AGRÉMENT SOUTH AFRICA
innovative construction product assessments

Tel: +27 12 841 3708
Fax: +27 12 841 2539
agrement@csir.co.za
Box 395, Pretoria
0001, South Africa

# GUIDELINES DOCUMENT
# FOR THE ASSESSMENT AND CERTIFICATION OF
# THIN BITUMINOUS SURFACING SYSTEMS

Guideline document v1.1
20 December 2005

**INDUSTRY TASK TEAM**

| | |
|---|---|
| Mr. Mervyn Henderson | Provincial Government Western Cape |
| Prof. Kim Jenkins | University of Stellenbosch |
| Mr. Pieter Myburgh | Sabita (SAFCEC) |
| Mr. J.P. (Basie) Nothnagel | Specialized Road Technologies |
| Mr. Paul Olivier | Jeffares & Green Consulting Engineers (SAACE) |
| Mr. Derick Pretorius | ARCUS GIBB (SAACE) |
| Mr. Dennis Rossmann | The South African National Roads Agency |
| Mrs. Elzbieta Sadzik | Gautrans |
| Mr. Gary Swart | BCP Engineers |
| Mr. Benoit Verhaeghe | CSIR Built Environment |
| Mr. Michael Winfield | Martin & East |
| Mr. Julian Wise | Martin & East |

**PROJECT TEAM**

| | |
|---|---|
| Mr. Erik Denneman | CSIR Built Environment |
| Dr. Wynand JvdM Steyn | CSIR Built Environment |
| Prof. Alex Visser | University of Pretoria |

**REPRESENTATIVES AGRÉMENT SOUTH AFRICA**

Mr. Joop van Wamelen
Mr. Kevin Bramwell

**LIST OF CONTENTS**

## 1. SCOPE

1.1 The assessment is directed towards the issue of an Agrément SA certificate confirming a thin bituminous surfacing system's compliance with the requirements as defined by the industry task team for this guideline.

1.2 The test methods and protocols contained in this document are for certification purposes only and are not intended for use on a contractual basis as a specification.

1.3 For the purpose of this scheme a thin bituminous surfacing system is defined as a proprietary bituminous product with suitable properties to provide a surface course that is laid at a nominal depth of up to 40 mm and is predominantly intended as a functional layer.

1.4 Various South African road authorities were involved with the development of this guideline. Systems receiving a certificate shall be recognised by these authorities as suitable for the specified use.

1.5 A condition of certification shall be that systems are only installed by contractors approved by the certificate holder and who operate a quality system which satisfactorily addresses the appropriate details listed in Section 3.2. The certificate holder shall periodically audit the contractor and make the details of the audits available to Agrément SA when requested.

1.6 A system's performance shall be determined through laboratory tests, in an installation trial and on basis of prior performance. Performance shall be measured against parameters, such as skid resistance, PSV and ACV, defined as mandatory in Section 3.6. The performance criteria for mandatory parameters are included in Appendix C. At the request of the applicant or the assessment team, the system’s performance shall be measured against one or more of the optional parameters also listed in Section 3.6.

1.7 The onus is on the applicant to verify that the latest version of this guideline, and of all documents referred to in this guideline, is used for the application. Where international standards are referred to in this guideline, the onus is on the applicant to verify that no relevant South African standard has been published since the publication of the guideline.

## 2. INTRODUCTION

2.1 The assessment and certification procedure shall be undertaken in six stages, followed by a monitoring stage;

Stage 1 - Assessment of applicant's data
Stage 2 - Assessment of production control
Stage 3 - Laboratory testing
Stage 4 - System installation
Stage 5 - System performance trial (if required)
Stage 6 - Certification
Stage 7 - Monitoring

For a graphical representation of the assessment process refer to Figure 1.

2.2 Generally each stage shall be successfully completed and, where appropriate, a report issued prior to the commencement of the next stage. However, stages 1 to 5 may, if all required data is available, at the request of the applicant be undertaken concurrently. The applicant shall have the option of withdrawing from the programme at any stage should the system submitted fail to comply with the requirements.

2.3 All systems shall be able to demonstrate satisfactory performance on at least 3 sites of appropriate nominal installation depth, and under conditions representative for the Certificate class selected by the applicant (refer Table 1), over a period of at least two years. One of the sites shall have been monitored during the two-year period by Agrément SA or their agent. Existing data obtained during the road trial for departmental type approval will normally be acceptable to Agrément SA. In the case no data, or insufficient data from completed trials is available, an appropriate monitoring plan needs to be developed for the necessary trial applications for which the applicant will carry full responsibility and risk during the evaluation period of 2 years. At the discretion of Agrément SA temporary certificates may be provided, on the basis of laboratory test results and other available data, pending the completion of all field tests.

2.4 Where systems already have type approval, or part approval, from an organisation or client body recognized by Agrément SA, and based on rigorous evaluation of information that can be substantiated to Agrément SA, the existing test data may be used for assessment purposes under stages 3 to 5. The suitability of existing test data will be assessed by Agrément SA.

2.5 In the event of an applicant offering a system including a number of options with regard to system components and/or alternative application procedures Agrément SA shall define the number of certificates required and the range of tests to be performed to allow the acceptance of the alternative materials and/or procedures.

2.6.1 Agrément SA, in consultation with the industry task team, reserves the right to amend or supplement the tests required for Agrément SA assessment and certification at any time, if required. The cost of all further tests shall be borne by the applicant. A certificate shall only be awarded on the system's successful completion of the appropriate stages 1 to 6.

