

PD 6689:2017



BSI Standards Publication

Surface treatments –

Guidance on the use of BS EN 12271 and BS EN 12273



Publishing and copyright information

The BSI copyright notice displayed in this document indicates when the document was last issued.

© The British Standards Institution 2017

Published by BSI Standards Limited 2017

ISBN 978 0 580 97981 1

ICS 93.080.20

The following BSI references relate to the work on this document:

Committee reference B/510/2

Draft for comment 17/30366702 DC

Amendments/corrigenda issued since publication

Date	Text affected

Contents

	Page
Foreword	ii
0 Introduction	1
1 Scope	1
2 Normative references	2
3 Terms and definitions	2
4 Traffic categories	3
<i>Table 1 — Traffic categories</i>	4
5 Surface Dressing Requirements (BS EN 12271)	4
<i>Table 2 — Surface dressing — categories for defects at one year determined by visual assessment in accordance with BS EN 12272-2</i>	6
<i>Table 3 — Surface dressing — minimum macrotexture levels after 11 months and before 13 months</i>	7
<i>Table 4 — Traditional binder class names</i>	8
<i>Table 5 — Surface dressing — tolerance and accuracy of rate of spread of binder and chippings</i>	9
<i>Table 6 — Surface dressing — frequencies of test for binder and chipping application</i>	10
<i>Table 7 — Surface dressing — example of family of TAITs</i>	11
6 Slurry surfacing including microsurfacing (BS EN 12273)	11
<i>Table 8 — Slurry surfacing including microsurfacing — categories for defects determined by visual assessment</i>	12
<i>Table 9 — Slurry surfacing including microsurfacing — recommended minimum</i>	13
<i>Table 10 — Slurry surfacing and microsurfacing — frequencies of testing — all road types</i>	15
<i>Table 11 — Slurry surfacing including microsurfacing — example of family of TAITs</i>	16
Annex A (informative) Purchaser sheet 1 and producer (contractor) Sheet 2 and TAIT information sheet 3 for surface dressing	18
Annex B (informative) Surface dressing — SHEET 1: Information to be provided by the purchaser (specifier/compiler)	18
Annex C (informative) Surface dressing — SHEET 2: Information to be provided by the producer	19
Annex D (informative) Surface dressing — SHEET 3: TAIT certificate information to be provided by the producer	20
Annex E (informative) Purchaser sheet 1 and producer (contractor) sheet 2 and TAIT information sheet 3 for slurry surfacing including microsurfacing	21
Annex F (informative) Slurry surfacing incorporating microsurfacing — Sheet 1: Information to be provided by the purchaser (specifier/compiler)	21
Annex G (informative) Slurry surfacing incorporating microsurfacing — Sheet 2: Information to be provided by the producer	22
Annex H (informative) Slurry surfacing incorporating microsurfacing — Sheet 3: TAIT certificate: Information to be provided by the producer	24
Annex I (informative) Examples of specification — surface dressing	25
<i>Table G.1 — Surface dressing — example specifications</i>	25
Annex J (informative) Examples of specification — slurry surfacing including microsurfacing	25
<i>Table J.1 — Slurry surfacing and microsurfacing — example specifications</i>	26
Bibliography	27

Summary of pages

This document comprises a front cover, and inside front cover, pages i to ii, pages 1 to 28, an inside back cover and a back cover.

Foreword

Publishing information

This Published Document is published by BSI Standards Limited, under licence from The British Standards Institution, and came into effect on 30 November 2017. It was prepared by Technical Committee B/510/2, *Surface treatments*. A list of organizations represented on this committee can be obtained on request to its secretary.

Supersession

This Published Document supersedes PD 6689:2009, which is withdrawn.

Relationship with other publications

This Published Document provides guidance on the use of BS EN 12271 and BS EN 12273.

Use of this document

As a guide, this Published Document takes the form of guidance and recommendations. It should not be quoted as if it were a specification or a code of practice and claims of compliance cannot be made to it.

Presentational conventions

The guidance in this standard is presented in roman (i.e. upright) type. Any recommendations are expressed in sentences in which the principal auxiliary verb is “should”.

Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.

Contractual and legal considerations

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard cannot confer immunity from legal obligations.

0 Introduction

0.1 Construction Products Regulation (EU) No 305/2011 [1]

The assessment and verification of constancy of performance (AVCP) for surface dressing and slurry surfacing, including microsurfacing products is System 2+, in accordance with BS EN 12271 and BS EN 12273. The AVCP for both products covers installation.

The Declaration of Performance, CE Marking, Type Approval Installation Trial (TAIT) and Factory Production Control (FPC) information should be provided.

0.2 Declaration of Performance (DoP)

DoP provides information about the intended use and performance of the product. The producer assumes legal responsibility for the conformity of the product with its declared performance. The DoP is kept with the technical file concerning the product. The application of the CE marking by the producer effectively certifies that the manufacturer has strictly followed the applicable procedures in drawing up the DoP and that it is accurate and reliable.

The producer should provide the purchaser with information on the DoP for the proposed product, which might be available on the producer's website.

The producer should be encouraged to continue to monitor the TAIT site and declare the period for which the performance characteristics have been retained.

0.3 CE marking

Each product covered by a harmonized technical specification should be CE marked as a requirement of the Construction Products Regulation (CPR) [1]. Demonstration that the product meets the requirements of the standard should be contained within the TAIT report accompanying the DoP for the product, see also [Annex A](#) to [Annex H](#).

It is the responsibility of the producer (contractor) to ensure that the information contained within the CE Marking, DoP and accompanying product TAIT report meets the requirements of the contract.

NOTE The required performance levels for use on the Highways England Strategic Road Network (SRN) and those considered applicable for Local Roads for use by Highway Authorities in the UK are set out in this Published Document.

It is the responsibility of the producer to provide the purchaser with the CE marking for the proposed product.

1 Scope

This Published Document provides guidance on the use of BS EN 12271 and BS EN 12273 to specify products for Local Roads and for the Highways England Strategic Road Network (SRN).

NOTE 1 BS EN 12271 specifies the properties of surface dressing and BS EN 12273 specifies the properties of slurry surfacing, including microsurfacing.

This Published Document provides guidance on the performance requirements and control procedures for the installation of both surface treatments as products for the maintenance of roads and other trafficked areas.

NOTE 2 In BS EN 12271 "other trafficked areas" include footways and cycleways.

This Published Document does not apply to the following:

- a) “surface dressing works” designed by the purchaser; i.e. surface dressing recipe specification for which the producer is instructed as to the rates of spread, chipping size, etc., and therefore is not responsible for performance requirements.

NOTE 3 Further guidance on the use of recipe specifications can be found in the RSTA Codes of Practice [2];

- b) surface treatments in tunnels where fire regulations apply;
- c) small areas under 500 m² which are not contiguous, such as patch repairs;
- d) airfield pavements covered by international regulations (e.g. International Civil Aviation Organization regulations); and
- e) cold applied ultra-thin surfacings (CAUTS).

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes provisions of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies..

BS EN 12271:2006, *Surface dressing — Requirements*

BS EN 12272-1, *Surface dressing — Test methods — Part 1: Rate of spread and accuracy of spread of binder and chippings*

BS EN 12272-2, *Surface dressing — Test methods — Part 2: Visual assessment of defects*

BS EN 12273, *Slurry surfacing — Requirements*

BS EN 12274-2, *Slurry surfacing — Test methods — Part 2: Determination of residual binder content*

BS EN 12274-8, *Slurry surfacing — Test methods — Part 8: Visual assessment of defects*

BS EN 13043, *Aggregates for bituminous mixtures and surface treatments for roads, airfields and other trafficked areas*

BS EN 13808, *Bitumen and bituminous binders — Framework for specifying cationic bituminous emulsions*

PD 6682-2:2009, *Aggregates — Part 2: Aggregates for bituminous mixtures and surface treatments for roads, airfields and other trafficked areas — Guidance on the use of BS EN 13043*

3 Terms and definitions

For the purposes of this Published Document, the terms and definitions given in BS EN 12271 and BS EN 12273 and the following apply.

