



**Institut de  
Tecnologia de la Construcció  
de Catalunya**

Wellington 19  
EN-08018 Barcelona  
Tel. +34 93 309 34 04  
qualprod@itec.cat  
itec.cat



# European Technical Assessment

**ETA 22/0358**  
of 19.09.2022



## General part

### Technical Assessment Body issuing the ETA: ITeC

ITeC has been designated according to Article 29 of Regulation (EU) No 305/2011 and is member of EOTA (European Organisation for Technical Assessment).

**Trade name of the construction product**

**MasterSeal Bridge 5000**

**Product area to which the construction product belongs**

Liquid applied bridge deck waterproofing kits.

**Manufacturer**

**MASTER BUILDERS SOLUTIONS INDIA PRIVATE LIMITED**  
D-126, TTC Industrial Area, Shiravane Navi Mumbai  
400703 Maharashtra  
India

**Manufacturing plant(s)**

According to Annex N kept by ITeC.

**This European Technical Assessment contains**

14 pages, including 1 annex which forms an integral part of this assessment  
and  
Annex N, which contains confidential information and is not included in the European Technical Assessment when that assessment is publicly available.

**This European Technical Assessment is issued in accordance with Regulation (EU) 305/2011, on the basis of**

European Assessment Document EAD 030675-00-0107.

**General Comments**

Translations of this European Technical Assessment in other languages shall fully correspond to the original issued document.

Communication of this European Technical Assessment, including transmission by electronic means, shall be in full (excepted the confidential Annex(es)).

## Specific parts of the European Technical Assessment

### 1 Technical description of the product

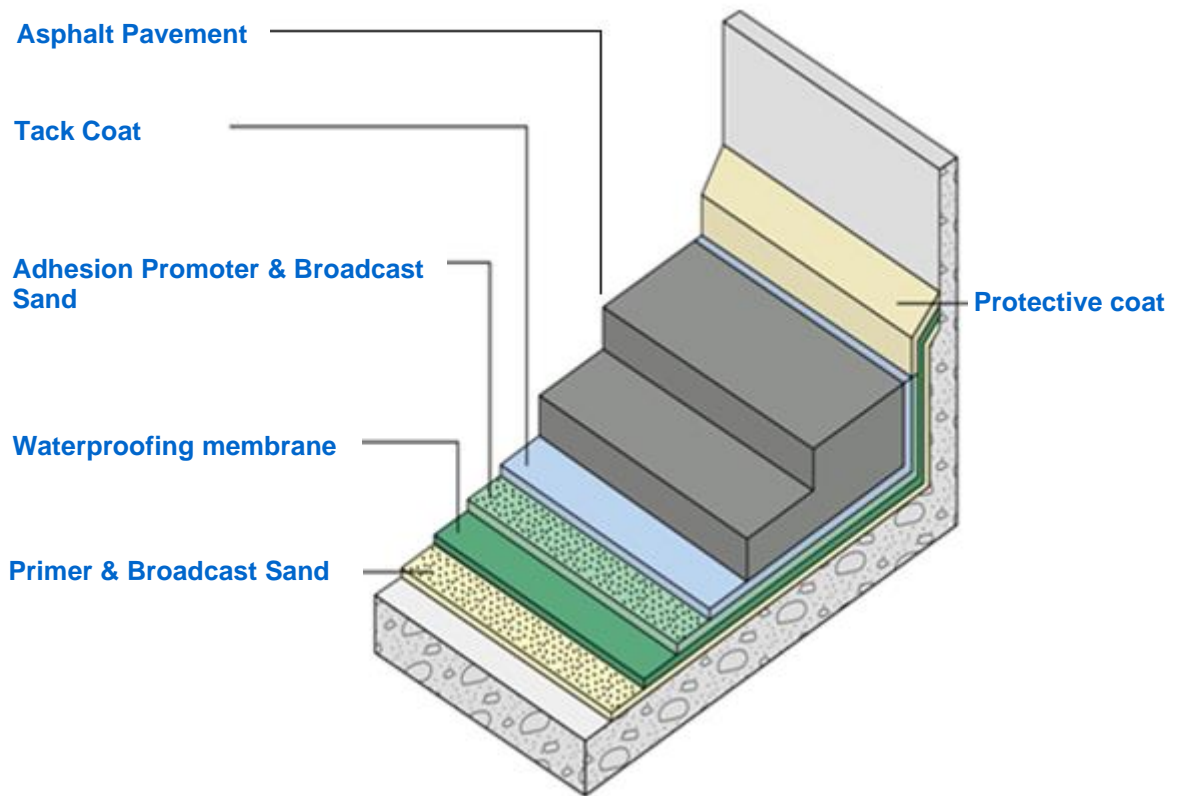
MasterSeal Bridge 5000 is a liquid applied bridge deck waterproofing system based on layers of hybrid polyurethane/polyurea and epoxy resins, sands and modified asphalt. The main component (waterproofing membrane) consists of a solvent free, instant curing and two-component hybrid polyurethane/polyurea resin, which is spray applied. The resin once polymerised conforms a jointless elastic membrane, in form of a layer completely bonded to the support (concrete or steel).

