

**TRANSPORT FOR NSW (TfNSW)**  
**QA SPECIFICATION TfNSW M213**  
**CROSS STITCHING OF CRACKS AND JOINTS**  
**(CONCRETE PAVEMENT)**

**NOTICE**

This document is a Transport for NSW QA Specification. It has been developed for use with roadworks and bridgeworks contracts let by Transport for NSW or by local councils in NSW. It is not suitable for any other purpose and must not be used for any other purpose or in any other context.

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**REVISION REGISTER**

<b>Ed / Rev Number</b>	<b>Clause Number</b>	<b>Description of Revision</b>	<b>Authorised By</b>	<b>Date</b>
<b>M230</b>				
Ed 1 / Rev 0		First edition	GM, RNIC	12/05/04
Ed 1 / Rev 1	Notes & 1 Foreword	New clause re Intended use New Foreword	GM, IC	30.08.07
Ed 1 / Rev 2	Most	Format corrected	GM, IC	24.10.07
<b>M213</b>				
Ed 2 / Rev 0	All  5.3  Annexure A	To match new Maintenance Activities: <ul style="list-style-type: none"> <li>• Changed number</li> <li>• Changed Pay Items</li> <li>• Changed references to other similarly changed specifications</li> </ul> Removed Deduction mechanisms Changed internal referencing format Added clause re Accomplishment reporting. Reduced warranty period from 1 year to 6 months.	GM, IC	05.08.08
Ed 3 / Rev 0	All	General technical review, and revision of some technical requirements. Format revised.	GM, IAM	19.02.13
Ed 3/Rev 1	Global	References to “Roads and Maritime Services” or “RMS” changed to “Transport for NSW” or “TfNSW” respectively.	DCS	22.06.20



## **GUIDE NOTES**

(Not Part of Contract Document)

### **THESE NOTES ARE NOT PART OF THE SPECIFICATION, CONTRACT OR AGREEMENT.**

The following notes are intended to provide guidance to TfNSW personnel on the application of the Specification. They do not form part of the Specification, Contract or Agreement.

### **USING TfNSW M213**

This specification has been specifically developed for TfNSW maintenance works. It must not be used without a review of its suitability for the application and in the contractual environment.

It is a QA specification. The use of QA specifications requires the implementation of a quality system by the service provider which meets the quality system requirements specified in TfNSW Q.

### **DETAILS OF WORK**

Cross stitching is to precede surface crack routing and sealing (where required). Cracks may be longitudinal, transverse or skewed. Joints requiring stitching will typically be longitudinal but could sometimes be transverse. Joints would generally only be cross stitched where tie bars have failed or are missing and involve only non-moving joints (never on moving joints such as contraction, expansion and isolation joints).

The work to be executed under this Specification consists of:

- Drilling of inclined holes in base concrete spanning cracks and/or joints using a drill mounted on a jig.
- “Down the hole” sealing of the cracks where required.
- Cleaning and installing cross stitch bars (referred to as “stitch-bars”) with chemical anchors using epoxy or polyester resins.
- Capping the drilled holes.

### **GENERAL**

The decision to require a Trial under Annexure A should be made taking into consideration the experience and recent performance of the contractor involved.

The depth of the existing base concrete may be determined by probing wide cracks or by exposing the end of a transverse joint and measuring the slab height with allowance for base and sub base edge slumping. The depth and location is to be recorded on the Contractor’s day sheet of works undertaken.

Cross stitching is to precede surface routing and sealing of cracks. Routing and sealing does not form part of this Specification.

The longitudinal joints to be treated are those that have, or have the potential, to open due to inadequate horizontal tie bar performance.

Where the crack width (not including arris spalling) when measured at the surface exceeds 1 mm, the crack must be sealed by injecting into the drilled hole a self expanding polyurethane foam which will

enter the crack void under the expansive forces. The selected foam expand to at least three times the injected volume. This hole is then redrilled to the final diameter so that a fresh face is exposed for bonding with the chemical anchor.

Technical information on cross stitching is available in the TfNSW Rigid Pavement Standard Details – Maintenance drawings. The Contract Manager and Surveillance Officer should be familiar with the specific requirements and underlying reasons to maintaining concrete pavements. It is the responsibility of the Project Manager to amend any Model Drawings such that they are suitable for use with this Specification on an individual project basis.

