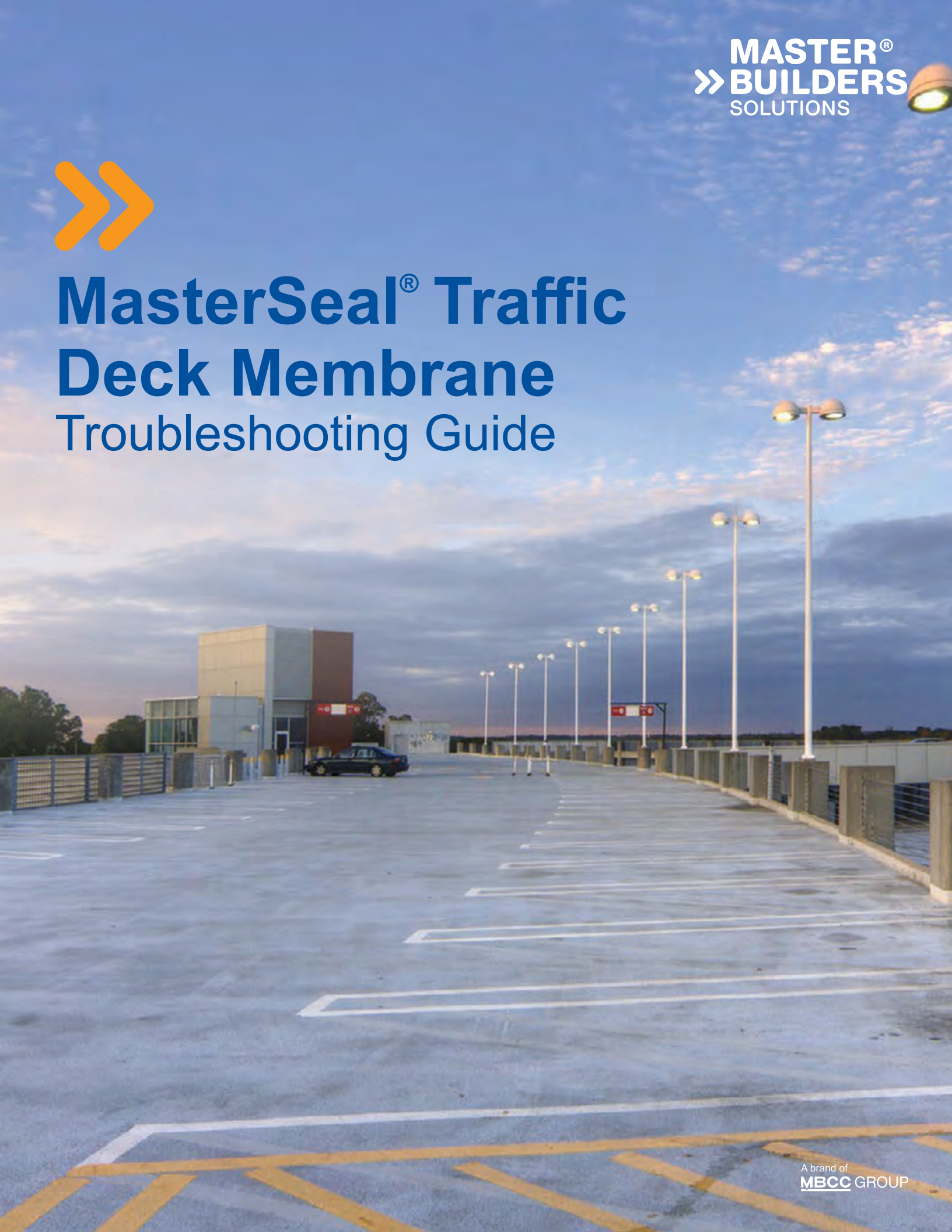




MasterSeal® Traffic Deck Membrane Troubleshooting Guide





Master your challenges with our systems and expertise

The Master Builders Solutions brand is built on the experience gained from more than a century in the construction industry. At the core of the Master Builders Solutions brand is the combined know-how and experience of a global community of Master Builders Solutions construction experts who help solve your construction challenges. As the industry leader in urethane deck membrane systems, Master Builders Solutions has the right systems and technical expertise to help you meet your project needs while saving time, money and labor.

Master Builders Solutions is committed to your continued success and safety

Safety is at the heart of everything we do. We believe that business success and safety are mutually supportive and are committed to enhancing health and safety awareness on projects. This troubleshooting guide is designed with safety in mind, since effective troubleshooting and application technique is critical to ensuring the safety of installers and facility users.

To explore best practices for improving safety and productivity on all your projects, consult you local Master Builders Solutions sales specialist.