MasterSeal Bridge 5000 comprises the following components:

Components	Trade name	Consumption* (kg/m <sup>2</sup> )	Thickness* (mm)
Tack coat	MasterSeal P629	1,0	0,95
Sand broadcast	MasterTop SRA No 3	1,0	
Adhesion/promoter	MasterSeal P628 Part A	0,4	0,6
	MasterSeal P628 Part B		
Waterproofing membrane	MasterSeal M800 Part A	2,2	2,0
	MasterSeal M800 Part B		
Sand broadcast	MasterTop SRA No 3	1,0	
Primer for concrete support	MasterSeal P2525 Part A	0,25	0,5
	MasterSeal P2525 Part B		
Primer for steel support	MasterSeal P681 Part A	0,25	0,2
	MasterSeal P681 Part B		
Primer for overlapping surfaces	MasterSeal P691	0,1	0,05

\* Nominal values.

**Table 1:** Components of the kit and their consumptions and thicknesses.



**Figure 1:** Perspective view of MasterSeal Bridge 5000.

## 2 Specification of the intended use(s) in accordance with the applicable EAD

Waterproofing of the concrete and/or steel deck of the bridge preventing or controlling the passage of water to the support.

The system is made of non-load bearing construction elements. It does not contribute directly to the stability of the bridge on which is installed, but it can contribute to its durability by providing enhanced protection from the effect of weathering.

The system is suitable for the following use categories:

- (A) with overlay and intended to receive vehicular traffic:
  - A.1 Overlay asphalt concrete applied at  $(160 \pm 10) \text{ }^\circ\text{C}$  (CBM).
  - A.3 Non-asphaltic overlays.

It is not intended to receive direct vehicular traffic in service and in this case will always be used beneath overlays of asphalt. The system can be applied in vertical surfaces to solve singular points.

The provisions made in this ETA are based on a working life of MasterSeal Bridge 5000 of at least 25 years, provided that the conditions laid down in the manufacturer's instructions for the installation, use and maintenance are met. These provisions are based upon the current state of the art and the available knowledge and experience.

The indications given as to the working life of the product cannot be interpreted as a guarantee but are regarded only as a means for choosing the appropriate products in relation to the expected economically reasonable working life of the works.

### 3 Performance of the product and reference to the methods used for its assessment

#### 3.1 Performance of the product

The assessment of MasterSeal Bridge 5000 has been performed in accordance with EAD 030675-00-0107 for *Liquid applied bridge deck waterproofing kits*.

