

BLUE ANGEL

The German Ecolabel



Low-pollutant facade paints

DE-UZ 225

Basic Award Criteria

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Version 3

The Environmental Label is supported by the following four institutions:



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.



The German Environmental Agency with its specialist department for "Ecodesign, Eco-Labeling 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.



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.



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

Exterior paints on facades are used as large-surface coating materials in the design of buildings and for their protection. Biocides are often used in coating systems designed for exterior areas to protect against algal and fungal growth. These biocides do not prevent this algal or fungal growth on the building facade but merely delay it and are washed out of the paint over time. The potential risk of these pollutants being released into the environment due to their large-scale application should be kept as low as possible from an environmental and health perspective. The environmental label is designed for the labelling of products without a protective film that are low in pollutants. In order to assess the facade paint's resistance to microbial growth for use in external thermal insulation composite systems on buildings, these Basic Award Criteria are based on an accelerated weathering test and the exclusion of various pollutants. The environmental label places requirements on the raw materials and substances added during production, as well as on the usage phase and disposal of the containers and any residual product left in the container. In addition, proper application¹ of the products is also important.

1.3 Objectives of the Environmental Label

The environmental label for "Low-pollutant facade paints" may be awarded to products that – above and beyond the legal regulations:

- are manufactured using raw materials, substances and consumables that place the lowest possible burden on the environment,
- do not release any harmful pollutants into the environment,
- reduce the use of biocides and
- do not contain any substances that could have significant diverse effects during the intended use of the product.

¹ DIN 18550-1 /-2

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



1.4 Definitions

APEO: Alkylphenol ethoxylates

BIT: Benzisothiazolinone

CIT: Chlormethylisothiazolinone

EPD: Environmental Product Declaration

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.

MIT: Methylisothiazolinone

PFC: Perfluorinated and polyfluorinated chemicals

Product-type (PT) 6 Preservatives for products during storage: Products used for the preservation of manufactured products, other than foodstuffs, feeding stuffs, cosmetics or medicinal products or medical devices by the control of microbial deterioration to ensure their shelf life. Products used as preservatives for the storage or use of rodenticide, insecticide or other baits. These products are described below as in-can preservatives.

Product-type (PT) 7 Film preservatives: Products used for the preservation of films or coatings by the control of microbial deterioration or algal growth in order to protect the initial properties of the surface of materials or objects such as paints, plastics, sealants, wall adhesives, binders, papers, art works.

PVC: Polyvinyl chloride

TiO₂: Titanium dioxide

ETICS: External thermal insulation composite system

2 Scope

These Basic Award Criteria apply to facade paints according to DIN 4618 and DIN 55945² that are applied to the exterior of an external component (e.g. exterior walls) and which are exclusively advertised for use outdoors, i.e.³:

- Emulsion paints
- Primers for facade paints according to DIN EN 1062-1
- Emulsion silicate facade paints
- Silicate resin paints
- Silicate paints, also in powder form
- Limewash

that are designed for use as facade paints outdoors and which have a water permeability W_0 - W_3 and a water vapour diffusion current density of V_1 - V_3 according to DIN EN 1062-3.⁴

The term "facade paints" will be used below to describe those plasters that fall under the scope of validity.

The following are excluded:

- Facade paints in the sense of these Basic Award Criteria Award Criteria that require labelling according to the German Ordinance on Hazardous Substances (GefStoffV)
- Varnishes
- Emulsion varnishes
- Other coating materials with paint properties
- Waxes
- Pickling solutions
- Wood protective coatings
- Paints exclusively advertised for interior use or for both interiors and exteriors⁵
- Fillers and repair compounds and adhesives
- Thermal insulating paints, anti-graffiti paints and facade paints which advertise they actively prevent microbial infestations (biocidal products)
- Pigment pastes
- Plaster according to DE-UZ 198

² DIN EN ISO 4618 Vocabulary and DIN 55945, Paints and varnishes - Additional terms and definitions to DIN EN ISO 4618

³ The Environmental Label Jury may include other external coatings in the scope of validity of the Basic Award Criteria on the recommendation of the Federal Environmental Agency (Umweltbundesamt).

⁴ During the first term of validity of the Basic Award criteria, the water permeability and water vapour diffusion current density must be determined by the testing institutions. However, an application will not be rejected if the product does not comply with the requirement. In the meeting to revise the Basic Award Criteria, the values determined during the first period of validity will be taken into account when deciding whether to include these values as obligatory requirements.

⁵ These come under the scope of the Basic Award Criteria for DE-UZ 102.

3 Requirements

3.1 Substance requirements

3.1.1 General substance requirements

Observance of the legal regulations according to European and German chemical law is a prerequisite; in the case of facade paints, this includes, in particular, the REACH Regulation⁶ Annexes XIV and XVII, the POP Regulation⁷ Annex I, ChemVerbotsV, GefStoffV, the Industrial Emissions Regulation⁸, the 25th BImSchV⁹, the Biocidal Products Regulation¹⁰, and the CLP Regulation^{11, 12}.