3.1 NPD

“no performance determined”, so that the property has no required value

3.2 producer

organization or entity responsible for the design and construction of the surface treatment

NOTE The producer is often called the “contractor” in the UK.

3.3 product

surface dressing or slurry surfacing, including microsurfacing

NOTE Microsurfacing is sometimes known as microasphalt. "Slurry seal" is a term no longer used for UK roads, although used in USA and sometimes for airfields.

3.4 purchaser

organization or person buying the product

NOTE The purchaser is sometimes known as the "overseeing organization" and this might be a local highway authority.

3.5 road type

road grade used to link the frequency of testing and performance categories for each technical requirement to the different end uses

NOTE 1 In this Published Document, road grades have been defined by reference to the Specification for the Reinstatement of Openings in Highways (SROH) [3]. See also Road Note 39 [4] for a link to surface dressing traffic categories. For clarity, the term "road type" is used throughout this document instead of "road grade".

NOTE 2 In Northern Ireland, for Highways Authorities & Utilities Committee (HAUC), see The Street Works (Northern Ireland) Order 1995 [5].

NOTE 3 Although the road type has been defined in terms of the SROH [3] it is always preferable to use actual traffic counts where these are available.

NOTE 4 Where the information has not been made available to enable road categories to be derived, reference can be made to Well-Managed Highway Infrastructure: A Code of Practice Section 4 Table 1 [6]. See: <http://www.ukroadsliaisongroup.org/en/codes/index.cfm>

3.6 specifier

organization or person specifying the product who might or might not be directly employed by the purchaser or the contractor

3.7 supplier

organization or entity providing the constituent materials to the producer

NOTE The supplier can provide the binder and the aggregate and any other minor constituent that might be incorporated into the product.

3.8 TAIT (Type Approval Installation Trial)

demonstrates that the characteristics of the surface dressing or slurry surfacing, including microsurfacing product, conforms to the declared characteristics, in accordance with BS EN 12271 or BS EN 12273 respectively.

NOTE Synonymous with Initial Type Test (ITT).

4 Traffic categories

The performance categories recommended in this Published Document have been chosen from those given in BS EN 12271 and BS EN 12273. These recommendations are related to the HAUC road types, which are specified in the HAUC's specification for highway reinstatements [7] and shown in Table 1, together with the design classifications from RN 39 [4].

NOTE The HAUC road types have been used as highway authorities in England and are required to have a record of these values for all of their roads (see also 3.5).

Table 1 — *Traffic categories*

Commercial vehicles per lane per day cvld	Footway	0-20	21-100	101-250	251-500	501-1250	1251-2000	2001-2500	2501-3250	over 3250
HAUC Road Type	FW	4	4 ^{A)}	3 ^{A)}	3	2	1	1	0	0
RN39 Approximate Design Category	FW	H	G	F	E	D	C	B	B	A

^{A)} Strictly, the division between HAUC type 4 and HAUC type 3 is at 125 cvld, assuming the normal calculation of 20 years life and 2% annual increase in traffic, but 100 cvld can be used, given the usual uncertainty in the knowledge of traffic flows.

5 Surface Dressing Requirements (BS EN 12271)

5.1 General

BS EN 12271 covers all varieties of surface dressing including single, racked-in, double and sandwich types. It also covers more complex surface dressing products, such as two layers of binder plus three layers of chippings and inverted surface dressing, in which a single surface dressing is followed immediately by, e.g. a racked-in surface dressing.

NOTE Example specifications for different end-uses are given in [Annex I](#).

BS EN 12271 is based on product performance categories, although the purchaser might have some limited control on components, such as minimum requirements for peak binder cohesion and maximum chipping size. It is recommended that the purchaser relies on the defined performance categories and the TAIT which demonstrates the producer's ability to design and install a product for a given road type. Essential guidance on the use of these performance specifications and the influence of their constituents is published and updated in the following:

- RSTA Codes of Practice [2];
- Road Note 39 (RN 39) [4];
- Manual of Contract Documents for Highway Works Volume1 (MCHW1) Series 900 clause 922 and MCHW2 clause NG 922 [8]; and
- the Strategic Road Network (SRN) for Highways England, MCHW1 clause 923, Cold Applied Ultra Thin Surfacing (CAUTS) [8].

