Standard for the award of Recycled Material Verified Mark

1. Foreword

Standard for the award of Recycled Material Verified Mark is drafted in accordance with the provisions of TUV Rheinland 2 PfG program policy.

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2. Introduction

Amid the global transition towards a circular economy and driven by policies such as the EU Ecodesign for Sustainable Products Regulation (ESPR), resource circularity across the entire product lifecycle has become a key focus for the electronics and electrical manufacturing industry. While many sustainability certifications currently available focus primarily on carbon footprint, energy efficiency, or individual materials, the Recycled Material Verified certification provides systematic conformation of the actual recycled material content, source traceability, and performance in finished products.

TÜV Rheinland introduced the Recycled Material Verified certification service with the aim of encouraging both the demand for and supply of products with a lower environmental impact and unlocking the potential for demand-driven, continuous environmental improvement.

Recycled Material Verified certification has been developed in accordance with ISO/IEC 17067 Conformity assessment – Fundamentals of product certification and guidelines for product certification schemes. Certification activities under Recycled Material Verified scheme shall be performed in accordance with ISO/IEC 17065 Conformity assessment – Requirements for bodies certifying products, processes and services.

This document is intended to convey clear and unambiguous requirements to be fulfilled for products to be awarded with Recycled Material Verified Mark.

3. Scope

This document lays out the requirements of Recycled Material Verified certification for Electrical and Electronic Products made from recycled materials such plastic, metal, paper, fabric, glass, magnet, etc. It applies to the Electrical and Electronic product sub-categories and product types listed in Annex A. The minimum thresholds for recycled content in this annex were determined in collaboration with the respective standard technical committee and actual industrial production practices.

TÜV Rheinland has evaluated this product and its production to determine how much recycled material is contained in the finished product. Additionally, the type of recycled material is linked to the percentage. This assessment considers both the "pre-consumer" portion of recycling (during manufacturing) and the "post-consumer" portion (at disposal).

TÜV Rheinland has defined a catalogue of testing, audit and documentation, which establishes the minimum standards for certification. The certified recycled materials' specifications shall be checked. The catalogue of audit is reference with ISO 22095 Chain of custody – General terminology and models, for entities to quantify the recycled content of their products and/or materials using either a physical segregation chain of custody model or a mass balance chain of custody model.

4. Normative references

The following documents, in whole or in part, are normatively referenced in this standard and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

- ISO 14001, Environmental management systems – Requirements with guidance for use
- ISO 9001, Quality management systems – Requirements
- ISO 14020, Environmental statements and programs for products – Principles and general requirements
- ISO/IEC 17065, Conformity assessment – Requirements for bodies certifying products, processes and services
- ISO/IEC 17067, Conformity assessment – Fundamentals of product certification and guidelines for product certification schemes
- ISO 22095, Chain of custody – General terminology and models.

5. Standard update and handling

The standard confirms the latest compliance requirements met only when all referred standards/regulations are still valid. The normative compliance standard/regulation indicated in this document shall be reviewed every 3 years.