In addition, the facade paint may not contain any substances with the following properties as a constituent component¹³:

- a) Substances which are identified as particularly alarming under the European Chemicals Regulation REACH Regulation⁶ and which have been incorporated into the list drawn up in accordance with Article 59, Paragraph 1 of the REACH Regulation (so-called "SVHC list of candidates")¹⁴.
- b) Substances that according to the CLP Regulation¹¹ have been classified in the following hazard categories or which meet the criteria for such classification¹⁵:
 - ♦ carcinogenic in categories Carc. 1A, Carc. 1B or Carc. 2¹⁶
 - ♦ germ cell mutagenic in categories Muta. 1A, Muta. 1B or Muta. 2
 - ♦ reprotoxic (teratogenic) in categories Repr. 1A, Repr. 1B or Repr. 2
 - ♦ acute toxicity (poisonous) in categories Acute Tox. 1, Acute Tox. 2, Acute Tox. 3
 - ♦ specific target organ toxicity in categories STOT SE 1, STOT SE. 2, STOT RE. 1, STOT RE. 2
 - ♦ hazardous to water in category Aquatic Chronic 1.

⁶ Regulation (EC) No. 1907/2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), in short REACH

⁷ Regulation (EC) No. 850/2004 on persistent organic pollutants

⁸ Regulation 2010/75/EU on industrial emissions

⁹ 25th Ordinance for the implementation of the Federal Immission Protection Act (ordinance for limiting emissions in the titanium dioxide industry)

¹⁰ Regulation (EU) No. 528/2012 concerning the making available on the market and use of biocidal products

¹¹ Regulation (EC) No. 1272/2008 on classification, labelling and packaging of substances and mixtures, short: CLP Regulation.

¹² If other legal regulations also apply to specific products, these also need to be observed.

¹³ 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.

¹⁴ The version of the list of candidates as amended at the time of application is valid. It can be found here: [REACH list of candidates](#).

¹⁵ The harmonized classifications and labellings of dangerous substances can be found in Annex VI, Part 3 of the CLP Regulation. Furthermore, a comprehensive classification and labelling inventory, which also includes all of the self-classifications of hazardous substances made by manufacturers, has been made available to the public on the website of the European Chemicals Agency: [ECHA classification and labelling inventory](#).

¹⁶ An exception is made for titanium dioxide if the product is sold as a liquid mixture because this classification is only based on the respirable dust.¹⁷ In accordance with Annex II of Directive (EC) No. 1907/2006

The corresponding H phrases for the hazard classes and categories can be found in Appendix A.

- c) Substances with other hazardous properties in concentrations that result in classification and labelling of the end product with a GHS hazard pictogram for health and environmental hazards. An exemption is made for facade paints that must be labelled with the GHS hazard pictograms GHS05 (caustic effect) or GHS07 (exclamation mark) due to their high pH values during processing.
- d) Environmentally hazardous components: The final product may not be classified with the H-Phrases H400, H410, H411 and H412.

In-can preservatives on the list of approved in-can preservatives are exempt from this rule (see Appendix B).

Compliance verification

The applicant shall declare compliance with the requirements in Annex 1. In addition, the applicant shall state the brand names and suppliers of all individual primary products for the facade paint, as well as their proportions and function in the manufactured facade paint (Annex 1). To comply with the requirements, declarations from the manufacturer or distributor of the primary/intermediate products (Annex R), as well as the corresponding safety data sheets¹⁷ for the facade paint and the primary/intermediate products used, must be submitted.

3.1.2 Volatile organic compounds VOC

The VOC content in the facade paints must not exceed a maximum value of 1.5 % by mass.

Compliance verification

The applicant shall declare compliance with the requirements in Annex 1. The declaration must be based on a test according to DIN EN ISO 17895 or DIN EN ISO11890-2. This criterion is considered to be fulfilled by silicate paints in powder form.

3.1.3 Key values for the environmental impact

The manufacturer must submit a valid EPD according to DIN EN 15804 for the product.

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.

3.1.4 Special requirements for specific substances

3.1.4.1 Pigments

Pigments containing lead compounds may not be added to the facade paint. The raw material may not contain more than 200 ppm of lead as process-related, technically unavoidable (natural or production-related) impurities.

¹⁷ In accordance with Annex II of Directive (EC) No. 1907/2006

3.1.4.2 Alkylphenol ethoxylates

Products containing alkylphenol ethoxylates (APEO) and/or their derivatives may not be added to the facade paint and their ingredients.

3.1.4.3 Plasticisers

Products that contain plasticising substances from the group of phthalates or group of organophosphates or other comparable substances with a high boiling point may not be added to the facade paints (except for plasticisers in the sense of VdL Guideline 01¹⁸). This requirement is considered to be fulfilled if the plasticiser content in the end product does not exceed 1 g/l.

3.1.4.4 Perfluorinated and polyfluorinated chemicals

It is not permitted for any perfluorinated or polyfluorinated chemicals (PFC), such as fluorocarbon resins and fluorocarbon emulsions, perfluorinated sulfonic and carboxylic acids, and substances that could be broken down into these chemicals to be added to the product. This also applies to primary products treated with PFCs.

3.1.4.5 PVC

Polyvinyl chloride (PVC) is not permitted as a component of the facade paints.

3.1.4.6 Flame retardants

Flame retardants may not be used in facade paints according to Paragraph 2.

3.1.4.7 Halogens

No halogenated organic compounds may be used in the manufacture of the facade paints (e.g. waterproofing agents and impregnations).

Compliance verifications for Paragraphs 3.1.4.1 - 3.1.4.7

The applicant shall declare compliance with the requirements in Annex 1. In addition, the applicant shall state the brand names and suppliers of all individual primary products for the facade paint, as well as their proportions and function in the manufactured facade paint (Annex 1). To comply with the requirements, declarations from the manufacturer or distributor of the primary/intermediate products (Annex R), as well as the corresponding safety data sheets¹⁹ for the facade paint and the primary/intermediate products used, must be submitted.

