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Validity

Users of any Agrément certificate should check its status: All currently valid certificates are listed on the website. In addition, check whether the certificate is [Active](#) or [Inactive](#).

The certificate holder is in possession of a confirmation certificate attesting to his/her status.

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Subject:

PRO-PHALT INFRARED ROAD REPAIR SYSTEM



Use

This certificate covers the use of the Pro-Phalt Infrared Road Repair System for the repair of ultra-thin as well as conventional shallow to medium-depth bituminous surfacings in all regions of South Africa.

This certificate and Agrément South Africa's assessment apply only to the Pro-Phalt Infrared Road Repair System as described in this certificate, and where the terms and conditions of certification are complied with.

General description

The Pro-Phalt Infrared Road Repair System is used to repair bituminous surfaces on pavements damaged by potholes and trench crossings.

Repairs are effected by:

- heating the damaged area of the bituminous surface using an infrared heater to between 180 and 200°C
- reworking/recycling the existing surface layer material with new binder and asphaltic material (to make up any shortfall in material) over the damaged area
- raking the surface to tie in with existing surface levels and then compacting.

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PREAMBLE

This certificate is issued by Agrément South Africa in terms of the powers granted to it by the Minister of Public Works.

This certificate:

- has been granted after a technical appraisal of the performance of the Pro-Phalt Infrared Road Repair System for the uses covered by the certificate.
- is independent of any patent rights that may or may not subsist in the subject of the certificate.
- does not relieve the certificate holder from the obligation to obtain prior approval of the roads authority concerned for the use of the system.

Agrément South Africa considers that the quality and performance of repairs carried out by the system will be satisfactory, provided that the requirements stipulated in this certificate are adhered to. However, Agrément South Africa does not on behalf of itself, or the government, or any of its employees or agents guarantee such quality or performance.

Responsibility for compliance with the requirements of this certificate and the quality of road repairs resides with the certificate holder.

No action for damages, or any other claim whatsoever, lies against Agrément South Africa, its members, the government or any of its employees, should the said system and materials fail to comply with the standards set out in this certificate.

Roads authorities or specifiers who are in any doubt about any detail or variation, should contact [Agrément South Africa](#).

This interim certificate is valid for two years during which time performance in the field will be monitored. On completion of the trial assessment the interim certificate will either be upgraded to a certificate with unlimited validity or retracted. Furthermore, during this two-year period the certificate shall remain valid as long as Agrément South Africa is satisfied that:

- the certificate holder complies with the general and specific conditions of certification and the technical requirements stipulated in the certificate
- the performance-in-use of the product is acceptable
- any changes in legislation, regulations, relevant standards or Agrément performance criteria have not invalidated the technical assessment that formed the basis of certification.

Agrément South Africa reserves the right to withdraw the certificate at any time, should reasonable cause exist.

Notices affecting the validity of this certificate will be published in the *Government Gazette*.

PART 1: CONDITIONS OF CERTIFICATION

Licensee - any person or company appointed by the certificate holder and registered with Agrément South Africa to use the Pro-Phalt Infrared Road Repair System in accordance with this certificate and authorised by him/her to claim compliance with the certificate. It is the certificate holder's responsibility to ensure that the licensee carries out the works in compliance with this certificate and in accordance with the approved quality system.

The Pro-Phalt Infrared Road Repair System, as described in this certificate must:

- use asphalt materials sourced and blended or mixed as applicable and equipment operated by Pro-Phalt SA (Pty) Ltd or licensees appointed by it and registered with Agrément South Africa
- comply with the conditions of certification.

Technical support and, if necessary, training must be provided by Pro-Phalt SA (Pty) Ltd.

Aspects of repairing road surfacings not specifically referred to in this certificate must be carried out in accordance with the good road construction practice, South African standards, codes of practice or best practice guidelines, including the CSIR publication: *POTHOLES: Technical guide to their causes, identification and repair*.

Any change to the system, repair methodology, or formulation of road repair material could result in various aspects of performance no longer complying with Agrément South Africa's performance criteria. For these reasons, no change may be made to the Pro-Phalt Infrared Road Repair System, as described in this certificate, unless such change is approved in writing by Agrément South Africa before it is implemented.

Pro-Phalt Infrared Road Repair System

Tested and approved fit for purpose as a road repair system when operated as specified in

INTERIM CERTIFICATE
2012/408



General conditions

Marking

Where possible and appropriate, marketing brochures and other material must be marked with:

- Pro-Phalt's trade name and the date
- Agrément South Africa's identification logo and certificate number, as illustrated opposite.

Validity

The validity of this interim certificate is two years during which time performance in the field will be assessed. On completion of the trial assessment the interim certificate will either be upgraded to a certificate with unlimited validity or retracted.

Quality monitoring

The certificate holder is required to participate in Agrément South Africa's post-certification quality management scheme, which requires:

- that the certificate holder shall continue to implement and manage the quality system approved by Agrément South

Africa in the assessment of the Pro-Phalt Infrared Road Repair System

- the cooperation of the certificate holder in facilitating post-certification quality monitoring by Agrément South Africa or its authorised agents.