Master Builders Solutions' troubleshooting guide connects you to industry leadership and years of extensive experience to identify the best solutions for the most common deck membrane issues

This guide includes information on:

- Identifying common problems associated with deck membrane applications
- Tips on how to safely repair or resolve identified issues
- Best practices to help minimize problems on future projects
- Additional resources to improve success on future applications

Master Builders Solutions' MasterSeal Deck Membrane Training Program connects you to application expertise

For further training on MasterSeal Traffic deck membrane applications, consider attending Master Builders Solutions' Deck Membrane Training programs. These live events teach pertinent application details such as adhesion testing, aggregate dispersion, detail work, moisture testing, mixing, mock-ups, surface preparation and weather condition management. Contact your local Master Builders Solutions Parking and Restoration Specialist for more information.



Note: This information and all further technical advice are based on Master Builders Solutions present knowledge and experience. As always, refer to the current Technical Data Guide for product and system specific information.

Index

This guide includes the following common topics associated with deck membrane troubleshooting:



06 Delamination / Debonding

Bond line failure between the coating and existing substrate or existing coating.



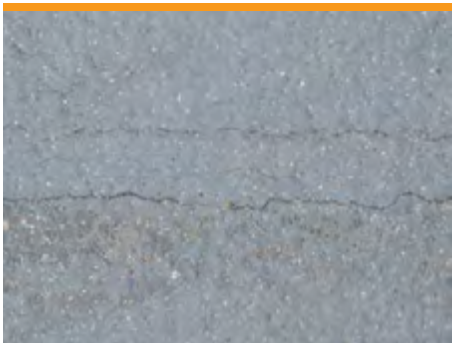
08 Bubbling / Cratering / Pinholing

A translucent, thin film forming a bubble on the surface which will form a crater when the bubble pops.



10 Blistering / Wrinkling

Sporadic swellings filled with air or fluid on the surface. Much thicker than a translucent bubble which typically occurs between coats. Can vary significantly in size, shape and thickness.



12 Cracks

Fractures in the existing substrate that telegraph through coating or fracture in cured membrane after application.



14 Texture Variations / Insufficient Skid Resistance

The profile of the finished coating is insufficient to impart adequate skid, slip and wear resistance as well as provide protection and aesthetic features to the overall system.



16 Water Damage

Displacement of material due to a water event before the system has cured. Severity of damage is typically proportional to the length of time the coating has been allowed to cure.



18 Aesthetics

Appearance inconsistencies resulting from a variety of conditions not identified in previous sections.



Support Information

- 20 Dew Point Chart
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Delamination / Debonding

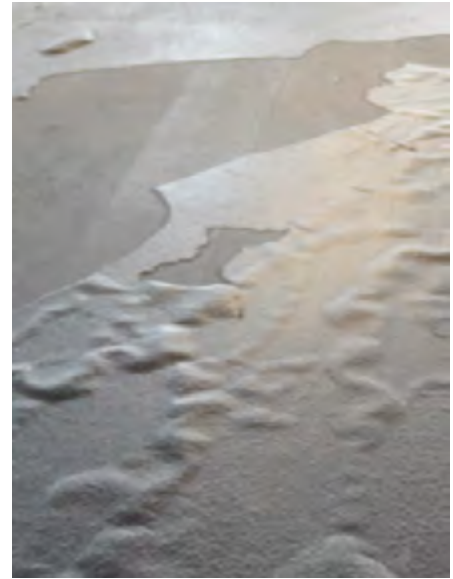
Bond line failure between the coating and existing substrate or existing coating.



A. Improper concrete surface preparation



B. Contaminants



C. Moisture



D. Incorrect System Selection



E. Improper surface preparation of existing coating



F. Missed recoat window

Likely Causes

- A. Improper concrete surface preparation
 - Failure to abrade substrate to appropriate CSP (Concrete Surface Profile)
- B. Contaminants
 - Failure to remove dust, debris and oil
- C. Moisture
 - Failure to allow surface to dry after water event
 - Environmental moisture resulting from a drop in dew point after application
- D. Incorrect System Selection
 - Exposure to conditions that exceed system design limitations
- E. Improper surface preparation of existing coating
 - Failure to abrade substrate (existing coating) to required surface profile
- F. Missed recoat window

Possible Repair Method

- Remove loose / delaminated / debonded coating
- Abrade surface as recommended in Master Builders Solutions's MasterSeal Traffic data guides
- Reapply coating

Tips to Minimize Future Occurrences

- Shot blasting is the recommended surface preparation method for concrete and existing coatings. Other means of abrasion may be acceptable if approved by a Master Builders Solutions representative in advance.
- Contact your local Master Builders Solutions representative and follow recoat recommendations in the technical data guide



Shotblasting a concrete substrate

Bubbling / Cratering / Pinholing

A translucent, thin film forming a bubble on the surface which will form a crater when the bubble pops.