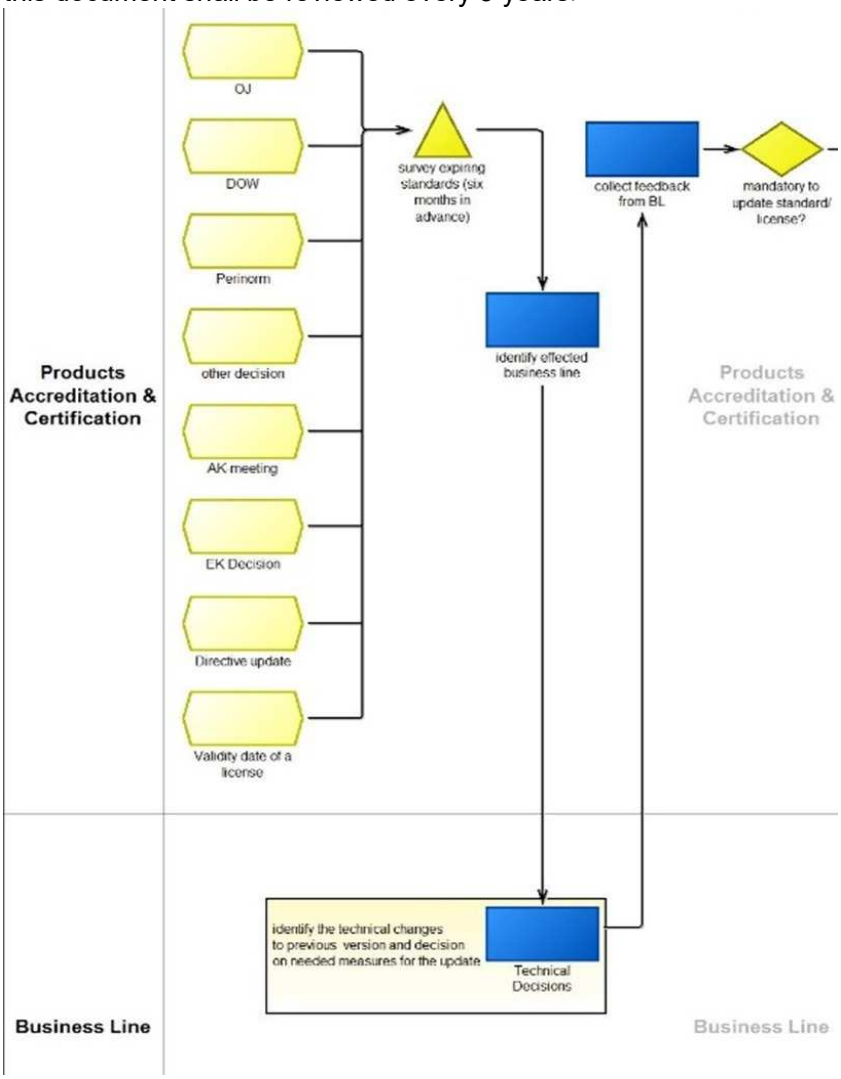

Figure 1. Process flow chart Standard update

This standard will also be regularly reviewed and updated every year to ensure that the standards continue to reflect product science and changes in industry.
The actual situation of product and material supply chains is a fundamental and crucial part. Every link in the supply chain, from the procurement of raw materials, processing, transportation to the assembly and delivery of the final products, directly affects the usage and quality of product materials.
As an internationally renowned testing and certification organization, TÜV Rheinland's projects cover a wide range of industries and product types. Through these projects, TÜV Rheinland has accumulated a large amount of practical data. This data not only helps companies understand the actual usage of their product materials but also provides references for the formulation and updating of industry standards.

6. Terms and definitions

To this standard, the following terms and definitions apply.

Audit
Third-party evaluation conducted by an approved certification body against this Standard. An audit includes the review of documents and records (e.g., procedures, BOM, conversion factor, etc.), interviews and observations.

Bill of Materials (BOM)
A list of the raw materials, sub-components, components, parts, and quantities of each needed, to manufacture a final product.

Chain of Custody
The process by which inputs and outputs and associated information are transferred, monitored, and controlled as they move through each step in the relevant supply chain.

Mass Balance
A chain of custody model in which materials or products with a set of specified characteristics are mixed with materials or products without that set of characteristics. Mass balance can be implemented using a percentage method or a credit allocation method.

Physical Segregation.
A chain of custody model in which raw materials with different origins or characteristics are kept physically separate during all operations.

Recycled content
Proportion, by mass, of recycled material in a product or packaging. Only pre-consumer and post-consumer materials shall be considered as recycled content, consistent with the following usage of terms.

Recycled material
Material that has been reprocessed from recovered [reclaimed] material by means of a manufacturing process and made into a final product or into a component for incorporation into a final product.

Post-Consumer material
Material generated by households or by commercial, industrial, and institutional facilities in their role as end-users of the product that can no longer be used for its intended purpose. This includes returns of materials from the distribution chain.
Note: To be considered post-consumer, any material returned from the distribution chain must come from end-users.

Pre-Consumer material (post-industrial waste)
Material diverted from the waste stream during the manufacturing process. Excluded is the reutilization of materials such as rework, regrind or scrap generated in a process and capable of being reclaimed within the same process that generated it.

7. Prerequisites

7.1 Legislative/regulatory requirements

Compliance shall be maintained with legal - safety requirements (generally accepted rules of engineering), essential usability requirements, and other requirements.

The applicant shall provide the certificate of national safety approval. The certificate shall not expire.