3.1.5 Biocides in the facade paint

Facade paints according to Paragraph 2 must not contain any biocides. Exempted are the biocidal substances used as in-can preservatives that are stated on the list of approved in-can preservatives and in the concentrations stated there (also contrary to Paragraphs 3.1.1 and 3.1.4.7, if applicable). The quantities of the preservatives used in the primary products must ensure that the preservation of the facade paint corresponds to the list of approved in-can preservatives

¹⁸ Guideline on the declaration of paints, lacquers, varnishes, renders, fillers, primers and related products (VdL Guideline 01), <http://www.wirsindfarbe.de/service-publikationen/vdl-richtlinien/>

¹⁹ In accordance with Annex II of Directive (EC) No. 1907/2006

(Appendix C), this also applies to formaldehyde releasers. Film preservatives and material preservatives are not permitted.²⁰

Compliance verification

The applicant shall declare compliance with the requirements in Annex 1. To comply with the requirements, declarations from the manufacturer or distributor of the primary/intermediate products (Annex R), as well as the corresponding safety data sheets¹⁷ for the facade paint and the primary/intermediate products used, must be submitted.

3.1.6 Production of titanium dioxide pigments

Emissions and waste resulting from the production of titanium dioxide pigments may not exceed the following values²¹:

- For the sulphate process:
 - ♦ SO_x calculated as SO₂: 7.0 kg/t of TiO₂ pigment
 - ♦ Sulphate waste: 500 kg/t of TiO₂ pigment
- For the chloride process:
 - ♦ If natural rutile ore is used: 103 kg chloride waste/t of TiO₂ pigment
 - ♦ If synthetic rutile ore is used: 179 kg chloride waste/t of TiO₂ pigment
 - ♦ If slag ore is used: 329 kg chloride waste/t of TiO₂ pigment
 - ♦ If more than one type of ore is used, the values apply in proportion to the quantities of the individual types of ore used.

Note on the chloride process:

- SO_x emissions only apply to the sulphate process.

The definition of waste given in Article 3 of the Waste Framework Directive 2008/98/EC of the European Parliament and of the Council applies²². If the TiO₂ producer can satisfy Article 5 (by-product production) of the Waste Framework Directive for solid waste, this waste will be exempted.

Compliance verification

The applicant shall verify compliance with the requirement by submitting declarations from the manufacturer of the titanium dioxide pigments used (Annex T) or shall ensure that this is submitted to RAL gGmbH.

3.2 Special requirements

3.2.1 Resistance to microbial growth

The facade paint must fulfil the minimum requirements for resistance to microbial growth.

²⁰ PT 7 and PT 10 according to the Biocidal Products Regulation (EU No. 528/2012)

²¹ Derived from the Best Available Techniques Reference Document for the Production of Large Volume Organic Chemicals (BREF) (August 2007).

²² Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives (OJ L 312 from 22/11/2008, p. 3).

Compliance verification

In an accelerated weathering test carried out according to Appendix D, the assessment of the resistance of the system based on the described assessment criteria over a test period of 100 days must not exceed the stated limits (W3 and A2). A test report shall be submitted with the application. The accelerated weathering test according to Appendix D must be carried out by a testing institution that fulfils the requirements for the competence of testing and calibration laboratories according to DIN EN ISO/IEC 17025.

Alternatively, manufacturers can use already completed and sufficiently documented natural weathering tests outside (see Appendix D), correspondingly documented, tried-and-tested, representative buildings (see Appendix D) and other accelerated tests or processes for assessing the resistance to microbial growth. In order to guarantee that the evaluation of the alternative verifications is comparable to the assessment according to Appendix D, the results must be audited by a central testing institution. This central testing institution is the Fraunhofer Institute for Building Physics (IBP) in Holzkirchen. In the case of alternative verifications, an audit report from the IBP shall be submitted with the application (Annex 6a).

The verification is considered to have been provided if the facade paint is already certified as part of an ETICS in accordance with DE-UZ 140.

3.2.2 Fitness for use

The facade paint according to Paragraph 2 must fulfil the usual quality requirements with respect to fitness for use for its respective product group (e.g. sd-value, W-value, minimum thickness, yield, water absorption, diffusion resistance) according to the relevant DIN standard.

If other technical properties are advertised that can be verified using standard methods (see Paragraph 3.2.2), the corresponding verifications must also be submitted with the application.

Compliance verification

The applicant shall declare compliance with the requirement in Annex 1 to and submit the corresponding technical data sheet and the container text. In the case of a claim with other technical properties with standardized methods: The evidence according to the relevant standards is submitted.

3.2.3 Advertising claims

- The type of facade paint according to Paragraph 2 must be stated on the container together with the product designation. The binder base must also be stated on the technical data sheet.
- Advertising claims that contain terms such as "Bio", "Eco", "Natural", "Fungal", "Insect" or "Nano" etc. as part of the name or description are not permitted.
- Advertising claims must not include claims in the sense of Article 25 (4) of the CLP Regulation (EC) No. 1272/2008¹¹ that could play down the risks such as e.g. "non-toxic", "non-harmful to health", "photocatalytic", "biologically harmless" or similar claims. Exceptions are "free of preservatives" (if applicable), "without coating protection" and "free of film protection".
- If other technical properties are advertised that cannot be verified using standard methods, a note must be added to indicate that this claim was not tested for the Blue Angel.

