



Agreement Draft

**PERFORMANCE CRITERIA**  
Cold mix materials for patching and pothole repairs

Revised October 2016

**innovative construction product assessments**



## Table of Contents

INDUSTRY TASK TEAM .....	2
PROJECT TEAM .....	2
AGRÉMENT SOUTH AFRICA REPRESENTATIVES.....	2
TABLE OF AMENDMENTS .....	3
SCOPE .....	4
1 INTRODUCTION .....	4
2 ASSESSMENT AND CERTIFICATION PROCEDURE.....	7
2.1 <i>Stage 1: Assessment of Applicant's Data</i> .....	7
2.2 <i>Stage 2: Assessment of production control (Quality management)</i> .....	7
2.3 <i>Stage 3: Laboratory testing</i> .....	8
2.4 <i>Stage 4: System installation trial</i> .....	8
2.5 <i>Stage 5: System performance trial</i> .....	9
2.6 <i>Test parameters</i> .....	10
2.7 <i>Stage 6: Certification</i> .....	12
2.8 <i>Audit Checks on Installers by the certificate holder</i> .....	12
3 PROCESSING OF DATA SUPPLIED BY THE APPLICANT.....	13
3.1 <i>Acceptance of data supplied by applicant</i> .....	13
3.2 <i>Assessment of data supplied by applicant</i> .....	13
APPENDIX A: APPLICATION FORM.....	15
1 GUIDELINES ON REQUIRED DOCUMENTATION .....	17
2 GENERAL .....	17
3 PRODUCT PERFORMANCE HISTORY .....	17
4 ADDITIONAL TESTING.....	18
5 ORGANISATIONAL STRUCTURE FOR PRODUCTION .....	18
6 PRODUCTION CONTROL (QUALITY MANAGEMENT).....	19
7 SPECIFICATIONS OF COLD-LAY SURFACING MATERIAL .....	20
APPENDIX B: TEST METHODS AND PROCEDURES .....	21
APPENDIX B.1: WHEEL TRACKING RATE .....	22
1 <i>Scope</i> .....	22
2 <i>Generic rut testing requirements</i> .....	22
3 <i>Testing apparatus</i> .....	22
4 <i>Testing conditions</i> .....	22
5 <i>Sample</i> .....	22
6 <i>Measurement and Reporting</i> .....	23
APPENDIX B.2: MODIFIED LOTTMAN TEST .....	24
1 <i>Scope</i> .....	24
2 <i>Generic testing requirements</i> .....	24
3 <i>Sample preparation and conditioning</i> .....	24
APPENDIX B.3: VOLUMETRIC CHARACTERISTICS.....	25
1 <i>Scope</i> .....	25
2 <i>References</i> .....	25
3 <i>Test Specimens</i> .....	25
4 <i>Specimen Preparation</i> .....	25
5 <i>Replication</i> .....	25
6 <i>Procedure</i> .....	25
7 <i>Reporting</i> .....	25
APPENDIX C: VOLUMETRIC CHARACTERISTICS.....	26



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## Table of Amendments

Amendment no.	Page no.	Scope
1	5	Corrected to delete “bituminous” in the definition of cold mix material
2	9	Amended to include suitable application methods of the product on the system installation trial
3	10 Table 1	Amended to include the application method of the product as a variable in the classification of certificates
4	11	Amended to include water permeability as a mandatory site performance test to be carried out to monitor the performance of the system over the 2-year trial period
5	13	Amended to change permeability from an optional test parameter to a mandatory test parameter
6	23	Amended to modify the requirements for “testing conditions” of the “generic rut testing requirements”
7	24	Amended to modify the procedure for “sample preparation and conditioning” of cold lay surfacing material
8	25	Amended to change the procedure for “specimen preparation” for measuring the volumetric characteristics of cold-lay surfacing material
9	26 Table C1	Amended to change the acceptable value of Aggregate polish resistance from a PSV test to 48



## Scope

The scope of this guideline is applicable to cold materials that comply with the requirements as determined by the industry task team.

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.

For the purpose of this scheme a cold mix material is defined as a proprietary binder with suitable properties to provide a waterproof and stable surfacing for patching or pothole repairs.