Likely Causes

- Moisture in the concrete that permeates through the top surface as the surface heats up from the sun / heat (vapor drive)
- Dew Point / Relative Humidity – atmospheric conditions causing excessive moisture in the air
- Curing at high heat can cause skinning on the surface, trapping CO₂
- Moisture in the aggregate from improper storage or exposure to weather elements

Possible Repair Method

- Bubbles / pinholes / craters typically do not impair the function of the overall system. They can be aesthetically displeasing and should be addressed on a case-by-case basis.

Tips to Minimize Future Occurrences

- Consider application in evenings as opposed to mornings to avoid rapid temperature fluctuations during application
- Store materials in controlled environment for proper conditioning
- Properly mix material. Be aware of local temperature and humidity forecasts. Reference Dew Point Chart for further information.
- At the first appearance of bubbling, a spiked roller may be used to mitigate the occurrence of bubbling / pinholing / craters. Consult Master Builders Solutions representative for more information.



Spiked roller

Blistering / Wrinkling

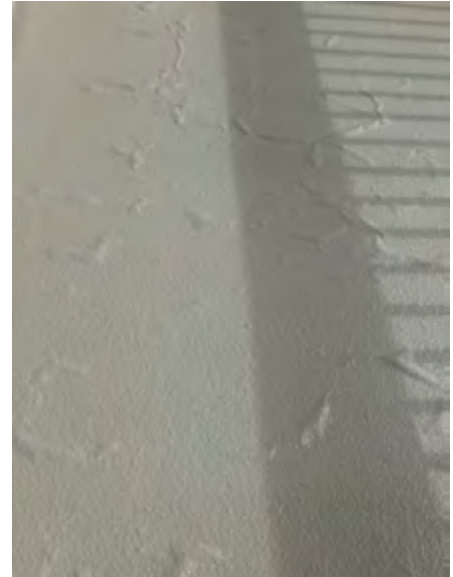
Sporadic swellings filled with air or fluid on the surface. Much thicker than a translucent bubble which typically occurs between coats. Can vary significantly in size, shape and thickness.



A. Over application



B. Excessive vapor drive



C. Incompatibility with existing coatings



D. Improper mixing



E. Curing at high heat

Likely Causes

- A. Over application that exceeds recommended coverage rates. This primarily occurs in one-component systems and can be exacerbated by high heat, which leads to rapid skinning.
 - Overly aggressive surface profile
 - Pitted or uneven surfaces
 - Improper sized squeegees
 - Damp aggregate
- B. Excessive vapor drive and high moisture levels in the concrete slab. This occurs most often in unvented pan decks, slab on grade and split slab applications.
- C. Incompatibility with existing coatings
- D. Improper mixing
 - Failure to premix individual components in one-component systems
 - Incorrect ratios when splitting two-component units
- E. Curing at high heat can cause skinning on the surface, trapping carbon dioxide

Possible Repair Method

For few sporadic blisters:

- Remove existing blisters
- Abrade and/or clean existing surface
- Apply waterproof basecoat where relevant
- Patch blisters with urethane and / or epoxy mortar
- Apply topcoat

For numerous blisters over a large area:

- Remove existing blisters
- Apply primer when required
- Apply urethane intermediate coat
- Apply topcoat

Tips to Minimize Future Occurrences

- Check mil thickness periodically to ensure recommended coverage rates are maintained. Utilize a grid system to help ensure proper yield.
- Back roll in the opposite direction of squeegee to help evenly distribute material
- Be sure to allow adequate curing between coats
- Some instances may require leveling of the surface prior to application of coating
- Avoid splitting two-component kit units and maintain proper mixing ratios



Back rolling

Cracks

Fractures in the existing substrate that telegraph through coating or fracture in cured membrane after application.



A. Improper detailing



B. Improper sealant chemistry



C. System component flexibility

Likely Causes

- A. Improper detailing
 - Failure to follow necessary preparation guidelines by routing and caulking cracks greater than $\frac{1}{16}$ " (1.5 mm) followed by prestripping
 - Failure to follow necessary preparation guidelines by prestripping cracks less than $\frac{1}{16}$ " (1.5 mm) as indicated in manufacturer technical data guides
 - Coating applied over moving joint
- exceeding elongation of membrane
- B. Improper sealant chemistry
 - Urethane coating applied over silicone sealant
- C. Rigidity of system components
 - Movement of substrate exceeds system capability. Note: Membrane may maintain waterproofing properties despite cracking and is therefore not necessarily deemed a system failure.