5.2 Performance categories

The main performance categories used in BS EN 12271:2006, Table 2, declared after eleven months and before thirteen months are:

- visual assessment of defects; and
- macrotexture.

The main performance-related categories that can be chosen from BS EN 12271:2006, Table 2, include:

- polished stone value (PSV) of chippings;
- aggregate abrasion value (AAV) of chippings;

NOTE BS EN 12271 requires this to be expressed in terms of Micro-Deval. The AAV test has been traditionally used for this property, see PD 6682-2).

- 3) tolerance on rates of spread of binders and chippings;
- 4) accuracy of spread of binders and chippings (a measure of even coverage);
- 5) type of surface dressing; and
- 6) binder characteristics, e.g. pendulum cohesion.

The producer is responsible for the design of the surface dressing and unless using a proprietary system, can use the guidance in Road Note 39 [4] to select the type of surface dressing. However, where an experienced purchaser wishes to secure specific performance criteria, the type of surface dressing can be specified as each type is considered in BS EN 12271 to be a different product. Purchasers should select a producer accredited to National Highways Sector Scheme 13 [9] as part of his tender quality submission and seek a performance guarantee.

NOTE The performance guarantee required by MCHW1 clause 922 [8] and generally for local roads is for two years.

If the producer proposes, or purchaser specifies, a product that is not a preferred type for the particular site conditions as detailed in Road Note 39 [4], an explanation should be provided. Any alternative design should still be permitted by RN39 for the site. A double surface dressing, for example, can be specified by the purchaser as it is a more durable product than a single surface dressing and has a greater initial cost and therefore might not necessarily be selected by a producer to satisfy the performance requirements in a contract with a short guarantee period.

The type of surface dressing influences tyre/noise generation. Where quieter surface dressings are required, the purchaser can specify a maximum macrotexture, which encourages design proposals that incorporate smaller chippings or multiple-layered surface dressings.

NOTE For further information, see the RSTA Codes of Practice [2] based on research at the University of Ulster.

The design of surface dressing is site-specific and the purchaser should ensure that the producer has access to at least the following information:

- commercial vehicles per lane per day or, where not available, the HAUC road type for each site;
- the required minimum PSV for the chippings;
- the required maximum AAV for the chippings;
- any significant variations in traffic that might not be apparent from a single site visit, e.g. market day in rural areas or seasonal timber logging; and
- “cold spots” revealed by winter maintenance or seasonal flooding.

The producer should visit each site. The procurement process should be planned to give sufficient time for the input to the design to be collected (road hardness is a fundamental input for design conforming to RN 39 [4] and can only be tested when the road temperature is between 15 °C and 35 °C).

If the procurement process does not allow time for the producer to capture road hardness test data, e.g. late tenders (January – March), the purchaser should provide this information to the producer. If this is based on visual assessment and/or local knowledge rather than actual measurement, this should be stated, as it might result in design errors, which would not be the responsibility of the producer.

The producer should supply the purchaser with a fully documented design proposal for each site and a method statement demonstrating conformity to the relevant TAIT. The method statement should

also detail the producer's proposals for traffic management, including dealing with emergencies or weather-related problems.

If any site is deemed to be unsuitable for surface dressing, the purchaser should be informed at this stage.

Reference should be made to RN 39 [4] if the condition of the existing road, e.g. very soft, patching, prevents the surface dressing from meeting the performance levels shown in Table 2.

Table 2 — Surface dressing — categories for defects at one year determined by visual assessment in accordance with BS EN 12272-2

Defects	Road type			
	FW	4 (0–100 cvld)	3 (101–250 cvld)	2, 1 or 0 (>501 cvld)
P1 – fatting up, tracking and bleeding	NPD	≤2.5%	≤1.0%	≤1.0%
P2 – scabbing and tearing	NPD	≤1.0%	≤0.5%	≤0.5%
P3 – fretting	≤10%	≤10%	≤6%	≤3%
P4 – streaking	≤90 m	≤90 m	≤30 m	≤10 m

NOTE The level of defects can be specified at the end of the guarantee period, they are not to be more onerous than the levels in Table 2.

