

PAH Guideline for Electrical Products

1. Foreword

On 15th May 2019 the Committee for Product Safety (AfPS) implemented the updated specification “AfPS GS 2019:01 PAK” about testing and evaluation of polycyclic aromatic hydrocarbons (PAH) to be taken into account when granting the GS-Mark. The following guideline considers the changes in the mentioned specification and replaces the former PAH Guideline for electrical products EK1 601-15 Rev2.

The consequential requirements expected of manufacturers and GS test houses offer the necessary structuring leeway which, under given circumstances, allow differing product-specific valuations. Which products or product parts are actually PAH relevant and how should the endangering potential be individually assessed? Which product parts should be the object of a measurement and when is a risk assessment sufficient? This Guideline intends to provide orientation regarding these and similar questions.

The description of the procedure to establish the relevant products and product components is followed by an assessment guideline. Only at the end of this assessment are the materials established that have to be examined by way of measurements. Various examples from the electrical area elucidate the procedure. Explanations regarding documentation and monitoring measures complete the understanding of the PAH matter.

2. Establishing the relevant products and product components for PAH assessment

2.1. General

The deciding criteria for PAH limit value assessment is the intended use and the reasonably predictable misuse of ready-to-use products by the user. In this connection the man/product interface is the focus of consideration.

Typical products that must be assessed:

Personal computers, notebooks, workplace printers, PC keyboards, PC mouse, mobile audio devices, hair dryers, TV remote controls, coffee machines, display screens, pocket calculators, cable reels, portable table-top sockets, ...

Typical products that are **not assessed**:

Server and IT-rack components (e.g. uninterruptible power supplies, current distribution systems ...), devices in IT rooms (e.g. bulk storage units, network products ...), industrial low-voltage switchgear, etc.

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The probability of contact and the size of the contact area are of essential importance by the risk assessment (*Examples in sections 2.2, 2.3 and 2.4.*).

2.2. Functional handling and actuation surfaces

Handling and actuation surfaces that must be touched by the user when the product is used for its intended purpose must always be assessed. The frequency and duration of contact, as well as the size of the contact area, must be taken into account when classifying the components (categories according to AfPS GS 2019:01 PAK, table 1).

Typical examples of handling/actuation surfaces that come under Category 2 (contact time >30 sec. or repeated short term skin contact):

Holding and carrying handles of mobile devices, key caps and housings of keyboards and PC input units, holding devices on domestic appliances, remote controls.

Typical examples of handling/actuation surfaces that come under Category 3 (<30 sec.):

Main switches on appliances such as coffee machines, workplace printers, personal computers.

2.3. Interpretation of the Phrase “repeated short term skin contact”

Materials grouped in category 2 can in addition to long term skin contact also be used under repeated short term skin contact conditions. Repeated short term contact is interpreted as “logic, timewise separated and repeated sequence of contacts during one use cycle of the product”

2.4. Other surfaces that can be touched

Products and components that are installed maintained and extended (e.g. PC memory upgrades) by specialist personnel do **not** have to be considered.

When assessing other surfaces that can be touched it will be necessary to consider the danger potential for the final user resulting from the frequency and duration of possible contact and the size of the contact area.

2.4.1 The danger potential is minimal for surfaces which, after installation and right up to dismantling, **can no longer be touched - or typically are no longer touched - by the user**. Consequently, such surfaces must be excluded in their entirety from an assessment.

Examples:

Undersides and feet of such devices as washing machines, TVs, workplace printers, PCs, coffee machines.

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Undersides and rear sides of devices that are to be built in (e.g. refrigerators, cookers...).

Power cables or the rear side of devices of stationary equipment which are normally set up once at a permanent location, e.g. refrigerators, cookers, washing machines, wall-mounted display screens.

2.4.2 Surfaces that are **temporarily touched** after installation basically must be assessed and they usually come under Category 3 (according to AfPS GS 2019:01 PAK Table 1).

Examples:

Housings of stationary devices (e.g. shredders, coffee machines), mains cables, external AC/DC adapters, chargers for portable units (e.g. notebooks)

2.4.3 Surfaces of products which are **rarely touched by the user, or only briefly during maintenance and upgrading work**, have a very low danger potential and are therefore excluded from the assessment.

Examples:

Battery compartments, parts of lamps that are only touched when bulbs have to be exchanged...

2.4.4 Surfaces of products and accessories **which, in the course of intended use, are continuously touched or where constant contact cannot be avoided** come under assessment Category 2 (according to AfPS GS 2014:01 PAK Table 1).

Examples:

Ear plugs of headphones, PC mouse wheel, cases of portable/mobile devices (e.g. notebook, camera)...

2.5. Internal components

Components that are inaccessible inside a product, and only become accessible when tools are used or as a result of destruction, are exempted from assessment (see AfPS GS 2019:01 PAK, Part 3.1). This also applies to internal components that are rarely and only briefly contacted in the course of maintenance or upgrading work by the user. These have a very low danger potential and are excluded from the assessment.