Compliance verification

The applicant shall declare compliance with the requirement in Annex 1 and submit the corresponding technical data sheet and the container text.

3.2.4 Instructions

3.2.4.1 General instructions

In addition to the obligatory P-phrases in accordance with the CLP Regulation (EC) No. 1272/2008, the following information must also be stated on the container and the technical data sheet in an easy-to-read form (comparable wording is permitted):

- "Keep out of the reach of children."
- "If a facade paint is toned using a pigment paste or toning paste that does not conform to the requirements of the Blue Angel, the toned paint no longer complies with the criteria for the Blue Angel."
- If the product can be applied by spraying: "Use an A2/P2 combination filter and protective goggles for the spray mist."
- "Do not eat, drink or smoke when handling the facade paint"
- "In case of contact with skin or eyes, rinse immediately with plenty of water"
- "Do not allow the product to enter drains, water bodies, ground or soil."
- "Only pass on empty containers for recycling. Dried product residues can be disposed of as household waste."

Information on cleaning the tools must be provided on the container or the technical data sheet. Product contains (indication of the name of the preservatives according to the list of approved in-can preservatives); Information for persons with allergies is available on telephone number:²³

The ingredients in the facade paint according to Paragraph 2 must be stated on the technical data sheet in accordance with the "Guideline on the declaration of paints, lacquers, varnishes, renders, fillers, primers and related products" (VdL Guideline 01)²⁴. The information must comply with at least the requirements in the 7th revised version from January 2018.

The consumption data, shelf life and storage conditions must be stated on the container.

In addition, the container must contain a clear reference to the technical data sheet, information on where it can be found and a telephone number for the manufacturer where the consumer can receive further information. The technical data sheet must be available on the Internet on the manufacturer's or distributor's website and/or under the product information on www.blauer-engel.de.

The application possibilities must be stated on the technical data sheet.

An additional QR code can be optionally provided on the container.

²³ At fixed-line telephone costs

²⁴ https://www.wirsindfarbe.de/fileadmin/user_upload/Dokumente/Richtlinien/VdL-RL01-Mai-2019.pdf

3.2.4.2 Additional instructions for labelled facade paints

In the case of facade paints that must be labelled with the pictograms GHS05 (caustic effect) or GHS07 (exclamation mark) according to chemical law, the following information must also be stated on the container and the technical data sheet in an easy to read form in addition to the information in Paragraph 3.2.4.1 (comparable wording / P-phrases are permitted):

- "Wear protective goggles and a P2 dust filter!"
- "If the facade paint comes into contact with your eyes, immediately rinse them with lots of water and consult an ophthalmologist."
- "Protect your hands using waterproof, robust gloves!"
- "Wear closed work clothing!"
- "Avoid prolonged skin contact with the facade paint. Thoroughly clean any affected areas of the skin immediately using water."
- "The longer fresh facade paint remains on the skin, the greater the danger of serious skin damage."
- "Keep children away from fresh facade paint!"
- "The safety instructions issued by the manufacturer must be strictly followed during the application phase."

Verifications for Paragraphs 3.2.4.1 - 3.2.4.2

The applicant shall declare compliance with the requirement in Annex 1 and submit the corresponding technical data sheet and the container text.

4 Applicants and Parties Involved

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

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Appendix A Cited legislations and standards, literature

From 1 December 2010, the European Chemicals Agency (ECHA) introduced a classification and labelling inventory ("C&L Inventory") according to Article 113 / 114 of Regulation (EC) No. 1907/2006 of the European Parliament and of the Council of 18 December 2006 (REACH Regulation), see http://echa.europa.eu/clp/c_l_inventory_de.asp

Decopaint Directive: Implemented in Germany in the "German chemical directive limiting VOC emissions by restricting the sale of paints and varnishes containing solvents (Directive for solvent-based paints and varnishes – ChemVOCFarbV) from 16 December 2004, as amended.

DIN EN ISO 1062-1 to 6 Paints and varnishes - Coating materials and coating systems for exterior masonry and concrete

DIN EN 13963 - Jointing materials for gypsum boards - Definitions, requirements and test methods

DIN EN ISO 4618 Paints and varnishes - Vocabulary

DIN 55945 Paints and varnishes - Additional terms and definitions to DIN EN ISO 4618

DIN EN ISO 7783-2 Paints and varnishes - Determination of water-vapour transmission properties - Cup method

List of MAK and BAT values, Senate Commission for the investigation of health hazards of chemical compounds in the work area, as amended.

TRGS 905, directory of carcinogenic, mutagenic or teratogenic substances from the Committee for Hazardous Substances (AGS), as amended: [TRGS 905](#). The TRGS lists such CMR substances that have not received harmonised classifications up to now or where the AGS has come to a different classification. The CMR complete list published by the Institute for Occupational Safety and Health of the German Social Accident Insurance can also be used as a reference tool: [CMR complete list](#).

Regulation (EC) No. 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), as amended.

Regulation (EC) No. 1272/2008 of the European Parliament and of the Council of 16 December 2008 concerning the classification, labelling and packaging of substances and mixtures, in short: CLP Regulation (Classification, Labelling and Packing), as amended.