5.3 Surface dressing — Specification

5.3.1 Defects determined by visual assessment

Defects determined by visual assessment should be specified in accordance with Table 2. Defects should be assessed after eleven months and before thirteen months. Testing should be conducted in accordance with BS EN 12272-2.

NOTE 1 The TAIT assessment period (1 year) is not to be confused with the guarantee period which is usually longer.

NOTE 2 There might be circumstances where the levels in Table 2 for durability might not be needed, e.g. late season work where a sacrificial dressing is used or dressing a binder course.

5.4 Macrotexture

Advice on the level of macrotexture required for different sites is given in RN 39 [4] (see also Table 3).

Requirements for higher speed roads are generally higher than those for lower speed roads. Similarly, high traffic levels require a higher macrotexture at one year than lightly trafficked roads, as more embedment occurs under heavier traffic after the one year measurement point.

Double and multiple surface dressings are less prone to excessive embedment.

NOTE For the SRN, advice is given in DMRB CD 20X (formerly HD 36) [10] and MCHW2 clause NG 922 [8].

Table 3 — Surface dressing — minimum macrotexture levels after 11 months and before 13 months

Road Type HAUC	Traffic cvld	Single or racked-in surface dressings	Single or racked-in surface dressings	Double and multiple surface dressings
		Speed limit 50 mph or higher	Speed limit less than 50 mph	All
3/2/1 and 0	>251	1.5	1.5	1.0
3	101-250	1.2	1.2	1.0
4	21-100	1.2	1.0	0.8
4	< 20	1.0	0.8	0.8

NOTE These macrotexture requirements are not all directly transferable to performance categories specified in BS EN 12271, but are those that are included in long standing specifications in the UK.

NOTE 1 The level of macrotexture can be specified at the end of the guarantee period, which, in the case of MCHW1 clause 922 [8], is two years and is not to be more onerous than the levels in Table 3.

Excessive levels of macrotexture should not be used as this increases costs and tyre/road noise generation disproportionately. Although the standard method of measuring macrotexture is the patch test given in BS EN 13036-1, the laser method given in BS EN ISO 13473-1 can be used, provided it has been correlated against the patch test.

NOTE 2 For the SRN, MCHW1 clause 922 [8], texture decay between 12 and 24 months is used to judge durability. A maximum value of macrotexture is specified to control tyre/road noise generation.

NOTE 3 MCHW1 clause 923 [8] has requirements for noise levels measured on site.

5.5 Constituent materials

5.5.1 Binders for surface dressing

Only constituent materials with established suitability can be used in surface dressing. Suitability can be established by means of conformity to a European Standard or a European Technical Approval, or based on a history of producing surface dressing products conforming to the relevant harmonized standard.

Unmodified and polymer modified binders should conform to a current European Standard for bituminous binders, e.g. BS EN 13808 for bituminous emulsions.

NOTE 1 BS EN 15322 covers fluxed binders. In the UK, polymer modified cationic bituminous emulsions are principally used.

NOTE 2 CE marking for the binder (framework specification) could provide sufficient information in some other circumstances. However, certificated products should provide additional assurance.

NOTE 3 BS EN 13808 and BS EN 15322 include a table of classes for pendulum cohesion of modified binders (for the test method, see BS EN 13588). BS EN 12271 covers the mandated characteristic cohesion by cross-reference to the classes in BS EN 13808.

The producer could provide information to the client to demonstrate adequacy of binder performance over the short, medium and particularly, long term.

Guidance on the selection of appropriate binders is given in:

- RN 39 [4];
- the RSTA Codes of Practice [2];
- MCHW2 clause NG922 [8];
- Design Manual for Roads and Bridges, Volume 7, HD 37/99 [10]; and