



AHFA Regulatory Summit
CPSC NPR – Clothing Storage Unit Tip Over
Demonstration: Test Methods + Workbook

CPSC NPR Furniture Tip Over

The Flintstone Collection



General Overview of the NPR

‘Based on the testing staff has conducted so far, CPSC staff is *only aware of one CSU on the market that would meet the requirements of the draft proposed rule.*’ (pg.371)

Based on the market analysis by staff in the NPR:

- All *43.6 million units sold* in 2018 (pg.10) are now *non-compliant* as are units sold between 2018 and 2020.
- For 2019, this would affect the *majority of the \$60.3B of bedroom furniture sold at retail* (pg.10).
- This impacts the 5,117 firms involved in household furniture importation and distribution and 13,826 furniture retailers (pg.10).

This rule *significantly impacts all aspects* of the global supply chain and market for clothing storage units.

General Overview of the NPR

Regardless of television involvement, the most reported CSU tip-over fatalities happened to children *3 years old or younger*.

- The 95th percentile weight [CDC Growth Chart] of a 3-yr old [even taking this up to 3.99 years old] is \cong *44-lbs*.

Among children 4 years and older, a television was more frequently involved than not involved.

- The 95th percentile weight [CDC Growth Chart] of a 4-yr old [even taking this up to 4.99 years old] is \cong *51-lbs*.

Of the ED-treated injuries, *among children*, 93 percent were treated and released, and 3 percent were hospitalized.

For 2010-2019, there is a statistically significant linear decline in *child injuries* involving CSU tip overs (with and without televisions); however, there is *no linear trend detected* in injuries to children involving only CSUs tipping over.

General Overview of the NPR

58.4% of all ED-treated injuries occurred with children up to 60-months years of age [1 to 5-yrs old].

Identified Hazard Patterns

- Where information was provided, **96% of fatalities and 90% of nonfatal incidents** indicated the drawers were **'filled or partially filled'**.
- Where interaction was reported, 74% involved climbing; 17% involved a child sitting, laying, or standing in a drawer; 9% involved a child opening drawers.
- Climbing was the **most common reported** interaction for children 3 years old and younger.
- 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

General Overview of the NPR – *The Test*

To *improve the inherent stability* of CSU designs and reduce the number of tip-over incidents, CPSC staff recommends that the test simulate the hazard patterns leading to CSU tip-overs by addressing the following:

- Carpeted surfaces;
- Multiple open drawers, doors, and pullout shelves;
- Drawers and pullout shelves filled or not filled with clothing;
- Children climbing the CSU; and
- Children pulling on CSU drawers.

Additionally, the test should *address these hazards simultaneously*.
(pg.216)

*General Overview of the NPR – **The Test***

ESMC staff tested a total of **10 CSUs** (as Table 1 indicates, for some of the 7 models, staff tested more than 1 unit) and analyzed **12 incidents**. The CSUs ranged in height from 27 inches to 50 inches and weighed between 45 pounds and 195 pounds. Two CSUs did not consistently meet the requirements in ASTM F2057 – 19 Section 7.1 (all drawers open). Five of the 10 CSUs did not meet the requirements in ASTM F2057 – 19 Section 7.2 (50-pound test fixture on one open drawer). (pg.191)

General Overview of the NPR

There are *4 major components* to the NPR:

- The *Test Methods*
 - Data Acquisition [on-going study with UL/SGS]; levelers; ± 0.5 angle tolerance [*1.0 vs. 2.0 angle is a big deal*]; *variability* and RR
 - Current testing – no CSU passes even if they pass current F2057
 - Ratios as low as 0.02/pass Section 7.2 + 60-lbs
- The *Rating System*
 - The 'ratio' – 1 or greater
- The *Hang Tag*
 - Only use if the CSU has a rating of 1 or greater
 - Confusing to the consumer
- Menu of *Compliance Options*
 - Forcing to *Interlocks*; interlocks alone will not get you to 1
 - Shorter drawer opening; counterweight; change the fulcrum

CPSC NPR Furniture Tip Over

The Test ... What Changed?

