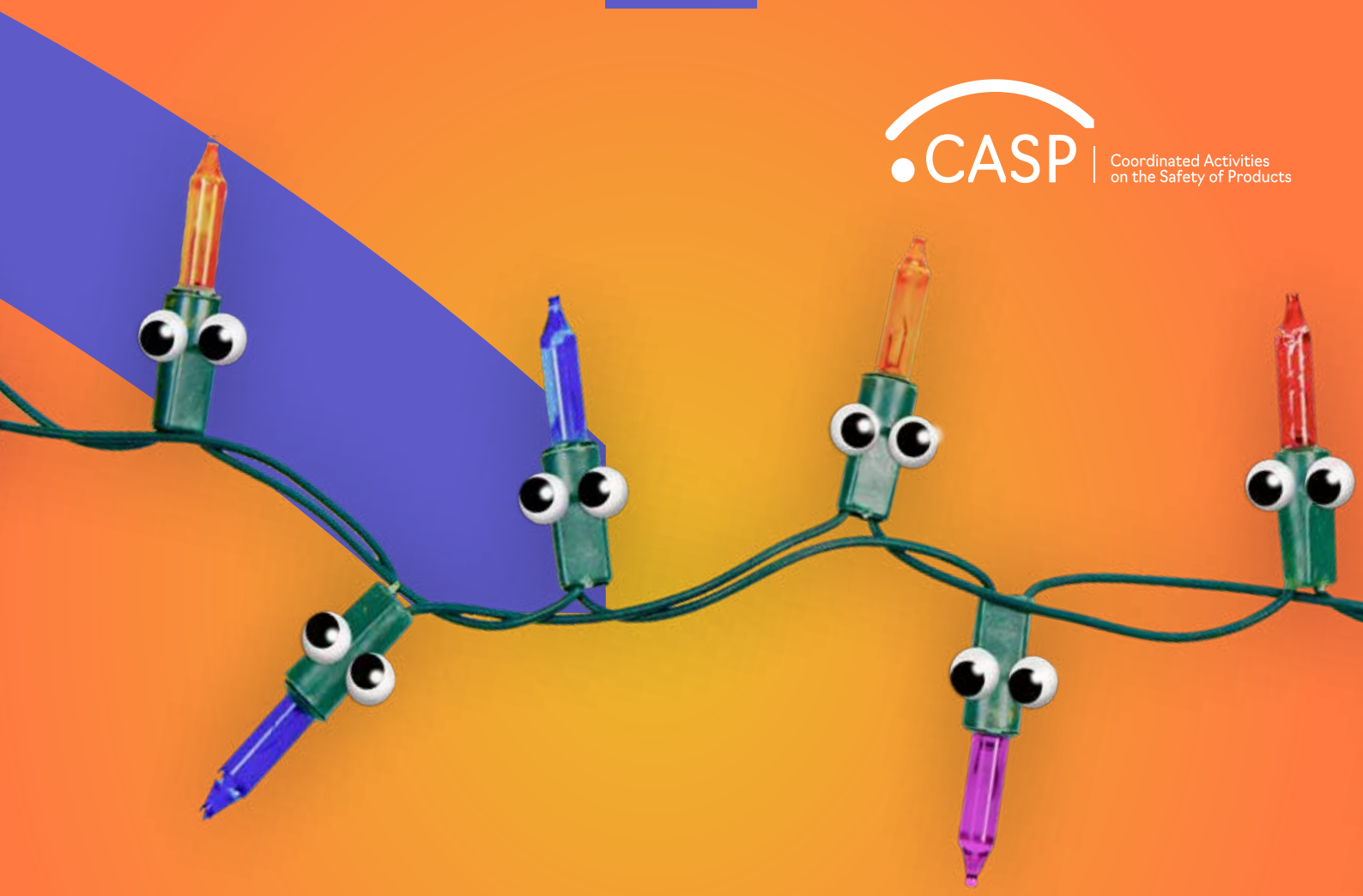
European Commission

CASP | Coordinated Activities on the Safety of Products



CASP 2024
Lighting chains

Final activity report

Justice and Consumers

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List of abbreviations

CASP	Coordinated Activities on the Safety of Products
DG JUST	Directorate-General for Justice and Consumers
EC	European Commission
EFTA	European Free Trade Agreement
EN	European Standard
EU	European Union
GPSR	General Product Safety Regulation 2023/988
IM	Intermediate meeting
KoM	Kick-off meeting
LED	Light emitting diode
LVD	Low Voltage Directive 2014/35/EU
MSA	Market surveillance authority
PSA	Product-specific activity

Executive summary

Objectives

The overarching goal of the Coordinated Activity on the Safety of Products (CASP) project is to protect the health and safety of European consumers by supporting national authorities from EU/EFTA countries responsible for market surveillance (MSAs) to better coordinate their activities. MSAs participate in joint sampling, testing and risk assessment of specific products during the CASP project.

