TIC Council's Market Study in the United States 2023

TIC Council is the global trade association representing the independent third-party Testing, Inspection and Certification (TIC) industry which brings together about 100-member companies and organizations from around the world to speak with one voice. Its members provide services across a wide range of sectors: consumer products, medical devices, petroleum, mining and metals, food, and agriculture among others. Through provision of these services, TIC Council members assure that not only regulatory requirements are met, but also that reliability, economic value, and sustainability are enhanced. TIC Council's members are present in more than 160 countries and the wider TIC sector currently employs more than 1 million people across the globe.

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Summary

Consumer product conformity assessment practices differ significantly between the European Union (EU) Single Market and the United States (US). The TIC Council has conducted multiple studies in the EU that demonstrate notably high levels of non-conformities. This study seeks to provide additional context by evaluating the level of consumer product conformity in the US, specifically, assessing the prevalence of non-conformities among three product categories regularly available on e-commerce platforms: children's toys, portable battery packs and e-mobility batteries, and household appliances. The results of this study demonstrate that pre-market conformity assessment practices in the US very likely reduce the frequency of product non-conformities, as compared to the EU. Nonetheless, our results also suggest that legal and regulatory gaps in the US have contributed to relatively high levels of product non-conformities on e-commerce platforms when measured against brick-and-mortar retailers. The TIC Council proposes that further studies in the US be conducted to evaluate the prevalence of non-compliant products at brick-and-mortar locations and to further compare the benefits and costs to consumers of different product safety regimes in the EU and US.

Key Recommendations

- Policymakers should consider enhancing regulations to drive increased scrutiny and vetting of vendors on e-commerce platforms,
- Legislative action to address regulatory gaps that permit non-conforming products to enter the market, and
- Require Certificates of Compliance (CoC) to be submitted with Customs and Border Protection (CBP) and the Consumer Product Safety Commission (CPSC) at the time of entry, including for de minimis shipments.

Glossary

Code of Federal Regulations (CFR): The codification of the general and permanent regulations promulgated by the executive departments and agencies of the federal government of the United States. The CFR is divided into 50 titles that represent broad areas subject to federal regulation.

Conformity Assessment Body (CAB): Organization that carries out conformity assessment activities.

Conformity Assessment: The demonstration that a product (service, system, process, installation, claim, person, body, etc.) meets requirements, which may be in a regulation or a standard or another normative document.

Consumer Product Safety Act (CPSA)/Consumer Product Safety Improvement Act (CPSIA): U.S. legislation that establishes an independent regulatory commission and empowers the CPSC to regulate products that may present safety hazards.

Consumer Product Safety Commission (CPSC): A U.S. government agency that protects the American public from products that may present safety hazards. This independent regulatory body focuses on consumer items that pose an unreasonable risk of fire, chemical exposure, electrical malfunction, or mechanical failure.

First Party Conformity Assessment: Performed by the person or organization that provides the object. The supplier or manufacturer demonstrates that a product or service meets the specified requirements and is usually used when there is less risk associated with non-compliance and the product.

Third Party Conformity Assessment: Performed by a person or body whose interests in the product are independent from those of first parties and whose interest in fulfilment of requirements are independent from those of second parties. It is typically used when there is a high level of risk associated with non-compliance and with the product.

Market Surveillance: The activity carried out by authorities and certification bodies to ensure that products on the market continue to conform to the applicable laws and regulations. Both pre-market and post-market surveillance activities are useful to protect consumer safety and ensure product quality. Proper pre-market surveillance can help ensure the conformity of products entering the market and alleviate the pressure on post-market surveillance. The manufacturer or supplier has liability for any nonconforming product.

Self-Declaration of Conformity (SDOC): A written assurance of conformity to a specific standard or technical regulation conducted by a manufacturer or supplier. This form of first-party conformity assessment is most common for low-risk products. SDOC is more regularly used in the European Union as opposed to the United States, where third party conformity assessment is more regularly employed.