Possible Repair Method

- Route existing crack
- Apply a Master Builders Solutions polyurethane sealant and strike flush.
- Apply the system basecoat to provide waterproofing properties
- Apply intermediate / topcoats

Tips to Minimize Future Occurrences

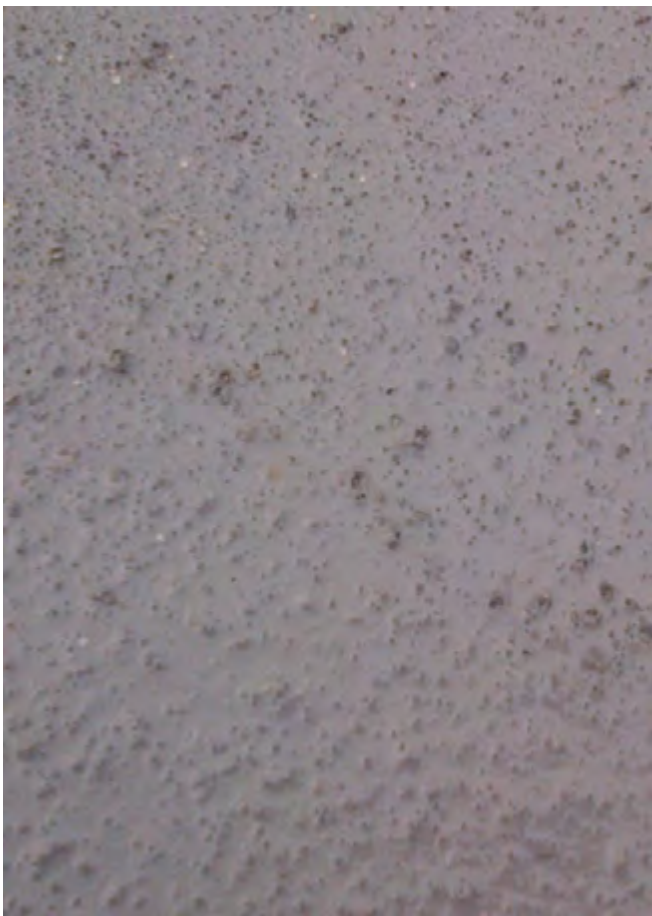
- Properly detail cracks prior to application of systems as recommended in the manufacturer technical data guide
- In excessive movement situations, fabric-reinforced joints may be required
- Select system according to movement needs of structure
- Only use urethane sealants with urethane coatings. Urethane coatings will not bond to silicone sealants.
- Honor joints larger than 1" (2.5 cm)



Detailing cracks

Texture Variations / Insufficient Skid Resistance

The profile of the finished coating is insufficient to impart adequate skid, slip and wear resistance as well as provide protection and aesthetic features to the overall system.



Likely Causes

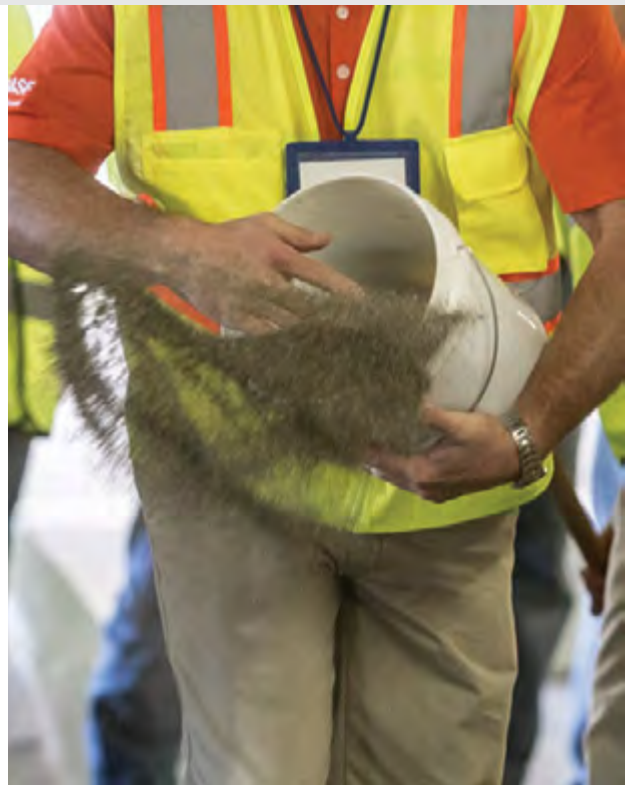
- Insufficient aggregate amount
- Inconsistent aggregate distribution
- Incorrect size of aggregate
- Improper back rolling
- Aggregate roll out resulting from a mil thickness of topcoat and/or intermediate coat that is insufficient to properly encapsulate aggregate.