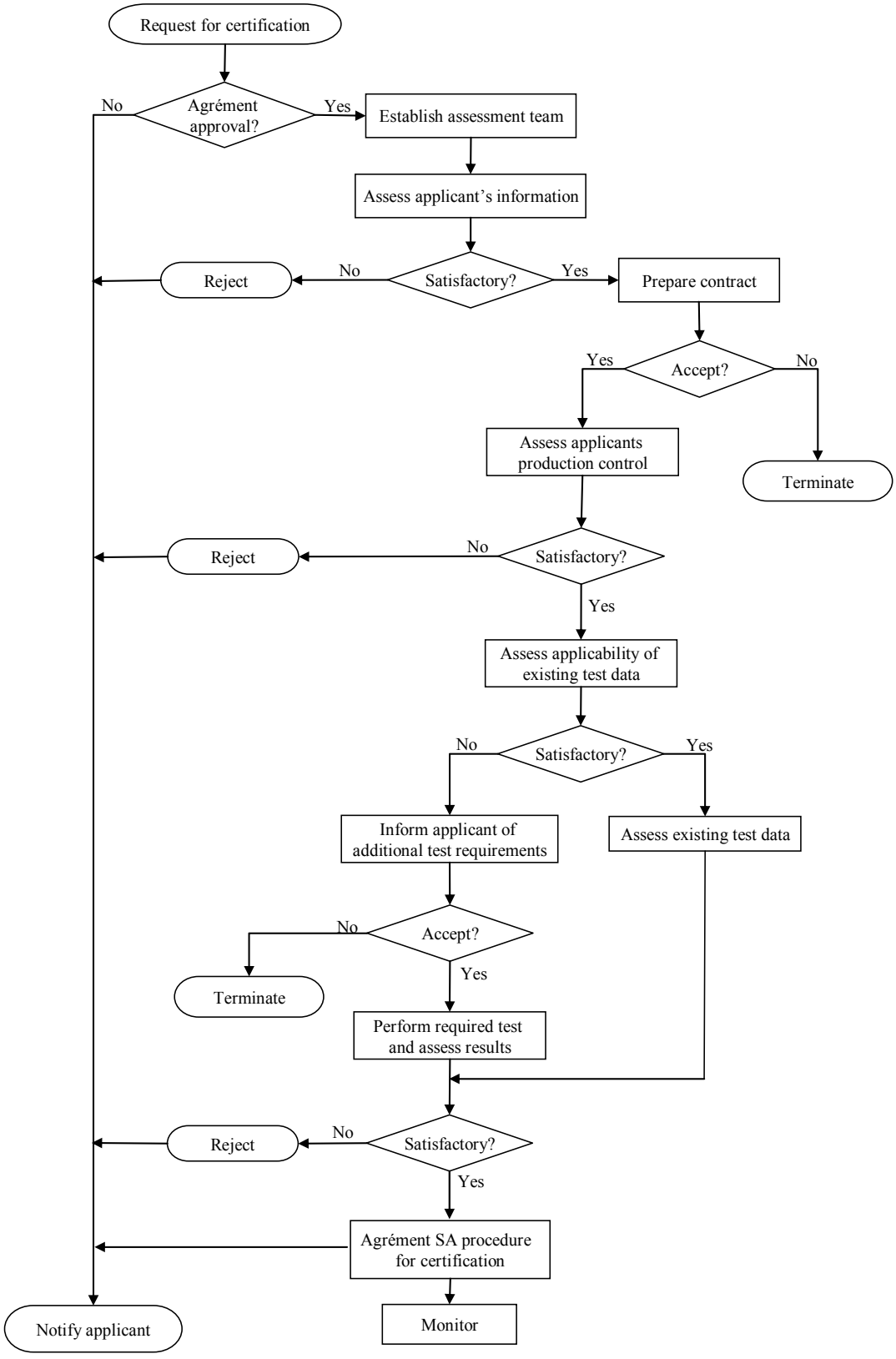


**Figure 1: Assessment process**

## 3. ASSESSMENT AND CERTIFICATION PROCEDURE

### 3.1 Stage 1: Assessment of Applicant's Data

3.1.1 Applicants shall submit the details as indicated on the application form in Appendix A for examination by Agrément SA. If the details are found to be acceptable the application data shall form the basis for the subsequent assessment. The application form requests general information on the product, the product's track record, available test data, process quality control, and the specific use of the product to be certified.

3.1.2 Should there be, during the assessment, the need to modify the system defined by the applicant (for example as a result of failure of the system to meet the requirements) the content of the assessment and additional work required shall be reconsidered by Agrément SA.

3.1.3 If the system includes hazardous substances, i.e. that require special precautions to be taken under the Occupational Health and Safety (OHS) Act, the applicant shall supply all the relevant data. No formal assessment of the suitability of this data, in terms of the OHS Act regulations, shall be undertaken by Agrément SA. However, this data shall always be required by Agrément SA and its subcontractors to ensure the safe use and testing of the system in their laboratories. The applicant's instructions for use shall include all necessary data to allow the safe use of the products.

3.1.4 Information supplied by the applicant will be treated as confidential by Agrément SA.

### 3.2 Stage 2: Assessment of production control

3.2.1 Agrément SA shall assess the applicant's production processes, material controls, records etc to ensure that a consistent product is offered for sale. It is required that the certificate holder's quality assurance system covers the manufacturing process as well as the installation process. The certificate holder shall, where applicable, identify the approved manufacturer(s) as well as the approved installer(s) and ensure compliance with the quality system. The check by Agrément SA shall include audit visits to one or more of the manufacturing locations and construction locations to confirm the Quality Plan and Quality System for the surfacing system. The assessment of production control shall form the basis for subsequent surveillance visits.

3.2.2 Where a quality system, covering the manufacture and installation of the thin surfacing system under assessment, is ISO 9000 series certified, this shall be acceptable to Agrément SA. Other quality assurance schemes[1] recognised by Agrément SA may also be acceptable for certification.

[1] Details of these schemes shall be assessed by Agrément SA prior to acceptance.

### 3.3 Stage 3: Laboratory testing

3.3.1 Identification / Characterisation

3.3.1.1 The applicant shall provide the results of tests[2], which show that the characteristics of the system offered for assessment fall within the agreed specification for the system.

3.3.1.2 These checks also serve to ensure that the system offered for assessment is typical and to enable confirmation, at a later date, that other samples also fall within the agreed specification.

3.3.2 Performance testing

3.3.2.1 All samples submitted for testing shall be prepared by the applicant or his representative. Preparation of the samples may be witnessed by Agrément SA, or their agent. The applicant shall provide evidence that the system submitted for this stage is within the declared manufacturing tolerances, e.g. certificate of conformity, including quality control data, etc.

3.3.2.2 Testing shall be undertaken, on behalf of Agrément SA by a laboratory approved by Agrément SA, in accordance with the test methods defined in Section 3.6.

3.3.3 Test protocols and test selection

For various tests (refer to Section 3.6) more than one test method exists that may provide acceptable data for evaluating the parameter in question. For these specific tests, the applicant (or the technical evaluation committee) has the option of selecting the most appropriate test method. For these tests generic guidelines have been provided (Appendix B) that should be adhered to during performance of the test.

### 3.4 Stage 4: System installation trial

3.4.1 The applicant shall arrange for the system installation trial, during daylight hours, to demonstrate the installation and quality control to enable verification of his installation procedures.

The site for the installation trial is to be selected in accordance with the certificate class for which accreditation is required. Refer to Table 1 on the next page for certificate classification. The certificate classification covers the application category for which the product is intended as well as the traffic loads for which the product is suitable; note that the traffic volume should include a minimum of 15 per cent heavy vehicles.

Products shall be classified under one of the following two application categories:

Category A: products suitable for use in lanes with a speed limit ≤ 60 km/h and/or gradients > 6 per cent and/or intersections.

Category B: product suitable for use in lanes with a speed limit > 60 km/h and gradients ≤ 6 per cent

[2] Refer to Section 4 for acceptance criteria

**Table 1: Certificate classification.**

| Application category | Number of vehicles per lane per day | Certificate class |
|---|---|---|
| A | > 10000 | 1A |
| B | > 10000 | 1B |
| A | 2000-10000 | 2A |
| B | 2000-10000 | 2B |
| A | < 2000 | 3A |
| B | < 2000 | 3B |

3.4.2 The trial shall be witnessed and assessed by Agrément SA or its agents to cover the applicant's installation procedures as defined in the Installation Method Statement. If the installation trial is to be used as a performance trial then the inspection panel, if required, shall also be invited to witness the installation.

