, CPSC received comments stating that Test Method 2 lacked repeatability and reproducibility. Staff assessed the repeatability and reproducibility of Test Method 2 by reviewing the laboratory test report that was provided by two trade associations, and by comparing the test to other furniture stability tests that apply a horizontal force. The laboratory report indicated variability in both methods, with Test Method 1 being almost twice as variable as Test Method 2 when both tests were conducted by hand (3.5 to 7.0 percent, compared to 2.0 to 4.5 percent, respectively). Staff identified the force location and application method as potential contributors to variability. The final rule addresses the variability of Test Method 1 with a recommendation to require the test to be conducted with weights, as described above. To address the variability of Test Method 2, CPSC considered possible modifications to the force location and application method by looking at other furniture stability tests that apply a horizontal load.

Staff identified three applicable tests: ANSI/BIFMA X6.5–2022, section 4.9; ANSI/BIFMA X6.5–2022, section 4.10; and balloted revisions to ASTM F2057–19. Two of these tests differ from Test Method 2 in that they apply a horizontal pull force to the drawer, rather than to the back of the unit; the other test applies a push force to the back of the unit, consistent with the NPR, and to other locations. All three of the tests are

otherwise similar in methodology; the key remaining difference is in the types of storage units to which they apply, suggesting that different force application sites may be appropriate for different CSUs.

The NPR already allowed either a push force or a pull force, so long as it was applied to the back of the unit orthogonal to the fulcrum; based on these other test methods and the comments on the NPR, test laboratories may prefer to apply a force to a location other than the back of the unit, and the preference and appropriateness of a method may vary depending on the design of the unit. CPSC has no information that indicates that any of these tests, all conducted by hand, would produce more or less consistent results than the others. Therefore, consistent with the comments, the final rule removes the requirement that the force be applied to the back of the CSU because the appropriate force application location may differ depending on the unit design and this will allow testers the flexibility to determine the best location to apply a force when using Test Method 2 for each unit. The tester's preference may slightly reduce variability in results, but CPSC does not expect this revision to alter stability test results in general.

The final rule also addresses which Test Method to use. The NPR specified that Test Method 1 could be used for CSUs with extendable elements and that Test Method 2 could be used for any CSU. The NPR indicated that the test methods produced approximately equal tip-over moments, and therefore either test method could be used. As discussed, there were several comments stating that Test Method 1 and Test Method 2 yield different results, primarily due to differences in force application methods, but also partly due to differences between the two test methods. However, the differences between the two test methods appear to be small. A test laboratory reported only a 3 percent difference when comparing Test Method 1 conducted with weights to Test Method 2 conducted by hand. These small differences between test method and force application methods corroborates the conclusion in the NPR that the two tests (with the above revision to force application methods) yield comparable stability results. However, CPSC considered revisions that may reduce this potential variation further to ensure that CSUs yield consistent and reliable stability test results, which is important for ensuring they are adequately stable. In addition, many commenters, including consumer safety advocates, recommended requiring only one test method to simplify testing, but commenters differed in which test method they recommended.

The final rule retains two test methods for several reasons. For one, although Test Method 2 is similar in variability to other voluntary standards that use a horizontal load, Test Method 1 with weights is the most accurate and least variable method for assessing stability, based on commenters' data. For this reason, the Commission is not requiring only Test Method 2. However, the Commission is not requiring only Test Method 1 because Test Method 1 cannot be used for CSUs without extendable elements since it requires applying a vertical force to an extendable element, and it is not appropriate for units with short extendable elements because the high loads required to induce tip over increases the potential for drawers to break and placing heavy weights on the drawer front is difficult (see discussion below). Therefore, Test Method 2 is a necessary option for testing CSUs for which Test Method 1 is not appropriate. However, the final rule removes the overlap of these test methods by specifying that Test Method 2 is only to be used when Test Method 1 does not apply. This will eliminate the inconsistent results between test methods raised by commenters and simplify testing.

The final rule also now specifies that, for Test Method 1, it is for units with extendable elements that extend at least 6 inches from the fulcrum, whereas the NPR did not specify an extension distance criteria. Test Method 1 requires that weight be placed on the unit's extendable element face until the unit tips over; that weight is multiplied by the distance it is applied from the fulcrum to determine the tip-over moment. The tip-over moment is then compared to the threshold moment, evaluated in the performance requirement section, and later turned into the stability rating on the hang tag. The tip-over moment is required to be greater than the threshold moment, for a minimum stability rating of 1.0. Using Test Method 1, there is a minimum weight required on an extendable element for a unit to have a stability rating of 1.0. As explained in the NPR, applying force at a location further from the CG of the CSU increases instability more than applying the force closer to the CG of the CSU (*e.g.,* this is why testing is done with open drawers with weights placed on them). Therefore, the minimum weight to meet the performance requirement increases as the extendable element distance from the fulcrum decreases. When extendable elements have very short distances from the fulcrum, the load required on the extendable element becomes so high that Test Method 1 becomes impractical because the weight takes up more space on the drawer face or the pull-out shelf, and the likelihood of the extendable element breaking increases. For example, a drawer with the median extension of 9.75 inches requires at least 88 pounds to meet the climbing threshold moment, while a drawer with a 6-inch extension requires at least 109 pounds (almost a 25 percent increase) and the rate at which the weight rises increases rapidly as the extension distance decreases.

In general, for CSUs with long extendable element extensions, vertical forces (such as a child's body weight) play a dominant role in producing a tip-over moment. However, as extendable element extensions are shorted or removed, horizontal forces (such as a pull force, or the forces required for a child to hold his or her body in front of the CSU face) dominate the tip-over moment. Vertical forces have very little ability to produce a tip-over moment when extendable element extensions from the fulcrum are sufficiently short.[101] The NPR addressed this by allowing Test Method 2 for any CSU. However, because the final rule eliminates the overlap of the test methods, it is necessary to establish a lower limit on which extendable element extensions can be tested using Test Method 1, and apply Test Method 2 to only those units with extendable element extensions shorter than the limit (or with no extendable elements).

In the dataset of 180 CSU drawer extensions CPSC staff provided to UMTRI researchers, the median drawer extension was approximately 0.81 feet (9.75 inches), with an approximate range of 0.53 feet (6.38 inches) to 1.15 feet (13.75 inches).[102] Consistent with the minimum drawer extension from the fulcrum identified in this information, 6 inches is the threshold used in the final rule. The use of Test Method 1 for units with extendable elements that extend at least 6 inches from the fulcrum is consistent with the NPR because it still applies to CSUs with extendable elements.

[101] A detailed analysis of the combination of forces produced by climbing interactions and how these forces produce a tip-over moment is in Tab D of the NPR briefing package.

[102] Tab D of the NPR and final rule briefing package provide further information about drawer extensions, including Figure 24 in Tab D of the NPR briefing package and Figure 7 in Tab D of the final rule briefing package.

Repairs. The NPR included a note regarding repairs under Test Method 1, which specified that if a drawer breaks during the test due to the force, use Test Method 2 or secure or reinforce the drawer, as long as the modifications do not increase the tip-over moment. This was included in the NPR so that Test Method 1 could be completed even if the force applied to the drawer face resulted in the drawers breaking, but ensured that such modifications would not improve stability. This provision is appropriate because the test is intended to address the stability of the product, not the strength of the product. To accomplish this, it may be necessary for a tester to conduct repairs or modifications to complete stability testing if weaker components break during the test. Staff's testing experience indicates that most CSUs require more than 80 pounds on the drawer front to meet the minimum performance requirement but that some CSU drawer designs cannot hold much more than 60 pounds without requiring additional reinforcement.

CPSC received comments indicating that testing may result in drawers needing repairs and requesting guidance on how to address components that break during testing, so that testing may be completed. To address these comments, the final rule applies the repair provisions to both test methods (rather than just Test Method 1). This is because Test Method 2 is no longer an alternative to Test Method 1; the purpose is to allow for needed repairs to complete testing, regardless of which test; and although breakage is less likely during Test Method 2, it is possible. The final rule also expands the wording to apply to any component (not just drawers) and to allow for repair, replacement, or securement (not just securement or reinforcement). This is consistent with the purpose of this provision, which is to allow breakage of weaker components that interferes with completing testing to be corrected. Consistent with the NPR, the final rule retains the requirement that any such modifications must not increase the tip-over moment so as not to undermine the integrity of stability test results.

e. Performance Requirements

Pass-fail criteria. Once the tip-over moment has been determined using one of the methods above, the rule specifies that the tip-over moment of the CSU must be greater than several comparison tip-over moments that represent a child interacting with the CSU (the greatest of which is considered the threshold moment). These comparison tip-over moments determine whether the tip-over moment of the CSU is sufficient to withstand tipping over when child interactions identified in incidents and measured by UMTRI occur. Staff developed three pass-fail criteria based on three child interactions that can lead to CSU tip-over incidents. The first interaction is a child climbing (ascending) a CSU; the second is a child pulling on a handhold of a CSU (*e.g.,* while opening or attempting to open an extendable element); and the third is a child climbing (hanging) on the door of a CSU. The comparison tip-over moment for ascending the CSU likely is the most onerous requirement for most CSUs. However, some CSUs with particular geometric features, or without extendable elements, may have greater tip-over moments associated with the alternative criteria, based on children's interactions with the CSU.

Climbing. As incident data indicates, climbing was the most common reported interaction (76 percent) in fatal CPSRMS incidents; it was the most common reported interaction (77 percent) in nonfatal NEISS incidents; and it was the second most common reported interaction (26 percent) in nonfatal CPSRMS incidents. Fatal and nonfatal climbing incidents most often involved children 3 years old and younger.

CPSC staff's analyses of tip-over incidents in Tab M of the NPR briefing package outlined several scenarios where children climbing or interacting with the front of a CSU caused the CSU to tip over. In some of the scenarios, the force on the edge of an open drawer associated with tipping the CSU was greater than the static weight of a child standing on the edge of an open drawer of the CSU. The equivalent force consists of the child's weight, the dynamic force on the edge of the drawer due to climbing, and the effects of the child's CG extending beyond the edge of the drawer. Based on the UMTRI study, staff estimated the equivalent force to be more than 1.6 times the weight of the child for typical drawer extensions. Therefore, these tip-over incidents occurred because the forces and moments associated with children climbing on a CSU exceeded the static body weight of a child standing on the edge of an open drawer.

Staff determined that the ascend interaction from the UMTRI child climbing study was the most representative of a child climbing interaction seen in the incident data. As discussed in Tab D of the NPR briefing package, based on the UMTRI study of child climbing behaviors (Tab R of the NPR briefing package), ascent can be described by the following equation:

$$M = \{1.08\ [Fulcrum\ X\ (\text{ft})] + 0.52\ \text{ft}\} \times Weight\ of\ child\ (\text{lb})$$

In this equation, Fulcrum X is the horizontal distance from the front of the extended drawer to the fulcrum.

In the UMTRI study, other measured climbing interactions involving climbing into drawers and climbing onto the tabletop generated lower moments than ascent; thus, they are included within performance requirements based on ascent.

Because most climbing incidents involved children 3 years old and younger, the rule uses the 95th percentile weight of 3-year-old children (51.2 pounds) in this equation to generate the first comparison tip-over moment. The 95th percentile weight of 3-year-old boys is 51.2 pounds and the 95th percentile weight of 3-year-old girls is 42.5 pounds.[103] To address the heaviest of these children, the rule uses 51.2 pounds. Moreover, this is consistent with the weight of children involved in tip-over incidents, particularly for climbing incidents, when known, or when estimated by their age.

Based on these considerations, to pass the moment requirement for a child ascending a CSU, the tip-over moment (M_{tip}) of the CSU must meet the following criterion: M_{tip} (pound-feet) > 51.2 (1.08X + 0.52), where X is the horizontal distance (in feet) from the front of the extended drawer to the fulcrum.[104] Simplified, this is M_{tip} (pound-feet) > 55.3X + 26.6.

CPSC staff calculates that CSUs that meet a requirement based on the climbing force generated by a 51.2-pound child and that considers the effects of all doors and extendable elements open and extendable elements filled, plus the effect of carpet on stability, likely will protect 95 percent of 3-year-old children and virtually all younger children. This requirement would also protect 92 percent of 4-year-old children, 64.5 percent of 5-year-old children, 50 percent of 6-year-old children, 25 percent of 7-year-old children, and 7.1 percent of 8-year-old children. These are likely low estimates because they assume that all climbing incidents occurred with all open and filled drawers on CSUs located on a

[103] Fryar, C.D., Carroll, M.D., Gu, Q., Afful, J., Ogden, C.L. (2021). Anthropometric reference data for children and adults: United States, 2015–2018. National Center for Health Statistics. Vital Health Stat 3(46). Three years of age covers children who are at least 36 months old and under 48 months old.

[104] For a CSU without drawers, X is measured from the fulcrum to the front edge of the farthest extended element, excluding doors. If the CSU has no extension elements (other than doors), X is measured from the fulcrum to the front of the CSU.

carpeted surface, which is a worst-case stability condition.

Pulling handholds. As incident data indicates, opening drawers was the most common reported interaction (54 percent) in nonfatal CPSRMS incidents; it was the second most common reported interaction (8 percent) in nonfatal NEISS incidents; and it was the third most common reported interaction (8 percent) in fatal CPSRMS incidents. Additional incidents involved other interactions (*e.g.,* pushing down on an open drawer, putting items in or taking items out of a drawer) that indicate the child opened the drawer as well. For the NPR data set, looking at both fatal and nonfatal CPSRMS tip overs involving children and only CSUs, where the interaction involved opening drawers, about 53 percent involved children opening one drawer, 10 percent involved opening two drawers, almost 17 percent involved opening ''multiple'' drawers, and additional incidents reported children opening ''all'' drawers or a specific number of drawers that may have represented all of the drawers on the unit. The youngest child reported to have opened all drawers was 13 months old. Incidents involving opening drawers most commonly involved children 3 years old and younger.

As discussed earlier, it is possible for CSUs to tip over from the forces generated by open drawers and their contents, alone, without additional interaction forces. However, pulling on an extendable element or door to open it applies an increased force that contributes to instability. The moment generated with a horizontal force is higher as the location of the force application gets farther from the floor. Therefore, the rule includes as the second required comparison tip-over moment, the moment associated with a child pulling horizontally on the CSU at the top reachable extendable element or other handhold within the overhead reach dimension of a 95th percentile 3-year-old. This is because children 3 years old and younger are most commonly involved in these incidents.

The rule establishes a comparison moment based on a horizontal pull force applied to the top of an extended drawer in the top row of drawers, or to another potential handhold, that is less than or equal to 4.12 feet high (49.44 inches). The 4.12-foot height limit is based on the overhead reach height for a 95th percentile 3-year-old male; the rule uses the overhead reach height of 3-year-olds because most children involved in opening drawer incidents were 3 years old or younger.[105] Consistent with this overhead reach height, staff's analysis of 15 incidents shows that the highest pull location was 46 inches from the floor.[106]

The rule includes a 17.2 pound-force of horizontal pull force. This pull force is based on the mean pull strength of 2- to 5-year-old females exerted at elbow level on a convex knob. The mean pulling strength of 2- to 5-year-old females is 76.43 Newton (17.2 pound-force), and 59.65 Newton (13.4 pound-force) for males.[107] In the study that provided these pull strengths, participants were 2 to 5 years old, and the mean participant weight was 16.3 kilograms (36 pounds). Participants were asked to exert their maximum strength at all times, described as the highest force they could exert without causing injury, using their dominant hand. Participants were instructed to build up to their maximum strength in the first few seconds, and to maintain maximum strength for an additional few seconds.

The rule uses this 17.2 pound-force pull strength because, in the study, females had a higher mean strength than males, and these incidents most commonly involve children 3 years old and younger. The weight of children in the study (36 pounds) is over the 50th percentile weight of 3-year-old children. Therefore, the pull force test requirement will address drawer opening and pulling on CSU incidents for 50 percent of 3-year-olds, 95 percent of 2-year-olds, 100 percent of children under 2 years, 25 percent of 4-year-olds, 10 percent of 5-year-olds, and will not address these incidents for children 6 years old and older.

Based on this 17.2-pound horizontal force on a handhold at a height of up to 4.12 feet, the moment created by this interaction can be described with the equation M (pound-feet) = 17.2 (pounds) × Z (feet), where Z is the vertical distance (in feet) from the fulcrum to the highest handhold that is less than or equal to 4.12 feet high. Using this equation, the tip-over moment of the CSU in the second comparison value in the proposed rule is M_{tip} (pound-feet) > 17.2Z.

Climbing on doors. As discussed, incident data also indicates that fatal and nonfatal tip-over incidents involved wardrobes and armoires, which include doors. In most of these incidents, children were interacting with things inside the CSU, indicating that the doors were open. The ages of the children in these incidents ranged from 3 to 11 years, although opening doors is easily within the physical and cognitive abilities of younger children. Once CSU doors are open, children are capable of putting their body weight on the open doors (*i.e.,* open and climbing/hanging), provided the child has a sufficient hand hold, and incident data indicates that climbing in general is a common interaction. For this reason, the third comparison tip-over moment in the rule represents the force from a 95th percentile 3-year-old child hanging on an open door of the CSU.

UMTRI researchers found that the vertical forces associated with children hanging by the hands were close to the body weight of the child.[108] For this reason, the third comparison tip-over moment, representing a child hanging on an open door, uses the weight of a 95th percentile 3-year-old child, or 51.2 pounds. Staff considers the weight placement location for testing doors in ASTM F2057–19 (section 7.2) reasonable. Therefore, the proposed rule uses the test location from the voluntary standard, which is approximately half the width of the test fixture, or 3 inches, from the edge of the door, to obtain the equation describing a 95th percentile weight 3-year-old child hanging from an open door of a CSU: M (pound-feet) = 51.2 (pounds) × [Y—0.25 (feet)], where Y is the horizontal distance (in feet) from the fulcrum to the edge of the door in its most extended position. Based on this equation, the tip-over moment of a CSU with doors must meet the following criterion: M_{tip} (pound-feet) > 51.2(Y—0.25). Simplified, this is M_{tip} (pound-feet) > 51.2Y − 12.8 pound-feet.

Additional addressability. For the reasons described above, the rule focuses on the interactions of children climbing on and opening CSUs. Although other plausible climbing-associated behaviors (*e.g.,* yank, lean, bounce, one hand) included in the UMTRI study generated higher moments, there was no direct evidence of these interactions in the incident data. However, depending on the child's age, weight, and strength, some of these interactions could be addressable with the performance requirements. Other measured climbing interactions (*e.g.,*

[105] Pheasant, S. (1986). Bodyspace Anthropometry, Ergonomics & Design. London: Taylor & Francis.

[106] Staff assessed 15 child incidents in which the height of the force application could be calculated based on descriptions of the incidents. Force application heights ranged from less than one foot to almost four feet (46.5 inches), and children pulled on the lowest, highest, and drawers in between.

[107] DTI, Strength Data for Design Safety—Phase 1 (DTI/URN 00/1070). London: Department of Trade and Industry (2000).

[108] See Figure 48 in Tab R of the NPR briefing package.

hop up, hang, in drawer, and climbing onto the tabletop) generated lower moments than ascent, making these interactions addressable by the final rule.

In addition, although the rule focuses on addressing the CSU tip-over hazard to children, improving the stability of CSUs should also reduce incidents involving adults. Most incidents involving adults included opening drawers, getting items in and out of drawers, or leaning on the CSU. These interactions are likely to be less onerous or equally onerous to the forces addressed in the rule.

C. Marking and Labeling

1. Final Rule Requirements

The final rule includes requirements for a warning label. The warning label requirements address the size, content, symbols, and format of the label. The warning statements address the CSU tip-over hazard, and how to avoid it. They indicate that children have died from furniture tipping over, and direct consumers how to reduce the risk of tip overs, by securing furniture to the wall; not allowing children to stand, climb, or hang on units; not defeating interlock systems (if the unit has them); placing heavier items in lower drawers; and not putting a television on CSUs (when the manufacturer indicates they are not designed for that purpose). The format, font, font size, and color requirements incorporate by reference the provisions in ASTM F2057–19. The rule also includes requirements for the location of the warning label, addressing placement in drawers or doors, and the height of the label in the unit. The rule also requires the warning label to be legible and attached after it is tested using the methods specified in ASTM F2057–19.

The rule also includes requirements for an informational mark or label. It requires the mark or label to include the name and address of the manufacturer, distributor, or retailer; the model number; the month and year of manufacture; and state that the product complies with the proposed rule. There are size, content, format, location, and permanency requirements as well. The mark or label must be visible from the back of the unit when the unit is fully assembled and must be legible and attached after it is tested using the methods specified in ASTM F2057–19.

2. Basis for Final Rule Requirements

The final rule requires a warning label to inform consumers of the tip-over hazard, indicate steps consumers can take to reduce the risk (*e.g.,* use anti-tip devices, do not let children climb on the CSU, placing the heaviest items in the lowest drawer), and motivate consumers to take those steps.

a. Warning Label Text

For a warning label to be effective, consumers must read the message, comprehend the message, and decide whether the message is consistent with their beliefs and attitudes. In addition, consumers must be motivated enough to spend the effort to comply with the warning-directed safe behavior. Warnings should allow for customization of hazard avoidance statements based on unit design, to reflect incident data (*e.g.,* television use). Similarly, the warning text should be understandable, not contradict typical CSU use, and be expressed in a way that motivates consumers to comply.