## **CUSTOMISING THE SPECIFICATION**

In addition to scheduling work details, ensure that a warranty period is defined, and that trial work is specified where that is considered necessary.

The technical treatment details should be examined in depth before issuing the Specification.

Any changes considered warranted by local circumstances should be dealt with by project specific changes to the Specification.



Transport  
for NSW

QA SPECIFICATION M213

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# CROSS STITCHING OF CRACKS AND JOINTS (CONCRETE PAVEMENT)

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IC-QA-M213

VERSION FOR: DATE:
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## **FOREWORD**

### **TfNSW COPYRIGHT AND USE OF THIS DOCUMENT**

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#### **When this document forms part of a contract**

This document should be read with all the documents forming the Contract.

#### **When this document does not form part of a contract**

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### **REVISIONS TO PREVIOUS VERSION**

This document has been revised from Specification TfNSW M213 Edition 3 Revision 0.

All revisions to the previous version (other than minor editorial and project specific changes) are indicated by a vertical line in the margin as shown here, except when it is a new edition and the text has been extensively rewritten.

### **PROJECT SPECIFIC CHANGES**

Any project specific changes have been indicated in the following manner:

- (a) Text which is additional to the base document and which is included in the Specification is shown in bold italics e.g. ***Additional Text***.
- (b) Text which has been deleted from the base document and which is not included in the Specification is shown struck out e.g. ~~Deleted Text~~.

# TfNSW QA SPECIFICATION TfNSW M213

## CROSS STITCHING OF CRACKS AND JOINTS (CONCRETE PAVEMENT)

### 1 GENERAL

- |     |   |                                |
|-----|---|--------------------------------|
| 1.1 | This Specification has been developed specifically for TfNSW maintenance works. It must not be used in any type of contract without consideration of its suitability in the prevailing circumstances.   | <b>Intended use</b>            |
| 1.2 | The work to be executed under this Specification consists of:<br><br>.1 The drilling of inclined holes in base concrete spanning CRACKS and/or JOINTS.<br><br>.2 DOWN THE HOLE CRACK SEALING of the CRACKS where required.<br><br>.3 Cleaning and installing CROSS STITCH bars (referred to as STITCH-BARS) with chemical anchors using epoxy or polyester resins.<br><br>.4 Capping the drilled holes.<br><br>.5 The drilling of holes by a rotary impact drill mounted on a jig.<br><br>.6 Stitching of longitudinal, transverse, or skewed CRACKS.<br><br>.7 Stitching of non-opening JOINTS such as tied longitudinal JOINTS. Transverse contraction JOINTS must not be stitched. | <b>Scope</b>                   |
| 1.3 | Some words have a special meaning in this Specification and they are explained in Annexure M213/M. These words are highlighted in capitals e.g. DEFINED TEXT.   | <b>Definitions</b>             |
| 1.4 | The standards, specifications and test methods referred to by this Specification are referenced using an abbreviated form (e.g. AS 1478). The titles are given in Annexure M213/M.  | <b>Referenced documents</b>    |
| 1.5 | Unless otherwise specified, the issue of an Australian Standard, TfNSW Test Method or referenced TfNSW specification to be used is the issue current one week before closing date for pricing the work.   | <b>Applicable issue</b>        |
| 1.6 | Details of work are described in Annexure M213/A.   | <b>Details of work</b>         |
| 1.7 | Payment for the activities associated with completing the work detailed under this Specification must be made using the Pay Item(s) and interpretation listed in Annexure M213/B.   | <b>Measurement and payment</b> |

- 1.8 YOU must provide all responsibilities, such as actions, works, supply of materials, unless specifically stated otherwise. Accordingly, this Specification does not generally use wording such as "YOU shall ..." or "YOU must ..." because this is the underlying requirement. However, it is used where actions in a clause involve both YOU and the PRINCIPAL and the roles need to be unambiguous. **Interpretation**
- 1.9 Provide the identified records specified in the TfNSW Quality Management System Specification included in the Contract Documents (TfNSW Q) and summarised in Annexure M213/C2. **Records**