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

A condition of certification shall be that a detailed method statement for the storage, handling and installation of the product is provided to all parties installing the product. The method statement shall be subject to continuous improvement and covered by the certificate holder's quality management system. The certificate holder shall periodically audit the effectiveness of the method statement and make the details of the audits available to Agrément South Africa (ASA) when requested.

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 rut resistance, moisture resistance and long-term voids content, 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.

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 national standard has been published since the publication of the guideline.

## 1 Introduction

1.1 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.

- 1.2 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.
- 1.3 All materials shall be able to demonstrate satisfactory performance on at least 3 sites of appropriate nominal installation depth (potentially limits are a minimum thickness of 30 mm, and a maximum thickness of 50 mm, but greater thickness may be evaluated for the purpose of the certificate), 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 ASA or their agent. Existing data obtained during the road trial for departmental type approval will normally be acceptable to ASA. 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 ASA temporary certificates may be provided, based on laboratory test results, past field performance of the system and other available data, pending the completion of all field tests.
- 1.4 Where materials already have type approval, or part approval, from an organisation or client body recognised by ASA, and based on rigorous evaluation of information that can be substantiated to ASA, 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 ASA.
- 1.5 ASA, in consultation with the industry task team, reserves the right to amend or supplement the tests required for ASA 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.

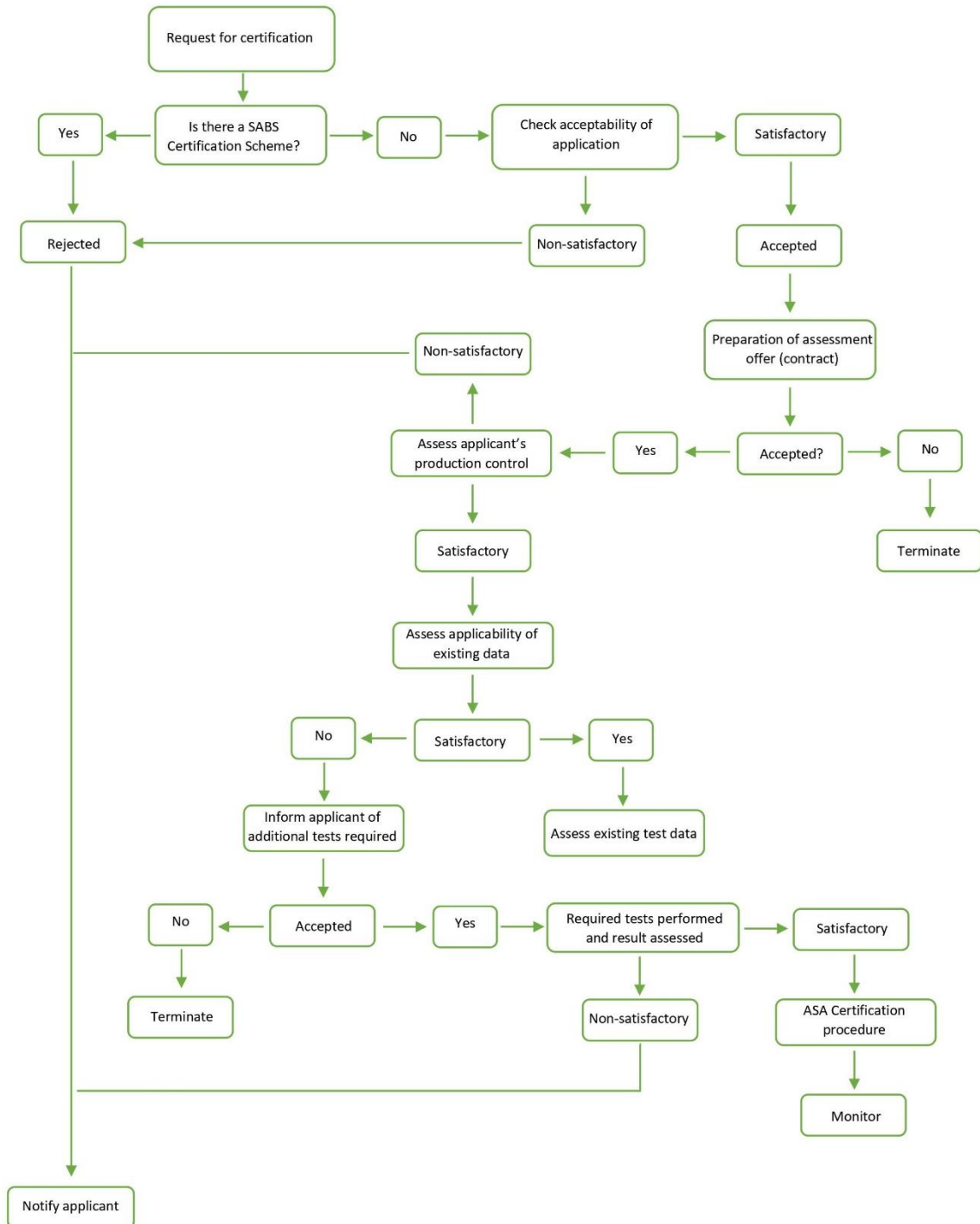


Figure 1 – Application process

## **2 Assessment and Certification Procedure**

### **2.1 Stage 1: Assessment of Applicant's Data**

- 2.1.1 Applicants shall submit the details as indicated on the application form in Appendix A for examination by ASA. 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.
- 2.1.2 Should there be, during the assessment, the need to modify the materials defined by the applicant (for example because of failure of the system to meet the requirements) the content of the assessment and additional work required shall be reconsidered by ASA.
- 2.1.3 If the materials include 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 ASA. However, this data shall always be required by ASA 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.
- 2.1.4 Information supplied by the applicant will be treated as confidential by ASA.