TIC (Testing, Inspection and Certification): TIC represents the Testing, Inspection and Certification sector. The independent TIC sector provides conformity assessment services (i.e., testing, inspection, certification, validation, declaration of conformity, etc.), for regulatory reasons or good practice, and to protect health, safety, and the environment. Some of the key testing and certification services include quality and safety controls through conformity assessments, such as supply chain certifications, industrial site inspections, product testing, management system auditing and certification, periodic corrective action response inspections, pre-shipment inspection, consignment-based conformity assessments and many more.

Introduction

Over the past century, the global testing, inspection, and certification (TIC) sector has grown to become a critical component of quality infrastructure (QI) systems ensuring product safety and quality while promoting cross-border trade. To demonstrate the importance of third-party testing, the TIC Council has conducted a series of studies over the past decade.

Previous studies, initially conducted by the TIC Council's predecessor associations, the International Federation of Inspection Agencies (IFIA) and the International Confederation of Inspection and Certification Organizations (CEOC), highlighted notably high levels of non-conformities in consumer products in the European Union. The European Commission acknowledged extremely high levels of non-compliant products in the single market, noting that approximately 32 percent of toys and 58 percent of electronics do not meet safety requirements.[1,2] A 2017 and a 2022 study conducted by the TIC Council confirmed that non-conformities remain excessively high among products that have received a self-declaration of conformity (SDOC) by the manufacturer. Furthermore, between 2017 and 2022, the number of non-conformities that were detected among electrical appliances increased.[3]

To further assess the importance of accredited third-party conformity assessment bodies (CABs) in product safety, quality, and compliance, the TIC Council conducted a study in 2023 to evaluate three product-categories: children's toys, portable battery packs and e-bike batteries, and electrical appliances (battery chargers, electric irons, and hand-held hairdryers). The 2023 study—in contrast to previous studies conducted in Europe—was carried out in the United States and sought to evaluate product compliance for online shopping platforms.

Online shopping platforms present numerous challenges to the enforcement of US product safety laws and regulations. A significant compliance gap uncovered relates to the US customs de minimis exception rule. The de minimis exception rule permits products valued at $800 or less to enter the US market without any formal filing requirements at the time of entry.[4] According to domestic manufacturers and consumer advocates, this rule has resulted in the proliferation of non-compliant and dangerous products within the US market.[5]

To further investigate and analyze these concerns the TIC Council study was designed to focus on consumer products offered for sale by online shopping platforms. Additional considerations included the impact of different product safety requirements between the EU Single Market and United States of America. The study utilized a purchased basket of goods that were readily available on multiple online platforms within the United States.

The category of children's toys, and their chemical content, is a consumer protection priority with a robust regulatory framework in the United States. Accordingly, the TIC Council survey was guided by Consumer Product Safety Commission (CPSC) rules around total lead content, soluble cadmium, phthalates, and soluble heavy metals.

The categories of e-bike batteries and portable battery packs were added to the US study to assess product safety and compliance of a product category that has garnered growing policy attention. The CPSC has held several hearings to craft rules/regulations around lithium-ion

1 Safe products in the EU Single Market: Commission acts to reinforce trust - European Commission (europa.eu)

2 Safety Gate: the EU rapid alert system for dangerous non-food products (europa.eu)

3 TIC Council Market Study Report 2022

4 De Minimis Value

5 KPMG report: Proposals to de minimis customs rules spike U.S. importer interest

batteries and the recently introduced “Setting Consumer Standards for Lithium-Ion Batteries Act” is an example of emerging legislation that would expand the CPSC’s role in regulating battery compliance.[6]

Nonetheless, as of the time of this study, there was neither federal legislation nor regulation requiring specific safety standards for battery packs and batteries used in e-mobility platforms. In the absence of guiding regulation, the TIC Council’s assessment of battery safety on US shopping platforms leveraged robust industry standards to assess compliance.