## **2 PLANNING**

### **2.1 PROJECT QUALITY PLAN REQUIREMENTS**

- 2.1.1 The requirements of the PROJECT QUALITY PLAN are defined in TfNSW Q. In addition, the PROJECT QUALITY PLAN must:
- .1 Address the HOLD POINTS and WITNESS POINTS required by this Specification and summarised in Annexure M213/C1. The PRINCIPAL will consider the submitted documents before authorising the release of any HOLD POINT. **Hold Points and Witness Points**
  - .2 Address each of the construction process requirements listed in this Specification and summarised in Annexure M213/D1. **Construction process**
  - .3 Include a requirement for the routine submission of data, which will certify conformity of all work and materials to the requirements of this Specification and include supporting documentation. **Conformity data**
  - .4 Be submitted to the PRINCIPAL at least 5 BUSINESS DAYS prior to commencement of work. **Submission**

- |   |
|---|
| 2.1.2 <b>Process Held:</b> Commencement of work <b>HOLD POINT</b>   |
| <b>Submission:</b> PROJECT QUALITY PLAN conforming to requirements in Clause 2.1.   |
| <b>Release of Hold Point:</b> The PRINCIPAL will consider the submitted documents before authorising the release of the HOLD POINT. |

**2.2 LOCATION AND SET OUT OF WORK**

- 2.2.1 The slabs that are to be CROSS STITCHED are detailed in Annexure M213/A. **Location**
  
- 2.2.2 The PRINCIPAL will mark on site the longitudinal JOINTS and CRACKS that are to be CROSS STITCHED. YOU must set out the bars on the identified CRACKS using alternate sides of the crack where possible. **Set out of work**
  
- 2.2.3 Prior to the set-out of Stitch-Bars for each shift, You must ascertain the depth of the Base Concrete at one location every 100 m of pavement for the determination of the length of the Stitch-Bar, drill hole and the offset positioning of the Cross Stitch hole. The depth and location is to be recorded on the daily work record (refer Clause 4.6). **Depth of base**  
  
The method of determining and recording the depth must be included in the PROJECT QUALITY PLAN.

**2.3 FIELD TRIAL OF CROSS STITCHING**

- 2.3.1 Unless specified otherwise in Annexure M213/A, YOU must demonstrate that the materials and construction methods achieve the requirements of this Specification by undertaking a trial pull out test. **Demonstrate conformity**
  
- 2.3.2 The pull out test is to be done in a vertical hole using the proposed chemical anchor and STITCH-BAR in a location on site as agreed with the PRINCIPAL. **Pull-out test**  
  
Affix by the chemical anchor an N12 mm Grade 500N deformed bar to AS4671 into a 16 mm diameter vertical test hole of 140 mm depth. Conformity is achieved when the bar resists an axial tension load of at least 28 KN one hour after installation before the chemical anchor yields.
  
- 2.3.3 A FIELD TRIAL is required for each combination of STITCH-BAR and installation method to be used. Each field trial must use a minimum of three (3) STITCH-BARS. **Combination FIELD TRIAL**

Every successful FIELD TRIAL forms part of the Work.

2.3.4	<b>Process Witnessed:</b> FIELD TRIAL of CROSS STITCHING.	<b>WITNESS POINT</b>
	<b>Submission:</b> Notification of FIELD TRIAL at least 7 BUSINESS DAYS in advance.	

<p>2.3.5    <b>Process Held:</b> Continuation of work following the FIELD TRIAL.</p> <p>          <b>Submission:</b> Verification that the FIELD TRIAL work conforms to requirements of this Specification.</p> <p>          <b>Release of Hold Point:</b> The PRINCIPAL will consider the submitted documents and may inspect the FIELD TRIAL work before authorising the release of the HOLD POINT.</p>	<p><b>HOLD POINT</b></p>
---	--------------------------

### **3        RESOURCES**

#### **3.1      GENERAL**

- |       |  |                             |
|-------|--|-----------------------------|
| 3.1.1 | All materials must be supplied by YOU.   | <b>Supply</b>               |
| 3.1.2 | YOU are responsible for all materials from the start of the work through to finalisation of the work.  | <b>Care</b>                 |
| 3.1.3 | Details of all materials and their suitability for use are to be included in the PROJECT QUALITY PLAN. | <b>Project Quality Plan</b> |

