Application Guide for MasterSeal® Roof 3500

(MasterSeal M 820 Membrane)

Roof slab crack-bridging waterproofing system

1. Surface Preparation

1.1 Ensure the substrate has properly cured and the concrete is profile free, no ridges or troughs, etc. Mechanically remove efflorescence before proceeding.
1.2 The substrates shall be free of laitance, loose or friable materials, debris and all contaminants by mechanical means preferably by captive shot blasting with hand held diamond grinders for edge work to achieve CSP 3 finish.
1.3 Bag up blowholes, especially on vertical surfaces, and carry out any necessary repairs in good time prior to priming. "Bagging up" should be carried out using a suitable MasterEmaco repair mortar.
1.4 To vertical surfaces, all form release agent must be removed prior to applying any primer.
1.5 Ensure adequate masking off of adjacent areas has been completed and all detailing is in accordance with the project drawing.

2. Priming

2.1 Prime surface by applying **MasterEmaco 2525**.
2.2 Before mixing, pre-condition both A and B components to a temperature of approximately 15 to 25 °C. Pour the entire contents of Part B into the container of Part A. Do not mix by hand. Mix with a mechanical drill and paddle at a very low speed (ca. 300rpm) for at least 3 minutes. Scrape the sides and the bottom of the container several times to ensure complete mixing. Keep the mixer blades submerged in the coating to avoid introducing air bubbles. Do not work out of the original container. After proper mixing to a homogeneous consistency pour the mixed Parts A and B into a fresh container and mix for another minute.
2.3 Apply a thin coat of **MasterEmaco 2525** to the prepared substrate by spreading with a squeegee at the minimum rate of 0.3 – 0.5 kg/m² and finished with a roller.
2.4 Porous substrates may require a second coat to ensure the surface is fully sealed.
2.5 Broadcast **MasterTop Filler F5** at a rate of 0.8 – 1.0kg/m2 into the still-wet primer to produce a light, even cover. Allow to cure for at least 6hours before removing all excess sand with a stiff broom and vacuum.

Note:

1. *MasterEmaco 2525 shall be applied when the ambient temperature is constant or falling, as this will decrease the risk of bubble formation due to expansion of air that is enclosed in the concrete.*
2. *MasterEmaco 2525 shall be applied when the substrate temperature is 8-400 C.*
3. *The Tensile Strength of the concrete shall not be less than 1.5MPa and the residual moisture shall not be more than 6%.*
4. *Membrane application onto primer:*

Application	at 10ºC at 20°C at 30°C at 30°C & > 80% RH	min. 12 min 9 min 4* min 4*

** When primer is tack free subsequent coat can be applied.*

2.6 Metal Surfaces

2.6.1 Remove dust, debris, and other contaminants from vent, drain pipe, and post penetrations; reglets; and other metal surfaces. Clean surfaces to bright metal and prime with sealant primer.
2.6.2 Provide cant with deep joint sealant to eliminate 90-degree angles and allow sealant to fully cure.
2.6.3 Detail cant with primer and base coat in accordance with manufacturer's instructions before application of deck coating system.

3. Surface Pre-striping & Detailing

3.1 Pre-stripe with primer 25 mm beyond surfaces that require detail work.

3.2 For non-moving joints and cracks less than 1.5 mm wide, apply 0.5 mm pre-striping of base coat over cured primer. Apply base coat to fill and overlap joint or crack 75 mm on each side. Feather the edges.

3.3 Dynamic cracks and joints over 1.5 mm wide shall be routed to a minimum of 6 mm by 6 mm and cleaned. Install bond breaker tape to prevent adhesion to bottom of joint. Prime joint faces only with sealant primer and fill with sealant. Fill joints deeper than 6 mm with backer rod and deep joint sealant. For cracks, sealant shall be flush with adjacent surface. For expansion joints, sealant shall be slightly concave.

3.4 Sealed joints 12 mm or less shall be coated over with deck coating system.

3.5 Expansion joints exceeding 12 mm wide, including primary wide expansion-joint system, shall not be coated. Joints should be reflected through the coating and suitable protection provided as required by the architect.

3.6 Where coating system will be terminated and no wall, joint, or other break exists, cut 6 mm by 6mm keyway into concrete. Fill and coat keyway as application of base coat progresses.

4. Membrane: MasterSeal M 820

4.1 Ensure surface for application is dry, free from dust, debris and all other contaminants which may inhibit adhesion between the membrane and primer.

4.2 **MasterSeal M 820** can only be applied by means of a suitable heated two component spray machine over the “tack free” primer at a coverage of 1.8-2.4kg/m2 to achieve a 1.5-2.0mm thick uniform grey membrane.

4.3 Allow the membrane to cure for at least 1 hour prior to subsequent topping.

4.4 **MasterSeal M 820** when sprayed results in a uniform grey colour which gives the sprayer a visual control of the quality of the mixing as machine faults become immediately obvious. This can reduce costly clean up time and material wastage. Due to the fast reaction it is possible to rapidly build thicknesses from 1.0 to > 6mm.