Product scope

The activity covered lighting chains that fall under the LVD and are plugged into a standard outlet. It includes both traditional and sealed lighting chains (rope lights).

Main testing criteria and results

The activity focused on testing lighting chains with and without control units against standards EN 60598:2015 and EN 61347-2-11, or EN 61347-2-13:2014+A1:2017 for lights with control units.

A total of 42 samples (48 %) did not meet at least one of the requirements of the testing plan. Examination of the labelling – warnings, markings and instructions – performed by the MSAs showed that 41 (53 %) of 87 samples did not meet the requirements. Overall, 48 samples (55 %) did not meet at least one requirement.

Conclusions

There is a long history of notifications on Safety Gate for lighting chains, mainly related to overheating. Under this activity however, the main safety issues identified related to exposure to live parts. For this activity, MSAs issued seven Safety Gate notifications for those products that pose a serious risk to consumers[1].

Key recommendations to stakeholders

For consumers

- If the lighting chain is damaged, dispose of it immediately to avoid electric shock;
- If possible, check if the product has the manufacturer or the importer's contact details, the CE marking, safety warnings and other identifiers;
- Always follow the instructions for the use of the control unit (indoor/outdoor).

For economic operators

- Ensure your product has safety warning and complies with standards. There should be no doubt about the conformity of the product you are supplying.

For standardisation organisations

- The standard needs to provide readability requirements for warnings;
- If the product is intended to be cut by the consumer, the part to be cut should be low voltage and be designed with safety in mind.

[1] Until 01.04.2025 (included).

Part I

Overview of the activity

Participating MSAs

		Country	MSA
1		Croatia	State Inspectorate
2		Czechia	Czech Trade Inspection Authority[2]
3		Germany	Tübingen Regional Council
4		Hungary	Ministry of Justice, Consumer Protection and Market Surveillance Department[2]
5		Ireland	Competition and Consumer Protection Commission
6		Italy	Chamber of Commerce of Venezia Rovigo[2]
			Chamber of Commerce of Reggio Calabria[2]
			Chamber of Commerce of Milan Monza Brianza Lodi
7		Lithuania	State Consumer Rights Protection Authority
8		Malta	Malta Competition and Consumer Affairs Authority
9		Poland	Office of Competition and Consumer Protection
10		Slovakia	Slovak Trade Inspection
11		Sweden	The Swedish Electrical Safety Authority

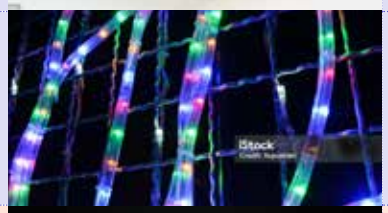
Product scope

Traditional mains-powered lighting chains with push-in type bulbs and integrated LED bulbs, offer a convenient and efficient lighting solution for various settings (indoor or outdoor), events and periods (e.g. summer, year-end celebration). These lighting systems are designed to be used simply by plugging them in. Additionally, the aesthetic appeal of these lighting solutions, available in various styles and colours, makes them a popular choice for creating ambiance and enhancing decor.

Between 2020 and 2024, 309 Safety Gate notifications were issued for lighting chains. The main safety risks related to electric shock, fire and burns.

[2] MSAs can participate in the CASP project in the testing-only modality. They participate in the testing process, but are not involved in the discussions and decision-making and do not take part in the activity meetings.

Table 1: Product scope

	Product sub-category	Photo	Description
In scope	Traditional mains-powered lighting chains (push-in type bulbs or integrated LED bulbs)		Luminaire comprising an assembly of series-connected lamps, parallel-connected lamps or series/parallel-connected lamps and interconnecting insulated conductors.
	Mains-powered rope lights (sealed lighting chains)		Lighting chain with non-replaceable light sources enclosed in a rigid or flexible insulating translucent pipe or tube, sealed at the ends, with or without joints.
Out of scope	Lighting chains non-reliant on electrical outlets, i.e. not covered by the LVD[3]		Non-mains-powered lighting chains such as **battery-powered** string lights and **solar- powered** outdoor light chains. This category was not considered in scope as electric shock is not a risk and overheating is unusual. Additionally, plugs, fuses and adaptors supplied with the products were considered out of the testing scope.

Testing criteria

The regulatory framework for lighting chains focuses on LVD provisions. The final testing plan is described in Table 2.

[3] Directive 2014/35/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits (recast). Text with EEA relevance.

