South Africa

COTO

Committee of Transport Officials

Standard Specifications for Road and Bridge Works for South African Road Authorities

Draft Standard (DS)

CHAPTER 8: PRETREATMENT AND REPAIR OF EXISTING LAYERS

October 2020

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FOREWORD

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Existing publication:

The new COTO Standard Specifications for Road and Bridge Works for South African Road Authorities was approved by COTO on 18 August 2020 as a Draft Standard (DS) and will be replacing the COLTO Standard Specifications for Road and Bridge Works for State Road Authorities (1998 Edition).

Existing contracts and tenders in the design phases based on the COLTO Standard Specifications (1998 Edition) will remain unaffected but will be phased out during the next 6 months and the COTO Standard Specifications (2020 Edition) will be mandatory for use in procurement documents advertised as from 1 March 2021.

Document versions:

Draft Standard (DS). The Draft Standard will be implemented in industry for a period of two (2) years, during which written comments may be submitted to the COTO subcommittee. Draft Standards (DS) have full legal standing.

Final Standard (FS). After the two-year period, comments received are reviewed and where appropriate, incorporated by the COTO subcommittee. The document is converted to a Final Standard (FS) and submitted by the Roads Coordinating Body (RCB) to COTO for approval as a final standard. This Final Standard is implemented in industry for a period of five (5) years, after which it may again be reviewed. Final Standards (FS) have full legal standing.

Comments:

Comments on the Draft Standard Chapters should be provided in writing on the Excel spreadsheet provided on the websites mentioned below and e-mailed to cotorevision@nra.co.za .

Please note:

This document and its various Chapters will only be available in electronic format.

The Draft Standard (DS) Chapters will be made available for download on the South African National Roads Agency SOC Ltd (SANRAL) and Department of Transport websites.

August 2020 version replaced with October 2020 version due to amendments to Chapters.

TABLE OF CONTENTS

CHAPTER 8: PRETREATMENT AND REPAIR OF EXISTING LAYERS 8-1
8.1 PRIME COAT 8-1
PART A: SPECIFICATIONS 8-1
PART B: LABOUR ENHANCEMENT 8-4
PART C: MEASUREMENT AND PAYMENT 8-5
PART D: GUARANTEES AND COMPLIANCE CERTIFICATES 8-7
8.2 COVER SPRAYS, FOG SPRAYS AND REJUVENATION SPRAYS 8-8
PART A: SPECIFICATIONS 8-8
PART B: LABOUR ENHANCEMENT 8-10
PART C: MEASUREMENT AND PAYMENT 8-11
PART D: GUARANTEES AND COMPLIANCE CERTIFICATES 8-13
8.3 TEXTURE TREATMENT 8-14
PART A: SPECIFICATIONS 8-14
PART B: LABOUR ENHANCEMENT 8-16
PART C: MEASUREMENT AND PAYMENT 8-17
PART D: GUARANTEES AND COMPLIANCE CERTIFICATES 8-18
8.4 RUT AND/OR DEPRESSION CORRECTION 8-19
PART A: SPECIFICATIONS 8-19
PART B: LABOUR ENHANCEMENT 8-22
PART C: MEASUREMENT AND PAYMENT 8-23
PART D: GUARANTEES AND COMPLIANCE CERTIFICATES 8-24
8.5 STANDARD CRACK SEALING 8-25
PART A: SPECIFICATIONS 8-25
PART B: LABOUR ENHANCEMENT 8-28
PART C: MEASUREMENT AND PAYMENT 8-29
PART D: GUARANTEES AND COMPLIANCE CERTIFICATES 8-30
8.6 GEOSYNTHETIC CRACK SEALING 8-31
PART A: SPECIFICATIONS 8-31
PART B: LABOUR ENHANCEMENT 8-33
PART C: MEASUREMENT AND PAYMENT 8-34
PART D: GUARANTEES AND COMPLIANCE CERTIFICATES 8-35
8.7 PLANING 8-36
PART A: SPECIFICATIONS 8-36
PART B: LABOUR ENHANCEMENT 8-38
PART C: MEASUREMENT AND PAYMENT 8-39
PART D: GUARANTEES AND COMPLIANCE CERTIFICATES 8-41
8.8 PATCHING AND EDGE BREAK REPAIR 8-42
PART A: SPECIFICATIONS 8-42
PART B: LABOUR ENHANCEMENT 8-45
PART C: MEASUREMENT AND PAYMENT 8-46
PART D: GUARANTEES AND COMPLIANCE CERTIFICATES 8-49
8.9 REPAIR OF SURFACE DEFECTS 8-50
PART A: SPECIFICATIONS 8-50
PART B: LABOUR ENHANCEMENT 8-54
PART C: MEASUREMENT AND PAYMENT 8-55
PART D: GUARANTEES AND COMPLIANCE CERTIFICATES 8-57

CHAPTER 8: PRETREATMENT AND REPAIR OF EXISTING LAYERS

8.1 PRIME COAT

CONTENTS

PART A: SPECIFICATIONS

A8.1.1 SCOPE

A8.1.2 DEFINITIONS

A8.1.3 GENERAL

A8.1.4 DESIGN BY CONTRACTOR / PERFORMANCE BASED SYSTEMS

A8.1.5 MATERIALS

A8.1.6 CONSTRUCTION EQUIPMENT

A8.1.7 EXECUTION OF THE WORKS

A8.1.8 WORKMANSHIP

PART B: LABOUR ENHANCEMENT

PART C: MEASUREMENT AND PAYMENT

PART D: GUARANTEES AND COMPLIANCE CERTIFICATES

A8.1 PRIME COAT

PART A: SPECIFICATIONS

A8.1.1 SCOPE

This Section covers the work in connection with the application of a prime coat.

A8.1.2 DEFINITIONS

Prime coat - consists of a low viscosity bituminous binder, applied in a single application on a granular, cemented or treated base or subbase to facilitate a good bond between the base and the bituminous surfacing or subbase and bitumen treated base.

A8.1.3 GENERAL

A8.1.3.1 Weather limitations

No prime shall be applied under the following adverse conditions:

- During foggy or wet conditions;
- When rain is imminent;
- When wind is blowing sufficiently hard to cause uneven spraying;
- When the surface of the layer is visibly wet, i.e. more than damp;
- When the temperature of the surface immediately prior to commencing with the application of the prime is below, or in the opinion of the Engineer, likely to fall below 10°C;
- After sunset;
- When at any position within the layer the moisture content of a granular base layer is more than 50 % of the optimum moisture content determined according to SANS 3001 No GR30. In the event of rain after priming, the base shall be allowed to dry out to meet the above moisture content requirements prior to surfacing. Limiting moisture contents for treated layers before priming shall be specified in the Contract Documentation.

A8.1.3.2 Nominal rate of prime coat application

The nominal rate of application, for tender purposes, shall be 0,8 l/m^2.

A8.1.4 DESIGN BY CONTRACTOR / PERFORMANCE BASED SYSTEMS

All specifications for prime coats addressed in this Section shall apply.

The selection of the appropriate prime coat type shall be based on good practice guidelines regarding the early performance of different products applied, as described in Clause A8.1.5.1.

A8.1.5 MATERIALS

A8.1.5.1 Bituminous material

The priming material shall be one of the following as specified in Part C: Measurement and Payment:

Table A8.1.5-1: Bituminous binder for priming the excavated area

Bituminous binder for priming the excavated area	Specification
MC-10 cut-back bitumen	SANS 4001 – BT2
MC-30 cut-back bitumen	SANS 4001 – BT2
Inverted bitumen emulsion	SANS 4001 – BT5
Other appropriate product containing solvents	Certified by independent certification agency
Other appropriate product containing no solvents	Certified by independent certification agency

The type of prime and application rate best suited for the base shall be determined after construction of the base. The Contractor shall provide about 20 ℓ of at least three prime products and apply it at different application rates with a brush on the base. The Engineer shall evaluate the performance of the prime in accordance with the latest version of TRH1/SABITA Manual 26 and then instruct the type of prime and application rate to be applied. No payment shall be made for tests to determine the appropriate priming product.

A8.1.5.2 Aggregate for blinding primed layers

Where so instructed, blinding material shall consist of crusher sand or natural sand, with 100 % passing the 7,1 mm sieve and not more than 10 % passing the 2,0 mm sieve. The aggregate shall be clean, hard and free from excessive dust and shall contain no clay, loam or other deleterious matter.

Blinding of the primed surface with such aggregate at a nominal rate of 285 m²/m³ shall only be permitted to facilitate traffic accommodation or access arrangements.

A8.1.6 CONSTRUCTION EQUIPMENT

The equipment specifications as prescribed in Clause A10.1.6.1 of Chapter 10, are applicable.

A8.1.7 EXECUTION OF THE WORKS

A8.1.7.1 Preparation of the layer to be primed

Not longer than 24 hours before spraying, the layer to be primed shall be broomed and cleaned of all loose or deleterious material by means of a controlled rotary broom and/or hand brooms. Sweeping shall be done carefully so as not to cause any damage to the layer. A light spray of water, sufficient to dampen the surface, shall be uniformly applied to the layer immediately before the application of the prime. If the water is over applied, resulting in standing water, the layer shall be allowed to dry until a uniform damp surface is obtained.

Before any priming material is sprayed, the layer to be primed shall be checked for conformance with the surface and other requirements specified.

A8.1.7.2 Storage and application of the prime coat

The temperatures for storage and spraying shall be in accordance with the relevant SANS 4001 specifications or be in accordance with the manufacturer's specifications or as required by a product's certification documentation.

All prime materials stored in a heated condition shall be stored in a tank with a properly functioning circulation system and having a securely fitting lid.

All layers where the application of a prime is specified or ordered shall be primed using a mechanical distributor complying with Clause A10.1.6.1 of Chapter 10. The edges of the previously constructed or existing surfacing shall be adequately protected by approved means to ensure that an overlap of prime not exceeding 50 mm is achieved.

A mat of reinforced paper or other suitable approved material shall be used at all joints at the beginning and end of all sprays to obtain a neat start and cut-off.

If the prime is applied in more than one strip, allowance shall be made for overlapping of strips by 200 mm, in accordance with the triple spray flair configuration, to ensure a full application of the prime over the joint.

Unless directed otherwise by the Engineer or indicated on the drawings, the edges of the primed surface shall be 200 mm wider than the edges of the surfacing. The edges of the primed surface shall be true to line with a maximum deviation of 25 mm from the specified edge line.

Wherever feasible, the prime shall be applied in one or more lanes evenly over the full width of the road and allowed to penetrate and cure until traffic can pass over the surface without any pickup. All traffic shall be kept off the surface until this condition is obtained.

Where it is not feasible for traffic to use diversions, the prime shall be applied and allowed to penetrate for as long as is practicable before a blinding layer of aggregate is applied at a nominal rate of 285 m²/m³. Care shall be exercised in this operation to avoid the aggregate being applied too soon after spraying the prime. Any "caking" of aggregate which may take place and cause problems during the surfacing process and all loose aggregate shall be removed before the final surfacing is applied.

Where it is not possible to construct such ancillary works after priming, care shall be taken to protect all kerbing, channeling and guard rails from the prime by covering them with suitable protective material when spraying. The Contractor shall, at his own cost, replace all soiled items. Painting of the soiled surfaces shall not be accepted as a suitable remedial measure.

A8.1.7.3 Areas inaccessible to mechanical equipment

The provisions of Clause A10.1.3.3 of Chapter 10 shall apply to the application of the prime in areas inaccessible to mechanical equipment. The prime shall be applied by means of a portable binder distributor that complies with the requirements of Clause A10.1.6.1 of Chapter 10. The quantity of prime applied shall be controlled so that the specified rate of application is achieved. Surplus prime shall be removed as specified in Clause A8.1.7.4.

A8.1.7.4 Removal of surplus prime

After the prime has penetrated sufficiently, surplus prime shall be covered with damp crusher sand, which shall be worked into it by means of hand brooms to absorb the surplus prime. As soon as it is saturated with prime, the crusher sand shall be swept off the primed surface and the area allowed to dry before surfacing. The process shall be repeated until no surplus prime or wet prime remains on the surface.

A8.1.7.5 Opening to traffic

Where a blinding layer is specified in the drawings or directed by the Engineer, and applied to the primed surface, the Contractor shall maintain the blinding layer and the primed surface during the period when the surface is opened to traffic and shall repair all damage caused to the surface by such traffic, as directed by the Engineer, at no additional payment.

Traffic accommodation shall comply with the specifications in Section A1.5 of Chapter 1.

A8.1.8 WORKMANSHIP

A8.1.8.1 Tolerances

The actual spray rates measured at spraying temperature shall not deviate by more than 8,0 % from that ordered by the Engineer. The Engineer may conditionally accept application rates falling outside this tolerance at reduced payment in accordance with Table A8.1.8-1. Conditional acceptance shall not relieve the Contractor of his contractual obligations.

A8.1.8.2 Testing

The Contractor shall give the Engineer at least 24 hours' notice of his intention to spray prime material so that the actual spray rates can be verified and approved by the Engineer. Unless otherwise agreed in advance, the Contractor shall only spray when the Engineer's representative is present.

The Contractor shall provide, at his cost, representative samples of every batch of prime delivered onto site.

Table A8.1.8-1: Payment reduction factors for conditionally accepted prime coat

Deviation specified spray rate at spraying temperature (%)	Payment reduction factor of tendered rate
±8,0	1.00
±9,0	0.97
±10,0	0.95
±11,0	0.90
±12,0	0.85
±13,0	0.80

Any deviation outside these limits shall not be paid for however, the Engineer shall have the right to instruct the Contractor to make up any deficiency, or blind excessive prime without additional payment. If under-spraying occurs, and it is accepted by the Engineer, only the actual quantities applied shall be paid for.

B8.1 PRIME COAT

PART B: LABOUR ENHANCEMENT

CONTENTS

B8.1.1 SCOPE

B8.1.2 DEFINITIONS

B8.1.3 GENERAL

B8.1.4 DESIGN BY CONTRACTOR / PERFORMANCE BASED SYSTEMS

B8.1.5 MATERIALS

B8.1.6 CONSTRUCTION EQUIPMENT

B8.1.7 EXECUTION OF THE WORKS

B8.1.8 WORKMANSHIP

B8.1.1 SCOPE

A large proportion of activities as defined in Part A under the various sections are considered labour intensive. Therefore, Part B only provides additional specifications, not contained in Part A.

B8.1.2 DEFINITIONS

Definitions as provided in A8.1.2 apply.

B8.1.3 GENERAL

Any activity specified in Part A, where hand work is given as an alternative, shall be executed in such a way as to maximise labour.

B8.1.4 DESIGN BY CONTRACTOR / PERFORMANCE BASED SYSTEMS

The provisions of Part A shall apply.

B8.1.5 MATERIALS

The provisions of Part A shall apply.

B8.1.6 CONSTRUCTION EQUIPMENT

Where reference is made in Part A to appropriate equipment, the use of light equipment shall be evaluated during trial sections.

For application of prime coats, a hand operated spray cart with a 210 ℓ drum holder or similar, the use of spray tanker towed with a tractor or bakkie with the necessary pumping equipment may be used in labour enhanced alternatives.

B8.1.7 EXECUTION OF THE WORKS

For prime coats, all preparation activities (sweeping, watering and protection of kerbs and roadside furniture are suitable components for labour enhancement.

B8.1.8 WORKMANSHIP

Unless revised tolerances are specified in the Contract Documentation, the provisions of Part A shall apply.

C8.1 PRIME COAT

PART C: MEASUREMENT AND PAYMENT

(i) Preamble

The tendered rate for each item shall include full compensation for providing, maintaining and decommissioning upon completion, of all the plant, equipment, labour, tools, incidentals and supervision to carry out the activity or construct the works in the item, unless otherwise stated.

Any prime cost or provisional sums shall be paid in accordance with the provisions of the conditions of contract. The charge or mark-up tendered or allowed for is a percentage of the amount actually paid under the prime cost or provisional sum. This percentage shall cover all the Contractor's handling, supervision, profit and liability costs to provide the services in the prime cost or provisional sum item.

The requirements of Section C1.1 of Chapter 1 shall apply.

Where pay item descriptions include any wording in brackets it is an indication that contract specific information is to be inserted in the Pricing Schedule included in the Contract Documentation.