4.5 Surrounding areas should be protected from overspray by masking off with e.g. polyethylene sheet or paper. Care should be taken to prevent spray mist being carried by wind by erecting suitable barriers.

4.6 Application to joints to joining walls, upstands and other details may require greater thickness.

Note:

1. *MasterSeal M 820 must be applied within the recommended temperature and relative humidity limits.*
2. *The temperature of the substrate must be at least 3ºC above the dew point during the application*
3. *MasterSeal M 820 can only be applied by means of a suitable two component spray machine. The choice of machine depends on the type and size of work and the ease of access. For example Graco Reactor XP2 series dual component heated 1:1 spray machines are suitable machines for spray MasterSeal M 820).*
4. *Optimum results are obtained when the material is sprayed at 60-70ºC*
5. *The uniform colour of the sprayed material gives the sprayer a visual control of the quality of the mixing, and machine faults become immediately obvious. If the membrane colour changes, stop spraying and check machine settings etc.*
6. *Surrounding areas should be protected from overspray by masking off. Care should be taken to prevent spray mist being carried by wind by erecting suitable barriers.*

5. Onsite QA

5.1. On-site QA is important to ensure that both the substrate and application are within the correct limits. There are three key QA tests: adhesion to the substrate, thickness of application and holiday testing.

5.1.1 Adhesion to the substrate:

5.1.1.1 Prior to application the substrate should be checked for soundness with a number of direct tensile strengths to ensure the substrate is suitable. Minimum direct tensile strength of the concrete substrate should be 1.5MPa.

5.1.1.2 Substrates other than concrete (tiles, block work, brick etc) should be tested for soundness and integrity.

5.1.1.3 During the application and once the MasterSeal has cured place a dolly at 3 meter intervals or as agreed by the supervising engineer onto the membrane and adhere with MasterEmaco 1444 and allow to cure overnight.

5.1.1.4 Once cured using a sharp knife cut through the membrane to the primer and then do a direct tensile test using a suitable tester.

5.1.1.5 Record the results and repeat if the direct tensile strength is less than 1.5MPa (As we have done a test on the substrate we will know that the concrete substrate is more than 1.5MPa)

5.1.2 Thickness testing

5.1.2.1 Prior to spraying pick a number of sections to check for thickness and apply a piece of duct tape (or other suitable tape that is not affected by heat) every 50 m^2.

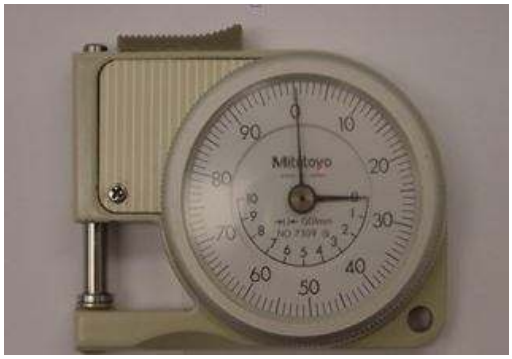
5.1.2.2 The tape should be about 100mm long with one end folded over about 10mm to allow for a piece that is not bonded to the substrate.

5.1.2.3 Spray the material as normal and allow to cure for 1 hour or so.

5.1.2.4 Cut carefully along the sides to free the material and remove the piece for thickness testing.

5.1.2.5 Check using a micrometer and record the thickness.

5.1.2.6 If the thickness is less than the required thickness as agreed by the engineer then revision of spray techniques will be required to ensure the right thickness across the job.



5.1.3 Holiday testing

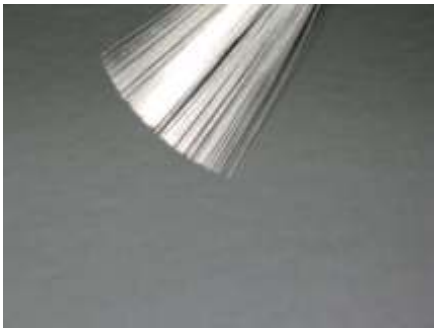
5.1.3.1 Ensuring that the membrane is pin hole free is important for the longevity of the installation and the water-tightness of the structure

5.1.3.2 Electronic holiday testers are available that test for changes in resistance between an earth point and the machine.

5.1.3.3 These spark testers use a wand with fine metal filaments that is drawn across the surface and a spark and an audible alarm sounds when a pin hole is found.

5.1.3.4 Once a pin hole is fond it can be repaired and the process repeated to ensure a complete lining is in place.

5.1.3.5 An alternative is a flood test which depending on the circumstances may be the most cost-effective option.



5.2 Dew Point is the temperature at which condensations forms.

5.2.1. To determine the Dew Point from the chart below, find the temperature of the air on the left side of the table. Next, locate the relative humidity of the air across the top of the table. The intersection of these two numbers in the matrix identifies the temperature at which Dew Point is reached. When air comes in contact with a surface that is at or below its Dew Point temperature, condensation will form on that surface.