The category of electrical appliances was added to the US study to provide an accurate comparison to previous studies in the EU.

Overall, the intent of this study was to assess the prevalence of non-conformities among three product categories regularly sold through online retailers, highlight the impact of pre-market controls on product safety compliance, and establish longitudinal data on product conformance to evaluate the effect of policy changes regarding product safety.

In combination with previous studies in the European Union, the aggregated results will enable stakeholders to gauge the impact of different regulatory systems—which go beyond the conclusions of each separate study. The results of this study support and strengthen conclusions made in previous studies, revealing the important role of the TIC sector, within a robust quality infrastructure ecosystem, and the effectiveness of pre-market third-party conformity assessment to incentivize product safety compliance.

The TIC Council will continue to conduct product safety surveys and publish studies that focus on safety compliance and potential market failures to guide policy makers, consumer protection authorities, and key stakeholders.

Methodology

The 2023 study aimed to assess whether consumer goods such as children’s toys, portable battery pack and e-bike batteries, and household appliances (specifically, cell-phone battery chargers, electric irons, and hand-held hairdryers) purchased through online platforms met industry and regulatory standards for safety.

All tested products were purchased through online platforms present in the US market[7]. Products were selected based upon popularity (the number of purchases on a platform) and on not being produced by a major well-known manufacturer. Following purchase, the items were sent to an accredited laboratory that is unaffiliated with the TIC Council. The laboratory is accredited according to ISO/IEC 17025 “general requirements for the competence of testing and calibration laboratories”.

1. Methodology: Chemical Testing of Toys

Thirty-six toys were purchased from four online platforms—two major global platforms and two toy-specialized platforms.

The chemical testing of toys was based on mandated federal requirements under the Consumer Product Safety Improvement Act (CPSIA – Section 106 and 16 CFR 1303) and the Consumer

6 Text - H.R.1797 - 118th Congress (2023-2024): Setting Consumer Standards for Lithium-Ion Batteries Act | Congress.gov | Library of Congress

7 The names of the online stores and of the testing laboratory won’t be published to protect their privacy.

Product Safety Act (CPSA – 16 CFR 1307 Part 13).[8][9]

The toys and their easily accessible components/parts were tested for lead content, soluble heavy metals, soluble cadmium, and phthalates. Total lead, soluble cadmium, and soluble heavy metals were tested following the protocols provided in ASTM F963-17, while phthalates were tested following the protocols outlined in 16 CFR 1307, CA Prop 65, including di-n-octyl phthalate (DnOP). In total:

- 221 individual components/parts from 36 products were tested for total lead content,
- 456 individual components/parts from 36 products were tested for the presence of soluble heavy metals,
- 4 individual components/parts from two products were tested for soluble cadmium,
- 158 individual components/parts from 36 products were tested for phthalates (specifically, 16 CFR 1307, CA Prop 65, and DnOP.

2. Methodology: Safety Testing of E-Bike Batteries and Portable Battery Packs

Ten e-bike batteries and 10 portable battery packs were purchased from two online platforms.

The battery testing was conducted in accordance with voluntary industry standards. Portable battery packs were tested following the protocols provided in UL 62133, Secondary Cells and Batteries Containing Alkaline or Other Non-Acid Electrolytes - Safety Requirements for Portable Sealed Secondary Cells, and for Batteries Made from Them, for Use in Portable Applications. E-Bike batteries were tested following the protocols provided in UL 2271, ANSI/CAN/UL/ULC Standard for Batteries for Use In Light Electric Vehicle (LEV) Applications (September 2018).

The batteries were assessed for the presence of markings and instructions, and tested for short circuits, overcharging, overloading, temperature, dielectric voltage, isolation resistance, as well as polymetric and drop/impact testing.

3. Methodology: Testing of Cell-Phone Battery Chargers, Electric Irons, and Hand-Held Hairdryers

36 different household appliances were purchased for the survey in total—12 cellphone battery chargers, 12 electric irons, and 12 hand-held hairdryers.