(ii) Items that will not be measured separately

The following activities, whether required to complete the specified work or not, will not be measured and paid for separately and the Contractor shall include the cost thereof in other pay items as he deems appropriate:

1. No separate payment will be made for setting out the works.
2. No separate payment will be made for the protection or repair as required of any existing or new road furniture, structures, buildings, infrastructure or services damaged by the Contractor's activities.
3. No additional payment shall be made, nor shall any claim for additional payment be considered, for any specified work in confined or restricted areas. Any additional costs associated with working in confined or restricted areas shall be deemed to be included in the standard applicable pay items.
4. No separate payment will be made for the loading of any materials.
5. No separate payment will be made for the hauling of any materials where the material is moved over a distance of less than, and up to 1,0 km.
6. No separate payment will be made for transporting materials from commercial sources irrespective of the haul distance.
7. No separate payment will be made for the removal or any surplus material imported to complete the works.
8. For all Works performed, precautionary measures required in terms of the Occupational Health and Safety Act (Act 85 of 1993) and the latest amendments thereof as well as the latest Construction Regulations shall be deemed included in the rates tendered for the relevant products.
9. Removal of surplus prime.

(iii) Items to be measured and paid for using items specified elsewhere in the specifications

Not applicable to this Section.

(iv) Items specifically for this Section of the specifications

Item		Description	Unit
C8.1.1		**Prime coat:**	
	C8.1.1.1	MC -10 cut-back bitumen	litre (ℓ)
	C8.1.1.2	MC -30 cut-back bitumen	litre (ℓ)
	C8.1.1.3	Inverted bitumen emulsion	litre (ℓ)
	C8.1.1.4	Certified product containing solvents (State name)	litre (ℓ)
	C8.1.1.5	Certified product containing no solvents (State name)	litre (ℓ)

The unit of measurement shall be the litre of priming material measured at spraying temperature and sprayed as required.

The tendered rates shall include full compensation for supplying the priming material, cleaning and watering the layer to be primed, applying the priming material and maintaining the primed surface as specified.

Item		Description	Unit
C8.1.2		**Aggregate for blinding:**	
	C8.1.2.1	Natural sand	cubic metre (m^3)
	C8.1.2.2	Crusher sand	cubic metre (m^3)

The unit of measurement shall be the cubic metre of aggregate used for blinding on the instructions of the Engineer.

The tendered rate shall include full compensation for procuring, furnishing and applying the aggregate for blinding where directed by the Engineer

and for maintenance of the blinding layer, as specified.

Item	Description	Unit
C8.1.3	**Extra over item C8.1.1 for applying the prime coat accessible only to hand-held or light equipment**	**litre (ℓ)**

The unit of measurement shall be the litre of priming material measured at spraying temperature and sprayed in accordance with the requirements for areas accessible only to hand-held or light equipment and shall include for all additional costs.

D8.1 PRIME COAT

PART D: GUARANTEES AND COMPLIANCE CERTIFICATES

CONTENTS

D8.1.1 SCOPE

D8.1.2 GENERAL

D8.1.3 PERFORMANCE GUARANTEE REQUIREMENTS

D8.1.4 FUNCTIONAL PERFORMANCE ASSESSMENTS

D8.1.5 VISUALLY ASSESSED PROPERTIES

D8.1.6 INSTRUMENTALLY ASSESSED PROPERTIES

D8.1.7 EVALUATION FOR ACCEPTANCE

D8.1.8 ADDITIONAL PROCEDURES TO BE ADOPTED IN THE EVENT OF FAILURE

D8.1.9 NOTIFICATION OF REMEDIAL WORK

D8.1.10 REMEDIAL WORK

D8.1.1 SCOPE

Pretreatment and repair of existing layers form an integral part of the final surfacing. Therefore, the relevant requirements of Part D in Chapter 9 and Chapter 10 shall apply.

D8.1.2 GENERAL

Not applicable to pretreatment works.

D8.1.3 PERFORMANCE GUARANTEE REQUIREMENTS

Not applicable to pretreatment works.

D8.1.4 FUNCTIONAL PERFORMANCE ASSESSMENTS

Not applicable to pretreatment works.

D8.1.5 VISUALLY ASSESSED PROPERTIES

Not applicable to pretreatment works.

D8.1.6 INSTRUMENTALLY ASSESSED PROPERTIES

Not applicable to pretreatment works.

D8.1.7 EVALUATION FOR ACCEPTANCE

Not applicable to pretreatment works.

D8.1.8 ADDITIONAL PROCEDURES TO BE ADOPTED IN THE EVENT OF FAILURE

Not applicable to pretreatment works.

D8.1.9 NOTIFICATION OF REMEDIAL WORK

Not applicable to pretreatment works.

D8.1.10 REMEDIAL WORK

Not applicable to pretreatment works.

8.2 COVER SPRAYS, FOG SPRAYS AND REJUVENATION SPRAYS

CONTENTS

PART A: SPECIFICATIONS

A8.2.1 SCOPE

A8.2.2 DEFINITIONS

A8.2.3 GENERAL

A8.2.4 DESIGN BY CONTRACTOR / PERFORMANCE BASED SYSTEMS

A8.2.5 MATERIALS

A8.2.6 CONSTRUCTION EQUIPMENT

A8.2.7 EXECUTION OF THE WORKS

A8.2.8 WORKMANSHIP

PART B: LABOUR ENHANCEMENT

PART C: MEASUREMENT AND PAYMENT

PART D: GUARANTEES AND COMPLIANCE CERTIFICATES

A8.2 COVER SPRAYS, FOG SPRAYS AND REJUVENATION SPRAYS

PART A: SPECIFICATIONS

A8.2.1 SCOPE

This Section covers the work in connection with the application of cover sprays, fog sprays and rejuvenation sprays.

A8.2.2 DEFINITIONS

Cover spray - refers to the application of a diluted emulsion as a final binder application on single or double seals or before application of the slurry, in case of Cape seals.

Fog spray or rejuvenation spray - is used for the application of diluted anionic emulsion or rejuvenator for purposes of adding additional binder to the seal or rejuvenating the seal at a later stage of the seal life.

The convention for describing diluted emulsion in this document is to state the type of emulsion with the proportion of emulsion and water in brackets e.g. 65 % cationic emulsion (60/40), which defines the mix as 60 % of the cationic emulsion and 40 % water.

A8.2.3 GENERAL

Fog sprays in the form of diluted anionic emulsion or inverted bitumen emulsion are applied during the service life of an existing bituminous surfacing to add additional binder or to rejuvenate the existing binder. Fog sprays using stable grade diluted anionic emulsions are applied as a pretreatment prior the application of a surfacing seal, if specified.

Diluted cationic spray grade emulsions are used as cover sprays during seal construction or shortly thereafter where the seal is sensitive to aggregate loss.

A8.2.3.1 Weather limitations

Weather limitations as specified in Clause A10.1.3.2 of Chapter 10 shall apply.

A8.2.3.2 Nominal rate of application for cover sprays, fog sprays and rejuvenation sprays

The nominal rate of application for tender purposes shall be:

a) Diluted cationic emulsion cover spray at 1,0 l/m^2

b) Diluted anionic or cationic emulsion cover spray, in the case of Cape seals, at 0,8 l/m^2

c) Diluted anionic emulsion fog spray as enrichment treatment at 0,8 l/m2

d) Rejuvenation spray with cut-back inverted emulsion or other Agrément certified products at 0,5 l/m^2

A8.2.4 DESIGN BY CONTRACTOR / PERFORMANCE BASED SYSTEMS

All specifications for cover sprays, fog sprays and rejuvenation sprays relevant to this Section shall apply.

The selection of the appropriate product and application rates are only applicable to alternatives offered by the contractor or if design by the Contractor is a specific requirement in the Contract Documentation. The proposed product and application rate shall be submitted to the Engineer, for approval based good practice guidelines.

A8.2.5 MATERIALS

A8.2.5.1 Bitumen

a) Cover spray

Diluted 65 % cationic spray grade emulsion, or 60 % anionic stable grade emulsion, with the dilutions as specified in Part C: Measurement and Payment.

b) Fog spray as enrichment treatment

A diluted 60 % anionic stable-grade emulsion (50/50) shall be used.

c) Rejuvenation spray

Agrément SA certified products or inverted bitumen emulsion complying with SANS 4001 – BT5, with the exception that the Viscosity at 60 °C on residue from distillation shall be between 10 and 20 Pas.

A8.2.6 CONSTRUCTION EQUIPMENT

Plant and equipment as specified in Clause A10.1.6.1 of Chapter 10 shall apply.

A8.2.7 EXECUTION OF THE WORKS

A8.2.7.1 Preparation and execution

The areas to be treated shall be cleaned of all dust, dirt, dung, oil or any other foreign matter.

The treatment shall consist of the application of a cover spray, fog spray or rejuvenation spray of the specified grade and dilution of bituminous emulsion to the existing surface, by means of a pressure distributor, at the rates of application as specified in the Contract Documentation or as directed by the Engineer, in widths that may vary from 0,5 m to 4,0 m.

A water tanker with a pressure distributor shall be available on standby for pre-wetting or post-wetting the areas scheduled for fog spray.

A8.2.7.2 Opening to traffic

Treated sections shall only be opened to traffic when the emulsion has properly cured and tackiness has reduced to the extent that no pickup occurs. Should pick-up occur after opening, immediate action is required by the Contractor to stabilise the situation through closure, water spraying or blinding with approved coarse sand.

Traffic accommodation shall comply with the specifications in Clause A1.5 of Chapter 1.

A8.2.8 WORKMANSHIP

The requirements of Clauses A10.1.3.9 and A10.1.3.4 of Chapter 10 regarding joints between sprayed strips and the protection of kerbs, channels, barriers, any structures, etc, shall apply.

B8.2 COVER SPRAYS, FOG SPRAYS AND REJUVENATION SPRAYS PART B: LABOUR ENHANCEMENT

CONTENTS

B8.2.1 SCOPE

B8.2.2 DEFINITIONS

B8.2.3 GENERAL

B8.2.4 DESIGN BY CONTRACTOR / PERFORMANCE BASED SYSTEMS

B8.2.5 MATERIALS

B8.2.6 CONSTRUCTION EQUIPMENT

B8.2.7 EXECUTION OF THE WORKS

B8.2.8 WORKMANSHIP

B8.2.1 SCOPE

A large proportion of activities as defined in Part A under the various sections are considered labour intensive. Therefore, Part B only provides additional specifications, not contained in Part A.

B8.2.2 DEFINITIONS

Definitions as provided in Clause A8.2.2 apply.

B8.2.3 GENERAL

Any activity specified in Part A, where hand work is given as an alternative, shall be executed in such a way as to maximise labour.

B8.2.4 DESIGN BY CONTRACTOR / PERFORMANCE BASED SYSTEMS

The provisions of Part A shall apply.

B8.2.5 MATERIALS

The provisions of Part A shall apply.

B8.2.6 CONSTRUCTION EQUIPMENT

Where reference is made in Part A to appropriate equipment in restricted areas, the use of light equipment shall be evaluated during trial sections.

For application of cover sprays, fog sprays and rejuvenation sprays, a hand operated spray cart with a 210 ℓ drum holder or similar, or a spray tanker towed with a tractor or bakkie with the necessary pumping equipment, may be used in labour enhanced alternatives.

B8.2.7 EXECUTION OF THE WORKS

For cover sprays, fog sprays and rejuvenation sprays, all preparatory activities (sweeping, watering and protection of kerbs and roadside furniture are suitable components for labour enhancement.

Given the light applications, hand spraying is not considered to be suitable for hand work except in restricted areas.

B8.2.8 WORKMANSHIP

The provisions of Part A shall apply.

C8.2 COVER SPRAYS, FOG SPRAYS AND REJUVENATION SPRAYS

PART C: MEASUREMENT AND PAYMENT

(i) Preamble

The tendered rate for each item shall include full compensation for providing, maintaining and decommissioning upon completion, of all the plant, equipment, labour, tools, incidentals and supervision to carry out the activity or construct the works in the item, unless otherwise stated.

Any prime cost or provisional sums shall be paid in accordance with the provisions of the conditions of contract. The charge or mark-up tendered or allowed for is a percentage of the amount actually paid under the prime cost or provisional sum. This percentage shall cover all the Contractor's handling, supervision, profit and liability costs to provide the services in the prime cost or provisional sum item.

The requirements of Section C1.1 of Chapter 1 shall apply.

Where pay item descriptions include any wording in brackets it is an indication that contract specific information is to be inserted in the Pricing Schedule included in the Contract Documentation.

(ii) Items that will not be measured separately

The following activities, whether required to complete the specified work or not, will not be measured and paid for separately and the Contractor shall include the cost thereof in other pay items as he deems appropriate:

1. No separate payment will be made for setting out the works.
2. No separate payment will be made for the protection or repair as required of any existing or new road furniture, structures, buildings, infrastructure or services damaged by the Contractor's activities.
3. No additional payment shall be made, nor shall any claim for additional payment be considered, for any specified work in confined or restricted areas. Any additional costs associated with working in confined or restricted areas shall be deemed to be included in the standard applicable pay items.
4. No separate payment will be made for the loading of any materials.
5. No separate payment will be made for the hauling of any materials where the material is moved over a distance of less than, and up to 1,0 km.
6. No separate payment will be made for transporting materials from commercial sources irrespective of the haul distance.
7. No separate payment will be made for the removal or any surplus material imported to complete the works.
8. For all Works performed, precautionary measures required in terms of the Occupational Health and Safety Act (Act 85 of 1993) and the latest amendments thereof as well as the latest Construction Regulations shall be deemed included in the rates tendered for the relevant products.

(iii) Items to be measured and paid for using items specified elsewhere in the specifications

Not applicable to this Section.

(iv) Items specifically for this Section of the specifications

Item	Description	Unit
C8.2.1	**Cover sprays, fog sprays and rejuvenation sprays**	
C8.2.1.1	65 % Cationic spray grade emulsion	
(a)	Indicate dilution (Diluted ..% Emulsion/…% Water)	litre (ℓ)
C8.2.1.2	60 % Anionic stable grade emulsion	
(a)	Indicate dilution (Diluted ..% Emulsion/…% Water)	litre (ℓ)
C8.2.1.3	Cutback Inverted bitumen emulsion	litre (ℓ)
C8.2.1.4	Certified rejuvenator (State type and certification)	litre (ℓ)

The unit of measurement shall be the litre of binder measured at spraying temperature and sprayed in accordance with the requirements.

The tendered rates shall include full compensation for cleaning and preparing the existing surface, for furnishing the material and applying the binder and for all other incidentals necessary for completing the work as specified.

Item	Description	Unit
C8.2.2	**Extra over item C8.2.1 for labour enhanced application**	
C8.2.2.1	65 % Cationic spray grade emulsion	
(a)	Indicate dilution (Diluted ..% Emulsion/…% Water)	litre (ℓ)
C8.2.2.2	60 % Anionic stable grade emulsion	
(a)	Indicate dilution (Diluted ..% Emulsion/…% Water)	litre (ℓ)

C8.2.2.3	Cutback inverted bitumen emulsion	litre (ℓ)
C8.2.2.4	Certified rejuvenator (State type and certification)	litre (ℓ)

D8.2 COVER SPRAYS, FOG SPRAYS AND REJUVENATION SPRAYS
PART D: GUARANTEES AND COMPLIANCE CERTIFICATES

CONTENTS

D8.2.1 SCOPE

D8.2.2 GENERAL

D8.2.3 PERFORMANCE GUARANTEE REQUIREMENTS

D8.2.4 FUNCTIONAL PERFORMANCE ASSESSMENTS

D8.2.5 VISUALLY ASSESSED PROPERTIES

D8.2.6 INSTRUMENTALLY ASSESSED PROPERTIES

D8.2.7 EVALUATION FOR ACCEPTANCE

D8.2.8 ADDITIONAL PROCEDURES TO BE ADOPTED IN THE EVENT OF FAILURE

D8.2.9 NOTIFICATION OF REMEDIAL WORK

D8.2.10 REMEDIAL WORK

D8.2.1 SCOPE

Pretreatment and repair of existing layers form an integral part of the final surfacing. Therefore, the relevant requirements of Part D in Chapters 9 and Chapter 10 shall apply.

D8.2.2 GENERAL

Not applicable to pretreatment works.

D8.2.3 PERFORMANCE GUARANTEE REQUIREMENTS

Not applicable to pretreatment works.

D8.2.4 FUNCTIONAL PERFORMANCE ASSESSMENTS

Not applicable to pretreatment works.

D8.2.5 VISUALLY ASSESSED PROPERTIES

Not applicable to pretreatment works.

D8.2.6 INSTRUMENTALLY ASSESSED PROPERTIES

Not applicable to pretreatment works.

D8.2.7 EVALUATION FOR ACCEPTANCE

Not applicable to pretreatment works.

D8.2.8 ADDITIONAL PROCEDURES TO BE ADOPTED IN THE EVENT OF FAILURE

Not applicable to pretreatment works.