Reappraisal:

- This must be requested by the certificate holder prior to implementing changes to the materials used, the methodology and components of the system.
- It will be required by Agrément South Africa if there are changes to regulations or Agrément South Africa's criteria.

This certificate may be withdrawn if the certificate holder or a registered licensee fails to comply with the above-mentioned requirements.

On behalf of the Board of Agrément South Africa:

Chairperson
25 July 2012

PART 2: ASSESSMENT

Scope of assessment

This assessment is based on:

- an assessment of materials used in the repair process
- an assessment of the infrared road repair methodology and system
- an inspection of the Pro-Phalt SA (Pty) Ltd's quality management system.

Assessment

In the opinion of Agrément South Africa, the Pro-Phalt Road Repair System is suitable for the uses as specified on page 1, in all regions of South Africa.

Agrément South Africa's comments on the various aspects of the assessment are set out in Table 1.

SANS 9001: *Quality management systems - Requirements*

Quality Management System

The certificate holder's quality management system complies with Agrément South Africa's requirements, which are based on SANS 9001. This will ensure a good product in design, manufacture and application.

Table 1: Material Properties and Performance

Aspect of assessment	Opinion of Agrément South Africa	Explanatory notes
<p><i>Polished Stone Value (PSV) of aggregates used in make-up material</i></p> <p>SANS 5848: Polished-stone value of aggregates</p>	<p>A minimum polished stone value (PSV) of 50 is required</p>	<p>To be tested in accordance with the requirements of SANS 5848</p>
<p><i>Aggregate Crushing Value (ACV) of stone used in make-up material</i></p> <p>SANS 5841: Aggregate crushing value of course aggregate</p>	<p>A maximum aggregate crushing value (ACV) of 21% is required</p>	<p>To be tested in accordance with the requirements of SANS 5841</p>
<p><i>Resistance to moisture-induced stripping</i></p> <p>Guideline document for the assessment and certification of thin bituminous surfacing systems</p>	<p>No stripping occurred during test, therefore, resistance to stripping is satisfactory</p>	<p>Tested in accordance with the generic requirements of Appendix B4 of Agrément South Africa's guideline document. Resistance to stripping was assessed using a Soillab's wheel tracking test on submerged specimens</p>
<p><i>Moisture sensitivity</i></p> <p>South African Interim Guidelines for the Design of Hot-Mix Asphalt</p>	<p>Satisfactory</p>	<p>Moisture sensitivity has been determined using the Modified Lottman Tensile Strength. Performance (95.3%) meets the criteria for the harshest combination of permeability and climate according to the requirements of the South African Interim Design Guide for hot mix asphalt</p>
<p><i>Air void content</i></p>	<p>Satisfactory</p>	<p>Air void content was measured as being 2.5% after 300 gyrations which indicates an acceptable resistance to deformation</p>
<p><i>Permanent deformation</i></p> <p>Guideline document for the assessment and certification of thin bituminous surfacing systems</p>	<p>Satisfactory</p>	<p>Tested in accordance with the generic requirements of Appendix B1 of Agrément South Africa's guideline document. Results obtained during a Soillab wheel tracking test at 40°C indicate a resistance to permanent deformation that is similar to that of conventional hot-mix asphalt</p>

Table 1 (Continued): Material Properties and Performance

Aspect of assessment	Opinion of Agrément South Africa	Explanatory notes
<p>Visual condition index</p> <div style="border: 1px solid green; padding: 5px; margin-top: 10px;"> <p>TM9: Pavement Management Systems: Standard Visual Assessment Manual for Flexible Pavements</p> </div>	Satisfactory	Repairs visually inspected in terms of TM9 show that the system performs satisfactorily
<p>Skid resistance and texture depth</p>	Satisfactory but subject to confirmation. In the interim, the area of road surface repaired at any point should not exceed 4 m ²	Given the limited area affected by repairs the skid resistance of the repaired surfacing is considered to be of lesser importance, however, during on-site inspections some repairs were found to have limited textural depth. This is an aspect which will be examined closely during the two-year trial period
<p>Torque bond</p>	Satisfactory but subject to confirmation	Given the limited area affected by repairs, the bond between the repaired surfacing and the substrata is considered unlikely to affect performance unduly. However, this aspect of performance will be examined during the two-year trial period
<p>Longevity/durability of repair</p>	Satisfactory	<p>The longevity/durability of the repair made, using the system, will depend, as for any other system, on:</p> <ul style="list-style-type: none"> • the condition of the surrounding pavement • the condition of the support structure • the installation thickness, climatic conditions and traffic loading

Table 1 (Continued): Material Properties and Performance

Aspect of assessment	Opinion of Agrément South Africa	Explanatory notes
<i>Quality management</i>	<p>Satisfactory</p> <p>When properly implemented, the quality system will ensure that acceptable standards are maintained during manufacture</p> <div data-bbox="592 640 935 790" style="border: 1px solid green; padding: 5px; margin-top: 10px;"> <p>SANS 9001: <i>Quality management systems - Requirements</i></p> </div>	<p>The quality system complies with Agrément South Africa's requirements that are based on SANS 9001</p>

PART 3: TECHNICAL DESCRIPTION

General description

The Pro-Phalt Infrared Road Repair System is used to reinstate bituminous surfaces of pavements damaged by potholes and trenches crossings.