3.4.3 The Installation Method Statement shall be practical and sufficiently detailed to cover all foreseen eventualities, such as substrate preparation, weather limitations and temperature. It shall include the application rates of binder, aggregate and/or mixed material, the calculation method for application rate of the bond/tack coat, methods of verification to be used on site, maintenance and repair techniques, aftercare, and frequency of testing and the allowable tolerances from the target composition.

3.4.4 Agrément SA shall inspect the site to assess the visual condition of the system and may witness the site performance tests detailed in Section 3.6.

3.4.5 The applicant shall arrange for a laboratory approved by Agrément SA to carry out the road tests and take relevant samples for laboratory testing from the installation. Details of the performance (mandatory and optional) on parameters are provided in Section 3.6.

3.4.6 Test methods and procedures are detailed in Appendix B and the performance levels, where applicable, are defined in Appendix C

3.4.7 Alternatively, where a system already has type approval, or part approval, from an overseeing organisation existing data relating to the road trial carried out as part of the approval, if suitable, may be used for assessment purposes under this stage. The suitability of the data will be assessed by Agrément SA.

### 3.5 Stage 5: System performance trial

3.5.1 A system performance trial shall be required to assess the installation of the system and to monitor the system's performance over a two-year period. This trial may be part of the audit process where a temporary certificate has been issued.

3.5.2 The installation of the system shall be carried out and assessed as detailed in Section 3.4.

3.5.3 In addition the applicant shall arrange for monitoring of the site and make available the test results from a laboratory approved by Agrément SA at six monthly intervals over a two-year period. The report shall be made available to Agrément SA within one month of the due date. The inspection panel may be required to inspect the site, during the trial period, if the results of the monitoring suggest the need for such an inspection.

The following site performance tests shall be carried out to monitor the performance of the system over the two-year trial period:
Mandatory:
a) Visual observation
b) Texture depth
c) Skid resistance
d) Torque bond

Optional:
Where performance is claimed against a parameter not covered by the above tests.

3.5.4 Test methods and procedures are detailed in Section 3.6 and Appendix B and the performance levels, where applicable, are defined in Appendix C.

3.5.5 The inspection panel, at the end of the two-year trial period, shall witness the site performance tests detailed in Section 3.6 and conduct a visual assessment of the system in accordance with TMH 9

3.5.6 Alternatively, where a system already has type approval, or part approval, from an overseeing organisation existing data relating to the road trial carried out as part of the approval, if suitable, may be used for assessment purposes under this stage. The suitability of the data will be assessed by Agrément SA.

## 3.6 Test parameters

The applicant shall supply suitable test data on the performance of the thin surfacing system under the mandatory test parameters listed in 3.6.1. Where the applicant claims enhanced performance under any of the optional parameters listed in 3.6.2, performance shall be determined and included in the certificate.

The test methods listed in Section 3.6.1 and 3.6.2 are the methods approved for the purpose of certification by the project team. Should the applicant have data on the required parameters from alternative tests not listed here, this data may be presented to Agrément SA for consideration and if found applicable, may be used for certification. For tests with a standard approved protocol, reference is only made to the standard test method / protocol in Section 3.6 and the test protocol is not repeated in this document. For tests where such an approved protocol does not yet exists, either generic guidelines or a prescribed interim test protocol is provided in Appendix B.

### 3.6.1 Mandatory parameters

*Refer to Appendix C for ranges of acceptable parameter values*

a) Parameter: Polish resistance of aggregate

Background: The Polished Stone Value (PSV) is a quantification of the resistance of the aggregate against polishing by vehicle tyres. The PSV of the aggregate is one of the determining factors for the skid resistance of the pavement.

Status: Mandatory for all systems, however because of the large variation in individual PSV results obtained by different laboratories, the approach that is taken in South Africa is to relate PSV values to generic geologic classifications and long term performance on the road. ASPASA www.aspasa.co.za provides guidance on representative PSV value ranges of common South African rock types. The PSV test therefore only has to be performed if the material used is not represented on the ASPASA list.

Approved test: PSV laboratory test, as per SABS SM 848 [SANS 5848][3]

Comments: The samples for the PSV test and ACV test (refer to Section 3.6.1f) are to be taken from the same aggregate batch.

b) Parameter: Torque bond value

Background: Failure of the bond between the thin bituminous surfacing system and the substrata will lead to poor long term performance of the surfacing system. The effectiveness of the bond is therefore to be tested.

Status: Mandatory for all systems

Approved test: Torque bond test, to be performed as either a laboratory test or road test, refer to Appendix B.2

c) Parameter: Skid resistance

Background: The resistance against skidding under wet conditions provided by the surface of the pavement to tyres is an important functional parameter.

Status: Mandatory for all systems.

Approved tests: Grip tester, road test; as per BS 7941-2,
Portable skid resistance tester (pendulum tester), road test, as per TMH6, [4]
SCRIM, road test, as per BS 7941-1

d) Parameter: Texture depth

Background: Texture depth is one of the main parameters determining the skid resistance of a pavement surface.

Status: Determination of the initial texture depth and retained texture depth after two years and the rate of decline are mandatory for all systems.

Approved tests: Sand patch method, road test, as per TMH6,
Sensor Measured Texture Depth (SMTD), road test, as per ISO-13473

[3] Prospective designation

[4] The portable skid resistance test is calibrated for low speed roads only.

e) Parameter: Resistance against moisture induced stripping
Background: Exposure to moisture may reduce the integrity of bitumen products and results in loss of material under wheel pavement interaction.
Status: Mandatory for all systems.
Approved tests: Submerged wheel tracking, laboratory test, refer to Appendix B.4.
MMLS, road or laboratory test, refer to Appendix B.4.
Erosion test, laboratory test, refer to Appendix B.4.

f) Parameter: Aggregate Crushing Value (ACV)
Background: The surfacing layer has to withstand the highest stresses in the pavement system; the ACV is a measurement of the resistance of the layer's aggregate against crushing.
Status: Mandatory for all systems
Approved test: The ACV laboratory test, as per SABS SM 841 [SANS 5841][3]
Comments: The samples for the ACV test and PSV test (refer to Section 3.6.1a) are to be taken from the same aggregate batch.

g) Parameter: Visual condition of pavement
Background: Visual inspection of the pavement before and after the road trial will provide insight in possible faults with the system.
Status: Mandatory for all systems
Approved test: Visual inspection, road test, as per TMH 9 (including rut evaluation)

h) Parameter: Permanent surface layer deformation
Background: Rutting is the vertical creep of the road surface along the wheel paths. Rutting resistance of the surface layer is of relevance only if this layer has a minimum thickness of 25mm.
Status: Mandatory for systems where the nominal surface layer thickness is larger than 25 mm.
Approved tests: Submerged wheel tracking, laboratory test, refer Appendix B.1
Erosion test, laboratory test, refer to Appendix B.1
Wheel tracking rate, laboratory test, refer Appendix B.1
MMLS, laboratory or road test, refer Appendix B.1