Basic requirement 1: Mechanical resistance and stability			
Essential characteristic	Test conditions	Performance	
Bond strength (kit to support)	P1-S0-T5	Concrete: 2,1 N/mm <sup>2</sup> , -/Y Steel: 2,1 N/mm <sup>2</sup> , -/Y	
Capacity to bridge cracks	P1-S1.2/S2-T1	Pass	
Resistance to chloride ion penetration	P1-S0-T5	Pass (< 0,01)	
Resistance to dynamic actions	Resistance to perforation	P1-S0-T5	Pass (I4)
	Resistance to compaction of asphalt concrete	P1-S1.2-T5	Watertight
Resistance to heat impact	Bond strength	P1-S1.2-T5	Concrete: 1,8 N/mm <sup>2</sup> , -/Y Steel: 2,3 N/mm <sup>2</sup> , -/Y
	Tensile characteristics: tensile strength	P1-S0-T5	8,7 / 7,7 N/mm <sup>2</sup>
	Tensile characteristics: elongation at break	P1-S1.2-T5	472 / 447 (%)
	Capacity to bridge cracks	P1-S1.2/S2-T1	Pass
Resistance to shear between the substrate and overlay	P1-S1.2-T5	Concrete: 1,1 N/mm <sup>2</sup> Steel: 0,9 N/mm <sup>2</sup>	
Watertightness	P1-S0-T5	Watertight	
Resistance to high and low service temperatures	Bond strength	P1-S0-T6	Concrete: 1,7 N/mm <sup>2</sup> , -/Y Steel: 1,9 N/mm <sup>2</sup> , -/Y
		P1-S0-T2	Concrete: 1,8 N/mm <sup>2</sup> , -/Y Steel: 2,4 N/mm <sup>2</sup> , -/Y
	Shear resistance to support	P1-S1.2-T6	Concrete: 0,3 N/mm <sup>2</sup> Steel: 0,3 N/mm <sup>2</sup>
		P1-S1.2-T3	Concrete: 4,0 N/mm <sup>2</sup> Steel: 2,9 N/mm <sup>2</sup>
Capacity to penetrate pores in the support	-	See table 3	
Resistance to flow (associated with the application to non-horizontal surfaces)	P1-S0-T5	0 %	
Dry film thickness	-	2,0 mm	
Resistance to the effects of climatic conditions on application	Bond strength (application at +40 °C)	P2-S0-T5	Concrete: 1,4 N/mm <sup>2</sup> , B/C Steel: 1,3 N/mm <sup>2</sup> , -/Y
	Bond strength (application at +5 °C)		Concrete: 1,4 N/mm <sup>2</sup> , A/B Steel: 1,3 N/mm <sup>2</sup> , -/Y

Resistance to the effects of the quality of the support (SC)	Moisture content (MC)	P3-S0-T5	1,4 N/mm <sup>2</sup> , A/B
	Day joints (OA)		1,9 N/mm <sup>2</sup> , C1/C2
	Section joints (up to six months) (OA)	P4-S0-T5	1,9 N/mm <sup>2</sup> , C1/C2
Resistance to water contact (Wa)	Water absorption		2,32 %
	Micro hardness	P1-S5.1-T5	77 / 69 IRHD
Resistance to alkali solution contact (Al)	Water absorption		0,47 %
	Micro hardness	P1-S5.2-T5	77 / 75 IRHD
Resistance to oil, petrol or diesel contact		-	NPA
Resistance to Bitumen contact (Bi)	Micro hardness	P1-S5.3-T5	77 / 78 IRHD
	Capacity to bridge cracks	P1-S1.2/S2-T1	Pass
Resistance to Heat ageing (HA)	Tensile characteristics: tensile strength	P1-S0-T5	8,7 / 7,8 N/mm <sup>2</sup>
	Tensile characteristics: elongation at break	P1-S2-T5	472 / 499 (%)
Resistance to UV radiation (exposed kits only) (UV)		-	Not applicable
<b>Basic requirement 3: Hygiene, health and the environment</b>			
<b>Essential characteristic</b>		<b>Test conditions</b>	<b>Performance</b>
Content, emission and/or release of dangerous substances		-	NPA
<b>Basic requirement 4: Safety and accessibility in use</b>			
<b>Essential characteristic</b>		<b>Test conditions</b>	<b>Performance</b>
Bond strength (kit to overlay)		P1-S1.2-T5	1,3 N/mm <sup>2</sup> , F
Slipperiness		-	Not applicable
Resistance to abrasion / Wear		-	Not applicable
Resistance to Freeze Thaw (FT)	Bond strength to support	P1-S3-T5	Concrete: 1,5 N/mm <sup>2</sup> , B/C Steel: 2,0 N/mm <sup>2</sup> , B/C
	Resistance to shear to support and to overlay	P1-S1.2/S3-T5	Concrete: 0,8 N/mm <sup>2</sup> Steel: 0,7 N/mm <sup>2</sup>
	Bond strength to overlay	P1-S1.2/S3-T5	0,3 N/mm <sup>2</sup> , C/D

