BLUE ANGEL

The German Ecolabel

Grouting materials for paving stones and terrace tiles

DE-UZ 238

Basic Award Criteria

Edition January 2025

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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Table of contents

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

Soil sealing has very negative impacts on the natural water balance because it increases surface runoff and reduces groundwater recharge. As cities have a high proportion of sealed surfaces, they are particularly affected by the impacts of climate change such as heat, heavy rainfall, floods and drought. Sponge city concepts use natural approaches to cope with and adapt to the impacts of climate change. Blue-green infrastructures and green cities not only reduce heat island effects but also have a positive impact on the quality of life, health and the wellbeing of people. The Blue Angel ecolabel can support the technical implementation of sponge cities by certifying suitable products. These include grouting or jointing materials that allow rainwater infiltration. These grouting materials are, for example, suitable for roads and pavements, courtyards and parking spaces, as well as private driveways and terraces.

1.3 Objectives of the Environmental Label

Permeable grouts used in combination with permeable paved surfaces are suitable and recommended for use on many paved areas. They are important for future-oriented urban planning because they reduce sealed surfaces and support natural water cycles. Permeable grouts reduce the burden on sewage systems and waste water treatment plant after heavy rainfall because they allow the rainwater to leach into groundwater. As a result, they help to reduce the risk of flooding and promote groundwater recharge. Permeable grouts are not only permeable but also enable water to evaporate. This evaporation can help to counteract urban heat islands. Permeable grouts made of grouting materials certified by the Blue Angel must be designed so that they remain permeable even when intensively used over a long period of time. At the same time, grouting materials certified with the Blue Angel must reliably prevent the introduction of pollutants in the grouting materials into the soil or groundwater.

Grouting materials with the Blue Angel ecolabel are associated with the following advantages for the environment and health.

- Reducing soil sealing on paved surfaces
- Strengthening the natural water balance
- Alleviating the impacts of climate change
- Supporting the implementation of sponge city approaches
- Protecting against pollutants and microplastics

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

- permeable and enable water to evaporate
- water friendly
- low level of harmful materials

1.4 Definitions

Load class according to RStO 12: Categorisation of roads according to load class, expressed using the unit "million equivalent 10-t axle crossings". The lowest load class Bk0.3 for residential pathways describes a load of ≤ 0.3 million equivalent 10-t axle crossings. The highest load class Bk100 for motorways describes a load of more than one hundred times greater (> 32 million equivalent 10-t axle crossings).

Fines: Particle size fraction of an aggregate that passes through a 0.063 mm sieve[1].

Rock: A natural, solid substance made of crystals or minerals.[2]

Aggregate size: Designation of an aggregate using a lower (d) and upper (D) sieve size (mesh size in mm), expressed as d/D. This designation accepts the presence of some particles which are retained on the upper sieve (oversize) and some which pass the lower sieve. The lower limit (d) can be zero.[3]

Los Angeles coefficient: The percentage of fragmented rock in a fragmentation test according to DIN EN 1097-2.

Natural aggregates: An aggregate from mineral sources which has been subjected to nothing more than mechanical processing.[4]

Recycled natural stone: Natural stone products (e.g. paving stones, panels, stairs) already used as construction materials in a building that are processed to produce an aggregate.

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1 Source document: DIN EN 933-8+A1: 2015-05
2 Source document: DIN EN 932-3: 2022-08
3 Source document: DIN EN 13242: 2008-03
4 Source document: DIN EN 13242: 2008-03

Sonnenbrand (sunburn): A type of rock decay in some basalts, which manifests itself under the influence of atmospheric conditions. Sonnenbrand starts with the appearance of grey or white star-shaped spots. Usually hairline cracks are generated, radiating out from the spots and interconnecting them. This reduces the strength of the mineral fabric, and as a result the rock decays to small particles. Depending on the source, this process can take place within months of extraction or extend over several decades. In exceptional cases, a rapid decay results in the formation of large cracks and the breaking of aggregate particles.[5]

2 Scope

These Basic Award Criteria apply to grouting materials for paved and slabbed surfaces in outdoor areas exposed to weathering. The Basic Award Criteria cover grouting materials for paved and partially paved surfaces that are primarily designed for pedestrian and bicycle traffic such as pavements, squares, courtyards and terraces or patios. They do not cover products used for the construction of roads that are subject to increased technical requirements due to the higher traffic loads. However, the Basic Award Criteria do cover permeable grouts for smaller residential and service roads if they only have a low traffic load in load class Bk0.3 according to the RStO.

