Risk Analysis for Copper Cables as Meter Goods or on Spools According to the General Product Safety Regulation (GPSR)

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1. Product Description

Product: Copper cables (meter goods or on spools) for the individual wiring of electrical accessories in motor vehicles
Application Area: Vehicles with operating voltages of 12 or 24 volts
Restrictions:

- Use only in motor vehicles for the specified purpose
- Adherence to maximum current carrying capacity according to cross-section and specification
- Mechanically secure installation required in the vehicle

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2. Identification and Assessment of Hazards

The hazard analysis considers mechanical, electrical, chemical, and other relevant risks.

2.1 Mechanical Hazards

- **Improper Installation:** Poorly installed or incorrectly routed cables can be damaged by vehicle movements.
    - **Risk:** Insulation damage, exposed conductors, short circuits, or fire.
    - **Assessment:** High.
- **Mechanical Abrasion:** Cables can wear down through sharp edges or vibrations.
    - **Risk:** Loss of function or fire hazards.
    - **Assessment:** Medium to high.

2.2 Electrical Hazards

- **Overheating:** Use of cables with insufficient cross-section for the current load.
    - **Risk:** Overheating, fire hazard.
    - **Assessment:** High.
- **Short Circuits:** Damaged or unprotected cables may come into contact with conductive vehicle parts.
    - **Risk:** Sparking, ignition hazard.
    - **Assessment:** High.

2.3 Chemical Hazards

- **Emission of Toxic Substances:** The insulation may release harmful gases when overheated or burned.
    - **Risk:** Health hazard for vehicle occupants.
    - **Assessment:** Medium.

2.4 Other Hazards

- **Foreseeable Misuse:** Use outside of vehicles or ignoring specifications (e.g., outdoor installations without protection).
    - **Risk:** Corrosion, short circuits, loss of function.
    - **Assessment:** High.
- **Improper Installation:** Lack of expertise by end users may lead to faulty installations.
    - **Assessment:** Medium to high.

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3. Analysis of Potential Risks

Intended Use:

- Wiring of electrical accessories in vehicles, installation within the vehicle interior, protected from mechanical influences.
- Use according to the maximum current carrying capacity.

Foreseeable Misuse:

- Use in environments with moisture or high mechanical stress (e.g., outside of the vehicle).
- Connecting devices with higher current demand than specified.
- Careless or unprotected routing of cables.

Risk Analysis:

- **Intended Use:** Relatively low risk when specifications are followed and installation is done correctly.
- **Misuse:** Significant safety risks that must be mitigated through proper labeling and user information.

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4. Requirements and Standards under GPSR

4.1 Labeling

- Information on:
    - Cable cross-section, maximum current carrying capacity, and application area.
    - Usage restrictions (e.g., only for use inside vehicles, protected from moisture).
    - Warnings about risks associated with improper use.

- Manufacturer details (name, address).
- CE marking (where applicable) to confirm conformity.

4.2 Traceability

- Product identification (serial number, production batch).
- Clear labeling on the packaging and spools.
- Documentation for traceability in case of a recall.

4.3 Safety Documentation

- Provision of technical specifications including:
    - Maximum current carrying capacity and cross-section data.
    - Installation instructions with clear guidance and warnings.
- Technical documentation demonstrating compliance with harmonized standards (e.g., EN 60228 for cable quality and EN 60598 for electrical safety).

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5. Assessment of Compliance with EU Harmonization Legislation

The copper cables must meet the following directives and standards:

- **Low Voltage Directive (2014/35/EU):** Electrical safety for low operating voltages.
- **EMC Directive (2014/30/EU):** Protection against electromagnetic interference.
- **RoHS Directive (2011/65/EU):** Restrictions on hazardous substances in cables and insulation.
- **REACH Regulation:** Safety of chemical materials in insulation.

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6. Risk Mitigation Measures

1. **Design Measures:**
    - Use of high-quality, abrasion-resistant insulation materials that can withstand high temperatures.
    - Clear color coding to prevent connection errors.
2. **Labeling and Information:**
    - Detailed specifications and restrictions on the product and packaging.
    - User-friendly installation manual with warnings.
3. **Product Testing and Certification:**
    - Conducting load tests to confirm current carrying capacity and durability.
    - Certification according to relevant standards.
4. **Traceability:**

- Establishment of a system to identify each production batch.
- Customer hotline or digital platform for resolving technical questions.

5. **Lifecycle Monitoring:**
   - Market monitoring and regular evaluation based on user feedback.
   - Swift recall actions in case of safety issues.

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7. Recommendations for GPSR Compliance

1. **Development and Manufacturing:**
   - Use of high-quality materials and ensuring compliance with relevant standards.
   - Regular quality checks in production.
2. **Distribution:**
   - Clear and comprehensive information on product packaging and in online descriptions.
   - Availability of safety data sheets and technical specifications.
3. **Documentation:**
   - Prepare technical documents that demonstrate product safety and compliance.
   - Keep the documentation up-to-date and ensure regular reviews.
4. **Monitoring:**
   - Set up a system for monitoring product performance in the market.
   - Provide a communication platform for questions or complaints.

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