#### **3.2      SUPPLY OF STITCH-BARS**

- |       |  |   |
|-------|--|---|
| 3.2.1 | The STITCH-BARS for CROSS STITCHING must comply with AS/NZS 4671 as appropriate. The bars must be N12 mm diameter deformed reinforcing steel with Grade 500N to AS 4671. The bar length is to be in accordance with Series MP Drawings referenced in Annexure M213/M.  | <b>Material properties and dimensions</b> |
| 3.2.2 | A certificate must be obtained from a laboratory with appropriate NATA registration stating that all steel reinforcement conforms to AS/NZS 4671.<br><br>The reinforcement material supplier must be certified by the Australian Certification Authority for Reinforcing Steels (ACRS) for the supply of reinforcement material. | <b>Obtain certificate</b>                 |
| 3.2.3 | The STITCH-BAR at the time of installation must be free of rust scale, grease, earth and other deleterious contaminants or other matter which could affect bar adhesion. The STITCH-BAR must be readily identified as to grade and origin.   | <b>Condition at time of installation</b>  |
| 3.2.4 | Corrosion protection must be provided in accordance with, and where specified by the Series MP Drawings referenced in Annexure M213/M. The STITCH-BAR must be cut to length to suit the slab depth and cover.  | <b>Corrosion protection</b>               |

**3.3 SUPPLY OF CHEMICAL ANCHORS**

- |       |   |                             |
|-------|---|-----------------------------|
| 3.3.1 | The STITCH-BARS must be affixed into the CROSS STITCH holes by a chemical anchor suitable for fixing steel into concrete. The anchor must be an industry recognised hydrophilic two-pack epoxy or polyester resin system for bonding starter bars into concrete and must use a mixing system complying with Clause 4.4. | <b>Type</b>                 |
| 3.3.2 | The components must be of sufficient colour difference to allow visual assessment of the resin being fully mixed. The hardened resin colour must be concrete light grey unless approved otherwise.  | <b>Colour</b>               |
| 3.3.3 | The hardened resin must be of sufficient strength such that when a STITCH-BAR is affixed by the chemical anchor into a 16 mm diameter vertical test hole of 140 mm depth it is able to be loaded axially in tension one hour after installation to at least 28 KN before the chemical anchor yields.                    | <b>Hardened resin</b>       |
| 3.3.4 | The resin must have a gel time of approximately 5 minutes at 25°C and must be fully cured within one hour at prevailing ambient temperatures.   | <b>Gel time</b>             |
| 3.3.5 | The chemical anchors must be stored and handled in accordance with the manufacturer's recommendations and must not exceed the expiry date of packaging nor have evidence of hardening or ageing in the storage containers.  | <b>Storage and handling</b> |

**3.4 DRILLING EQUIPMENT**

- |       |  |                             |
|-------|--|-----------------------------|
| 3.4.1 | The drills to be used must be of rotary/impact type mounted on a drilling jig to maintain an inclined drilling angle of $30 \pm 3$ degrees to horizontal with the drilled hole intersecting the vertical CRACK/JOINT at approximately mid base slab depth. | <b>Type</b>                 |
| 3.4.2 | Where the drill is powered by a 240 volt supply, earth leakage devices must be used.   | <b>Earth leakage device</b> |

**4 EXECUTION****4.1 ORDER OF WORKS**

- |       |   |   |
|-------|---|---|
| 4.1.1 | Progressively complete sections of CROSS STITCHING on both sides of all the CRACKS or JOINTS.   | <b>Progressive cross stitching</b>      |
| 4.1.2 | For CRACKS or JOINTS that are close to the trafficked side of the closed lane such that there is inadequate space for the drilling jig and/or the safety clearance is insufficient, CROSS STITCH holes on one side only of the crack are to be completed. The holes on the other side of the CRACK/JOINT are to be CROSS STITCHED when the traffic control arrangements are reversed. | <b>Cross stitching close to traffic</b> |

**4.2 DRILLING**

4.2.1 The location of the drill holes is to be in accordance with the Series MP Drawings referenced in Annexure M213/M. **Location of drill holes**

4.2.2 The hole diameter is to a nominal 16 mm with the following tolerances applied to the dimensions provided in the Series MP Drawings. **Drilling dimensions**

Distance from marked location:  $\pm 20$  mm

Diameter of hole:  $\pm 1$  mm

Depth of hole: - 20,+ 5 mm

For holes that are to be DOWN THE HOLE CRACK SEALED the initial hole diameter must be less than the final hole diameter.