### 3.6.2 Optional parameters

a) Parameter: Noise
Background: Certain properties of the surface layer influence the level of noise emanating from the contact between tyre and pavement.
Status: Optional
Approved test: Statistical pass by, road test, ISO 11819-1.

b) Parameter: Tensile fatigue after ageing
Background: The flexibility of the surfacing deteriorates under sustained climatic influences, which reduces the durability of the surface layer.
Status: Mandatory
Approved test: Indirect Tensile Fatigue Test, laboratory test, refer to Appendix B4 for test method and to Appendix B.6 for ageing method.

c) Parameter: Rut improvement value
Background: Comparison in surface regularity across the direction of the traffic flow before and after the thin surfacing layer has been applied.
Status: Optional
Approved test: Straight edge, road test, as per Appendix B.6

d) Parameter: Permeability
Background: A high level of permeability of the surface layer benefits drainage, but puts erosion and durability restrictions on the substrata.
Status: Optional
Approved tests: Hydraulic conductivity test, laboratory test, as per BS DD229
Marvil test, laboratory test, as per Technical Note TP/181/83.
Air permeameter test, laboratory test, as per TRH8.

e) Parameter: Changes in longitudinal irregularities
Background: Surface irregularities in the direction followed by traffic have a negative impact on the riding quality of the road.
Status: Optional
Approved tests: Any suitable automated test method

### 3.7 Stage 6: Certification

3.7.1 Any certificate issued shall be in the Agrément SA series and shall verify the system's compliance with the requirements given in this document. The certificate shall also define the system assessed, the conditions of use and the likely performance related to the severity of the conditions of use.

3.7.2 The assessment and any certificate issued shall be subject to the terms and conditions of the relevant Agrément SA contract, which shall include the following:

a) Where all requirements of this guideline have been fulfilled, the certificate issued shall remain valid provided that:

i) The specification and installation procedures of the system remain unchanged.
ii) The manufacturer continues to have the system checked by Agrément SA, which shall include ongoing surveillance of the production and installation
iii) The validity is confirmed by a review carried out every three years by Agrément SA.
The validity of a certificate can be checked by referring to the "Directory of certificates ", which is available on www.agrement.co.za, or by contacting Agrément SA telephonically on +27 12 841 3708.
iv) The requirements of the Guidelines Document remain unchanged.

b) Where all mandatory laboratory tests have been completed satisfactorily Agrément SA may issue a temporary certificate for the two years during which the trial tests are to take place. On completion of the trial assessment the temporary certificate will either be upgraded to a certificate with unlimited validity or retracted.

c) In the event of the certificate holder going into liquidation the certificate shall be suspended and may be withdrawn.

d) Reinstatement of a suspended or expired certificate shall be the subject of a review by Agrément SA. Certificates which have been suspended or expired for longer than 2 years shall no longer be valid for reinstatement.

3.7.3 During the validity of any certificate the certificate holder shall be responsible for the quality assurance/control of the production as declared to Agrément SA.

3.7.4 Agrément SA or its agents shall carry out one or more audit visits each year to production location(s) and/or the certificate holders offices (where appropriate), to check the certificate holders records and to ensure that the procedures and controls defined at the outset continue to apply. The number and frequency of the visits shall be agreed between Agrément SA and the applicant.

3.7.5 The certificate holder shall inform Agrément SA of the locations of any additional manufacturing plants before they become operational.

3.8 Audit Checks on Installers by the certificate holder

3.8.1 The applicant shall conduct audit checks on the installer(s) approved by the applicant in accordance with the product Quality Plan and installation method statement. Audit reports shall be supplied to Agrément upon request.

# 4. PROCESSING OF DATA SUPPLIED BY THE APPLICANT

## 4.1 Acceptance of data supplied by applicant

4.1.1 Agrément SA shall accept test data from laboratories with SANAS accreditation for the specific tests referred to in Section 3.6, which are performed on samples approved by Agrément SA. Agrément SA would require the test laboratory to submit a copy of their "SANAS schedule".

4.1.2 In the absence of a laboratory meeting the conditions of Section 4.1.1, Agrément SA may accept test data from other SANAS accredited testing laboratories, or laboratories approved by Agrément SA, that have demonstrated their competence and ability to perform the relevant tests to the satisfaction of Agrément SA Quality Manager.

4.1.3 Test data from overseas, external, independent testing laboratories that have the equivalent national accreditation for the specific tests may be accepted if there is a reciprocal agreement between SANAS and the national accreditation authority of the country in question, and the test methods used have been demonstrated as being equivalent to the satisfaction of Agrément SA.

4..1.4 Other data supplied in support of the assessment (e.g. background information, test data relating to generic materials etc), where the above conditions are not met, shall only be accepted after having been individually assessed and approved as being suitable by Agrément SA.

## 4.2 Assessment of data supplied by applicant

4.2.1 Test data submitted by the applicant in support of an application for the assessment of a thin surfacing system will be assessed by Agrément SA. Where necessary Agrément SA may consult specialists or a specialist panel of normally 5 or 6 members representative of the industry task team with at least one from each of the following areas:

- Expert in the testing and interpretation of test data relating to the performance of thin surfacing materials.
- Road authorities.
- Manufacturers / trade associations (not the manufacturer submitting the data).

4.2.2 Agrément SA shall agree with the applicant the need to consult a specialist or a specialist panel prior to the consultation taking place.

4.2.3 The data submitted by the applicant shall be assessed to ensure that it is valid, i.e. it should be:

- Relevant / traceable to the system proposed.
- Adequate to allow a judgement to be made of the performance in relation to the relevant mandatory tests and/or any optional tests the applicant claims for the system.

4.2.4 After reviewing the data submitted by the applicant Agrément SA will decide, (in consultation with the specialist panel, if necessary) on the need for any additional testing. Any additional testing shall be carried out by a laboratory approved by Agrément SA.

4.2.5 Appeal by the Applicant

If the Applicant wishes to appeal against the decision taken then the appeal shall be considered by Agrément SA.

**APPENDIX A**


## A P P L I C A T I O N

**for the technical assessment of a thin bituminous surfacing system**

Brand name of product to be assessed …….....

Name of company/individual making application ……

Signed …… Date ……...

Name (print) …….. Position in company …….

ADMINISTRATIVE INFORMATION REQUIRED

Company registration no …….. Vat no ……

ID no (in case of private applicant) ……

Postal address ……

Street address ……

Telephone no ……. Cell no …… Fax no ……...

Individual in the company responsible for this application and who can be contacted for information

Name ……. Position in company …….

Telephone no ……. Cell no ……... Fax no …….

If this application is being handled by an agent, please provide:

Name of agent ……...

Name of company …….

Telephone no ……. Cell no…… Fax no ……...