The FMG CSU use study considered these factors, with focus group participants evaluating the ASTM F2057–19 warning label text, which is similar to the final rule. Based on the principles above and the focus group findings, the warning statements in the final rule are similar to those in the ASTM standard. The warning label includes warnings about the hazard, television use (where appropriate for the product), and placing heavier items in lower drawers, but does not include a statement to not open multiple drawers because a majority of focus group participants said that they and their children open multiple drawers simultaneously. In addition, the tip-restraint warning explicitly directs the consumer to secure the CSU to the wall and uses a term for tip restraint that consumers will likely understand. ''Tipover restraint,'' used in ASTM F2057–19, might confuse some consumers because restraints generally describe what they contain (*e.g.,* child restraint), rather than what they prevent. Terminology such as ''anti-tip device'' is clearer.

The warning text requirements in the final rule are the same as those proposed in the NPR, but the final rule makes explicit that the content of the warning label must not be modified or amended, except as specifically permitted in the rule. The NPR explained that the warning text in the proposed regulation must be used for the warning label, except for specified modifications regarding televisions and interlocks, which varied depending on the CSU. The final rule makes this explicit for several reasons. For one, CPSC received comments on the NPR recommending that the Commission allow manufacturers to determine what hazards to address on the label, and how. As explained in the discussion of comments, above, CPSC developed the warning label requirements, including the text, based on commonly used approaches in voluntary standards, ASTM's warning label requirements, consumer studies, research, human factors assessments, and staff's expertise. Such insights and expertise would be lost, and warnings likely would be less effective, if manufacturers were permitted to determine the warning content.

In addition, the primary U.S. voluntary consensus standard on product safety signs and labels, ANSI Z535.4, *Product Safety Signs and Labels,* states that word messages should be concise, readily understandable, and restricted to the most critical information. Requiring that warning label text precisely meet the requirements in the rule and not include additional content, as well as requiring that specific features (*i.e.,* interlocks and televisions) only be addressed when appropriate for the particular CSU, achieves this.

b. Warning Label Symbols

The final rule requires the ASTM F2057–19 ''no television'' symbol for CSUs that are not designed to hold a television, as proposed in the NPR. The final rule also requires a three-panel child climbing symbol on the warning label. The NPR presented three possible child climbing symbols that the Commission was considering, displayed in Figure 9, below.

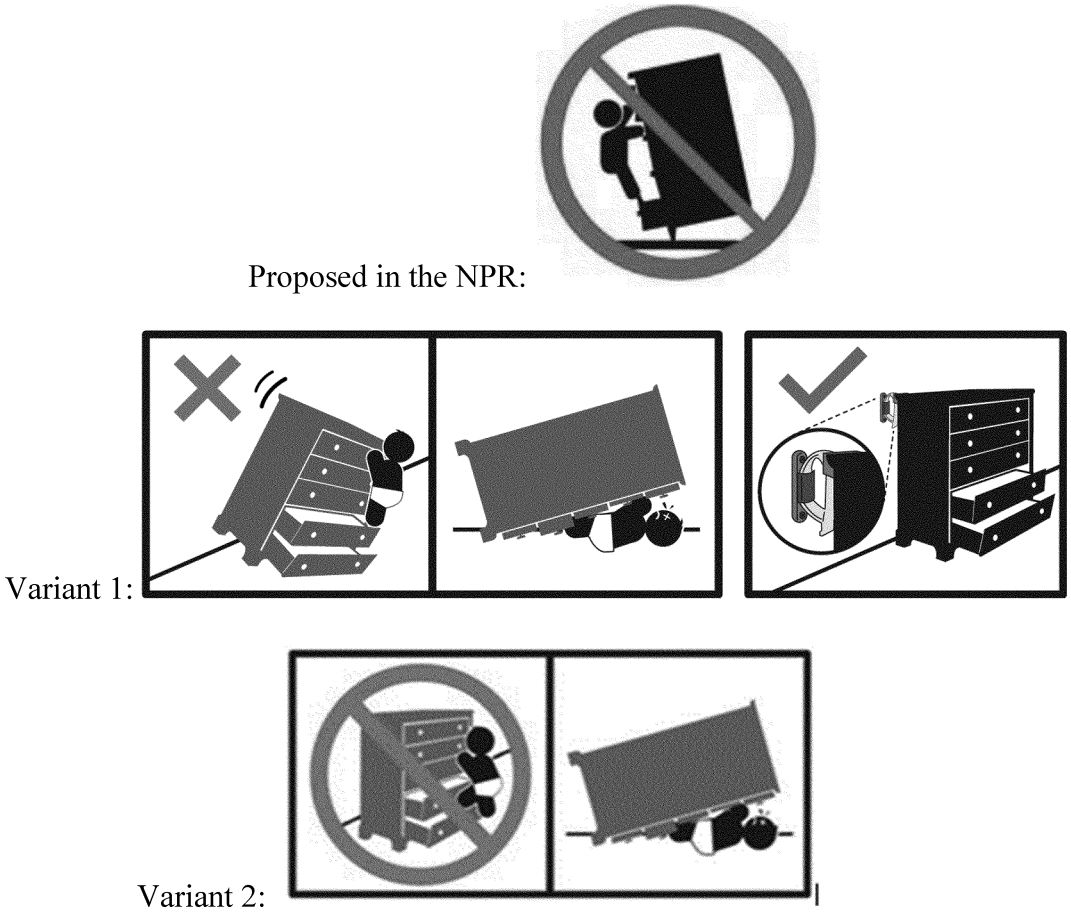


Figure 9: The three child climbing symbols presented in the NPR. Note: the symbols are reproduced in grayscale here, but the color version includes a red ''x'' and prohibition symbol, and a green check mark.

The NPR proposed to require the first symbol displayed in Figure 9, which is the symbol used in ASTM F2057–19, and raised as possible alternatives to that symbol, the two variants. As the NPR explained, CPSC was working with contractors to test the two variants using the same methodology as the previous comprehension study. Based on the subsequent findings of that study, discussed earlier in this preamble, surpassed the ASTM symbol and Variant 2 in comprehension testing.

CPSC also received comments on the three possible warning symbols, which expressed a preference for Variant 1. Based on comments and because Variant 1 showed better comprehension than the ASTM symbol or Variant 2, the final rule requires that Variant 1 be provided as part of the warning label. The rule allows the third panel of the symbol (*i.e.,* the one depicting attachment to the wall) to be modified to show the specific anti-tip device included with the CSU. This is based on a comment expressing concern with the specific type of anti-tip device depicted and on CPSC staff's assessment that consumers will better understand the function and set up of an anti-tip device provided with a CSU if the symbol depicts that specific type of device.

c. Warning Label Format

The rule requires the warning label to be at least 2 inches wide by 2 inches tall. This size is consistent with the required content and format for the label, and it ensures that the label is not too narrow or short. CPSC staff regularly uses ANSI Z535.4, *American National Standard for Product Safety Signs and Labels*—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. The rule uses the warning format in ASTM F2057–19, which is consistent with ANSI Z535.4. These requirements are the same as those in the proposed rule.

d. Warning Label Placement

For CSUs with drawers, the rule requires the warning label to be placed at the top and front of the interior side panel of a drawer in the uppermost drawer row or, if the top of the drawer in the uppermost drawer row is more than 56 inches from the floor, the label must be on the interior side panel of a drawer on the uppermost drawer row below 56 inches from the floor. The 56-inch criteria is based on the 5th percentile standing eye height of women in the United States, to ensure that the label is visible.[109] For CSUs with doors, the warning label must be on an interior side or back panel of the cabinet behind the door or on the interior door panel, and must not be obscured by a shelf or other interior element. For CSUs that are assembled by consumers, the warning label must be pre-attached to the panel and the assembly instructions must direct consumers to place that panel according to the placement requirements for drawers and doors that are specified in the rule. These requirements are the same as in the NPR.

[109] Nesteruk, H.E.J. (2017). Human Factors Analysis of Clothing Storage Unit Tipover Incidents and Hazard Communication. In Staff Briefing Package Advance Notice of Proposed Rulemaking: Clothing Storage Units. Available at: *https://www.cpsc.gov/s3fs-public/ANPR%20-%20Clothing%20Storage%20Unit%20Tip%20Overs%20-%20November%2015%202017.pdf.*

The placement requirements in the rule are consistent with the information CPSC obtained from the FMG study, regarding placement of warnings. In the FMG CSU use study,[110] researchers evaluated warning labels in in-home interviews and focus groups. They found that participants indicated that they had not paid attention to or noticed warning labels on the units in their children's rooms, even when the researchers noted they were present. Focus group participants identified the inside the top drawer of a unit as a location where a warning label could be seen easily and be more likely to grab their attention. Participants also expressed that they would remove labels that were too conspicuous (*e.g.,* on the outside or top of a unit).

e. Warning Label Permanency

To be effective, a warning label must remain present. Label permanency requirements are intended to prevent the warning label from being removed inadvertently and to provide resistance to purposeful removal by the consumer. The final rule requires that the warning label be legible and attached after it is tested using the methods in section 7.3 of ASTM F2057–19. CPSC staff evaluated the ASTM F2057–19 label permanency requirements [111] and concluded that they are sufficiently effective. This is the same as proposed in the NPR.

f. Identification Mark or Label

As indicated in the NPR, CPSC was able to identify the manufacturer and model of CSU associated with only 22 of the 89 fatal CPSRMS incidents involving children and CSUs without televisions and 230 of the 263 nonfatal CPSRMS incidents involving children and CSUs without televisions. In the case of recalls, consumers must be able to identify whether their CSUs are subject to the recall and are potentially unsafe. Accordingly, an identification label that provides the model, manufacturer information, date of manufacture, and a statement of compliance with the rule is important to facilitate identification and removal of potentially unsafe CSUs.

For this reason, the final rule requires an identification mark or label containing this information. The mark or label must be at least 2-inches wide by 1-inch tall, which is consistent with the required content and format, and ensures that the label is not too narrow or short. The rule requires text size that is consistent with ANSI Z535.4. The mark or label must be visible from the back of the unit when the unit is fully assembled because it is not necessary for the label to be visible to the consumer during normal use, but it should be visible to anyone inspecting the unit. In addition, the rule requires the mark or label remain legible and attached after it is tested with the methods in section 7.3 of ASTM F2057–19 to increase the likelihood that the label remains attached to the CSU and will be legible when needed.

These requirements are the same as the NPR except that the final rule refers to this as an ''identification mark or label,'' rather than just an ''identification label.'' This does not change the meaning of the requirements, but addresses a comment that expressed concern that the term ''label'' meant that other means of applying the information to the product (*e.g.,* printing, etching, engraving, or burning) were not permissible. The permanency testing requirements in section 7.3 of ASTM F2057–19 include requirements for paper labels, non-paper labels, and those applied directly to the surface of the product. As such, the final rule does not prevent firms from applying the informational label in various ways that can be tested and comply with the requirements in section 7.3 of ASTM F2057–19. However, to make this clear, the final rule includes the term ''mark,'' in addition to ''label,'' as ''mark'' more clearly conveys the availability of direct application to the surface of the product for meeting the requirement.

D. Hang Tags

1. Final Rule Requirements

As discussed above, section 27(e) of the CPSA authorizes the Commission to issue a rule to require manufacturers of consumer products to provide ''such performance and technical data related to performance and safety as may be required to carry out the purposes of [the CPSA].'' 15 U.S.C. 2076(e). The Commission may require manufacturers to provide this information to the Commission or, at the time of original purchase, to prospective purchasers and the first purchaser for purposes other than resale, as necessary to carry out the purposes of the CPSA. *Id.*

The final rule sets out requirements for providing performance and technical data related to performance and safety to consumers at the time of original purchase and to the first purchaser of the CSU (other than resale) in the form of a hang tag. The hang tag provides a stability rating, displayed on a scale of 1 to ''2 or more,'' that is based on the ratio of tip-over moment (as determined in the testing required in the rule) to the minimally allowed tip-over moment (provided in the rule). The rule includes size, content, icon, and format requirements for the hang tag. It also includes requirements that the hang tag be attached to the CSU and clearly visible to a person standing in front of the unit; that lost or damaged hang tags be replaced such that they are attached and provided, as required by the rule; and that the hang tags may be removed only by the first purchaser. In addition, the rule includes placement requirements that the hang tag appear on the product and the immediate container of the product in which the product is normally offered for sale at retail; that for RTA furniture, the hang tag must appear on the main panel of consumer-level packaging; that any units shipped directly to consumers contain the hang tag on the immediate container of the product; and that the hang tag information be provided on manufacturers' and importers' online sales interfaces from which the CSU may be purchased. For a detailed description of the requirements, see the regulatory text.

2. Basis for Final Rule Requirements

a. Purpose

Consistent with the requirements in section 27(e) of the CPSA, the hang tag requirements help carry out the purpose of the CPSA by ''assisting consumers in evaluating the comparative safety of consumer products.'' 15 U.S.C. 2051(b)(2). The rule requires CSUs to meet a minimum level of stability (*i.e.,* exceed a threshold tip-over moment). However, above that minimum level, CSUs may have varying levels of stability. A hang tag provided on the CSU offers consumers comparative information about the stability of products, based on the tip-testing protocol in the rule. By providing product information at the time of original purchase, the hang tag informs consumers who are evaluating the comparative safety of different CSUs and making buying decisions. This information may also improve consumer safety by incentivizing manufacturers to produce CSUs with higher levels of stability, to better compete in the market, thereby increasing the overall stability of CSUs on the market.

b. Background

CPSC based the formatting and information requirements in the hang tag on work CPSC has done previously to develop performance and technical

[110] See Tab Q of the NPR briefing package.

[111] See Tab F of the NPR briefing package.

data requirements,[112] as well as the work of other Federal agencies that require comparative safety information on products.[113] As part of CPSC's development of a similar requirement for recreational off-highway vehicles (ROVs), CPSC issued a contract for cognitive interviews and focus group evaluation to refine the proposed ROV hang tag. The contractor (EurekaFacts) developed recommendations regarding the content, format, size, style, and rating scale, based on consumer feedback during this work.[114]

Studies on the usefulness and comprehension of point-of-sale product information intended to help consumers evaluate products and make buying decisions support the effectiveness of hang tags, and linear scale graphs, in particular. For example, a study on the EnergyGuide label for appliances, which also uses a linear scale, indicated that the label increased consumer awareness of energy efficiency as an important purchasing criterion.[115]

c. Specific Elements of the Final Rule Requirements

Applicability. Section 27(e) of the CPSA authorizes the Commission to apply requirements for performance and technical information to manufacturers. Under the CPSA, a ''manufacturer'' is ''any person who manufactures or imports a consumer product.'' 15 U.S.C. 2052(a)(11). As such, these requirements apply to manufacturers and importers.

Content. The required hang tag includes a symbol on the front and back of the hang tag. Research has shown that pictorial symbols and icons make warnings more noticeable and easier to detect than warnings without them.[116] Additionally, including a graphic before introducing text may serve as a valuable reference for consumers, by maintaining attention and encouraging further reading.[117] In addition, presenting information both graphically and textually offers a better chance of comprehension by a wide range of users, such as non-English-literate users. Both symbols depict a CSU tipping over, and one of them shows a child climbing a CSU that is tipping over. These symbols identify the product and hazard.

The hang tag also includes a title—Stability Rating—to make clear what information is provided on the tag. To allow consumers to identify exactly what product the label describes, the hang tag requires the manufacturer's name and the model number of the unit.

The performance criteria in the stability provisions of the final rule require the tested moment of a CSU to be greater than a calculated threshold moment requirement. The tip rating number on the hang tag is the ratio of tested moment to threshold requirement. This provides a simple calculation that results in a number greater than 1,[118] which can be easily represented on a scale. Additionally, due to the nature of a ratio, a rating of 1.5 means the unit can withstand 1 and half times the threshold moment, a rating of 2 means the unit can withstand twice the threshold moment, and so forth. The graph starts with the minimally acceptable tip rating of 1 [119] and indicates that it is the minimum, so that consumers can evaluate the extent to which the rating of a particular CSU meets or exceeds the minimum permissible rating. The NPR proposed to start the scale at 0 and mark 1 on the scale as the minimally acceptable rating. However, based on comments, the final rule begins the scale at 1 because there is no need to show a lower rating since a CSU with a stability rating lower than 1 would not meet the stability requirements of the rule and would be impermissible.

The NPR proposed to require the maximum rating displayed on the scale to be 5. CPSC staff testing suggests that most CSUs on the market today would achieve ratings between 1 and 2, once modified to comply with the stability requirements in the rule. CPSC also received numerous comments on the NPR indicating that, even with modifications, CSUs currently on the market would not exceed a stability rating of 2. Commenters expressed concern that displaying a scale that goes higher than 2 would confuse consumers looking for higher rated CSUs and would suggest that a rating of 2 is not sufficiently stable. To address these concerns, the final rule modifies the maximum rating displayed on the scale to ''2 or more.'' This reflects currently achievable stability ratings and still allows for future designs that may exceed a rating of 2. If CSU designs evolve to commonly exceed a rating of 2, the Commission can adjust the maximum rating on the scale in a future rulemaking.

Because the stability rating scale ranges from 1 to ''2 or more,'' many stability ratings will fall between these whole numbers. As such, the final rule specifies that the stability rating must be displayed rounded to one decimal place (*e.g.* 1.5). Although, as the NPR noted, research suggests that consumers prefer whole numbers, keeping a scale of 1 to 2 and reflecting differences with decimals allows for better relative comparisons because, with this scale, a consumer can easily understand that a CSU with a rating of 1.5 is one and a half times more stable than a CSU with a rating of 1.0. To ensure this is clear, the final rule also includes a requirement that the front of the hang tag include such an explanatory statement (*e.g.,* ''This unit is 1.5 times more stable than the minimum required'').

Because the linear scale on the hang tag is a graphical representation of the stability information, the requirement also includes text to explain the importance of the graph, and the significance and meaning of the tip-over resistance value of the CSU so that consumers understand the data on the tag. The back of the hang tag includes a technical explanation of the graph and rating to explain how to interpret and use the graphic and number. In addition, based on comments provided on the NPR, the final rule adds an additional statement to the front of the hang tag (stating ''This unit is X times more stable than the minimum required,'' with the stability rating being inserted for X) to make a brief explanation of the technical information more quickly visible and understandable to consumers. The front of the hang tag also must state that ''Higher numbers represent more stable units'' to further explain the meaning of the rating. The front of the hang tag also includes statements to connect the technical information (*i.e.,* the stability

[112] *E.g.,* 16 CFR 1401.5, 1402.4, 1404.4, 1406.4, 1407.3, and 1420.3.

[113] *E.g.,* the Federal Trade Commission's EnergyGuide label for appliances in 16 CFR part 305, requiring information about capacity and estimated annual operating costs; and the National Highway Traffic Safety Administration's New Car Assessment Program star-rating for automobiles, providing comparative information on vehicle crashworthiness.

[114] EurekaFacts, LLC, *Evaluation of Recreational Off-Highway (ROV) Vehicle Hangtag: Cognitive Interview and Focus Group Testing Final Report* (Aug. 31, 2015), available at: *https://www.cpsc.gov/s3fs-public/pdfs/ROVHangtagEvaluationReport.pdf.*

[115] National Research Council. *Shopping for Safety: Providing Consumer Automotive Safety Information—Special Report 248.* Washington, DC: The National Academies Press (1996).

[116] Wogalter, M., Dejoy, D., Laughery, K. (1999). *Warnings and Risk Communication.* Philadelphia, PA: Taylor & Francis, Inc.

[117] Smith, T.P. (2003). *Developing consumer product instructions.* Washington, DC: U.S. Consumer Product Safety Commission.

[118] The equation is $Moment_{tested}/Moment_{threshold}$. If $Moment_{tested} = Moment_{threshold}$, then $Moment_{tested}/Moment_{threshold} = 1$. But the performance requirement is that $Moment_{tested}$ *exceed* $Moment_{threshold}$. Therefore, all units must have a ratio greater than 1, although it may be only a small fraction over 1.

[119] Although the minimally acceptable rating is just above 1, for simplicity, the hang tag marks the minimally acceptable rating as 1.

rating) with the safety concern, such as ''this is a guide to compare units' resistance to tipping over,'' ''always secure the unit to the wall,'' and ''tell children not to climb furniture.''

Size, color, and format. As proposed in the NPR, the final rule requires the physical hang tag to be at least 5 inches wide by 7 inches tall. This size requirement is consistent with the recommendations by EurekaFacts and similar requirements in other standards. The EurekaFacts report found that participants preferred hang tags to be large because they were more noticeable and easier to read. In addition, participants preferred a vertical orientation. Also as proposed in the NPR, the final rule requires the front of the hang tag to be yellow. This increases the likelihood that consumers will notice the tag, is consistent with EurekaFacts' findings regarding effective hang tags, and aligns with other similar Federal hang tag requirements (such as the EnergyGuide for household appliances). The rule also requires the hang tag to be formatted as shown in the figure provided, which provides consistency and ease of comparisons across CSU models.