4.2.3 Start drilling the hole in the vertical direction for approximately 10 mm to facilitate commencement of the 30 degree angle. **Drilling direction**

Care must be exercised to ensure that the STITCH-BAR cover to the sub-base/BASE CONCRETE interface is not compromised. Where the net cover is less than 20 mm, the hole is to be abandoned and filled with the chemical anchor. No payment will be made for the abandoned hole and a new hole must be drilled 100 mm clear of the abandoned hole.

4.2.4 YOUR attention is drawn to the likely presence of tie bars, dowels, mesh and other steel products in PCP, CRCP, JRCP and SFCP (in particular near longitudinal tied JOINTS) BASE CONCRETE which will affect the progress of drilling and the wear rates of drill bits. No additional payment will be made due to the presence of any steel encountered. **Presence of steel**

4.2.5 Following drilling, the drill detritus that has accumulated on top of the BASE CONCRETE must be removed by vacuuming. Air lancing of the road surface is not permitted. **Removal of surface detritus**

Where the hole is not required to be DOWN THE HOLE CRACK SEALED, the drilled hole must be cleaned immediately. For holes that are to be DOWN THE HOLE CRACK SEALED, the drill hole is not to be cleaned until after reaming.

**4.3 DOWN THE HOLE CRACK SEALING**

4.3.1 Unless specified otherwise in Annexure M213/A, the drill hole must be treated by DOWN THE HOLE CRACK SEALING. **Down the hole crack sealing**

4.3.2 The CRACK must be sealed by injecting into the hole a self-expanding polyurethane foam which will enter the crack void under the expansive forces. A foam must be selected which expands to at least three times the injected volume. **Use self-expanding foam**

- |       |   |                                   |
|-------|---|-----------------------------------|
| 4.3.3 | The drill hole is not to be air-lance cleaned prior to injection of the foam.   | <b>Do not air-lance clean</b>     |
| 4.3.4 | The foam must be injected into the bottom of the drill hole with the injection tube withdrawn as the hole is filled in one continuous process. The foam must be compressible but stiff when set, and must be installed to rise during the expansion process to a target point 50 mm below the top of BASE CONCRETE.                 | <b>Injecting foam</b>             |
| 4.3.5 | Allow the foam to cure before the hole is reamed out.   | <b>Allow to cure</b>              |
| 4.3.6 | After the self expanding foam has set, the foam in the hole must be redrilled full-depth to the final diameter. The final hole diameter must be such that a fresh concrete face is exposed along the full length of the hole and all the foam, including that in surface voids, is removed. The drill need not be mounted in a jig. | <b>Preparation of drill holes</b> |
| 4.3.7 | Ream the foamed holes within 48 hours of injecting the foam.  | <b>Ream out foamed hole</b>       |
| 4.3.8 | The hole must be cleaned immediately following reaming.   | <b>Clean hole</b>                 |

#### **4.4 INSTALLATION OF CHEMICAL ANCHORS**

- |       |  |   |
|-------|--|---|
| 4.4.1 | The STITCH-BAR must be cut to size to maintain cover to the top of the hole in accordance with the Series MP Drawings referenced in Annexure M213/M.   | <b>Cut stitch bar to size</b>                 |
| 4.4.2 | The chemical anchor mixing system must incorporate automated component dosage and mixing to the requirements of the resin manufacturer. The mixed resin when discharged from the mixing nozzle must be thoroughly mixed and discharged through either a transparent mixing tube or discharge tube attached to the mixing nozzle. | <b>Mixing and installing chemical anchors</b> |
| 4.4.3 | Resins which have started to gel in the mixing or discharge nozzle must not be used.<br><br>Manual mixing or systems of mixing which expose the resins to the atmosphere prior to being fully mixed must not be used.  | <b>Rejection of mix</b>                       |
| 4.4.4 | The mixing system must inject the mixed chemical anchor into the CROSS STITCH hole from the bottom, with the discharge tube gradually withdrawn as the hole is filled. The discharge quantity must be able to be controlled so that the hole is neither under nor over filled after the STITCH-BAR is inserted.                  | <b>Control of injection</b>                   |