### **2.2 Stage 2: Assessment of production control (Quality management)**

- 2.2.1 ASA 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) and ensure compliance with the quality system. The verification by ASA shall include audit visits to one or more of the manufacturing locations and construction locations to confirm the Quality Management System (QMSA) for the surfacing system. The assessment of production control shall form the basis for subsequent surveillance visits.
- 2.2.2 Where a quality system, covering the manufacture and installation of the cold-lay surfacing material under assessment, is ISO 9001 certified, this shall be acceptable to ASA. Other quality assurance schemes<sup>1</sup> recognised by ASA may also be acceptable for certification.

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<sup>1</sup> Details of these schemes shall be assessed by ASA prior to acceptance.



## 2.3 Stage 3: Laboratory testing

### 2.3.1 Identification/Characterisation

2.3.1.1 The applicant shall provide the results of tests<sup>2</sup>, which show that the characteristics of the system offered for assessment fall within the agreed specification for the system.

2.3.1.2 The verification also serves to ensure that the materials offered for assessment can be confirmed at a later stage, ensuring that other samples also fall within the agreed specification.

### 2.3.2 Performance testing

2.3.2.1 All samples submitted for testing shall be prepared by the applicant or his representative. Preparation of the samples may be witnessed by ASA, 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.

2.3.2.2. Testing shall be undertaken, on behalf of ASA by a laboratory approved by ASA, in accordance with the test methods defined in Section 2.6.

### 2.3.3 Test protocols and test selection

For various tests (refer to Section 2.6) 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 when tests are conducted. Suitable alternative test methods, not included in the guideline document, may be proposed by the applicant, and shall be considered for assessment by ASA.

## 2.4 Stage 4: System installation trial

2.4.1 The applicant shall arrange for the materials installation trial, during the day, to demonstrate the installation and quality control to enable verification of the 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 for certificate classification. The certificate classification covers the application category for which the product is intended as well as the traffic loads and application methods for which the product is suitable. Note that the table was designed to cover current traffic conditions on all roads in South Africa.

**Table 1: Certificate classification**

Traffic level	Average daily traffic	Certificate class	Application method
Light	0 to 80	1	Throw and go – <i>self compacting and purely for short term safety purposes</i>
Medium	80 to 200	2	Permanent patching on – <i>bound (asphalt) bases</i>
Heavy	200 to 700	3	Permanent patching on – <i>unbound granular bases (where permeability is a prime consideration)</i>
Very heavy	> 700	4	Paver laid mixes – <i>such as on remote bridge decks or municipal residential accesses/parking lots</i>

<sup>2</sup> Refer to Section 3 for acceptance criteria.