Table 2: Testing plan for traditional lighting chains (EN 60598-2-20:2015) and sealed lighting chains (EN 60598-2-21:2015)

Standards EN 60598-2-20:2015 & EN 60598-2-21:2015		
Clause	**Requirements**	**Comments**
20/21.5	Classification of luminaires, together with 20.6: Marking, to ensure that all necessary information is present and consistent (Note: 20.6 includes requirements for the packaging and instructions)	
20/21.7	Construction	Within this clause, subclause 20/21.7.8 covers control units. If there are such units, and not every set has them, it requires 'electronic control devices' to meet EN 61347-2-11 and 'LED-drivers' to meet EN 61347-2-13. Where that is the case, recommended test clauses of those standards are set out separately below this list.
20/21.11	External and internal wiring	
20/21.12	Protection against electric shock	
20/21.13	Thermal tests	Thermal tests only. Endurance tests omitted for this PSA.
20/21.14	Resistance to solid objects and moisture	Dust tests not relevant to this PSA. Moisture tests relevant to lighting intended for outdoor use.
20/21.15	Insulation resistance and electric strength	
20/21.16	Resistance to heat, fire	Tracking tests omitted for this PSA.

Table 3: Additional testing plan for traditional and sealed lighting chains with control unit

Standards EN 61347-2-11 or EN 61347-2-13:2014+A1:2017 (as applicable)		
Note: These standards are only to be applied to the extent that they contain additional requirements, not to repeat anything already covered by testing to EN 60598-2-20 or EN 60598-2-21.		
Clause	**Requirements**	**Comments**
8	Protection against accidental contact with live parts	For most lighting chains, this is already addressed in 20.12 of EN 60598-2-20 (or 20.12 of EN 60598-2-21).
12	Electric strength	For most lighting chains, this is already addressed in 20.15 of EN 60598-2-20 (or 21.15 of EN 60598-2-21).
14	Fault conditions	
Note: The numbering of the subsequent clauses differs between the two standards, because an additional clause 15 exists in EN 61347-2-13, but the clause titles are the same.		
15/16	Construction	
16/17	Creepage distances and clearances	
18/19	Resistance to heat, fire	Only for parts within control modules not already tested in in 20.16 of EN 60598-2-20 (or 21.16 of EN 60598-2-21). Tracking tests omitted for this PSA.

Sampling and testing

Sampling distribution

The sampling process was carried out by MSAs based on the sampling distribution agreed during the Intermediate meeting. A total of 87 products were collected by the participating MSAs for testing, both online and from physical stores.

Due to the timing of the sampling process, in summer, several MSAs encountered difficulties in collecting samples. If sampling had occurred during winter, the results might have been different. The availability of products on the market is seasonal and likely influenced the results of the activity.

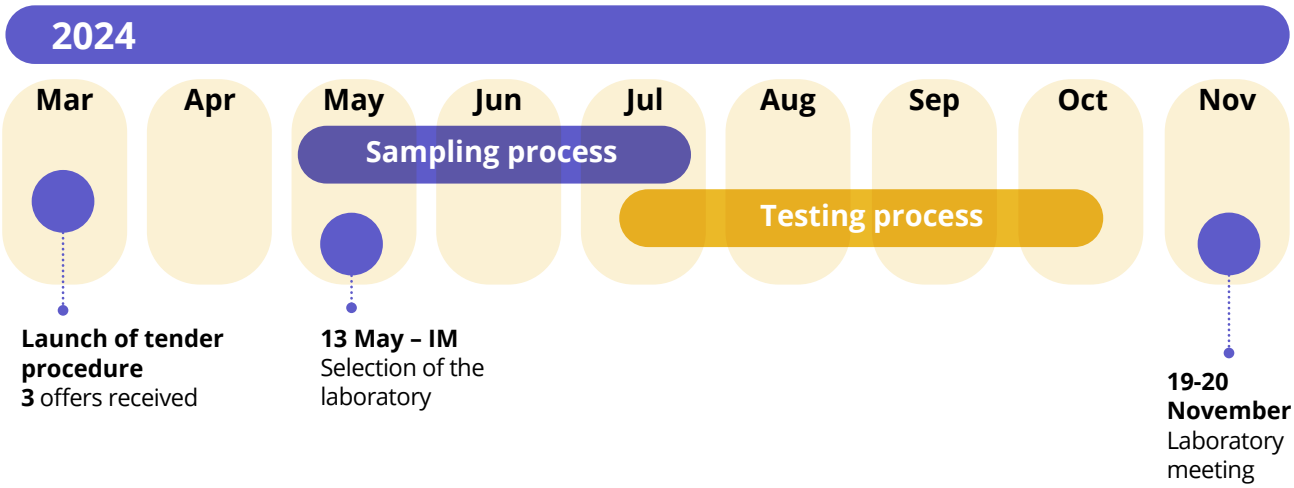
Testing process

The testing laboratory for this activity was selected through a tender procedure. The tender specifications were sent to 81 laboratories in the EU/EFTA that had been identified by the project team's laboratory engagement strategy. Each laboratory was asked to submit an offer including detailed information on pricing, evidence of certification, the relevant experience of the experts and test report templates.