3 Requirements

3.1 Water permeability

Aggregates that display adequate water permeability in their installed state are suitable as grouting materials for the unbound, permeable grouting of paving stones and terrace tiles. Depending on the grout width, coarse aggregates in aggregate sizes 1/3 and 2/5[6] are permitted. A permeable grout width of at least 5 mm is required for aggregate size 1/3 and of at least 8 mm for aggregate size 2/5.[7] Wider grout widths of between 1.5 cm and 3 cm are possible.
The grouting materials can be made of natural aggregates from crushed rock (e.g. basalt or granite) or recycled natural stone. Bound grouts are not permitted.
The grouting materials must have a particle size distribution according to Table 1. If changes are made to the particle size distribution in the reference standards, Table 1 may be editorially amended during the term of the Basic Award Criteria and supplemented with other aggregate sizes.

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5 Source document: DIN EN 1367-3

6 Aggregate sizes 1/3, 2/4 and 2/5 are recommended, for example in the "Merkblatt versickerungsfähige Verkehrsflächen" (MVV – Fact sheet on permeable traffic surfaces). According to DIN 18318, aggregate sizes 1/3 and 2/5 can be used as unbound grouting materials. According to the "Merkblatt für versickerungsfähige Pflasterbefestigungen aus Beton" (Fact sheet on permeable paved surfaces made of concrete), aggregate sizes of up to 5/8 can generally be used. Due to the larger grout widths associated with larger aggregate sizes, these Basic Award Criteria restrict the aggregate sizes to the standard aggregate sizes according to DIN 18318.

7 "Merkblatt für versickerungsfähige Pflasterbefestigungen aus Beton" (2020) (Fact sheet on permeable paved surfaces made of concrete)

Table 1: Requirements for the particle size distribution of water permeable grouting materials

Aggregate size	Particle size distribution	Test method
1/3	Category GC 85/15 according to DIN EN 13242 or DIN EN 13043[8]	DIN EN 933-1
2/5	Category GC 90/10 according to DIN EN 13043 and "TL Gestein-StB"[9]	DIN EN 933-1

To guarantee the required permeability of the grouting joint, particle mixes with a smallest particle < 1 mm may not be used. Grouting materials with aggregate sizes of 0/4, 0/5 and 0/8 according to the additional technical conditions "ZTV Pflaster-StB 20" and technical delivery terms for aggregates "TL Pflaster-StB 06/15" are not permitted. The fines content must comply with the requirement according to Paragraph 3.2.

Compliance verification

A CE marking according to DIN EN 13242 or DIN EN 13043 stating the required aggregate size and particle size distribution and a delivery note with corresponding information according to "TL Gestein-StB".

3.2 Structural suitability

The grouting materials must be suitably resistant to deformation and weathering when exposed to traffic loads and changing climate conditions such as frost, dew, heavy rain and drought. The grouting material must verify its structural suitability according to Table 2.

Table 2: Minimum requirements for the structural suitability of unbound grouting materials for permeable paved surfaces according to DIN EN 13242, DIN EN 13043, "TL Gestein StB 23" (Appendix H), MVV (Section 4.3.1) and the "Merkblatt für versickerungsfähige Pflasterbefestigungen aus Beton" (Fact sheet on permeable paved surfaces made of concrete)

Property	Requirement	Description	Test method
Petrographic classification	Must be stated	Naming the type of aggregate	DIN EN 932-3
Resistance to fragmentation	Los Angeles coefficient ≤ 25	LA25[10]	DIN EN 1097-2
Water absorption	≤ 0.5% (by mass)	WAcm0.5	DIN EN 1097-6
Resistance to frost	Loss ≤ 4 % (% by mass)	F4	DIN EN 1367-1
"Sonnenbrand" of basalt	Chipping after boiling ≤ 1% (by mass)	SBLA[11]	DIN EN 1367-3
	Increase in the Los Angeles coefficient after boiling ≤ 8 %		DIN EN 1097-2
Fines content	≤ 1% (by mass) passing through a 0.063 mm sieve	f1	DIN EN 933-8

[8] Table 2 in DIN EN 13242 / DIN EN 13043, based on the technical delivery terms for aggregates "TL Gestein-StB 23" (Appendix H)
[9] Table 2 in DIN EN 13043, Appendix H of "TL Gestein-StB 23"
[10] A fragmentation value of SZ22 is considered to be equivalent ("TL Gestein-StB 23", Appendix H).
[11] The designation SBSZ is considered equivalent.