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Examples:

Internal parts (like pc-boards and electronic components, cables and other internal materials), of household appliances and tools as well as of devices of the information technology, consumables (e.g. printer cartridge).

If there is a sound suspicion of a PAH fault (e.g. intense smell of mothballs or burnt rubber), then exceptions regarding non-assessment can be made. In such cases the limit value according to Category 3 should be applied.

2.6. Materials that come into contact with food

For components which, in the course of intended use, come into contact with food the German Food and Feed Code (LFGB) applies and not the Document AfPS GS 2019:01 PAK.

It has to be considered that this exception applies only for the single material, component or module and not for the product as a whole. Materials and components of a product not covered by the LFGB have to be evaluated according to the requirements of the PAH document.

Examples:

Water conducting parts of a coffee machine are subject to the LFGB and therefore excluded from the practice of the PAH document. Handhold surfaces of the coffee machine however have to be evaluated according to the requirements of the PAH document further on.

3. 3 PAH assessment of relevant product materials

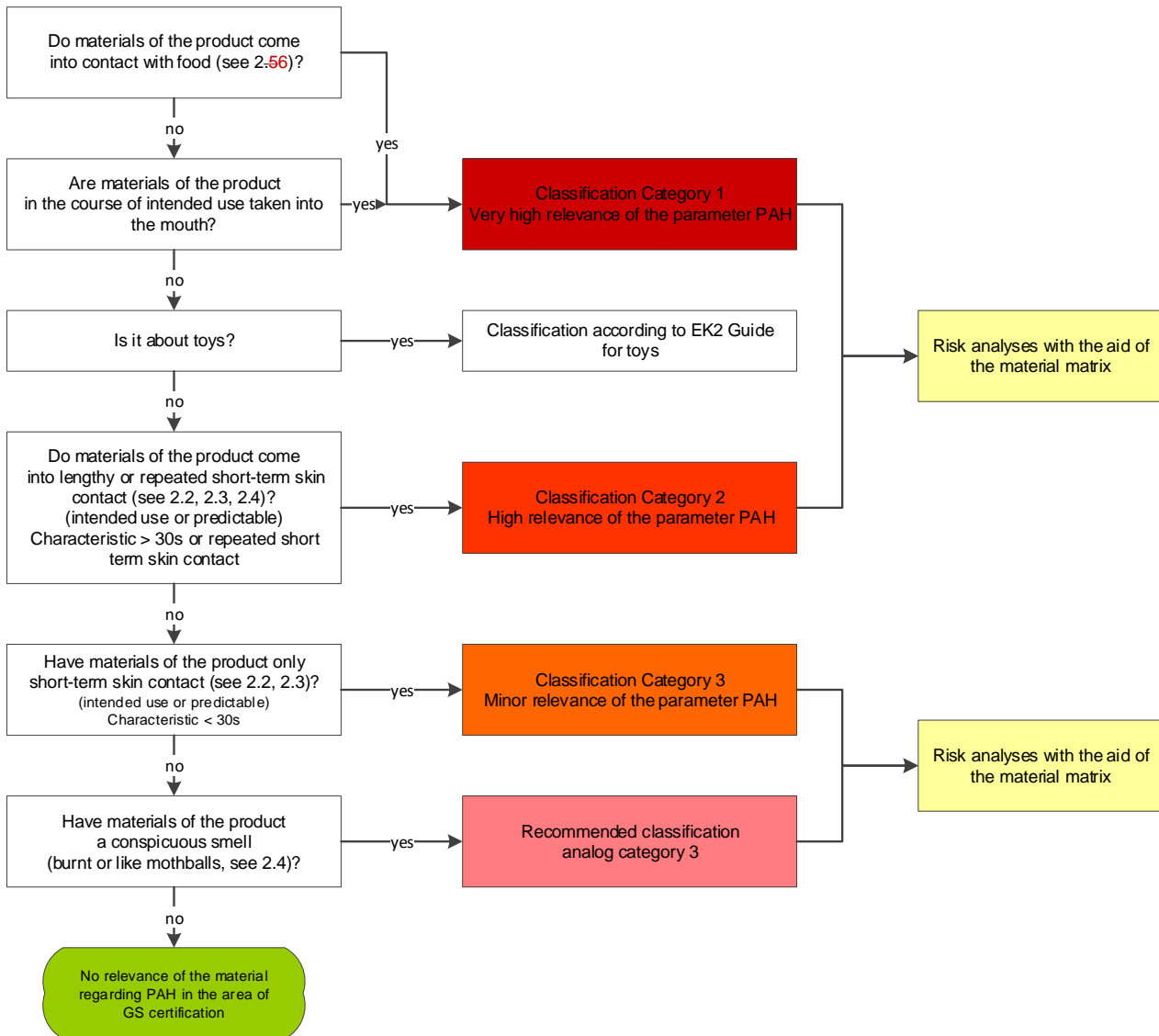
3.1. Classifying product components and materials according to categories

Product components and materials are classified according to the subsequent order of decisions. Classifications identified with it can be upgraded or degraded in exceptional case consideration dependent on the expected effective hazard.