Attachment and placement. Like the NPR, the final rule requires hang tags to be attached to the CSU at the time of original purchase in a place that is clearly visible to a person standing in front of the unit and that hang tags be replaced if lost or damaged to ensure they are available at the time of original purchase. In addition, the hang tag must be on the immediate container of the CSU in which it is normally offered for sale at retail; on the main panel of consumer-level packaging for RTA furniture; on the immediate container of the CSU for units shipped directly to consumers; and remain on the product/packaging/container until the time of original purchase.

The final rule also requires that manufacturers and importers of CSUs with an online sales interface from which consumers may purchase CSUs provide on the online sales interface where the CSUs are offered the same information required on physical hang tags, with some modifications and additions to reflect differences in online and physical displays. The final rule includes this additional online hang tag requirement because many consumers buy CSUs online and not just in physical stores. As such, the ''time of original purchase'' includes online sales and consumers buying online would only see the comparative safety information provided on the hang tag if it is provided in these online sales interfaces as well. Consistent with this, numerous commenters noted that online sales interfaces are also places consumers buy CSUs and the hang tag information is necessary in these venues to facilitate informed decision making. This requirement is also consistent with similar Federal requirements to provide performance and technical information, such as EnergyGuide labels for appliances, which apply to sales websites.[120]

In general, an online hang tag is required to meet the same content, form, and sequence requirements as physical hang tags. This ensures that consumers have the same information, in the same easily comparable form, whether shopping online or in stores, and facilitates comparisons between online and in-store products. The only difference in content between online and physical hang tags is that online hang tags need not contain the statements ''See back side of this tag for more information'' and ''This tag not to be removed except by consumer'' since these statements are not applicable to non-physical hang tags.

The online hang tag requirements also address placement and visibility on the website to ensure that, similarly to physical hang tags, online hang tags are noticeable and legible to consumers. Because of the large amount of content in the hang tag and the importance of this information being visible, for online sales interfaces, the stability rating must be displayed in a font size that is equivalent to that of the price and in proximity to the price of the product. This ensures that the stability rating will be visible to consumers when making their buying decisions and that the information will not be buried in less visible places on the interface. Also because of the large amount of content in the hang tag, online sales interfaces must provide the full hang tag through a link that is accessible through one user action (such as through a mouse click, mouse roll-over, or tactile screen expansion) on the displayed stability rating. This provides the same comparative information, in the same format, as physical hang tags, but also accommodates the need for other information on the website for the product. These requirements are consistent with those for online EnergyGuide labels as well as the European Union's online energy label requirements.[121]

Together, the physical and online hang tag requirements ensure that the hang tag information is available and visible to consumers at the time of original purchase, whether they are purchasing in a store or online, and whether the CSU is assembled and on display, or in packaging. These requirements are necessary for consumers to be able to use the information to make informed buying decisions. These requirements are consistent with similar standards and align with the limits provided in section 27(e) of the CPSA, which limit performance and technical data requirements manufacturers and the time of original purchase.

E. Prohibited Stockpiling

1. Final Rule Requirements

The final rule prohibits manufacturers and importers of CSUs from manufacturing or importing CSUs that do not comply with the requirements of the rule in any 1-month period between the date the rule is promulgated and the effective date of the rule at a rate that is greater than 105 percent of the rate at which they manufactured or imported CSUs during the base period for the manufacturer. The rule defines the base period as the calendar month with the median manufacturing or import volume within the last 13 months immediately preceding the month of promulgation of the final rule. This is the same limit as proposed in the NPR.

2. Basis for Final Rule Requirements

The purpose of the stockpiling limit is to prevent manufacturers and importers from stockpiling products that will be subject to a mandatory rule, in an attempt to circumvent the final rule. Because most firms will need to modify their CSUs to comply with the requirements in the rule, and the modifications may be costly, CPSC believes it is necessary to prevent stockpiling of noncompliant products. The stockpiling limit will allow manufacturers and importers sufficient flexibility to meet normal levels and fluctuations in demand for CSUs, while limiting their ability to stockpile large quantities of CSUs that do not comply with the rule for sale after the effective date. CPSC received several comments on the stockpiling limits in the NPR, most of which supported the provisions.

Based on comments largely supporting the stockpiling limits in the NPR and the need for such provisions to allow manufacturers and the industry to meet existing or foreseeable increases

[120] *See* Federal Trade Commission (2013) EnergyGuide Labeling: FAQs for Appliance Manufacturers, available at: *https://www.ftc.gov/business-guidance/resources/energyguide-labeling-faqs-appliance-manufacturers.*

[121] *See* European Commission, internet Labelling—Nested Display Arrows For Labels, available at: *https://ec.europa.eu/energy/eepf-labels/label-type/internet-labels.*

in the demand for CSUs, without allowing large quantities of CSUs that do not meet the standard to be stockpiled, the final rule retains the stockpiling provisions proposed in the NPR. This stockpiling provision reflects a balance between the competing goals of addressing the hazard but also considering the compliance cost and practicalities for businesses and potential impacts on consumers.

X. Final Regulatory Analysis [122]

The Commission is issuing this rule under sections 7 and 9 of the CPSA. The CPSA requires that the Commission publish a final regulatory analysis with the text of the final rule. 15 U.S.C. 2058(f)(2). This section provides the final regulatory analysis of the rule. For additional details, see Tab H of the NPR and final rule briefing packages. For significant comments received on the regulatory analysis provided in the NPR, see section VIII. Response to Comments.

A. Market Information

Retail prices of CSUs vary substantially, with the least-expensive units retailing for less than $100, while some more expensive units may retail for several thousand dollars. The less expensive units may be in use for only a few years, while the most expensive units may remain in use for decades, and possibly be passed from one generation to the next. CPSC staff used sales information provided by large furniture associations during the NPR comment period to estimate an average price per CSU of $338.50 in 2021 dollars, for this analysis.[123]

CPSC staff used multiple sources of information to estimate the annual revenues from the sale of CSUs within the scope of the final rule and estimates that there were $6.99 billion retail sales in 2021 of CSUs within the scope of the rule.[124] CPSC staff estimates that there were 20.64 million units sold in 2021 by dividing the $6.99 billion in sales revenue by the average price of $338.50. A large majority of these CSUs were likely imported, mainly from Asia. CPSC staff also developed an estimate of the number of models sold each year. To develop this estimate, staff used the assumption that, on average, 10,000 individual CSUs of each CSU model are sold. CPSC staff divided the number of CSUs sold in each year by 10,000 units of estimated sales per model, to generate a rough approximation that 2,064 new CSU models were sold in 2021.

CPSC staff estimated the number of CSU units in use using estimates of historic sales of CSUs, in combination with a statistical distribution of CSU failure rates (*i.e.,* when CSUs are discarded by consumers, based on the average lifecycle of 15 years). The estimate of CSUs in use was constructed iteratively, to reflect that CSUs in use may remain in use for varied periods beyond the 15-year period. Using this approach, CPSC staff estimates that there were 229.94 million CSUs in use in 2021. CPSC staff estimated the number of CSU models in use in a similar fashion, estimating that the number of CSU models in use in 2021 is 6,365.

B. Benefits Associated With the Rule

CPSC staff measured the benefits of the rule as the expected reduction in societal costs of deaths and injuries from implementation of the rule.

Death and injury estimates. In addition to the incident data discussed in this preamble from the CPSRMS and NEISS databases, staff used estimates generated by CPSC's Injury Cost Model (ICM).[125] The ICM uses data from NEISS's representative hospitals to generate national estimates of the total number of ED-treated injuries and hospital admissions. Beyond injuries initially treated in EDs and through hospital admissions, many product-related injuries are treated in other medical settings, such as physicians' offices, clinics, and ambulatory surgery centers. Some injuries also result in direct hospital admission, bypassing the hospital ED entirely. Therefore, the ICM also estimates the number of injuries treated outside of hospital EDs.

For this benefit-cost analysis, CPSC staff chose a 15-year timeframe (*i.e.,* 2007–2021) to reflect the average product life of a CSU and excluded data from 2022 because it is not complete. CPSC staff identified at least 60 deaths related to CSU tip-over incidents without televisions and involving children, for an average of 4 deaths per year. The ICM estimated that there were 44,652 injuries to children under the age of 18 years involving CSU tip-overs from 2007 through 2021, or an average of 2,977 per year that were treated in EDs or through hospital admissions. The ICM also projected an additional 58,351 CSU tip-over injuries to children treated in other settings during the same 15-year period, or an average of 3,890 per year. Combined, there were an estimated 103,003 injuries from 2007 through 2021, or an average of 6,867 per year to children from CSU tip overs.

From 2007 through 2021, there were 22 adult fatalities involving CSU tip-overs, an average of 1.5 a year. The ICM produced a national estimate of 23,695 adults treated in EDs and through hospital admissions because of injuries received when CSUs tipped over. The ICM also projected that there were 50,119 adult injuries treated in other medical settings, for a total of 73,814 medically attended injuries to adults involving CSU tip overs, or an average of 4,921 a year.

Societal costs of deaths and injuries. CPSC staff used the U.S. Environmental Protection Agency's value of statistical life (VSL) of $10.5 million [126] to estimate the societal costs of CSU-related deaths. Using this VSL, the societal cost of annual child fatalities (involving only CSUs) is $42 million. The societal cost of the adult fatalities is $15.4 million a year. The aggregated societal cost components for injuries provided by the ICM include medical costs, work losses, and the intangible costs associated with pain and suffering. The estimated injury costs for children are $16,085 per injury treated in a physician's office, $36,206 for injuries treated and released from a hospital ED, and $465,992 for hospital admitted injuries (average costs of injuries admitted to the hospital after an assessment at the ED, and those admitted to the hospital bypassing the ED). The overall average cost of injuries to adults is slightly lower than the average cost of injuries to children: $30,859 vs. $35,003. The total cost of deaths and injuries to both children and adults totals $449.61 million per year.

Benefits associated with the rule. Staff estimates that 83.9 percent of nonfatal CSU tip-over incidents involving children are addressable with the final rule.[127] CPSC staff was not able to

[122] Further detail regarding the final regulatory analysis is available in Tab H of the final rule briefing package.

[123] Staff increased the average price per CSU from the value used in the NPR to reflect information provided by large furniture associations during the comment period.

[124] This estimate is higher than the 2018 estimate used in NPR of $5.15 billion. Sales data were updated to 2021 in order to reassess the number of CSUs in light of updated market prices provided during the NPR comment period.

[125] For additional information about the ICM, see Tab H of the final rule briefing package and CPSC's website at: *https://www.cpsc.gov/content/The-Consumer-Product-Safety-Commissions-Revised-Injury-Cost-Model-2018.*

[126] For additional information about VSL, see Tab H of the final rule briefing package.

[127] These figures are similar to the addressability estimates calculated for the NPR. Staff calculated the ratio of nonfatal addressable incidents by the total number of nonfatal incidents for each age, and took the average of those percentages to calculate the aggregate nonfatal addressability. See Tab C of the final rule briefing package for discussion of what incidents staff considered addressable. Staff assessed that the ratio of nonfatal addressable incidents can be considered a reasonable estimate of the ratio of fatal addressable incidents; and used it as such in the estimation of benefits.

estimate the exact portion of incidents involving adults that would be prevented. Instead, staff conservatively assumed that the final rule would prevent adult tip-over incidents at half the efficacy rate of child tip-over incidents, or 42 percent. Given these expected efficacy rates in reducing the number of fatal and nonfatal incidents, when all CSUs in use comply with the performance standards, the annual societal benefits from the final rule would be $307.17 million. This total is comprised of $41.71 million in reduced deaths and $265.46 million in reduced injuries, as shown in Table 3.

TABLE 3—SUMMARY OF EXPECTED ANNUAL BENEFITS

Description	Annual number of CSU incidents (no TV)	Annual societal costs ($M)	Expected efficacy of standard (%)	Expected reduction in incidents	Expected annual benefit ($M)
Fatalities	5.5	$57.40		4.0	$41.71
Children	4.0	42.00	83.9	3.4	35.25
Adults	1.5	15.40	42.0	0.6	6.46
Injuries	11,788	392.21		7,828	265.46
Children	6,867	240.36	83.9	5,763	201.73
Adults	4,921	151.85	42.0	2,065	63.73
Total	11,793	449.61		7,832	307.17

C. Costs Associated With the Rule

The costs associated with the rule include costs to manufacturers and importers, as well as costs to consumers. Costs to manufacturers and importers include the cost to redesign and modify CSUs to meet the requirements of the standard, testing CSUs for conformance, as well as the cost of the labor and materials required to produce compliant CSUs.

Costs of redesign and testing. Staff estimates that current conformance with the performance requirements in the final rule is very low. To comply with the final rule, most furniture manufacturers, during the first year of implementation, must produce updated designs that achieve the performance requirements of the final rule, and conduct testing to verify conformance. Manufacturers will also need to add stability-rating hang tags on each CSU, as well as provide the required certificates of compliance, identification label, and warning labels.

Industry would incur the cost of redesigning CSUs during the first year of implementation of the rule as a one-time cost. Future models would use the redesigned features of the models created during the first year of implementation of the rule. Under the assumption that, on average, 10,000 CSUs are produced of every CSU model, CPSC staff estimates that there will be a total of 6,334 existing CSU models that need to be redesigned in the first year of the rule.

Information provided by a large furniture manufacturer/retailer association indicated that it would take an average of 5 months to redesign one thousand different CSU models. CPSC staff assumed that a team of 20 full-time professionals, earning an average hourly compensation of $66.37 [128], would work a total of 17,333 hours [129] to produce the updated designs of one thousand CSU models. This results in a cost per model of $1,150.41 for labor ($66.37 per hour × 17,333 hours ÷ 1,000 models). Therefore, manufacturers will redesign all existing models at a total cost of $7.29 million ($1,150.41 per model × 6,334 existing CSU models). To calculate cost of redesign cost per CSU, staff divided the total cost of redesign, $7.29 million, by the number of CSUs expected to be produced during that first year, estimated at 17.68 million. This equates to a redesign cost of $0.41 per CSU.

Model testing would recur annually, as all new models will have to be tested to verify compliance with the standard. The cost of CSU model testing is estimated at $711.46 [130] per model as of the end of 2021. Using the assumption of 10,000 CSUs per model, average cost per model translates into a cost per CSU of around $0.071. In the first year of rule implementation, there will likely be a larger number of models to be tested, which prompted CPSC staff to round the average cost per CSU to $0.10.[131]

Costs of labor and materials to increase CSU stability. CPSC staff has identified several CSU modifications that could increase the stability of the CSU. These are (1) adding interlock mechanisms to limit the number of drawers, pull-out shelves, or doors that can be opened at one time; (2) reducing the maximum drawer extensions; (3) extending the feet or front edge of the CSU forward; (4) various devices and methods to raise the front of the unit; and (5) adding additional weight to the back of the CSU. Manufacturers can use combinations of more than one of these methods, or any other methods they develop, to increase the stability of a CSU model.

The cost of an interlock mechanism includes the cost of the interlock itself; the cost of design, materials, and labor required to manufacture an interlock adapted to the CSU model and install the mechanism into the CSU. Staff estimates the total cost of implementing interlock mechanisms, including labor, per CSU is $2.93 for CSUs that require a single interlock and up to $14.64 for CSUs that require more complex CSU mechanisms with significant redesign costs.

The cost of extending the feet or the front edge of the CSU forward can be very low. In some cases, no additional parts would be required, and the only cost would be the time it takes for the manufacturer to make the change in manufacturing procedure. In these cases, the cost of shifting the front edge forward could be less than $1 per unit. In other cases, feet might need to be added or redesigned at costs of up to $5

[128] Total hourly compensation for private service-providing industry workers in professional and related occupations as of the fourth quarter of 2021 from the Bureau of Labor Statistics compensation statistics.

[129] This is the result of 40 hours a week per full-employee times 20 employees, times 5 months of 4.33 weeks each (52 weeks a year/12 months).

[130] A large furniture association provided an estimate of $700 per model testing. Staff assumed the estimate corresponded to September 2021, and updated it to December 2021 using the Consumer Price Index for All Urban Consumers.

[131] Additional competition for resources needed to perform a large number of tests within a short timeframe may create price pressures. To use a conservative estimate, staff rounded the per-unit test cost estimate to the next tenth.

per CSU unit,[132] making the midpoint $3.

The cost of tipping the unit back by raising its front or providing adjustable leveling feet is estimated at $2.80 per CSU. CPSC staff estimated this cost based on information provided by one manufacturer—according to whom, the cost of devices to raise the front of the CSU could be as high as $5 per CSU; and, observed retail prices for leveling devices of 30 cents each, or $0.60 for a minimum of two devices needed to stabilize a CSU.

The cost of adding weight to a unit to improve its stability includes the cost of the additional materials, the cost of shipping heavier CSUs, and the cost of additional packing redesign and materials. Based on observed retail prices per pound of medium-density fiberboard costs, the average cost per additional pound is $0.24.[133] Staff estimated the average cost of additional shipping per pound at $0.16 [134] for a total cost of $0.40 per additional pound of weight.

If the additional weight required is a few pounds, then companies only incur the cost of additional materials because minimal manufacturing changes would be needed, and it is unlikely additional packing materials would be required. When the additional weight required to make a CSU compliant is high, then additional packing materials would likely be required. CPSC staff applied a 5-pound threshold in applying additional cost for added weight. CSUs that added 5 pounds or more in additional weight incur an additional packing expense of $1.61 [135] per CSU.

The manufacturing costs of reducing the maximum drawer extensions [136] is unquantified, but likely low [137] because it does not necessarily require additional parts [138] or labor time.

Summary of costs. As the NPR explained, staff assessed several CSUs that were representative of models involved in incidents and identified combinations of modifications that could be used to bring them into compliance with the rule. Considering those exemplar CSUs, the weighted average cost of labor and materials of all proposed modifications for the five representative CSU models are between $9.70 and $17.13. CPSC staff added $0.51 for the cost of redesign and testing to the weighted average cost of labor and material to get the total production cost for a representative model. In total, incremental costs for the five representative models are between $10.21 and $17.64. These represent the incremental cost of the draft final rule. To calculate total annual costs, CPSC staff assumed equal share among the five representative models for the 17.68 million CSUs estimated to be produced in the first year of rule.[139] The total estimated annual cost of the final rule is $250.90 million.

Costs to consumers. The costs also include the costs and impacts on consumers. These include the loss of utility if certain desired characteristics or styles are no longer available, or if compliant CSUs are less convenient to use. The costs of designing, manufacturing, and distributing compliant CSUs would be initially incurred by the manufacturers and suppliers, but most of these costs would likely be passed on to the consumers via higher retail prices. The costs involving the loss of utility because CSUs with certain features or characteristics are no longer available would be borne directly by those consumers who desired CSUs with those characteristics or features.

D. Sensitivity Analysis

The benefits and costs of the draft final rule are estimates that depend upon a relatively high number of inputs and assumptions. The benefits, for instance, are dependent on the different sets of incidents considered in the analysis, the value of a statistical life, and the societal cost of the different type of injuries; the benefits per CSU are also influenced by the number of CSUs in use and the expected CSU lifecycle, among other considerations. The costs of the draft final rule are also dependent on inputs and assumptions. Costs are driven by the modifications required to make the CSU compliant, the number of CSUs and CSU models, as well as other market variables. Some of these inputs and assumptions have a significant impact on the outcome of the analysis, while others are less significant.

In conducting the analysis, staff sought to use inputs and assumptions that best reflected reality. However, during the NPR comment period multiple commenters suggested that the analysis include alternative values for inputs and assumptions of significant uncertainty, as well as discuss the impacts of the trends observed over time in the data. Accordingly, staff examined the impact of using alternative values for some of the key inputs and assumptions of the analysis. Public comments suggested some of the alternative inputs used. See Tab H of the final rule briefing package for the sensitivity analysis.

E. Alternatives to the Rule

CPSC considered several alternatives to the rule. These alternatives, their potential costs and benefits, and the reasons CPSC did not select them, are described in detail in section XI. Alternatives to the Rule, below, and Tab H of the final rule briefing package.

XI. Alternatives to the Rule

The Commission considered several alternatives to reduce the risk of injuries and death related to CSU tip overs. However, as discussed below, the Commission concludes that none of these alternatives would adequately reduce the risk of injury.

A. No Regulatory Action

One alternative to the proposed rule is to take no regulatory action and, instead, rely on voluntary recalls, compliance with the voluntary standard, after-market anti-tip devices, and education campaigns. The Commission has relied on these alternatives to address the CSU tip-over hazard to date.

Between January 1, 2000, and July 1, 2022, 43 consumer-level recalls occurred in response to CSU tip-over hazards. The recalled products were responsible for 341 tip-over incidents, including reports of 152 injuries and 12 fatalities, and affected approximately 21,530,000 CSUs. ASTM F2057 has included stability requirements for

[132] Cost based on observed retail prices for furniture feet available on the internet. These prices are likely much higher than the prices many manufacturers would be able to obtain for large scale volumes of production.

[133] Furniture manufacturers most likely would purchase materials at much less than retail prices; however, to produce conservative estimates, CPSC staff did not include cost improvements associated with large scales of production and/or sourcing of materials. The use of higher retail prices might also offset the higher cost associated with short-term supply-chain disruptions in commodities markets, as well as the potential use of more expensive materials, argued by a few furniture manufacturers and associations during the NPR comment period.