Ten laboratories submitted an offer within the given timeframe. Based on the completeness and competitiveness of their offers, three laboratories were pre-selected and invited to an interview. During the Intermediate meeting, the MSAs were presented with comparative analyses of the technical quality and financial aspects of the offers received from the laboratories. The MSAs selected the laboratory that was awarded the highest number of points for technical quality and financial competitiveness.

Following the selection of the laboratory, the MSAs were given two months to collect the samples and send them to the laboratory.

Figure 1: Timeline of the sampling and testing process



Test results

Overview of the test results and main findings

Out of 87 samples tested, 42 products (48 %) did not meet at least one of the requirements of the testing plan, as illustrated in Figure 2. This included 29 samples which did not meet the requirements of clause 20.11 on 'external and internal wiring'.

If we include the outcome of the checks on warnings, markings and instructions performed by the MSAs with the tests performed by the laboratory, 48 samples (55 %) did not meet at least one requirement – see Figure 3.

Figure 2: Test results excluding checks on warnings, markings and instructions (N=87)

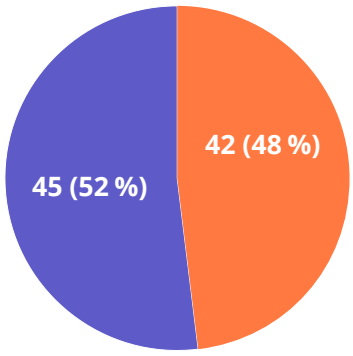
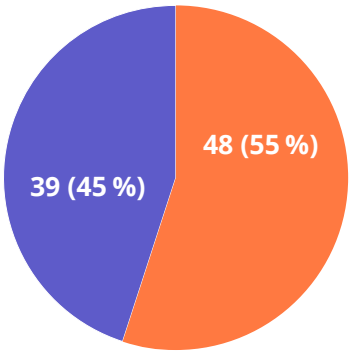
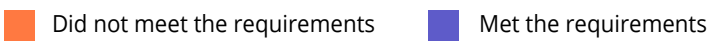


Figure 3: Test results including checks on warnings, markings and instructions (N=87)



