BLUE ANGEL

The German Ecolabel

Roofing tiles and fittings

DE-UZ 227

Basic Award Criteria

Edition January 2023

Version 1

The Environmental Label is supported by the following four institutions:

Federal Ministry
for the Environment, Nature Conservation,
Nuclear Safety and Consumer Protection

The Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection is the owner of the label. It regularly provides information on the decisions taken by the Environmental Label Jury.

Umwelt Bundesamt

The German Environmental Agency with its specialist department for "Ecodesign, Eco-Labelling and Environmentally friendly Procurement" acts as office of the Environmental Label Jury and develops the technical criteria of the Basic Criteria for Award of the Blue Angel.

Jury Umweltzeichen

The Environmental Label Jury is the independent, decision-making body for the Blue Angel and includes representatives from environmental and consumer associations, trade unions, industry, the trade, crafts, local authorities, academia, the media, churches, young people and the German federal states.

RAL gGmbH

The RAL gGmbH is the awarding body for the Environmental Label. It organises the process for developing the relevant award criteria in independent expert hearings – which involve all relevant interest groups.

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This document is a translation of a German original. In case of dispute, the original document should be taken as authoritative.

1 Introduction

1.1 Preface

In cooperation with the Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection, the German Environmental Agency and considering the results of the expert hearings conducted by RAL gGmbH, the Environmental Label Jury has set up these Basic Criteria for the Award of the Environmental Label. RAL gGmbH has been tasked with awarding the Environmental Label.
Upon application to RAL gGmbH and on the basis of a Contract on the Use of the Environmental Label to be concluded with RAL gGmbH, the permission to use the Environmental Label may be granted to all products, provided that they comply with the requirements as specified hereinafter.
The product must comply with all the legal requirements in the country in which it is to be marketed. The applicant shall declare that the product meets this requirement.

1.2 Background

Roofing tiles and fittings (in short: roofing tiles) are installed over large areas and come into contact with rain water. It is important to minimise the release of pollutants from these products during their use in order to reduce their environmental impact within the natural water cycle. These Basic Award Criteria include a surface leaching test to evaluate the release of pollutants from roofing tiles.
Due to the high number of roofing tiles used every year in both new buildings and renovation projects, it is important that the products are manufactured and transported using climate friendly solutions. These Basic Award Criteria promote solutions that comply with a strict life cycle assessment benchmark for greenhouse gas emissions.

1.3 Objectives of the Environmental Label

This environmental label may be awarded to products that – above and beyond the legal regulations:

- are manufactured using materials and consumables that place less burden on the environment than usual,
- are durable and reusable or recyclable,
- are safe for the environment from an ecotoxicological perspective and
- do not contain any harmful substances that have a detrimental impact during the recycling or disposal process,
- have particularly low emissions of greenhouse gases during the manufacturing and transportation processes and the manufacturer offsets their non-avoidable and non-reducible greenhouse gas emissions.

Therefore, following benefits for the environment and health are stated in the explanatory box:

2 Scope

These Basic Award Criteria are valid for products produced according to the DIN EN 490 standard "Concrete roofing tiles and fittings for roof covering and wall cladding - Product specifications" for which a declaration of performance according to Regulation (EU) No. 305/2011 has been issued.

3 Requirements

3.1 Requirements for constituent components

Constituent components are substances added to the product as such or as part of a mixture in order to achieve or influence certain product properties and those required as chemical cleavage products for achieving the product properties. This does not apply to residual monomers that have been reduced to a minimum. Above and beyond the legal requirements, products certified with the Blue Angel may not contain any substances with the following properties as constituent components:

1. Substances which are identified in the REACH Regulation (EC) No. 1907/2006
- as particularly alarming and which have been incorporated into the list drawn up in accordance with Article 59, Paragraph 1 of the REACH Regulation (so-called "list of candidates") or
- which are classified as persistent, bioaccumulative and toxic (PBT) substances or as very persistent and very bioaccumulative (vPvB) substances.

2. Substances that according to the CLP Regulation have been classified in the following hazard categories or which meet the criteria for such classification:
- carcinogenic in categories Carc. 1A or Carc. 1B;
- germ cell mutagenic in categories Muta. 1A or Muta. 1B;
- reprotoxic (teratogenic) in categories Repr. 1A or Repr. 1B;
- acute toxicity (poisonous) in categories Acute Tox. 1 or Acute Tox. 2;
- specific target organ toxicity in categories STOT SE 1 or STOT RE 1;
- hazardous to water in category Aquatic Chronic 1 or
- hazardous to the ozone layer in category Ozone 1.

