

# Risk Analysis for Fuses and Fuse Holders in Compliance with the General Product Safety Regulation (GPSR)

## 1. Introduction

**Ampire Electronics GmbH & Co.KG** plans to offer universal fuses and fuse holders in various designs for use in vehicles, starting on December 13, 2024, in its online store. These products are designed to protect electrical components in vehicles with operating voltages of 12 or 24 volts. They must comply with the new requirements of the **General Product Safety Regulation (GPSR)**.

The following risk analysis examines potential hazards and risks associated with these products and proposes measures to ensure they meet safety requirements.

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## 2. Identification and Evaluation of Hazards

### 2.1 Mechanical Hazards

- **Scratches and injuries from sharp edges:** The fuses and fuse holders may have sharp edges that could cause skin injuries during installation or use. This is especially a concern with poorly deburred metal parts.
- **Incorrect installation or defects:** Improper installation may result in fuses not fitting correctly, which can lead to short circuits or electrical malfunctions.

### 2.2 Electrical Hazards

- **Short circuits and overload:** Incorrect installation, such as improper wiring or insecure mounting, can lead to short circuits or overloads. This could cause fires or damage to other vehicle components.
- **Incorrect current rating:** Using a fuse rated for higher currents than specified could lead to a fire or electrical damage.
- **Electric shock hazard:** Insufficiently insulated contacts or defective fuses could lead to electric shock.

### 2.3 Chemical Hazards

- **Corrosion and gas emission:** In the vehicle environment, especially under damp conditions or extreme climates, corrosion of metal parts may occur, potentially releasing hazardous gases.

### 2.4 Environmental Risks

- **Disposal and recycling:** The products contain materials like metals and plastics, which can pose environmental hazards if not disposed of properly. Thus, proper recycling and disposal are critical.
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## 3. Analysis of Potential Risks in Intended and Foreseeable Use

- **Intended Use:** The fuses and fuse holders are designed for installation in vehicles with an operating voltage of 12 or 24 volts. Their purpose is to protect electrical components from overload or short circuits.
  - **Foreseeable Use:** End users may install the fuses without adequate expertise, leading to safety issues. Incorrect installation could impair the product's functionality and safety, potentially causing accidents.
  - **Misuse:** If the products are used for higher current loads than specified or in vehicles they are not intended for, there is a risk of malfunction.
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## 4. Consideration of GPSR Requirements

### 4.1 Marking and Traceability

- The products must be clearly and unambiguously marked to inform the consumer of proper use and potential risks. This includes:
  - The maximum current rating.
  - Instructions for professional installation by a qualified technician.
  - Electrical hazard symbols and safe disposal instructions.
- **Traceability:** A reliable traceability system must be in place to ensure that the product's origin can be traced in case of defects or safety incidents.

### 4.2 Safety Documentation

- Comprehensive technical documentation is required, containing all safety-related information, such as test reports, installation instructions, and certificates confirming compliance with relevant standards and regulations.

### 4.3 Conformity with EU Harmonization Regulations

- The product must comply with the relevant EU directives, such as the **RoHS Directive (Restriction of Hazardous Substances)** and the **Low Voltage Directive (LVD)**, as well as **EMC requirements** (Electromagnetic Compatibility).
  - It should be tested and certified according to applicable international standards for electrical safety products (e.g., IEC 60950-1 for electrical safety requirements).
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## 5. Evaluation of Product Conformity

- **Standards and Regulations:** A thorough review must ensure that the fuses and fuse holders meet relevant technical standards. The product should be certified according to **ISO standards** (e.g., ISO 9001 for quality management) and **EN standards** (e.g., EN 60269 for electrical protection).
  - **Product Testing:** It is advisable to have the products tested by accredited testing institutions to verify electrical safety, durability, and functionality under realistic operating conditions.
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## 6. Risk Minimization Measures

### 6.1 Product Safety

- **Packaging and Instructions:** Each fuse and fuse holder should be accompanied by a detailed installation manual clearly stating the need for professional installation.
- **Safety Certificates:** All products should be certified by independent testing bodies to confirm compliance with relevant EU standards.

### 6.2 Customer Training and Information

- **Customer Education:** The website and product descriptions should clearly highlight the risks and proper installation procedures. It should emphasize that installation must be performed only by qualified professionals.

### 6.3 Recall Strategy and Feedback System

- A system must be in place for quickly identifying and recalling products in case of safety issues. Customers should be able to provide feedback easily.

### 6.4 Disposal and Recycling

- **Environmentally Friendly Disposal:** The company should ensure that the products can be disposed of or recycled in an environmentally friendly manner. Information about disposal should be provided on the packaging or in the manuals.

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## 7. Recommendations for Compliance with GPSR Requirements

1. **Conformity Testing:** Ensure that all products comply with EU harmonization regulations and obtain certifications from independent testing bodies.
2. **Marking and Documentation:** Make sure the products are correctly marked and that comprehensive safety documentation is provided.
3. **Professional Installation:** Provide clear instructions that installation should only be performed by qualified professionals.
4. **Customer Safety:** Implement a robust traceability and product protection system, including a feedback and recall mechanism.
5. **Environmental Considerations:** Promote sustainable disposal practices and inform end users about proper handling of used products.

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This risk analysis provides a comprehensive foundation to ensure that the fuses and fuse holders are not only safe and reliable but also fully compliant with the General Product Safety Regulation (GPSR) and other relevant EU regulations.