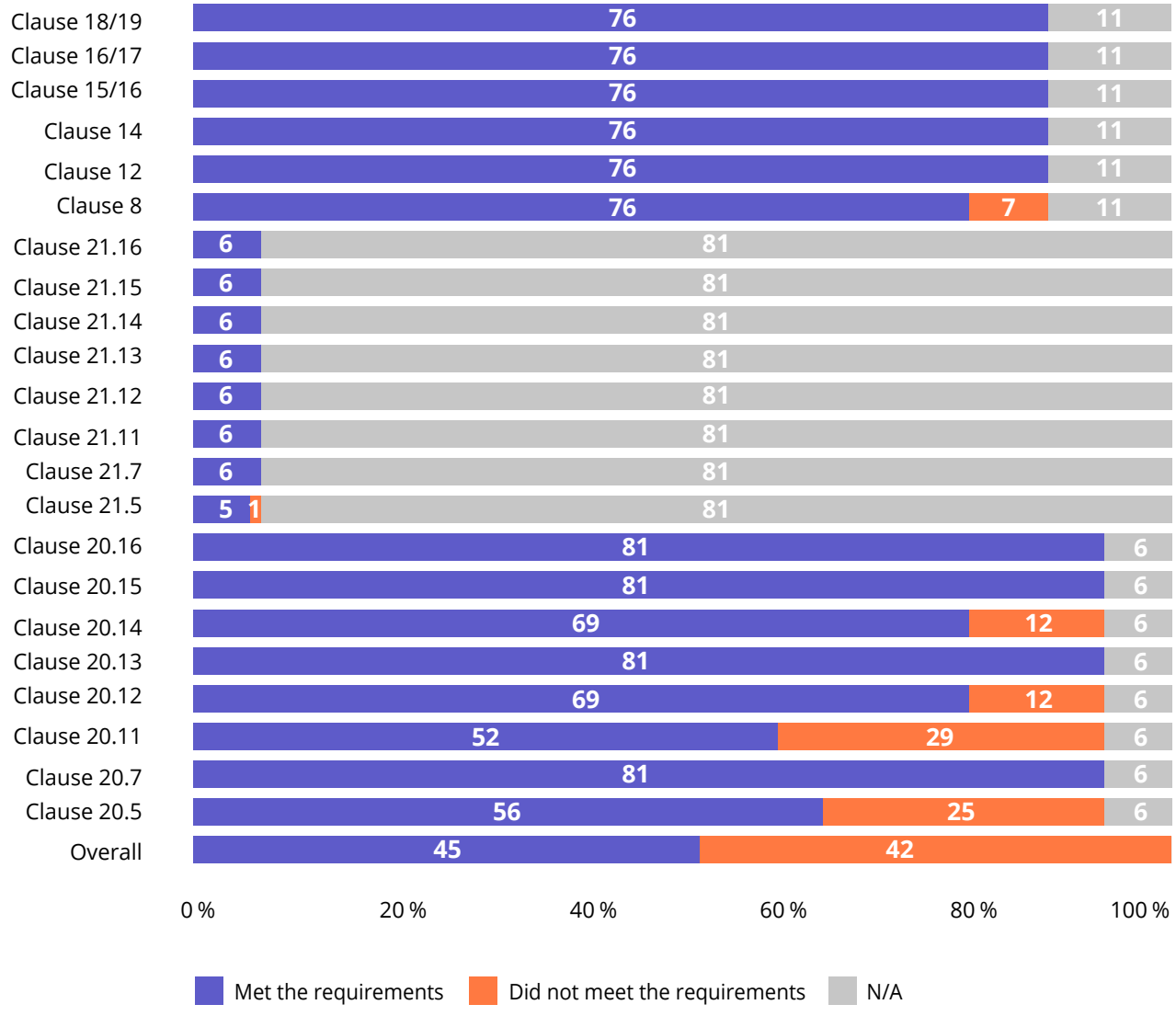


When considering only the warnings, markings and instructions, MSAs found that 41 samples (53 %) out of 87 did not meeting these requirements. The main reasons for non-compliance were problems with the name and address of the manufacturer/importer (15 samples), electric shock warnings if the lamps are broken (15 samples), warnings about connecting to the power supply while the product is in the packaging (11 samples) and voltage-related information about the chain itself (9 samples).

Detailed test results

Looking at the results for standard **EN 60598-2-20:2015**, clauses for which there were a particularly large number of failures were 20.11: External and internal wiring and 20.5: Classification of luminaires, as illustrated below. The standard's clauses were not applicable to 6 products.

Figure 4: Test results per clause



In addition, 12 samples did not meet the requirements of Clauses 20.12: Resistance to solid objects and moisture and 20.14: Protection against electric shock. In several products it was found that the lacquer used for insulation was not safe, as it can deteriorate, leaving the product unprotected against short-circuits. All samples met the requirements of Clause 20.16: Resistance to heat, fire. The laboratory said that, in their experience, this is rare.

As per standard **EN 60598-2-21:2015**, only one product did not meet the testing requirements, specifically Clause 21.5 on the classification of luminaires – which is meant to ensure that all necessary information is present and consistent. For **EN 61347-2-11** clauses, 7 samples did not meet the requirements of Clause 8: Protection against accidental contact with live parts.

Conclusions of the test results

Improved technology and materials

There is a long history of failures in lighting chains on Safety Gate. Many of them are linked to overheating. This presents the risks of fire and plastic melting, which can expose live electrical parts. However, technology has evolved significantly in the recent years. While older sets used small, replaceable incandescent lamps, nearly all samples tested during this activity had non-replaceable LEDs.

LEDs operate at much lower temperatures than incandescent lights, resulting in no heat-related failures during this activity. This demonstrates a significant improvement in consumer safety. All samples met the requirements for glow-wire and ball-pressure tests, indicating an overall enhancement in the quality of plastics used in lighting chains.

Main consumer safety problems

The main failures were related to resistance of solid objects and moisture and electric shock protection. **Access to live parts** and risk of electric shock is due to poor quality construction of the control boxes.

- Some sets indicated suitability for outdoor use but were found not to be waterproof. This **inadequate protection** of live parts against ingress of water can cause electric shock if the set is handled when plugged in. Certain sealed sets can be cut at designated points. However, in one instance, making a cut exposed live wiring.
- **Undersized wiring** – extremely small cross-sectional areas – were seen in some samples, which can lead to two potential issues: 1) insufficient current-carrying capacity and 2) inadequate mechanical strength. The first issue is not a major concern, as they are low-power devices with minimal current requirements. However, the second issue is critical: if the wiring in the mains voltage component fails, it can expose live parts. In one sample, the wiring was so thin that it broke during cord anchorage testing.

Risk assessment and corrective measures

Risk assessment results

Lighting chains can only be placed on the market if they comply with all relevant safety requirements set out in the legislation. When assessing if a product poses a risk, Article 26 on the notification of dangerous products through the Safety Gate Rapid Alert System should be respected[4].

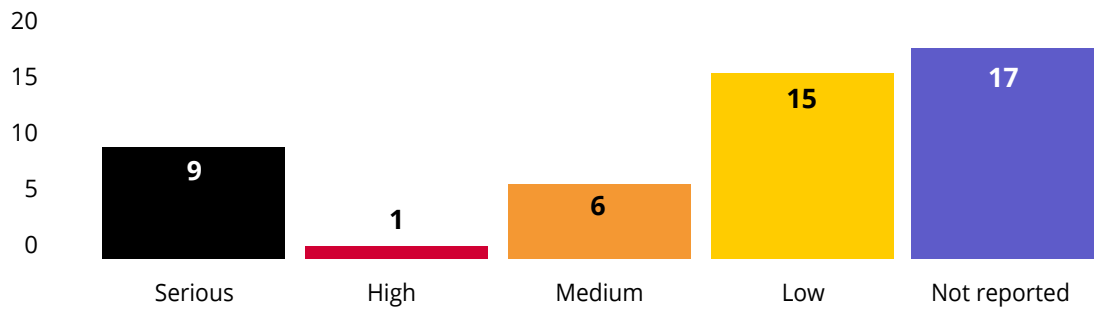
Overall, 48 (55 %) samples did not meet the requirements. A total of 42 samples (48 %) did not meet the requirements of the tests performed by the laboratory and 41 (53 %) did not meet the labelling requirements (for warnings, markings and instructions).