The following table assigns the stated hazard categories to the corresponding hazard statements (H Phrases) according to the CLP Regulation (EC) No. 1272/2008.

Table 1: Hazard categories, H Phrases and assigned hazard statements

Hazard categories	H Phrases	Hazard statements
Carcinogenic substances		
Carc. 1A	H350	May cause cancer
Carc. 1B	H350	May cause cancer
Carc. 1A, 1B	H350i	May cause cancer if inhaled
Germ cell mutagenic substances		
Muta. 1A	H340	May cause genetic defects
Muta. 1B	H340	May cause genetic defects
Reprotoxic (teratogenic) substances		
Repr. 1A, 1B	H360D	May damage the unborn child
Repr. 1A, 1B	H360F	May damage fertility
Repr. 1A, 1B	H360FD	May damage fertility May damage the unborn child
Repr. 1A, 1B	H360Df	May damage the unborn child Suspected of damaging fertility
Repr. 1A, 1B	H360Fd	May damage fertility Suspected of damaging the unborn child
Acute toxicity substances		
Acute Tox. 1 Acute Tox. 2	H300	Fatal if swallowed
Acute Tox. 1 Acute Tox. 2	H310	Fatal in contact with skin
Acute Tox. 1 Acute Tox. 2	H330	Fatal if inhaled
Substances with specific target organ toxicity		
STOT SE. 1	H370	Causes damage to organs
STOT RE. 1	H372	Causes damage to organs through prolonged or repeated exposure
Environmental hazards		
Aquatic Chronic 1	H410	Very toxic to aquatic life with long-lasting effects
Ozone 1	H420	Harms public health and the environment by destroying ozone in the upper atmosphere.

3. Substances that are classified in TRGS 905 as:
- Carcinogenic (K1A, K1B)
- Germ cell mutagenic (M1A, M1B)
- Reprotoxic (R_F1A, R_F1B)
- Teratogenic (R_D1A, R_D1B)

Compliance verification

The applicant shall declare compliance with the requirements in Annex 1 and submit corresponding declarations from the manufacturer/suppliers (Annex 3), technical data sheets and safety data sheets for all of the primary products and auxiliary substances used. If the term of validity of the Basic Award Criteria is extended, new declarations from the manufacturer and suppliers shall be submitted.

3.2 Flame retardants

If flame retardants are used, they must be named by the applicant (name, CAS no). No organic flame retardants may be used.

Compliance verification

The applicant shall declare compliance with the requirement in Annex 1. The applicant shall declare whether a flame retardant has been added to the product. If this is the case, the applicant shall enclose the name, CAS number and classification of the flame retardant with the application.

3.3 Prohibited substances in roofing tiles

3.3.1 Halogens

No halogenated organic compounds may be used in the manufacture of the products.

3.3.2 Biocides and herbicides

The use of biocidal film preservatives according to Regulation (EU) No. 528/2012 and herbicides in the sense of Regulation (EG) No. 1107/2009 in dyes and coatings used on the roofing tiles is prohibited. As an exception to the requirements in 3.1 and 3.3.1, however, substances (active substances or biocides) for which an active substance dossier for preservatives for products during storage (product-type 6) according to the Biocidal Product Regulation (BPR, Regulation (EU) 528/2012) has been submitted or which are listed in Appendix A may be used in the dyes/coatings as preservatives. If an application for the inclusion of a substance on the list of approved substances for product type 6 has been rejected, the use of this substance is not permitted.

3.3.3 Pigments

Pigments containing lead compounds may not be added.

3.3.4 Organotin compounds

The use of organotin compounds is not permitted.

Compliance verification for Paragraph 3.3

The applicant shall declare compliance with the requirement in Annex 1 and submit the safety data sheet for the dye/coating used on the product. If preservatives are used, the applicant shall also submit their concentrations and an up-to-date screenshot from the ECHA database for the approval of biocidal products (https://echa.europa.eu/de/information-on-chemicals/biocidal-active-substances). The screenshot must demonstrate that the preservative used has already been approved under PT6 or is still being evaluated.