[134] See Tab H of the final rule briefing package for explanation of this.

[135] See Tab H of the final rule briefing package for explanation of this.

[136] Reducing the maximum drawer extensions will decrease the tip-over moment, as defined by the draft final rule, by reducing the effective amount of weight added to the front of the CSU fulcrum when opening a drawer.

[137] The largest cost is likely the unquantified potential impact on consumer utility from CSUs with drawers that cannot open as widely.

[138] Out-stop devices are discussed in the 2014 update of the ASTM F2057 as part of the evaluation of the operational sliding length: ''In the absence of stops, the operational length is length measured from the inside back of the drawer to the inside face of the drawer front in its fully closed position with measurements taken at the shortest drawer depth dimension minus 3.5 in.''

[139] Forecasted sales for 2023 lower than 2021 sales due to staff considering sales for 2021 an aberration from the normal trend due to the recovery of the COVID–19 pandemic. Forecasted sales for 2023 follows pre-pandemic historical trends.

unloaded and loaded CSUs since its inception in 2000 and, based on CPSC testing, there is a high rate of compliance with the standard. In addition, CPSC's Anchor It! campaign—an education campaign intended to inform consumers about the risk of CSU tip overs, provide safety tips for avoiding tip overs, and promote the use of tip restraints—has been in effect since 2015.

Given that this alternative primarily relies on existing CPSC actions, the primary costs staff estimates for this alternative are associated with tip restraints. However, this alternative is unlikely to provide additional benefits to adequately reduce the risk of CSU tip overs. For one, CPSC does not consider ASTM F2057 adequate to address the hazard because it does not account for several factors involved in tip-over incidents that contribute to instability, including multiple open and filled drawers, carpeting, and forces generated by children's interactions with the CSU. In addition, numerous tip-over incidents have involved CSUs that comply with the ASTM standard.

In addition, as Tab C of the NPR briefing package explains, several studies indicate that the rate of consumer anchoring of furniture, including CSUs, is low. A 2010 CPSC survey found that 9 percent of participants who responded to a question about anchoring furniture under their television indicated that they had; the same survey found that 10 percent of consumers who used a CSU to hold their television reported anchoring the CSU. A 2018 Consumer Reports study found that 27 percent of consumers overall, and 40 percent of consumers with children under 6 years old in the home, had anchored furniture; the same study found that 10 percent of those with a dresser, tall chest, or wardrobe had anchored it. CPSC's 2020 study on the Anchor It! campaign found that 55 percent of respondents (which included parents and caregivers of children 5 years old and younger) reported anchoring furniture. As such, on their own, these options have limited ability to further reduce the risk of injury and death associated with CSU tip overs. CPSC's use of this alternative to date illustrates this since, despite these efforts, CSU tip-overs results in injuries and death continue to occur at a high rate.

B. Require Performance and Technical Data

Another alternative is to adopt a standard that requires only performance and technical data, similar to or the same as the hang tag requirements in the rule, with no performance requirements for stability. This could consist of a test method to assess the stability of a CSU model, a calculation for determining a stability rating based on the test results, and a requirement that the rating be provided for each CSU on a hang tag. A stability rating would give consumers information on the stability of CSU models they are considering, to inform their buying decisions, and potentially give manufacturers an incentive to achieve a higher stability rating to increase their competitiveness or increase their appeal to consumers that desire more stable CSUs. The hang tag could also connect the stability rating to safety concerns, providing consumers with information about improving stability.

Because this alternative would not establish a minimum safety standard, it would not require manufacturers to discontinue or modify CSUs. Therefore, the only direct cost of this alternative would be the cost to manufacturers of testing their CSUs to establish their stability rating and labeling their CSUs in accordance with the required information. Any changes in the design of the CSUs would be the result of manufacturers responding to changes in consumer demand for particular models.

However, the Commission does not consider this alternative adequate, on its own, to reduce the risk of injury from CSU tip overs. Similar to tip restraints, this alternative relies on consumers, rather than making CSUs inherently stable. This assumes that consumers will consider the stability rating, and accurately assess their need for more stable CSUs. However, this is not a reliable approach to address this hazard, based on the low rates of anchoring, and the FMG focus group, which suggests that caregivers may underestimate the potential for a CSU to tip over, and overestimate their ability to prevent tip overs by watching children. In addition, this alternative would not address the risk to children outside their homes (where the stability of CSUs may not have been considered), or CSUs purchased before a child's birth. The long service life of CSUs and the unpredictability of visitors or family changes in that timespan, and these potential future risks might not be considered at the time of the original purchase.

C. Adopt a Performance Standard Addressing 60-Pound Children

Another alternative is to adopt a mandatory standard with the same requirements as the rule, but addressing 60-pound children, rather than 51.2-pound children. This alternative would be more stringent than the rule. About 74 percent of CSU tip-over injuries to children involve children 4 years old and younger,[140] and these are addressed by the proposed rule, because the 95th percentile weight for 4-year-old children is approximately 52 pounds. The rule would also address some of the injuries to children who are 5 and 6 years old, as well, because many of these children also weigh less than 51.2 pounds. Mandating a rule that would protect 60-pound children would increase the benefits associated with the rule by further reducing injuries and fatalities. Presumably, the cost of manufacturing furniture that complies with this more rigorous alternative would be somewhat higher than the costs of manufacturing CSUs that comply with the rule, using similar, but somewhat more extensive modifications. Because this alternative would provide only a limited increase in benefits, but a higher level of costs than the rule, the Commission did not select this alternative.

D. Mandate ASTM F2057 With a 60-Pound Test Weight

Another alternative would be to mandate a standard like ASTM F2057–19, but replace the 50-pound test weight with a 60-pound test weight. Sixty pounds approximately represents the 95th percentile weight of 5-year-old children, which is the age ASTM F2057–19 claims to address. This alternative was discussed in the ANPR.

This alternative would be less costly than the rule, because, based on CPSC testing, about 57 percent of CSUs on the market would already meet this requirement. The cost of modifying CSUs that do not comply is likely to be less than modifying them to comply with the rule, which is more stringent. By increasing the test weight, it is possible that this alternative would prevent some CSU tip overs. However, this alternative still would not account for the factors that occur during CSU tip-over incidents that contribute to instability, including multiple open and filled drawers, carpeting, and the horizontal and dynamic forces from children's interactions with the CSU. As this preamble and the NPR briefing package explain, a 60-pound test weight does not equate to protecting a 60-pound child. The UMTRI study demonstrates that children generate forces greater than their weight during certain interactions with a CSU, including interactions that are common in CSU tip-over incidents. Because this

[140] Based on NEISS estimates for 2015 through 2019.

alternative does not account for these factors, staff estimates that it may only protect children who weigh around 38 pounds or less, which is approximately the 75th percentile weight of 3-year-old children. For these reasons, the Commission does not believe this alternative would adequately reduce the CSU tip-over hazard, and did not select this alternative.

E. Wait for Potential Update to ASTM F2057

Another alternative would be to wait for ASTM to finalize a new version of ASTM F2057. At that point, the Commission could rely on the voluntary standard, in lieu of rulemaking; mandate compliance with the voluntary standard if the voluntary standard was likely to adequately reduce the risk of injury but there was not substantial compliance with it; or mandate the requirements that have been considered for the potential new ASTM standard.

This alternative may reduce costs associated with the rule because the provisions in the draft version of the ASTM standard are generally less stringent than those in this rule. As such, they would require less cost for labor and materials, and more CSUs would comply with the standard without modifications. ASTM balloted possible changes to the ASTM F2057 standard in May 2022 and July 2022. However, as of September 2022, ASTM has not finalized a new version of the standard and CPSC staff have submitted letters and votes indicating that the balloted revisions would not adequately address the hazards. As such, CPSC does not know whether ASTM will update the standard; what specific provisions the update would contain, if issued; does not consider the current draft form of the update adequate to address the hazard; and does not know what level of compliance there would be with an updated standard. Therefore, although this alternative may improve the stability of CSUs to some extent, continuing to wait for ASTM would delay the benefits of the rule, and staff does not consider the current draft revisions adequate to address the hazard, even if they were adopted.

F. Longer Effective Date

Another alternative would be to provide a longer effective date than the 180-day effective date in the rule. It is likely that hundreds of manufacturers, including importers, will have to modify potentially several thousand CSU models to comply with the rule, which will require understanding the requirements, redesigning the CSUs, and manufacturing compliant units. Delays in meeting the effective date could result in disruptions to the supply chain, or fewer choices being available to consumers, at least in the short term. A longer effective date could reduce the costs associated with the rule and mitigate potential disruption to the supply chain. However, delaying the effective date would delay the safety benefits of the rule as well. As such, the Commission did not select this alternative.

XII. Paperwork Reduction Act

This 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). The preamble to the proposed rule discussed the information collection burden of the proposed rule and specifically requested comments on the accuracy of CPSC's estimates. 87 FR 6246 (Feb. 3, 2022). The estimates included the time for preparing and providing required markings and labels as well as performance and technical information required on hang tags. These requirements fall within the definition of ''collection of information,'' as defined in 44 U.S.C. 3502(3).

OMB has assigned control number 3041–0191 to this information collection. CPSC did not receive any comments regarding the information collection burden in the NPR through OMB. CPSC received one comment, through the docket for this rulemaking on *www.regulations.gov,* that stated that producing the hang tag in a foreign country and shipping it would be difficult to achieve during the 30-day effective date proposed in the NPR. However, in response to comments and other considerations, the final rule provides a 180-day effective date. CPSC also received comments and obtained additional information regarding economic considerations, which resulted in the final rule updating the number of estimated manufacturers and CSUs. The final rule also includes requirements for online hang tags, which were not specified in the NPR; however, these requirements are not expected to create additional economic burdens because they can be addressed by simply adding a soft copy of the physical design to the manufacturer website.

Accordingly, the estimated burden of this collection of information is modified, as follows:

Title. Safety Standard for Clothing Storage Units.

Summary of information collection. The consumer product safety standard prescribes the safety requirements, including labeling or marking and hang tag requirements, for CSUs. These requirements are intended to reduce or eliminate an unreasonable risk of death or injury to consumers from CSU tip overs.

Requirements for marking and labeling, in the form of warning labels or markings, and requirements to provide performance and technical data by labeling, in the form of a physical and online hang tag, will provide information to consumers. Warning labels or markings on CSUs will provide warnings to the consumer regarding product use. Hang tags will provide information to the consumer regarding the stability of the unit. These requirements fall within the definition of ''collection of information,'' as defined in 44 U.S.C. 3502(3).

Section 27(e) of the CPSA authorizes the Commission to require, by rule, that manufacturers of consumer products provide to the Commission performance and technical data related to performance and safety as may be required to carry out the purposes of the CPSA, and to give notification of such performance and technical data at the time of original purchase to prospective purchasers and to the first purchaser of the product. 15 U.S.C. 2076(e). Section 2 of the CPSA provides that one purpose of the CPSA is to ''assist consumers in evaluating the comparative safety of consumer products.'' 15 U.S.C. 2051(b)(2).

Section 14 of the CPSA requires manufacturers, importers, or private labelers of a consumer product subject to a consumer product safety rule to certify, based on a test of each product or a reasonable testing program, that the product complies with all rules, bans or standards applicable to the product. In the case that a CSU could be considered to be a children's product, the certification must be based on testing by an accredited third-party conformity assessment body. The final rule for CSUs specifies the test procedure be used to determine whether a CSU complies with the requirements. For products that manufacturers certify, manufacturers would issue a general certificate of conformity (GCC).

Identification and labeling requirements will provide information to consumers and regulators needed to locate and recall noncomplying products. Identification and labeling requirements include content such as the name and address of the manufacturer.

Warning labels or markings will provide information to consumers on hazards and risks associated with product use. Warning label or marking requirements specified in the final rule include size, content, format, location, and permanency.

The standard requires that CSU manufacturers provide technical information for consumers on a hang tag at the time of original purchase. The information provided on the hang tag would allow consumers to make informed decisions on the comparative stability of CSUs when making a purchase and would provide a competitive incentive for manufactures to improve the stability of CSUs. Specifically, the manufacturer of a CSU would provide a physical hang tag with every CSU and on retail packaging visible at points of sale and when shipped to consumer directly that explains the stability of the unit. For online sales, the hang tag information must be provided on manufacturer websites from which consumers may purchase a CSU.[141] CSU hangtag requirements include:

- *Size:* Every hangtag shall be at least 5 inches wide by 7 inches tall.
- *Content:* Every CSU shall be offered for sale with a hang tag that states the stability rating for the CSU model.
- *Attachment:* Every hang tag shall be attached to the CSU and clearly visible. The hang tag shall be attached to the CSU and lost or damaged hang tags must be replaced. The hang tags may be removed only by the first purchaser.
- *Placement:* The hang tag shall appear on the product and immediate container of the product in which the product is normally offered for sale at retail. RTA furniture shall display the hang tag on the main panel of consumer-level packaging. Any units shipped directly to consumers shall contain the hang tag on the immediate container of the product. For manufacturer websites from which consumers can purchase a CSU, a link to the hang tag information must be provided in the same form as the physical hang tag and be available in close proximity to the price listed on the website.
- *Format:* The format of the hang tag is provided in the final rule and the hang tag must include the elements shown in the figure provided.

The requirements for the GCC are stated in section 14 of the CPSA. Among other requirements, each certificate must identify the manufacturer or private labeler issuing the certificate and any third-party conformity assessment body, on whose testing the certificate depends; the date and place of manufacture; the date and place where the product was tested; each party's name, full mailing address, telephone number, and contact information for the individual responsible for maintaining records of test results. The certificates must be in English. The certificates must be furnished to each distributor or retailer of the product and to CPSC, if requested.

Respondents and frequency. Respondents include manufacturers and importers of CSUs, many of which are considered small private firms. More than 3 thousand manufacturers and close to 18 thousand importers will have to comply with the information collection requirements when the CSUs are manufactured or imported; this is addressed further in the discussion of estimated burden. CPSC estimates that more than 95 percent of respondents that will have to comply with the information collection requirements are small firms.

Estimated burden. CPSC has estimated the respondent burden in hours and the estimated labor costs to the respondent. The hourly burden for labeling includes designing the label and the hang tag that will be used for each model, physically attaching the label and hang tag to each CSU, and, where applicable, posting the hang tag online. Additionally, the burden for third-party testing is estimated for a subset of CSUs that are children's products.

Manufacturers will have to place a hang tag on each CSU sold. CPSC staff estimated that there were 20.64 million units sold in 2021. This would be a reasonable estimate of the number of responses per year.[142] CPSC estimates that there are about 6,365 different models of CSUs in use. The estimated number of models in use was also updated in the final rule.[143]

Estimate of Respondent Burden. The hourly reporting burden imposed on firms includes the time it will take them to design and update hang tags, and identification labeling, including warning labels, as well as the hourly burden of attaching them to all CSUs sold domestically.

TABLE 4—ESTIMATED ANNUAL REPORTING BURDEN

Burden type	Type of supplier	Total annual reponses	Length of response	Annual burden (hours)
Labeling, design and update	Manufacturer or Importer	2,122	60 min	2,122
Labeling, attachment	Manufacturer, Importer, or Retailer	20.64 million	.06 min	20,640
Total Labeling Burden				22,762
Third-party recordkeeping, certification	Manufacturers of Children's CSUs	21	3 hours	63
Total Hourly Burden				22,825

CPSC estimates that it could take an hour for a supplier to design the hang tags and labeling or marking per CSU model, and that the design could be used for a period of three years, or until the CSU is redesigned.[144] At 60 minutes per hang tag design, the hourly burden for designing a hang tag that will be used for three years is 20 minutes per

[141] The online hang tag is an additional requirement, not specified in the NPR. However, because hang tags must exactly match the figure provided in the regulation, the same design would be used for both physical and online hang tags. Therefore, the economic burden of the online hang tags is only the cost of adding a picture per model to the manufacturer website, and the virtual space required to post the hang tags. CPSC considers these costs to be small, or practically negligible for the purpose of estimating the burden of this information collection.

[142] The final rule updated the estimate of number of CSUs sold in the United States, based on new data from commenters and from additional staff analysis.

[143] The changes in the final rule to estimates of U.S. sales of CSUs and models in use reduced the estimated respondent burden by about half as compared to the ICR for the proposed rule.

[144] The lifespan of a CSU model was reduced from five years in the NPR to three years in the final rule. This update takes into consideration an accelerating trend in furniture design that demands new designs with a much higher frequency, in some cases even on a yearly basis.

year; or equivalently, it could be assumed that one third of all CSU models are redesigned each year (2,122 or 6,365 ÷ 3 years). Therefore, the annual burden would be 2,122 hours at a burden of one hour per CSU model.

CPSC estimates it could take 0.06 minutes (3.6 seconds or 1,000 hang tags per hour) for a supplier to attach the hang tag to the CSU, for each of the 20.64 million units sold in the United States annually. Attaching the hang tag to the CSU would amount to an hourly burden of 20,640 hours (0.06 min × 20,640,000 CSUs/60 mins per hour).

In addition, three types of third-party testing of children's products are required: certification testing, material change testing, and periodic testing. Requirements state that manufacturers conduct sufficient testing to ensure that they have a high degree of assurance that their children's products comply with all applicable children's product safety rules before such products are introduced into commerce. If a manufacturer conducts periodic testing, it is required to keep records that describe how the samples of periodic testing are selected. The hour burden of recordkeeping requirements will likely vary greatly from product to product, depending on such factors as the complexity of the product and the amount of testing that must be documented. Therefore, estimates of the hour burden of the recordkeeping requirements are somewhat speculative.

CPSC estimates that up to 1 percent of all CSUs models sold annually,[145] or 21 CSUs, are children's products and would be subject to third-party testing, for which 3 hours of recordkeeping and record maintenance will be required. Thus, the total hourly burden of the recordkeeping associated with certification is 63 hours (3 × 21).

Labor Cost of Respondent Burden. According to the U.S. Bureau of Labor Statistics (BLS), Employer Costs for Employee Compensation, the total compensation cost per hour worked for all private industry workers was $38.61 (March 2022, Table 4, *https://www.bls.gov/news.release/archives/ecec_06162022.pdf*). Based on this analysis, CPSC staff estimates that the labor cost of respondent burden would impose a cost to industry of approximately $881,273 annually (22,825 hours × $38.61 per hour = $881,273.25).

Respondent Costs Other Than Burden Hour Costs. In addition to the labor burden costs addressed above, the hang tag requirement imposes additional annualized costs. These costs include capital costs for cardstock used for each hang tag to be displayed and the wire or string used to attach the hang tag to the CSU. CPSC estimates the cost of the printed hang tag and wire for attaching the hang tag to the CSU will be about $0.10. Therefore, the total cost of materials to industry would be about $2.06 million per year ($0.10 × 20.64 million units).

Most domestic firms that are expected to manufacture or import CSUs subject to the final rule are small businesses. CPSC provides a variety of resources to help both new and experienced small businesses learn about safety requirements that apply to consumer products, including the CPSC Regulatory Robot, small business education videos, and the Small Business Ombudsman. Many of these resources can be accessed online at: *https://www.cpsc.gov/Business--Manufacturing/Small-Business-Resources.* Small firms can reach the Small Business Ombudsman by calling (888) 531–9070.

Cost to the Federal Government. The estimated annual cost of the information collection requirements to the Federal Government is approximately $4,304, which includes 60 staff hours to examine and evaluate the information as needed for Compliance activities. This is based on a GS–12, step 5 level salaried employee. The average hourly wage rate for a mid-level salaried GS–12 employee in the Washington, DC metropolitan area (effective as of January 2022) is $48.78 (GS–12, step 5). This represents 68.0 percent of total compensation (U.S. Bureau of Labor Statistics, ''Employer Costs for Employee Compensation,'' March 2022, Table 2, percentage of wages and salaries for all civilian management, professional, and related employees: *https://www.bls.gov/news.release/archives/ecec_06162022.pdf*). Adding an additional 32.0 percent for benefits brings average annual compensation for a mid-level salaried GS–12 employee to $71.74 per hour. Assuming that approximately 60 hours will be required annually, this results in an annual cost of $4,304 ($71.74 per hour × 60 hours = $4,304.40).

XIII. Final Regulatory Flexibility Analysis [146]

Whenever an agency is required to publish a proposed rule, the Regulatory Flexibility Act (5 U.S.C. 601–612) requires that the agency prepare an initial regulatory flexibility analysis (IRFA) for the NPR and a final regulatory flexibility analysis (FRFA) for the final rule. 5 U.S.C. 603, 604. These analyses must describe the impact that the rule would have on small businesses and other entities. The FRFA must contain:

(1) a statement of the need for and objectives of the rule;

(2) significant issues raised by commenters on the IRFA, the agency's assessment of those issues, and changes made to the result as a result of the comments;

(3) a response to comments filed by the Chief Counsel for Advocacy of the U.S. Small Business Administration (Office of Advocacy), and changes made as a result of those comments;

(4) a description and estimate of the number of small entities to which the rule will apply;

(5) a description of the projected reporting, recordkeeping and other compliance requirements of the rule, including an estimate of the classes of small entities which will be subject to the requirement and the type of professional skills necessary for preparation of the report or record; and

(6) steps the agency has taken to minimize the significant economic impact on small entities, consistent with the objective of the applicable statute, including the factual, policy, and legal reasons for selecting the alternative in the final rule and why other alternatives were rejected.