Possible Repair Method

- Abrade affected areas
- Solvent wipe immediately before applying coating
- Apply one or two coats of intermediate / topcoat and recommended aggregate broadcasts depending upon traffic volume and location

Tips to Minimize Future Occurrences

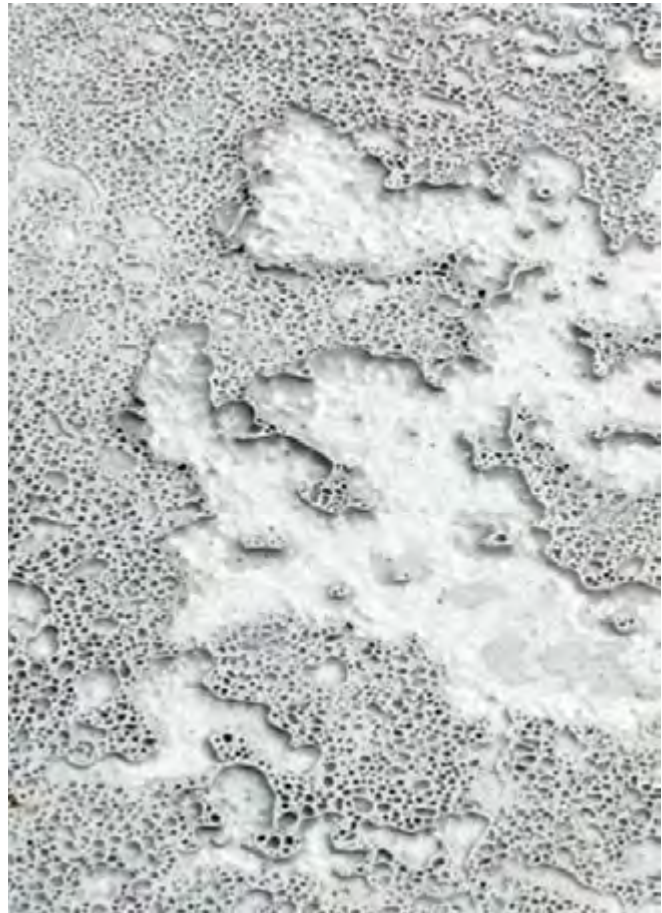
- Broadcast sufficient amount of aggregate per the mil thickness required by the system selected
- Broadcast and back roll aggregate into the system topcoat to provide additional slip resistance and desired texture
- When using two-component and epoxy intermediate coats, fractured aggregate may be acceptable to increase degree of slip resistance
- Refer to manufacturer technical data guide for proper aggregate sieve size and application rates
- Apply mock-ups whenever possible



Broadcasting aggregate

Water Damage

Displacement of material due to a water event before the system has cured. Severity of damage is typically proportional to the length of time the coating has been allowed to cure.



Likely Causes

Introduction of water before cure

- Application during or immediately preceding inclement weather
- Sprinkler system activation prior to full cure of coating

Possible Repair Method

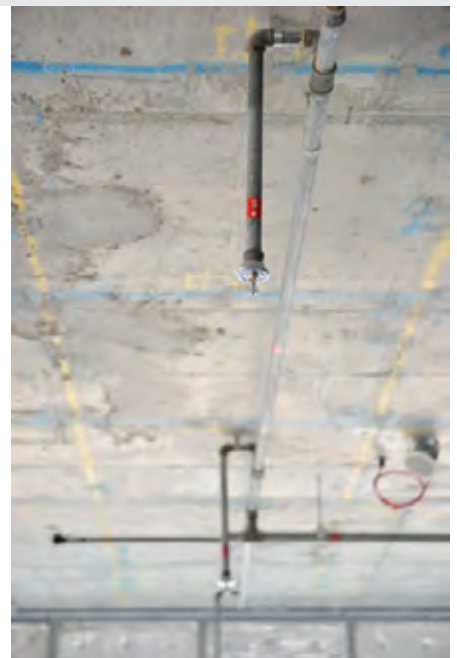
Contact your Master Builders Solutions representative to determine proper course of action

Severity of damage will dictate necessary recourse

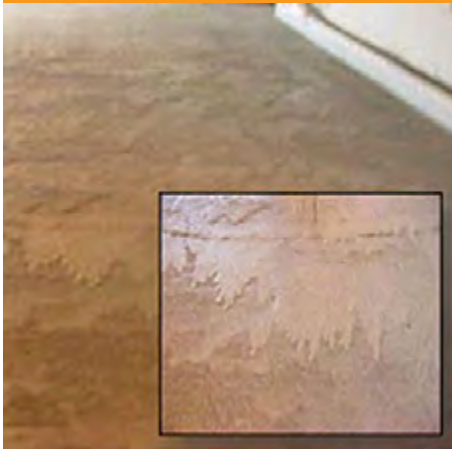
- Minor damage may require a simple re-prime and reapplication
- Moderate damage may require grinding followed by solvent wipe, priming and reapplication
- Severe damage may require complete removal and reapplication of system
Note: If rain between coats of cured membrane occurs, please contact your representative for project-specific assistance.