Product safety and compliance regarding cell-phone battery chargers and electrical irons is not governed by any relevant rules or regulations; testing was carried out in accordance with voluntary industry standards. Cell-phone batteries were tested to UL 62368-1 (Edition 3, October 2021) and electrical irons were tested to UL 60335-2-3 (Edition 5, July 2004).

Meanwhile, hand-held hairdryers are regulated by 16 CFR 1120 (the Substantial Product Hazards List) and were tested in accordance with UL 859 (Edition 11, 20 June 2012).[10]

All electrical appliances were evaluated for the presence of markings and instructions. In addition, cell-phone battery chargers were tested for dielectric voltage, abnormal faults, electric shock, and functionality following abuse testing. Hand-held hairdryers were tested for power input, surface temperature, and abnormal operations. Electrical irons were tested for leakage current,

8 Federal Register, Vol. 89, No. 12, (govinfo.gov)

9 eCFR :: 16 CFR Part 1307 -- Prohibition of Children's Toys and Child Care Articles Containing Specified Phthalates

10 Federal Register: Substantial Product Hazard List: Hand-Supported Hair Dryers

mechanical hazards, and faults. The full list of tests conducted is available in the results section.

Results

1. Results: Chemical Testing of Toys

None of the 36 children's toys tested positive for soluble heavy metals or soluble cadmium. Approximately 8.33 percent of the samples contained lead **above** the acceptable threshold and almost 14 percent of the samples contained phthalates **above** the acceptable threshold.

Separated into easily accessible components/parts, approximately 3 percent of the 221 parts tested positive for the presence of lead failed to meet **statutory limits** (seven of 221 parts). Similarly, approximately eight percent of the 158 parts tested for phthalates failed to meet **statutory limits** (12 of 158 parts).

Among the failed components, those parts that were comprised of PVC-based materials were at a higher risk of containing lead and/or phthalates in excess of statutory limits. Conversely, accessible parts and components made of material such as hard plastic, steel, and silicone—or had printings comprised of CMYK inks—were at a relatively lower risk of non-compliance.

Tables 1 through 3 provide the summary results for children's toy products and components that were tested.

Table 1: Test Results for the Product

	Total Toys	Pass	Fail	Percentage of failures
ASTM F963-17+CPSIA+16 CFR 1303 – Total Lead	36	33	3	8.33%
ASTM F963-17 Soluble Heavy Metals	36	36	0	0%
ASTM F963-17 Soluble Cadmium	2	2	0	0%
16 CFR 1307 + CA Prop 65 Phthalates + DnOP	36	31	5	13.89%

Table 2: Test Results for Component Parts of the Product

	Total parts	Pass	Fail	Percentage of failures
ASTM F963-17+CPSIA+16 CFR 1303 – Total Lead	221	214	7	3.17%
ASTM F963-17 Soluble Heavy Metals	456	456	0	0%
ASTM F963-17 Soluble Cadmium	4	4	0	0%
16 CFR 1307 + CA Prop 65 Phthalates + DnOP	158	146	12	7.59%