Agrément SA
P O Box 395, Pretoria, 0001 □ Telephone (012) 841 3708 □ Fax (012) 841 2539
e-mail agrement@csir.co.za □ http://www.agrement.co.za

## 1. GUIDELINES ON REQUIRED DOCUMENTATION

1.1 One set of supporting documentation must be submitted with each application. If the application is accepted, further sets of documentation may be required.

1.2 This application form is an appendix of, and should be read in conjunction with, the Agrément SA guideline document for the assessment and certification of thin bituminous surfacing systems.

1.3 A complete description of the thin surfacing system must be provided; the information should cover all requirements stated in the guideline.

1.4 Any confidential information provided by the applicant is to be clearly marked as such.

## 2. GENERAL

2.1 Provide a short (single paragraph) description of the thin surfacing system. No details to be supplied.

2.2 List the product purposes (e.g. noise abatement, skid resistance, etc)

2.3 Provide a short description of the product's applicability (e.g. terrain type, climatic zones where the product will be used, traffic conditions, requirements on substrata etc.)

2.4 At what stage is the development of this product (e.g. being developed, marked tested, in production)?

2.5 Refer to section 2.1 and 2.2 of the guideline document and indicate the preferred order of the Agrément SA assessment.

2.6 Refer to Table 1 of the guideline document and indicate the desired certificate class for the product.

2.7 Provide all information required for the safe use of the product by Agrément SA and its subcontractors (refer to section 3.1.3 of the guideline document)

## 3 PRODUCT PERFORMANCE HISTORY

3.1 Provide information on where and by whom the original thin surfacing system was developed.

3.2 Is this the original or an improved version of the thin surfacing system?

3.3 List sites in South Africa (if any) where the product has been used, including per site the number of years the product has been in service. If only some sites are available for inspection, indicate which sites are available. Provide contact details of road authority for each site

3.4 List sites outside South Africa (if any) where the product has been used, including per site the number of years the product has been in service, the traffic and climatic conditions, and the condition of the road prior to the placing of the product. Provide contact details of road authority for each site.

3.5 Taking into account the certificate class selected under 2.6 of this form indicate appropriate sites for assessment as described under section 2.3 of the guideline document. Provide a detailed description of the condition of the existing pavement structures prior to the installation of the thin surfacing system.

3.6 Any available test reports or approvals issued by testing bodies or authorities which used the product should be submitted. Reports must be applicable for the use of the product as envisaged in South Africa. Documents in foreign languages should be submitted in English. Refer to Section 4 of the guideline for the acceptance criteria for use of data supplied by the applicant for accreditation. Identify from these reports the results for the parameters listed under Section 3.6 of the guideline document.

3.7 The applicant shall supply a detailed test protocol for any test method used to obtain historical test data or if available refer to the published protocol.

## 4 ADDITIONAL TESTING

4.1 Where additional data on the performance parameters listed under Section 3.6 of the guideline is required the applicant is to submit a test plan, including:

- A selection of laboratory tests (where required) as per Section 3.5 of the guideline taking into account the requirements of Section 3.3 of the guideline.
- Where a system installation and or performance trial is required identify the site for the trial and propose a construction schedule (refer to requirements in Section 3.4, 3.5 and 3.6 of the guideline). Also provide a list of selected road tests as per Section 3.6 of the guideline.

4.2 The applicant shall supply a detailed test protocol for any test that forms part of the test plan, or if available refer to the published protocol.

## 5 ORGANIZATIONAL STRUCTURE FOR PRODUCTION

5.1 The applicant shall identify approved manufacturers (or supplier) and installers for the thin surfacing system.

5.1.1 The manufacturer of the thin surfacing system shall be indicated together with contact details and manufacturing plant details. It must also be clearly indicated whether the system's materials are:

- Locally manufactured under license from an international firm;
- Internationally manufactured and imported, or
- Locally manufactured by a local supplier.

5.1.2 The status of the local end-supplier of the system should be indicated in terms of:

- Local licensed agent;
- Sole supplier, or
- Sole manufacturer.

5.1.3 The selected manufacturer's experience in terms of supply/manufacturing of thin surfacing systems in general should be supplied. Information such as the number of years in business, project track record, and the experience with the product for which the application is being submitted should be provided.

5.1.4 The selected contractor's experience in terms of installing of thin surfacing systems in general should be supplied. Information such as the number of years in business, project track record, and the experience with the product for which the application is being submitted should be provided.

## 6 PRODUCTION CONTROL

6.1 Provide the installation method statement and full details of the quality management system covering the manufacture, transportation, and installation of the thin surfacing system (refer to section 3.2 of the guideline document).
As an indication quality management schemes acceptable to Agrément SA (such as ISO 9000) typically include;
- A policy of focus on customer satisfaction
- Availability of records
- Process planning
- Responsibilities
- Assurance of availability of competent personnel and resources
- Safety procedures
- Detailed descriptions of production processes
- Production tolerances
- Monitoring of process and product performance against quality requirements
- Control of nonconformities
- Application of corrective/preventive actions
- Focus on continual improvement

6.2 An indication should be provided of any warranty/guarantee supplied for the product. The conditions under which the warranty/guarantee is supplied should also be stipulated.

6.3 The applicant must supply information regarding all critical design requirements for the surfacing system, both for new and rehabilitation projects. The client shall supply detailed information on the boundary conditions for successful application of the product (i.e. condition of existing surface, pre-treatment required, limits on deflection, etc.).

## 7 SPECIFICATIONS OF THIN BITUMINOUS SURFACING SYSTEM

7.1 The applicant shall supply detailed specifications of the system under assessment including information on:

- The binder (type, source, characteristics),
- Aggregates (type, source, characteristics),
- Tack coat (type, source, characteristics),
- Ancillary products (type, source, characteristics),
- Mix design parameters,

- Provide references where materials comply with standards
- Description of final product, including the nominal thickness
- The formulation and composition (mix ratios are not required) of non-standard materials are required: these will be kept confidential to Agrément SA

7.2 An indication of the expected service life for the thin surfacing system should be provided. This information should be based on existing experience of the system's performance.

# 5. APPENDIX B: TEST METHODS AND PROCEDURES

Non-standard test methods and standard test methods with modifications to the method of sample preparation

Appendix B.1 Wheel tracking rate
Appendix B.2 Torque bond strength
Appendix B.3 Ageing Characteristics evaluation
Appendix B.4 Resistance against moisture induced stripping
Appendix B.5 Initial changes in maximum transverse irregularities
Appendix B.6 Air permeability test
Appendix B.6 Accelerated ageing of samples

## Appendix B.1 Wheel tracking rate

### 1. Scope

This protocol describes the method for determining the susceptibility of thin surfacing systems to surface deformation. As there is more than one available test method that is acceptable for measuring this property (MMLS, Adapted erosion test method, Wheel Track Tester, etc), a generic guideline for the requirements of the test is provided in this appendix.

### 2. Generic rut testing requirements

The requirements provided below are generic for any rut tester being used for evaluation of thin bituminous surface systems for the purposes of potential certification through Agrément SA. The purpose of these generic guidelines is to enable applicants to submit data obtained from an acceptable test method and not only one specific test method.

