

Dow Corning[®] Silicone Air Barrier System: Tech Talk

Build a Better Barrier[™]



Building and Construction
Solutions

Tech Talk Table of Contents

The *Dow Corning*® Silicone Air Barrier System is a suite of fully compatible high-performance silicone technologies from Dow Corning designed to work in concert to help protect the entire building envelope in both new construction and renovation projects.

<i>Dow Corning</i> ® DefendAir 200 Absorption Rates on Various Substrates	pg. 3
<i>Dow Corning</i> ® DefendAir 200 on Damp Substrates and in Rain	pg. 4
Importance of Thickness of <i>Dow Corning</i> ® DefendAir 200	pg. 5
<i>Dow Corning</i> ® DefendAir 200 Certified Applicators and Warranty	pg. 6
<i>Dow Corning</i> ® DefendAir 200 Compatibility with Accessory Building Products.....	pg. 7
Example of Quality Control Wet Mil Thickness Form	pg. 8
Tinting <i>Dow Corning</i> ® DefendAir 200 to Medium Gray	pg. 9
Penetrations through <i>Dow Corning</i> ® DefendAir 200	pg. 10

Dow Corning® DefendAir 200 Absorption Rates on Various Substrates

Dow Corning® DefendAir 200 is a liquid applied thin mil air barrier coating. As such, it is important to achieve the specified 15 mil dry film thickness on the surface of the substrate to ensure a robust application of the air barrier. There are industry concerns surrounding achieving the appropriate mil thickness on different substrates when using these thin mil systems. Dow Corning has completed absorption testing on different substrates and found that the absorption rates of *Dow Corning®* DefendAir 200 can change by substrate and even substrate manufacturer.

In general, a 30 mil wet coating results in the required 15 mil dry film thickness. However, some substrates do absorb more coating, and may require a higher wet mil application thickness to achieve the appropriate thickness on the surface of the substrate. Here is a summary of the wet mil vs. dry film thicknesses for a variety of substrates that were tested:

Substrate	Wet Mil	24 hr Dry Mill
GP DensGlass® Gold	30	13.8
National Gypsum Purple	30	14.2
USG Green SECUROCK®	40	12.7
Plywood brand 1 (primed)	40	17.9
Plywood brand 2 (primed)	40	19
OSB	30	21.8
Large Aggregate Concrete	30	14

Coverage rates for your specific substrate may differ and should be verified by completing a mockup.

Please contact your local Dow Corning sales development professional for further assistance.

***Dow Corning*[®] DefendAir 200 on Damp Substrates and in Rain**

Damp Substrates

Dow Corning has completed testing of *Dow Corning*[®] DefendAir 200 on selected wet and damp substrates (on variety of sheathing, plywood, OSB and concrete). Our findings have consistently shown that damp substrates can be effectively coated with *Dow Corning*[®] DefendAir 200 and adhesion is acceptable.

The adhesion of *Dow Corning*[®] DefendAir 200 is not affected by the moisture content or “dampness” of most substrates. Testing has shown, however, that when OSB is damp, primer is required for the *Dow Corning*[®] DefendAir 200 to achieve acceptable adhesion.

Dow Corning always recommends field adhesion testing be completed for job site specific conditions, as not every brand of every substrate, especially sheathing, could be included in the study.

Dry Time Before Precipitation

While damp substrates are acceptable, *Dow Corning*[®] DefendAir 200 should not be applied when raining or when rain is imminent. Rain will wash the *Dow Corning*[®] DefendAir 200 off the substrate if the coating is not at least partially dry. *Dow Corning*[®] DefendAir 200 dry times will depend on the temperature and humidity at the time of application and while it is drying.

In our studies, we have found that if a 30 mil (wet) coating is applied and is allowed to dry for eight hours, rain after that time did not negatively affect the coating. When rain is expected sooner than eight hours, or the weather cannot be predicted, it is possible to apply one 15 mil (wet) coat of *Dow Corning*[®] DefendAir 200. At the thinner wet film thickness, rain will not negatively affect the *Dow Corning*[®] DefendAir 200 after only a four hour drying time. A second coat can then be applied after four hours or when the rain has subsided. This technique allows the air barrier to be applied in more unpredictable weather conditions.