Comparative *pass/fail test*

CSUs 'tipped forward' 1.5° (carpet)

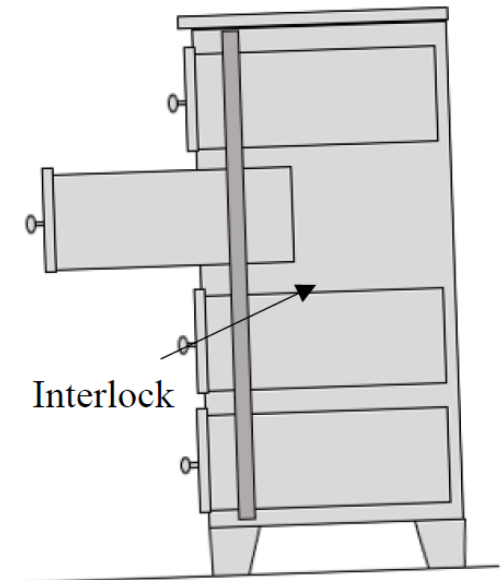
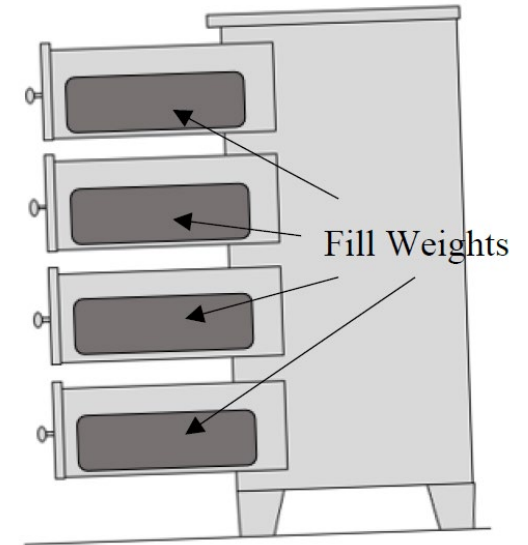
Drawers are loaded (8.5 lb/ft³)

- Calculation similar to proposed *ASTM drawer volume calculation*

Interlocks are considered

Compares the *actual moment* to make the CSU tip

- Moment = Force x Distance
- So the *target moment* depends on the design of the unit



CPSC NPR Furniture Tip Over

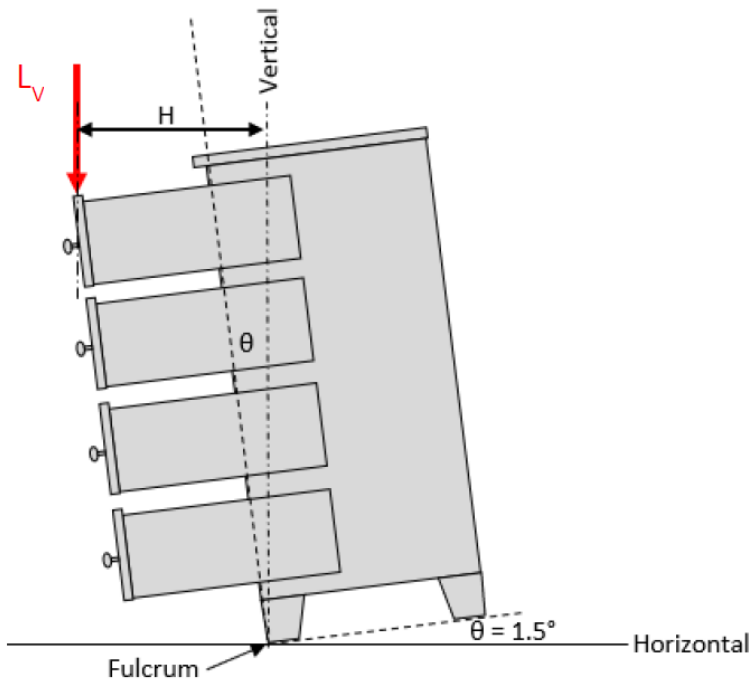
The test ... What Changed?