7.2 Environmental compliance

All production facilities shall ensure compliance with the applicable national and local legal environmental law and regulations applicable to their processing/manufacturing stage.

The applicant shall provide the valid certificate or related documents to prove compliance with the applicable national and local legal environmental law. A valid ISO 14001 certificate is acceptable. The certificate shall not expire.

7.3 Restriction of hazardous substances

The final product shall not contain hazardous substances based on REACH, RoHS and POP regulation at or above the specified concentration limits or according to the specified restrictions.

Controlling and monitoring the chemical usage in production is covered by auditing process.

Biocide finishes used to give biocidal properties to the final products shall not be incorporated into fibers, fabrics or the final product.
Examples on biocidal treatment include triclosan, nano- silver, zinc organic compounds, tin organic compounds, dichlorophenyl(ester) compounds, benzimidazol derivatives and isothiazolinones.

The applicant shall provide test reports issued by TÜV Rheinland, or by a laboratory accredited by one of ILAC MRA signatories according to ISO/IEC 17025 and holding accreditation scope that cover the standards relevant to regulatory.

The chemical test report must identify the product and/or materials and comply with substance scope and reporting limits set out in.

Testing reports are deemed valid for a period of 12 months from date of test sample submission up to the date of review.

7.4 Product function characteristics

Attribute or characteristics in the performance and use of a product, which suitable for mass production.
The major features of the Recycled Material Verified Product as claimed by the manufacturer shall be confirmed for the feasibility.
The applicant shall provide the test report or related proof documents and TÜV Rheinland carries out an assessment report of these documents.

8. Recycled material content

8.1 Management Systems & Documentation

The applicant shall establish and maintain an effective quality and production management system.

8.1.1 For quality management system, valid certification can be considered, e.g. ISO 9001.

8.1.2 The applicant shall have specifications of recycled material used in product.

The specification shall at least include type of recycled material; the percentage of recycled material used in the article.

The specification can be design documents or a bill of materials (BOM) or other comparable documents.

8.1.3 For production management system,

8.1.3.1 The applicant shall establish and maintain procedure for recycled material management. The procedure shall demonstrate the traceability of recycled material used in product.

The applicant shall meet the requirements for a physical segregation chain of custody model for all inputs and outputs within its operations

8.1.3.2 The applicant shall establish and maintain procedure for production, which covers all processes involving recycled material.

The procedure shall include manufacturing process flowchart or description; production records from source material to final product.

8.1.3.3 The applicant shall establish and maintain procedure for procurement of recycled material and or article/component contains recycled material.

The procedure shall include supplier information; material supplied; source of material; records including invoices, delivery receipts, supplier affidavits or sustainability declarations and production records; audit reports, certificates, and corrective action plans, etc.

8.1.4 The applicant shall maintain a documented mass balance procedure.

For each product under review, the applicant shall maintain production totals for the data review period including the total amount, by dry weight, of product coming off the manufacturing line, including any waste from trimming or finishing, defective products, and all non-saleable material.

The applicant shall maintain inventory records of the amount and types of recycled materials used in the product for the data review period.

8.2 Measuring

Recycled content is proportion, by mass, of recycled material in a product.

Calculation of the percentages based on the article weight as follow,

$X (\%) = \Sigma A_n / P \times 100$

Where, X is the recycled content, expressed as a percentage
A is the mass of recycled material or specific type recycled material
n is each recycled material article
P is the mass of ***product***

The product and the article used recycled material shall be selected from production line and/or warehouse.

Here the identification or scope of ***product*** can be defined by client. Or for the manufacturing product, “P” will be regarded and calculated on basic of selling unit package.

8.3 On-Site Audit

8.3.1 The applicant shall meet the requirements for a physical segregation chain of custody model for all inputs and outputs within its operations

A physical segregation chain of custody model ensures materials with different origins or characteristics are kept physically separate during all operations.

8.3.1.1 The applicant shall maintain a documented procedure for segregating and clearly identifying recycled material from virgin material to ensure there is no co-mingling of materials when in the custody of the applicant.
The applicant shall at least have labelling and storage method of recycled material.

8.3.1.2 The applicant shall maintain a documented procedure for segregating and clearly identifying conformant and non-conformant product to ensure there is no co-mingling of non-conformant product with conformant product in the production stages.
The applicant shall at least have procedure of recycled material retrieval and transfer, manufacturing process flowchart or description for reference.