D8.2.9 NOTIFICATION OF REMEDIAL WORK

Not applicable to pretreatment works.

D8.2.10 REMEDIAL WORK

Not applicable to pretreatment works.

8.3 TEXTURE TREATMENT

CONTENTS

PART A: SPECIFICATIONS

A8.3.1 SCOPE

A8.3.2 DEFINITIONS

A8.3.3 GENERAL

A8.3.4 DESIGN BY CONTRACTOR / PERFORMANCE BASED SYSTEMS

A8.3.5 MATERIALS

A8.3.6 CONSTRUCTION EQUIPMENT

A8.3.7 EXECUTION OF THE WORKS

A8.3.8 WORKMANSHIP

PART B: LABOUR ENHANCEMENT

PART C: MEASUREMENT AND PAYMENT

PART D: GUARANTEES AND COMPLIANCE CERTIFICATES

A8.3 TEXTURE TREATMENT

PART A: SPECIFICATIONS

A8.3.1 SCOPE

This Section covers the work in connection with the application of texture treatments.

A8.3.2 DEFINITIONS

Texture treatment - refers to the application of a thin layer of slurry or microsurfacing to obtain a uniform fine texture prior to surfacing or resurfacing.

A8.3.3 GENERAL

This treatment shall be used where the existing surface macro texture is coarse or varying to such an extent that one single and uniform binder application rate for the seal to follow could result in the poor performance of the seal.

A8.3.3.1 Weather limitations

Weather limitations applicable to slurry seals, as specified in Clause A8.1.3.1, shall apply.

A8.3.3.2 Nominal rate of application for texture treatments

Nominal rates for tender purposes shall be in accordance with Table A8.3.3-1.

Table A8.3.3-1: Nominal rates for application of texture treatments

Component	Nominal rate
Texture slurry application on existing macro texture of 1,0 mm to 2,0 mm	0,003 m^3/m^2
Texture slurry application on existing macro texture of 2,0 mm to 4,0 mm	0,0045 m^3/m^2
Microsurfacing application on existing macro texture up to 6,0 mm	0,007 m^3/m^2
Emulsion content for the texture slurry	200 l/m^3
Emulsion content for the microsurfacing	180 l/m^3
Active filler content of the texture slurry	16.5 kg/m^3

A8.3.4 DESIGN BY CONTRACTOR / PERFORMANCE BASED SYSTEMS

All specifications for texture treatments relevant in this Section shall apply. The Contractor shall submit the proposed mix design for approval.

A8.3.5 MATERIALS

A8.3.5.1 Bitumen

a) The bituminous binder for conventional slurry shall be a 60 % stable-grade anionic bitumen emulsion complying with SANS 4001 – BT3.

b) The bituminous binder for microsurfacing shall comply to the specifications of Clause A10.1.5.5 of Chapter 10.

A8.3.5.2 Aggregate

a) Aggregate for texture slurry shall comply with the specifications of Clause A10.15.17a) of Chapter 10 for fine slurry, fine grade or medium grade.

b) Aggregate for texture treatment with microsurfacing shall comply with the specifications of Clause A10.15.18 of Chapter 10 for Type II grading.

A8.3.5.3 Active filler for slurry

The active filler shall comply with the specifications of Clause A10.1.5.17b) of Chapter 10.

A8.3.6 CONSTRUCTION EQUIPMENT

Plant and equipment shall comply with the specifications of Clause A10.1.6.8 of Chapter 10.

A8.3.7 EXECUTION OF THE WORKS

A8.3.7.1 Preparation and execution

The bituminous slurry shall be prepared, mixed and applied as specified in Clauses A10.1.6.8, A10.1.6.11 and A10.1.6.12 of Chapter 10.

The slurry shall be applied by hand and worked into cracks or other open patches with brooms or squeegees until the surface is smooth and even.

A8.3.7.2 Opening to traffic

The road shall be exposed to traffic before further surface treatment work is carried out for such period as defined in Clause A10.1.3.11 of Chapter 10, or until such time that the representative ball penetration value (SANS 3001-BT10) at expected operating temperature (refer SABITA Manual 40) road surface temperature, reduces to less than 2,0 mm.

Traffic accommodation shall comply with the specifications in Clause A1.5 of Chapter 1.

A8.3.8 WORKMANSHIP

The requirements of Clause A10.1.8 of Chapter 10 shall apply.

B8.3 TEXTURE TREATMENT

PART B: LABOUR ENHANCEMENT

CONTENTS

B8.3.1 SCOPE

B8.3.2 DEFINITIONS

B8.3.3 GENERAL

B8.3.4 DESIGN BY CONTRACTOR / PERFORMANCE BASED SYSTEMS

B8.3.5 MATERIALS

B8.3.6 CONSTRUCTION EQUIPMENT

B8.3.7 EXECUTION OF THE WORKS

B8.3.8 WORKMANSHIP

B8.3.1 SCOPE

A large proportion of activities as defined in Part A under the various sections are considered labour intensive. Therefore, Part B only provides additional specifications, not contained in Part A.

B8.3.2 DEFINITIONS

Definitions as provided in Clause A8.3.2 apply.

B8.3.3 GENERAL

Any activity specified in Part A, where hand work is given as an alternative, shall be executed in such a way as to maximise labour.

B8.3.4 DESIGN BY CONTRACTOR / PERFORMANCE BASED SYSTEMS

The provisions of Part A shall apply.

B8.3.5 MATERIALS

The provision of Part A shall apply.

B8.3.6 CONSTRUCTION EQUIPMENT

Plant and equipment shall comply with the specifications of Clause B10.1.6.3 of Chapter 10. Where reference is made to appropriate or approved equipment, the use of light equipment shall be evaluated during trial sections.

B8.3.7 EXECUTION OF THE WORKS

The provision of Part A shall apply.

B8.3.8 WORKMANSHIP

The provisions of Part A shall apply.

C8.3 TEXTURE TREATMENT

PART C: MEASUREMENT AND PAYMENT

(i) Preamble

The tendered rate for each item shall include full compensation for providing, maintaining and decommissioning upon completion, of all the plant, equipment, labour, tools, incidentals and supervision to carry out the activity or construct the works in the item, unless otherwise stated.

Any prime cost or provisional sums shall be paid in accordance with the provisions of the conditions of contract. The charge or mark-up tendered or allowed for is a percentage of the amount actually paid under the prime cost or provisional sum. This percentage shall cover all the Contractor's handling, supervision, profit and liability costs to provide the services in the prime cost or provisional sum item.

The requirements of Section C1.1 of Chapter 1 shall apply.

Where pay item descriptions include any wording in brackets it is an indication that contract specific information is to be inserted in the Pricing Schedule included in the Contract Documentation.

(ii) Items that will not be measured separately

The following activities, whether required to complete the specified work or not, will not be measured and paid for separately and the Contractor shall include the cost thereof in other pay items as he deems appropriate:

1. No separate payment will be made for setting out the works.
2. No separate payment will be made for the protection or repair as required of any existing or new road furniture, structures, buildings, infrastructure or services damaged by the Contractor's activities.
3. No additional payment shall be made, nor shall any claim for additional payment be considered, for any specified work in confined or restricted areas. Any additional costs associated with working in confined or restricted areas shall be deemed to be included in the standard applicable pay items.
4. No separate payment will be made for the loading of any materials.
5. No separate payment will be made for the hauling of any materials where the material is moved over a distance of less than, and up to 1,0 km.
6. No separate payment will be made for transporting materials from commercial sources irrespective of the haul distance.
7. No separate payment will be made for the removal or any surplus material imported to complete the works.
8. For all Works performed, precautionary measures required in terms of the Occupational Health and Safety Act (Act 85 of 1993) and the latest amendments thereof as well as the latest Construction Regulations shall be deemed included in the rates tendered for the relevant products.
9. Rolling of the microsurfacing.

(iii) Items to be measured and paid for using items specified elsewhere in the specifications

Not applicable to this Section.

(iv) Items specifically for this Section of the specifications

Item		Description	Unit
C8.3.1		**Texture treatment**	
	C8.3.1.1	Application of slurry for texture improvement, applied by hand (Indicate aggregate grade, type of emulsion, filler type)	cubic metre (m³)
	C8.3.1.2	Application of slurry for texture improvement, applied by spreader box (Indicate aggregate grade, type of emulsion, filler type)	cubic metre (m³)
	C8.3.1.3	Application of microsurfacing for texture improvement, applied by spreader box (Indicate aggregate grade, type of emulsion, filler type)	cubic metre (m³)

The measurement for slurry shall be the cubic metre of saturated fine aggregate used, measured as described in item C10.1.20 of Chapter 10.

The tendered rates shall include full compensation for procuring and furnishing all the materials, for mixing and applying the slurry, demarcating all areas to be treated and for all plant, labour and incidentals necessary to complete the work as specified.

D8.3 TEXTURE TREATMENT

PART D: GUARANTEES AND COMPLIANCE CERTIFICATES

CONTENTS

D8.3.1 SCOPE

D8.3.2 GENERAL

D8.3.3 PERFORMANCE GUARANTEE REQUIREMENTS

D8.3.4 FUNCTIONAL PERFORMANCE ASSESSMENTS

D8.3.5 VISUALLY ASSESSED PROPERTIES

D8.3.6 INSTRUMENTALLY ASSESSED PROPERTIES

D8.3.7 EVALUATION FOR ACCEPTANCE

D8.3.8 ADDITIONAL PROCEDURES TO BE ADOPTED IN THE EVENT OF FAILURE

D8.3.9 NOTIFICATION OF REMEDIAL WORK

D8.3.10 REMEDIAL WORK

D8.3.1 SCOPE

Pretreatment and repair of existing layers form an integral part of the final surfacing. Therefore, the relevant requirements of Part D in Chapters 9 and Chapter 10 shall apply.

D8.3.2 GENERAL

Not applicable to pretreatment works.

D8.3.3 PERFORMANCE GUARANTEE REQUIREMENTS

Not applicable to pretreatment works.

D8.3.4 FUNCTIONAL PERFORMANCE ASSESSMENTS

Not applicable to pretreatment works.

D8.3.5 VISUALLY ASSESSED PROPERTIES

Not applicable to pretreatment works.

D8.3.6 INSTRUMENTALLY ASSESSED PROPERTIES

Not applicable to pretreatment works.

D8.3.7 EVALUATION FOR ACCEPTANCE

Not applicable to pretreatment works.

D8.3.8 ADDITIONAL PROCEDURES TO BE ADOPTED IN THE EVENT OF FAILURE

Not applicable to pretreatment works.

D8.3.9 NOTIFICATION OF REMEDIAL WORK

Not applicable to pretreatment works.

D8.3.10 REMEDIAL WORK

Not applicable to pretreatment works.

8.4 RUT AND/OR DEPRESSION CORRECTION

CONTENTS

PART A: SPECIFICATIONS

A8.4.1 SCOPE

A8.4.2 DEFINITIONS

A8.4.3 GENERAL

A8.4.4 DESIGN BY CONTRACTOR / PERFORMANCE BASED SYSTEMS

A8.4.5 MATERIALS

A8.4.6 CONSTRUCTION EQUIPMENT

A8.4.7 EXECUTION OF THE WORKS

A8.4.8 WORKMANSHIP

PART B: LABOUR ENHANCEMENT

PART C: MEASUREMENT AND PAYMENT

PART D: GUARANTEES AND COMPLIANCE CERTIFICATES

A8.4 RUT AND/OR DEPRESSION CORRECTION

PART A: SPECIFICATIONS

A8.4.1 SCOPE

This Section covers the work in connection with rut and/or depression correction before resurfacing.

A8.4.2 DEFINITIONS

Rut correction - refers to filling of ruts in the wheel tracks

Screeding - refers to level correction using coarse slurry, microsurfacing or asphalt where the road surface is uneven and where depressions, humps or small grooves occur as a result of deformation of the pavement layers not due to structural failure of the pavement.

A8.4.3 GENERAL

Where both planing and screeding are specified, the screed shall only be placed after the planing has been completed.

When asphalt is specified for rut filling or screeding, longitudinal keys shall be cut in accordance with the Contract Documentation.

The existing surface shall be swept clean or cleaned by other approved methods to be free from dust, soil, gravel, loose stones or any other undesirable materials. If required, due to brittleness and permeability of the existing surface, a fog spray in accordance with Section A8.2 shall be applied as pre-treatment.

The bituminous material used for the screed shall be asphalt, coarse slurry or microsurfacing as specified in the Contract Documentation.

The design of asphalt shall be in accordance with TRH8, and the coarse slurry and microsurfacings in accordance with SABITA Manual 28 and shall be submitted to the Engineer for approval.

A8.4.3.1 Weather limitations

Weather limitations applicable to asphalt (Chapter 9) or coarse slurry and microsurfacing as per Clause A10.1.3.2 of Chapter 10 shall apply.

A8.4.3.2 Nominal rates for rut and depression correction

Nominal rates for tender purposes shall be in accordance with Table A8.4.3-1.

Table A8.4.3-1: Nominal rates for rut and depression correction

Component	Nominal rate
Bond coat for asphalt	0,5 l/m^2
Emulsion content for the coarse slurry	210 l/m^3
Emulsion content for the microsurfacing	180 l/m^3
Active filler content of the slurry and microsurfacing	1,65 kg/m^3

A8.4.4 DESIGN BY CONTRACTOR / PERFORMANCE BASED SYSTEMS

All specifications for rut and depression correction addressed in this section shall apply.

The selection of the appropriate materials, equipment and methods shall be the responsibility of the Contractor, based on good practice guidelines. The Contractor shall submit all designs to the Engineer for approval.

A8.4.5 MATERIALS

Materials and references to requirements are as follows:

Table A8.4.5-1: Specifications for rut and depression correction materials

Component	Binder	Aggregate
Asphalt materials: Refer to Chapter 9	As specified	As specified
Coarse slurry	Clause A10.1.5.4 in Chapter 10	Clause A10.1.5.17 a) in Chapter 10 for Type 1 or Type 2
Microsurfacing	Clause A10.1.5.5 in Chapter 10	Clause A10.1.5.18 in Chapter 10 for Type 2 or Type 3

A8.4.6 CONSTRUCTION EQUIPMENT

A8.4.6.1 Asphalt (Hot or cold applied)

The requirements as specified in Chapter 9 or Agrèment SA Certification shall apply as relevant.

A8.4.6.2 Microsurfacing and coarse slurry

The requirements as specified in Clauses A10.1.6.11 and A10.1.6.12 of Chapter 10 shall apply.

A8.4.7 EXECUTION OF THE WORKS

A8.4.7.1 Continuous graded asphalt

The asphalt shall be produced, transported, placed and compacted as specified in Chapter 9, as applicable. The paver shall be so adjusted that the straight-edge blade will screed off any high spots on the existing surface and the asphalt will therefore only be placed only in depressions. Where high spots have been planed down, the straight-edge blade shall nevertheless comply with the specified standards for evenness. Where the required asphalt thickness exceeds 25 mm at any position, no hand placement shall be allowed, unless specified in the Contract Documentation. Such sections of the screed shall be placed in more than one layer at thicknesses in accordance with the instructions of the Engineer.

Where the surface of the screed breaks up, the screed shall be removed and replaced, all at the cost of the Contractor.

A8.4.7.2 Microsurfacing

The mixing and application of the microsurfacing shall be done by a mixer designed to provide a rapid mixing time, and sufficient agitation within the spreading system to prevent segregation or premature hardening.

The appropriate workability measured by the flow (Consistency test: ASTM 3910) shall be verified during the first application and recorded as part of a method statement.

A8.4.7.3 Coarse slurry

The mixing and application of the coarse slurry shall be done by a continuous slurry machine or if specified in the Contract documentation by appropriate and approved equipment.

The appropriate workability measured by the flow (Consistency test: ASTM 3910) shall be verified during the first application and recorded as part of a method statement.

A8.4.7.4 Opening to traffic

The road shall be left open to traffic before further surface treatment work is carried out for such period as defined in Clause A10.1.3.6 of Chapter 10 or until such time that the representative corrected ball penetration value (SANS 3001-BT10), at the expected operating road surface temperature (Refer SABITA Manual 40), reduces to less than 2,0 mm.

Traffic accommodation shall comply with the specifications in Section A1.5 of Chapter 1.

A8.4.8 WORKMANSHIP

When continuous graded asphalt or coarse slurry is used for rut filling, the completed screed shall not deviate by more than 6,0 mm from the bottom edge of a 3,0 m straight- edge placed in any direction.