Targets: 3 different '*moments*' associated with children

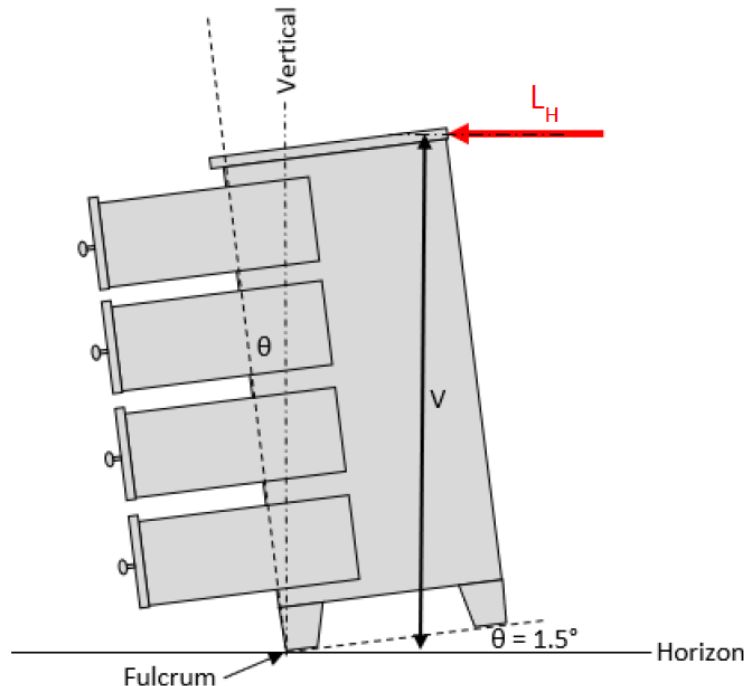
Ascending a CSU = $55.3 \times H + 26.6$

Hanging on a CSU door = $51.2 \times H - 12.8$

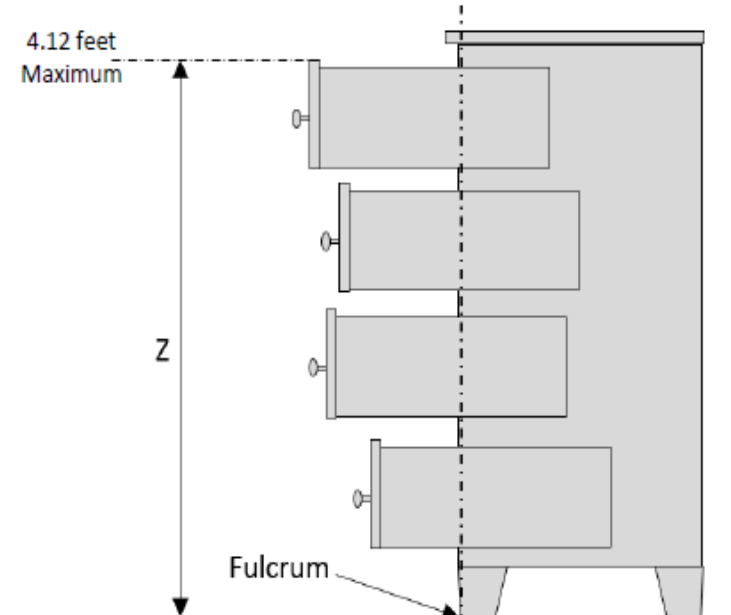
Pulling on the top drawer or handhold of the CSU (max 4.12 ft) = $17.2 \times Z$



AHFA



CPSC NPR



CPSC NPR Furniture Tip Over – *The Test*



Dresser

56"Wx18"Dx36"H 152 lbs.

CPSC NPR Test Methods

Drawer 1	
Drawer length (in)	13 5/8
Drawer width (in)	24 1/4
Drawer depth (in)	7 5/8
Drawer volume (ft ³)	1.114
Test weight (lb)	9.5

Drawer 2	
Drawer length (in)	13 5/8
Drawer width (in)	24 1/4
Drawer depth (in)	7 5/8
Drawer volume (ft ³)	1.114
Test weight (lb)	9.5

Drawer 3	
Drawer length (in)	13 3/4
Drawer width (in)	24 1/4
Drawer depth (in)	6 5/8
Drawer volume (ft ³)	0.931
Test weight (lb)	7.9