- 4.4.5      Cleaning of the drill hole must be achieved by vacuuming and assisted by brushes where necessary. The cleaned hole must be free from all loose debris, pulverised concrete dust and other material, which may have a deleterious effect on the adhesion of the resin to the drilled hole. **Cleaning of drilled holes**
- Work must be conducted so as to minimise the amount of air-borne dust and siliceous material.
- Only air lancing of the drill hole is permitted.
- 4.4.6      Immediately following cleaning of the drill hole, inject the required volume of chemical anchor by injecting the resin into the bottom of the hole and withdrawing the nozzle as the hole is filled in one continuous operation. **Injecting chemical anchor**
- 4.4.7      The STITCH-BAR must be inserted gently into the hole with a slight oscillating or slow spinning motion to allow the resin to coat the entire bar and eliminate air voids prior to the chemical anchor starting to gel. When the end of the STITCH-BAR is level with the top of the BASE CONCRETE, push the STITCH-BAR firmly into place using a push rod. **Installation of stitch bar**
- 4.4.8      Where unplanned circumstances arise and YOU are unable to install the STITCH-BAR and resin immediately, the hole must be kept clean. If the hole for any reason subsequently becomes contaminated, YOU must re-clean the hole. **Delay in installing stitch bar and resin**
- 4.4.9      Take all necessary precautions to protect the work until the chemical anchor has set and has developed sufficient strength to carry traffic without damage to the work. **Protection of work**

#### **4.5      COMPLETION OF WORK**

All drill detritus, spent drill bits and all other wastes from the operations are to be removed from site and disposed of in accordance with Specification TfNSW G36.

#### **4.6      DAILY WORK RECORD**

The number of STITCH-BARS together with the location details is to be recorded on the daily work record. You must sign the daily work record using the pro-forma in Annexure M213/D.

A sketch must be made daily showing the location of all completed STITCH-BARS.

## 5 CONFORMITY

### 5.1 CERTIFICATION OF CONFORMITY

Submit a conformity summary report for all work done and provide any necessary supporting documentation. This report will certify conformity of all work and materials to the requirements of this Specification.

**Conformity  
Summary**

The activities in Table 1 must be included in the summary report.

**Table 1. Summary Report Activities**

Activity	Reference	Conformity
Material Conformity	Clauses 3.2 & 3.3	Supply of STITCH-BARS and Chemical Anchors.
Daily Work Record	Clause 4.6 & Annexure M213/D	Using pro-forma in Annexure M213/E for the purpose of recording works done and for measurement for payment.
Cross Stitching process	Clause 4.1 to 4.4	Certification of conformity.
Completion of work	Clause 4.5	Certification of conformity.
Nonconformities	TfNSW Q	List of NCR's issued and dispositions.

### 5.2 WARRANTY PERIOD

YOU warrant the work for the period set out in Annexure M213/A. The PRINCIPAL will inspect the work at the end of that period. Any defect identified within the warranty period is deemed to be a nonconformity and must be rectified within one month.

### 5.3 ACCOMPLISHMENT REPORTING

The accomplishment of conforming work must be reported as specified in Table 2.

**Table 2. Accomplishment Reporting**

Code	Description	Unit of Measure	Accomplishment Reporting
213	Cross stitching of cracks and joints (concrete pavement)	m <sup>2</sup>	Report each STITCH-BAR installed.