A. Need for and Objectives of the Rule

The final rule would establish mandatory performance requirements for CSUs. The purpose of the final rule is to reduce the risks of death and serious injury from CSU tip overs. Incident data indicates that tip-overs commonly involve CSUs and children and result in serious injuries and death. Incidents and staff's testing also indicate that factors such as child interactions, open and filled drawers, and carpeting contribute to the instability of CSUs. The rule would require CSUs to be tested for stability, exceed minimum stability requirements, be marked or labeled with safety and identification information, and bear a hang tag providing performance and technical data about the stability of the CSU. Manufacturers of CSUs would be required to test CSUs for compliance

[145] CPSC updated its estimate of the proportion of CSU models that are children's products, broadly based on an online search of available CSU models for children.

[146] Further details about the final regulatory flexibility analysis are available in Tab I of the final rule briefing package. Additional information about costs associated with the rule are available in Tab H of the final rule briefing package. *See also* Tabs H and I of the NPR briefing package for additional details.

with the stability requirements and provide the required labeling and hang tag.

B. Comments on the IRFA

CPSC received comments on the substantive requirements in the proposed rule. CPSC also received comments on the costs and benefits calculations presented in the preliminary regulatory analysis and IRFA, the cost and benefit impacts of the scope and effective date of the proposed rule, and other possible economic impacts of the rule, including economic impacts on firms, the utility of the product for consumers, hazard costs associated with the product, and alternative actions that the Commission could take. A summary of the comments, CPSC staff's assessment of them, and changes to the final rule as a result of comments, are discussed in section VIII. Response to Comments of this preamble and Tab K of the final rule briefing package. To summarize, based on comments relevant to economic considerations, the final rule extends the effective date of the rule to 180 days and excludes from the scope of the rule lightweight CSUs if the combined weight of the CSU and the contents of filled drawers is less than 57 pounds. These changes should reduce the costs associated with compliance with the rule for businesses of all sizes. The change in the effective date will give businesses more time to manufacture or import CSUs that are compliant with the rule. The exclusion of lightweight units from the scope of the rule means that manufacturers of those units, which represent about 10 percent of U.S. annual sales of CSUs by number of units, will not need to test for compliance with this rule, or provide a certificate of compliance with this rule. Staff made other clarifying changes on scope and test methods that should make it more clear how companies of all sizes must comply with the rule, but that should not impact either costs or benefits.

C. Comments From the Office of Advocacy

The Office of Advocacy filed comments on the proposed rule. The Office of Advocacy commented: ''CPSC should consider reasonable alternatives to the proposed rule that would ease the burden on small businesses while still meeting the Commission's stated objectives'' and described specific issues and concerns raised by small businesses, including manufacturers, importers, and retailers. Alternatives to the proposed rule, and their expected impact on small businesses, were discussed in the IRFA and Preliminary Regulatory Analysis that accompanied the NPR and are also discussed in this preamble. The issues raised by the Office of Advocacy, and CPSC's response are as follows.

Comment: The Office of Advocacy stated that ''CPSC's Initial Regulatory Flexibility Act analysis underestimates the impact the proposed rule will have on small businesses.'' The Office of Advocacy also noted that almost all of the industry is small businesses, adding: ''One small importer estimated that additional packing materials and costs plus the increased shipping weight will drive up per unit costs by 44 percent. This does not include costs to test the CSUs or ship them to third parties for testing, nor does it include the cost increases this importer's suppliers will incur in the manufacturing process. Other small manufacturers and importers reported similar estimates of the impacts of the proposed rule, stating that the costs will increase approximately 30–40 percent. These small businesses report that an increase of this magnitude will put many of them out of business.'' The Office of Advocacy also expressed concern that the rule would impact small retailers, because the compliant CSUs would be so heavy the units would injure the delivery drivers.

Response: The economic analyses have been revised to reflect these and other commenters' input on costs of compliance. This rule does not require third-party testing, except for CSUs that are children's products, which are already subject to third-party testing requirements. In addition, the assumptions of higher costs by the Office of Advocacy and others were based on increased costs for shipping and packaging, assuming that compliance with the performance standard is achieved by adding weight to the CSU, which is not required by the final rule. The regulation is a performance standard, not a design standard; and as discussed in the Final Regulatory Analysis, there are multiple ways to comply with the final rule that may not involve adding weight to the unit. Suppliers can select the lowest-cost option to achieve compliance, which, in some cases, will likely be interlock hardware or foot extensions that add minimal weight to the unit, or one of those options in combination with added weight. Thus, there are many options to achieve compliance where shipping and packaging cost increases could be minimal, if any. Additionally, the Office of Advocacy did not provide data to demonstrate these costs of compliance would disproportionately affect small businesses.

The Office of Advocacy provided an estimate of the total cost to small businesses of 30 percent to 40 percent above current costs, but it did not provide any specific breakdown of increased costs to small manufacturers or importers from components, redesign, packaging, and shipping. This estimate is on the high end of the range of estimates provided by other commenters, primarily trade associations and large businesses, that did provide a breakout of increased costs for components, redesign, shipping, and packaging. Larger businesses and trade associations that provided comments generally assumed that wholesale prices would rise to cover costs of compliance, and they also assumed that retail prices would rise to cover all or nearly all of the increased cost to manufacturers and importers. It is unlikely, given that large suppliers apparently plan to raise prices to cover the cost of compliance, that small suppliers would not be able to pass any of the cost of regulatory compliance on to retail customers, as is implied by the Office of Advocacy's comments. That would only occur if demand were highly elastic (any price increase would cause demand to drop sharply), so suppliers are unable to pass any of the cost of compliance on to retail consumers. The Final Regulatory Analysis assumes that demand is somewhat elastic, so that both small and large suppliers will be able to cover some or all of the compliance costs of the rule by raising wholesale prices, which, in turn, will result in higher retail prices. The deadweight loss analysis portion of the Final Regulatory Analysis discusses that some manufacturers may exit the market because their increased marginal costs will exceed the price consumers are willing to pay for their product.

An industry trade association commenter noted that more than 90 percent of CSUs sold in the United States are imported. This means that very few U.S. manufacturers will directly bear the cost of redesign or testing, which, instead, will fall on foreign manufacturers. Small importers will be able to choose a compliant foreign supplier for their products, rather than incur the cost of redesign themselves, although the cost of compliance will likely be reflected in the wholesale cost. The economies of scale for larger manufacturers, as compared to small manufacturers, may not be an issue in a U.S. industry that is primarily importers, not manufacturers.

On specifics of shipping costs, the Final Regulatory Analysis includes an estimate of shipping furniture with added weight for an average of 16 cents per additional pound, which is highly unlikely to add 30 percent to the cost of a unit, given the average retail price of a CSU is estimated to be $338.50. Again, adding weight to the unit is not required by the final rule, and suppliers are free to choose a different compliance method that does not add significant weight to the unit, such as drawer interlocks or foot extensions. The Preliminary Regulatory Analysis that accompanied the proposed rule estimated the cost of added weight at 24 cents per pound, based on the retail price of medium density fiberboard (MDF); manufacturers would likely pay far less for MDF. The Preliminary Regulatory Analysis used the retail price as a conservative estimate of the cost of added weight, in part because the retail price included the price of shipping the MDF to the customer. CPSC did not receive any comments that the MDF price estimate in the Preliminary Regulatory Analysis that included the cost of shipping MDF to the consumer point of purchase was inaccurate.

On the issue of economies of scale for any specific technology for compliance, while it is possible that large manufacturers would have a lower cost per unit for the components, due to economies of scale, no small manufacturers provided specific price data on this issue. Again, an industry trade association noted that nearly all (more than 90 percent) of the CSUs sold in the United States are imported, so it will largely be foreign manufacturers who decide the best way to achieve compliance with the standard in the most cost-effective way.

Comment: The Office of Advocacy stated that ''CPSC should consider a later effective date for the rulemaking, and in the interim require small businesses to educate and assist consumers with existing product safety options.'' They also stated that ''small businesses will not have enough time to redesign their products to comply with the proposed requirements. Small businesses that import products will incur additional difficulties due to existing supply chain disruptions, as well as normal lead times required for some of these products.''

Response: Other commenters representing large businesses and trade associations had similar comments about the burden of the effective date. In response to these comments, the final rule effective date is 180 days after the publication of the rule, rather than 30 days after, as proposed in the NPR. The effective date applies to the date of manufacture, which addresses concerns from commenters regarding the status of items manufactured in foreign countries before the effective date of the rule, but still in transport when the rule becomes effective. Because the effective date applies to the date of manufacture, items manufactured in foreign countries before the effective date that do not comply with the rule could still legally be imported and sold.

The Office of Advocacy provided no data about why small businesses would find the effective date a greater burden than larger businesses. Given that most CSUs are imported, not manufactured domestically, it is unclear whether small importers would find the effective date more burdensome than large importers. In fact, the rule's effective date may temporarily disproportionally benefit U.S. manufacturers, including small manufacturers, who will have shorter shipping times for units manufactured in the United States than importers of any size.

Comment: The Office of Advocacy commented that ''CPSC should reconsider its two proposed testing methods, as they produce different results that may be confusing for consumers and small businesses alike.''

Response: Other commenters representing large businesses and trade associations had similar comments. The final rule has been revised so that only one of the test methods applies to any given CSU (this change is discussed in detail in section IX. Description of and Basis for the Rule).

Comment: The Office of Advocacy commented that ''CPSC should consider updating existing voluntary standards if it is appropriate to do so'' and that ''updating existing standards will ensure that industry has a voice in the process, which may help in minimizing the impacts to small businesses.''

Response: Other commenters representing large businesses and trade associations had similar comments favoring the alternative of voluntary standards. The Office of Advocacy did not provide data or any detailed information that would lead staff to conclude that adopting the voluntary standard would minimize the impacts on small businesses, or provide adequate levels of safety for consumers. As explained in this preamble, staff has reviewed existing standards that address CSU instability and concluded that they do not adequately reduce the risk of injury. The primary current voluntary standard, ASTM F2057–19, does not adequately reduce the risk of injury associated with CSU tip overs because it does not address the multiple factors demonstrated to contribute to instability and that exist in incidents (*i.e.,* the effect of carpet, multiple open and filled drawers, and dynamic forces generated by common interactions). In addition, staff found that many specific CSU models involved in injuries and fatalities during tip-over incidents would meet the current ASTM standard, thus demonstrating that the current standard is not adequate to address the hazard. CPSC staff worked closely with ASTM to update ASTM F2057–19, and ASTM has balloted revisions to the standard. However, staff considers several balloted items inadequate to reduce the risk of injury and therefore has submitted negative votes on several items. Moreover, ASTM has worked on updating its standard for several years and has not succeeded in doing so. Therefore, the Commission does not consider it appropriate to continue to wait for ASTM to update the standard, particularly since the updates under consideration do not adequately address the risk. Finally, a voluntary standard does not require compliance. Therefore, for a voluntary standard to be effective at reducing the hazard, it would need to be both effective and have a high level of compliance. Thus, even if ASTM were to develop an effective standard, the level of compliance would be relevant to whether it would be as effective as the mandatory draft final rule.

Comment: The Office of Advocacy commented that ''CPSC should clarify that once a product has been tested and certified, small importers and retailers may rely on that certification without incurring additional testing costs.''

Response: Parts 1109 and 1110 of CPSC's regulations include requirements for relying on component part testing or certification and for certificates of compliance. Once a product has been tested and certified, importers and retailers of any size may rely on the certificate of compliance as evidence that the product has met the testing and certification requirements. This applies to both children's products (for which 16 CFR part 1109 applies) and general use products (for which 16 CFR part 1110 applies). These CPSC regulations apply to many products and are not new or specific to CSUs.

D. Small Entities to Which the Rule Will Apply

The final rule would affect firms or individuals that manufacture or import CSUs that fall within the scope of the rule. Therefore, the rule would apply to small entities that manufacture or import CSUs. As discussed in the IRFA that accompanied the NPR,

manufacturers of CSUs are principally classified in the North American Industrial Classification (NAICS) category 337122 (non-upholstered wood household furniture manufacturing) but may also be categorized in NAICS codes 337121 (upholstered household furniture manufacturing), 337124 (metal household furniture manufacturing), or 337125 (household furniture (except wood and metal) manufacturing). According to data from the U.S. Census Bureau, in 2019, there were a total of 3,303 firms classified in these four furniture categories. Of these firms, 1,992 were primarily categorized in the non-upholstered wood furniture category. More than 99 percent of the firms primarily categorized as manufacturers of non-upholstered wood furniture would be considered small businesses, as were 97 percent of firms in the other furniture categories, according to the U.S. Small Business Administration's size standards.[147] These categories are broad and include manufacturers of other types of furniture, such as tables, chairs, bed frames, and sofas. It is also likely that not all the firms in these categories manufacture CSUs. Production methods and efficiencies vary among manufacturers; some make use of mass production techniques, and others manufacture their products one at a time, or on a custom-order basis.

The number of U.S. firms that are primarily classified as manufacturers of non-upholstered wood household furniture has declined over the last few decades, as retailers have turned to international sources of CSUs and other wood furniture. Additionally, firms that formerly produced CSUs domestically have shifted production to foreign plants.

Sixty-seven percent of the value of apparent consumption of non-upholstered wood furniture (net imports plus domestic production for the U.S. market) in 2020 was comprised of imported furniture, and the share held by imports has grown in recent years (up from 56 percent in 2017). Although CSUs are not reported as a separate category by the U.S. Department of Commerce, an even greater proportion of CSUs purchased by U.S. consumers could be imported. An industry trade association commented on the proposed rule, noting that more than 90 percent of CSUs sold in the United States are imported products. Firms that import CSUs would also be impacted by the final rule, because imported CSUs would have to comply with the standards; although, as noted above, importers may rely on a certificate of compliance from the foreign manufacturer.

The final rule would apply to products manufactured after the effective date of the rule. As such, the rule would not directly apply to retailers, unless they are also manufacturers or importers. However, because retailers may be indirectly affected by changes made by manufacturers or importers, staff also considered the effects of the rule on retailers. Under the NAICS classification system, importers are classified as either wholesalers or retailers. Furniture wholesalers are classified in NAICS category 423210 (Furniture Merchant Wholesalers). According to the Census Bureau data, in 2019, there were 4,824 firms involved in household furniture importation and distribution. A total of 4,609 of these wholesalers (or 96 percent) are classified as small businesses because they employ fewer than 100 employees (which is the SBA size standard for NAICS category 423210). Furniture retailers are classified in NAICS category 442110 (Furniture Stores). According to the Census Bureau, there were 13,142 furniture retailers in 2019. The SBA considers furniture retailers to be small businesses if their gross revenue is less than $20.5 million. Using these criteria, at least 97 percent of the furniture retailers are small (based on revenue data from the 2012 Economic Census of the United States). Wholesalers and retailers may obtain their products from domestic sources or import them from foreign manufacturers. Retailers would be indirectly impacted by this rule only to the extent that they would need to buy compliant units from manufacturers or importers. Retailers can increase the retail price of units to reflect any increase in their wholesale costs and to maintain their profit margin. However, given that demand is responsive to price (somewhat elastic), it is possible that retailers will see lower sales of CSUs. Given that most furniture stores sell a wide mix of furniture and accessory products, it is unlikely that any indirect impact of this rule on small retailers would be substantial (more than 1 percent of annual revenue).

E. Projected Reporting, Recordkeeping, and Other Compliance Requirements

The final rule establishes a mandatory standard that all CSUs must meet to be sold in the United States. The requirements in the rule are discussed in this preamble and include stability testing requirements, warning and identification label requirements, hang tag requirements, stockpiling limits, and certification requirements.

As discussed above, most of the entities to which the rule would apply are small businesses. No specialized professional skills or training are needed for the preparation of the record of compliance. CPSC's public website provides guidance on how to create a certificate of compliance, and an example one-page certificate.[148] CSU suppliers already would have had to provide such a general certificate of compliance for other applicable CPSC regulations, such as lead paint, so this rule should not require any new skills or training for certificates of compliance. The compliance testing requirements are described in detail this document and many suppliers are already performing similar tests to demonstrate compliance with the voluntary standard. Third-party testing is not required, except for CSUs that are also children's products. The text and graphics for the required labels and hang tags are provided in the rule, so a graphics designer will not be required to make the labels and hang tags. Because the Commission is issuing the hang tag requirement under section 27(e) of the CPSA, a regulatory analysis or regulatory flexibility analysis is not required. However, the cost of hang tags will be about 10 cents for materials and less than a minute of labor to attach to the unit. As noted earlier, the labeling or marking of the unit should have similarly minor costs for manufacturing.

F. Steps Taken To Minimize Significant Impacts on Small Entities

As discussed in section XI. Alternatives to the Rule, CPSC examined several alternatives to the rule, which could reduce the burden on firms, including small entities. Because most domestic firms that are expected to manufacture or import CSUs subject to the final rule are small businesses, an exemption for small manufacturers/importers is not a feasible alternative. As described in section XI. Alternatives to the Rule, the Commission concluded that the additional alternatives would not adequately reduce the risk of injury and death associated with CSU tip overs and did not select those alternatives. The Commission did, however, extend the effective date for the rule to 180 days, which was an alternative discussed in the NPR. This will likely reduce burdens on firms of all sizes.

[147] *Table of Small Business Size Standards Matched to North American Industry Classification System Codes,* available at: *http://www.sba.gov/sites/default/files/files/Size_Standards_Table.pdf.*

[148] Available at: *https://www.cpsc.gov/Business--Manufacturing/Testing-Certification/General-Certificate-of-Conformity-GCC.*

XIV. Incorporation by Reference

This rule incorporates by reference ASTM F2057–19. The Office of the Federal Register (OFR) has regulations regarding incorporation by reference. 1 CFR part 51. Under these regulations, in the preamble, an agency must summarize the incorporated material and discuss the ways in which 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 requirements, section V. Relevant Existing Standards, subsection *A. ASTM F2057–19* summarizes the standard. In this rule, the Commission requires compliance with specific provisions of ASTM F2057–19. Section IX. Description of and Basis for the Rule of this preamble summarizes those provisions.

The standard is reasonably available to interested parties and interested parties can purchase a copy of ASTM F2057–19 from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428–2959 USA; telephone: 610–832–9585; *www.astm.org.* Once this rule takes effect, a read-only copy of the standard will be available for viewing on the ASTM website at: *https://www.astm.org/READINGLIBRARY/.* Interested parties can also schedule an appointment to inspect a copy of the standard at CPSC's Office of the Secretary, U.S. Consumer Product Safety Commission, 4330 East West Highway, Bethesda, MD 20814, telephone: 301–504–7479; email: *cpsc-os@cpsc.gov.*

XIV. Testing, Certification, and Notice of Requirements

Section 14(a) of the CPSA includes requirements for certifying that children's products and non-children's products comply with applicable mandatory standards. 15 U.S.C. 2063(a). Section 14(a)(1) addresses required certifications for non-children's products, and sections 14(a)(2) and (a)(3) address certification requirements specific to children's products.

A ''children's product'' is a consumer product that is ''designed or intended primarily for children 12 years of age or younger.'' *Id.* 2052(a)(2). The following factors are relevant when determining whether a product is a children's product:

- manufacturer statements about the intended use of the product, including a label on the product if such statement is reasonable;
- whether the product is represented in its packaging, display, promotion, or advertising as appropriate for use by children 12 years of age or younger;
- whether the product is commonly recognized by consumers as being intended for use by a child 12 years of age or younger; and
- the Age Determination Guidelines issued by CPSC staff in September 2002, and any successor to such guidelines.

Id. ''For use'' by children 12 years and younger generally means that children will interact physically with the product based on reasonably foreseeable use. 16 CFR 1200.2(a)(2). Children's products may be decorated or embellished with a childish theme, be sized for children, or be marketed to appeal primarily to children. *Id.* § 1200.2(d)(1).

As discussed above, some CSUs are children's products and some are not. Therefore, this rule requires CSUs that are not children's products to meet the certification requirements under section 14(a)(1) of the CPSA and requires CSUs that are children's products to meet the certification requirements under section 14(a)(2) and (a)(3) of the CPSA. The Commission's requirements for certificates of compliance are codified at 16 CFR part 1110.

Non-children's products. Section 14(a)(1) of the CPSA requires every manufacturer (which includes importers [149]) of a non-children's product that is subject to a consumer product safety rule under the CPSA or a similar rule, ban, standard, or regulation under any other law enforced by the Commission to certify that the product complies with all applicable CPSC-enforced requirements. 15 U.S.C. 2063(a)(1).

Children's products. Section 14(a)(2) of the CPSA requires the manufacturer or private labeler of a children's product that is subject to a children's product safety rule to certify that, based on a third-party conformity assessment body's testing, the product complies with the applicable children's product safety rule. *Id.* 2063(a)(2). Section 14(a) also requires the Commission to publish a notice of requirements (NOR) for a third-party conformity assessment body (*i.e.,* testing laboratory) to obtain accreditation to assess conformity with a children's product safety rule. *Id.* 2063(a)(3)(A). Because some CSUs are children's products, the rule is a children's product safety rule, as applied to those products.