VdL Guideline 01: Guideline on the declaration of paints, lacquers, varnishes, renders, fillers, primers and related products, 6th revised version January 2018; publisher: German Paint and Printing Ink Association (Verband der deutschen Lack- und Druckfarbenindustrie e. V.), Frankfurt am Main

VdL Guideline 03: Guideline for the determination of the formaldehyde concentration in water-dilutable paints and varnishes, and polymer dispersions

VdL Guideline 11: Consumer products

Appendix B Assignment of hazard categories and hazard statements

The following table assigns the hazard categories stated in Paragraph 3.1.1 to the corresponding hazard statements (H Phrases) according to the CLP Regulation (EC) No. 1272/2008.

Hazard category	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.
Carc. 216	H351	Suspected of causing cancer
Germ cell mutagenic substances		
Muta. 1A	H340	May cause genetic defects.
Muta. 1B	H340	May cause genetic defects.
Muta. 2	H341	Suspected of causing 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.
Repr. 2	H361	Suspected of damaging fertility or the unborn child.
Repr. 2	H361d	May damage the unborn child.
Repr. 2	H361f	Suspected of damaging fertility.
Repr. 2	H361fd	Suspected of damaging fertility. May damage the unborn child.
Acute toxicity substances		
Acute Tox. 1 Acute Tox. 2	H300	Fatal if swallowed
Acute Tox. 3	H301	Toxic if swallowed
Acute Tox. 1 Acute Tox. 2	H310	Fatal in contact with skin
Acute Tox. 3	H311	Toxic in contact with skin
Acute Tox. 1 Acute Tox. 2	H330	Fatal if inhaled
Acute Tox. 3	H331	Toxic if inhaled.
Substances with specific target organ toxicity		
STOT SE 1	H370	Causes damage to organs.
STOT SE 2	H371	May cause damage to organs.
STOT RE 1*	H372	Causes damage to organs through prolonged or repeated exposure.
STOT RE 2*	H373	May cause damage to organs through prolonged or repeated exposure.
Environmental hazards		
Aquatic chronic 1	H410	Very toxic to aquatic life with long-lasting effects.

Appendix C List of approved in-can preservatives

Alternatively, the following substances or substance combinations with a total content of the individual substances in the product of ≤ 400 ppm may be used for the purposes of in-can preservation in facade coatings. The quantities of the preservatives used in the primary products must also ensure that the preservation of the final product corresponds to Appendix B. Products labelled with H317 are prohibited.

Approved Preservatives	CAS no.	Content [ppm]
DBDCB	35691-65-7	400
BIT	2634-33-5	360
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
CIT ²⁵	26172-55-4	Total < 15
TiO ₂ AgCl based on AgCl	7783-90-6	100
IPBC	55406-53-6	80
Prohibited substances ²⁶ Total of		
BBIT	4299-07-4	< 15
MIT	2682-20-4	
OIT	26530-20-1	
DTBMA	2527-58-4	
MBIT	2527-66-4	

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. Exception for other substances²⁷: Other preservatives may be used if a MAK value is available and/or sufficient data regarding inhalation toxicology and analytics on the pure active substance and, if applicable, relevant degradation products, isomers and impurities, as well as other by-products of the substance and/or sufficient examinations relating to inhalative exposure are submitted to the Federal Environmental Agency for evaluation and setting of a maximum content.

²⁵ CIT as single substance - ACTICIDE C1 until 16/03/2024

²⁶ These substances may not be actively added to the Blue Angel product for the purpose of storage preservation.

²⁷ The checklist and the biotest for the admission process are published on the Blue Angel website under: (Add link).

Appendix D Instructions on testing the resistance to microbial growth

The new Basic Award Criteria for the Blue Angel for ETICS (DE-UZ 140) and facade paints (DE-UZ XY) require that the products have a high level of resistance to microbial growth.

In the case of paints for which verification has already been submitted in accordance with DE-UZ 140, no further verification is required. If the resistance of the facade paint is being verified for the first time, the following methods may be used:

Accelerated weathering test according to Appendix C of the Basic Award Criteria

- ♦ 100-day test
- ♦ At least 7 test samples (5 test samples for the test, 2 test samples as retained samples) for each facade paint with the following measurements: 12.5 x 12.5 cm. These test samples must be produced in accordance with the application instructions on polystyrene sheets that have the intended coating structure for the application. The insulation and plaster²⁸ are only intended as a mounting plate and are not part of the test.

Tried-and-tested, representative buildings or natural weathering tests according to Appendix C of the Basic Award Criteria

- ♦ A representative building on which the facade paint has been applied for at least three to five years should be evaluated (criteria according to the IBP or ASTM method)
- ♦ or at least 3 test samples (ETICS with the facade paint) with an identical, complete and representative system composition of a suitable size (at least 30 x 30 cm) should be subjected to natural weathering outside for at least 3-5 years (criteria according to the IBP or ASTM method)

Evaluations of representative buildings and natural weathering tests according to the ASTM method (ASTM D3274 – 09(2017)) can be completed by the Fraunhofer Institute for Building Physics (IBP) in Holzkirchen and by other laboratories. Such laboratories include e.g.: Institut für Galvano- und Oberflächentechnik Solingen GmbH & Co. KG (IGOS), Grünwalder Str. 29-31, 42657 Solingen and Q-Lab Deutschland GmbH, In den Hallen 30, 66115 Saarbrücken

²⁸ Standard plaster agreed with the testing institution without film protection

Appendix E Accelerated weathering (test specifications) and alternative verifications for resistance to microbial growth

1 Selection of the systems to be tested

The test must be carried out on a representative system configuration. This means a complete (recommended composition with reinforcing plaster and a top plaster coat with the normally recommended underlays), typical system composition as recommended by the manufacturer and conforming to the regulations, which has been produced according to the application instructions provided by the manufacturer. The system must not contain any unusual materials or coating combinations or any that are not explicitly recommended by the manufacturer.