Where microsurfacing is used:

- The applied thickness of the microsurfacing, before compaction, shall be 20-25 % more than the depression/rut to be filled.
- The formulation of the product shall be such that complete curing will take place within a maximum of 4 hours, regardless of the climatic conditions during construction, to allow opening to traffic.
- Representative corrected ball penetration value (SANS 3001-BT10), at the expected operating road surface temperature (Refer SABITA Manual 40), shall reduce to less than 2,0 mm within a period of 4 weeks.

B8.4 RUT AND/OR DEPRESSION CORRECTION
PART B: LABOUR ENHANCEMENT

CONTENTS

B8.4.1 SCOPE

B8.4.2 DEFINITIONS

B8.4.3 GENERAL

B8.4.4 DESIGN BY CONTRACTOR / PERFORMANCE BASED SYSTEMS

B8.4.5 MATERIALS

B8.4.6 CONSTRUCTION EQUIPMENT

B8.4.7 EXECUTION OF THE WORKS

B8.4.8 WORKMANSHIP

B8.4.1 SCOPE

A large proportion of activities as defined in Part A under the various sections are considered labour intensive. Therefore, Part B only provides additional specifications, not contained in Part A.

B8.4.2 DEFINITIONS

Definitions as provided in Clause A8.4.2 shall apply.

B8.4.3 GENERAL

Any activity specified in Part A, where hand work is given as an alternative, shall be executed in such a way as to maximise labour.

B8.4.4 DESIGN BY CONTRACTOR / PERFORMANCE BASED SYSTEMS

The provisions of Part A shall apply.

B8.4.5 MATERIALS

The provisions of Part A shall apply.

B8.4.6 CONSTRUCTION EQUIPMENT

Where reference is made in Part A to appropriate or approved equipment, the use of light equipment shall be evaluated during trial sections.

B8.4.7 EXECUTION OF THE WORKS

The provisions of Part A shall apply.

B8.4.8 WORKMANSHIP

The provisions of Part A shall apply.

C8.4 RUT AND/OR DEPRESSION CORRECTION

PART C: MEASUREMENT AND PAYMENT

(i) Preamble

The tendered rate for each item shall include full compensation for providing, maintaining and decommissioning upon completion, of all the plant, equipment, labour, tools, incidentals and supervision to carry out the activity or construct the works in the item, unless otherwise stated.

Any prime cost or provisional sums shall be paid in accordance with the provisions of the conditions of contract. The charge or mark-up tendered or allowed for is a percentage of the amount actually paid under the prime cost or provisional sum. This percentage shall cover all the Contractor's handling, supervision, profit and liability costs to provide the services in the prime cost or provisional sum item.

The requirements of Section C1.1 of Chapter 1 shall apply.

Where pay item descriptions include any wording in brackets it is an indication that contract specific information is to be inserted in the Pricing Schedule included in the Contract Documentation.

(ii) Items that will not be measured separately

The following activities, whether required to complete the specified work or not, will not be measured and paid for separately and the Contractor shall include the cost thereof in other pay items as he deems appropriate:

1. No separate payment will be made for setting out the works.
2. No separate payment will be made for the protection or repair as required of any existing or new road furniture, structures, buildings, infrastructure or services damaged by the Contractor's activities.
3. No additional payment shall be made, nor shall any claim for additional payment be considered, for any specified work in confined or restricted areas. Any additional costs associated with working in confined or restricted areas shall be deemed to be included in the standard applicable pay items.
4. No separate payment will be made for the loading of any materials.
5. No separate payment will be made for the hauling of any materials where the material is moved over a distance of less than, and up to 1,0 km.
6. No separate payment will be made for transporting materials from commercial sources irrespective of the haul distance.
7. No separate payment will be made for the removal or any surplus material imported to complete the works.
8. For all Works performed, precautionary measures required in terms of the Occupational Health and Safety Act (Act 85 of 1993) and the latest amendments thereof as well as the latest Construction Regulations shall be deemed included in the rates tendered for the relevant products.

(iii) Items to be measured and paid for using items specified elsewhere in the specifications

Not applicable to this Section.

(iv) Items specifically for this Section of the specifications

Item	Description	Unit
C8.4.1	**Rut and/or Depression correction (screeding)**	
C8.4.1.1	Bond coat using 50 % diluted stable grade bitumen emulsion	litre (ℓ)
C8.4.1.2	Correction material	
(a)	Continuously-graded asphalt (State Nominal maximum aggregate size and binder type)	ton (t)
(b)	Semi-gap graded asphalt (State Nominal maximum aggregate size and binder type)	ton (t)
(c)	Cold applied asphalt (Agrèment SA certified for specific class as specified)	ton (t)
(d)	Coarse slurry (state aggregate grade and emulsion type)	cubic metre (m³)
(e)	Microsurfacing (state aggregate grade and binder type)	cubic metre (m³)

The unit of measurement for the bond coat shall be the litre of emulsion applied, measured at spraying temperature. The unit of measurement for asphalt shall be the ton of asphalt placed according to the specifications.

The of measurement for slurry and microsurfacing shall be the cubic metre of saturated fine aggregate used, measured as described in item C10.1.20 of Chapter 10.

The tendered rate for asphalt shall include full compensation for procuring, furnishing and mixing all the materials, for placing the asphalt and for all transport and other incidentals necessary for completing the work as specified.

The tendered rate for slurry and microsurfacing shall include full compensation for all materials, equipment and labour for producing and applying the slurry, irrespective of the number of applications required to attain the required thickness.

D8.4 RUT AND/OR DEPRESSION CORRECTION

PART D: GUARANTEES AND COMPLIANCE CERTIFICATES

CONTENTS

D8.4.1 SCOPE

D8.4.2 GENERAL

D8.4.3 PERFORMANCE GUARANTEE REQUIREMENTS

D8.4.4 FUNCTIONAL PERFORMANCE ASSESSMENTS

D8.4.5 VISUALLY ASSESSED PROPERTIES

D8.4.6 INSTRUMENTALLY ASSESSED PROPERTIES

D8.4.7 EVALUATION FOR ACCEPTANCE

D8.4.8 ADDITIONAL PROCEDURES TO BE ADOPTED IN THE EVENT OF FAILURE

D8.4.9 NOTIFICATION OF REMEDIAL WORK

D8.4.10 REMEDIAL WORK

D8.4.1 SCOPE

Pretreatment and repair of existing layers form an integral part of the final surfacing. Therefore, the relevant requirements of Part D in Chapters 9 and Chapter 10 shall apply.

D8.4.2 GENERAL

Not applicable to pretreatment works.

D8.4.3 PERFORMANCE GUARANTEE REQUIREMENTS

Not applicable to pretreatment works.

D8.4.4 FUNCTIONAL PERFORMANCE ASSESSMENTS

Not applicable to pretreatment works.

D8.4.5 VISUALLY ASSESSED PROPERTIES

Not applicable to pretreatment works.

D8.4.6 INSTRUMENTALLY ASSESSED PROPERTIES

Not applicable to pretreatment works.

D8.4.7 EVALUATION FOR ACCEPTANCE

Not applicable to pretreatment works.

D8.4.8 ADDITIONAL PROCEDURES TO BE ADOPTED IN THE EVENT OF FAILURE

Not applicable to pretreatment works.

D8.4.9 NOTIFICATION OF REMEDIAL WORK

Not applicable to pretreatment works.

D8.4.10 REMEDIAL WORK

Not applicable to pretreatment works.

8.5 STANDARD CRACK SEALING

CONTENTS

PART A: SPECIFICATIONS

A8.5.1 SCOPE

A8.5.2 DEFINITIONS

A8.5.3 GENERAL

A8.5.4 DESIGN BY CONTRACTOR / PERFORMANCE BASED SYSTEMS

A8.5.5 MATERIALS

A8.5.6 CONSTRUCTION EQUIPMENT

A8.5.7 EXECUTION OF THE WORKS

A8.5.8 WORKMANSHIP

PART B: LABOUR ENHANCEMENT

PART C: MEASUREMENT AND PAYMENT

PART D: GUARANTEES AND COMPLIANCE CERTIFICATES

A8.5 STANDARD CRACK SEALING

PART A: SPECIFICATIONS

A8.5.1 SCOPE

This Section covers the work in connection with standard crack sealing before resurfacing or as treatment of defects.

A8.5.2 DEFINITIONS

Standard crack sealing - refers to the sealing of singular line cracks, such as longitudinal cracks, transvers cracks and large block cracks, using cold or hot modified binders.

A8.5.3 GENERAL

The types of cracks to be treated shall be specified in the Contract Documentation. The Engineer shall instruct the Contractor regarding the type of treatment to be used in the various cases.

A8.5.3.1 Weather limitations

Cracks shall be sealed only when the temperature of the road surface exceeds 10°C. Crack sealing may not be done within 3 days after rain has fallen on the site.

Crack sealing shall not take place when the conditions are excessively windy or dusty.

A8.5.3.2 Traffic limitations

Unless specified differently in the Contract Documentation, no crack sealing shall be allowed before 09:00 and after 15:00.

A8.5.4 DESIGN BY CONTRACTOR / PERFORMANCE BASED SYSTEMS

All specifications for crack sealing addressed in this section shall apply.

The selection of the appropriate materials, equipment and methods shall be based on good practice guidelines. If the Contractor proposes a proprietary product, it shall be certified by an independent certification agency.

A8.5.5 MATERIALS

A8.5.5.1 Herbicide

Herbicide shall be a non-selective herbicide approved by the Engineer.

A8.5.5.2 Bitumen

a) Primer for sealing cracks

The primer shall be an invert bitumen emulsion complying with SANS 4001 – BT5.

b) Modified binder crack sealant

The classification of modified binders for crack sealing, minimum required properties and requirements for short term handing and application, shall be in accordance with the latest publication of TG1.

The binders to be used for the sealing of cracks shall be C-E1, CC-E1, C-R1 or C-R2 modified binder crack sealants as listed in the Pricing Schedule.

c) Aggregate

Where so instructed, blinding material shall consist of crusher sand or river sand, with 100 % passing the 7,1 mm sieve and not more than 10 % passing the 2,0 mm sieve. The aggregate shall be clean, hard and free from excessive dust and shall contain no clay, loam or other deleterious matter.

A8.5.6 CONSTRUCTION EQUIPMENT

A8.5.6.1 Equipment for crack-sealing

The Contractor shall provide the following equipment for crack sealing:

a) Blowing out cracks

A mobile compressor capable of discharging at least 3,0 m³/min compressed air at 650 kPa pressure. The compressed air shall be free of water, oil and other deleterious matter that may adversely affect the bond between the sealant and the cracks. The compressor shall be free of oil and diesel leaks.

A lance shall be used to direct the force of the air into the cracks and must be manoeuvrable enough to follow the path of the crack accurately.

If hot air is specified, the compressed air must be heated by a hot air lance capable of achieving a temperature of 300°C in the combustion chamber.

b) Prime injector

A special prime injector for injecting prime into open cracks using compressed air propulsion shall be used. Essentially the equipment shall consist of a blowpipe with nozzle to direct the jet of compressed air into the cracks, a venturi or similar device shall be fitted to the blow pipe for sucking in prime from the storage vessel. A suitable throttling valve shall be fitted on the prime supply line to adjust the prime flow, i.e. to adjust the compressed air to prime ratio.

The injectors, blowpipes, storage vessel interconnecting piping, inter alia, shall all be capable of safely withstanding the pressure generated by the compressors. Design sketches of the equipment shall be submitted to the Engineer for approval.

c) Sealant applicator

The sealant shall be applied through an applicator manufactured specifically for this purpose. Essentially the equipment for the hot sealant shall consist of a mobile vessel capable of heating the sealant to the required application temperature by indirect heat and controlled by a thermostat to prevent overheating. A calibrated thermometer shall be fitted in an accessible position to accurately monitor the sealant temperature in the tank. Only pumps which can deliver the sealant into the crack in a controlled manner shall be used.

The sealant shall only be applied with pressure type application equipment to ensure that the cracks are filled rather than covered. The Contractor shall ensure that all equipment is kept clean so as to prevent blockages and resultant poor workmanship.

d) Roller

Where required, a vibratory steel-wheeled roller of between 2 and 4 tons mass with an adjustable amplitude and frequency of vibration shall be utilised to flatten out any ridges.

e) Other equipment

All equipment shall be suitable for the specified use and working areas and shall be capable of obtaining the specified results.

A8.5.7 EXECUTION OF THE WORKS

A8.5.7.1 Preparation and execution

The cracks shall be blown out with heated ("hot air lance") or cold compressed air, according to the method specified in the Contract Documentation. All dirt, grit and other base or foreign matter shall be blown out and be removed from the cracks and road surface.

A supply of approved herbicide, diluted in accordance with the manufacturers recommendations, shall be prepared. The solution shall be sprayed into the cracks on the road surface where required by means of rucksack type of sprayers and allowed to dry.

If required in the Contract Documentation, the cracks shall be pre-treated with a specified primer.

Where, in accordance with the Contract Documentation, the cracks are to be rolled, the Contractor shall treat the cracks as follows:

- The cracks shall be cleaned and herbicides applied, if specified.
- The surface shall be heated in an approved manner along the full length of the crack and over a width of 250 mm on each side of the crack and then rolled with approved rollers until an even surface has been obtained.

A8.5.7.2 Linear cracks smaller than 3,0 mm

No line cracks smaller than 3,0 mm width shall be sealed unless so ordered by the Engineer.

A8.5.7.3 Linear cracks of 3,0 mm and wider

Cracks shall first be cleaned before the crack is sealed. The specified sealant shall be forced into the cracks by means of the specified sealant applicator. The Contractor shall note that a single application of crack sealant might not be sufficient and that the application might have to be repeated.

A8.5.7.4 Opening to traffic

The road shall not be opened to construction, or public traffic, until the binder has hardened sufficiently to prevent any pickup or damage of the sealant or sand blinding layer.

Traffic accommodation shall comply with the specifications in Section A1.5 of Chapter 1.

A8.5.8 WORKMANSHIP

The Contractor shall ensure that the injected prime and sealant mixture actually penetrates the crack and does not merely cover the crack in the form of a bandage. All excess sealant on the road surface wider than 30 mm on each side of the crack shall be removed and shall not be paid for.

B8.5 STANDARD CRACK SEALING
PART B: LABOUR ENHANCEMENT

CONTENTS

B8.5.1 SCOPE

B8.5.2 DEFINITIONS

B8.5.3 GENERAL

B8.5.4 DESIGN BY CONTRACTOR / PERFORMANCE BASED SYSTEMS

B8.5.5 MATERIALS

B8.5.6 CONSTRUCTION EQUIPMENT

B8.5.7 EXECUTION OF THE WORKS

B8.5.8 WORKMANSHIP

B8.5.1 SCOPE

A large proportion of activities as defined in Part A under the various sections are considered labour intensive. Therefore, Part B only provides additional specifications, not contained in Part A.

B8.5.2 DEFINITIONS

Definitions as provided in Clause A8.5.2 apply.

B8.5.3 GENERAL

Any activity specified in Part A, where hand work is given as an alternative, shall be executed in such a way as to maximise labour.

B8.5.4 DESIGN BY CONTRACTOR / PERFORMANCE BASED SYSTEMS

The provisions of Part A shall apply.

B8.5.5 MATERIALS

The provisions of Part A shall apply.

B8.5.6 CONSTRUCTION EQUIPMENT

The provisions of Part A shall apply.

B8.5.7 EXECUTION OF THE WORKS

The provisions of Part A shall apply.

B8.5.8 WORKMANSHIP

The provisions of Part A shall apply.

C8.5 STANDARD CRACK SEALING

PART C: MEASUREMENT AND PAYMENT

(i) Preamble

The tendered rate for each item shall include full compensation for providing, maintaining and decommissioning upon completion, of all the plant, equipment, labour, tools, incidentals and supervision to carry out the activity or construct the works in the item, unless otherwise stated.

Any prime cost or provisional sums shall be paid in accordance with the provisions of the conditions of contract. The charge or mark-up tendered or allowed for is a percentage of the amount actually paid under the prime cost or provisional sum. This percentage shall cover all the Contractor's handling, supervision, profit and liability costs to provide the services in the prime cost or provisional sum item.

The requirements of Section C1.1 of Chapter 1 shall apply.

Where pay item descriptions include any wording in brackets it is an indication that contract specific information is to be inserted in the Pricing Schedule included in the Contract Documentation.