3.4 Ecotoxicity

A laboratory sample of the product is required for testing its ecotoxicity in an eluate. In addition to any standard permeable packaging, this sample should be supplied in a hermetically sealed packaging. Two test specimens (each measuring between 250 and about 500 cm^2) must be produced from the laboratory sample and then eluted in accordance with CEN/TS 16637-2[1] for 24 hours. The leaching test must be carried out at a ratio of water volume to surface area of the test specimen (L/A) of 25 l/m². The dimensions of the test specimen must be adjusted so that the height of the water in the test vessel is at least 20 mm above the surface of the test specimen at this L/A ratio and a sufficient volume of eluate is produced for the required ecotoxicity tests (including a blind test).
The ecotoxicity of the eluate must be tested in accordance with CEN/TS 17459[2] or CEN/TR 17105[3] (mixture of the first two eluates produced according to CEN/TS 16637-2 from the two test specimens). The eluate must comply with the criteria in the following table.

Table 2: Criteria for evaluating the exotoxicity of the eluates

Test species	**Test standard**	**Endpoint**	**Criterion**
Luminescent bacteria (*Vibrio fischeri*)	EN ISO 11348-1[4]	Light	$LID_L \leq 8$
Algae (*Raphidocelis subcapitata* / Desmodesmus subspicatus)	EN ISO 8692[5]	Growth	$LID_A \leq 4$
Crustaceans (*Daphnia magna*)	EN ISO 6341[6]	Mobility	$LID_D \leq 4$
umu test	ISO 13829[7]	Genotoxicity	$LID_{EU} \leq 1.5$

Compliance verification

The applicant shall submit a test certificate that verifies compliance with the criteria. The testing laboratory must have implemented a quality assurance system according to DIN EN ISO/IEC 17025 "General requirements for the competence of testing and calibration laboratories" or a comparable standard (e.g. GLP) and confirm that this is the case in the test report. If the term of validity of the Basic Award Criteria is extended, a new test certificate must be submitted.

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1 DIN CEN/TS 16637-2 Construction products - Assessment of release of dangerous substances - Part 2: Horizontal dynamic surface leaching test
2 DIN CEN/TS 17459:2023-02 Construction products: Assessment of release of dangerous substances - Determination of ecotoxicity of construction product eluates; German version CEN/TS 17459:2022
3 DIN CEN/TR 17105, Construction products - Assessment of release of dangerous substances - Guidance on the use of ecotoxicity tests applied to construction products
4 DIN EN ISO 11348-1 Water quality - Determination of the inhibitory effect of water samples on the light emission of Vibrio fischeri (Luminescent bacteria test) - Part 1: Method using freshly prepared bacteria
5 DIN EN ISO 8692 Water quality - Fresh water algal growth inhibition test with unicellular green algae
6 DIN EN ISO 6341 Water quality - Determination of the inhibition of the mobility of Daphnia magna Straus (Cladocera, Crustacea) - Acute toxicity test
7 ISO 13829 Water quality - Determination of the genotoxicity of water and waste water using the umu-test

3.5 Solar reflectance

The concrete roofing tiles must have a solar reflectance of at least 0.20.

Compliance verification

The applicant shall submit a test certificate in accordance with DIN EN ISO 22969[8], ASTM E903[9] or ASTM E1918[10].

3.6 Environmental Product Declaration (EPD) and global warming potential (GWP)

The product must have a valid EPD according to DIN EN 15804. The global warming potential declared in the EPD must not exceed 10.0 kg CO_2 eq./m^2 for the life cycle stages A1 to A3 for the roof or 210.0 kg CO_2 eq./t. The declared reference service life must be at least 50 years.

Compliance verification

The applicant shall submit a valid Environmental Product Declaration (EPD) according to DIN EN 15804 for the product and state the location where the EPD is publicly accessible and declare compliance with the requirement in Annex 1.

3.7 Green electricity

At least 50 % of the electricity consumed in the production of the certified product must be sourced from renewable energy sources as defined in Directive 2018/2001/EU on the promotion of the use of energy from renewable sources and this electricity must be labelled accordingly. The electricity consumed in the production of the certified product must correspond to the supplied proofs of origin for the purchased electricity. In addition, the purchased electricity must also promote the production of additional electricity from renewable energies. A different rule applies to manufacturers that produce their products outside of the EU: 50 % of the electricity consumed in the production of the certified product must be sourced from renewable energy sources certified in accordance with the international REC standard (I-REC).

Compliance verification

The applicant shall declare compliance with the requirement on green electricity in Annex 1 and submit his electricity labelling and proof of origin as verification that the consumed green electricity has been certified by the Grüner Strom e.V. (Green Electricity) label or the OK Power label. In the case of manufacturers outside of the EU, a certificate in accordance with the international REC standard (I-REC) (https://www.irecstandard.org/) will be accepted as proof of origin. This verification must be re-submitted for every year of the term of the contract on the use of the environmental label.