- Nine samples were assessed as posing a serious risk, and one a high risk. Six were labelled a medium risk and 15 a low risk;
- Products that met the testing requirements, but did not meet the labelling requirements, are reported under the label 'Formal non-compliance'.

Figure 5 shows the risks levels of the samples that did not meet the requirements.

[4] Regulation (EU) 2019/1020 of the European Parliament and of the Council of 20 June 2019 on market surveillance and compliance of products

Figure 5: Risk level of samples that did not meet the requirements

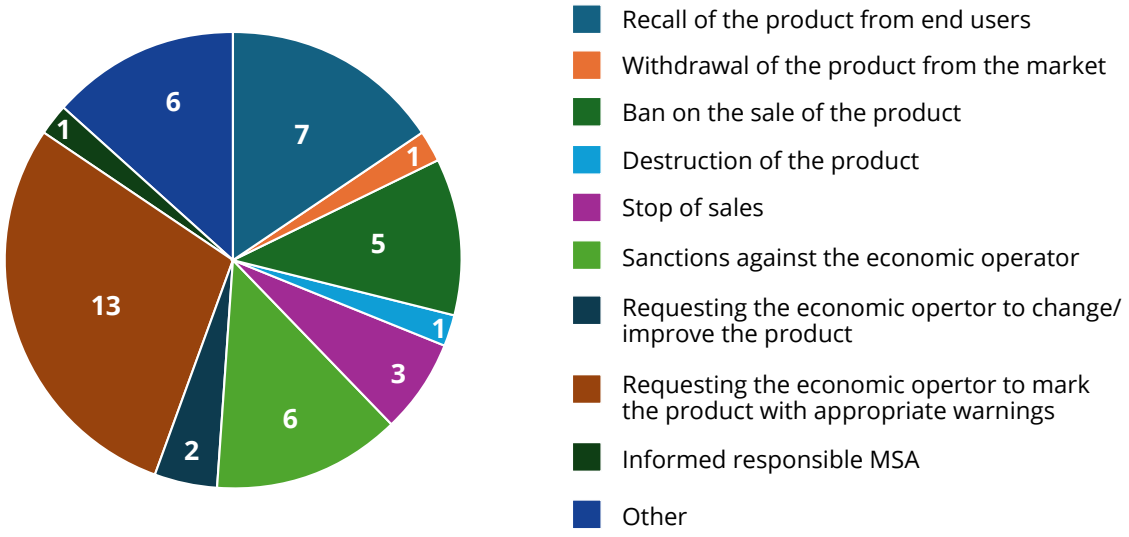


Corrective measures

Based on the results and the risk assessments performed, the MSAs determined the corrective measures for products that did not comply with EU legislation and/or the applicable standards.

Figure 6 displays the corrective measures taken for the products that did not meet the testing requirements.

Figure 6: Measures taken for products that did not meet the requirements (N=45)[5]



Additionally, when a serious risk is identified, MSAs are legally required to submit a notification on the Safety Gate Rapid Alert System, in accordance with Article 26 of the GPSR [6]. On the basis of the GPSR and Regulation (EU) 2019/1020[7], it is also recommended that MSAs submit notifications for measures taken against products posing a less-than-serious risk.

Following this testing campaign, Safety Gate notifications were issued for **seven** products.

[5] Until 01.04.2025 (included).

[6] Regulation (EU) 2023/988 of the European Parliament and of the Council of 10 May 2023 on general product safety.

[7] Regulation (EU) 2019/1020 of the European Parliament and of the Council of 20 June 2019 on market surveillance and compliance of products.

Conclusions and recommendations

Conclusions

The activity tested the mechanical safety of lighting chains. The plastic materials were generally considered to be of better quality than before. In total, 48 % of the samples did not meet the requirements of at least one of the requirements of the electrical and mechanical tests.

When adding the checks performed by MSAs on warnings, markings and instructions, the number of samples which did not meet at least one of the requirements increases to 55 %. This is an important part of the risk profile of lighting chains, as it provides users with crucial information about a product's correct use and reduces the risk of electric shock.

MSAs issued seven Safety Gate notifications and instructed the economic operators to mark the products with appropriate warnings and recall them from end users. They banned the sale of some products and imposed sanctions on several economic operators.