Under a controlled blending model, recycled and virgin material with different characteristics may be combined or blended in the manufacturing process stage to create a product with partial recycled content.

8.4 Conformity

To achieve certification, the product shall meet the product-level thresholds listed in Annex A.

Due to actual industrial production practices, and limitation to functionality, performance, and/or regulatory criteria, material-level thresholds can be considered.

	Options for Conformance	
Type of Threshold	**Option 1**	**Option 2**
Material-Level Threshold:	The product shall meet the material-level thresholds listed in **Metal type-1** and/or **Plastic type-1** and/or **Other type**	The product[1] shall meet the material-level thresholds listed in **Metal type-1** and/or **Plastic type-2** and/or **Other type**
Threshold for Number of Recycled Materials in the product:	≥ 3	1 recycled material and, Total Mass of recycled material article/ Total Mass of the Final Product* ≥ 20%
Product-Level Threshold:	Min. 50% of the product-level thresholds listed in Annex A.	The product-level thresholds listed in Annex A are not required.

Remark:

[1] It is only applicable to products such as Dongle, Hub, Streaming Device, Earbuds, Smartphones, Tablets, Wearable electronics, Smart Display, Mobile Laptop, Laptop Notebook, Lamps, Camera and Kitchen Appliances.

* Total weight does not include the weight of exempted materials,

Examples of allowable exemptions may include:

- The material cannot be traced (e.g., copper in printed circuit boards); or
- Virgin material is required for regulatory reasons, such as for food contact materials.

Metal type-1

Material Input	Minimum % Recycled Content (Pre-/Post-Consumer)
Aluminum	30
Rare Earths metal	15
Steel	20

Plastic type-1

Material Input	Minimum % Recycled Content (Pre-/Post-Consumer)
Polyethylene (PE)	30
Polyethylene Terephthalate (PET)	30
Polycarbonate (PC)	30
Carbon Fiber	30
Polypropylene (PP)	30
ABS; PC/ABS; PET/PA	30
Other (includes, but not limited to PA6, PA66, HIPS, SAN, POM, PBT, PETG)	25

Plastic type-2

Material Input	Minimum % Recycled Content (Pre-/Post-Consumer)
Polyethylene (PE)	50
Polyethylene Terephthalate (PET)	50
Polycarbonate (PC)	50
Polypropylene (PP)	50
ABS; PC/ABS; PET/PA	50
Other (includes, but not limited to PA6, PA66, HIPS, SAN, POM, PBT, PETG)	30

Other type

Material Input	Minimum % Recycled Content (Pre-/Post-Consumer)
Fabric	80
Glass	30

9. Certificate

All products which demonstrate compliance with the requirements of these standards are entitled to be awarded certificate.

The keyword “Recycled Material Verified” confirms that the product meets TÜV Rheinland's requirements.

The certificate is valid for 3 years. The period of validity is shown on the certificate.

10. Surveillance

Surveillance activities comprise a catalogue of testing, audit and document review which define in clause 8.1 to 8.3. These activities focus on checking if the manufactured products continue to fulfil the specified requirements after the initial certification.

The applicant shall have the procedure and monitor the recycled materials used in finished products are continuously not changed, including specification, supplier and manufacturing.

The applicant shall solve the nonconformities in initial certification by undertaking corrective actions.

The applicant shall maintain documented yearly mass balance data for review, including the total amount, by dry weight, of product coming off the manufacturing line, including any waste from trimming or finishing, defective products, all non-saleable material and inventory records.

All products which demonstrate compliance with the surveillance requirements of these standards are entitled to use the certification continuously.