**Table 2:** Performance of the product.

Primer	Temperature	Viscosity (mPa·s)
MasterSeal P2525: concrete substrates	23 °C	1.568,0
	5 °C	3.043,9
MasterSeal P681: steel substrates	23 °C	1.941,0
	5 °C	5.630,5
MasterSeal P691: overlapping surfaces	23 °C	59,5
	5 °C	59,5

**Table 3:** Capacity to penetrate pores in the support (viscosity of primers).

Characteristics		Conditions	Performance
Watertightness		P1-S0-T5	Watertight
Tensile strength	Nominal	P1-S0-T5	8,7 N/mm <sup>2</sup>
	After heat impact	P1-S1.2-T5	7,7 N/mm <sup>2</sup>
	After heat ageing	P1-S2-T5	7,8 N/mm <sup>2</sup>
Tensile elongation at break	Nominal	P1-S0-T5	472 %
	After heat impact	P1-S1.2-T5	447 %
	After heat ageing	P1-S2-T5	499 %
Micro-hardness	Nominal	P1-S0-T5	77 IRHD
	Contact with water	P1-S5.1-T5	69 IRHD
	Contact with alkaline solution	P1-S5.2-T5	75 IRHD
	Contact with bitumen	P1-S5.3-T5	78 IRHD
Change of mass	Contact with water	P1-S5.1-T5	2,32 %
	Contact with alkaline solution	P1-S5.2-T5	0,47 %
Resistance to compaction of asphalt concrete		P1-S1.2-T5	Watertight
Resistance to perforation		P1-S0-T5	Pass (I4)

**Table 4:** Specific characteristics of waterproofing membrane MasterSeal M800.

Conditions	Code	Meaning
Conditions for sample preparation	P1	Normal application climate: (23 ± 2) °C and (50 ± 10) % RH
	P2	Severe application climate: at lower or higher temperatures in combination with high relative humidity
	P3	High moisture content of the substrate
	P4	Overlapping areas
Stress conditions before testing	S0	No stress conditions
	S1.2	Heat impact: Application of asphalt concrete at 160 °C - (CBM)
	S2	Heat ageing at (70 ± 2) °C for (28 ± 0.5) days
	S3	Freeze-thaw cycles
	S5.1	Contact to water
	S5.2	Contact to alkali solution
	S5.3	Contact to bitumen
Temperature conditions for testing	T1	Extreme low temperature (-30 °C)
	T2	Severe low temperature (-20 °C)
	T3	Low temperatures (-10 °C)
	T4	Moderate low temperature (0 °C)
	T5	Normal temperature (23 °C)
	T6	High temperature (40 °C)

**Table 5:** Conditions codes meaning.

<b>Code</b>	<b>Meaning</b>
A	Cohesive failure of support
A/B	Adhesive failure between support and primer
B	Cohesive failure of primer
B/C	Adhesive failure between primer and membrane
C	Cohesive failure of membrane
C/D	Adhesive failure between membrane and adhesion/promoter
D	Cohesive failure of adhesion/promoter
D/E	Adhesive failure between adhesion/promoter and tack coat
E	Cohesive failure of tack coat
E/F	Adhesive failure between tack coat and bitumen mixture
F	Cohesive failure of bitumen mixture
-/Y	Adhesive failure between final coat and adhesive to test cylinder
Y	Cohesive failure of adhesive to test cylinder
Y/Z	Adhesive failure between adhesive and test cylinder
C1/C2	Adhesive failure between first membrane and second membrane

**Table 6:** Meaning of codes of bond strength failure.



### **3.2 Methods used for the assessment**

#### **3.2.1 Bond strength (kit to support)**

MasterSeal Bridge 5000 has been assessed according to clause 2.2.1 of the EAD. Tested according to EN 13596.