Recommendations to stakeholders

The following recommendations are based on the outcome of the testing and discussions by MSAs during the project.

For consumers

- Only trust products that have the manufacturer or importer's contact details based in the EU;
- Always follow the manufacturer's instructions, including on where the controller box must be placed (indoors or outdoors);
- If the lighting chain is damaged, carefully unplug it and dispose of it immediately to avoid the risk of electric shock;
- If buying online, favour products that have at least one photo. From the photo(s), you should be able to find the following key information easily:
  - CE marking;
  - safety warning;
  - identifiers.
- The controller box always needs to be kept away from water, unless it is specified that it is for outdoor use and that the box is rainproof;
- Check on Safety Gate to see if the product you're buying has been identified as dangerous;
- Report any safety issues or accidents with your product to the seller/producer and then to your consumer protection authority on Consumer Safety Gateway. Note that the authority will not intervene directly in your individual case.

For economic operators

- Ensure your product has an electric shock warning and complies with safety standards;
- Know your suppliers so that the product can be traced in case of defects;
- Ensure that the product has undergone safety checks. You should not have any doubts about the conformity of the product you intend to, or are, supplying;
- When economic operators (distributors and online sellers) receive the products, they are obliged to check compliance with product safety rules before placing them on the market.

For standardisation organisations

- Ensure the standard includes warnings that if the product is damaged, it should not be used;
- The standard needs to provide requirements about the size, readability, placement, colour and contrast of warnings on the packaging and product;
- If a product is intended to be cut by the consumer, the part that can be cut should be low voltage and be designed with safety in mind. Additionally, where relevant, means and instructions must be included with the set to maintain the IP rating;
- The standard allows a minimum cross-sectional area (CSA) of 0.15 mm2 in low-voltage wiring. Particularly for LED lighting chains, the power (and therefore the current) is extremely low, so a lower CSA poses no risk. Perhaps the minimum CSA could be further reduced in the standard.

Part II

What is CASP?

The Coordinated Activities on the Safety of Products (CASP) project enables close cooperation between market surveillance authorities from European Union/ European Free Trade Agreement countries to ensure the safety of products on the Single Market.

CASP 2024 includes seven product-specific testing activities and two horizontal activities

Participants in the product-specific activities test the jointly selected products sampled on their respective national markets. The products are tested in accredited laboratories in the EU/EFTA according to the commonly agreed testing criteria.

CASP 2024 also includes one re-testing activity. Based on the same testing plan as in the previous testing campaign of the given product category, the re-testing initiative involves repeating large-scale market surveillance activities for those product categories to verify the compliance level after a certain period of time.

PSA 1
Baby soothers

PSA 2
High chairs

PSA 3
Lighting chains

PSA 4
Mini electric heaters

PSA 5
Disposable electronic cigarettes

PSA 6
Bicycles for children

PSA 7
Slime toys (re-testing)

Horizontal activities provide a knowledge-exchange forum for market surveillance authorities. With the guidance of technical experts in the relevant fields, the participants develop common approaches, procedures, and practical tools for market surveillance.

HA 1
Standardisation – use of standards by analogy

HA 2
Starter kit for newcomers

Roles and responsibilities

EISMEA

The contracting authority manages the administrative relationship with the contractor on behalf of DG JUST. EISMEA monitors and approves all contractual deliverables.

CONTRACTOR

Coordinates the implementation and organisation of the activities. Provides technical and logistical support. The contractor is responsible for project management, reporting, communication and the dissemination of the project deliverables.

Market surveillance authorities of European Union / European Free Trade Agreement