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8 DIN EN ISO 22969:2021-02 Paints and varnishes - Determination of solar reflectance

9 Standard Test Method for Solar Absorptance, Reflectance, and Transmittance of Materials Using Integrating Spheres, https://www.astm.org/standards/e903

10 Standard Test Method for Measuring Solar Reflectance of Horizontal and Low-Sloped Surfaces in the Field, https://www.astm.org/e1918-21.html

3.8 Offsetting of CO_2 emissions

The non-avoidable and non-reducible CO_2 emissions emitted during the manufacture of the roofing tiles and the manufacture and supply of its source materials must be offset (life cycle module A1 to A3 according to the EPD). The emissions must be offset in accordance with the recommendations[11] published by the German Environment Agency (UBA) (see Appendix B). For example, the UBA guide "Voluntary CO_2 offsetting through climate protection projects"[12] can be used for this purpose. The decisive factor for whether the offsetting measures will be accepted is validated verification of the additionality of the supported projects, the sustainable additional benefits of the measures, the use of tested methodologies, the permanence of the achieved emission reduction, the monitoring of any carbon leakage and associated project emissions, the verified reduction in emissions, the cancellation of the emission credits and the avoidance of double counting. The use of emission reduction credits from climate protection projects registered by one of the standards named in the UBA guide described above will confirm with sufficient plausibility that these quality requirements have been fulfilled.

Compliance verification

The requirement is considered to be fulfilled if the applicant acquires, cancels and provides corresponding verification in a suitable form of the cancellation of certified emission reduction credits from registered climate protection projects for the CO_2 emissions emitted during the manufacture and transport of the roofing tiles – including their source materials.
The offsetting measures shall be carried out annually based on the annual production figures. At the end of each calendar year, the environmental impact must be calculated and offset in the following year – e.g. in 2023, the environmental impact in 2022 is calculated and offset. It is important to ensure that the emissions in the production period are offset based on the valid EPD and the annual changes in the production and transport volumes or according to the GHG Protocol[13]. The production volumes must also be stated on an annual basis.

3.9 Consumer information, packaging and advertising messages

The following information and recommendations must be enclosed with the product (in printed form or as a link to a website):

- Installation instructions
- Technical data sheet
- Notes on maintenance
- Information on the recycling possibilities and proper disposal

Sales packaging[14] for the product may not contain any PVC. Sales packaging must contain at least 50% recycled materials. An exception to this requirement is made for transport packaging, such as shrink hoods for pallets. In addition, the sales packaging must comply with the current minimum standard for determining the recyclability of packaging[15].

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[11] The UBA informs RAL gGmbH as the awarding body about the latest recommendations.
[12] https://www.umweltbundesamt.de/sites/default/files/medien/376/publikationen/ratgeber_freiwillige_co2_kompensation_final_internet.pdf
[13] https://ghgprotocol.org/product-standard (The GHG Protocol is a private series of international standards for reporting greenhouse gas emissions.)
[14] Transport packaging is exempt from this requirement.
[15] https://www.verpackungsregister.org/fileadmin/files/Mindeststandard/Mindeststandard_VerpackG_2020.pdf

Advertising messages that contain terms such as "Bio", "Eco" or "Natural" are not permitted.

Compliance verification

The applicant shall declare compliance with the requirement in Annex 1, state the proportion of recycled materials in the sales packaging and submit the required consumer information and declarations from the manufacturer/suppliers of the sales packaging.

3.10 Outlook

Following the first term of validity of the Basic Award Criteria, the level of ambition for the green electricity (target value: 100%) and greenhouse gas emissions criteria will be examined and amended where appropriate. In this context, consultations will be held to determine whether it is possible to take into account emission reductions due to the carbonation of the roofing tiles during their use (the carbonation of concrete during the life cycle of the product has been scientifically verified by the IPCC as a carbon sink). For offsetting the emissions, consultations will be held to determine the best way to take into account the emissions during the transportation of the roofing tiles from the manufacturer to the installation site.

4 Applicants and Parties Involved

Manufacturers or distributors of final products according to Paragraph 2 shall be eligible for application.

Parties involved in the award process are:

- RAL gGmbH to award the Blue Angel Environmental Label,
- the federal state being home to the applicant's production site,
- Umweltbundesamt (German Environmental Agency) which after the signing of the contract receives all data and documents submitted in applications for the Blue Angel in order to be able to further develop the Basic Award Criteria.

5 Use of the Environmental Label

The use of the Environmental Label by the applicant is governed by a contract on the use of the Environmental Label concluded with RAL gGmbH.

Within the scope of such contract, the applicant undertakes to comply with the requirements under Paragraph 3 while using the Environmental Label.