#### **3.2.2 Capacity to bridge cracks**

MasterSeal Bridge 5000 has been assessed according to clause 2.2.2 of the EAD. Tested according to EN 14224 at -30 °C with a sinusoidal wave of maximum crack amplitude of 0,32 mm at 1 Hz during 10.000 cycles.

#### **3.2.3 Resistance to chloride ion penetration**

MasterSeal Bridge 5000 has been assessed according to clause 2.2.3 of the EAD. Tested according to Annex B.5 of the EAD.

#### **3.2.4 Resistance to dynamic actions**

MasterSeal Bridge 5000 has been assessed according to clause 2.2.4 of the EAD. Resistance to perforation has been tested according to Annex B.1 of the EAD with an indenter type I4. Resistance to compaction of asphalt concrete has been tested according to EN 13375.

#### **3.2.5 Resistance to heat impact**

MasterSeal Bridge 5000 has been assessed according to clause 2.2.5 of the EAD. Bond strength to support has been tested according to EN 13596. Tensile characteristics have been tested according to EN ISO 527-2. Capacity to bridge cracks has been tested according to EN 14224 at -30 °C with a sinusoidal wave of maximum crack amplitude of 0,32 mm at 1 Hz during 10.000 cycles.

#### **3.2.6 Resistance to shear between the substrate and overlay**

MasterSeal Bridge 5000 has been assessed according to clause 2.2.6 of the EAD. Tested according to EN 13653 with an overlay of coarse bitumen at 160 °C (use category A.1).

#### **3.2.7 Watertightness**

MasterSeal Bridge 5000 has been assessed according to clause 2.2.7 of the EAD. Tested according to EN 14694.

#### **3.2.8 Resistance to high and low service temperatures**

MasterSeal Bridge 5000 has been assessed according to clause 2.2.8 of the EAD. Bond strength to support has been tested according to EN 13596 at -20 °C and at +40 °C. Shear strength to support and overlay has been tested according to EN 13653 at -10 °C and at +40 °C with an overlay of coarse bitumen at 160 °C (use category A.1).

#### **3.2.9 Capacity to penetrate pores in the support**

Primers MasterSeal P2525, MasterSeal P681 and MasterSeal P691 have been assessed according to clause 2.2.9 of the EAD. Tested according to EN ISO 3219.

#### **3.2.10 Resistance to flow (associated with the application to non-horizontal surfaces)**

MasterSeal Bridge 5000 has been assessed according to clause 2.2.10 of the EAD. Tested according to Annex B.2 of the EAD.

### **3.2.11 Dry film thickness**

MasterSeal Bridge 5000 has been assessed according to clause 2.2.11 of the EAD. Tested according to EN ISO 2808, table A.2.

### **3.2.12 Resistance to the effects of climatic conditions on application**

MasterSeal Bridge 5000 has been assessed according to clause 2.2.12 of the EAD. Tested according to EN 13596 with specimens prepared at +5 °C and at +40 °C.

### **3.2.13 Resistance to the effects of the quality of the support (SC)**

MasterSeal Bridge 5000 has been assessed according to clause 2.2.13 of the EAD. Moisture content (MC) and section joints (up to six months) (OA) have been tested according to EN 13596 with the conditioning according to EN 13578 and clause 2.2.13 of the EAD respectively. Section joints (up to six months) (OA) results are valid for day joints (OA).

### **3.2.14 Resistance to water contact (Wa)**

MasterSeal Bridge 5000 has been assessed according to clause 2.2.14 of the EAD. Change of mass has been tested according to EN 14223. Micro hardness has been tested according to EN ISO 48-2.

### **3.2.15 Resistance to alkali solution contact (Al)**

MasterSeal Bridge 5000 has been assessed according to clause 2.2.15 of the EAD. Change of mass has been tested according to EN 14223. Micro hardness has been tested according to EN ISO 48-2.

### **3.2.16 Resistance to bitumen contact (Bi)**

MasterSeal Bridge 5000 has been assessed according to clause 2.2.17 of the EAD. Micro hardness has been tested according to EN ISO 48-2.