For Categories 2 and 3, classification in the subcategory "Use by children" only applies for those products for which the manufacturer has intended the essential use by children under 14 years of age.

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Order of decisions: Classification of materials in categories



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3.2. Classifying materials by the probability of PAH occurrence (material matrix)

The following table lists the customary materials and the recommendation to consider the PAH parameter within the framework of GS certification.

Table: PAH – Material matrix (classification of materials)

Material		PAH-Proof necessary
Vulcanised rubber	all colours	yes
Flexible plastic materials, silicone, synthetic leather	all colours	yes
Hard plastics	dark or black shade	yes
	pale shades, transparent	no
Varnish / paint coats / coatings	dark or black shade	yes
	pale shades, transparent	no
Natural materials like bast, parts of plants	without significant smell	no
	significant smell of naphthalene (mothball smell)	yes
Wood (natural and glued)	without significant smell	no
	significant smell of naphthalene (mothball smell)	yes
Textile materials	without significant smell	no
	significant smell of naphthalene (mothball smell)	yes
Leather	dark or black shade	yes
	pale shades	no
Paper /carton glued (material homogeneous)	-	no
Paper (e.g. labels; print insignificant)	-	no
Glass, clay, ceramics, porcelain, enamel	-	no
Metal (not varnished)	-	no

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4. Recognition of the PAH test results

The measurements must be carried out according to the requirements defined in document AfPS GS 2019:01 PAH "Prüfung und Bewertung von Polyzyklischen Aromatischen Kohlenwasserstoffen (PAK) bei der Zuerkennung des GS-Zeichens".

Test reports based on the above test principles can be accepted by various bodies, among them:

- GS test houses
- CTF Stage 1 laboratory (Customers' Testing Facility)
- Subcontracted laboratories with ISO 17025 accreditation
- Recognized manufacturer's laboratory with ISO 17025 accreditation or corresponding validation by an appointed body

The requirements of the relevant principle decisions must be observed.

In the event that the accepting body has doubts about the test results, then it is free to conduct renewed tests. The accepting body determines the extent of the test.

5. Documentation of the assessment results

The GS-body should gain information about the manufacturer in conformity with Attachment 1 as the basis for the PAH assessment.

The tested materials must be clearly described and assignable in the test report. It must therefore be possible to identify and recognize them on the basis of the given test report when they are used in other products.

The GS-body documents its own PAH assessment in the appropriate manner, e.g. as shown in Attachment 2. It must be listed in the test report as an attachment that is likewise valid.

6. Procedure while monitoring

The general procedure to monitor PAH requirements is identical with the procedure to conduct goods control checks defined in the principle decision ZEK-GB-2017-01 rev.1.

Annex 2: Information from GS test center

Material list for PAH risk assessment; Only materials accessible without tools or having foreseeable contact with food shall be listed.

Material #	Location / Function of the material	Name / Description of the material	Evidence attached. Institute, report no., date	Category	Smell	Rigidity	Colour	Correction of data by test center? 1)	Chem. test needed?	Test result	Attachement
1				<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Soft <input type="checkbox"/> Flexible <input type="checkbox"/> Rigid	<input type="checkbox"/> Black or dark-colored <input type="checkbox"/> White or light-colored	<input type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/> passed <input type="checkbox"/> failed	
2				<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Soft <input type="checkbox"/> Flexible <input type="checkbox"/> Rigid	<input type="checkbox"/> Black or dark-colored <input type="checkbox"/> White or light-colored	<input type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/> passed <input type="checkbox"/> failed	
3				<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Soft <input type="checkbox"/> Flexible <input type="checkbox"/> Rigid	<input type="checkbox"/> Black or dark-colored <input type="checkbox"/> White or light-colored	<input type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/> passed <input type="checkbox"/> failed	
4				<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Soft <input type="checkbox"/> Flexible <input type="checkbox"/> Rigid	<input type="checkbox"/> Black or dark-colored <input type="checkbox"/> White or light-colored	<input type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/> passed <input type="checkbox"/> failed	
5				<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Soft <input type="checkbox"/> Flexible <input type="checkbox"/> Rigid	<input type="checkbox"/> Black or dark-colored <input type="checkbox"/> White or light-colored	<input type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/> passed <input type="checkbox"/> failed	
4				<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Soft <input type="checkbox"/> Flexible <input type="checkbox"/> Rigid	<input type="checkbox"/> Black or dark-colored <input type="checkbox"/> White or light-colored	<input type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/> passed <input type="checkbox"/> failed	
5				<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Soft <input type="checkbox"/> Flexible <input type="checkbox"/> Rigid	<input type="checkbox"/> Black or dark-colored <input type="checkbox"/> White or light-colored	<input type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/> passed <input type="checkbox"/> failed	

1) Applicant data from Annex 1

Assessed by *name*

Place _____, Date _____

(Test engineers signature)