- 2.4.2 The trial shall be in accordance with the 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.
- 2.4.3 The Installation Method Statement shall be practical and sufficiently detailed to cover all foreseen eventualities, such as substrate preparation, weather limitations and temperature.
- 2.4.4 ASA shall inspect the site to assess the visual condition of the system and may witness the site performance tests detailed in Section 2.6.
- 2.4.5 The applicant shall arrange for a laboratory approved by ASA 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 2.6.
- 2.4.6 Test methods and procedures are detailed in Appendix B and the performance levels, where applicable, are defined in Appendix C.

## **2.5 Stage 5: System performance trial**

- 2.5.1 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.
- 2.5.2 The installation of the system shall be carried out and assessed as detailed in Section 2.4.
- 2.5.3 In addition the applicant shall arrange for monitoring of the site and make available the test results from a laboratory approved by ASA at six monthly intervals over a two-year period. The report shall be made available to ASA 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) Voids content of extracted cores and
- c) Water permeability

Optional:

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

- 2.5.4 Test methods and procedures are detailed in Section 2.6 and Appendix B and the performance levels, where applicable, are defined in Appendix C.

2.5.5 The inspection panel, at the end of the two-year trial period, shall witness the site performance tests detailed in Section 2.6 and conduct a visual assessment of the system in accordance with TMH 9.

## 2.6 Test parameters

The applicant shall supply suitable test data on the performance of the materials under the mandatory test parameters listed in 2.6.1. Where the applicant claims enhanced performance under any of the optional parameters listed in 2.6.2, performance shall be determined and included in the certificate.

The test methods listed in Section 2.6.1 and 2.6.2 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 ASA 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 2.6 and the test protocol is not repeated in this document. For tests where such an approved protocol does not yet exist, either generic guidelines or a prescribed interim test protocol is provided in Appendix B.

### 2.6.1 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](http://www.aspasa.co.za) provides guidance on representative PSV value ranges of common South African rock types. The PSV test therefore only must be performed if the material used is not represented on the ASPASA list.  
Approved test: PSV laboratory test, as per SANS 5848<sup>3</sup>  
Comments: The samples for the PSV test and ACV test (refer to Section 3.6.1c) are to be taken from the same aggregate batch.
- b1) Parameter: Resistance against moisture induced stripping and permanent deformation  
Background: Exposure to moisture may reduce the integrity of bitumen products and results in loss of material under wheel pavement interaction. Lack of resistance against permanent deformation may lead to the product deforming excessively in the field.

<sup>3</sup> Prospective designation

- Status: Mandatory for all systems.  
 Approved tests: Hamburg Wheel Tracking Test (HWTT) (AASHTO T 324-04), laboratory test, refer to Appendix B.1  
 MMLS, road or laboratory test, refer to Appendix B.1  
 Erosion test, laboratory test, refer to Appendix B.1
- b2) 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: Modified Lottman test and ability of briquettes to withstand moisture conditioning, refer to Appendix B.2
- c) 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 SANS 5841<sup>3</sup>  
 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.
- d) Parameter: Volumetric properties  
 Background: Long term stability is determined by the mix retaining a minimum of voids, and eliminates bitumen flushing thus reducing the texture and skid resistance.  
 Status: Mandatory for all systems.  
 Approved test: Modified Marshall laboratory test, as per SANS 5841<sup>3</sup>  
 Comments: The material is heated and compacted at 135 OC, and the voids determined.
- e) 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 SANS 3012 (including rut evaluation).
- f) Parameter: Permanent surface layer deformation in the field trials  
 Background: Rutting is the vertical creep of the road surface along the wheel paths. The rutting is measured in the field trials under a 2m straight edge.  
 Status: Field rutting may not exceed 20 mm.
- g) Parameter: Permeability  
 Background: The ability of the material to protect the underlying layers from moisture ingress is important.