**M213**

**Cross Stitching of Cracks and Joints (Concrete Pavement)**

**ANNEXURE M213/A – DETAILS OF WORK**

Road No.	C/Way	Lane	Segment or Link	Chainage		Slab ID	Down The Hole Crack Sealing Required	No. Bars in Trans Cracks	No. Bars in Long Cracks
				From	To				

<b>Slab maps/sketch plans attached:</b>	YES / NO	("Yes" unless specified otherwise)
<b>FIELD TRIAL required:</b>	YES / NO	("Yes" unless specified otherwise)
<b>Down the Hole Crack Sealing required:</b>	YES / NO	("Yes" unless specified otherwise)
<b>Warranty Period:</b>		6 months unless specified otherwise)

**ANNEXURE M213/B – MEASUREMENT AND PAYMENT****B1 GENERAL**

B1.1	Pay items are identified in Annexure M213/B2.	<b>Pay Items to be used</b>
B1.2	The price(s) of pay items with a quantity of work in the schedule must be costed with due allowance for all costs of the activity.  Any pay item with a quantity of work that is not priced is understood to be included in other priced pay items.	<b>Prices</b>
B1.3	Any overheads must be distributed between pay items.	<b>Overheads</b>
B1.4	Pay items with a quantity of work specified must not be tendered as a lump sum price.	<b>No Lump Sum</b>
B1.5	Measurement will include any field trial which form part of the work detailed in Annexure M213/A and conform to this Specification.	<b>Field Trial</b>
B1.6	No payment is made for rework required to achieve conformity.	<b>No payment</b>

**B2 SCHEDULE OF PAY ITEMS**

Pay Item *	Item Name and Description	Units**
	<p><b>Note:</b> The work includes:</p> <ul style="list-style-type: none"> <li>• Supply and delivery of STITCH-BARS;</li> <li>• Protective coatings where required;</li> <li>• Drilling of holes and</li> <li>• fixing bars in the hole using a chemical anchor.</li> </ul> <p>No separate payment will be made for these.</p>	
<b>M213P1</b>	<b>Supply and Install Stitch-bars</b>	<b>Each</b>
M213P1.1	Supply and install STITCH-BARS (less than 25 within Work Zone)	Each
M213P1.2	Supply and install STITCH-BARS (25 to 100 within Work Zone)	Each
M213P1.3	Supply and install STITCH-BARS (greater than 100 within Work Zone)	Each
<b>M213P2</b>	<b>Down the hole crack sealing and reaming out for Cross Stitching holes</b>	<b>Each</b>
	<p><b>Note:</b> The work includes costs associated with provision of DOWN THE HOLE CRACK SEALING and reaming out for CROSS STITCHING holes.</p>	

\*\* Claim each complying STITCH-BAR installed.

<b>M213P3</b>	<b>Establishment</b>	<b>Item</b>
	<p><b>Note:</b> It is taken that you have included all the following in tendering your establishment rate - no further payment will be made for them:</p> <ul style="list-style-type: none"><li>• Plant float to/from the site or project;</li><li>• Set up and removal of site facilities (eg: office, sheds, toilets); Principals facilities (if required,</li><li>• Initial travel to site or project;</li><li>• Daily travel to/from site or project;</li><li>• Accommodation (eg: on site or motel/hotel). .</li></ul>	<p><b>Establishment is paid once per Work Order</b></p>
<p><b>* Pay Items are primarily for guidance in preparing Work Orders (which can be Lump Sum or Schedule of Rates).</b> When preparing a Work Order, any or all of the Pay Items may be incorporated: the aim is to improve the accuracy of the Service Provider’s estimation and pricing by:</p> <ul style="list-style-type: none"><li>a) selecting those Pay Items which denote the activities that are to be undertaken and</li><li>b) requiring the Service Provider to estimate and price each Pay Item individually.</li></ul> <p>When Establishment is a significant cost, the Pay Item specific to it must be incorporated in the Work Order – the cost must not be amortised / absorbed across the other Pay Items. Similarly, when Traffic Control is a significant cost, its Pay Item(s) must be incorporated. See Specification TfNSW G10M for a list of these.</p>		

## **ANNEXURE M213/C – SCHEDULES OF HOLD POINTS, WITNESS POINTS AND IDENTIFIED RECORDS**

### **C1 SCHEDULE OF HOLD POINTS AND WITNESS POINTS**

<b>Reference</b>	<b>Type</b>	<b>Process Held</b>	<b>Submission Details</b>
Clause 2.1.2	Hold Point	Commencement of work	Submission of Project Quality Plan.
Clause 2.3.4	Witness Point	Trial of CROSS STITCHING work	7 BUSINESS DAYS advance notification.
Clause 2.3.5	Hold Point	Continuation of work following the trial	Successful Completion of trial.