### 3. Testing apparatus

A constant, standard load of acceptable magnitude should be applied to the whole sample during testing.

The testing apparatus must be calibrated and maintained in a working condition.

Where applicable, a quality management process should be in place for the maintenance of the apparatus.

A standard protocol should be in place for the use of the apparatus.

### 4 Testing conditions

A constant, standard temperature of acceptable magnitude should be maintained throughout the test.

The whole sample should be conditioned at the test temperature before testing initiates to ensure that no adverse temperature effects develop during the test.

### 5 Sample

The sample should be representative of the thickness that will be used in the field.

The support provided to the sample should be rigid and constant for the whole sample.

The sample should consist of the same material to be used in the field.

The samples should be prepared in a standard mould using a repeatable protocol, ensuring that different samples of the same mix will be similar.

### 6 Measurement and Reporting

The rutting on the surface of the sample should be measured to an acceptable accuracy (± 0.1 mm).

Measurements should commence before the test is started to provide a baseline value.

Measurements should be performed at adequate intervals during the test to ensure that a clear trend in rut behaviour can be observed from the collected data (at least 10 data points at different intervals during the test).

All information regarding the sample, testing conditions and measured data, as well as a detailed description of the test method and test protocol, should be reported in a standard and clear report.

**Appendix B.2 Torque Bond Test**

(Draft for development)

**1. Scope**

The following protocol describes methods for determining the Bond Strength between a thin surfacing system and its substrate, which may be bituminous or cementitious, by measuring the peak shearing torque, at a known temperature. Two methods of test are described for tests carried out on site and on cores taken from site and tested in the laboratory. The test shall only be carried out on thin surfacing systems which have been installed for a period of between 28 and 56 days.

The protocol describes a test procedure that has been developed specifically for the assessment of thin surfacing systems under Agrément SA certification procedures. The method is currently at the draft for development stage and should not be used for specifying purposes.

**2. Definitions**

t: inter-layer bond strength in kilo-Pascals (kPa),
M: peak value of applied shearing torque in Newton metres (N m),
D: diameter of core in millimetres (mm)

**3. Apparatus**

3.1 Equipment

3.1.1 Core cutting (dry) apparatus: suitable for cutting 100 mm (or 150 mm)(1) diameter cores in bituminous and cementitious materials;
3.1.2 Torque meter: fitted with a fiducial reading gauge. The device shall be calibrated over a range of 0 to 350 N m with a scale readable to at least 10 N m. The device shall be fitted with a socket-fitting allowing steel plate to be fitted and removed.
3.1.3 Metal Plate: of mild steel having a diameter of (95±5) mm or (145±5) mm, and a thickness of (14±2) mm. The plate shall incorporate a fitting enabling it to be coupled to the torque meter (2).
3.1.4 Thermometer: readable to 0.1 °C and accurate to 0.5 °C.
3.1.5 Steel Rule
3.1.6 Callipers: for measurement of core diameters;
3.1.7 Mould or other means of confining Laboratory test samples for testing.
3.1.8 Watch or Timer: readable and accurate to 1 second.
3.1.9 Mould: for confining laboratory test specimens, (e.g. 150 $mm^3$ concrete cube mould).
3.1.10 Spirit Level: for checking laboratory test specimens;
3.1.11 Oven or refrigerated incubator (optional).

Notes:
1 Subject to review.
2 Fittings of 12.7 mm and 19.05 mm have been found to be suitable.

3.2 Materials

3.2.1 Adhesive: (a stiff adhesive, such as rapid setting epoxy resin, with sufficient strength to avoid failure within the adhesive or at the adhesive/thin surfacing interface).
3.2.2 Mounting material (for laboratory tests): e.g. rapid hardening mortar, concrete or grout.

## 4. Test methods

4.1 Site test method

4.1.1 Core (dry) the location to be tested using a 100 mm (or 150 mm) diameter core barrel to a minimum depth of 20 mm below the thin surfacing layer to be tested without removing the cores. Six such cores shall be cut along a 100 m length of the installation at nominally even spacing along a diagonal line across the lane width.

4.1.2 Ensure that all debris is removed from the rebate formed by the core barrel. Clean and dry the surface to be tested.

4.1.3 Use the bonding agent to secure the metal plate to the surface of the core, taking care to ensure that the plate is parallel to the surface.

4.1.4 When the bonding agent has developed sufficient strength, (i.e. failure should not occur within the adhesive), fit the torque meter to the metal plate, using adapters and extension rods as appropriate.

4.1.5 Apply torque to the core at a steady rate so that failure occurs in (60±30) seconds. Care must be taken to ensure that the torque is applied parallel to the core surface (within ±10°). Torque is applied to the plate until failure of the bond occurs. Observe and record the time to failure to within ±2 seconds.

4.1.6 Record the value of torque at failure, M, in Newton metres. Measure and record the bond interface temperature immediately after failure.

4.1.7 Examine the core and substrate and record the condition of the bond interface (e.g. smooth, planar, rough or irregular). Record the substrate type (e.g. bituminous or cementitious surface). Where known record details of the substrate condition prior to surfacing, (i.e. planed, untreated or regulated).

4.1.8 Measure and record the core diameter at two locations approximately 90°. apart using callipers and record the mean value, D, to an accuracy of 1 mm.

4.1.9 Measure and record the depth of the surfacing to the substrate interface to an accuracy of 1 mm.

4.1.10 Calculate the bond strength in accordance with Section 5.

4.2 Laboratory test method

4.2.1 Cut a 100 mm (or 150 mm) diameter core (dry) to a minimum depth of 80 mm below the bottom of the surface layer. Extract the core taking care not to damage the surface layer of the core or the bond interface with the substrate. Six such cores shall be taken along a 100m length of the installation at nominally even spacing along a diagonal line across the lane width.

4.2.2 Trim the core to a length suitable for mounting if appropriate.

4.2.3 Place the core in the mould, using mortar or grout as a bedding layer if appropriate, so that the upper layer and the bond interface to be tested is (20±10) mm above the rim of the mould. Fill the mould with the mortar/grout and trim flush with the mould rim, ensuring that the core is perpendicular to, and the upper surface parallel with, the mould surface. Check using the spirit level.

4.2.4 Fix the metal plate to the core using the adhesive and allow setting.

4.2.5 Unless otherwise specified (1), condition the mounted cores by storing at a temperature of (20±2) °C for a minimum of 4 hours and for not more than 16 hours before testing. Record the times and temperatures employed.

4.2.6 Unless otherwise specified, test the core at a temperature of (20±2) °C: where other temperatures are used the test shall be completed within 5 minutes of removal from the conditioning environment.

4.2.7 Fix or clamp the mould containing the mounted core to a suitably rigid surface. Carry out the test as described in 4.1.5.

Examine the core and record all the relevant information as described in 4.1.6 to 4.1.9.