(ii) Items that will not be measured separately

The following activities, whether required to complete the specified work or not, will not be measured and paid for separately and the Contractor shall include the cost thereof in other pay items as he deems appropriate:

1. No separate payment will be made for setting out the works.
2. No separate payment will be made for the protection or repair as required of any existing or new road furniture, structures, buildings, infrastructure or services damaged by the Contractor's activities.
3. No additional payment shall be made, nor shall any claim for additional payment be considered, for any specified work in confined or restricted areas. Any additional costs associated with working in confined or restricted areas shall be deemed to be included in the standard applicable pay items.
4. No separate payment will be made for the loading of any materials.
5. No separate payment will be made for the hauling of any materials where the material is moved over a distance of less than, and up to 1,0 km.
6. No separate payment will be made for transporting materials from commercial sources irrespective of the haul distance.
7. No separate payment will be made for the removal or any surplus material imported to complete the works.
8. For all Works performed, precautionary measures required in terms of the Occupational Health and Safety Act (Act 85 of 1993) and the latest amendments thereof as well as the latest Construction Regulations shall be deemed included in the rates tendered for the relevant products.

(iii) Items to be measured and paid for using items specified elsewhere in the specifications

Not applicable to this Section.

(iv) Items specifically for this Section of the specifications

Item	Description	Unit
C8.5.1	**Standard crack sealing**	
C8.5.1.1	Cleaning cracks	
(a)	Cleaning crack with cold compressed air	metre (m)
(b)	Cleaning crack with hot compressed air	metre (m)
C8.5.1.2	Applying herbicides for sealing cracks	litre (ℓ)
C8.5.1.3	Priming (indicate primer)	litre (ℓ)
C8.5.1.4	Sealing the cracks	
(a)	Sealing using (State crack sealant)	litre (ℓ)
C8.5.1.5	Heating of surface before rolling	metre (m)
C8.5.1.6	Rolling the cracks	metre (m)

The tendered rates shall include full compensation for treating the crack as specified

Where cracks must be heated and/or rolled, the unit of measurement shall be a metre of crack heated/rolled.

D8.5 STANDARD CRACK SEALING

PART D: GUARANTEES AND COMPLIANCE CERTIFICATES

CONTENTS

D8.5.1 SCOPE

D8.5.2 GENERAL

D8.5.3 PERFORMANCE GUARANTEE REQUIREMENTS

D8.5.4 FUNCTIONAL PERFORMANCE ASSESSMENTS

D8.5.5 VISUALLY ASSESSED PROPERTIES

D8.5.6 INSTRUMENTALLY ASSESSED PROPERTIES

D8.5.7 EVALUATION FOR ACCEPTANCE

D8.5.8 ADDITIONAL PROCEDURES TO BE ADOPTED IN THE EVENT OF FAILURE

D8.5.9 NOTIFICATION OF REMEDIAL WORK

D8.5.10 REMEDIAL WORK

D8.5.1 SCOPE

Pretreatment and repair of existing layers form an integral part of the final surfacing. Therefore, the relevant requirements of Part D in Chapters 9 and Chapter 10 shall apply.

D8.5.2 GENERAL

Not applicable to pretreatment works.

D8.5.3 PERFORMANCE GUARANTEE REQUIREMENTS

Not applicable to pretreatment works.

D8.5.4 FUNCTIONAL PERFORMANCE ASSESSMENTS

Not applicable to pretreatment works.

D8.5.5 VISUALLY ASSESSED PROPERTIES

Not applicable to pretreatment works.

D8.5.6 INSTRUMENTALLY ASSESSED PROPERTIES

Not applicable to pretreatment works.

D8.5.7 EVALUATION FOR ACCEPTANCE

Not applicable to pretreatment works.

D8.5.8 ADDITIONAL PROCEDURES TO BE ADOPTED IN THE EVENT OF FAILURE

Not applicable to pretreatment works.

D8.5.9 NOTIFICATION OF REMEDIAL WORK

Not applicable to pretreatment works.

D8.5.10 REMEDIAL WORK

Not applicable to pretreatment works.

8.6 GEOSYNTHETIC CRACK SEALING

CONTENTS

PART A: SPECIFICATIONS

A8.6.1 SCOPE

A8.6.2 DEFINITIONS

A8.6.3 GENERAL

A8.6.4 DESIGN BY CONTRACTOR / PERFORMANCE BASED SYSTEMS

A8.6.5 MATERIALS

A8.6.6 CONSTRUCTION EQUIPMENT

A8.6.7 EXECUTION OF THE WORKS

A8.6.8 WORKMANSHIP

PART B: LABOUR ENHANCEMENT

PART C: MEASUREMENT AND PAYMENT

PART D: GUARANTEES AND COMPLIANCE CERTIFICATES

A8.6 GEOSYNTHETIC CRACK SEALING

PART A: SPECIFICATIONS

A8.6.1 SCOPE

This Section covers the work in connection with geosynthetic crack sealing before resurfacing or treatment of defects.

A8.6.2 DEFINITIONS

Geosynthetic crack sealing - refers to the application of emulsion and a geosynthetic fabric over a cracked area, with or without a sand blinding layer.

A8.6.3 GENERAL

The types of cracks to be treated with geosynthetic shall be specified in the Contract Documentation. The Engineer shall instruct the Contractor regarding the degree (width) and types of cracks to be treated.

A8.6.3.1 Weather limitations

Cracks shall be sealed only when the temperature of the road surface exceeds 10°C. Crack sealing may not be done within 3 days after rain has fallen on the site, unless otherwise instructed by the Engineer.

A8.6.4 DESIGN BY CONTRACTOR / PERFORMANCE BASED SYSTEMS

All specifications for crack sealing addressed in this Section shall apply.

The selection of the appropriate materials, equipment and methods shall be based on good practice guidelines.

A8.6.5 MATERIALS

A8.6.5.1 Bituminous binder

The bituminous binder shall be one of the following listed in Table A8.6.5-1, and as prescribed in the Contract Documentation:

Table A8.6.5-1: Bituminous binder for geosynthetic crack sealing

Bituminous binder for geosynthetic crack sealing	Specification
Cationic bitumen emulsion (solvents omitted)	SANS 4001 – BT4
SC-E1(t) - (solvents omitted)	TG1
Other appropriate product	Certified by independent certification agency

A8.6.5.2 Geosynthetic fabric

The geosynthetic shall be a non-woven geosynthetic fabric, double needle punched with properties as specified in Table A10.1.5-10 of Chapter 10.

A8.6.5.3 Aggregate

Aggregate shall comply with Clause A10.1.5.12 of Chapter 10 for sand seals.

A8.6.6 CONSTRUCTION EQUIPMENT

The Contractor shall provide the following equipment:

- Suitable hand applicator for emulsion application
- Pneumatic-tyred roller
- Other hand equipment suitable for the intended use and working areas to obtain the specified final product.

A8.6.7 EXECUTION OF THE WORKS

A8.6.7.1 Preparation and execution

The cracks and surrounding surface shall be cleaned using compressed air and sweeping the area with hand brooms. The exact area where the geosynthetic should be applied shall be marked out. A tack coat of the specified bitumen emulsion shall be applied at a spray rate of 0,8 l/m² by means of a hand applicator. The geosynthetic shall then be applied to the wet tack coat by hand and rolled with a suitable roller to ensure satisfactory bonding between the geosynthetic and the road surface. All wrinkles in the geosynthetic shall be smoothed out. The geosynthetic is then saturated by applying a final coat of the specified bitumen emulsion by hand at 1,2 l/m² which is spread out with a squeegee. The second application of the emulsion may be diluted with water to aid the saturation of the geosynthetic, if required or ordered by the Engineer. A layer of sand or Grit as specified in Clause A10.1.5.12 of Chapter 10, not more than 5,0 mm thick, shall then be evenly applied using shovels and appropriate spreading tools.

A8.6.7.2 Opening to traffic

Geosynthetic patches shall be opened to traffic as soon as the emulsion has cured completely.

Traffic accommodation shall comply with the specifications in Clause A1.5 of Chapter 1.

A8.6.8 WORKMANSHIP

The geosynthetic patch shall have a neat appearance without excess binder extending further than 30 mm from the geosynthetic patch edge.

B8.6 GEOSYNTHETIC CRACK SEALING
PART B: LABOUR ENHANCEMENT

CONTENTS

B8.6.1 SCOPE

B8.6.2 DEFINITIONS

B8.6.3 GENERAL

B8.6.4 DESIGN BY CONTRACTOR / PERFORMANCE BASED SYSTEMS

B8.6.5 MATERIALS

B8.6.6 CONSTRUCTION EQUIPMENT

B8.6.7 EXECUTION OF THE WORKS

B8.6.8 WORKMANSHIP

B8.6.1 SCOPE

A large proportion of activities as defined in Part A under the various sections are considered labour intensive. Therefore, Part B only provides additional specifications, not contained in Part A.

B8.6.2 DEFINITIONS

Definitions as provided in Clause A8.6.2 apply.

B8.6.3 GENERAL

Any activity specified in Part A, where hand work is given as an alternative, shall be executed in such a way as to maximise labour.

B8.6.4 DESIGN BY CONTRACTOR / PERFORMANCE BASED SYSTEMS

The provisions of Part A shall apply.

B8.6.5 MATERIALS

The provisions of Part A shall apply.

B8.6.6 CONSTRUCTION EQUIPMENT

All specifications under this heading of Part A shall apply, except for the pneumatic-tyred roller, which could be replaced with a pedestrian roller.

B8.6.7 EXECUTION OF THE WORKS

The provisions of Part A shall apply.

B8.6.8 WORKMANSHIP

The provisions of Part A shall apply.

C8.6 GEOSYNTHETIC CRACK SEALING

PART C: MEASUREMENT AND PAYMENT

(i) Preamble

The tendered rate for each item shall include full compensation for providing, maintaining and decommissioning upon completion, of all the plant, equipment, labour, tools, incidentals and supervision to carry out the activity or construct the works in the item, unless otherwise stated.

Any prime cost or provisional sums shall be paid in accordance with the provisions of the conditions of contract. The charge or mark-up tendered or allowed for is a percentage of the amount actually paid under the prime cost or provisional sum. This percentage shall cover all the Contractor's handling, supervision, profit and liability costs to provide the services in the prime cost or provisional sum item.

The requirements of Section C1.1 of Chapter 1 shall apply.

Where pay item descriptions include any wording in brackets it is an indication that contract specific information is to be inserted in the Pricing Schedule included in the Contract Documentation.

(ii) Items that will not be measured separately

The following activities, whether required to complete the specified work or not, will not be measured and paid for separately and the Contractor shall include the cost thereof in other pay items as he deems appropriate:

1. No separate payment will be made for setting out the works.
2. No separate payment will be made for the protection or repair as required of any existing or new road furniture, structures, buildings, infrastructure or services damaged by the Contractor's activities.
3. No additional payment shall be made, nor shall any claim for additional payment be considered, for any specified work in confined or restricted areas. Any additional costs associated with working in confined or restricted areas shall be deemed to be included in the standard applicable pay items.
4. No separate payment will be made for the loading of any materials.
5. No separate payment will be made for the hauling of any materials where the material is moved over a distance of less than, and up to 1,0 km.
6. No separate payment will be made for transporting materials from commercial sources irrespective of the haul distance.
7. No separate payment will be made for the removal or any surplus material imported to complete the works.
8. For all Works performed, precautionary measures required in terms of the Occupational Health and Safety Act (Act 85 of 1993) and the latest amendments thereof as well as the latest Construction Regulations shall be deemed included in the rates tendered for the relevant products.

(iii) Items to be measured and paid for using items specified elsewhere in the specifications

Not applicable to this Section.

(iv) Items specifically for this Section of the specifications

Item		Description	Unit
C8.6.1		**Geosynthetic crack sealing**	
	C8.6.1.1	Sealing cracks with 200 mm wide geosynthetic (specify type of emulsion)	metre (m)
	C8.6.1.2	Sealing cracks with geosynthetic over areas (specify type of emulsion)	square metre (m²)

The unit of measurement for the 200 mm wide geosynthetic shall be the linear metre crack sealed with the geosynthetic as specified in Clause A8.6.5.2.

The unit of measurement for the area geosynthetic crack sealing shall be the square metre crack sealed with the geosynthetic as specified.

The tendered rate shall include full compensation for procuring and supplying all materials, labour, transport and other incidentals required to complete the work in accordance with the specifications.

D8.6 GEOSYNTHETIC CRACK SEALING

PART D: GUARANTEES AND COMPLIANCE CERTIFICATES

CONTENTS

D8.6.1 SCOPE

D8.6.2 GENERAL

D8.6.3 PERFORMANCE GUARANTEE REQUIREMENTS

D8.6.4 FUNCTIONAL PERFORMANCE ASSESSMENTS

D8.6.5 VISUALLY ASSESSED PROPERTIES

D8.6.6 INSTRUMENTALLY ASSESSED PROPERTIES

D8.6.7 EVALUATION FOR ACCEPTANCE

D8.6.8 ADDITIONAL PROCEDURES TO BE ADOPTED IN THE EVENT OF FAILURE

D8.6.9 NOTIFICATION OF REMEDIAL WORK

D8.6.10 REMEDIAL WORK

D8.6.1 SCOPE

Pretreatment and repair of existing layers form an integral part of the final surfacing. Therefore, the relevant requirements of Part D in Chapters 9 and Chapter 10 shall apply.

D8.6.2 GENERAL

Not applicable to pretreatment works.

D8.6.3 PERFORMANCE GUARANTEE REQUIREMENTS

Not applicable to pretreatment works.

D8.6.4 FUNCTIONAL PERFORMANCE ASSESSMENTS

Not applicable to pretreatment works.

D8.6.5 VISUALLY ASSESSED PROPERTIES

Not applicable to pretreatment works.

D8.6.6 INSTRUMENTALLY ASSESSED PROPERTIES

Not applicable to pretreatment works.

D8.6.7 EVALUATION FOR ACCEPTANCE

Not applicable to pretreatment works.

D8.6.8 ADDITIONAL PROCEDURES TO BE ADOPTED IN THE EVENT OF FAILURE

Not applicable to pretreatment works.

D8.6.9 NOTIFICATION OF REMEDIAL WORK

Not applicable to pretreatment works.

D8.6.10 REMEDIAL WORK

Not applicable to pretreatment works.

8.7 PLANING

CONTENTS

PART A: SPECIFICATIONS

A8.7.1 SCOPE

A8.7.2 DEFINITIONS

A8.7.3 GENERAL

A8.7.4 DESIGN BY CONTRACTOR / PERFORMANCE BASED SYSTEMS

A8.7.5 MATERIALS

A8.7.6 CONSTRUCTION EQUIPMENT

A8.7.7 EXECUTION OF THE WORKS

A8.7.8 WORKMANSHIP

PART B: LABOUR ENHANCEMENT

PART C: MEASUREMENT AND PAYMENT

PART D: GUARANTEES AND COMPLIANCE CERTIFICATES

A8.7 PLANING

PART A: SPECIFICATIONS

A8.7.1 SCOPE

This Section covers the work in connection with planing before resurfacing.

A8.7.2 DEFINITIONS

Planing in the context of this Chapter refers to level correction where the road surface is uneven and where depressions, humps or small grooves occur as a result of deformation of the pavement layers not due to structural failure of the pavement or the removal or surface irregularities through precision milling to a specified depth, to obtain a clean and regular running surface.

A8.7.3 GENERAL

The work involves the planing down of high spots or ridges in the existing bituminous surfacing in accordance with the specified level or thickness requirements.

A8.7.4 DESIGN BY CONTRACTOR / PERFORMANCE BASED SYSTEMS

Not applicable.

A8.7.5 MATERIALS

The bituminous binder for the fog spray, where so specified, shall be anionic bitumen emulsion complying with SANS 4001 – BT3 diluted in accordance with best practice guidelines.

A8.7.6 CONSTRUCTION EQUIPMENT

A8.7.6.1 Planing machine

The machine shall be of such a design with an appropriate drum configuration which will be suitable for planing the existing surfacing, with level control, in order to remove any irregularities without tearing or disturbing the remaining layer. The final texture shall be as smooth and even as possible without any longitudinal grooves in excess of 1,0 mm.

Before planing may start, the Contractor shall demonstrate to the Engineer that the machine is capable of executing the work in accordance with the Contract Documentation.

A8.7.7 EXECUTION OF THE WORKS

A8.7.7.1 Preparation and execution

Planing shall be done with an approved planing machine. The full width of the road or sections of the road may be planed, depending on the instructions of the Engineer or shown on the drawings.

Planing deeper than 25 mm shall be classified as milling and payment shall be made under items C4.3.6 or C4.3.7 of Chapter 4.

Material planed off shall be transported to stockpiles for recycling or to approved spoil sites, as specified.

Material removed beyond the specified dimensions shall not be paid for, and repairs of such affected areas shall be to the satisfaction of the Engineer and at the Contractor's own cost.

