

# DEC-TECHNICAL BULLETIN



Bulletin No: TB011 Version: v.02

Effective Date: 2018-10-29

Subject: BUBBLES IN DEC-TEC MEMBRANE

- Product  Pre-Installation  Installation  Repair  Maintenance  Other  
 External  Internal Use  Internal Use Only

- Target Audience:** All
- Reason for Bulletin:**
1. Explain what a bubble is.
  2. Explain what causes bubbles to form.
  3. Offer suggestions on how to repair bubbles.

**Details:**

What is a bubble?

A bubble, as it applies to this document, is best described as a pocket of air or gas that is trapped between the substrate and the Dec-Tec PVC membrane.

A bubble typically creates a raised area that lacks firmness and solidity due to a loss of adhesion between the substrate and the Dec-Tec PVC membrane. (Ref. Figure 1)

Note: Bubbles are a cosmetic issue and as such will not impair the integrity of the watertight system.



Figure 1 – Typical Bubble

What causes bubbles?

There are a number of factors that can contribute to the formation of bubbles. Bubbles can occur as a result of any one or combination of the following reasons.

**Moisture:**

1. Moisture coming out of the structure.
  - Has the joist system adequately dried out? Pay special attention to new construction. The acceptable moisture level in wood depends primarily on the final use of the wood and the average relative humidity at the place where the wood is to be used. Other factors may include the wood species and the thickness or size of the wood. In all cases, determining the acceptable moisture level of wood requires the use of an accurate moisture meter.
  - Failure to allow the wood to acclimate or come in balance with the relative humidity (RH) at its end-use location will result in any number of moisture-related problems in the wood – including warping, cracking, buckling, diminished wood strength, corrosion of fasteners, and even fungal growth after the wood product is constructed. In general, for most areas of the United States and Canada, acceptable moisture levels of wood can be in the range of 9% to 14% Moisture Content (MC) for exterior wood or building envelope components within constructed assemblies. Wood MC in this range, therefore, is considered sufficiently dry for exterior in-service wood.

- Ventilation: Provide adequate ventilation to the underside of decks that are built close to finished grade. If the substrate is to be installed over living space, airflow must be present below the substrate and above the insulation layer to keep frost and dew from forming on the underside of the substrate.
2. Moisture coming out of the substrate.
    - Only use Dec-Tec recommended or acceptable substrates. Refer to Dec-Tec Technical Bulletin TB006 – Substrate Recommendations.
    - Use well-seasoned (dry) substrate material that has never been wet or subjected to conditions where it could swell. Do NOT install Dec-Tec over a damp or wet substrate. Ensure substrates are thoroughly dried throughout and not just the surface veneers. Note: Plywood absorbs moisture and quicker around the edges as it gets wet, it also takes longer to dry at its edges.
    - Ideal moisture content (MC) of plywood at the time of installation is 9% to 14% @ 70% relative humidity / 68 deg. F (20 deg. C).
  3. Moisture coming out of the concrete on installations over concrete.
    - Only install on fully cured - non-primed – above grade concrete.
    - Rule of thumb is new concrete takes ~28 days per inch of thickness to cure. Moisture testing is highly recommended.
  4. Moisture coming out of the Dec-Patch II application if not allowed to thoroughly dry.
    - Apply per installation instructions to ½” (max) thickness and allow to thoroughly dry – 100%
    - Allow to dry naturally and do not attempt to “Force Dry” the Dec-Patch II with thermal heat welders, propane torches, fans etc.
  5. Moisture on Dec-Tec materials that have become wet or damp. All system components need to be thoroughly dry prior to installation.
  6. Moisture being absorbed into the structure or substrate due to inadequate ventilation.