## 5. Calculation of Bond Strength and expression of results

Calculate the bond strength for each specimen using the following formula:

$$\tau = \frac{12M \times 10^6}{\pi D^3}$$

Calculate the arithmetic mean of the inter-layer bond strength, t, for the six specimens. A sample which has a result more than two standard deviations from the mean will be considered an outlier and is disconsidered in the calculation of the mean.

## 6. Test report

6.1 The test report shall include the following information:

- Name of organisation carrying out the test
- Method of test used
- Description of materials (system and substrate)
- Date of test
- Peak torque at failure (N m)
- Inter-layer bond strength (kPa), (individual and mean values)
- Time to failure (seconds)
- Diameter of core (mm)
- Depth of Bond interface (mm)
- Temperature of the Bond interface at test ($^{o}$C)
- Conditioning details (duration and temperature)
- Site or Laboratory test
- Identification of Site or Scheme
- Core location
- Age of the installation / specimen at the time of test
- Nature of the Bond interface

## 7. Precision

The precision for this test method has not been determined.

Note:

1. Temperatures outside this range may be specified, e.g. in order to compare data obtained from site tests carried out at temperatures other than (20±2)°C. In this case additional laboratory apparatus (i.e. ovens or refrigerated incubators) may be required. Conditioning of specimens in a soaked condition may also be undertaken. Details of the conditioning used prior to testing shall be recorded.

## Appendix B.3 Ageing characteristics evaluation

### 1. Scope

This protocol describes a method for measuring the ageing characteristics of thin surfacing systems by determining fatigue characteristics (using Indirect Tensile Fatigue) before and after long term oven ageing.

The protocol describes a test procedure that has been developed specifically for the assessment of thin surfacing systems under Agrément SA certification procedures. The method has yet to be proven and shown to be valid. The method is therefore unsuitable for use in specifications and should not be used for this purpose.

### 2. References

Normative references

This protocol incorporates, by reference, provisions from specific editions of other publications. Subsequent amendments to, or revisions of, any of these publications apply to this protocol only when incorporated in it by updating or revision.

### 3. Test Specimens

The specimens for test shall be cylindrical cores (dry). The preferred option is core samples removed from the road, but cores removed from trial strips are also acceptable.

The method is applicable to test specimens having a thickness of (40 ± 10) mm and diameter of (100 ± 3) mm.

### 4. Specimen Preparation

The maximum ambient air temperature during transit to the testing laboratory shall be recorded. Upon receipt at the laboratory they should initially be stored at (15 ± 10) °C.

Storage of specimens awaiting testing or preparation for testing shall be maintained at (15 ± 10) °C up to a maximum period of 72 hours from the time of coring.

Cored specimens that have been trimmed by wet sawing in preparation for testing shall be allowed to dry in air at (15 ± 10) °C for a minimum of 16 hours prior to the determination of bulk density.

If long term oven ageing or fatigue testing has not commenced within 72 hours of coring, the specimens shall be placed in storage and maintained at (5 ± 2) °C until commencement of the testing procedure.

Specimens shall not be stacked at any stage.

### 5. Replication

A minimum of ten core pairs (20 specimens) shall be taken from the road or trial strip. Each core constituting a pair shall be taken within 100 mm of each other and each core pair shall be clearly identified.

All ten core pairs shall be taken randomly within a road where possible, but in any case within a laid area of 60 $m^2$. The diameter of the specimens quoted assumes a nominal maximum aggregate size of not greater than 20 mm.

## 6. Procedure

Separate the 10 core pairs into two sets of 10, nominate one set of 10 samples as the "Unaged Set" and determine the fatigue characteristics of this set of samples according to draft [BS DD ABF, June 1995[5]]. Nominate the other set of 10 samples as the "Aged Set" and age them for 120 hours at 85°C in accordance with the method described in Appendix A12. At the end of the Long Term Oven Ageing Procedure, allow the specimens to cool for at least 24 hours, then determine the fatigue characteristics of this set of samples according to draft [BS DD ABF, June 1995[5]].

## 7. Reporting

7.1 Ageing characteristics

Report the results of the stiffness and ageing tests separately for each set of ten samples, as described in draft [BS DD ABF, June 1995[5]]. In addition, report the difference between the "Unaged Set" and "Aged Set" of data in terms of the number of cycles to failure (Nf) at a maximum tensile horizontal strain at the centre of a specimen of 100 microstrain, calculated from the linear regression analysis equation described in draft [BS DD ABF, June 1995[5]].

7.2 Stiffness

Report the results of the stiffness tests in accordance with [BS DD 213[5]] if required.

## 8. Precision

The precision for this test method has not been established.

[5] As this is a new test method that is proposed, the original BS references are kept until the use of the test in South Africa has indicated the most appropriate local test methods to replace the British test method with.

## Appendix B.4 Resistance against moisture induced stripping

### 1. Scope

This test is required to determine the resistance against moisture induced stripping of the sample. The test should be conducted with a standard wheel tracking type apparatus (refer to Appendix B.1). As there are no prescribed or standardised methods available for this test, the following generic guidelines are provided for conducting the test.

### 2. Generic moisture susceptibility testing requirements

The requirements provided below are generic for any rut tester being used for evaluation of thin bituminous surface systems for the purposes of potential certification through Agrément SA. The purpose of these generic guidelines is to enable applicants to submit data obtained from an acceptable test method and not only one specific test method.

### 3. Testing apparatus

A constant, standard load of acceptable magnitude should be applied to the whole sample during testing.

The testing apparatus must be calibrated and maintained in a working condition.

Where applicable, a quality management process should be in place for the maintenance of the apparatus.

A standard protocol should be in place for the use of the apparatus.

### 4 Testing conditions

A constant, standard temperature of acceptable magnitude should be maintained throughout the test.

The whole sample should be conditioned at the test temperature before testing initiates to ensure that no adverse temperature effects develop during the test.

When performing a test to evaluate stripping potential of the sample, the moisture conditions should be controlled for the duration of the test.

### 5 Sample

The sample should be representative of the thickness that will be used in the field.

The support provided to the sample should be rigid and constant for the whole sample.

The sample should consist of the same material to be used in the field.

The samples should be prepared in a standard mould using a repeatable protocol, ensuring that different samples of the same mix will be similar.

### 6 Measurement and Reporting

The stripping behaviour of the binder from the aggregate should be observed during the test.

The test should be stopped at regular, pre-defined intervals to evaluate the condition of the sample and determine whether any stripping has occurred.

When stripping has started to occur on the sample, the repetitions to that point should be noted.

All information regarding the sample, testing conditions and measured data, as well as a detailed description of the test method and test procedure should be reported in a standard and clear report.

## Appendix B.5 Initial changes in maximum transverse irregularities

### 1. Scope

This protocol describes the procedure for determining the reduction in the size of any surface irregularities across the direction that traffic will travel following the application of a thin surfacing system by comparison of surveys with a straight edge and wedge carried out before and after the surfacing was laid.

The protocol describes a test procedure that has been developed specifically for the assessment of thin surfacing systems under Agrément SA certification procedures. The method has yet to be proven and shown to be valid. The method is therefore unsuitable for use in specifications and should not be used for this purpose.