Status: Mandatory for all systems.  
Approved test: Constant head water permeability test (laboratory and field tests) and Marvel test (field)

## 2.7 Stage 6: Certification

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

2.7.2 The assessment and any certificate issued shall be subject to the terms and conditions of the relevant ASA 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 material remain unchanged.
  - ii. The manufacturer continues to participate in ASA's post-certification quality management scheme which requires:
    - that the certificate holder shall continue to implement and manage the quality system approved by ASA;
    - the co-operation of the certificate holder in facilitating post-certification quality monitoring by ASA or its authorised agents. The validity is confirmed by a review carried out every three years by ASA.
  - iii. The validity of a certificate can be checked by referring to the Directory of Certificates, available at [www.agreement.co.za](http://www.agreement.co.za), or by contacting ASA at [info@agreement.co.za](mailto:info@agreement.co.za).
  - iv. The requirements of the Guidelines Document remain unchanged.
- b) Where all mandatory laboratory tests have been completed satisfactorily ASA 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 full certificate or retracted. In the event of the certificate holder going into liquidation the certificate shall be suspended and may be withdrawn.
- 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 ASA. Certificates which have been suspended or expired for longer than 2 years shall no longer be valid for reinstatement.

2.7.3 The certificate holder shall inform ASA of the locations of any additional manufacturing plants before they become operational.

## 2.8 Audit Checks on Installers by the certificate holder

2.8.1 The applicant shall conduct audit checks on the installer(s) approved by the applicant in accordance with the product QMSA and installation method statement. Audit reports shall be supplied by ASA upon request.

### **3 Processing of Data Supplied by the applicant**

#### **3.1 Acceptance of data supplied by applicant**

- 3.1.1 ASA shall accept test data from laboratories with SANAS accreditation for the specific tests referred to in Section 2.6, which are performed on samples approved by ASA. ASA would require the test laboratory to submit a copy of their "SANAS schedule".
- 3.1.2 In the absence of a laboratory meeting the conditions of Section 3.1.1, ASA may accept test data from other SANAS accredited testing laboratories, or laboratories approved by ASA, that have demonstrated their competence and ability to perform the relevant tests to the satisfaction of ASA's Technical Group Leader: Technical Assessment.
- 3.1.3 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 ASA.
- 3.1.4 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 ASA.

#### **3.2 Assessment of data supplied by applicant**

- 3.2.1 Test data submitted by the applicant in support of an application for the assessment of materials for cold-lay placing will be assessed by ASA.
- 3.2.2 ASA shall agree with the applicant the need to consult a specialist or a specialist panel prior to the consultation taking place.
- 3.2.3 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.
- 3.2.4 After reviewing the data submitted by the applicant ASA will decide on the need for any additional testing. Any additional testing shall be carried out by a laboratory approved by ASA.
- 3.2.5 Appeal by the Applicant  
If the Applicant wishes to appeal against the decision taken the appeal shall be considered by ASA. The structure of the appeal procedure is shown in Figure 2.