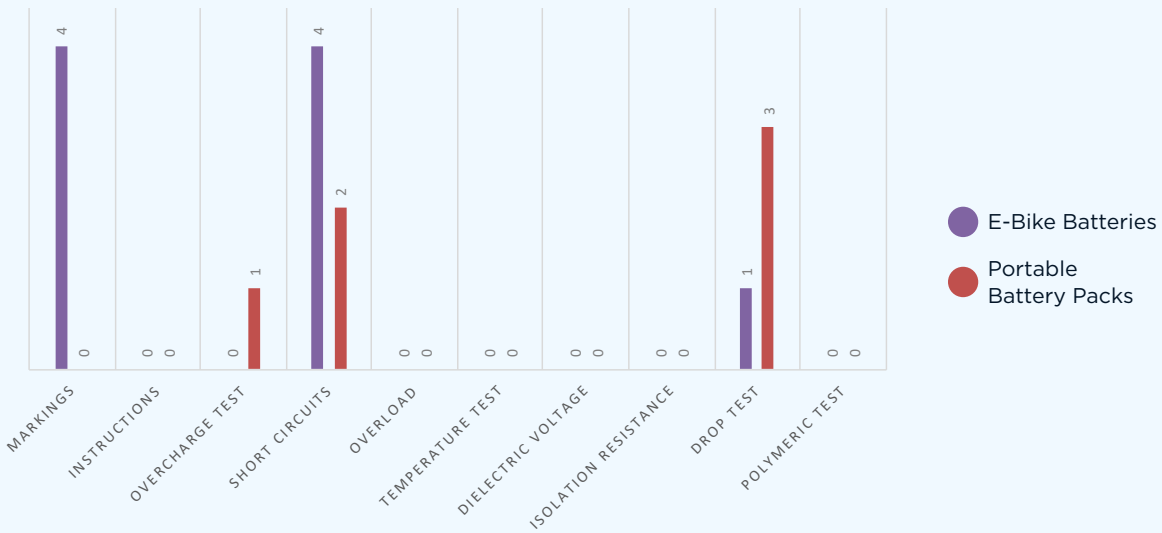
Table 3: Component Part Failures

Material types	Quantity of Failed Components	
	Lead	Phthalates
USB Cable	6	3
Sandpaper	1	
Foam with glue		2
Sotf plastic		3
Artificial leather		1
Transfer printing layer		1
Tool handle plastic		2

2. Results: Safety Testing of E-Bike Batteries and Portable Battery Packs

E-bike batteries and battery packs—respectively—presented the highest levels of non-conformities among the products tested in this study. In summary, 90 percent of e-bike batteries (nine of 10) and 50 percent of portable batteries (five of 10) presented non-conformities related to short-circuit testing, over-charging, drop-testing, and incorrect or incomplete labeling/markings.

Figure 1: E-Bike and Portable Battery Pack Non-Compliance



3. Results: Safety Testing of Cell-Phone Battery Chargers, Electric Irons, and Hand-Held Hairdryers

In total, electrical appliances tested for this study demonstrated a non-compliance rate of approximately 15 percent (five of 36 sampled appliances). While there were no testing non-conformities identified among electric irons, 25 percent of cell-phone battery chargers (three of 12) presented abnormal faulting and 17 percent of hand-held hairdryers (two of 12) failed abnormal operations testing. Furthermore, 25 percent of battery chargers (three of 12) and eight percent of hairdryers (one of 12) lacked third-party certification markings.

All products that lacked third-party certification markings presented at least one non-conformity during testing. Meanwhile, only one product (hand-held hairdryer) that had obtained a mark from a third-party conformity assessment body presented a non-conformity (abnormal operations testing).

Conclusions and Discussion

One of the key findings of the chemical testing of toys is that identified non-conformities were concentrated in accessible components derived from PVC-based materials—such as USB cables, sandpaper (with a PVC backing), foam with glue, soft plastic, artificial leather, transfer printing layer, and tool handle plastic.

The trace levels of lead and phthalates in children's toys potentially demonstrates an existing trend among products sold through online platforms. While children's toys that are sold through 'brick and mortar' retailers in the US face stringent regulatory oversight at both the federal and state levels, online retailers importing single-items under a value of $800 from outside jurisdictions into the US do not face the same level of scrutiny.[11,12]

The absence of regulatory scrutiny for many consumer products sold via online retailers likely also contributes to observed levels of non-compliance among tested battery packs, e-bike batteries, and electrical appliances (cell-phone battery chargers and hand-held hair dryers).