Tips to Minimize Future Occurrences

- Deactivate nearby sprinkler systems
- Do not apply coatings if rain is expected prior to initial cure of coating

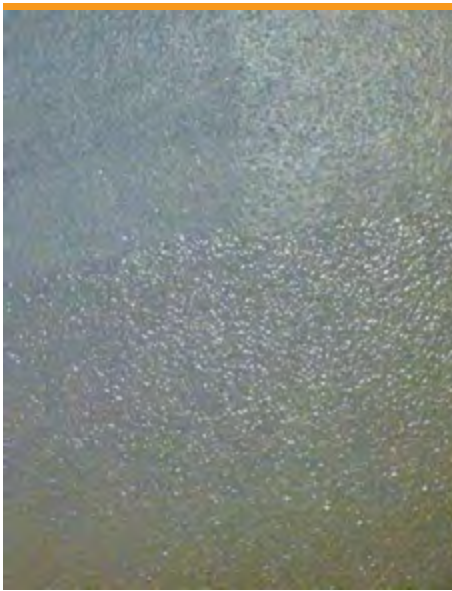


Aesthetics



SAGGING

- Cause:** Excessive pitch and lack of back rolling
- Repair:** Grind high spots and recoat
- Prevent:** Use slope grade material and employ proper back rolling technique



DISCOLORATION

- Cause:** Non-UV-stable topcoat used in areas exposed to sunlight, contaminates such as salt residue on the surface, moisture on surface during cure, plasticizer migration from tires
- Repair:** Contact your Master Builders Solutions representative to determine proper course of action
- Prevent:** Use proper UV-stable topcoat, provide proper drainage to prevent water ponding, do not apply coating if inclement weather is expected during cure, and ensure the system is cleaned and maintained in accordance with the Master Builders Solutions Deck Coating Maintenance Guides. Also, ensure that owner expectations regarding color are managed. Be sure to install mockups.



COLOR VARIANCES

- Cause:** Color variations from applying two different systems, inconsistent roller marks, or variances from installation stop and start points. Also see section on texture variations as inconsistent textures can cause inconsistencies in appearance of coatings.
- Repair:** Contact your Master Builders Solutions representative to determine proper course of action
- Prevent:** Ensure customer expectations regarding color are managed when applying different systems. Be sure to install mockups.



RUSTING

- Cause:** Loose steel shot not removed after shot blasting or iron in aggregate
- Repair:** Remove the coating in the affected area and reapply in accordance with Master Builders Solutions technical data guides. Contact your representative for more information.
- Prevent:** Use magnet to remove all loose shot and blow off surface prior to applying coatings. Verify aggregate purity with aggregate supplier.



SPIKED SHOE DAMAGE

- Cause:** Walking on insufficiently cured coating with spiked shoes
- Repair:** Reapply coating to damaged areas in accordance with Master Builders Solutions technical data guides.
- Prevent:** Coating must be able to support your weight in spikes before next application



SNOWPLOW DAMAGE

- Cause:** Scraping of the membrane from metal blade used to remove snow
- Repair:** Reapply coating to damaged areas in accordance with Master Builders Solutions technical data guides.
- Prevent:** Ensure owner uses plastic or rubber blades on snow removal equipment

Note: Please consult your Master Builders Solutions representative for project-specific repair method recommendations.

Dew Point Chart

Dew point refers to temperature at which moisture in the air will form water droplets on surfaces. Since surface moisture impacts the curing properties of liquid applied coating materials, it is important to apply products only when surface temperatures are above the dew point.

Using the chart below, the dew point can be calculated once ambient air temperature and relative humidity are measured.

When installing MasterSeal Traffic deck membranes, ensure that the substrate temperature is at least 5° F (3°C) above the dew point during the application and cure for best performance.

To use this chart, locate the ambient air temperature in the first column and then find the ambient relative humidity %. The intersection on the chart represents the dew point.

For instance, at an ambient temperature of 70° F (21°C) and a relative humidity of 50%, the dew point would be 50° F (10°C). Therefore, installation of MasterSeal Traffic deck membranes should begin only after the surface temperature reaches 55° F (50° F + 5° F); 13°C (10°C + 3°C).