2 Accelerated weathering

An accelerated weathering process has been developed by the Fraunhofer Institute for Building Physics (IBP) that incorporates real-life environmental conditions [1-4]. The framework conditions for the process are described below.

2.1 Climate

The accelerated weathering process is based on the conditions experienced during an average autumn day in the town of Valley (post code: 83626) as the most comprehensive data from field studies on microbial growth was available for this location. Figure 1 shows the dew-point temperature, surface temperature and air temperature during the selected daily cycle. The test samples are sprayed with water for a period of 4 hours over a 7-day cycle. 15 cycles are completed so that a test period of 100 days is achieved.

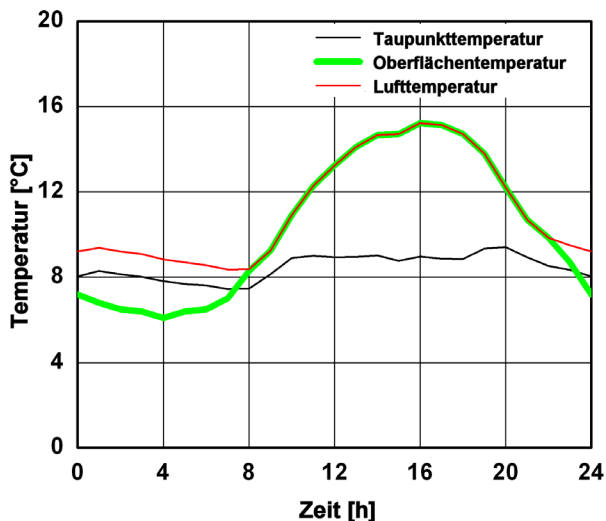


Figure 1:

The climate for the selected daily cycle in the weathering chamber (air temperature, dew-point temperature and surface temperature of the standard test sample).

2.2 Accelerated weathering chamber

The test system shown in Figure 2 consists of a stainless steel chamber whose rear wall can be cooled to lower the surface temperature of the facade coatings placed in the chamber to below the dew-point temperature and thus form dew on the test samples. The temperature falls below

the dew point by 1.5 K for a period of approx. 8 hours. Openings on the side of the chamber allow conditioned air to be fed into the chamber to create the selected test climate. Decalcified tap water is used for the spraying process which is applied via nozzles on the front of the chamber. In order to prevent any cross-contamination of the samples as the water runs off them, drainage gutters have been fitted under each series of samples. Two lamps have been fitted on the doors at the side for lighting purposes, which expose the samples to a day-night cycle with an illuminance of 650 Lux.



Figure 2: Photograph of the accelerated weathering chamber during operation (left) and a screenshot of the monitoring program (right).

2.3 Test samples and preparation of the test samples

The material to be tested (ETICS coating) is applied to polystyrene sheets and allowed to harden in accordance with the manufacturer's instructions. For the test, 5 test samples (10 x 10 cm²) are cut and separated from the polystyrene sheets and subjected to a pre-treatment process in which the in-can preservative and salts present on the surface are removed. The test samples are sprayed with water three times for 24 hours and dried between spraying processes at 40 °C in a recirculating air chamber for 24 hours. Until the start of the accelerated weathering test, the samples are stored at a constant temperature of 23°C and a constant humidity of 50%. The test samples are sealed at the rear using self-adhesive aluminium foil and then attached in this state to the cooled rear wall of the accelerated weathering chamber so that the heat can be transferred optimally.

The test samples are arranged at random in the accelerated weathering chamber. A parallel sample is not inoculated in each case and serves as a control.

2.4 Inoculating the test samples

An inoculation cocktail comprising a suitable selection of primary colonisers (moulds and algae) on structural surfaces, which show sufficient growth in the culture, is produced and used for the regular inoculation of the samples. Examples of suitable test organisms are shown in Table 1 and Table 2. At least 4 strains should be selected from each list for the test so that a total of 8-10 strains of the test organisms are used for the test. If necessary, other or additional test organisms can be used, although these deviations should be justified in the test report.

Examples of suitable test moulds are shown in Table 1.

Table 1: Examples of suitable test moulds

Ulocladium chartarum
Alternaria alternata
Cladosporium herbarum
Epicoccum purpurascens
Phoma herbarum

In addition, common algae from primary succession are added to the inoculation suspension (at least 4 strains from Table 2).

Table 2: Examples of suitable test algae

Chloroidium ellipsoideum (Chlorella ellipsoidea)
Coelastrella vacuolata (Chlorella fusca)
Klebsormidium flaccidum
Nostoc commune
Stichococcus bacillaris

The inoculation suspension is produced based on the process described in section 8.2.1 of the EN ISO 846 [5] standard.

Hygienic requirements are fulfilled when applying the organisms, i.e. wearing suitable personal protective equipment. The process involves applying a watery suspension containing species and mould that are found particularly frequently on buildings.

The samples are inoculated after the first spraying process and this is repeated five times at 2 weekly intervals in each case.