### **C2 SCHEDULE OF IDENTIFIED RECORDS**

<b>Reference</b>	<b>Description of the Identified Record</b>
Clause 2.1	Project Quality Plan
Clauses 2.2 & 4.6 and Annexure M213/D	Daily Work Record & Location Sketch
Clause 3.2.2	Conformity data for supplied stitch-bars

## **ANNEXURE M213/D – PLANNING DOCUMENTS**

### **D1 CONSTRUCTION PROCESSES**

<b>Reference</b>	<b>Process</b>	<b>Details</b>
Clause 2.2	Set out of work	Method of determining the depth of the base concrete
Clause 3.1.3	Materials	Full details
Clause 4.2	Drilling	Method for locating, drilling and preparing holes
Clauses 4.3 and 4.4	Installation	Methods for installing chemical anchors

**ANNEXURE M213/E – DAILY WORK RECORD**

Date of Work:

Road No.

Location / Site:

C/Way

Lane

Segment or Link	Chainage		Slab ID	Base Depth (mm)	Down The Hole Crack Sealed (Yes/No)	NCR's	No. Bars in Trans Cracks	No. Bars in Long Cracks
	From	To						

The works recorded above have been completed in conformity with the Project Quality Plans & the Specification.

Contractor's Representative Name: \_\_\_\_\_

Contractor's Representative Signature: \_\_\_\_\_

Date: \_\_\_\_\_

**ANNEXURES M213/F TO M213/L – (NOT USED)**

## **ANNEXURE M213/M – REFERENCED DOCUMENTS AND DEFINITIONS**

### **M.1 REFERENCED DOCUMENTS**

#### **M1.1 Australian Standards**

AS/NZS 4671 Steel reinforcing materials

#### **M1.2 TfNSW Documents**

TfNSW G10M Traffic Management (Maintenance Works)

TfNSW G36 Environmental Protection

TfNSW Q Quality Management System

Series MP Rigid Pavement Standard Details – Maintenance, Plain Concrete Pavement

### **M2 DEFINITIONS**

**CRACK** An irregular, unplanned opening in BASE CONCRETE which is essentially vertical and of various widths and which may intersect with others, typically orientated longitudinally (viz, in the direction of traffic), or transversely or a combination. The crack may be straight or meandering and may have arris spalling.

**JOINT** A planned joint in BASE CONCRETE, which runs either parallel (in the case of longitudinal joints) or transverse to the direction of traffic flow. They are either formed or induced.

Longitudinal joints are typically tied mid-depth by 1 m long, 12 mm diameter tie bars at centres typically ranging from 0.5 to 1.0 m.

Transverse joints are broadly categorised as either moving joints (such as contraction, isolation, expansion) or tied joints. Tied joints typically contain mid-depth tie bars of 12 mm diameter, 1 m long at 300 mm centres.

**STITCH-BAR** A length of deformed non-galvanised 12 mm diameter, minimum 500 MPa reinforcing steel rod inserted and affixed into the CROSS STITCH hole by epoxy or polyurethane adhesive.

**CROSS STITCH** A process of drilling inclined holes into concrete across a CRACK or JOINT and affixing a STITCH-BAR.

**BASE CONCRETE** The upper (structural) layer of concrete with varying insitu strengths, typically 25 to 50 MPa. The concrete contains various forms of steel reinforcement, dowels and tie bars. In some instances the concrete may contain steel fibre reinforcement.

**DOWN THE HOLE CRACK SEALING** Sealing of CRACKS by injection into the hole of self expanding polyurethane foam and then redrilling to final diameter so that no voids exists for the escape of the chemical anchor from the drill hole.

**FIELD TRIAL** A trial section of cross stitching of cracks and joints that includes the nominated materials, equipment, and construction methods to be used in executing the works under this Specification.

**LAST PAGE**