Risk Assessment for RAPEX

General Information

Product

Product name:	LED-lamp
Product category:	Lighting equipment
Description:	This is a PROSAFE risk assessment template for LED-lamps. It describes likely accident scenarios linked, partly, to non-conformities with the requirements set in the European harmonized standard EN 62560. Applicable clauses: §7 Protection against accidental contact with live parts §8 Insulation resistance and electric strength after humidity treatment §9 Mechanical strength §11 Resistance to heat §12 Resistance to flame and ignition of the plastic parts of the lamp §13 Fault conditions §14 Creepage distances and clearances between parts of different polarity. How to use: Users should select the scenario(s) that correspond to the non-compliances identified for the product under assessment. All other scenarios can then be deleted. Users should ensure that the steps are correct and that the injury level is appropriate. The probability assigned to each step should be determined according to the exact nature of the non-conformity concerned, as recorded in the test report. Disclaimer: The template has been developed by PROSAFE to help market surveillance officials to assess the risk(s) associated with the non-conformities of a particular product that has been checked and tested during a joint market surveillance action. The template is not authorized or endorsed in any way and is not binding on national market surveillance authorities. The content of the original template is subject to change without notice.

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Product risks - Overview

Scenario 1 :	**Risk to be determined** - The lamp breaks during operation in a way that energizes the accessible metal part(s) of the lamp (due to insufficient isolation between accessible parts and high voltage (230V) components). The user touches the lamp, gets an electric shock and is electrocuted.
Scenario 2 :	**Risk to be determined** - The user wants to replace the LED lamp. While unscrewing the lamp, the housing of the LED breaks and internal live parts become accessible. The user accidentally gets in touch with live parts and is electrocuted.
Scenario 3 :	**Risk to be determined** - The LED lamp overheats due to a failure in the electronics of the lamp. The plastic housing begins to melt and very hot material drips on some flammable material in the vincinity. The flamable material catches fire that causes lethal burns to the user.
Scenario 4 :	**Risk to be determined** - The user tries to replace a non-functioning LED lamp that installed in a high place. The LED lamp has broken in a way that exposes live parts. The user climbs up a stepladder to reach the luminaire. The used touches the LED lamp, gets an electric shock and is schocked. The user loses his balance and falls down. The user get fractures when hitting the floor.

Overall risk : **Risk to be determined**

Scenario 1 : Other consumers - High/low voltage

Product hazard

Hazard Group: Electrical energy
Hazard Type: High/low voltage

Consumer

Consumer Type: Other consumers - Consumers other than vulnerable or very vulnerable consumers

How the hazard causes an injury to the consumer

Injury scenario: The lamp breaks during operation in a way that energizes the accessible metal part(s) of the lamp (due to insufficient isolation between accessible parts and high voltage (230V) components). The user touches the lamp, gets an electric shock and is electrocuted.

Severity of Injury

Injury: Electric shock
Level: 4 Electrocution

Probability of the steps to injury

	Step(s) to Injury	Probability
Step 1:	Sometime during the lifetime of the LED lamp, a breakdown occurs between live and accessible metal parts due to too small creepage and clearance distances. (The probability depends upon the measured distance compared to the requirement of the standard.)	
Step 2:	The LED lamp breaks down in a way that energises the accessible metal parts permanently.	
Step 3:	The user notices that the lamp doesn't light and will replace it.	
Step 4:	The user doesn't switch off the luminaire before replacing the LED lamp.	
Step 5:	The user touches the accessible metal parts of the lamp with his hands when trying to unscrew the lamp from the luminaire.	
Step 6:	The yser is not electrically isolated from ground and is electrocuted. (Other outcomes of electric shocks are possible and should be considered.)	