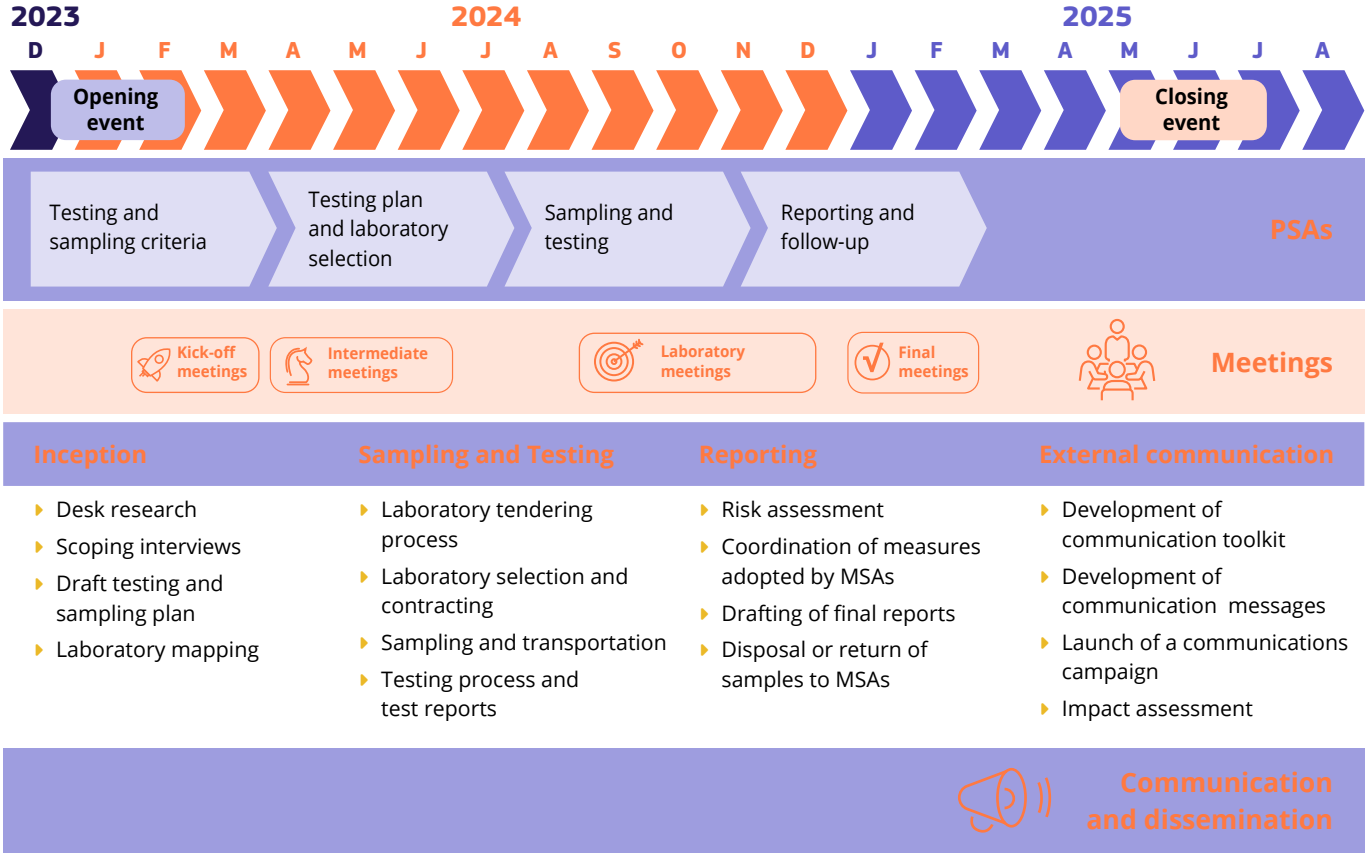
DG JUST

Oversees the planning and execution of the CASP project. Ensures operational leadership, management, and successful implementation. Supports the participating market surveillance authorities with continuous guidance.

TECHNICAL EXPERT (one per activity)

Provides technical advice and guidance to market surveillance authorities. Helps with drafting of the sampling and testing plan and selection of the most suitable laboratory. Analyses results, helps assess the identified risks and makes recommendations.

Product-specific activities work plan



Product-specific activities processes and tools

0 Pre-CASP process
DG JUST conducts a priority-setting exercise with market surveillance authorities to select the product categories for each CASP project. This selection process encompasses both new and previously tested product categories in the framework of a CASP project.

1 Validation of testing and sampling plans
The technical experts draft the testing plans based on the priorities set by market surveillance authorities and the main product hazards identified. The drafts are presented at the kick-off meetings, then finetuned and validated by the participants.

2 Laboratory selection
The contractor's team maps the testing laboratories and contacts them to collect preliminary fee quotes and other relevant information. The tendering process is launched after the kick-off meetings, and the offers are compared and evaluated. During the intermediate meetings, the market surveillance authorities select one laboratory per activity.

3 Collection and transportation of samples
The market surveillance authorities collect samples from their national markets, perform preliminary checks and send them to the selected testing laboratory.

4 Testing and delivery of test reports
The laboratory tests the samples according to the agreed testing plan. The market surveillance authorities check and validate the test reports.

5 Risk assessment
The technical expert and the market surveillance authorities perform risk assessments on all samples that do not meet the testing requirements.

6 Measures adopted by the market surveillance authorities
The market surveillance authorities take corrective measures for the products that do not meet the requirements and issue notifications on Safety Gate.

7 External communications
The external communication campaign will launch when all testing results have been validated. It is rolled out via media and influencer engagement activities, supported through stakeholder dissemination activities.

External communication

Communication tools
- **Final reports** for each activity and for the CASP 2024 project;
- **Factsheets;**
- **#ProductGo game and related assets;**
- **Press kit and social media assets.**

Channels
The communication material is disseminated via:

- ec.europa.eu web presence (Safety Gate, CASP webpage, EISMEA news section);
- Social media accounts of DG JUST and EISMEA;
- Communication channels of market surveillance authorities;
- Selected partner influencers;
- Selected media partnerships.

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Directorate Consumers
Unit B4 Product Safety and Rapid Alert System
Email: JUST-B4@ec.europa.eu

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