Decimal chart	
1/8	0.125
1/4	0.250
3/8	0.375
1/2	0.500
5/8	0.625
3/4	0.750
7/8	0.875

Drawer 4	
Drawer length (in)	13 3/4
Drawer width (in)	24 1/4
Drawer depth (in)	6 5/8
Drawer volume (ft ³)	0.931
Test weight (lb)	7.9

Drawer 5	
Drawer length (in)	13 3/4
Drawer width (in)	24 1/4
Drawer depth (in)	6 5/8
Drawer volume (ft ³)	0.931
Test weight (lb)	7.9

Drawer 6	
Drawer length (in)	13 3/4
Drawer width (in)	24 1/4
Drawer depth (in)	6 5/8
Drawer volume (ft ³)	0.931
Test weight (lb)	7.9

Largest/widest door	
Length (in)	0

Handhold height (max 49,5)	
Height Z (in)	0

Target moments of force	
Moment 1 (lb·ft)	79.6
Moment 2 (lb·ft) *	-12.8
Moment 3 (lb·ft)	0.0

* for CSU with doors only

Method 1 CSU moment to tip	
Force L _v (lb)	2.11
Distance H (in)	11 1/2
Moment (lb·ft)	2.0

Method 2 CSU moment to tip	
Force L _H (lb)	
Distance V (in)	
Moment (lb·ft)	0.0

Rating method 1	
	0.025404387
Rating method 2	
	0

CPSC NPR Furniture Tip Over – *The Test*

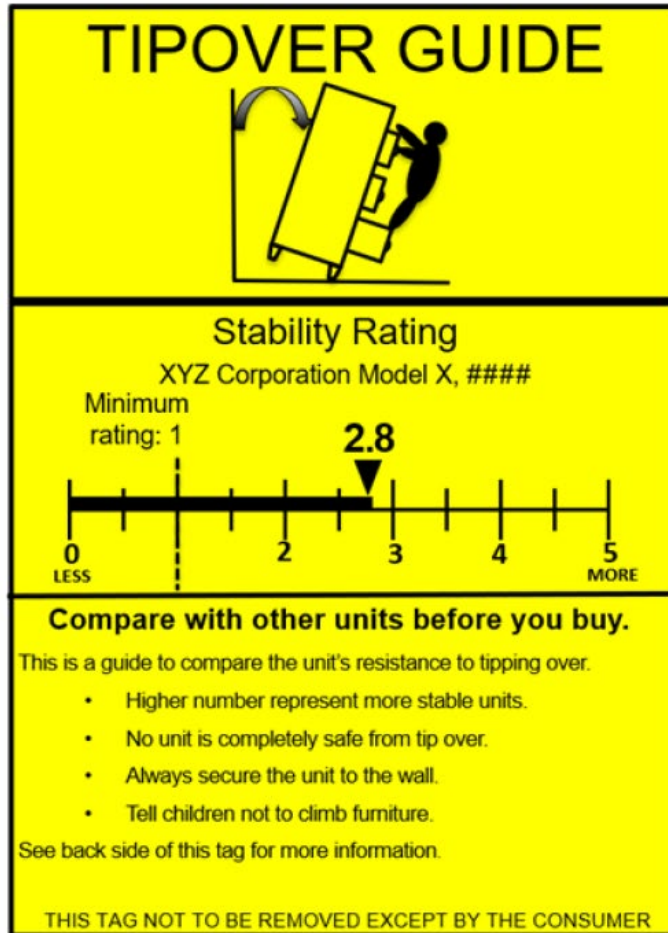
9 Drawer 'Bow Front' Dresser

- This CSU weighs 175-lbs [*300-lb CSU*]
- Passes Section 7.2/2057 with 65-lbs.
- Failed Test Method 1
- Compliance Method to achieve a 1.06 [Test Method 1]
 - 125-lbs counterweight; reduce drawer extension from 16" to 10"
 - Cost of steel for counterweight adds \$125 to the mfg cost of the CSU
 - Interlocks alone could not achieve a 1 or greater ratio for Test Method 1 – had to add an additional 10-lbs of counterweight.