Calculated probability: To be determined

Overall probability: To be determined

Risk of this scenario: Risk to be determined

Scenario 2 : Other consumers - High/low voltage

Product hazard

Hazard Group: Electrical energy
Hazard Type: High/low voltage

Consumer

Consumer Type: Other consumers - Consumers other than vulnerable or very vulnerable consumers

How the hazard causes an injury to the consumer

Injury scenario: The user wants to replace the LED lamp. While unscrewing the lamp, the housing of the LED breaks and internal live parts become accessible. The user accidentally gets in touch with live parts and is electrocuted.

Severity of Injury

Injury: Electric shock
Level: 4 Electrocution

Probability of the steps to injury

	Step(s) to Injury	Probability
Step 1:	The user wants to replace or remove the LED lamp from the luminaire.	
Step 2:	The user doesn't switch off the luminaire before touching the LED lamp.	
Step 3:	The quality of the LED lamp is low, so the housing breaks when user tries to unscrew the lamp from the lamp holder. This exposes live parts (e.g. solder joints, electronic components, internal wires).	
Step 4:	The user accidentally touches some of the accessible live parts.	
Step 5:	The user is not electrically isolated from ground and is electrocuted. (Other outcomes of electric shocks are possible and should be considered.)	

Calculated probability: To be determined
Overall probability: To be determined
Risk of this scenario: Risk to be determined

Scenario 3 : Other consumers - Overheating

Product hazard

Hazard Group: Fire and explosion
Hazard Type: Overheating

Consumer

Consumer Type: Other consumers - Consumers other than vulnerable or very vulnerable consumers

How the hazard causes an injury to the consumer

Injury scenario: The LED lamp overheats due to a failure in the electronics of the lamp. The plastic housing begins to melt and very hot material drips on some flammable material in the vincinity. The flamable material catches fire that causes lethal burns to the user.

Severity of Injury

Injury: Burn/ Scald (by heat, cold, or chemical substance)
Level: 4 2º or 3º, >35% of body surface Inhalation burn requiring respiratory assistance

Probability of the steps to injury

	Step(s) to Injury	Probability
Step 1:	A malfunction occurs in the electronic control gear of the LED lamp during its lifetime, for instance due to accumulation of dirt inside the lamp.	
Step 2:	The LED lamp overheats.	
Step 3:	The plastic housing begins to melt and very hot material will drip on flammable material beneath the lamp.	
Step 4:	The flammable material catches fire.	
Step 5:	The user (is probably asleep and) doesn't notice the fire immediately, so the fire spreads.	
Step 6:	The user will have serious burns. (Other injury severity levels are possible and should be considered.)	

Calculated probability: To be determined
Overall probability: To be determined
Risk of this scenario: Risk to be determined

Scenario 4 : Other consumers - High/low voltage

Product hazard

Hazard Group: Electrical energy
Hazard Type: High/low voltage

Consumer

Consumer Type: Other consumers - Consumers other than vulnerable or very vulnerable consumers

How the hazard causes an injury to the consumer

Injury scenario: The user tries to replace a non-functioning LED lamp that installed in a high place. The LED lamp has broken in a way that exposes live parts. The user climbs up a stepladder to reach the luminaire. The used touches the LED lamp, gets an electric shock and is schocked. The user loses his balance and falls down. The user get fractures when hitting the floor.

Severity of Injury

Injury: Fracture
Level: 3 Ankle Leg (femur and lower leg) Hip Thigh Skull Spine (minor compression fracture) Jaw (severe) Larynx Multiple rib fractures Blood or air in chest

Probability of the steps to injury

	Step(s) to Injury	Probability
Step 1:	The LED lamp breaks in that way that exposes live metal parts permanently or energises accessible metal parts.	
Step 2:	The user touches the accessible live part of the lamp with bare hands when unscrewing the LED lamp from the luminaire.	
Step 3:	The user gets a small electric shock and is schocked.	
Step 4:	The user loses his balance and falls down from the stepladder.	
Step 5:	The user gets fractures.	

Calculated probability: To be determined
Overall probability: To be determined
Risk of this scenario: Risk to be determined