Air Temperature (dry bulb)	Relative Humidity %																		
	100	95	90	85	80	75	70	65	60	55	50	45	40	35	30	25	20	15	10
110°F (43°C)	110°F (43°C)	108°F (42°C)	106°F (41°C)	104°F (40°C)	102°F (39°C)	100°F (38°C)	98°F (37°C)	95°F (35°C)	93°F (34°C)	90°F (32°C)	87°F (31°C)	84°F (29°C)	80°F (27°C)	76°F (24°C)	72°F (22°C)	65°F (18°C)	60°F (16°C)	51°F (11°C)	41°F (5°C)
105°F (41°C)	110°F (43°C)	103°F (39°C)	101°F (38°C)	99°F (37°C)	97°F (36°C)	95°F (35°C)	93°F (34°C)	91°F (33°C)	88°F (31°C)	85°F (29°C)	83°F (28°C)	80°F (27°C)	76°F (24°C)	72°F (22°C)	67°F (19°C)	62°F (17°C)	55°F (13°C)	47°F (8°C)	37°F (3°C)
100°F (38°C)	100°F (38°C)	99°F (37°C)	97°F (36°C)	95°F (35°C)	93°F (34°C)	91°F (33°C)	89°F (32°C)	86°F (30°C)	84°F (29°C)	81°F (27°C)	78°F (26°C)	75°F (24°C)	71°F (22°C)	67°F (19°C)	63°F (17°C)	58°F (14°C)	52°F (11°C)	44°F (7°C)	32°F (0°C)
95°F (35°C)	95°F (35°C)	93°F (34°C)	93°F (33°C)	90°F (32°C)	88°F (31°C)	86°F (30°C)	84°F (29°C)	81°F (27°C)	79°F (26°C)	76°F (24°C)	73°F (23°C)	70°F (21°C)	67°F (19°C)	63°F (17°C)	59°F (15°C)	54°F (12°C)	48°F (9°C)	40°F (4°C)	32°F (0°C)
90°F (32°C)	90°F (32°C)	88°F (31°C)	87°F (31°C)	85°F (29°C)	83°F (28°C)	81°F (27°C)	79°F (26°C)	76°F (24°C)	74°F (23°C)	71°F (22°C)	68°F (20°C)	65°F (18°C)	62°F (17°C)	59°F (15°C)	54°F (12°C)	49°F (9°C)	43°F (6°C)	36°F (2°C)	32°F (0°C)
85°F (29°C)	85°F (29°C)	83°F (28°C)	81°F (27°C)	80°F (27°C)	78°F (26°C)	76°F (24°C)	74°F (23°C)	72°F (22°C)	69°F (21°C)	67°F (19°C)	64°F (18°C)	61°F (16°C)	58°F (14°C)	54°F (12°C)	50°F (10°C)	45°F (7°C)	38°F (3°C)	32°F (0°C)	
80°F (27°C)	80°F (27°C)	78°F (26°C)	77°F (25°C)	75°F (24°C)	73°F (23°C)	71°F (22°C)	69°F (21°C)	67°F (19°C)	65°F (18°C)	62°F (17°C)	59°F (15°C)	56°F (13°C)	53°F (12°C)	50°F (10°C)	45°F (7°C)	40°F (4°C)	35°F (2°C)	32°F (0°C)	
75°F (24°C)	75°F (24°C)	73°F (23°C)	72°F (22°C)	70°F (21°C)	68°F (20°C)	66°F (19°C)	64°F (18°C)	62°F (17°C)	60°F (16°C)	58°F (14°C)	55°F (13°C)	52°F (11°C)	49°F (9°C)	45°F (7°C)	41°F (5°C)	36°F (2°C)	32°F (0°C)		
70°F (21°C)	70°F (21°C)	68°F (20°C)	67°F (19°C)	65°F (18°C)	63°F (17°C)	61°F (16°C)	59°F (15°C)	57°F (14°C)	55°F (13°C)	53°F (12°C)	50°F (10°C)	47°F (8°C)	44°F (7°C)	40°F (4°C)	37°F (3°C)	32°F (0°C)			
65°F (18°C)	65°F (18°C)	63°F (17°C)	62°F (17°C)	60°F (16°C)	59°F (15°C)	57°F (14°C)	55°F (13°C)	53°F (12°C)	50°F (10°C)	48°F (9°C)	45°F (7°C)	42°F (4°C)	40°F (4°C)	36°F (2°C)	32°F (0°C)				
60°F (16°C)	60°F (16°C)	58°F (14°C)	57°F (14°C)	55°F (13°C)	53°F (12°C)	52°F (11°C)	50°F (10°C)	48°F (9°C)	45°F (7°C)	43°F (6°C)	41°F (5°C)	38°F (3°C)	35°F (2°C)	32°F (0°C)					
55°F (13°C)	55°F (13°C)	53°F (12°C)	52°F (11°C)	50°F (10°C)	49°F (9°C)	47°F (8°C)	45°F (7°C)	43°F (6°C)	40°F (4°C)	38°F (3°C)	36°F (2°C)	34°F (1°C)	32°F (0°C)						
50°F (10°C)	50°F (9°C)	48°F (8°C)	46°F (7°C)	45°F (7°C)	44°F (7°C)	42°F (6°C)	40°F (4°C)	38°F (3°C)	36°F (2°C)	34°F (1°C)	32°F (0°C)								
45°F (7°C)	45°F (7°C)	43°F (6°C)	42°F (6°C)	40°F (4°C)	39°F (4°C)	37°F (3°C)	35°F (2°C)	33°F (1°C)	32°F (0°C)										
40°F (4°C)	40°F (4°C)	39°F (4°C)	37°F (3°C)	35°F (2°C)	34°F (1°C)	32°F (0°C)													

Glossary of Terms

Blisters:

Sporadic swells filled with air or fluid on the surface of a coating. They can vary significantly in size, shape and thickness and are typically much thicker than bubbles. (See also: Wrinkles)

Bubble:

A translucent thin film forming on the surface that creates a crater when popped.