Property	Requirement	Description	Test method
Proportion of crushed or broken surfaces[12]	90 - 100% (by mass) fully crushed or partially crushed particles; 0 - 3% (by mass) fully rounded particles	C90/3	DIN EN 933-5

The reference values stated in the table for the resistance to frost apply to aggregates > 4 mm and are provided here for orientation purposes.[13] In the case of aggregate mixes with aggregate sizes ≤ 4 mm, it is assumed that they are resistant to frost if their water absorption is ≤ 0.5% by mass.[14]
In the case of basalt aggregates, it must be verified that they do not suffer from the weathering effect "Sonnenbrand".

Compliance verification

A CE marking according to DIN EN 13242 or DIN EN 13043 verifying the required performance parameters according to Table 2 and a delivery note with corresponding information according to "TL Gestein-StB 23". If basalt is the petrographic classification, the grouting material must fulfil the requirements with respect to "Sonnenbrand". If no test report is available, the applicant shall submit a manufacturer's declaration verifying that there is no indication of "Sonnenbrand".

3.3 Organic ingredients, binding agents, microplastics, impurities

No organic ingredients or binding agents (e.g. cement, epoxy resin, polyurethane, polybutadiene) may be added to the grouting material. In the case of aggregates made of recycled natural stone, no contamination with mineral or non-mineral impurities (e.g. plastic, mortar, concrete) may be identifiable during a visual inspection.

Compliance verification

The applicant shall declare compliance with the requirement.

3.4 Grouting materials made of recycled natural stone

Grouting materials made of recycled natural stone (e.g. recycled natural stone paving) may not contain any substances of very high concern[15]. Possible sources of substances of very high concern must be excluded when selecting the source materials (e.g. coatings, pollutant loads due to the type of use). If information on the recipe is incomplete, a test must be carried out to verify that the product does not contain any substances of very high concern. Recycled natural stone from track ballast may not be used due to potential contamination with plant protection agents.

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[12] In the case of aggregates obtained by crushing rock, it is assumed according to DIN EN 13242 that they comply with category C90/3 without further testing.
[13] The test method in DIN EN 1367-1 can be used for aggregates with a particle size of between 4 mm and 63 mm.
[14] See DIN EN 13043:2002-12, section 4.2.9.1.
[15] https://www.echa.europa.eu/de/candidate-list-table

Compliance verification

The applicant shall declare compliance with the requirement. If information on the recipe is incomplete, the applicant shall submit a test report according to DIN/TS 51012 or DIN 51012 that attests that no substances of very high concern according to the latest version of the "Candidate List of Substances of Very High Concern for Authorisation" were identified. Theses verifications are required for all of the source materials during the term of the Basic Award Criteria and must be submitted once the test has been completed.

3.5 Environmental Product Declaration

The grouting material must have an Environmental Product Declaration (EPD) according to DIN EN 15804 issued by the manufacturer or the manufacturer's association for the available aggregate sizes.

Compliance verification

The applicant shall state the location where the EPD is published. If there is a long waiting time for verification of the EPD, a link to the declaration can be submitted. In this case, the applicant shall submit confirmation from the EPD supplier to verify receipt of the EPD application.

3.6 Accompanying information

The grouting material must be supplied with accompanying information that indicates the source of the grouting material, states that it is intended for the "unbound and permeable grouting of paved and slabbed surfaces" and defines the recommended width of the permeable grout (at least 5 mm for aggregate size 1/3 and at least 8 mm for aggregate size 2/5) depending on the aggregate size. This accompanying information must also describe suitable materials and planning and application instructions for the permeable grout (at least with a reference to MVV) in order to guarantee that an optimal permeability is achieved using the grouting material. The accompanying material must also explain how to maintain the permeability of the grouting material for as long as possible.

Compliance verification

The applicant shall submit the accompanying information for the available grain sizes.

3.7 Packaging

The manufacturing site must be stated on the packaging. Every delivery must include an identification number and information on the manufacturer. Sales packaging may not contain any PVC. It 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, all packaging must comply with the minimum standards for determining the recyclability of packaging[16].

[16] https://www.verpackungsregister.org/fileadmin/files/Mindeststandard/Mindeststandard_VerpackG_Ausgabe_2023.pdf

Compliance verification

The applicant shall declare compliance with the requirement.