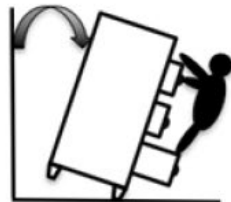


CPSC NPR Furniture Tip Over

Hang Tag and Tip Over Rating



Stability Rating: 2.8



Stability Rating Explanation

Test data on this unit indicated it withstood **2.8 times** the threshold tip over rotational force/moment, per tests required by the Consumer Product Safety Commission (see below)

Deaths and serious crushing injuries have occurred from furniture tipping over onto people.

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 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 XXXX.

$$\text{Rating} = \frac{\text{Actual Moment}}{\text{Target Moment}}$$

CPSC NPR Furniture Tip Over

What Else?

⚠ WARNING




**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.
- Do not defeat or remove the drawer interlock system
- Place heaviest items in the lowest drawers
- NEVER put a TV on this furniture

Warning Label – No Major Changes

⚠ WARNING



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- NEVER allow children to stand, climb, or hang on drawers, doors or shelves.
- Place heaviest items in the lowest drawers

NPR Compliance Cost Analysis

Select the *'best selling'* dresser and chest for the analysis

For *last year* [2020], total number of units sold for each; total sales dollar for each; total number of units and total sales dollar for the past 5-yrs.

Extrapolate the cost of compliance as determined in the analysis over the total number of CSUs sold in 2020 and for the last 5-yrs.

The cost of compliance will take into consideration any engineering/design changes + any other compliance option selected to bring the units into compliance with the *minimum ranking of 1 or greater*.

Cost of Compliance will take into consideration design, packaging, shipping, components [e.g., interlocks, ballast, drawer guides], etc.

Total cost of compliance is the manufacturing cost of the CSU.

NPR Compliance Cost Analysis

Sales Data
Annual Total Units
Annual Total Dollars
Last 5-yrs for Both



Product Description
LxWxH
Weight
Drawer Dimensions

<i>Product Name</i>	<i>ASTM F2057</i>	<i>Test Method 1</i>	<i>Interlocks</i>	<i>Third Party</i>
Unit Cost				
Unit Annual Cost				
CSU Annual Cost				

CPSC NPR Furniture Tip Over – *Going Forward*

Timing @ the Agency

- Briefing/vote/notice [FR]
- The three nominees to the Commission [floor vote; take office]
- Adler's *dislike of CPSA rulemaking* – kick this down the road
- Agency holding out for STURDY
- Notice of NPR vs. STURDY [*discard NPR and take up 553*]

ASTM F15.42 Subcommittee Meeting – November/ATL

- Discussion of the NPR – don't show all your hand
- Offer alternative with the *AHFA 'test methods' – UL/MI CSU Study*
- Test methods developed closely 'mimic' the NPR Test Methods
- STURDY requires the agency to consider the voluntary standard

Timing in the Senate

- Committee hearing; vote; vehicle [end of year omnibus]

CPSC NPR Furniture Tip Over – *Going Forward*

AHFA *'Data Acquisition' Study* – UL/SGS

- Both domestic and off-shore labs
- Collecting data for Test Method 1 and 2
- Variability in measuring push force gauge – pushing down [Test Method 1] vs. from behind [Test Method 2]; height of the individual plays a key role; accuracy of the measurements; accuracy of the angle
- Potentially forces the industry to *third party testing*

Determine *Cost of Compliance*

- Use of the workbook to evaluate CSUs
- Selection of *compliance method(s)* to achieve rating of 1 or greater
- Mfg cost; redesign; transportation; packaging; margins; interlocks

AHFA *Comments*

- On behalf of the members

CPSC NPR Furniture Tip Over – *Going Forward*

AHFA *Evaluation of Tab R* – Dynamic Stability Study/’Child Climbing Study’

- High level evaluation of the methodology and data used to inform the test methods [see slide 9].

AHFA *Summit Presentation/Demonstration* of Test Methods

- On-site demonstration of the test methods
- Evaluation of CSUs to current 2057, +60-lb Test Apparatus, ratios, compliance options
- Unit to evaluate the use of interlocks

AHFA *’Toolbox’*

- Workbook; video; Tab R Evaluation; Data Acquisition Study
- Summit presentation and demo of test methods
- AHFA Comments
- AHFA UL/MI Study