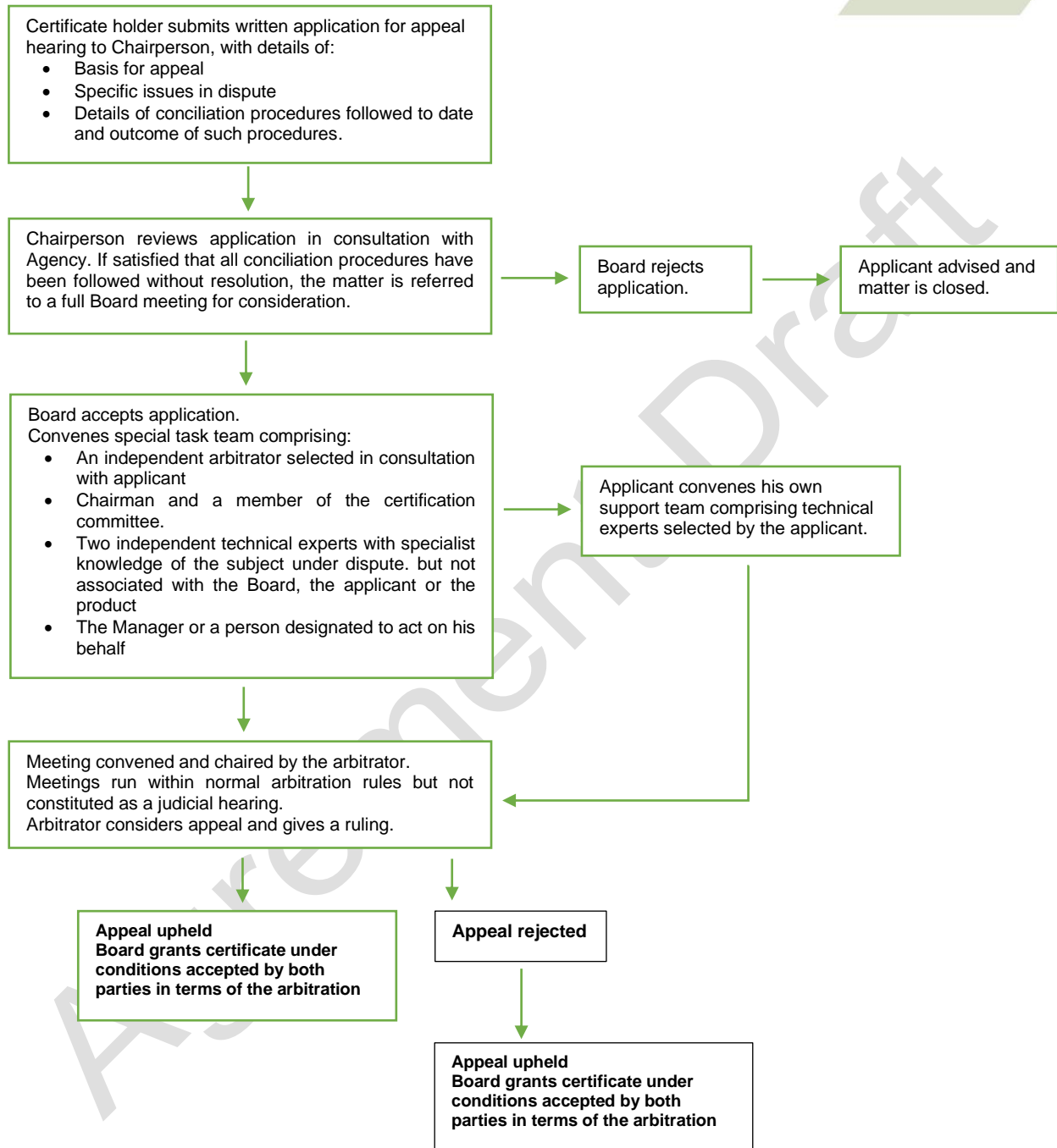



Figure 2: Recourse procedure where Board has refused certification



## Appendix A: Application Form




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**APPLICATION**  
for the technical assessment of cold-lay surfacing materials

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..... Fax no .....

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

Name ..... Position in company.....

Telephone no ..... Cell .....

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





Name	of	agent
.....		
Name	of	company
.....		
Telephone no.....	Cell no.....	Fax no. ....

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## **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 ASA guideline document for the assessment and certification of cold-lay surfacing material.
- 1.3 A complete description of the cold-lay surfacing material 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 cold-lay surfacing material. No details to be supplied.
- 2.2 List the product purposes (e.g., pothole repairs, patching, 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, market tested, in production)?
- 2.5 Refer to section 2.1 and 2.2 of the guideline document and indicate the preferred order of the ASA 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 ASA 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 cold-lay surfacing material was developed.
- 3.2 Is this the original or an improved version of the cold-lay surfacing material?
- 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 Considering the certificate class selected under 2.6 of this guideline document indicate appropriate sites for assessment as described under section 2.3 of the guideline document. Provide a detailed visual description of the condition of the existing pavement structures prior to the installation of the cold-lay surfacing material.
- 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 with English translation. Refer to Section 3 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 2.6 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 2.6 of the guideline is required the applicant is to submit a test plan, including:
  - A selection of laboratory tests (where required) as per Section 2.5 of the guideline considering the requirements of Section 2.3 of the guideline.
  - Where a material installation and or performance trial is required identify the site for the trial and propose a construction schedule (refer to requirements in Section 2.4, 2.5 and 2.6 of the guideline). Also provide a list of selected road tests as per Section 2.6 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 Organisational Structure for Production**

- 5.1 The applicant shall identify approved manufacturers (or supplier) for the cold-lay surfacing material.
  - 5.1.1 The manufacturer of the cold-lay surfacing material shall be indicated together with contact details and manufacturing plant details. It must also be clearly indicated whether the 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 cold-lay surfacing material 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 cold-lay surfacing material 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 (Quality Management)**

- 6.1 Provide the installation method statement and full details of the quality management system covering the manufacture, transportation, and installation of the cold-lay surfacing material (refer to section 2.2 of the guideline document).