The weathering period is 100 days. Experience has shown that algae are not yet visible to the naked eye after this period of time without technical aids, the development of the test algae is assessed at the end of the test using a stereomicroscope and then evaluated in the same way as for the moulds.

3 Evaluating the accelerated weathering test

3.1 Assessing the microbial growth

An important part of evaluating the risk of microbial growth, is assessing the microbial growth on the test samples over time. In order to assess the growth quantitatively, in addition to any dirt, a visual rating scale [1] in modified form [2] is used (Table 3). The ratings 1 to 3 (very low to medium) at the lower end of the scale are more differentiated in order to also observe smaller differences during the test. In this process, individual spots of dirt that are just perceptible to the naked eye are investigated. In the case of heavier microbial growth, the scale primarily measures the "coverage rate" of the growth. Experience has shown that complaints about coatings on buildings are generally received at ratings from 3 - 5. Therefore, rating 3 on the scale is highlighted graphically by a dotted red line (lowest level of microbial growth which can already result in complaints when critically examined).

Table 3: Rating scale for the visual assessment of microbial growth on the test samples.

Bewertung	Bedeutung
10	Sehr stark, Fläche fast durchgehend bewachsen, über 87,5% bis die gesamte Fläche sind von deutlichem Aufwuchs bzw. Verschmutzung bedeckt
9	Stark bis sehr stark, über 75% bis 87,5% der Fläche zeigen Aufwuchs bzw. Verschmutzung
8	Starke(r) Aufwuchs/Verschmutzung, über 62,5% bis 75% der untersuchten Oberfläche sind bewachsen bzw. verschmutzt
7	Deutlich bis stark, über 50% bis 62,5% der Aufnahmefläche sind von Aufwuchs und/oder Verschmutzung betroffen
6	Aufwuchs/Verschmutzung deutlich, über 37,5% bis 50% der Oberfläche sind bewachsen oder verschmutzt
5	Aufwuchs/Verschmutzung mäßig bis deutlich, über 25% bis 37,5% sind insgesamt verschmutzt oder bewachsen
4	Zahlreiche Punkte bzw. schütterere Flecken, gesamt über 5% bis 25% von Aufwuchs und Verschmutzung betroffen
3	Einige Punkte bzw. schütterere Flecken, Gesamtausdehnung bis 5 %
2	2 bis wenige deutliche Punkte und / oder blasse – schütterere Flecken bzw. Ablaufspuren (gesamte Ausdehnung deutlich unter 5 %)
1	Nur 1 bis 3 kleine Punkte
0	Visuell kein Befall zu erkennen

While the general/total microbial growth is continuously recorded, algae growth is only evaluated after the conclusion of the test because the test samples need to be removed and examined under a stereomicroscope for this purpose. This is not possible during the ongoing test without removing the test samples from the chamber and thus interrupting the environmental conditions for the test for a long period of time.

3.2 Assessing the resistance, evaluation

The resistance of the variants to microbial growth is assessed based on 5 grades:

W1 High: The microbial growth remained below rating 3 on the assessment scale over the 100 days

W2 Good to medium: The microbial growth slightly exceeded rating 3 on the assessment scale but only towards the end of the test cycle

W3 Medium: The microbial growth exceeded rating 3 on the assessment scale but only developed relatively late on in the test cycle and did not reach a serious level

W4 Medium to low: clear development of microbial growth

W5 Low: Significant microbial growth developed relatively quickly and reached a high level by the end of the test cycle

Algae was generally only able to grow in very small colonies over the 100 days. Therefore, the level of resistance can be split into 3 ratings:

A1 High: No growth of algae visible

A2 Medium: Algae only visible under a stereomicroscope

A3 Low: Algae visible with the naked eye at the end of the accelerated weathering test

Note: As a result of the accelerated conditions in the weathering chamber and due to the experience gained using the process in different projects and in individual tests, the test samples were assessed a little differently to the surfaces weathered naturally outside in accordance with the already described process (mould growth may develop more quickly, homogeneously and intensively on susceptible materials than with natural weathering outside; algae is assessed separately; see also [3]).

4 Tried-and-tested, representative buildings

4.1 Criteria for the buildings being assessed

The buildings should be tested individually. The type of ETICS must conform to the regulations and function perfectly; the composition of the system must be representative of the ETICS being tested. The building must be in a location with representative climatic conditions for Germany (neither unusually cold or unusually hot) and the ETICS must have been installed for at least 3 - 5 years. For the test, it is necessary to exclude facade surfaces that are facing in the main direction of the sun's rays (these are usually south facing facades). A representative surface of sufficient size and with a homogeneous coating and a representative weathering load (depending on the area, priority should be given to an east, north or west-facing facade) should be selected. Any highly protective or negative influences must be excluded, such as particularly large roof overhangs, "heat-giving" lighting, thermal bridges, trees and shrubs directly in front of the ETICS, interruptions to the facade surface (windows, roof drainage, ledges, corners and similar) or areas exposed to spraying or dripping water.

4.2 Testing the surfaces / assessment criteria

The test should be carried out on three different, representative areas of the wall surface (each measuring approx. 30 x 30 cm) by a trained expert in accordance with the assessment scale used for the IBP process ([1], [6], [7]), a highest rating of 5 for 3 -5 years; a highest rating of 6 from 5 years upwards. Alternatively, an assessment according to ASTM D3274 – 09(2017) [8] is possible; a highest rating 8 for 3 -5 years; a highest rating 6 from 5 years.