The Commission published a final rule, codified at 16 CFR part 1112, entitled *Requirements Pertaining to Third Party Conformity Assessment Bodies,* which established requirements and criteria concerning testing laboratories. 78 FR 15836 (Mar. 12, 2013). Part 1112 includes procedures for CPSC to accept a testing laboratory's accreditation and lists the children's product safety rules for which CPSC has published NORs. When CPSC issues a new NOR, it must amend part 1112 to include that NOR. Accordingly, this rule amends part 1112 to add this standard for CSUs to the list of children's product safety rules for which CPSC has issued an NOR.

Testing laboratories that apply for CPSC acceptance to test CSUs that are children's products for compliance with the new rule would have to meet the 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 include 16 CFR part 1261, *Safety Standard for Clothing Storage Units,* in the laboratory's scope of accreditation listed on the CPSC website at: *www.cpsc.gov/labsearch.*

XV. Environmental Considerations

The Commission's regulations address whether CPSC is required to prepare an environmental assessment (EA) or an environmental impact statement (EIS). 16 CFR 1021.5. Those regulations list CPSC actions that ''normally have little or no potential for affecting the human environment,'' and therefore, fall within a ''categorical exclusion'' under the National Environmental Policy Act (42 U.S.C. 4231–4370h) and the regulations implementing it (40 CFR parts 1500–1508) and do not require an EA or EIS. 16 CFR 1021.5(c). Among those actions are rules that provide performance standards for products. *Id.* § 1021.5(c)(1). Because this rule would create performance requirements for CSUs, the rule falls within the categorical exclusion, and thus, no EA or EIS is required.

XVI. Congressional Review Act

The Congressional Review Act (CRA; 5 U.S.C. 801–808) states that before a rule may take effect, the agency issuing the rule must submit the rule, and certain related information, to each House of Congress and the Comptroller General. 5 U.S.C. 801(a)(1). The CRA submission must indicate whether the rule is a ''major rule.'' The CRA states that the Office of Information and Regulatory Affairs (OIRA) determines whether a rule qualifies as a ''major rule.'' A ''major rule'' is one that OIRA finds has resulted in or is likely to result in:

- an annual effect on the economy of $100,000,000 or more;

[149] The CPSA defines a ''manufacturer'' as ''any person who manufactures or imports a consumer product.'' 15 U.S.C. 2052(a)(11).

• a major increase in costs or prices for consumers, individual industries, government agencies, or geographic regions; or

• significant adverse effects on competition, employment, investment, productivity, innovation, or the ability of U.S. enterprises to compete with foreign enterprises in domestic and export markets.

Id. 804(2).

Because CPSC estimates the annual effect of this rule to be $100,000,000 or more, OIRA determined that this is a major rule. To comply with the CRA, CPSC will submit the required information to each House of Congress and the Comptroller General.

XVII. Preemption

Executive Order (E.O.) 12988, *Civil Justice Reform* (Feb. 5, 1996), directs agencies to specify the preemptive effect of a rule in the regulation. 61 FR 4729 (Feb. 7, 1996), section 3(b)(2)(A). In accordance with E.O. 12988, CPSC states the preemptive effect of the rule, as follows:

The Commission issues the regulations for CSUs under authority of the CPSA. 15 U.S.C. 2051–2089. Section 26 of the CPSA provides that whenever a consumer product safety standard under the Act is in effect and applies to a risk of injury associated with a consumer product, no State or political subdivision of a State shall have any authority either to establish or to continue in effect any provision of a safety standard or regulation which prescribes any requirements as to the performance, composition, contents, design, finish, construction, packaging or labeling of such product which are designed to deal with the same risk of injury associated with such consumer product, unless such requirements are identical to the requirements of the Federal standard. 15 U.S.C. 2075(a). The Federal Government, or a state or local government, may establish or continue in effect a non-identical requirement for its own use that is designed to protect against the same risk of injury as the CPSC standard if the Federal, state, or local requirement provides a higher degree of protection than the CPSA requirement. *Id.* 2075(b). In addition, states or political subdivisions of a state may apply for an exemption from preemption regarding a consumer product safety standard, and the Commission may issue a rule granting the exemption if it finds that the state or local standard: (1) provides a significantly higher degree of protection from the risk of injury or illness than the CPSA standard, and (2) does not unduly burden interstate commerce. *Id.* 2075(c).

Thus, with the exception of the allowances in 15 U.S.C. 2075(b) and (c), the requirements in part 1261 preempt non-identical state or local requirements for CSUs designed to protect against the same risk of injury and prescribing requirements regarding the performance, composition, contents, design, finish, construction, packaging or labeling of CSUs.

XVIII. Effective Date

The CPSA requires that consumer product safety rules issued under sections 7 and 9 must take effect at least 30 days after the date the rule is promulgated, but not later than 180 days after the date the rule is promulgated unless the Commission finds, for good cause shown, that an earlier or a later effective date is in the public interest and, in the case of a later effective date, publishes the reasons for that finding. 15 U.S.C. 2058(g)(1).

In addition, the CRA includes requirements regarding effective dates for ''major rules.'' As discussed in section XVI. Congressional Review Act, this is a major rule. In general, unless Congress disapproves a rule, a major rule must take effect no earlier than 60 days after the rule is published in the **Federal Register** or Congress receives a report of the rule, whichever is later. 5 U.S.C. 801(a)(3).

The NPR proposed that the rule would take effect 30 days after publication of the final rule in the **Federal Register**. CPSC received numerous comments regarding the effective date. Most comments asserted that the proposed 30-day effective date would be unrealistic given the time, costs, and logistics necessary to modify CSUs to comply with the standard, particularly since nearly all CSUs would not meet the standard. Commenters explained that work necessary to comply with the rule would include: testing CSUs in their current state, modifying CSU designs as necessary and within reasonable cost ranges, working with suppliers, redesigning packaging, reworking logistics, changing manufacturing processes, communicating with and training stakeholders, and adjusting costing including with retailers. Commenters also stated that significant supply chain issues affect a realistic effective date. Commenters asserted that under normal conditions, product lead time would be 4 to 6 weeks longer than 30 days, but with current supply chain issues, product lead time from ordering to manufacturing to delivery is between 9 and 12 months and orders sit in process for 6 months or more. Accordingly, they assert that orders placed before the final rule takes effect could not be met, as manufacturing would not occur for several months. Commenters noted that these issues could also increase consumer prices. Several commenters recommended that an effective date of 180 days may be sufficient to accommodate these considerations, and several stated that 360 days was more in line with the normal product development process and would still be short, since they asserted that this process typically takes several years.

Based on these comments, and staff's analysis of the costs associated with the rule (Tab H), the rule (including the amendment to part 1112) will go into effect May 24, 2023 and will apply to all CSUs that are subject to the rule that are manufactured after that date.

XIX. Findings

As explained, the CPSA requires the Commission to make certain findings when issuing a consumer product safety standard. 15 U.S.C. 2058(f)(1), (f)(3). These findings are stated in § 1261.8 of the rule and are based on information provided throughout this preamble and the staff's briefing packages for the proposed and final rules.

XX. Conclusion

For the reasons stated in this preamble, the Commission concludes that CSUs that do not meet the requirements specified in this rule, and are not exempt from the rule, present an unreasonable risk of injury associated with CSU tip overs.

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 1261

Consumer protection, Imports, Incorporation by reference, Information, Labeling, Safety.

For the reasons discussed in the preamble, the Commission amends chapter II, subchapter B, 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: Pub. L. 110–314, section 3, 122 Stat. 3016, 3017 (2008); 15 U.S.C. 2063.

■ 2. Amend § 1112.15 by adding reserved paragraph (b)(53) and paragraph (b)(54) to read as follows:

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

* * * * *

(b) * * *

(54) 16 CFR part 1261, Safety Standard for Clothing Storage Units.

* * * * *

■ 3. Add part 1261 to read as follows:

PART 1261—SAFETY STANDARD FOR CLOTHING STORAGE UNITS

Sec.

Authority: 15 U.S.C. 2051(b), 2056, 2058, 2063(c), 2076(e).

§ 1261.1 Scope, purpose, application, and exemptions.

(a) *Scope and purpose.* This part, a consumer product safety standard, prescribes the safety requirements, including labeling and hang tag requirements, for clothing storage units, as defined in § 1261.2(a). The requirements in this part are intended to reduce or eliminate an unreasonable risk of death or injury to consumers from clothing storage unit tip overs.

(b) *Application.* Except as provided in paragraph (c) of this section, all clothing storage units that are manufactured after May 24, 2023, are subject to the requirements of this part.

(c) *Exemptions.* The following products are exempt from this part:

(1) Clothes lockers, as defined in § 1261.2(b); and

(2) Portable storage closets, as defined in § 1261.2(t).

§ 1261.2 Definitions.

In addition to the definitions given in section 3 of the Consumer Product Safety Act (15 U.S.C. 2052), the following definitions apply for purposes of this part:

(a) *Clothing storage unit* means a consumer product that is a freestanding furniture item, with drawer(s) and/or door(s), that may be reasonably expected to be used for storing clothing, that is designed to be configured to greater than or equal to 27 inches in height, has a mass greater than or equal to 57 pounds with all extendable elements filled with at least 8.5 pounds/cubic foot times their functional volume (cubic feet), has a total functional volume of the closed storage greater than 1.3 cubic feet, and has a total functional volume of the closed storage greater than the sum of the total functional volume of the open storage and the total volume of the open space. Common names for clothing storage units include, but are not limited to: chests, bureaus, dressers, armoires, wardrobes, chests of drawers, drawer chests, chifforobes, and door chests. Whether a product is a clothing storage unit depends on whether it meets this definition. Some products that, depending on their design, may not meet the criteria in this definition and, therefore, may not be considered clothing storage units are: shelving units, office furniture, dining room furniture, laundry hampers, built-in closets, and single-compartment closed rigid boxes (storage chests).

(b) *Clothes locker* means a predominantly metal furniture item without exterior drawers and with one or more doors that either locks or accommodates an external lock.

(c) *Closed storage* means storage space inside a drawer and/or behind an opaque door. For this part, both sliding and hinged doors are considered in the definition of closed storage.

(d) *Door* means a hinged furniture component that can be opened or closed, typically outward or downward, to form a barrier; or a sliding furniture component that can be opened or closed by sliding across the face or case of the furniture item. This does not include vertically opening hinged lids.

(e) *Door extension from fulcrum distance* means the horizontal distance measured from the farthest point of a hinged door that opens outward or downward, while the door is in the least stable configuration (typically 90 degrees), to the fulcrum, while the clothing storage unit is on a hard, level, and flat test surface. See figure 1 to this paragraph (e). Sliding doors that remain within the clothing storage unit case are not considered to have a door extension.

Figure 1 to paragraph (e)—(Top View) The door extension from fulcrum distance, illustrated by the letter Y.

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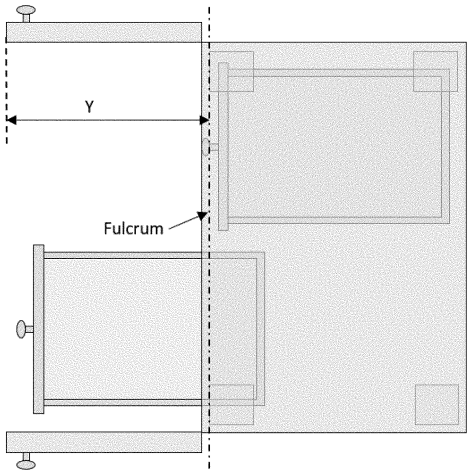


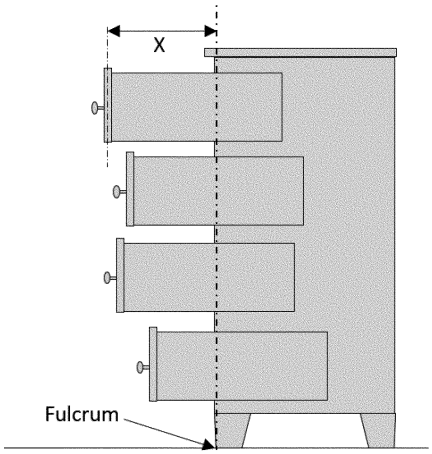
(f) *Drawer* means a furniture component intended to contain or store items that slides horizontally in and out of the furniture case and may be attached to the case by some means, such as glides. Only components that are retained in the case when extended up to ⅔ the shortest internal length,

when empty, are included in this definition.

(g) *Extendable element* means a drawer or pull-out shelf.

(h) *Extendable element extension from fulcrum distance* means the horizontal distance measured from the centerline of the front face of the drawer or the outermost surface of the pull-out shelf to the fulcrum, when the extendable element is at the maximum extension and the clothing storage unit is on a hard, level, and flat test surface. For a curved or angled surface this measurement is taken where the distance is at its greatest. See figure 2 to this paragraph (h).

Figure 2 to paragraph (h)—The extendable element extension from fulcrum distance, illustrated by the letter X.



(i) *Freestanding* means that the unit remains upright, without needing attachment to the wall or other upright rigid structure, when it is fully assembled and empty, with all extendable elements and doors closed. Built-in units are not considered freestanding.

(j) *Functional volume* of an extendable element means the interior bottom surface area multiplied by the effective extendable element height, which is distance from the bottom surface of the extendable element to the top of the extendable element compartment minus ⅛ inches (see figure 3 to this paragraph (j)). Functional volume behind a door means the interior bottom surface area behind the door, when the door is closed, multiplied by the height of the storage compartment (see figure 4 to this paragraph (j)). Functional volume of open storage means the interior bottom surface area multiplied by the effective open storage height, which is distance from the bottom surface of the open storage to the top of the open storage compartment minus ⅛ inches.

Figure 3 to paragraph (j)—Functional volume of extendable element.

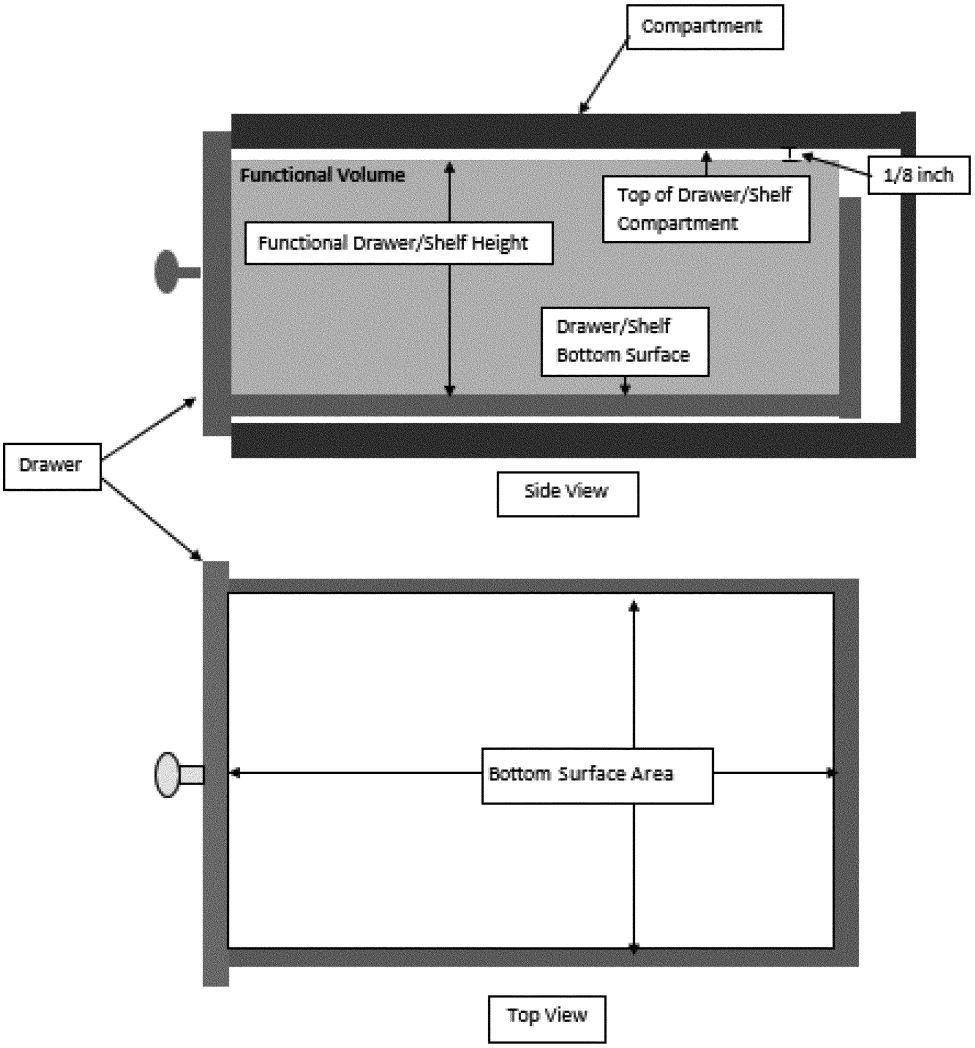
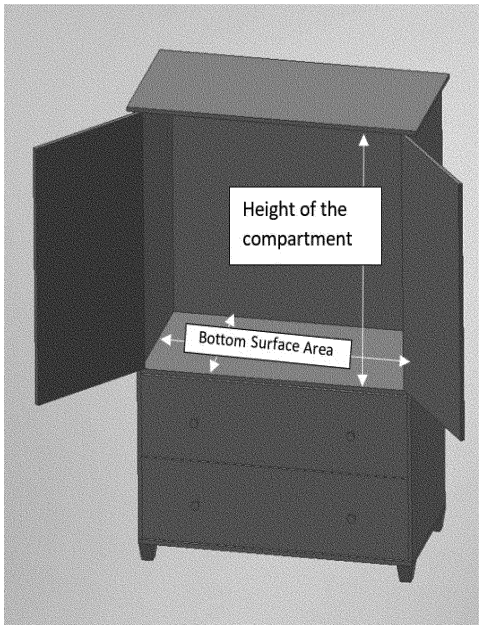


Figure 4 to paragraph (j)—Functional volume behind a door.



(k) *Fulcrum* means the point or line at the base of the clothing storage unit about which the clothing storage unit pivots when a tip-over force is applied (typically the front feet). The fulcrum position is determined while the clothing storage unit is on a hard, level, and flat test surface with all doors and extendable elements closed.

(l) *Hard, level, and flat test surface* means a test surface that is:

(1) Sufficiently hard to not bend or break under the weight of a clothing storage unit and any loads associated with testing the unit;

(2) Level with no more than 0.5 degrees of variation; and

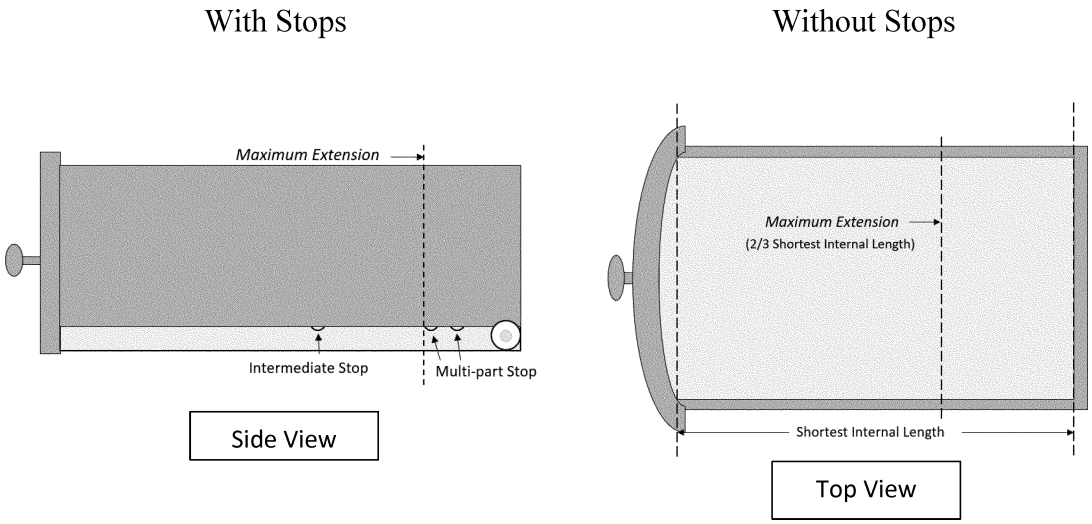
(3) Smooth and even.

(m) *Interlock* means a device(s) that restricts simultaneous opening of extendable elements or doors.

(n) *Levelling device* means an adjustable device intended to adjust the level of the clothing storage unit.