As an indication quality management schemes acceptable to ASA Quality Management System Guidelines (such as ISO 9001) 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; and
  - Focus on continual improvement.
- 6.2 An important focus in the quality management system shall be that a detailed method statement for the storage, handling and installation of the product is provided to all parties installing the product. The method statement shall be subject to continuous improvement. The certificate holder shall periodically audit the effectiveness of the method statement and make the details of the audits available to ASA when requested.
- 6.3 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.

- 6.4 The applicant must supply information regarding all critical design requirements for the cold-lay surfacing material. The applicant shall supply detailed information on the boundary conditions for successful application of the product (i.e. condition of existing surface, pre-treatment required, etc.).

## **7 Specifications of Cold-lay Surfacing Material**

- 7.1 The applicant shall supply detailed specifications of the material 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; and
  - The formulation and composition (mix ratios are not required) of non-standard materials are required: these will be kept confidential to ASA.
- 7.2 An indication of the expected service life for the cold-lay surfacing material should be provided. This information should be based on existing experience of the material's performance.



## 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 Modified Lottman test
- Appendix B.3 Volumetric characteristics

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## Appendix B.1: Wheel tracking rate

### 1 Scope

This protocol describes the method for determining the susceptibility of cold-lay surfacing material 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. The specifications in Appendix C were set for the Hamburg Wheel Tracking Test performed in accordance with AASHTO T 324-04.

### 2 Generic rut testing requirements

The requirements provided below are generic for any rut tester being used for evaluation of cold-lay surfacing material for the purposes of potential certification through ASA. 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 Hamburg Wheel Tracking Test apparatus.

### 4 Testing conditions

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

For cold-lay surfacing material the samples are compacted at 30 °C in the gyratory compactor after conditioning in an oven at 30 °C for 6 hours. The whole sample should be conditioned at the test temperature before testing initiates to ensure that no adverse temperature effects develop during the test.

The test is conducted submerged in 30 °C water. If the sample contains solvent which results in damage to the sample during removal from the gyratory compaction mould, first cool the sample in a freezer set at between 0 °C and -5 °C for 4 hours before removal from the compaction mould.

### 5 Sample

The compacted sample has a standard thickness for the test equipment.

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.



## 6 Measurement and Reporting

The rutting on the surface of the sample should be measured to an acceptable accuracy ( $\pm 0.1$  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.

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## Appendix B.2: Modified Lottman test

### 1 Scope

This protocol describes the method for determining the susceptibility of cold-lay surfacing material to moisture damage.

### 2 Generic testing requirements

The test shall be performed in accordance with the procedure in ASTM D4867 / D4867M-09.

### 3 Sample preparation and conditioning

For cold-lay surfacing material the samples are compacted at 30 °C using the standard 75 blows per side Marshall compaction effort. After compaction leave the briquettes to cure in oven at 60 °C for three days before extracting.

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## **Appendix B.3: Volumetric characteristics**

### **1 Scope**

This protocol describes a method for measuring the volumetric characteristics of cold-lay surfacing material by determining the voids content and comparing with a minimum value related to the traffic level, with a specific view of predicting the voids content after several years trafficking.

The protocol describes a test procedure that has been adapted from the hot mix asphalt design method specifically for the assessment of cold-lay surfacing material under ASA 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**

Taute, A., Verhaeghe, BMJA. & Visser, AT. 2001. Interim Guidelines for the Design of Hot-Mix Asphalt in South Africa. Prepared as part of the Hot-Mix Asphalt Design Project.

### **3 Test Specimens**

The specimens for test shall be cylindrical briquettes. The briquettes are manufactured by using the Modified Marshall test or the Gyratory compactor.