### 2. References

2.1 Normative references

This protocol incorporates, by reference, provisions from specific editions of other publications. Subsequent amendments to, or revisions of, any of these publications apply to this protocol only when incorporated in it by updating or revision.

2.2 Informative references

This protocol refers to other publications that provide information or guidance. Editions of these publications current at the time of issue of this standard are in 0, but reference should be made to the latest editions.

### 3. Definitions

The following definitions apply to this test:

- Initial rut is the average deformation in the nearside wheel-track over 100 m length of carriageway prior to resurfacing.
- Residual rut is the average deformation in the nearside wheel-track over 100 m length of carriageway after resurfacing but before trafficking.
- Rut improvement value is the reduction in the size of permanent deformations due to resurfacing as measured by the proportional change from initial to residual ruts.

### 4. Apparatus

A 2 m straight edge, as supplied for "Chart surveys" and associated depth measurement probe.

### 5. Sampling

The testing shall be carried out along a 100 m length of the nearside wheel-track selected to have the required initial deformation.

### 6. Test procedure

6.1 Test locations

Mark ten locations along the kerb or other suitable reference point at 10 m intervals in a manner that will remain visible after the surfacing has been laid.

6.2 Initial measurement

Prior to the surfacing being applied, place the straight edge alongside the first location, so that it is nominally perpendicular to the direction of traffic, bridging the nearside wheel-track. Record the distance from the kerb or other reference line and locate and measure the maximum initial rut depth. Repeat the measurements at the remaining 9 locations and calculate the mean initial rut depth (Ri).

The mean initial rut depth shall be at least 6 mm for the test to be valid.

6.3. Final measurement

After the surfacing has been applied but before it is opened to traffic, place the straightedge in the same position as in 6.2 (± 10 mm) and repeat the measurements at each location. Calculate the mean residual rut (Rr).

7. Calculation and expression of results

7.1 Rut improvement value

The rut improvement value (R%) is calculated from:

$$R_{\%} = \frac{100(R_i - R_r)}{R_i}$$

Where,

The initial rut (Ri) is the mean rut depth at each location measured prior to laying the surfacing. The initial rut shall be recorded to ± 1 mm.

The residual rut (Rr) is the mean rut depth at each location measured after laying the surfacing but before trafficking.

The residual rut shall be recorded to ± 1 mm.

The rut improvement value (R%), shall be recorded to the nearest 5 percent.

**8. Test report**

The test report shall include the following information:

- date, time and place of test;
- the total length of the test strip;
- the rut depth at each location, both before and after the surfacing was laid;
- the mean initial rut, the mean residual rut and the rut improvement value;
- any test conditions and operational details not provided in this protocol, and anomalies, if any, likely to have affected the results.
- name of person taking technical responsibility for the test;
- the number and date of this protocol

NOTE. The test report may include the following optional information:

- name of project;
- name of supplier and source of material;

- date of production of material;
- specification of material.

## 9. Precision

The precision of this method has not been determined.

## Appendix B.6 Accelerated ageing of samples

### 1. Scope

This protocol is used to simulate the ageing of thin surfacing systems. The ageing simulates the hardening of the bitumen in the mixture subsequent to installation. The practice should result in ageing representative of 5 to 10 years in service for dense-graded mixtures.

The protocol describes a procedure that has been developed specifically for the assessment of thin surfacing systems under Agrément SA certification procedures. The method has yet to be proven and shown to be valid. The method is therefore unsuitable for use in specifications and should not be used for this purpose.

### 2. Normative References

This protocol incorporates, by reference, provisions from specific editions of other publications. Subsequent amendments to, or revisions of, any of these publications apply to this protocol only when incorporated in it by updating or revision.

### 3. Apparatus

Forced-draught oven - thermostatically controlled and capable of being set to maintain any desired temperature from room temperature to 100°C to within ±2°C.

Thermometer - capable of measuring temperatures from room temperature to 100°C and having an accuracy of ±1°C or better.

Wire mesh basket - of sufficient rigidity to support the side and bottom of the compacted specimens, without bending or flexing appreciably and having an open area to total area ratio of at least 75 per cent.

Note: Stainless steel Expamet has been found to be suitable for this purpose.

### 4. Preparation

Core specimens shall be prepared and stored in accordance with TMH1 Appendix to Method C2

### 5. Procedure

5.1 Place the prepared specimen(s), supported in the wire mesh basket(s), in the forced-draft oven for (120±0.25) hours at a temperature of (85±2) °C.

5.2 After (120±0.25) hours, turn off the oven, open the door and allow the specimen to cool to room temperature for at least 24 hours.

Note: Do not disturb the specimen until it has cooled to room temperature.

5.3 After the specimen has cooled down to room temperature, remove it from the oven. The specimen is now ready for testing as required.

## APPENDIX C PERFORMANCE LEVELS

Verified and approved data on performance values for many of the proposed test parameters are not available specifically for thin bituminous surface systems in applications as covered in this guideline. Although various tests have been conducted in the past, there are no generally accepted performance levels for these specific products.

However, due to the nature of the product and based on experience of knowledgeable engineers, estimates can be made regarding the required performance levels for these parameters. Therefore, the project team is of the opinion that three separate evaluation columns are required.

The first column contains the minimum value for parameters on which relevant published performance requirements are available. The second column contains indicative values for performance on parameters where limited information is available. The third column contains the proposed performance value for parameters where no performance data is available. The values in columns 2 and 3 (indicative and proposed values) are based on the experience and knowledge of engineers and not necessarily related to test data. It is the intention that these values be refined towards acceptable values (based on controlled experiments and measurements) with time.

**TABLE C1**

| Section | Parameter | Test | Acceptable value | Indicative value | Proposed value |
|---|---|---|---|---|---|
| 3.6.1a | Aggregate Polish resistance | PSV test | 50[6] | | |
| 3.6.1b | Torque bond value | Torque bond test | | ≥ 400kPa | |
| 3.6.1c | Skid resistance | Grip tester | | ≥ 0.66 | |
| | | Portable skid resistance tester | | ≥ 65 | |
| | | SCRIM | | ≥ 0.55 | |
| 3.6.1d | In service Texture depth | Sand patch method | 0.6 mm | | |
| | | SMTD | 0.6 mm | | |
| 3.6.1e | Resistance against moisture induced stripping | Wheel tracking tests | | No stripping | |
| 3.6.1f | Aggregate Crushing Value | ACV test | 15 | | |
| 3.6.1g | Visual condition of pavement | TMH 9 | Condition index: ≤ 2 | | |
| 3.6.1h | Permanent surface layer deformation | Wheel tracking tests | | | ≤ 25 % of layer thickness[7] |

**Note: For the optional parameters no requirements are set, the recorded performance under these parameters can be included on the certificate.**

[6] Refer to www.aspasa.co.za for guidance on representative PSV value ranges of common South African rock types.

[7] Deformation at the standard number repetitions for the test device. The standard number of repetitions shall be representative for the prospected traffic during the design life of the layer.