### **3.2.17 Resistance to heat ageing (HA)**

MasterSeal Bridge 5000 has been assessed according to clause 2.2.18 of the EAD. Capacity to bridge cracks has been tested according to EN 14224. Tensile characteristics have been tested according to EN ISO 527-2.

### **3.2.18 Bond strength (kit to overlay)**

MasterSeal Bridge 5000 has been assessed according to clause 2.2.21 of the EAD. Tested according to EN 13596 with an overlay of coarse bitumen at 160 °C (use category A.1).

### **3.2.19 Resistance to freeze thaw (FT)**

MasterSeal Bridge 5000 has been assessed according to clause 2.2.24 of the EAD with the specimens subjected to 20 thermal cycles from -15 °C to 60 °C. Bond strength to support has been tested according to EN 13596. Shear strength to support and overlay has been tested according to EN 13653. Bond strength to overlay has been tested according to EN 13596 with an overlay of coarse bitumen at 160 °C (use category A.1).

#### 4 **Assessment and verification of constancy of performance (AVCP) system applied, with reference to its legal base**

According to the Decision 2003/722/EC of the European Commission, the system of AVCP (see EC delegated Regulation (EU) No 568/2014 amending Annex V to Regulation (EU) 305/2011) given in the following table applies.

Product(s)	Intended use(s)	System
Liquid Applied Bridge deck Waterproofing	In bridge decks	2+

**Table 7:** AVCP system.

#### 5 **Technical details necessary for the implementation of the AVCP system, as foreseen in the applicable EAD**

All the necessary technical details for the implementation of the AVCP system are laid down in the Control Plan deposited with the ITeC and agreed in accordance with EAD 030675-00-0107, section 3.

The Control Plan is a confidential part of the ETA and only handed over to the notified product certification body involved in the assessment and verification of constancy of performance.

The factory production control operated by the manufacturer shall be in accordance with the above-mentioned Control Plan.

Issued in Barcelona 19<sup>th</sup> September 2022

by the Catalonia Institute of Construction Technology.



Ferran Bermejo Nualart  
Technical Director, ITeC

## ANNEX A: Description of design and installation procedure

This informative annex provides a general description of MasterSeal Bridge 5000. The design and installation shall be carried out in accordance with the manufacturer's instructions.

### A.1. Design

**Consumptions:** In the MTD, the manufacturer gives information on the quantities consumed per each layer (see table 1) and the procedures.

**Application weather conditions:** the waterproofing system cannot be put in place during rain, hail or snow. The support temperature shall be greater than 5 °C, and at least 3 °C above the dew point, and lower than 40 °C.

**Support:** concrete or steel support including (where applicable) any repair or levelling treatments applied to the support surface.

**Overlay:** asphalt concrete applied at  $(160 \pm 10)$  °C (CBM).

### A.2. Installation

#### A.2.1. Considerations

It shall be considered:

- MasterSeal Bridge 5000 installation has to be carried out by qualified installers.
- Components not included in table 1 of this ETA have not been assessed.
- The supervision of the amount of material used ( $\text{kg/m}^2$ ) and the visual control to check that each layer covers completely the surface is an indirect method to ensure the thickness of each layer.

#### A.2.2. Steps

##### Surface condition

- Ensure concrete surface is sound with a minimum pull out strength of 1,5 MPa.
- Ensure there is proper slope in the deck and towards the rainwater outlet.
- No water ponding should occur along the curb.
- Moisture content of the substrate should be less than 5%.

##### Future installations on the deck

- Ensure all drilling, breaking, etc. of the surface for fixtures or penetrations are completed. After the treatment, no damage to surface shall be allowed.

##### Surface preparation (concrete)

- Clean surface free of laitance, curing membrane, remnant of release agent, sharp projections by grinding, shot blasting or mechanical abrasion.

- The surface should have a surface roughness of ICRI- CSP 3 or CSP 4.
- Repair surface defects and cracks.
- Make groove of 3 mm along the termination level at the parapet/curb.

#### Surface preparation (steel)

- Steel substrates should be sand blasted to an SA 2.5 finish according to EN ISO 8501 or EN ISO 12944-4.