While ongoing concern about the safety of lithium-ion batteries remains a significant policy concern in the US, the absence of a federal law and a patchwork of state and local laws have not substantially reduced the proliferation of non-compliant batteries.[13]

In fact, in April 2024, approximately 6 months following the completion of this study, the US CPSC issued a public health and safety notice urging consumers to stop purchasing an e-bike battery that was identified in this study as non-compliant. The notice highlighted that the product—which can be purchased via online shopping platforms—had an increased risk of fire and burn hazards following several reports of fire and property damage.[14]

Nonetheless, the results of this initial market survey suggest that the American legal system acts as a positive force, encouraging, if not requiring, major importers and manufacturers to conduct pre-market third-party testing and certification prior to entering the market. This is most clearly highlighted in Figure 2, in which detected non-conformities among the three household

11 Section 321 Programs | U.S. Customs and Border Protection (cbp.gov)

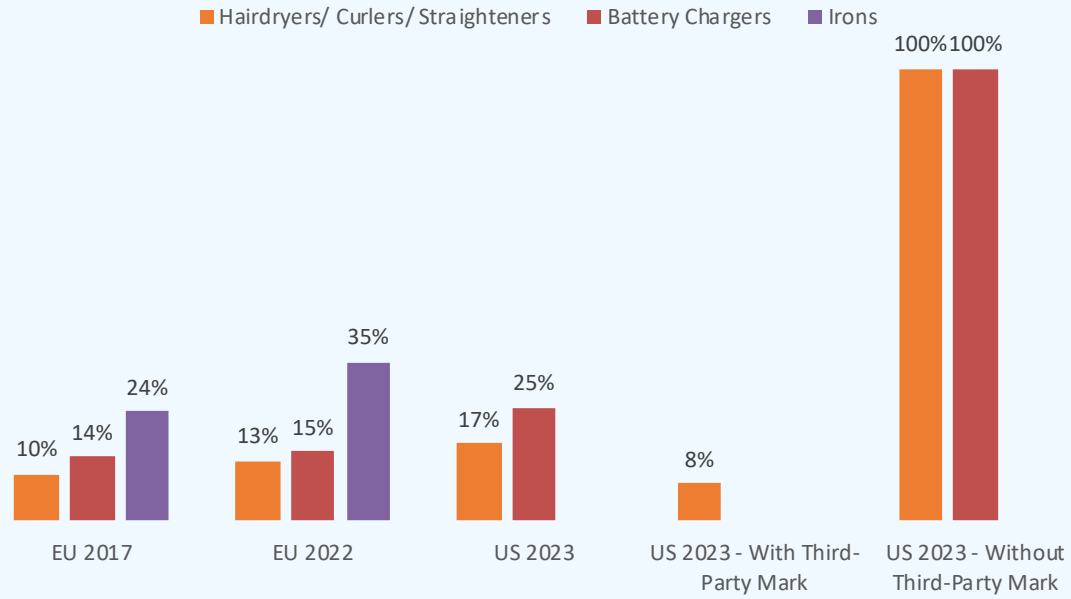
12 CBP and the Trade Facilitation and Trade Enforcement Act of 2015 (TFTEA) | U.S. Customs and Border Protection

13 Senate Advances Slate of Lithium-Ion Battery Safety Standards | NYSenate.gov

14 CPSC Warns Consumers to Stop Using Unit Pack Power (UPP) E-bike Batteries Due to Fire and Burn Hazards; Risk of Serious Injury and Death | CPSC.gov

appliances are compared between US and EU studies and with respect to the presence of a third-party certification marking. **In the US we notice a lower rate of non-conformities, all of which are from products that do not bear a third-party marking.**

Figure 2: US Study Comparison with EU 2017 and 2022 Studies



According to the results of this study, the presence of a third-party TIC mark significantly decreased the likelihood of non-conformities. The rate of non-conformities in the EU and among products in this study that lacked a TIC mark are substantially higher than those with a TIC mark.

Nonetheless, further examination of the US market is still needed. Future studies in the US would benefit from increasing sample sizes to establish more statistically robust results as well as comparing levels of non-conformity between products purchased at retailers and those purchased online.

Editor's Note About TIC Council

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