#### Poor Installation

1. Too much, too little or no adhesive present.
  - Contact adhesives dry by “flashing off”. When using Solvent Based Adhesive (SBA), bubbling can occur when large wet pockets of SBA are trapped between the substrate and the membrane where the SBA is still trying to off-gas. These wet pockets will take longer to flash off which can cause a gas bubble to form.
2. Improper mating time of the Dec-Tec membrane to the substrate.
  - Not obtaining an effective transfer of WBA adhesive from the substrate onto the Dec-Tec membrane. The WBA adhesive dries too much before mating.
  - Not allowing the first coat application of SBA to thoroughly 100% dry and off-gas.
  - Not allowing the final coat application of SBA to effectively off-gas.
  - Similarly, if SBA adhesive is applied in cooler temperatures and the membrane is mated to the substrate before the SBA has had a chance to properly off-gas, then when the ambient conditions warm, the SBA will be reactivated and will try to finish off-gassing, potentially creating bubbles.

3. Temperature limitations of Dec-Tec adhesives: Tips to ensure proper application of the adhesive:
  - If it's hot and dry, the adhesive will set up fast.
  - If it's hot and humid, water based adhesives take longer to set.
  - If it's cool and dry, make sure you do not apply adhesive below temperature limitations.
  - If it's cool and humid, adhesives may not work.
4. Improper technique or procedure used during the thermally heat welding process.
  - Heat from the thermal heat welder being directed inappropriately into the area behind the seam. This can cause the adhesive to dry before it has bonded the Dec-Tec membrane to the substrate.
5. A reaction of the adhesive with something in or on the substrate due to not preparing or cleaning the deck properly prior to application of the adhesive.
6. Not practicing proper roll-out procedures when rolling out the adhesive during the installation process.

#### How to Repair Bubbles

The effort required to repair a bubble is primarily dependent upon the type of adhesive used during installation, what has caused the bubble in the first place and the size of the bubble. There are situations where bubbles will either be difficult or even not possible to remedy. In the majority of situations, the methods described below can be used successfully to remedy common issues with bubbling. To minimize the risk of further complications Dec-Tec recommends giving first consideration to less invasive techniques when attempting to repair a bubble.

#### How to Repair Bubbles where Water Based Adhesive (WBA) was used.

Dec-Tec's Water based adhesive (WBA 100) dries and sets naturally as the moisture in the adhesive evaporates. The membrane and the substrate slowly bond with each other as the adhesive dries. If the Dec-Tec membrane and the substrate fail to bond and a bubble is formed it is typically due to:

1. There was not enough WBA applied to the area resulting in a bubble.
2. There was no WBA applied to the area resulting in a bubble.
3. The WBA dried prior to mating the membrane onto the substrate (workability).

It is important to understand that it is NOT possible to reactivate Water Based (Latex) adhesive once it has dried or set. Any effort to add water or apply heat in an effort to reactivate the adhesive will NOT work.

#### **Method 1: Apply Additional Adhesive (Injection Method)**

This method is suitable when trying to repair bubbles where there is insufficient or no adhesive applied originally. It is important to note that Water Based Adhesive (WBA) should be used for all repairs involving an injection method because Solvent Based Adhesive is too difficult to spread out and or apply to the substrate and back of the membrane using this method. Also, it would be difficult for SBA to off-gas effectively using this procedure. This procedure involves establishing an entry and exit point on the membrane and using a syringe containing WBA to inject at the entry point. The adhesive is injected and rolled out throughout the affected area until it is noticeable at the exit or release point. The affected area is rolled out flat and then a flat heavily weighted object is placed over the top of the bubbled area to hold it down for a period of 24-48 hours to promote a good healthy bond. This can easily be achieved by placing a flat surface like wood with weight like a pail of water on it to weigh it down.

#### **Method 2: Strategic Cut**

This method is invasive and involves cutting or slicing the membrane strategically in an effort to better expose and access the surfaces of the substrate and Dec-Tec membrane in the affected area. This method is typically used to resolve more challenging bubbles that are too pronounced and difficult to work flat using other methods. The procedure involves administering a strategic cut, repairing the problem area and then thermal heat welding the cut edges.

### **Method 3: Apply a Patch**

This method involves cutting out the bubble or wrinkle and replacing it with a similarly sized piece of membrane, adhering it into place and then thermally heat welding it to the outer perimeter.