#### Primer application: MasterSeal P2525 or MasterSeal P681

- Prime the horizontal and vertical surfaces.
- Broadcast sand immediately after primer (ideally within 5 minutes of primer application)
- After primer is tack free (dry) remove all loose and unbounded sand by brush/ vacuum cleaner.
- Subsequent coat of MasterSeal M 800 to be applied after primer is dry and within 48 hours.
- Re-prime and sand broadcast the area if it rains before application of MasterSeal M 800 or if the period of 48 hours exceeds. Re-priming to be done after grinding the broadcast sand by floor grinder.

#### Waterproofing membrane: MasterSeal M800

- Ensure the primer is free of contamination and all loose and broadcast sand has been removed.
- It is applied by a hot spray machine. Pre-condition MasterSeal M 800 to a pressure of 130 bars to 180 bars and a temperature of 60 °C to 65 °C: component A at 70 to 75 °C and component B at 65 to 70 °C.
- Spray apply MasterSeal M 800 in few passes.
- Apply higher thickness (pre-strip) at construction joints and cold joints.

#### Adhesion Promoter: MasterSeal P628

- Applied within 1 hour to 4 days of application of MasterSeal M800.
- In case of rain/or waiting longer than 4 days, check the surface by a pull-out strength test. If pull-out strength result is higher than 1,5 N/mm<sup>2</sup>, proceed with application.
- Ensure that the surface is free from dust, oil or any contaminant that may inhibit the bond of MasterSeal P628 and MasterSeal M800.
- MasterSeal P628 should be preconditioned to a temperature of 20 °C to 25 °C.
- Mix both part of MasterSeal P 628 using a handheld mixing machine and stirrer at a speed of 300 rpm to 350 rpm. Mix the material for 2 minutes.
- Apply the material using a squeeze or a roller.
- Broadcast sand while the primer is still wet and within its pot life.

#### Tack Coat: MasterSeal P629

- MasterSeal P629 should be applied within two weeks of application of MasterSeal P628.

- In case of waiting between two and four weeks, carefully clean the MasterSeal P628 surface, then proceed application of MasterSeal P629.
- In case of waiting more than four weeks, check the surface by a pull-out strength test. If pull-out strength result is higher than 1,2 N/mm<sup>2</sup>, proceed with application.
- Ensure that the surface is free of contamination and all loose and broadcast sand has been removed.
- Heat MasterSeal P629 to a temperature of 230 °C. Precaution to be taken the temperature should not rise above 250 °C.
- Apply MasterSeal P629 with a hard bristle rake. Ensure MasterSeal P629 has fully cover the whole area without gap.
- Subsequent Mastic coating should be done within two months.

#### Asphalt pavement

- Asphalt pavement shall be applied between 150 °C and 170 °C with a minimum thickness of 80 mm.

#### **A.2.3. Resolution of defects in application**

There can be cases where blisters or prolonged setting of MasterSeal M 800 may occur. These can happen due to isolated moisture or issue with the spray equipment. The rectification method is as follows:

- Cut the membrane of the affected area in any geometrical shape. The cut-out should minimum be 10 mm more than the affected area.
- Grind the existing primer within the cut-out area to expose the concrete. Check moisture content, it should be maximum 5 %, before primer is applied.
- Clean a band of 100 mm of existing membrane along the periphery of the cut-out membrane (overlap area) with sandpaper/emery paper so as to remove 100 µm to 200 µm of the membrane. Clean the overlap area with Xylene/solvent.
- Prime only the exposed substrate (concrete) and broadcast sand (do not prime the old membrane of the overlap area). Apply higher thickness of primer so that extra sand can be broadcasted. This will decrease the depression from the existing membrane.
- After the primer is tack free (generally between 3 h and 24 h) and moisture level on the primer maximum 5%, mix and apply MasterSeal M800. Caution to be taken that the material should not exceed the boundary of the prepared membrane.

#### **A.3. Maintenance and repair of works**

When waterproofing layers are deteriorated, they will be repaired by removing all the deteriorated area. Afterwards, the new product will be assembled following the installation instruction and the new coats must overlap, at least 5 cm, to the non-deteriorated are.