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, 2028.
They shall be extended by periods of one year each, unless terminated in writing by March 31, 2028 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 Cited legislations and standards, literature

DIN 18318:2019-09. German construction contract procedures (VOB) - Part C: General technical specifications in construction contracts (ATV) - Sett and slab pavements, and surrounds. https://dx.doi.org/10.31030/3086165

DIN 51012 Supplement 1:2024-08. Screening of substances of very high concern (SVHC); Supplement 1: File with notes. https://dx.doi.org/10.31030/3549611

DIN EN 932-3:2022-08. Tests for general properties of aggregates - Part 3: Procedure and terminology for simplified petrographic description; German version EN 932-3:2022. https://dx.doi.org/10.31030/3318879

DIN EN 933-1:2012-03. Tests for geometrical properties of aggregates - Part 1: Determination of particle size distribution - Sieving method; German version EN 933-1:2012. https://dx.doi.org/10.31030/1863141

DIN EN 933-5:2023-01. Tests for geometrical properties of aggregates - Part 5: Tests for geometrical properties of aggregates - Part 5: Determination of percentage of crushed particles in coarse and all-in natural aggregates; German version EN 933-5:2022. https://dx.doi.org/10.31030/3362868

DIN EN 933-8:2015-07. Tests for geometrical properties of aggregates - Part 8: Assessment of fines - Sand equivalent test; German version EN 933-8:2012+A1:2015. https://dx.doi.org/10.31030/2318945

DIN EN 1097-2:2020-06. Tests for mechanical and physical properties of aggregates - Part 2: Methods for the determination of resistance to fragmentation; German version EN 1097-2:2020. https://dx.doi.org/10.31030/3131398

DIN EN 1097-6:2022-05. Tests for mechanical and physical properties of aggregates - Part 6: Determination of particle density and water absorption; German version EN 1097-6:2022Determination of particle size distribution - Sieving method; German version EN 1097-6:2022. https://dx.doi.org/10.31030/3290441

DIN EN 1367-1:2007-06. Tests for thermal and weathering properties of aggregates - Part 1: Determination of resistance to freezing and thawing; German version EN 1367-1:2007. https://dx.doi.org/10.31030/9847721

DIN EN 1367-3:2001-06. Tests for thermal and weathering properties of aggregates - Part 3: Boiling test for "Sonnenbrand basalt"; German version EN 1367-3:2001. https://dx.doi.org/10.31030/9124123

DIN EN 13043:2002-12. Aggregates for bituminous mixtures and surface treatments for roads, airfields and other trafficked areas; German version EN 13043:2002. https://dx.doi.org/10.31030/9238117

DIN EN 13242:2008-03. Aggregates for unbound and hydraulically bound materials for use in civil engineering work and road construction; German version EN 13242:2002+A1:2007. https://dx.doi.org/10.31030/9871408

DIN EN 15804:2022-03. Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products; German version EN 15804:2012+A2:2019 + AC:2021. https://dx.doi.org/10.31030/3294005

DIN/TS 51012:2020-04. Screening of substances of very high concern (SVHC) - General principles, with CD-ROM. https://dx.doi.org/10.31030/3095557

Merkblatt für versickerungsfähige Pflasterbefestigungen aus Beton. Grundlagen, Planung, Ausführung, Erhaltung. August 2020.
(Fact sheet on permeable paved surfaces made of concrete. Basics, Planning, Execution, Maintenance. August 2020) SLG Betonverband Straße, Landschaft, Garten e.V. Bonn. https://www.betonstein.org/service/downloads/

Merkblatt für Versickerungsfähige Verkehrsflächen. MVV.
(Fact sheet on permeable traffic surfaces. MVV.) Edition 2013. Road and Transportation Research Association (FGSV), Cologne. FGSV No. 947. R2.

Guidelines for the standardisation of pavement structures of traffic areas. RStO 12/24. Edition 2012, Version 2024. Road and Transportation Research Association (FGSV), Cologne. FGSV No. 499. R1.

Technische Lieferbedingungen für Bauprodukte zur Herstellung von Pflasterdecken, Plattenbelägen und Einfassungen.
(Technical delivery specifications for construction products for the manufacture of pavements, slabstone paving and edging). TL Pflaster-StB 06/15. Edition 2006, Version 2015. Road and Transportation Research Association (FGSV), Cologne. FGSV No. 643. R1.

Technical Delivery Terms for Aggregates in Road Construction. TL Gestein-StB 23. Edition 2004, Version 2023. Road and Transportation Research Association (FGSV), Cologne. FGSV No. 613. R1.

Additional technical conditions of contract and directives for the construction of block pavements, slab pavements and edgings. ZTV Pflaster-StB 20. Edition 2020. Road and Transportation Research Association (FGSV), Cologne. FGSV No. 699. R1.