Contracts on the Use of the Environmental Label are concluded to fix the terms for the certification of products under Paragraph 2. Such contracts shall run until December 31, 2026.
They shall be extended by periods of one year each, unless terminated in writing by March 31, 2026 or March 31 of the respective year of extension.
After the expiry of the contract, the Environmental Label may neither be used for labelling nor for advertising purposes. This regulation shall not affect products being still in the market.

The applicant (manufacturer) shall be entitled to apply to RAL gGmbH for an extension of the right to use the ecolabel on the product entitled to the label if it is to be marketed under another brand/trade name and/or other marketing organisations.

The Contract on the Use of the Environmental Label shall specify:

- Applicant (manufacturer/distributor)
- Brand/trade name, product description
- Distributor (label user), i.e. the above-mentioned marketing organisations.

Appendix A List of approved in-can preservatives

Alternatively, the following substances or substance combinations, where the individual substances in the product have a total content of 400 ppm, may be used for the purposes of in-can preservation in dyes or coatings for concrete roofing tiles and fittings. The quantities of the preservatives used in the primary/intermediate products must also ensure that the preservation of the dye/coating complies with this Appendix. Coating materials labelled with H317 are prohibited.

Permitted Preservatives	**CAS no.**	**Content [ppm]**
DBDCB	35691-65-7	400
BIT	2634-33-5	400
Bronopol	52-51-7	200
Natrium pyrithione	3811-73-2	200
Zinc pyrithione	13463-41-7	200
Combination CIT/MIT (3:1)	55965-84-9	Total < 15
CIT16	26172-55-4	
TiO2 AgCl based on AgCl	7783-90-6	100
IPBC	55406-53-6	80
Prohibited substances[17]		
Total of		< 15
BBIT	04/07/4299	
MIT	2682-20-4	
OIT	26530-20-1	
DTBMA	2527-58-4	

However, only those substances (active substances or biocides) may be used for which an active substance dossier for preservatives for products during storage (product-type 6) according to the Biocidal Product Regulation (BPR, Regulation (EU) 528/2012) has been submitted. If inclusion on the list of approved substances for product type 6 is rejected after an evaluation has been completed, the use of this substance is no longer permitted.

[16] Preliminary approval of the biocidal product ACTICIDE C1 until 16/03/2024

[17] These substances may not be actively added to the Blue Angel product for the purpose of preserving the product during storage

Appendix B Quality of emission reduction credits

Offsetting is only permitted when the greenhouse gases cannot be avoided or reduced. Emission reduction credits (often also described as certificates) must be acquired and cancelled for this purpose.

How can emission reduction credits be acquired?
An overview of the carbon offset providers (without any claim to the quality or completeness of the list) can be found here:

- https://www.dehst.de/SharedDocs/downloads/DE/projektmechanismen/Anbieter.html

What should be taken into account when acquiring emission reduction credits?
Ambitious climate protection projects, whose emission reduction credits are used for the purpose of carbon offsetting, must deliver an additional emission reduction (additionality) and should provide additional benefits above and beyond purely reducing greenhouse gas emissions (so-called co-benefits).

The following criteria are important for determining the quality of emission reduction credits and this information should be requested from the carbon offsetting providers:

a) verification of the additionality of the supported projects,
b) verification of the sustainable additional benefits of the measure,
c) the use of tested methodologies under the umbrella of a recognised standard,
d) the permanence of the achieved emission reduction,
e) inclusion of any carbon leakage and associated project emissions in the calculation of the emission reduction,
f) avoidance of double counting and
g) verification of the project and the emission reduction by an independent expert.

Further information on the stated criteria is available here:

- Guide issued by the German Environment Agency: https://www.umweltbundesamt.de/publikationen/freiwillige-co2-kompensation-durch

How are emission reduction credits cancelled?
The carbon offsetting provider cancels the emission reduction credits acquired for offsetting purposes on behalf of the client and issues a cancellation certificate (verification of the cancellation of the credit) that must be submitted to the UBA in order to receive the Blue Angel.

Further information on voluntary offsetting is available here:

- German Emissions Trading Authority (DEHSt) at the German Environment Agency: http://www.dehst.de/Freiwillige-Kompensation
- A study by the German Environment Agency "Future role for voluntary carbon markets in the Paris era": https://www.umweltbundesamt.de/publikationen/future-role-for-voluntary-carbon-markets-in-the
- Carbon Credit Quality Initiative: https://carboncreditquality.org
- Carbon Offset Guide: https://www.offsetguide.org