The surfaces which can be repaired include:

- thin bituminous surfacing systems (up to 40 mm thick)
- shallow and medium-surface defects of conventional, medium-graded hot-asphalt products (up to 75 mm deep).

The surface area to be repaired is heated using a portable infrared heater to between 180 and 200°C. The heating cycle takes about eight minutes.

Once the surface has been heated, new material is added to and mixed with the in situ material to make up for surface material which may have been lost.

The new material which has been premixed is kept hot and stored in bins ready for use. This new material is made up of new binder and asphaltic material. The new and in situ material are mixed together using a rake, levelled to tie in with the surrounding surfaces and compacted.

Typically the repaired area may be opened to traffic within 25 minutes.

The system utilises the existing surface material, effectively recycling it thereby reducing the amount of new material required and material which must be discarded and removed from the site.

The process ensures that a 'thermo-bond' is created between the repaired area and the existing surrounding area ensuring no water ingress at this junction.

All of the equipment and material required to begin surface repairs are self-contained in a 4 tonne panel van and the system is operated by two trained persons.

Manufacturing of make-up asphalt material

The new or additional material used to make up lost material in the area to be repaired is manufactured by Promix Asphalt.

The mix is manufactured from 60/70 penetration grade bitumen supplied by the ENREF, SAPREF or CALREF refineries, proprietary polymers, lime, graded fine and pre-coated 6 or 10 mm aggregates.

The bitumen and polymer are mixed together in heated tanks to form the binder. Once thoroughly mixed the binder is stored in heated tanks in which the binder is continually circulated.

Aggregates are stored in separate stockpiles and kept free from contamination by other materials.

The constituents of the asphalt are mixed in a 60 tonne per hour continuous drum mixer. Lime filler is added to the binder at the point where the binder enters the mixer.

Aggregates from different stock piles is heated to 160°C and added to the lime and binder mixture at which time it is thoroughly mixed.

Following mixing, the hot mix is transported via a skip into the hot storage silo from where it is discharged into transport vehicles and taken to concrete slabs where the asphalt is spread out and allowed to cool for two days.

Following cooling, the mix is packaged in 25 kg sealed bags and stored on pallets.

During the manufacturing process, care is taken to ensure that due cognisance is taken of the OH&S Act requirements in the work place when handling and storing bituminous and other hazardous material.

Field assessment and categorisation of potholes

Following a thorough survey of the section of pavement to be repaired, a decision is made as to the most suitable repair method applicable to the area concerned.

Site and surface preparation

The section of road containing the potholes to be repaired is made safe using appropriate traffic management equipment.

Damaged areas are repaired, where necessary up to surfacing level in accordance with the recommendations of the CSIR's document: *POTHLES: Technical guide to their causes, identification and repair.*



The Pro-Phalt van being backed up to the damaged road surface

The Pro-Phalt van is backed up to the area to be repaired and the infrared heater box is hoisted out of the van and placed over the area to be repaired. The surface is heated by the infrared heater until the surface is approximately 200°C.



Removing infrared heater from rear of van using extended hoist

The infrared is applied in “pulse cycles” starting with short-wave infrared to heat the air between the emitter and stabilise initial operating conditions. The next cycle is medium-wave infrared that penetrates the upper-layer wearing course. Finally, long-wave infrared is applied to penetrate and heat the sub-base and base layers. The total heating cycle takes eight minutes.

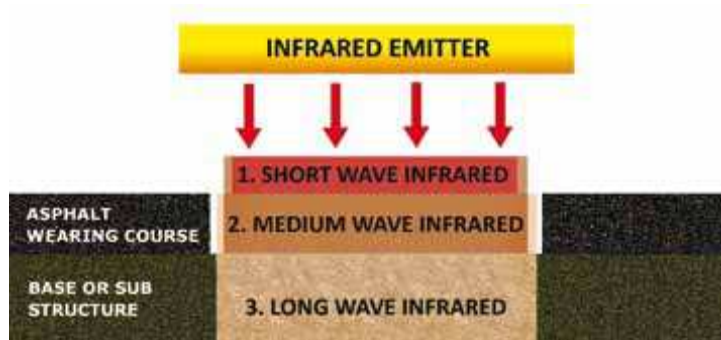


Diagram showing the different layers of pavement heated using differing infrared wave lengths



Positioning of infrared heater over surface area to be repaired

Recycling old material and adding new material levelling and compaction

Once heated, the surface of the area to be repaired is re-worked using a rake and anionic bitumen emulsion added to rejuvenate the defective area.



Reworking of in situ surfacing material



Adding of anionic bitumen emulsion

New material is added to replace lost material and mixed in with the in situ material. The surface of the repair area is raked to ensure that it ties in with adjacent surface levels and compacted with a vibratory roller. The surface may then be opened to traffic.



New material being added and mixed with in situ material



Compacting of repaired surfacing



Rolling being completed