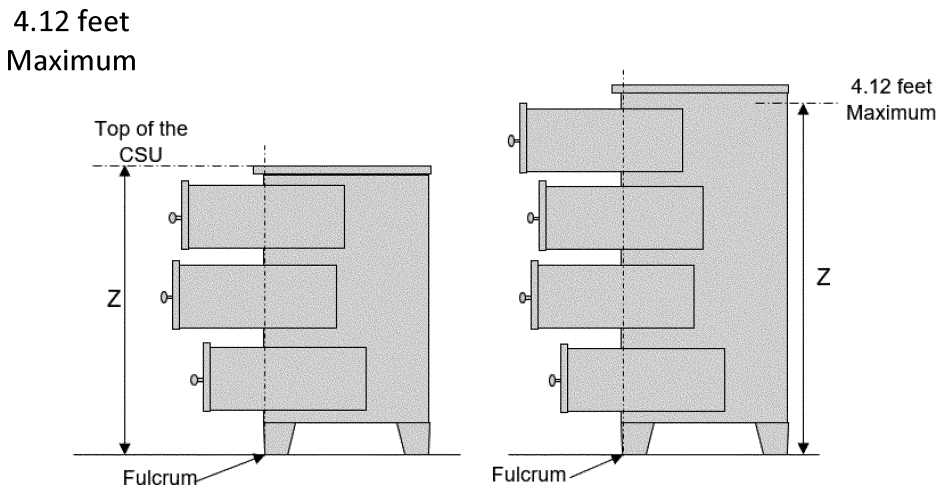
(o) *Maximum extension* means a condition when an extendable element is open to the furthest manufacturer recommended use position, as indicated by way of a stop. In the case of slides with multiple intermediate stops, this is the stop that allows the extendable element to extend the furthest. In the case of slides with a multipart stop, such as a stop that extends the extendable element to the furthest manufacturer recommended use position with an additional stop that retains the extendable element in the case, this is the stop that extends the extendable element to the manufacturer recommended use position. If the manufacturer does not provide a recommended use position by way of a stop, this is ⅔ the shortest internal length of the drawer measured from the inside face of the drawer front to the inside face of the drawer back or ⅔ the shortest internal length of the pull-out shelf. See figure 5 to this paragraph (o).

Figure 5 to paragraph (o)—Example of maximum extension on extendable elements with stops and without stops.



(p) *Maximum handhold height* means the highest position at which a child may grab hold of the clothing storage unit, measured while the clothing storage unit is on a hard, level, and flat surface. For units shorter than 4.12 feet, this is the top of the clothing storage unit. For units 4.12 feet or taller, this is 4.12 feet. See figure 6 to this paragraph (p).

Figure 6 to paragraph (p)—The maximum handhold height, illustrated by the letter Z for a unit shorter than 4.12 feet (left) and for a unit 4.12 feet or taller (right).



(q) *Moment* means a moment of a force, which is a measure of the tendency to cause a body to rotate about a specific point or axis. It is measured in pound-feet, representing a force multiplied by a lever arm, or distance from the force to the point of rotation.

(r) *Open storage* means space within the frame of the furniture that is open (*i.e.,* is not in a drawer or behind an opaque door) and that reasonably can be used for storage (*e.g.,* has a flat bottom surface). For example, open shelf space that is not behind a door, display space behind a non-opaque door, and framed open clothing hanging space are considered open storage.

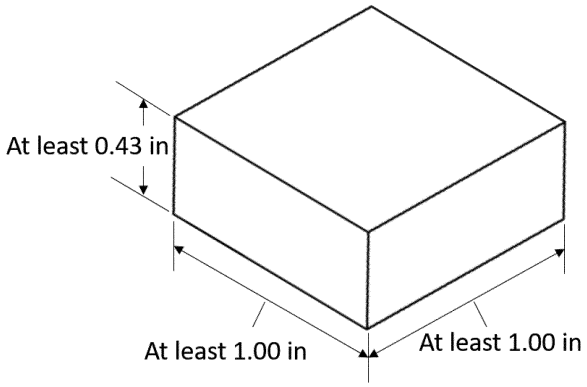
(s) *Open space* means space within the frame of the furniture, but without a bottom surface. For example, open space between legs, such as with a console table, or between separated storage components, such as with a vanity or a desk, are considered open space. This definition does not include space inside the furniture case (*e.g.,* space between a drawer and the case) or any other space that is not visible to a consumer standing in front of the unit (*e.g.,* space behind a base panel).

(t) *Portable storage closet* means a freestanding furniture item with an open frame that encloses hanging clothing storage space and/or shelves. This item may have a cloth case with curtain(s), flap(s), or door(s) that obscure the contents from view.

(u) *Pull-out shelf* means a furniture component with a horizontal flat surface that slides horizontally in and out of the furniture case and may be attached to the case by some means, such as glides.

(v) *Test block* means a block constructed of a rigid material, such as steel or aluminum, with the following dimensions: at least 0.43 inch thick, at least 1 inch deep, at least 1 inch wide. See figure 7 to this paragraph (v).

Figure 7 to paragraph (v)—Test block.



(w) *Tip over* means an event at which a clothing storage unit pivots forward to the point at which the clothing storage unit will continue to fall and/or be supported by a non-support element.

(x) *Tip-over force* means the force required to cause tip over of the clothing storage unit.

(y) *Tip-over moment* means the minimum moment in pound-feet about the fulcrum that causes tip over.

§ 1261.3 Requirements for interlocks.

(a) *General.* For all clothing storage units with interlocks, including consumer-assembled units, the interlock components must be pre-installed, and automatically engage when the consumer installs the interlocked extendable element(s) or door(s) in the unit. All interlocks must engage automatically as part of normal use.

(b) *Interlock pull test.* (1) If the unit is not fully assembled, assemble the unit according to the manufacturer's instructions.

(2) Place the unit on a hard, level, and flat test surface.

(3) If the unit has one or more levelling devices, adjust the levelling device(s) to the lowest level; then adjust the levelling device(s) in accordance with the manufacturer's instructions.

(4) Secure the unit, without interfering with the interlock function, to prevent sliding or tip over.

(5) Open any non-interlocked doors that are in front of the interlocked extendable elements.

(6) Engage the interlock by opening to the maximum extension the number of extendable elements or doors necessary to engage the interlock.

(7) Gradually apply over a period of at least 5 seconds a 30-pound horizontal pull force on each interlocked extendable element or door at the center of the pull area(s), one element at a time, and hold the force for at least 10 seconds.

(8) Repeat this test until all possible combinations of extendable elements and doors have been tested.

(c) *Performance requirement.* The interlock will be disabled or bypassed for the stability testing in § 1261.4(c) if, as a result of the testing specified in paragraph (b) of this section:

(1) Any interlocked extendable element or door extends during the test without retracting the originally open extendable element or door; or

(2) Any interlock or interlocked extendable element or door is damaged or does not function as intended after the test.

§ 1261.4 Requirements for stability.

(a) *General.* Clothing storage units shall be configured as described in paragraph (b) of this section, and tested in accordance with the procedure in paragraph (c) of this section. Clothing storage units shall meet the requirement for tip-over stability based on the tip-over moment as specified in paragraph (d) of this section.

(b) *Test configuration.* The clothing storage unit used for tip-over testing shall be configured in the following manner:

(1) If the unit is not fully assembled, assemble the unit according to the manufacturer's instructions. Units shall not be attached to the wall or any upright structure for testing.

(2) Place the unit on a hard, level, and flat test surface in the orientation most likely to cause tip over. If necessary, secure the unit from sliding without preventing tip over.

(3) If the clothing storage unit has one or more levelling devices, adjust the levelling device(s) to the lowest level; then adjust the levelling device(s) in accordance with the manufacturer's instructions.

(4) Record the maximum handhold height, the longest extendable element extension from fulcrum distance, and the longest door extension from fulcrum

distance, as applicable. These measurements are used in paragraph (d) of this section.

(5) Tilt the clothing storage unit forward by placing the test block(s) under the unit's most rear floor support(s) such that either the entire floor support contact area is over the test block(s) or the back edge of the test block(s) is aligned with the back edge of the rear floor supports.

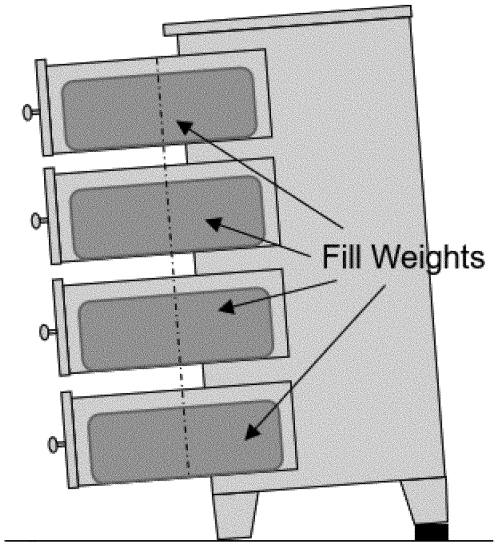
(6) Disable or bypass any interlock(s) in accordance with § 1261.3(c).

(7) Open all hinged doors that open outward or downward that are not locked by an interlock to the least stable configuration (typically 90 degrees).

(8) Open all extendable elements that are not locked by an interlock to the maximum extension, in the configuration most likely to cause tip over (typically the configuration with the largest drawers in the highest position open). Then place fill weights according to the following criteria:

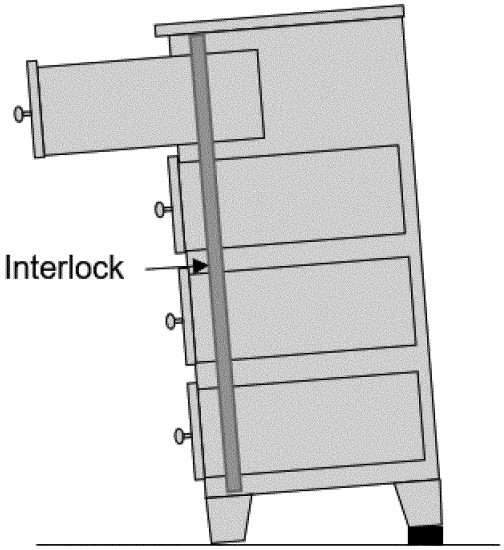
(i) If 50 percent or more of the extendable elements by functional volume are open, place a fill weight in the center of the bottom surface of each extendable element, including those that remain closed, that consists of a uniformly distributed mass in pounds. The fill weight in open extendable elements must be at least 8.5 pounds/cubic foot times the functional volume (cubic feet). The fill weight in closed extendable elements must be no more than 8.5 pounds/cubic foot times the functional volume (cubic feet). If necessary, secure the fill weights to prevent sliding. See figure 1 to this paragraph (b)(8)(i).

Figure 1 to paragraph (b)(8)(i)—Fill weights in all drawers if 50 percent or more of the extendable elements by functional volume are open.



(ii) If less than 50 percent of the extendable elements by functional volume are open, do not place a fill weight in or on any extendable element(s). See figure 2 to this paragraph (b)(8)(ii).

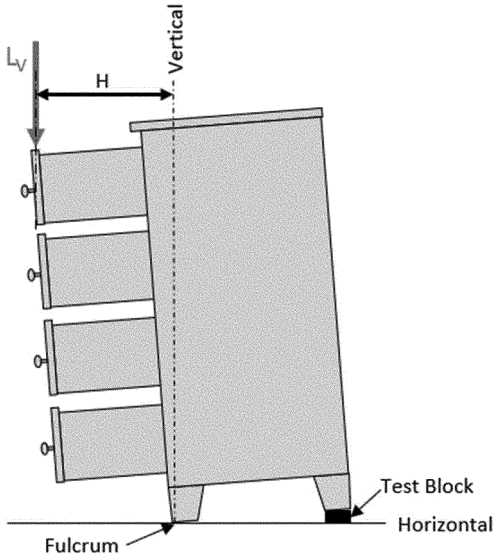
Figure 2 to paragraph (b)(8)(ii)—No fill weights if less than 50 percent of the extendable elements by functional volume are open.



(c) *Test procedure to determine tip-over moment of the unit.* Perform one of the following two tip-over tests (Test Method 1 or Test Method 2), whichever is the most appropriate for the unit:

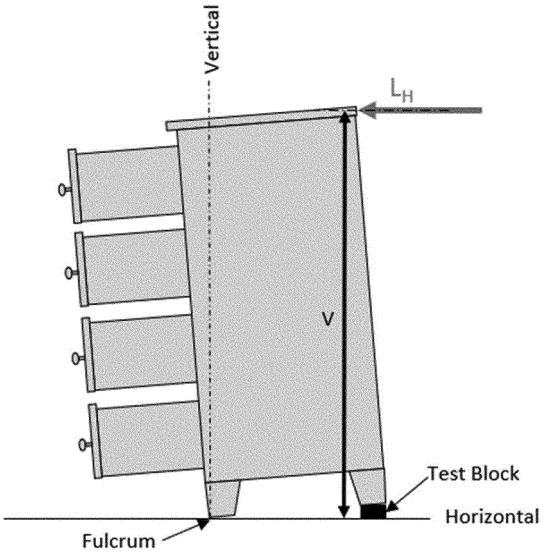
(1) Test Method 1 shall be used for units with extendable elements that extend at least 6 inches from the fulcrum. Record the horizontal distance from where the center of force will be applied (the center of gravity of the weights to be applied) to the fulcrum. Gradually apply over a period of at least 5 seconds weights to the face of an extended extendable element of the unit to cause the unit to tip over. The weights are to be placed on a single drawer face or distributed evenly across multiple drawer faces or as adjacent as possible to the pull-out shelf face. The weights shall not interfere with other extended extendable elements. Record the tip-over force. Calculate the tip-over moment of the unit by multiplying the tip-over force (pounds) by the horizontal distance from the center of the force application to the fulcrum (feet). See figure 3 to this paragraph (c)(1).

Figure 3 to paragraph (c)(1)—Illustration of force application methods for Test Method 1 with vertical load L_V (test block not to scale).



(2) Test Method 2 shall be used for any unit for which Test Method 1 does not apply. Record the vertical distance from where the center of force will be applied to the fulcrum. Gradually apply over a period of at least 5 seconds a horizontal force to the unit orthogonal to the fulcrum to cause the unit to tip over. Record the tip-over force. Calculate the tip-over moment of the unit by multiplying the tip-over force (pounds) by the vertical distance from the center of force application to the fulcrum (feet). See figure 4 to this paragraph (c)(2).

Figure 4 to paragraph (c)(2)—Illustration of force application methods for Test Method 2 with horizontal load L_H (test block not to scale).



(3) If a failed component prohibits completion of the test, then to continue testing, the failed component(s) must be repaired or replaced to the original specifications, or the component(s) must be replaced and the test repeated with the failed component(s) secured to prevent the component(s) from failing, as long as the modifications do not increase the tip-over moment.

(d) *Performance requirement.* The tip-over moment of the clothing storage unit must be greater than the threshold moment, which is the greatest of all of the applicable moments in paragraphs (d)(1) through (3) of this section:

(1) For units with an extendable element(s): 55.3 pounds times the extendable element extension from fulcrum distance in feet +26.6 pound-feet;

(2) For units with a door(s): 51.2 pounds times the door extension from fulcrum distance in feet −12.8 pound-feet; and

(3) For all units: 17.2 pounds times maximum handhold height in feet.

§ 1261.5 Requirements for marking and labeling.

(a) *Warning label requirements.* The clothing storage unit shall have a warning label, as defined in this paragraph (a).

(1) *Size.* The warning label shall be at least 2 inches wide by 2 inches tall.

(2) *Content.* (i) The warning label shall contain the text in figure 1 to this paragraph (a)(2)(i), with the text following brackets to be included only for the units specified in the brackets.

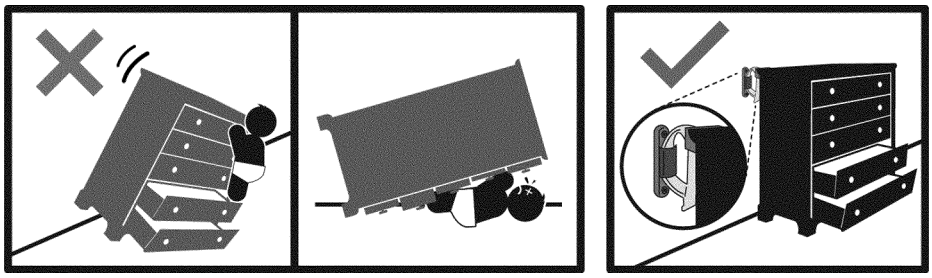
Figure 1 to paragraph (a)(2)(i)—Warning label content.

Children have died from furniture tip over. To reduce the risk of tip over:

- ALWAYS secure this furniture to the wall using an anti-tip device.
- NEVER allow children to stand, climb, or hang on drawers, doors or shelves.
- [for units with interlocks only] Do not defeat or remove the drawer interlock system.
- Place heaviest items in the lowest drawers.
- [for units that are not designed to hold a television only] NEVER put a TV on this furniture.

(ii) The warning label shall contain the three-panel child climbing symbol displayed in figure 2 to this paragraph (a)(2)(ii), with the prohibition symbol in red and the check mark in green. The third panel (*i.e.,* depicting attachment to the wall) may be modified to show a specific anti-tip device included with the clothing storage unit.

Figure 2 to paragraph (a)(2)(ii)—Three-panel child climbing symbol.



(iii) For units that are not designed to hold a television, the warning label also shall contain the no television symbol displayed in figure 3 to this paragraph (a)(2)(iii), with the prohibition symbol in red.

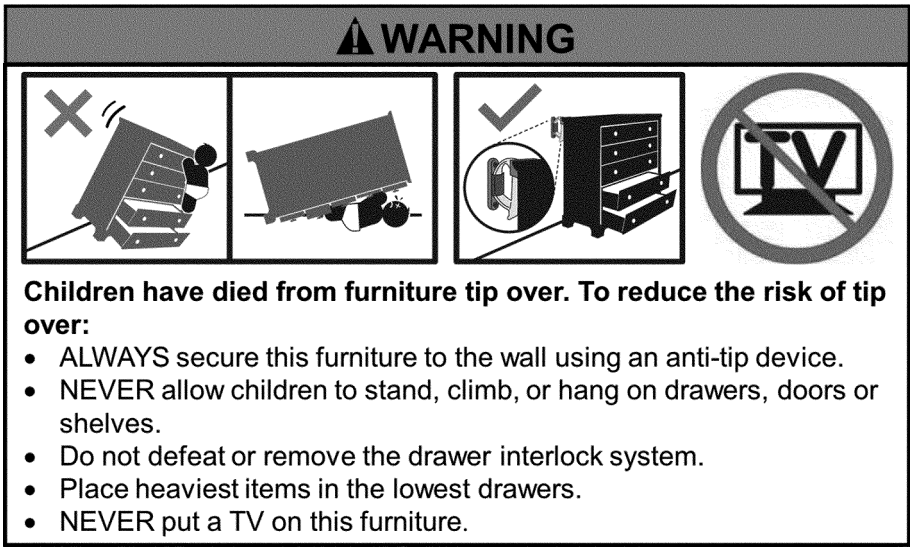
Figure 3 to paragraph (a)(2)(iii)—No television symbol.

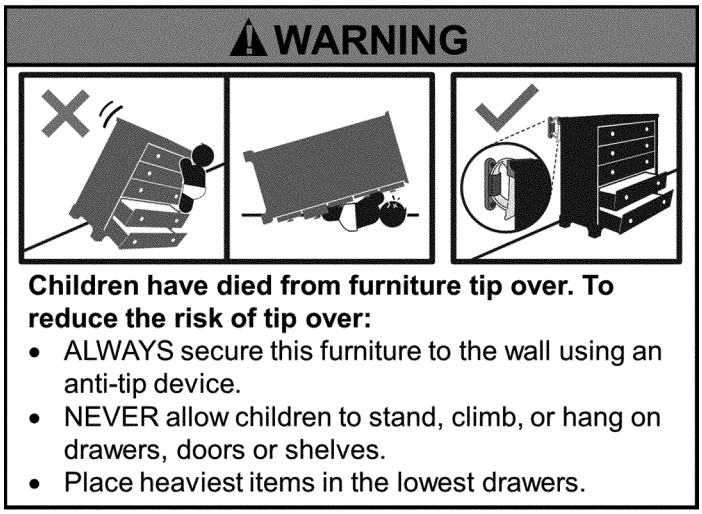
(iv) The content of the warning label required in this paragraph (a)(2) shall not be modified or amended except as specifically indicated.

(3) *Format.* The warning label shall use the signal word panel content and format specified in Section 8.2.2 of ASTM F2057–19, Standard Safety Specification for Clothing Storage Units, and the font, font size, and color specified in Section 8.2.3 of ASTM F2057–19 (incorporated by reference, see paragraph (c) of this section). Each safety symbol shall measure at least 1

inch by 1 inch. See figure 4 to this paragraph (a)(3).

Figure 4 to paragraph (a)(3)—Example warning label for a clothing storage unit with an interlock system that is not designed to hold a television (top) and for a clothing storage unit without an interlock system that is designed to hold a television (bottom).





(4) *Location.* (i) For units with one or more drawer(s):

(A) The warning label shall be located on the interior side panel of a drawer in the upper most drawer row or, if the top of the drawer(s) in the upper most drawer row is more than 56 inches from the floor, on the interior side panel of a drawer in the upper most drawer row below 56 inches from the floor, as measured from the top of the drawer.

(B) The top left corner of the warning label shall be positioned within 1 inch of the top of the drawer side panel and within the front ⅓ of the interior drawer depth.