### **Method 4: Replace Panel**

This is typically a last resort option available in worst-case circumstances, where issues cannot be addressed effectively using any of the methods described above

### **How to Repair Bubbles where Solvent Based Adhesive (SBA) was used.**

Dec-Tec's Solvent Based Adhesive (SBA 100R and SBA 200VC), sometimes referred to as contact adhesives dry by "flashing off" or the process of "Off-Gassing". Added care and attention is required when using SBA as the underlying goal is to maximize the amount of off-gassing that occurs. There is a high probability that the formation of bubbles can occur if the SBA has not sufficiently off gassed prior to mating the membrane onto the substrate. For further clarity, the installation procedure with SBA involves applying an adequate coat of SBA to the substrate (decks surface) and allowing it to completely 100% flash off or dry. A coat of SBA is then added to the other surface (back of the Dec-Tec membrane) letting it become tacky and then mating the two surfaces. If there are any areas or pockets of wet adhesive trapped under the partially adhered membrane the adhesive will not be allowed to flash off effectively which can lead to the formation of bubbles.

Unlike Water Based Adhesive, it is important to understand that it is possible to reactivate Solvent Based Adhesive once it has dried. Applying an appropriate amount of heat is an effective technique that can be used to reactivate the adhesive to contend with bubbles.

### **Method 1: Applying Weight**

This method is suitable when trying to remedy smaller circular bubbles that are isolated. The method is predicated on knowing there is sufficient adhesive that was originally applied and that it has just not activated and bonded together. The procedure simply involves trying to push the bubbled membrane into place using your hands and/or a silicone hand roller. Apply enough force to maneuver and coerce the membrane down in an effort to get the bubble to lay flat and stay down. If this is achievable, it is recommended to place a flat heavily weighted object over top of the bubbled area to hold it down for a period of 24-48 hours to promote a good healthy bond. This can easily be achieved by placing a flat surface like wood with weight like a pail of water on it to weigh it down.

### **Method 2: Applying Heat**

A slight variation to method 1 above that can be used that is very effective in situations where there is sufficient adhesive originally applied that has not bonded is to apply heat to the affected area from the thermal heat welder. The procedure involves attempting to heat up the affected and surrounding area sufficiently enough in an effort to try and heat the substrate as well as the membrane. Slowly heat the overall area and use Dec-Tec's 40mm silicone roller to roll out the heated area and re-establish the adhesive bond.

### **Method 3: Apply Additional Adhesive (Injection Method)**

This method is suitable when trying to repair bubbles where there is insufficient or no adhesive applied originally. It is important to note that Water Based Adhesive (WBA) should be used for all repairs involving an injection

method because Solvent Based Adhesive is too difficult to spread out and or apply to the substrate and back of the membrane using this method. Also, it would be difficult for SBA to off-gas effectively using this procedure. This procedure involves establishing an entry and exit point on the membrane and using a syringe containing WBA to inject at the entry point. The adhesive is injected and rolled out throughout the affected area until it is noticeable at the exit or release point. The affected area is rolled out flat and then a flat heavily weighted object is placed over the top of the bubbled area to hold it down for a period of 24-48 hours to promote a good healthy bond. This can easily be achieved by placing a flat surface like wood with weight like a pail of water on it to weigh it down.

#### **Method 4: Strategic Cut**

This method is invasive and involves cutting or slicing the membrane strategically in an effort to better expose and access the surfaces of the substrate and Dec-Tec membrane in the affected area. This method is typically used to resolve more challenging bubbles that are too pronounced and difficult to work flat using other methods. The procedure involves administering a strategic cut, repairing the problem area and then thermal heat welding the cut edges.

#### **Method 5: Apply a Patch**

This method involves cutting out the bubble or wrinkle and replacing it with a similarly sized piece of membrane, adhering it into place and then thermally heat welding it to the outer perimeter.

#### **Method 6: Replace Panel**

This is typically a last resort option available in worst-case circumstances, where issues cannot be addressed effectively using any of the methods described above

If you have any questions concerning this bulletin, please contact Dec-Tec, Technical Support at 1-866-461-3914.

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