Cracks:

Fractures in the existing substrate that telegraph through coating; or fractures that occur in cured membrane after application.

Crater:

Divot on surface formed from a bubble that has popped.

Debonding:

Bond line failure between the coating and existing substrate or coating. (See also: Delamination)

Delamination:

Bond line failure between the coating and existing substrate or coating. (See also: Debonding)

Pinholes:

Small hole or puncture in the coating which may cause a bubble to form.

Texture:

Profile of finished coating to impart skid and slip resistance as well as provide protection and aesthetic features to the overall system.

Water Damage:

Displacement of material due to a water event before the system has cured. Severity of damage is typically proportional to the length of time the coating has been allowed to cure.

Wrinkles:

Sporadic swells filled with air or fluid on the surface of a coating, causing the coating to look wrinkled. The size, shape and thickness of wrinkles vary and are typically much thicker than bubbles. (See also: Blisters)

Additional Resources

Consult the following for more information:

Master Builders Solutions Sales Specialists:

Consult your local Master Builders Solutions sales specialists for project-specific recommendations. To locate a Master Builders Solutions sales specialist in your area, please use the Rep Finder Tool:

www.master-builders-solutions.com/en-us/about-us/find-a-representative

Master Builders Solutions Technical Support:

A team of experienced Technical Support Specialists are available to assist with your immediate needs. Technical Support can be reached at 1(800)243-6739 or at BLDGSTECHSUPPORT@mbcc-group.com

Master Builders Solutions Website:

For Technical Data Guides and SDS for MasterSeal Traffic Deck Membrane systems and components: www.master-builders-solutions.com.us/en-us/products/masterseal

For Technical Bulletins and Technical Drawings pertaining to specific MasterSeal Traffic systems and application:

www.master-builders-solutions.com.us/en-us/support-for-professionals/technical-service

International Concrete Repair Institute (ICRI) Technical Guidelines:

The ICRI Technical Guidelines No. 710.2-2014 Guide for Horizontal Waterproofing of Traffic Surfaces and No. 310.2R-2013 Guide for Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays and Concrete Repair are available for purchase at the ICRI bookstore: www.icri.org/publications/guidelines.asp





Master Builders Solutions

The Master Builders Solutions brand brings all of MBCC Groups expertise together to create chemical solutions for new construction, maintenance, repair and renovation of structures. Master Builders Solutions is built on the experience gained from more than a century in the construction industry.

The know-how and experience of a global community of MBCC Group construction experts form the core of Master Builders Solutions. We combine the right elements from our portfolio to solve your specific construction challenges. We collaborate across areas

of expertise and regions and draw on the experience gained from countless construction projects worldwide. We leverage global MBCC Group technologies, as well as our in-depth knowledge of local building needs, to develop innovations that help make you more successful and drive sustainable construction. The comprehensive portfolio under the Master Builders Solutions brand encompasses concrete admixtures, cement additives, chemical solutions for underground construction, waterproofing solutions, sealants, concrete repair and protection solutions, performance grouts and performance flooring solutions.

Master Builders Solutions products for the Construction Industry:

MasterAir®

Solutions for air-entrained concrete

MasterBrace®

Solutions for concrete strengthening

MasterCast®

Solutions for manufactured concrete product industry

MasterCem®

Solutions for cement manufacture

MasterEmaco®

Solutions for concrete repair

MasterFinish®

Solutions for formwork treatment

MasterFlow®

Solutions for precision grouting

MasterFiber®

Comprehensive solutions for fiber reinforced concrete

MasterGlenium®

Solutions for high-performance concrete

MasterInject®

Solutions for concrete injection

MasterKure®

Solutions for concrete curing

MasterLife®

Solutions for enhanced durability

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Advanced rheology control solutions for self-consolidating concrete

MasterPel®

Solutions for water tight concrete

MasterPolyheed®

Solutions for high-performance concrete

MasterPozzolith®

Solutions for water-reduced concrete

MasterProtect®

Solutions for concrete protection

MasterRheobuild®

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MasterRoc®

Solutions for underground construction

MasterSeal®

Solutions for waterproofing and sealing

MasterSet®

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MasterSure®

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