After the planing operation has been completed and the area broomed, the planed surface, or if so directed by the Engineer, the entire levelled surface, shall be sprayed with a diluted anionic emulsion (50/50) which has been further diluted if necessary in accordance with the instructions of the Engineer at a rate of application to be determined by the Engineer. After complete curing of the emulsion, the area shall be rolled with pneumatic-tyred rollers.

Depressions over which the planning machine has moved without touching the surface and which fall outside the specified smoothness requirements, shall be filled in as specified or, if so instructed by the Engineer, a screed shall be placed as specified in Section A8.4.

A8.7.7.2 Opening to traffic

The treated surface shall only be opened to traffic when the emulsion has completely cured, and when instructed by the Engineer.

Traffic accommodation shall comply with the specifications in Section A1.5 of Chapter 1.

A8.7.8 WORKMANSHIP

The planed surface shall be even without any ridges or steps between the longitudinal cuts. Where planning is required over only a portion of the road width, the edge of the planned section shall be vertical and straight.

Upon completion, the entire treated surface shall be tested for levelness and unless otherwise specified in the Contract Documentation, the surface shall not deviate by more than 5,0 mm from the bottom edge of the 3,0 m straight-edge placed in any direction.

B8.7 PLANING

PART B: LABOUR ENHANCEMENT

CONTENTS

B8.7.1 SCOPE

B8.7.2 DEFINITIONS

B8.7.3 GENERAL

B8.7.4 DESIGN BY CONTRACTOR / PERFORMANCE BASED SYSTEMS

B8.7.5 MATERIALS

B8.7.6 CONSTRUCTION EQUIPMENT

B8.7.7 EXECUTION OF THE WORKS

B8.7.8 WORKMANSHIP

B8.7.1 SCOPE

Except for application of the fog spray, if required, this activity is not suitable for labour enhanced work.

B8.7.2 DEFINITIONS

Definitions as provided in Clause A8.7.2 apply.

B8.7.3 GENERAL

Application of the fog spray shall be executed in such a way as to maximise labour.

B8.7.4 DESIGN BY CONTRACTOR / PERFORMANCE BASED SYSTEMS

The provisions of Part A shall apply.

B8.7.5 MATERIALS

The provisions of Part A shall apply.

B8.7.6 CONSTRUCTION EQUIPMENT

The provisions of Part A shall apply.

B8.7.7 EXECUTION OF THE WORKS

The provisions of Part A shall apply.

B8.7.8 WORKMANSHIP

The provisions of Part A shall apply.

C8.7 PLANING

PART C: MEASUREMENT AND PAYMENT

(i) Preamble

The tendered rate for each item shall include full compensation for providing, maintaining and decommissioning upon completion, of all the plant, equipment, labour, tools, incidentals and supervision to carry out the activity or construct the works in the item, unless otherwise stated.

Any prime cost or provisional sums shall be paid in accordance with the provisions of the conditions of contract. The charge or mark-up tendered or allowed for is a percentage of the amount actually paid under the prime cost or provisional sum. This percentage shall cover all the Contractor's handling, supervision, profit and liability costs to provide the services in the prime cost or provisional sum item.

The requirements of Section C1.1 of Chapter 1 shall apply.

Where pay item descriptions include any wording in brackets it is an indication that contract specific information is to be inserted in the Pricing Schedule included in the Contract Documentation.

(ii) Items that will not be measured separately

The following activities, whether required to complete the specified work or not, will not be measured and paid for separately and the Contractor shall include the cost thereof in other pay items as he deems appropriate:

1. No separate payment will be made for setting out the works.
2. No separate payment will be made for the protection or repair as required of any existing or new road furniture, structures, buildings, infrastructure or services damaged by the Contractor's activities.
3. No additional payment shall be made, nor shall any claim for additional payment be considered, for any specified work in confined or restricted areas. Any additional costs associated with working in confined or restricted areas shall be deemed to be included in the standard applicable pay items.
4. No separate payment will be made for the loading of any materials.
5. No separate payment will be made for the hauling of any materials where the material is moved over a distance of less than, and up to 1,0 km.
6. No separate payment will be made for transporting materials from commercial sources irrespective of the haul distance.
7. No separate payment will be made for the removal or any surplus material imported to complete the works.
8. For all Works performed, precautionary measures required in terms of the Occupational Health and Safety Act (Act 85 of 1993) and the latest amendments thereof as well as the latest Construction Regulations shall be deemed included in the rates tendered for the relevant products.

(iii) Items to be measured and paid for using items specified elsewhere in the specifications

The following items of work, when specified, shall be carried out, measured and paid for in accordance with the appropriate Sections of the specifications.

Table C8.7-1: Payment items from other Chapters or Sections

Activity	Section 8.7 reference	Section item reference
Planing deeper than 25mm	A8.7.7.1	C4.3.6 or C4.3.7 of Chapter 4
Placing of a screed	A8.7.7.1	C8.4.1 – item C8.4.1.2 of Chapter 8

(iv) Items specifically for this Section of the specifications

Item	Description	Unit
C8.7.1	**Planing**	
C8.7.1.1	Planing of road surface (Indicate thickness in mm)	square metre (m²)
C8.7.1.2	Fog spraying on planned surfaces	litre (ℓ)
C8.7.1.3	Hand spraying	litre (ℓ)
C8.7.1.4	Spraying with mechanical equipment	litre (ℓ)
C8.7.1.5	Rolling the planed surface	roller passes (m²-pass)

The unit of measurement shall be a square metre of road surface or concrete bridge decks planed in accordance with the specifications.

The tendered rate shall include full compensation for planing, for obtaining the required surface regularity to a maximum depth of 25 mm, collecting, loading and removing the planed material over a haul distance of 1,0 km, for all plant movement over the site as instructed by the Engineer and for providing planing and other equipment, labour, supervision and incidentals for completing the work in accordance with the specifications, including filling up irregularities caused by the Contractor. Any planing deeper than nominal 25 mm shall be classified as milling.

The unit of measurement shall be a litre of diluted 60 % anionic emulsion (50/50) sprayed on planed surfaces on the instruction of the Engineer. The tendered rate shall include full compensation for fog spraying on planed surfaces complete as specified.

The unit of measurement for rolling of planed surfaces shall be a square metre of roller-pass with an approved pneumatic roller on planed surfaces as may be directed by the Engineer.

The tendered rate shall include full compensation for the rolling of planed surface complete as specified.

Where a screed is placed, payment shall be made under item C8.4.1.2.

D8.7 PLANING

PART D: GUARANTEES AND COMPLIANCE CERTIFICATES

CONTENTS

D8.7.1 SCOPE

D8.7.2 GENERAL

D8.7.3 PERFORMANCE GUARANTEE REQUIREMENTS

D8.7.4 FUNCTIONAL PERFORMANCE ASSESSMENTS

D8.7.5 VISUALLY ASSESSED PROPERTIES

D8.7.6 INSTRUMENTALLY ASSESSED PROPERTIES

D8.7.7 EVALUATION FOR ACCEPTANCE

D8.7.8 ADDITIONAL PROCEDURES TO BE ADOPTED IN THE EVENT OF FAILURE

D8.7.9 NOTIFICATION OF REMEDIAL WORK

D8.7.10 REMEDIAL WORK

D8.7.1 SCOPE

Pretreatment and repair of existing layers form an integral part of the final surfacing. Therefore, the relevant requirements of Part D in Chapters 9 and Chapter 10 shall apply.

D8.7.2 GENERAL

Not applicable to pretreatment works.

D8.7.3 PERFORMANCE GUARANTEE REQUIREMENTS

Not applicable to pretreatment works.

D8.7.4 FUNCTIONAL PERFORMANCE ASSESSMENTS

Not applicable to pretreatment works.

D8.7.5 VISUALLY ASSESSED PROPERTIES

Not applicable to pretreatment works.

D8.7.6 INSTRUMENTALLY ASSESSED PROPERTIES

Not applicable to pretreatment works.

D8.7.7 EVALUATION FOR ACCEPTANCE

Not applicable to pretreatment works.

D8.7.8 ADDITIONAL PROCEDURES TO BE ADOPTED IN THE EVENT OF FAILURE

Not applicable to pretreatment works.

D8.7.9 NOTIFICATION OF REMEDIAL WORK

Not applicable to pretreatment works.

D8.7.10 REMEDIAL WORK

Not applicable to pretreatment works.

8.8 PATCHING AND EDGE BREAK REPAIR

CONTENTS

PART A: SPECIFICATIONS

A8.8.1 SCOPE

A8.8.2 DEFINITIONS

A8.8.3 GENERAL

A8.8.4 DESIGN BY CONTRACTOR / PERFORMANCE BASED SYSTEMS

A8.8.5 MATERIALS

A8.8.6 CONSTRUCTION EQUIPMENT

A8.8.7 EXECUTION OF THE WORKS

A8.8.8 WORKMANSHIP

PART B: LABOUR ENHANCEMENT

PART C: MEASUREMENT AND PAYMENT

PART D: GUARANTEES AND COMPLIANCE CERTIFICATES

A8.8 PATCHING AND EDGE BREAK REPAIR

PART A: SPECIFICATIONS

A8.8.1 SCOPE

This Section covers the work in connection with patching and edge break repair before surfacing or treatment of defects.

A8.8.2 DEFINITIONS

Structural patching - involves excavating existing failed areas and reconstructing the pavement layers, with specified pavement material.

Surfacing patching - involves the repair of only the failed surfacing layer (seal or asphalt) exposing but not affecting the underlying layer.

Edgebreak repair - involves repairing the edges of the paved area so that it lines up with the true edge of the original road or with such other edge as may be required. Work could include excavation of pavement layers and backfilling with suitable material and if specified, sealing the joint with a geosynthetic strip. Any excavation and backfilling extending into the wheel path shall be measured under patching.

A8.8.3 GENERAL

This Section covers the patching of existing pavement layers and surfacing, as well as repairing of edge breaks, prior to any resealing or resurfacing. Extra overcompensation for work in restricted areas shall not be applicable to any patching and repairing edge breaks.

A8.8.4 DESIGN BY CONTRACTOR / PERFORMANCE BASED SYSTEMS

All specifications for patching and edge break repair addressed in this Section shall apply.

The selection of the appropriate materials, equipment and methods shall be based on good practice guidelines. The design of asphalt mixes and bituminous stabilised materials (BSM) shall be the responsibility of the Contractor and shall be undertaken in accordance with the latest version of TRH8 (Design of Asphalt Mixes) as published by COTO, or Technical Guideline 2 (TG2 – Design of Bituminous Stabilised Material) as published by the Asphalt Academy SA, and shall be submitted to the Engineer for acceptance.

A8.8.5 MATERIALS

A8.8.5.1 Herbicide

Herbicide shall be a non-selective herbicide.

A8.8.5.2 Bituminous binder for priming

The bituminous binder for priming the excavated area shall be one of the following as listed in Table A8.8.5-1 and as specified in the Contract Documentation.

Table A8.8.5-1: Bituminous binder for priming the excavated area

Bituminous binder for priming the excavated area	Specification
Anionic bitumen emulsion complying	SANS 4001 – BT3
Cationic bitumen emulsion	SANS 4001 – BT4
Invert bitumen emulsion	SANS 4001 – BT5
Other appropriate product	Certified by independent certification agency

A8.8.5.3 Backfill material

The backfill material shall be one of the following as listed in Table A8.8.5-2 and as specified in the Contract Documentation. The properties of the material used for backfilling shall conform to all the requirements as prescribed in the relevant Chapters in this document as listed, or in the Contract Documentation.

Table A8.8.5-2: Backfill material

Backfill material	Specification
Granular material of G4 quality	Chapter 4
Crushed stone of G1, G2 or G3	Chapter 4
Cement treated material of C4	Chapter 4
BSM1 or BSM2	Chapter 4
Hot-mix asphalt (continuous or semi-gap graded as stated in the Pricing Schedule)	Chapter 9
Cold-mix asphalt: certified by Agrèment SA as a minimum of Class 2 type	Chapter 9
Coarse slurry	Contract Documentation

A8.8.6 CONSTRUCTION EQUIPMENT

All equipment shall be suitable for the intended use and working areas and shall be capable of obtaining the specified results.

Only approved cutting or sawing equipment may be used for cutting or sawing asphalt layers. The equipment shall be capable of cutting asphalt layers to depths of 200 mm in one operation without fragmenting the remaining material, and in straight lines within the required tolerances.

The following items of plant and equipment shall be available and in good working order:

- Milling machine
- Saw cutting machine
- A mobile compressor
- Appropriate paving breakers
- Manually-operated pneumatic compactors as appropriate for the encountered situation
- Appropriate concrete mixers
- A vibratory roller with an adjustable amplitude and frequency of vibration
- Hand tools

A8.8.7 EXECUTION OF THE WORKS

A8.8.7.1 Patching

The excavation and backfilling of all patching work, complete as specified for a patch, shall be carried out and completed on the same day when under traffic. When the portion of road being patched is temporarily closed, structural patches excluding the wearing course, shall still be completed on the same day or as detailed in the Contract Documentation

a) Demarcation

The Contractor shall give at least four (4) calendar days' notice to the Engineer of the intention to commence with repair work of any nature on any specific section of the road, so that there is sufficient time to demarcate the areas to be patched.

The Engineer shall demarcate any failed areas to be repaired, which may vary in size and number from that estimated at design and tender stage and shall instruct the Contractor regarding the repair work to be done. The Contract Documentation shall specify the various types of patching expected to be done for the various failed areas for the project. Each demarcated area shall be cross-referenced to one of the repair types.

In addition to his specified responsibilities for the accommodation of traffic, the Contractor shall also be responsible for traffic accommodation during the demarcation work.

b) Excavating pavement material

The patching area shall have a neat rectangular shape, unless otherwise instructed by the Engineer. The existing material shall be excavated and removed to the full depth specified in the Contract documentation or as instructed by the Engineer. Asphalt layers and surfacing shall be cut with approved sawing equipment.

Excavation for structural patching in granular material by hand shall be done with side slopes of approximately 60 degrees to the horizontal.

Unless specifically otherwise specified, the Contractor may choose to carry out the excavation in the existing pavement layers either by hand with the aid of jackhammers and saw cutting machines, or with an appropriate milling machine.

Front end loaders or TLB's may not be used for breaking up and excavating the existing pavement, but may be used to assist with the loading of the excavated material into trucks

Excavated material from each pavement layer shall be placed in separate stockpiles adjacent to the patch if to be re-used. The stockpiled material shall be re-used or spoiled in an approved manner in accordance with the Engineer's instructions.

After completion of the excavation to the specified depth, the Engineer shall be afforded the opportunity to approve the excavation. Where required, the floor of the excavation shall be compacted to the specified density for the layer concerned.

c) Backfilling excavations

Excavations for structural patching and surfacing patching shall be backfilled with compliant pavement material as specified in the Contract Documentation. The backfilling shall be compacted to the specified density and finished to the required levels or finished to match the existing levels of the surrounding surface. The level tolerances for patches are specified in Clause A8.8.8.1.

Where backfilling material consists of any bituminous based products, the floor and sides of the prepared excavation shall be treated with a bond coat consisting of a diluted stable grade anionic bitumen emulsion (50/50) and applied at a nominal rate 0,5 l/m². The bond coat shall be applied by means of an approved pressurised sprayer, hand sprayer or paint brush, or a combination thereof, dependant on the specific dimensions of the patch.

Cement or bituminous stabilized materials shall be mixed in concrete mixers or by other approved equipment. Placing concrete in patches shall not be permitted.

A8.8.7.2 Edgebreak repairs

Where the existing edge of the surfacing is sound and undamaged, but the required surfacing width is exceeded by more than 50 mm, the excess surfacing shall be cut back by saw cutting and trimming, parallel to the centre line of the road, to the required width. Where the edge of the surfacing is fragmented or where the surfacing is narrower than the required width, it shall be cut back to a line along which a sound and uniform edge can be obtained, without reducing the shoulder or driving lane by more than 100 mm.

Where the surfacing, after having been cut back, is narrower than the specified width, the pavement material between the cut edge and the specified surfacing edge shall be excavated to a depth of 60 mm below the final road surface, or until firm material is found. The edges shall then be built up with asphalt or other material as specified in the Contract Documentation. All exposed surfaces resulting from any cutting and excavations shall be treated with a bituminous bond coat as described in Clause A8.8.7.1c) prior to reinstatement.

After the edge is built up and if prescribed in the Contract Documentation a geosynthetic strip wide enough to overlap the joint of the repair shall be placed in accordance with Clause A8.6.7.1.

A8.8.7.3 Opening to traffic

Unless otherwise instructed, in writing, by the Engineer, the excavation, backfilling and all patching work, complete as specified, for any patch shall be carried out and completed on the same day. Traffic accommodation and workman safety measures shall be as prescribed in the Contract Documentation.