5 Natural weathering test outside

5.1 Criteria for the natural weathering tests outside

At least 3 test samples with identical, completely (from the insulation outwards, depending on the design, a rear sealing plate and edge sealing is recommended) representative system composition with a suitable size (at least 30 x 30 cm) should be subjected to natural weathering outside for at least 3-5 years. The extent of the microbial growth must be regularly assessed and documented (at least quarterly) and the climate data (amount of precipitation, air temperature, relative humidity, duration of driving rain) continuously recorded. A typical example can be found in Figure 3.

Prüfkörperaufbau

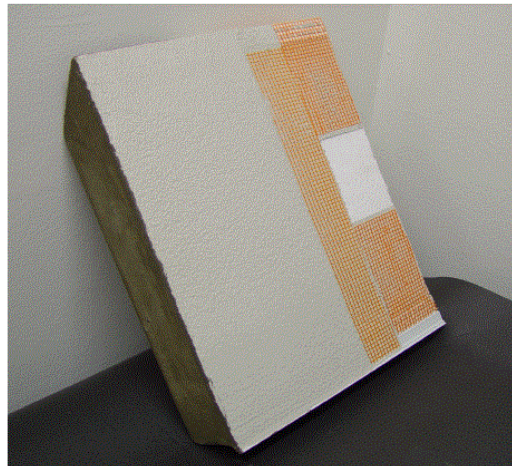
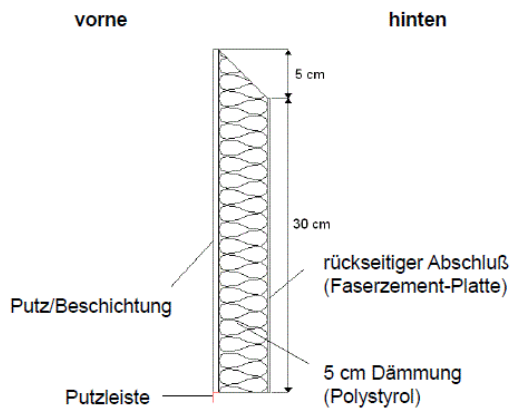


Figure 3: Schematic example of a suitable set up for the test sample.

5.2 Testing the surfaces / assessment criteria for the samples weathered naturally outside

Assessment of the development of microbial growth by a trained expert in accordance with the assessment scale used for the IBP process ([1], [6], [7]), a highest rating of 4 for 3 -5 years; a highest rating of 5 from 5 years upwards. Alternatively, an assessment according to ASTM D3274 – 09(2017) [8] is possible; a highest rating 8 for 3 -5 years; a highest rating 6 from 5 years.

6 Literature

- [1] Hofbauer, W.; Fitz, C.; Krus, M.; Sedlbauer, K.; Breuer, K.: Prognoseverfahren zum biologischen Befall durch Algen, Pilze und Flechten an Bauteiloberflächen auf Basis bauphysikalischer und mikrobieller Untersuchungen (Process for forecasting biological attacks from algae, mould and lichen on building surfaces on the basis of building physics and microbial tests). Publisher: Fraunhofer Institute for Building Physics –IBP-, Holzkirchen; Bauforschung für die Praxis Band 77 (Building research for practical application Volume 77) (2006). IRB-Verlag. (IRB Publishing House) ISBN 978-3-8167-7102-9.
- [2] Sedlbauer, K.; Krus, M.; Hofbauer, W.; Breuer, K.; Fitz, C.: Neue Erkenntnisse zum mikrobiellen Bewuchs auf Außenoberflächen (New findings about microbial growth on exterior surfaces). WKS 56 (2006), P. 10-18.
- [3] Künzel HM, Krus, M., Fitz, C., Hofbauer, W., Scherer, C., Breuer, K., (2011). Accelerated Test Procedure to Assess the Microbial Growth Resistance of Exterior Finishes. In: Freitas, V.P. de; Corvacho, H., Lacasse, M. (eds.) XII DBMC 2011, 12th International Conference on Durability of Building Materials and Components, Conference Proceedings, Vol. 1: 275-282.
- [4] Krueger, N, Hofbauer W.K., Thiel, A., Ilvonen, O. (2018): Resilience of biocide-free ETICS against microbiological growth in a rapid weathering test. Building and Environment (in progress).

- [5]** DIN EN ISO 846: 1997: Plastics - Evaluation of the action of microorganisms.
- [6]** Schwerd, R.; Scherer, C.; Krueger, N.; Hofbauer, W.; Mayer, F.; Breuer, K. (2010): Dauerhaftigkeit von Bioziden in Fassadenbeschichtungen (Durability of biocides in facade coatings). In: Middendorf, B. (ed.): Tagung Bauchemie (Building chemistry conference). GDCh Conference 2010. GDCh Monograph 42: 77-84.
- [7]** Breuer, K., Hofbauer, W., Krueger, N., Mayer, F., Scherer, C., Schwerd, R., Sedlbauer, K. (2012): Wirksamkeit und Dauerhaftigkeit von Bioziden in Bautenbeschichtungen (Effectiveness and durability of biocides in building coatings). Bauphysik (Building Physics) 34(4): 170-182.
- [8]** ASTM D3274 – 09(2017): Standard Test Method for Evaluating Degree of Surface Disfigurement of Paint Films by Fungal or Algal Growth, or Soil and Dirt Accumulation. ASTM International, West Conshohocken, PA.