5.2.2. Example: If the temperature in a facility is 24ºC and the relative humidity is 35%, the intersection of the two shows that the Dew Point is reached at a temperature of 7ºC, or below. This means that moisture vapour in the 24º C / 35% RH air will condense on any surface that is at or below the Dew Point temperature of 7ºC

	Relative Humidity								
Air Temperature [C]	**100**	**90**	**80**	**70**	**60**	**50**	**40**	**30**	**20**
-10	-10,0	-11,3	-12,8	-14,4	-16,3	-18,4	-21,0	-24,3	-28,7
-8	-8,0	-9,3	-10,8	-12,5	-14,4	-16,6	-19,2	-22,5	-27,0
-6	-6,0	-7,4	-8,9	-10,6	-12,5	-14,7	-17,4	-20,7	-25,3
-4	-4,0	-5,4	-6,9	-8,7	-10,6	-12,9	-15,6	-19,0	-23,6
-2	-2,0	-3,4	-5,0	-6,7	-8,7	-11,0	-13,8	-17,2	-21,9
0	0,0	-1,4	-3,0	-4,8	-6,8	-9,2	-12,0	-15,5	-20,3
2	2,0	0,5	-1,1	-2,9	-4,9	-7,3	-10,2	-13,7	-18,6
4	4,0	2,5	0,9	-1,0	-3,1	-5,5	-8,4	-12,0	-16,9
6	6,0	4,5	2,8	0,9	-1,2	-3,6	-6,6	-10,3	-15,3
8	8,0	6,5	4,8	2,9	0,7	-1,8	-4,8	-8,5	-13,6
10	10,0	8,4	6,7	4,8	2,6	0,1	-3,0	-6,8	-11,9
12	12,0	10,4	8,7	6,7	4,5	1,9	-1,2	-5,0	-10,3
14	14,0	12,4	10,6	8,6	6,4	3,7	0,6	-3,3	-8,6
16	16,0	14,4	12,5	10,5	8,2	5,6	2,4	-1,6	-7,0
18	18,0	16,3	14,5	12,4	10,1	7,4	4,2	0,2	-5,3
20	20,0	18,3	16,4	14,4	12,0	9,3	6,0	1,9	-3,6
22	22,0	20,3	18,4	16,3	13,9	11,1	7,8	3,6	-2,0
24	24,0	22,3	20,3	18,2	15,7	12,9	9,6	5,3	-0,4
26	26,0	24,2	22,3	20,1	17,6	14,8	11,3	7,1	1,3
28	28,0	26,2	24,2	22,0	19,5	16,6	13,1	8,8	2,9
30	30,0	28,2	26,2	23,9	21,4	18,4	14,9	10,5	4,6
32	32,0	30,1	28,1	25,8	23,2	20,3	16,7	12,2	6,2
34	34,0	32,1	30,0	27,7	25,1	22,1	18,5	13,9	7,8
36	36,0	34,1	32,0	29,6	27,0	23,9	20,2	15,7	9,5
38	38,0	36,1	33,9	31,6	28,9	25,7	22,0	17,4	11,1
40	40,0	38,0	35,9	33,5	30,7	27,6	23,8	19,1	12,7
42	42,0	40,0	37,8	35,4	32,6	29,4	25,6	20,8	14,4
44	44,0	42,0	39,8	37,3	34,5	31,2	27,3	22,5	16,0

6. Topcoat: MasterSeal TC 465

6.1. Ensure surface for application is dry, free from dust, debris and all other contaminants.

6.2. Prior to application, **MasterSeal TC 465** shall be preconditioned to a temperature of between 15 and 29°C.

6.3. Mix with a mechanical drill and paddle at a low speed (approx. 300 rpm) until product is homogeneous.

6.4. Apply **MasterSeal TC 465** polyurethane sealer over the **MasterSeal M 820** membrane with a squeegee and followed by back rolling with 12-14mm nap roller at least 6 hours later to specified colour at a rate of 0.5 – 0.8 kg/m² in one coat to achieve a dry film thickness of 0.4 – 0.64mm.

6.5. Protect from foot traffic for at least 24 hours.

Note:

1. *The temperature of the substrate must be at least 3 0C above the dew point before application and must remain so until the topcoat has cured.*
2. *Topcoat MasterSeal TC 465 application times onto MasterSeal M 820 intervals as below or until tack free.*

Top Coat Application	*at 10ºC* *at 20°C* *at 30°C* *at 30°C & > 80% RH*	*min 24* hours* *min 12* hours* *min 6* hours* *min 6* hours*

7. Protection of Work

7.1. The roof deck must not be used as a working platform by other trades unless fully protected to the satisfaction of the Contract Administrator and deck installer.

7.2. No harmful substances should come into contact with the new system.

7.3. No building materials, scaffolding, plant machinery etc should be stored on the deck.

7.4. Finished works must be protected from damage by subsequent building operations.

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