### **4 Specimen Preparation**

The loose mix is removed from the bag and a quantity sufficient for 3 cores is conditioned in an oven at 100 °C for 24 hours, where after the cores are compacted in either the Modified Marshall compaction equipment or the Gyratory compactor at 135 °C. The voids content may not be determined by using the Corelok method. The voids content is determined by using a Corelok (cores are sealed by a close fitting plastic bag) apparatus for determining the compacted relative density, and the Rice's bulk density.

### **5 Replication**

Three replicate cores are used, and the average as well as range in voids content is reported.

### **6 Procedure**

As described above.

### **7 Reporting**

The average as well as range in voids content is reported.

## Appendix C: Volumetric characteristics

Verified and approved data on performance values for many of the proposed test parameters are not available specifically for cold-lay surfacing material 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.

Table C1 gives the requirements. 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: Requirements for cold-lay surfacing material**

Parameter	Test	Type 1 <sup>[1]</sup>	Type 2 <sup>[2]</sup>	Type 3 <sup>[3]</sup>
Aggregate polish resistance	PSV test	N/A	N/A	≥ 45 <sup>[4]</sup>
Aggregate Crushing Value	ACV test	N/A	≤ 25%	≤ 25%
In service texture depth	SMTD	N/A	N/A	≥ 0.6 mm
	Sand patch method			
Resistance to permanent deformation	Hamburg Wheel-Tracking Test (HWTT) as per AASHTO: T 324	N/A	≥ 5000 reps to rut of 20 mm at 30°C	≥ 16 000 reps to rut of 6 mm at 50°C
Resistance to cracking	Visual – No fatigue cracking	After 2 months	After 2 years	After 2 years
	<b>AND</b> Four point beam fatigue after ageing	N/A	N/A	Typical values: Sabita Manual 35/TRH 8
Durability	Modified Lottman test	N/A	TSR ≥ 0.8	TSR ≥ 0.8
	<b>AND</b> Visual – No disintegration or loss of material	After 6 months	After 2 years	After 2 years
Compaction (construction voids content)	Gyratory compaction (xx gyrations) at application temperature, followed by conditioning of the briquette <b>OR</b> Field cores after construction	≤ 8%	≤ 8%	≤ 8%

Terminal voids content	Gyratory compaction (300 gyrations) at 135°C, followed by conditioning of the briquette	N/A	N/A	≥ 1.5%
Visual condition of pavement	TMH 9	N/A	Condition index: ≤ 2	Condition index: ≤ 2
Field rutting after 2 years	TMH 9	N/A	Rut < 10 mm	Rut < 5 mm
Water permeability	Water permeability on field core after construction (BS1377-8: 1990)	≤ 10 1/m <sup>2</sup> /h	≤ 7 1/m <sup>2</sup> /h	≤ 7 1/m <sup>2</sup> /h
Bond strength	Torque bond test on field core after one month	N/A	N/A	≥ 400 kPa

<sup>1</sup>Type 1: Emergency repair

<sup>2</sup>Type 2: Permanent repair (less than 3 m<sup>2</sup>)

<sup>3</sup>Type 3: Permanent repair (greater than 3 m<sup>2</sup>)

**<sup>4</sup>Considerations are given to adopting a limiting value of 45, with due regard to material availability, traffic, road geometry and climate. Aggregates should also comply with other requirements of aggregates used for asphalt mixes (i.e. requirements contained in Sabita Manual 35/TRH 8)**

Notes:

- Maximum stone size should be one-third (1/3) of layer thickness.
- Tests should ideally be performed at shelf life recommended by the manufacturer.
- It recommended that specimens should be conditioned at 60oC for 24 hours. Considerations of non-bituminous products (should these products be treated on ad hoc?).

**Table C1: Requirements for cold-lay surfacing material**

Traffic category ADTT per lane in ( )	Number of blows in the Mod. Marshall test	Minimum voids content (%)
Light (< 80 vpd)	75 + 15	3.0
Medium (80 – 200 vpd)	75 + 45	3.0
Heavy (200 – 700 vpd)	75 + 75	4.0
	<b>With gyratory compactor, minimum voids content of 1.5% after 300 gyrations using ASTM D 4013</b>	
Very heavy (> 700 vpd)	75 + 75	4.5
	<b>With gyratory compactor, minimum voids content of 2.5% after 300 gyrations using ASTM D 4013</b>	