(ii) For units with only doors: The warning label shall be located on an interior side or back panel of the cabinet behind the door(s), or on the interior door panel. The warning label shall not be obscured by a shelf or other interior element.

(iii) For consumer-assembled units: The warning label shall be pre-attached to the panel, and the assembly instructions shall direct the consumer to place the panel with the warning label according to the placement requirements in paragraphs (a)(4)(i) and (ii) of this section.

(5) *Permanency.* The warning label shall be legible and attached after it is tested using the methods specified in Section 7.3 of ASTM F2057–19, Standard Safety Specification for Clothing Storage Units (incorporated by reference, see paragraph (c) of this section).

(b) *Identification marking or labeling requirements.* The clothing storage unit shall have an identification mark or label, as defined in this paragraph (b).

(1) *Size.* The identification mark or label shall be at least 2 inches wide by 1 inch tall.

(2) *Content.* The identification mark or label shall contain the following:

(i) Name and address (city, state, and zip code) of the manufacturer, distributor, or retailer; the model number; and the month and year of manufacture.

(ii) The statement ''Complies with U.S. CPSC Safety Standard for Clothing Storage Units,'' as appropriate; this label

may spell out ''U.S. Consumer Product Safety Commission'' instead of ''U.S. CPSC.''

(3) *Format.* The identification mark or label text shall not be less than 0.1 in. (2.5 mm) capital letter height. The text and background shall be contrasting colors (*e.g.,* black text on a white background).

(4) *Location.* The identification mark or label shall be visible from the back of the unit when the unit is fully assembled.

(5) *Permanency.* The identification mark or label shall be legible and attached after it is tested using the methods specified in Section 7.3 of ASTM F2057–19, Standard Safety Specification for Clothing Storage Units (incorporated by reference, see paragraph (c) of this section).

(c) *Incorporation by reference.* ASTM F2057–19, Standard Safety Specification for Clothing Storage Units, approved on August 1, 2019, is incorporated by reference into this part with the approval of the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. You may obtain a copy from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428–2959; phone: (610) 832–9585; *www.astm.org.* A read-only copy of the standard is available for viewing on the ASTM website at *https://www.astm.org/READINGLIBRARY/.* You may inspect a copy at the Office of the Secretary, U.S. Consumer Product Safety Commission, 4330 East West Highway, Bethesda, MD 20814, telephone (301) 504–7479, email: *cpsc-os@cpsc.gov,* or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, email *fr.inspection@nara.gov,* or go to: *www.archives.gov/federal-register/cfr/ibr-locations.html.*

§ 1261.6 Requirements to provide performance and technical data by labeling.

Manufacturers of clothing storage units shall give notification of performance and technical data related to performance and safety to prospective purchasers of such products at the time of original purchase and to the first purchaser of such product for purposes other than resale, in the manner set forth in this section:

(a) *Consumer information requirements for physical points of sale, packaging, and on-product.* The manufacturer shall provide a hang tag with every clothing storage unit that provides the ratio of tip-over moment as tested to the minimally allowed tip-over moment of that model clothing storage unit. The label must conform in content, form, and sequence to the hang tag shown in figure 2 to this paragraph (a).

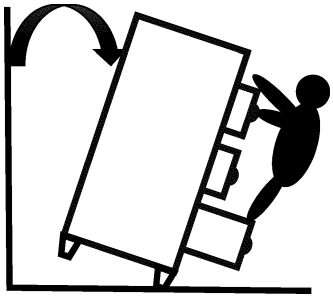
(1) *Size.* Every hang tag shall be at least 5 inches wide by 7 inches tall.

(2) *Side 1 content.* The front of every hang tag shall contain the following:

(i) The title—''TIP OVER GUIDE.''

(ii) The icon shown in figure 1 to this paragraph (a)(2)(ii):

Figure 1 to paragraph (a)(2)(ii)—Hang tag icon.



(iii) The statement—''Stability Rating.''

(iv) The manufacturer's name and model number of the unit.

(v) Ratio of tip-over moment, as tested per § 1261.4(c), to the threshold moment, as determined per § 1261.4(d), of that model clothing storage unit, displayed on a progressive scale. This value shall be the stability rating, rounded to one decimal place (*e.g.,* X.Y).

(vi) The scale shall start at 1 and end at 2.

(vii) ''MIN'' and ''OR MORE'' on the left and right sides of the scale, respectively.

(viii) A solid horizontal line from 1 to the calculated rating.

(ix) The statement—''This unit is [enter rating value] times more stable than the minimum required,'' with the stability rating to be inserted for bracketed text.

(x) The statement—''Compare with other units before you buy.''

(xi) The statement—''This is a guide to compare units' resistance to tipping over.''

(xii) The statement—''Higher numbers represent more stable units.''

(xiii) The statement—''No unit is completely safe from tip over.''

(xiv) The statement—''Always secure the unit to the wall.''

(xv) The statement—''Tell children not to climb furniture.''

(xvi) The statement—''See back side of this tag for more information.''

(xvii) The statement—''THIS TAG NOT TO BE REMOVED EXCEPT BY THE CONSUMER.''

(3) *Side 2 content.* The reverse of every hang tag shall contain the following:

(i) The statement—''Stability Rating Explanation.''

(ii) The icon in paragraph (a)(2)(ii) of this section.

(iii) The stability rating determined in paragraph (a)(2)(v) of this section.

(iv) The statement—''Test data on this unit indicated it withstood [insert rating determined in paragraph (a)(2)(v) of this section] times the minimally acceptable moment, per tests required by the Consumer Product Safety Commission (see below),'' with the stability rating to be inserted for bracketed text.

(v) The statement—''Deaths and serious crushing injuries have occurred from furniture tipping over onto people.''

(vi) The statement—''To reduce tip-over incidents, the U.S. Consumer Product Safety Commission (CPSC) requires that clothing storage units, such as dressers, chests, bureaus, and armoires, resist certain tip-over forces. The test that CPSC requires measures the stability of a clothing storage unit and its resistance to rotational forces, also known as moments. This test is based on threshold rotational forces of a 3-year-old child climbing up, hanging on, or pulling on drawers and/or doors of this unit. These actions create rotational forces (moments) that can cause the unit to tip forward and fall over. The stability rating on this tag is the ratio of this unit's tip-over moment

(using CPSC's test) and the threshold tip-over moment. More information on the test method can be found in 16 CFR part 1261.''

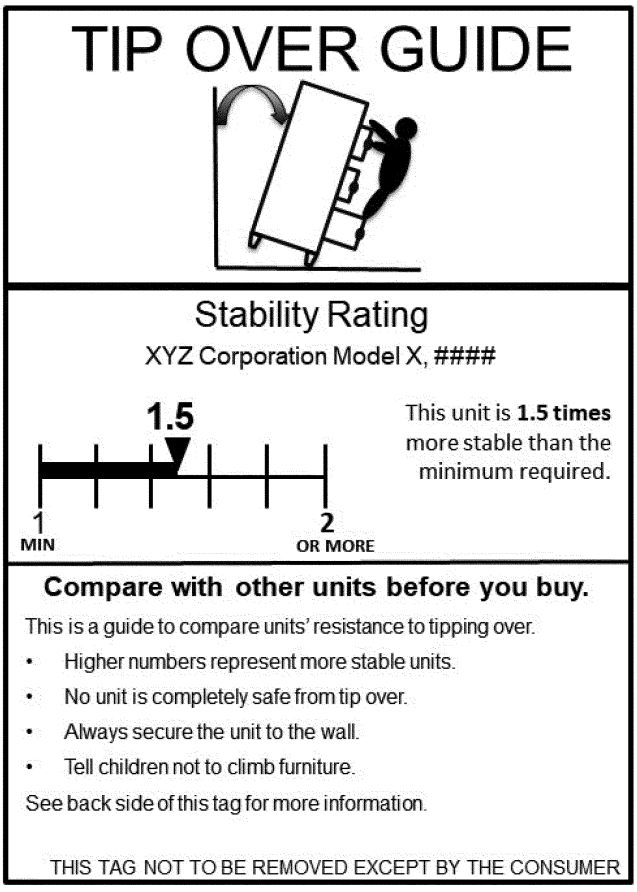
(4) *Format.* The hang tag shall be formatted as shown in figure 2 to this paragraph (a). The background of the front of the tag shall be printed in full bleed process yellow or equivalent; the background of the back of the tag shall be white. All type and graphics shall be printed in process black.

(5) *Attachment.* Every hang tag shall be attached to the clothing storage unit and be clearly visible to a person standing in front of the unit. The hang tag shall be attached to the clothing storage unit and lost or damaged hang tags must be replaced such that they are attached and provided, as required by this section, at the time of original purchase to prospective purchasers and to the first purchaser other than resale. The hang tags may be removed only by the first purchaser.

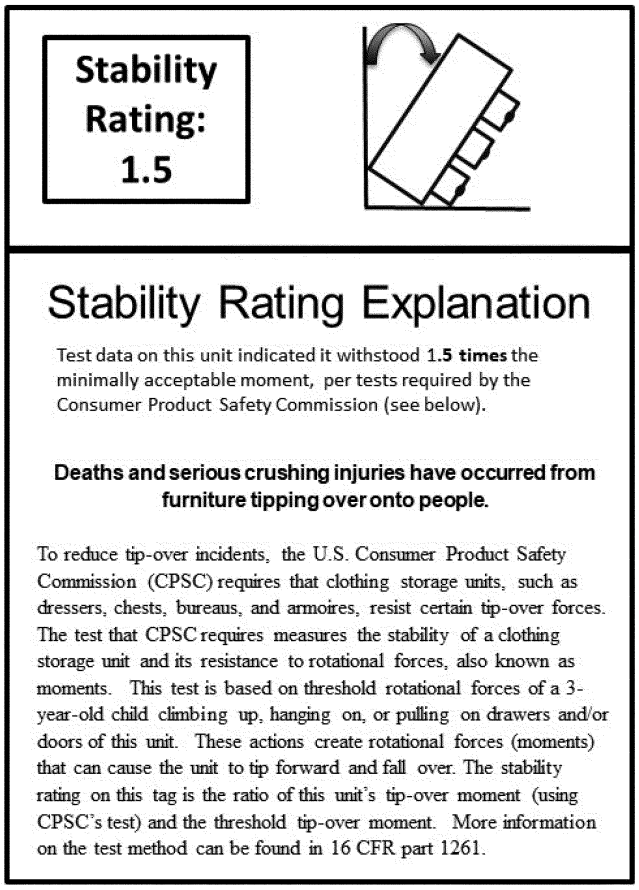
(6) *Placement.* The hang tag shall appear on the product and the immediate container of the product in which the product is normally offered for sale at retail. Ready-to-assemble furniture shall display the hang tag on the main panel of consumer-level packaging. The hang tag shall remain on the product/container/packaging until the time of original purchase. Any units shipped directly to consumers shall contain the hang tag on the immediate container of the product.

Figure 2 to paragraph (a)—Hang tag for a unit with a tip rating of 1.5.

SIDE 1



SIDE 2



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(b) *Consumer information requirements for online points of sale.* Any manufacturer or importer of a clothing storage unit with an online sales interface (*e.g.,* website or app) from which the clothing storage unit may be purchased shall provide on the online sales interface that offers the clothing storage unit for purchase:

(1) All of the content required by paragraphs (a)(2) and (3) of this section, in the form and sequence shown in figure 2 to paragraph (a) of this section, except that it need not contain the statements in paragraphs (a)(2)(xvi) and (xvii) of this section.

(2) The stability rating must be displayed in a font size equivalent to that of the price, in proximity to the price of the product, and a link to the virtual hang tag of the product must be provided through one user action (*e.g.,* mouse click, mouse roll-over, or tactile screen expansion) on the stability rating value or image.

§ 1261.7 Prohibited stockpiling.

(a) *Prohibited acts.* Manufacturers and importers of clothing storage units shall not manufacture or import clothing storage units that do not comply with the requirements of this part in any 1-month period between November 25, 2022 and May 24, 2023 at a rate that is greater than 105 percent of the rate at which they manufactured or imported clothing storage units during the base period for the manufacturer.

(b) *Base period.* The base period for clothing storage units is the calendar month with the median manufacturing or import volume within the last 13 months immediately preceding November 2022.

§ 1261.8 Findings.

(a) *General.* Section 9(f) of the Consumer Product Safety Act (15 U.S.C. 2058(f)) requires the Commission to make findings concerning the following topics and to include the findings in the rule. Because the findings are required to be published in the rule, they reflect the information that was available to the Consumer Product Safety Commission (Commission, CPSC) when the standard was issued on November 25, 2022.

(b) *Degree and nature of the risk of injury.* The standard is designed to reduce the risk of death an injury from clothing storage units tipping over onto children. The Commission has identified 199 clothing storage unit tip-over fatalities to children that were reported to have occurred between January 1, 2000, and April 30, 2022. There were an estimated 60,100 injuries, an annual average of 3,800 estimated injuries, to children related to clothing storage unit tip overs that were treated in U.S. hospital emergency departments from January 1, 2006, to December 31, 2021. Injuries to children, resulting from clothing storage units tipping over, include soft tissue injuries, skeletal injuries and bone fractures, and fatalities resulting from skull fractures, closed-head injuries, compressional and mechanical asphyxia, and internal organ crushing leading to hemorrhage.

(c) *Number of consumer products subject to the rule.* In 2021, there were approximately 229.94 million clothing storage units in use and about 20.64 million clothing storage units sold.

(d) *The need of the public for clothing storage units and the effects of the rule on their cost, availability, and utility.* (1) Consumers commonly use clothing storage units to store clothing in their

homes. The standard requires clothing storage units to meet a minimum stability threshold, but does not restrict the design of clothing storage units. As such, clothing storage units that meet the standard would continue to serve the purpose of storing clothing in consumers' homes. There may be a negative effect on the utility of clothing storage units if products that comply with the standard are less convenient to use. Another potential effect on utility could occur if, in order to comply with the standard, manufacturers modify clothing storage units to eliminate certain desired characteristics or styles, or discontinue models. However, this loss of utility would be mitigated to the extent that other clothing storage units with similar characteristics and features are available that comply with the standard.

(2) Retail prices of clothing storage units vary widely. The least expensive units retail for less than $100, while some more expensive units retail for several thousand dollars. CPSC estimates that the cost, per unit, to modify a clothing storage unit to comply with the rule is between $10.21 and $17.64, which includes the cost to redesign, modify (labor and materials), and test. Clothing storage unit prices may increase to reflect the added cost of modifying or redesigning products to comply with the standard, or to account for increased distribution costs. In addition, consumers may incur a cost in the form of additional time to assemble clothing storage units if additional safety features are included.

(3) If the costs associated with redesigning or modifying a clothing storage unit model to comply with the standard results in the manufacturer discontinuing that model, there would be some loss in availability of clothing storage units.

(e) *Other means to achieve the objective of the rule while minimizing adverse effects on competition, manufacturing, and commercial practices.* (1) The Commission considered alternatives to achieving the objective of the rule of reducing unreasonable risks of injury and death associated with clothing storage unit tip overs. For example, the Commission considered relying on voluntary recalls, anti-tip devices, compliance with the voluntary standard, and education campaigns, rather than issuing a standard. This alternative would have minimal costs; however, it is unlikely to further reduce the risk of injury from clothing storage unit tip overs because the Commission has relied on these efforts to date.

(2) The Commission also considered issuing a standard that requires only performance and technical data, with no performance requirements for stability. This would impose lower costs on manufacturers, but is unlikely to adequately reduce the risk of injury from clothing storage unit tip overs because it relies on manufacturers choosing to offer more stable units; consumer assessment of their need for more stable units (which CPSC's research indicates consumers underestimate); and does not account for units outside a child's home or purchased before a child was born.

(3) The Commission also considered mandating a standard like the voluntary standard, but replacing the 50-pound test weight with a 60-pound test weight. This alternative would be less costly than the rule because many clothing storage units already meet such a requirement, and it would likely cost less to modify noncompliant units to meet this less stringent standard. However, this alternative is unlikely to adequately reduce the risk of clothing storage unit tip overs because it does not account for factors that are present in tip-over incidents that contribute to clothing storage unit instability, including multiple open and filled drawers, carpeting, and forces generated by a child interacting with the unit.

(4) Another alternative the Commission considered was providing a longer effective date. This may reduce the costs of the rule by spreading them over a longer period, but it would also delay the benefits of the rule, in the form of reduced deaths and injuries.

(f) *Unreasonable risk.* (1) Incident data indicates that there were 234 reported tip-over fatalities involving clothing storage units that were reported to have occurred between January 1, 2000, and April 30, 2022, of which 199 involved children, 11 involved adults, and 24 involved seniors. Of the reported child fatalities, 86 percent (171 fatalities) involved children 3 years old or younger.

(2) There were an estimated 84,100 injuries, an annual average of 5,300 estimated injuries, related to clothing storage unit tip overs that were treated in U.S. hospital emergency departments from January 1, 2006, to December 31, 2021. Of these, 72 percent (60,100) were to children, which is an annual average of 3,800 estimated injuries to children over the 16-year period. In addition, there were approximately 58,351 tip-over injuries involving clothing storage units and children treated in other settings from 2007 through 2021, or an average of 3,890 per year. Therefore, combined, there were an estimated 103,100 nonfatal, medically attended tip-over injuries to children from clothing storage units during the years 2007 through 2021.

(3) Injuries to children when clothing storage units tip over can be serious. They include fatal injuries resulting from skull fractures, closed-head injuries, compressional and mechanical asphyxia, and internal organ crushing leading to hemorrhage; they also include serious nonfatal injuries, including skeletal injuries and bone fractures.

(g) *Public interest.* This rule is intended to address an unreasonable risk of injury and death posed by clothing storage units tipping over. The Commission believes that adherence to the requirements of the rule will significantly reduce clothing storage unit tip-over deaths and injuries in the future; thus, the rule is in the public interest.

(h) *Voluntary standards.* The Commission is aware of four voluntary and international standards that are applicable to clothing storage units: ASTM F2057–19, Standard Consumer Safety Specification for Clothing Storage Units (incorporated by reference, see § 1261.5(c)); AS/NZS 4935: 2009, the Australian/New Zealand Standard for Domestic furniture—Freestanding chests of drawers, wardrobes and bookshelves/bookcases—determination of stability; ISO 7171 (2019), the International Organization for Standardization International Standard for Furniture—Storage Units—Determination of stability; and EN14749 (2016), the European Standard, European Standard for Domestic and kitchen storage units and worktops—Safety requirements and test methods. The Commission finds that these standards are not likely to adequately reduce the risk of injury associated with clothing storage unit tip overs because they do not account for the multiple factors that are commonly present simultaneously during clothing storage unit tip-over incidents and that testing indicates decrease the stability of clothing storage units. These factors include multiple open and filled drawers, carpeted flooring, and dynamic forces generated by children's interactions with the clothing storage unit, such as climbing or pulling on the top drawer.

(i) *Relationship of benefits to costs.* The aggregate benefits of the rule are estimated to be about $307.17 million annually and the cost of the rule is estimated to be about $250.90 during the first year the rule is in effect. Based on this analysis, the Commission finds that the benefits expected from the rule

bear a reasonable relationship to the anticipated costs of the rule.

(j) *Least burdensome requirement that would adequately reduce the risk of injury.* (1) The Commission considered less-burdensome alternatives to the rule, but concluded that none of these alternatives would adequately reduce the risk of injury.

(2) The Commission considered relying on voluntary recalls, anti-tip devices, compliance with the voluntary standard, and education campaigns, rather than issuing a mandatory standard. This alternative would be less burdensome by having minimal costs, but would be unlikely to reduce the risk of injury from clothing storage unit tip overs. The Commission has relied on these efforts to date, but despite these efforts, there continue to be a high number of child injuries from clothing storage unit tip overs.

(3) The Commission considered issuing a standard that requires only performance and technical data, with no performance requirements for stability. This would be less burdensome by imposing lower costs on manufacturers, but is unlikely to adequately reduce the risk of injury because it relies on manufacturers choosing to offer more stable units; consumer assessment of their need for more stable units (which CPSC's research indicates consumers underestimate); and does not account for clothing storage units outside a child's home or purchased before a child was born.

(4) The Commission considered mandating a standard like ASTM F2057–19, Standard Consumer Safety Specification for Clothing Storage Units (incorporated by reference, see § 1261.5(c)), but replacing the 50-pound test weight with a 60-pound test weight. This alternative would be less burdensome than the rule because many clothing storage units already meet such a requirement, and it would likely cost less to modify noncompliant units to meet this less stringent standard. However, this alternative is unlikely to adequately reduce the risk of tip overs because it does not account for several factors that are simultaneously present in clothing storage unit tip-over incidents and contribute to instability, including multiple open and filled drawers, carpeting, and forces generated by a child interacting with the unit.

(5) The Commission considered providing a longer effective date. This may reduce the cost burden of the rule by spreading the costs over a longer period, but it would also delay the benefits of the rule, in the form of reduced deaths and injuries.

(6) Therefore, the Commission concludes that the rule is the least burdensome requirement that would adequately reduce the risk of injury.

Alberta E. Mills,

Secretary, Consumer Product Safety Commission.

[FR Doc. 2022–24587 Filed 11–23–22; 8:45 am]

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