A8.8.8 WORKMANSHIP

A8.8.8.1 Tolerances

The backfilling shall be compacted to the appropriate thickness, density and level per layer specified in other relevant sections of this document or as specified in the Contract Documentation.

The final riding surface on any particular point on patches and repaired edge-breaks shall not deviate more than 5,0 mm from the bottom of a 3,0 m long straight edge.

Edge repairs shall be true to line with a maximum deviation of 20 mm from the specified edge line.

A8.8.8.2 Testing

The Engineer shall carry out routine inspections and conduct routine tests to determine whether the quality of material and workmanship provided comply with the requirements as specified in this Section. Any test results and measurements shall be assessed in accordance with the provisions of Chapter 20, as applicable.

B8.8 PATCHING AND EDGE BREAK REPAIR
PART B: LABOUR ENHANCEMENT

CONTENTS

B8.8.1 SCOPE

B8.8.2 DEFINITIONS

B8.8.3 GENERAL

B8.8.4 DESIGN BY CONTRACTOR / PERFORMANCE BASED SYSTEMS

B8.8.5 MATERIALS

B8.8.6 CONSTRUCTION EQUIPMENT

B8.8.7 EXECUTION OF THE WORKS

B8.8.8 WORKMANSHIP

B8.8.1 SCOPE

A large proportion of activities as defined in Part A under the various sections are considered labour intensive. Therefore, Part B only provides additional specifications, not contained in Part A.

B8.8.2 DEFINITIONS

Definitions as provided in Clause A8.8.2 apply.

B8.8.3 GENERAL

Any activity specified in Part A, where hand work is given as an alternative, shall be executed in such a way as to maximise labour.

B8.8.4 DESIGN BY CONTRACTOR / PERFORMANCE BASED SYSTEMS

The provisions of Part A shall apply.

B8.8.5 MATERIALS

The provisions of Part A shall apply.

B8.8.6 CONSTRUCTION EQUIPMENT

Where reference is made in Part A to appropriate or approved equipment, the use of light equipment shall be evaluated during trial sections.

B8.8.7 EXECUTION OF THE WORKS

The provisions of Part A shall apply.

B8.8.8 WORKMANSHIP

The provisions of Part A shall apply.

C8.8 PATCHING AND EDGE BREAK REPAIR

PART C: MEASUREMENT AND PAYMENT

(i) Preamble

The tendered rate for each item shall include full compensation for providing, maintaining and decommissioning upon completion, of all the plant, equipment, labour, tools, incidentals and supervision to carry out the activity or construct the works in the item, unless otherwise stated.

The requirements of Section C1.1 of Chapter 1 shall apply.

Where pay item descriptions include any wording in brackets it is an indication that contract specific information is to be inserted in the Pricing Schedule included in the Contract Documentation.

(ii) Items that will not be measured separately

The following activities, whether required to complete the specified work or not, will not be measured and paid for separately and the Contractor shall include the cost thereof in other pay items as he deems appropriate:

1. No separate payment will be made for setting out the works.
2. No separate payment will be made for the protection or repair as required of any existing or new road furniture, structures, buildings, infrastructure or services damaged by the Contractor's activities.
3. No additional payment shall be made, nor shall any claim for additional payment be considered, for any specified work in confined or restricted areas. Any additional costs associated with working in confined or restricted areas shall be deemed to be included in the standard applicable pay items.
4. No separate payment will be made for the loading of any materials.
5. No separate payment will be made for the hauling of any materials where the material is moved over a distance of less than, and up to 1,0 km.
6. No separate payment will be made for transporting materials from commercial sources irrespective of the haul distance.
7. No separate payment will be made for the removal or any surplus material imported to complete the works.
8. For all Works performed, precautionary measures required in terms of the Occupational Health and Safety Act (Act 85 of 1993) and the latest amendments thereof as well as the latest Construction Regulations shall be deemed included in the rates tendered for the relevant products.

(iii) Items to be measured and paid for using items specified elsewhere in the specifications

The following items of work, when specified, shall be carried out, measured and paid for in accordance with the appropriate Sections of the specifications.

Table C8.8-1: Payment items from other Chapters or Sections

Activity	Section 8.8 reference	Section item reference
Milling (where specified in the Contract Documentation)	C8.8.2	C4.3.6 or C4.3.7 of Chapter 4

(iv) Items specifically for this Section of the specifications

Item	Description	Unit
C8.8.1	**Saw cutting pavement layers for patching**	
C8.8.1.1	Asphalt or bituminous surfacing to an average depth	
(a)	Not exceeding 50 mm	metre (m)
(b)	Exceeding 50 mm but not exceeding 100 mm	metre (m)
(c)	Exceeding 100 mm	metre (m)
C8.8.1.2	Cemented pavement layers to an average depth	
(a)	Not exceeding 100 mm	metre (m)
(b)	Exceeding 100 mm but not exceeding 200 mm	metre (m)
(c)	Exceeding 200 mm	metre (m)
C8.8.1.3	Granular layers to an average depth	
(a)	Not exceeding 100 mm	metre (m)
(b)	Not exceeding 200 mm	metre (m)

	(c) Exceeding 200 mm	metre (m)

The unit of measurement shall be the metre of sawcut. The length in each depth range shall be measured and paid separately.

The tendered rate shall include full compensation for all plant, equipment, labour, supervision, materials, transport and for all incidentals for sawing the asphalt and the cemented pavement layers, complete as specified and prescribed by the Engineer, and also for work in restricted areas. The rate shall also include for any haul to an approved spoil site if so required.

Item	Description	Unit
C8.8.2	**Excavation in existing pavements for patching (non-milling)**	
C8.8.2.1	Asphalt layers	
	(a) Not exceeding 10 m^2 including for edge repairs wider than 250 mm	cubic metre (m³)
	(b) Exceeding 10 m² but not exceeding 50 m² including for edge repairs wider than 250 mm	cubic metre (m³)
	(c) Exceeding 50 m² up to 100 m² including for edge repairs wider than 250 mm	cubic metre (m³)
	(d) Exceeding 100 m^2	cubic metre (m³)
C8.8.2.2	Cemented layers	
	(a) Not exceeding 10 m^2 including for edge repairs wider than 250 mm	cubic metre (m³)
	(b) Exceeding 10 m² but not exceeding 50 m² including for edge repairs wider than 250 mm	cubic metre (m³)
	(c) Exceeding 50 m² up to 100 m² including for edge repairs wider than 250 mm	cubic metre (m³)
	(d) Exceeding 100 m^2	cubic metre (m³)
C8.8.2.3	Other layers (specify type)	
	(a) Not exceeding 10 m^2 including for edge repairs wider than 250 mm	cubic metre (m³)
	(b) Exceeding 10 m² but not exceeding 50 m² including for edge repairs wider than 250 mm	cubic metre (m³)
	(c) Exceeding 50 m² up to 100 m² including for edge repairs wider than 250 mm	cubic metre (m³)
	(d) Exceeding 100 m^2	cubic metre (m³)

All excavations in items C8.8.2.1(a), C8.8.2.2(a) and C8.8.2.3(a) shall be done by hand.

Distinction shall be made between excavation and milling of materials. In addition to this separate pay items apply to asphalt milling dependent on the ownership of the millings as specified in the Contract Documentation. Milling, where specified shall be measured and paid for under items C4.3.6 or C4.3.7 of Chapter 4, if specified in the Contract Documentation. If milling for patch excavation is not specified, excavation shall be measured and paid for under item C8.8.2.

The unit of measurement shall be a cubic metre of material excavated from the existing pavement. The quantity shall be computed in accordance with the authorised dimensions of the excavation.

The tendered rate shall include full compensation for demarcating the excavation, excavating the material, placing the excavated material in temporary stockpiles, spoiling of material in the stockpiles where ordered by the Engineer, including haul over a haul distance of 1,0 km, complete as specified, and also for work in restricted areas.

Payment shall distinguish between the different types of pavement material excavated.

Item	Description	Unit
C8.8.3	**Compacting the floor of excavations for patching (specify density)**	**square metre (m²)**

The unit of measurement shall be a square metre of excavation floor compacted on the instruction of the Engineer, and the quantity shall be computed in accordance with the authorized dimensions of the excavation floor.

The tendered rate shall include full compensation for compacting the floor of excavations complete as specified, and also for work in restricted areas. Payment shall not distinguish between the various methods of compaction or various compaction requirements.

Item	Description	Unit
C8.8.4	**Backfilling of excavations for patching with:**	
C8.8.4.1	Chemically stabilized pavement material (state the pavement material and the stabilising agent) for a patch with a surface area:	
	(a) Not exceeding 10 m^2 including for edge repairs wider than 250 mm	cubic metre (m³)
	(b) Exceeding 10 m² but not exceeding 50 m² including for edge repairs wider than 250 mm	cubic metre (m³)

(c)	Exceeding 50 m² up to 100 m² including for edge repairs wider than 250 mm	cubic metre (m³)
(d)	Exceeding 100 m²	cubic metre (m³)
C8.8.4.2	Bitumen Stabilised Material (specify type and level of compaction) for a patch with a surface area:	
(a)	Not exceeding 10 m² including for edge repairs wider than 250 mm	cubic metre (m³)
(b)	Exceeding 10 m² but not exceeding 50 m² including for edge repairs wider than 250 mm	cubic metre (m³)
(c)	Exceeding 50 m² up to 100 m² including for edge repairs wider than 250 mm	cubic metre (m³)
(d)	Exceeding 100 m²	cubic metre (m³)
C8.8.4.3	Asphalt for a patch with a surface area (state type and density)	
(a)	Not exceeding 10 m² including for edge repairs wider than 250 mm	ton (t)
(b)	Exceeding 10 m² but not exceeding 50 m² including for edge repairs wider than 250 mm	ton (t)
(c)	Exceeding 50 m² up to 100 m² including for edge repairs wider than 250 mm	ton (t)
(d)	Exceeding 100 m²	ton (t)
C8.8.4.4	Granular base material (*state type and de*nsity) for a patch with a surface area	
(a)	Not exceeding 10 m² including for edge repairs wider than 250 mm	ton (t)
(b)	Exceeding 10 m² but not exceeding 50 m² including for edge repairs wider than 250 mm	ton (t)
(c)	Exceeding 50 m² up to 100 m² including for edge repairs wider than 250 mm	ton (t)
(d)	Exceeding 100 m²	ton (t)

The tendered rates shall include full compensation for design of backfill material, providing all the material, irrespective of its origin, including gravel, for all mixing, placing, compacting and finishing as specified in this Section and other appropriate Sections of the specifications, for all transport, work in restricted areas, and also for all machinery, equipment, labour, supervision and other incidentals for executing the work as specified.

The tendered rate shall also include full compensation for the provision and application of the stabilisation agents.

Item	Description	Unit
C8.8.5	**Geosynthetic patching**	
C8.8.5.1	Sealing joints with geosynthetic strips (specify width and type of emulsion)	metre (m)

The tendered rate shall also include full compensation for cleaning of the road surface, supply and application of the geosynthetic strips on the emulsion. The geosynthetic strips shall be as specified in Section A12.11 of Chapter 12.

Item	Description	Unit
C8.8.6	**Repairing edge breaks in surfacing**	
C8.8.6.1	Cutting back the edges of the existing surfacing for the repairing of edge breaks	metre (m)
C8.8.6.2	Prime coat (state type and rate of application)	litre (ℓ)
C8.8.6.3	Reconstructing edges using:	
(a)	Continuously-graded hot asphalt (state type and density)	ton (t)
(b)	Continuously-graded cold asphalt (Agrèment SA certified -state class and density)	ton (t)
(c)	Bitumen Stabilised Material (state type and level of compaction)	cubic metre (m³)

Item C8.8.6 shall apply only to edge breaks with an average width of 250 mm and less. Repairing wider edge breaks shall be classified as patching.

The unit of measurement for cutting back the edges shall be a metre of pavement edge cut back and excavated as specified.

The tendered rate for cutting back the edges shall include full compensation for cutting back the edges in accordance with instructions, excavating the material to the specified depth, removing all excavated and loose material to spoil, and compacting the surface onto which the fresh edge shall be constructed, all in accordance with the required lines and levels.

The tendered rates shall also include full compensation for all transport, handling, labour, material, and all incidentals necessary for completing all the work.

D8.8 PATCHING AND EDGE BREAK REPAIR

PART D: GUARANTEES AND COMPLIANCE CERTIFICATES

CONTENTS

D8.8.1 SCOPE

D8.8.2 GENERAL

D8.8.3 PERFORMANCE GUARANTEE REQUIREMENTS

D8.8.4 FUNCTIONAL PERFORMANCE ASSESSMENTS

D8.8.5 VISUALLY ASSESSED PROPERTIES

D8.8.6 INSTRUMENTALLY ASSESSED PROPERTIES

D8.8.7 EVALUATION FOR ACCEPTANCE

D8.8.8 ADDITIONAL PROCEDURES TO BE ADOPTED IN THE EVENT OF FAILURE

D8.8.9 NOTIFICATION OF REMEDIAL WORK

D8.8.10 REMEDIAL WORK

D8.8.1 SCOPE

Pretreatment and repair of existing layers form an integral part of the final surfacing. Therefore, the relevant requirements of Part D in Chapters 9 and Chapter 10 shall apply.

D8.8.2 GENERAL

Not applicable to pretreatment works.

D8.8.3 PERFORMANCE GUARANTEE REQUIREMENTS

Not applicable to pretreatment works.

D8.8.4 FUNCTIONAL PERFORMANCE ASSESSMENTS

Not applicable to pretreatment works.

D8.8.5 VISUALLY ASSESSED PROPERTIES

Not applicable to pretreatment works.

D8.8.6 INSTRUMENTALLY ASSESSED PROPERTIES

Not applicable to pretreatment works.

D8.8.7 EVALUATION FOR ACCEPTANCE

Not applicable to pretreatment works.

D8.8.8 ADDITIONAL PROCEDURES TO BE ADOPTED IN THE EVENT OF FAILURE

Not applicable to pretreatment works.

D8.8.9 NOTIFICATION OF REMEDIAL WORK

Not applicable to pretreatment works.

D8.8.10 REMEDIAL WORK

Not applicable to pretreatment works.

8.9 REPAIR OF SURFACE DEFECTS

CONTENTS

PART A: SPECIFICATIONS

A8.9.1 SCOPE

A8.9.2 DEFINITIONS

A8.9.3 GENERAL

A8.9.4 DESIGN BY CONTRACTOR / PERFORMANCE BASED SYSTEMS

A8.9.5 MATERIALS

A8.9.6 CONSTRUCTION EQUIPMENT

A8.9.7 EXECUTION OF THE WORKS

A8.9.8 WORKMANSHIP

PART B: LABOUR ENHANCEMENT

PART C: MEASUREMENT AND PAYMENT

PART D: GUARANTEES AND COMPLIANCE CERTIFICATES

A8.9 REPAIR OF SURFACE DEFECTS

PART A: SPECIFICATIONS

A8.9.1 SCOPE

This Section covers the work in connection with the repair of surface defects.

A8.9.2 DEFINITIONS

Repair of surface defects - deals specifically with repair of early bleeding areas and/or aggregate loss during the Defect Notification Period as defined in the conditions of contract.

Repair of surfacing failures (typically delamination) is dealt with under patching in Section A8.8.

Bleeding - occurs when excess binder moves upwards relative to the aggregate and reduces the surface texture depth

Aggregate loss (ravelling) - is the loss of surfacing aggregate

A8.9.3 GENERAL

When surface defects occur within the maintenance period, the Contractor shall search and find the cause and mechanism of distress, propose and submit an appropriate repair method, in accordance with current good practice or specifications provided in this section, to the Engineer for approval. The proposed method/s shall include a detailed method statement, materials, construction equipment, traffic accommodation and quality plan.

Aggregate loss of Degree 2 or more and bleeding of Degree 3 and more according to the latest revision of TMH9 Part B, occurring within the defects liability period, as prescribed in the General Conditions of Contract, shall be repaired.

Sections of the road where severe loss of aggregate (Degree 3 or more), or bleeding (Degree 4 or 5) have occurred shall be closed to traffic by means of the statutory required road signs.

In case of aggregate loss, all loose stones shall be removed from the road surface and disposed of at an approved spoil site. The Contractor shall make sure that all the remaining aggregate is satisfactorily embedded into the road surface.

This work shall be effected as soon as possible after the distress occurs. However, the Contractor may not commence with the repair work without the Engineer's approval.