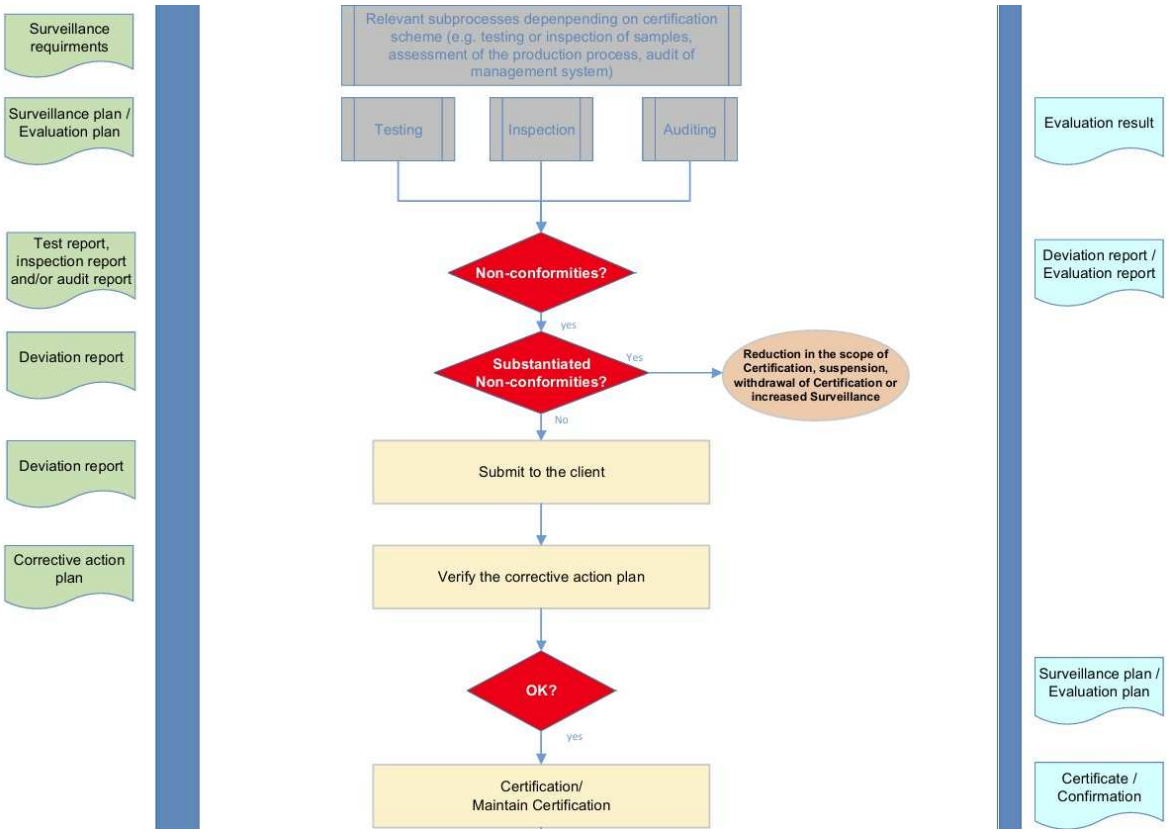

Figure 2. Process flow chart of certificate decision with surveillance.

11. Expiry of the certificate

In the event that the surveillance according to section 10 has not been completed before expiry of the validity period, the right to use the certificate, test mark and keyword expires without the necessity for explicit notification from TÜV Rheinland.

Furthermore, the certificate can also expire if:
– test mark and keywords are misused by the certificate holder,
– the requirements laid down in the certification scheme or its accompanying documents are not fulfilled,
– the certification fees are not paid on the due date
– the prerequisites for the issuing of the certificate are no longer fulfilled

12. Appeals

A client has the right to appeal a certification decision within 30 days of receiving the audit report for non-compliance and certification expiration. Appeals shall be submitted to TÜV Rheinland for evaluation and resolution.

Annex A

Thresholds for recycled content by sub-category and product type

Product Type	**Threshold % (minimum recycled content threshold of a product)**
Keyboard, Mouse, Dongle, Hub, Streaming Device	50%
All other electronics	50%
Uncorded speakers, Earbuds, Smartphones, Tablets, Wearable electronics, Headset, Smart Display	30%
Printer, Scanner	25%
Heater	25%
Storage, Server	20%
Corded speaker, Desktop, Mobile Laptop, Laptop Notebook, Power Supplies (chargers), Webcam	15%
Coffee Machine	15%
Smart Plug, Smart Switch/Breaker	15%
Wi-Fi Router	15%
PC Display/Monitor	15%
Table light/Lamps	15%
Gaming console, Gaming controller, Gaming device	10%
Camera	10%
Dehumidifiers	10%
TV	10%
All other kitchen and household appliances	10%
Power tools, Garden tools, Electrical lawn mover	10%
Batteries	10%
Accessories	10%