Notwithstanding the proposed method/s of treatment, the Engineer may order any seal which has not been properly constructed to be removed and replaced. The removal of the seal shall be done so as not to damage the existing substrate. All aggregate and binder shall be removed either by grader or by hand tools and disposed of at an approved spoil site. Any damage done to the substrate surface shall be repaired to the satisfaction of the Engineer.

A8.9.4 DESIGN BY CONTRACTOR / PERFORMANCE BASED SYSTEMS

The Contractor shall assess, investigate and design appropriate remedial measures and submit his proposals to the Engineer for approval prior to commencing any permanent repairs

A8.9.5 MATERIALS

Materials proposed and used for repair shall be appropriate materials complying with relevant referenced specifications in this document.

A8.9.6 CONSTRUCTION EQUIPMENT

Construction equipment appropriate to the proposed and approved repair method shall be listed as part of the detailed method statement for repair.

A8.9.7 EXECUTION OF THE WORKS

A8.9.7.1 Bleeding

Bleeding shall be corrected by one or more of the methods described below or according to the method approved by the Engineer.

a) Application and rolling in of heated aggregate with, or without, softening of the existing surfacing with an approved heating apparatus

The Engineer shall determine the size of the aggregate to be applied to the bleeding portions and for this purpose he may require ball penetration tests to be performed on the portions in question. The nominal maximum size of aggregate shall either be 10 mm or 7,1 mm complying with the requirements of Clause A10.1.5.10 of Chapter 10.

Trial sections shall be constructed to determine the most effective process using:

- 10 mm and 7,1 mm aggregate
- Pre-coated and unprecoated aggregate
- Heated aggregate
- Heating of the road surface
- Steel wheel and pneumatic-tyred rolling

If the binder of the existing surface has an oxidised film or if the road has been used by traffic for some time, the surface shall be softened by heating apparatus. The heating apparatus shall be an approved type that does not expose the road surface to open flames. This work shall only commence when the road temperature exceeds 30°C.

The aggregate, heated to 60°C at the time of application shall be applied to the surface at the rate determined by the Engineer and immediately rolled with a flat wheeled (steel) roller as well as a pneumatic-tyred roller having a mass of at least 2t per wheel, until the aggregate is firmly embedded. All loose aggregate not embedded shall be broomed off the road before it is opened to traffic. The road shall only be opened to traffic if the road surface temperature has cooled off sufficiently in the opinion of the Engineer, usually in the late afternoon. When opening the road to traffic the treated areas shall be demarcated with traffic cones and speed limit and “loose stone” signs for at least the first two days. All loose aggregate shall be broomed off and removed at least twice per day until full adhesion of the aggregate has been achieved.

Areas where whip-off is excessive after the treatment has been completed, shall be retreated in accordance with the Engineer’s instructions.

If only one lane and/or shoulder or half the road width is to be treated the application of aggregate shall be finished in a neat line. If only half the road width is to be treated, the application of aggregate shall be finished in a neat line on the centre line of the road.

b) Water cutting

Areas with excess binder, Degree 3 or more according to TMH9 Part B and/or insufficient macro texture, according to performance-based specifications in Part D of this Section, shall be marked out.

Trials shall be conducted with the approved apparatus using different pressure settings and jets to obtain the target macro texture for the particular type of seal according to Clause D10.1.6 of Chapter 10.

Before opening any rectified work to traffic, the road surface shall be properly cleaned and the waste material spoiled at an approved dump site.

c) Removal

Where very severe bleeding (Degree 4 or 5 according to TMH9 Part B) in large sections or in circumscribed smaller sections occur, the Engineer may prescribe the removal of the seal.

In these sections the seal shall be removed from the surface of the base by means of an approved method, e.g. planing or blading. The removal work shall be executed while the temperature of the road surface is below 15°C. If necessary, the road surface shall be cooled with water during the execution of the work.

Only graders fitted with new blades shall be used.

The Contractor shall repair all damage to the surface of the base to the satisfaction of the Engineer, where after an asphalt surfacing or a new seal shall be applied in accordance with the Engineer’s instructions.

A8.9.7.2 Aggregate loss

Aggregate loss during construction or within the Defects Notification Period shall be corrected, at the cost of the Contractor, by one or more of the

methods described below or according to the method approved by the Engineer.

a) Slight loss of aggregate

Slight loss of aggregate or perceived future risk thereof according to good practice guidelines and experience, shall be treated in accordance with the requirements of the Engineer, with the aid of a cover spray. The surface to be treated shall be clean and dry and a diluted cationic spray-grade emulsion (60/40) or diluted SC-E1 (60/40) shall be applied at a minimum rate of 0,8l/m² or such higher rate as may be approved by the Engineer.

b) Loss of aggregate: Isolated areas

(i) Single seals or upper layer of double seals

One of the following methods shall be applied:

1. Remove and replace

The areas where the remaining aggregate has to be removed from the road surface shall be demarcated by the Engineer. The remaining aggregate in these areas shall be removed with hand-equipment. Heating apparatus as described in Clause A8.9.7.1a) shall be used. Thereafter the areas shall be resealed as specified in Clause A10.1.7.1 of Chapter 10.

2. Replace with smaller aggregate

Cationic spray grade emulsion or SC-E1 shall be hand applied at an approximate rate of 0,8 l/m² and dry precoated aggregate of one nominal maximum size smaller than the stripped aggregate originally applied to fill the voids.

When the emulsion has cured properly, the area shall be rolled with a pneumatic tyre roller and a cover spray applied using a diluted cationic spray-grade emulsion (60/40) at a rate of 0,8 l/m².

c) Loss of both layers of a double seal

(i) Remove and replace

The areas where the remaining aggregate must be removed from the road surface shall be demarcated by the Engineer. The remaining aggregate in these areas shall be removed with hand-equipment. Heating apparatus as described in Clause A8.9.7.1a) shall be used. Thereafter the areas shall be resealed as specified in Clause A10.1.7.1 of Chapter 10.

(ii) Application of the second aggregate layer

Cationic spray grade emulsion or SC-E1 shall be hand applied at an approximate rate of 0,8 l/m² and dry precoated aggregate of one nominal size smaller than the initial small aggregate used to fill the voids.

When the emulsion has cured properly, the area shall be rolled with a pneumatic tyre roller and a cover spray applied using a diluted cationic spray-grade emulsion (60 % emulsion/40 % water) at a rate of 0,8 l/m².

d) Loss of aggregate: Large area

One of the following methods shall be applied:

(i) Remove and replace

The remaining aggregate shall be bladed from the road surface as soon as possible. Following investigation regarding the substrate conditions, the exposed area shall be resealed with binder and aggregate according to the design approved by the Engineer.

(ii) Replace and add additional layer of small aggregate

As soon as the temperature of the road surface is within the prescribed limits as stated in Table A10.1.3-1 of Chapter 10, a spray of cationic spray grade emulsion or SC-E1 shall be applied at the rate of 0,8 l/m² or the rate approved by the Engineer. Nozzles of the distributor could be closed to only apply the binder only where required.

Precoated aggregate of the same size as the stripped aggregate shall be applied by a self-propelled mechanical chip spreader at the rate determined through a trial section and rolled with a 2-4-ton steel wheel roller. When the emulsion has cured sufficiently, the area shall be rolled with pneumatic-tyred rollers, covering the repaired areas with at least eight roller passes.

A precoated 5,0 mm aggregate complying with Clause A10.1.5.10 of Chapter 10 (Grade 3), or precoated Grit seal complying with Clause A10.1.5.12 of Chapter 10, is then constructed over the entire road surface, using a diluted cationic spray grade emulsion (60/40) at 0,8 l/m² and aggregate spread rate of 240 m^2/m^3.

(iii) Replace and add slurry texture treatment

As soon as the temperature of the road surface is within the prescribed limits, a spray of cationic spray grade emulsion or SC-E1 shall be applied at the rate specified or approved by the Engineer. Nozzles of the distributor could be closed to only apply the binder only where required.

Precoated aggregate of the same size as the stripped aggregate shall be applied by a self-propelled mechanical chip spreader at the rate determined through a trial section and rolled with a 2-4-ton steel wheel roller. When the emulsion has cured sufficiently, the area shall be rolled with pneumatic-tyred rollers, covering the repaired areas with at least eight roller passes.

A fine slurry texture treatment shall then be applied by hand over the full width as specified in Section A8.3.

A8.9.7.3 Opening to traffic

Repaired sections shall only be opened to traffic when the applied binder has cured sufficiently and large aggregate particles are well embedded and the road surface is deemed safe to travel on.

Traffic accommodation shall comply with the specifications in Clause A1.5 of Chapter 1.

A8.9.8 WORKMANSHIP

The Engineer shall undertake routine inspections and routine tests to determine whether the quality of material and workmanship provided comply with the requirements of this Section.

B8.9 REPAIR OF SURFACE DEFECTS
PART B: LABOUR ENHANCEMENT

CONTENTS

B8.9.1 SCOPE

B8.9.2 DEFINITIONS

B8.9.3 GENERAL

B8.9.4 DESIGN BY CONTRACTOR / PERFORMANCE BASED SYSTEMS

B8.9.5 MATERIALS

B8.9.6 CONSTRUCTION EQUIPMENT

B8.9.7 EXECUTION OF THE WORKS

B8.9.8 WORKMANSHIP

B8.9.1 SCOPE

A large proportion of activities as defined in Part A under the various sections are considered labour intensive. Therefore, Part B only provides additional specifications, not contained in Part A.

B8.9.2 DEFINITIONS

Definitions as provided in Clause A8.9.2 apply.

B8.9.3 GENERAL

Any activity specified in Part A, where hand work is given as an alternative, shall be executed in such a way as to maximise labour.

B8.9.4 DESIGN BY CONTRACTOR / PERFORMANCE BASED SYSTEMS

The provisions of Part A shall apply.

B8.9.5 MATERIALS

The provisions of Part A shall apply.

B8.9.6 CONSTRUCTION EQUIPMENT

Where reference is made in Part A to appropriate or approved equipment, the use of light equipment shall be evaluated during trial sections.

B8.9.7 EXECUTION OF THE WORKS

The provisions of Part A shall apply.

B8.9.8 WORKMANSHIP

The provisions of Part A shall apply.

C8.9 REPAIR OF SURFACE DEFECTS

PART C: MEASUREMENT AND PAYMENT

(i) Preamble

The tendered rate for each item shall include full compensation for providing, maintaining and decommissioning upon completion, of all the plant, equipment, labour, tools, incidentals and supervision to carry out the activity or construct the works in the item, unless otherwise stated.

The requirements of Section C1.1 of Chapter 1 shall apply.

Where pay item descriptions include any wording in brackets it is an indication that contract specific information is to be inserted in the Pricing Schedule included in the Contract Documentation.

(ii) Items that will not be measured separately

The following activities, whether required to complete the specified work or not, will not be measured and paid for separately and the Contractor shall include the cost thereof in other pay items as he deems appropriate:

1. No separate payment will be made for setting out the works.
2. No separate payment will be made for the protection or repair as required of any existing or new road furniture, structures, buildings, infrastructure or services damaged by the Contractor's activities.
3. No additional payment shall be made, nor shall any claim for additional payment be considered, for any specified work in confined or restricted areas. Any additional costs associated with working in confined or restricted areas shall be deemed to be included in the standard applicable pay items.
4. No separate payment will be made for the loading of any materials.
5. No separate payment will be made for the hauling of any materials where the material is moved over a distance of less than, and up to 1,0 km.
6. No separate payment will be made for transporting materials from commercial sources irrespective of the haul distance.
7. No separate payment will be made for the removal or any surplus material imported to complete the works.
8. For all Works performed, precautionary measures required in terms of the Occupational Health and Safety Act (Act 85 of 1993) and the latest amendments thereof as well as the latest Construction Regulations shall be deemed included in the rates tendered for the relevant products.
9. Aggregate loss during construction or within the Defects Notification Period shall be corrected at the cost of the Contractor.

(iii) Items to be measured and paid for using items specified elsewhere in the specifications

Not applicable to this Section.

(iv) Items specifically for this Section of the specifications

Item	Description	Unit
C8.9.1	**Heating of the road surface**	
C8.9.1.1	Establishing of heating apparatus on site for softening of the road surface	lump sum
C8.9.1.2	Heating of road surface	square metre (m²)

The unit of measurement for the heating of the road surface is the square metre heated as specified.

Except for the provision of heating apparatus, the tendered rate for heating the road surface shall include full compensation for all equipment, materials and labour needed for the heating of the road surface, all in accordance with the specifications.

Item	Description	Unit
C8.9.2	**Aggregate for treatment of bleeding sections**	
C8.9.2.1	Heated aggregate (state size)	cubic metre (m³)
C8.9.2.2	Precoating of aggregate (state type and application litre/m^3)	cubic metre (m³)

The unit of measurement for the provision of aggregate shall be the cubic metre of aggregate as specified.

The tendered rate shall include full compensation for furnishing the aggregate, for precoating it, if required, with a bitumen based precoating fluid, including the furnishing of the precoating fluid, and for heating it to the specified temperature, all in accordance with the specifications and instructions of the Engineer.

Item	Description	Unit
C8.9.3	**Application and rolling in of heated aggregate**	**square metre (m²)**

The unit of measurement for the application and rolling in of the aggregate shall be the square metre of road treated in accordance with the specifications and instructions of the Engineer.

The tendered rate shall include full compensation for cleaning the existing road surface, for the application of the aggregate, irrespective of the size, with an approved chip spreader to the specified rate, for rolling in the aggregate as specified, for brooming off excessive aggregate as and when

needed, all in accordance with the specifications and instructions of the Engineer.

The tendered rate shall not include the provision of the aggregate.

Item	Description	Unit
C8.9.4	**Trial sections for heating, application and rolling in of heated aggregate**	**square metre (m²)**

The unit of measurement shall be the square metre of trial section constructed as ordered.

The tendered rate shall include full compensation for the construction of the trial section as instructed. It shall only be paid more than once if it is unsuccessful and the Contractor has executed all work according to the specifications and instructions.

Item	Description	Unit
C8.9.5	**Water cutting**	**square metre (m²)**
C8.9.5.1	Establishing of water cutting equipment on site	lump sum
C8.9.5.2	Water cutting of the road surface	square metre (m²)

The unit of measurement for the water cutting of the road surface is the square metre of road treated in accordance with the specifications and instructions of the Engineer.

Except for the provision of water cutting equipment, the tendered rate for water cutting of the road surface shall include full compensation for all equipment, materials and labour needed for water cutting of the road surface, including removal of material generated to an approved spoil site, all in accordance with the specifications.

Item	Description	Unit
C8.9.6	**Trial sections for water cutting**	**square metre (m²)**

The tendered rate shall include full compensation for a trial section as instructed. It shall only be paid more than once if it is unsuccessful and the Contractor has executed all work according to the specifications and instructions.

D8.9 REPAIR OF SURFACE DEFECTS

PART D: GUARANTEES AND COMPLIANCE CERTIFICATES

CONTENTS

D8.9.1 SCOPE

D8.9.2 GENERAL

D8.9.3 PERFORMANCE GUARANTEE REQUIREMENTS

D8.9.4 FUNCTIONAL PERFORMANCE ASSESSMENTS

D8.9.5 VISUALLY ASSESSED PROPERTIES

D8.9.6 INSTRUMENTALLY ASSESSED PROPERTIES

D8.9.7 EVALUATION FOR ACCEPTANCE

D8.9.8 ADDITIONAL PROCEDURES TO BE ADOPTED IN THE EVENT OF FAILURE

D8.9.9 NOTIFICATION OF REMEDIAL WORK

D8.9.10 REMEDIAL WORK

D8.9.1 SCOPE

Pretreatment and repair of existing layers form an integral part of the final surfacing. Therefore, the relevant requirements of Part D in Chapters 9 and Chapter 10 shall apply.

D8.9.2 GENERAL

Not applicable to pretreatment works.

D8.9.3 PERFORMANCE GUARANTEE REQUIREMENTS

Not applicable to pretreatment works.

D8.9.4 FUNCTIONAL PERFORMANCE ASSESSMENTS

Not applicable to pretreatment works.

D8.9.5 VISUALLY ASSESSED PROPERTIES

Not applicable to pretreatment works.

D8.9.6 INSTRUMENTALLY ASSESSED PROPERTIES

Not applicable to pretreatment works.

D8.9.7 EVALUATION FOR ACCEPTANCE

Not applicable to pretreatment works.

D8.9.8 ADDITIONAL PROCEDURES TO BE ADOPTED IN THE EVENT OF FAILURE

Not applicable to pretreatment works.

D8.9.9 NOTIFICATION OF REMEDIAL WORK

Not applicable to pretreatment works.

D8.9.10 REMEDIAL WORK

Not applicable to pretreatment works.