This testing was completed at 70°F and low relative humidity (15%RH) when the *Dow Corning*[®] DefendAir 200 had potential to dry more quickly than would be seen in high humidity conditions. A higher humidity or lower temperature will lengthen the required drying time prior to the *Dow Corning*[®] DefendAir 200 being unaffected by rain.



Importance of Thickness of *Dow Corning*[®] DefendAir 200

When sealing the building envelope with *Dow Corning*[®] DefendAir 200, correct installation and proper material thickness is critical to final air barrier system performance. To this end, Dow Corning has completed the most stringent air barrier testing and achieved airtight systems down to an air leakage level that was nearly beyond the test equipment's capability to detect. Dow Corning tested at multiple thicknesses (lower than our recommendations) to be conservative and ensure that our applied thickness recommendations are robust. Following are the system test results (an actual wall system with penetrations tested, not just a film of material):

ASTM E2357: <0.000007 cfm/ft² at 1.57 psf

We understand that a “thick mil” or even sheet applied materials may seem more comfortable, but in reality, the question is: What performs, and what can be installed over and over the same way, and still perform for many years?

Sheet applied materials do guarantee a certain thickness. But in application, there are joints, seams and folds to worry about, in addition to achieving 100% adhesion of the adhesive backing. Dow Corning has shown, through our own testing, that not fully sealing the seams, or having a “fishmouth” such as shown below, may yield air infiltration results that do not pass current air barrier standards and/or exceed the infiltration rate of liquid applied membranes.

Thick mil applied liquid materials must still be applied at the thickness stated and validated for the correct thickness.

Taking care to assess progress, as Dow Corning recommends with any sealant or coating application, is part of a quality installation; and it is not difficult. It is a matter of measuring the wet mil thickness during application using a hand held gauge. It is similar to other measurement or quality control methods in place for any number of construction products.

Please contact your local Dow Corning sales development professional for further assistance with on-site and hands-on training regarding quality control.



***Dow Corning*[®] DefendAir 200 Certified Applicators and Warranty**

Dow Corning[®] DefendAir 200 is offered with a 10-year limited warranty. When *Dow Corning*[®] brand sealants and transition materials are applied with *Dow Corning*[®] DefendAir 200, the system may qualify for a 15-year limited warranty.

When sealing the building envelope with *Dow Corning*[®] DefendAir 200, it is critical to choose and install the appropriate materials correctly.

Dow Corning has completed extensive hands-on training seminars with our distributors and key contractors specifically for *Dow Corning*[®] DefendAir 200 (and other associated sealants and materials used with it).

Dow Corning[®] DefendAir 200 is Air Barrier Association of America (ABAA) evaluated. Specifications often call for ABAA certified installers. Dow Corning fully supports this program. It is not a specific Dow Corning requirement, but an ABAA certified installer can be chosen for your quality project.

Please contact your local Dow Corning sales development professional for further assistance.

Note: Not intended for use on single family residential dwellings.



***Dow Corning*[®] DefendAir 200 Compatibility with Accessory Building Products**

When sealing the building envelope, many different materials come into contact. *Dow Corning*[®] DefendAir 200 adheres to and is compatible with a wide range of building substrates including, but not limited to: gypsum-based sheathing, plywood, OSB, brick, concrete, concrete masonry units (CMU), aluminum, and galvanized and stainless steel.

Other common building components that *Dow Corning*[®] DefendAir 200 may come into contact with include self-adhering flashings, mechanical flashings, other liquid flashings, sealants, weatherstrips and insulation.

Dow Corning[®] DefendAir 200 can be continuously sealed to other mechanical and self-adhering flashings by creating a bridge between the two materials using either *Dow Corning*[®] Silicone Transition Strip or *Dow Corning*[®] 758 Silicone Weather Barrier Sealant. This allows for adhesion between the differing products, creating a continuous air and water tight seal. Mechanically attached flashings do not negatively affect the performance of *Dow Corning*[®] DefendAir 200. Furthermore, the asphaltic and/or butyl backings of the self-adhering flashings do not negatively affect the performance of *Dow Corning*[®] DefendAir 200.

If a liquid flashing from a company other than Dow Corning is used, it should be fully cured before *Dow Corning*[®] DefendAir 200 is applied over it. If the liquid flashing is to be applied over the *Dow Corning*[®] DefendAir 200, allow the *Dow Corning*[®] DefendAir 200 to cure a minimum of three days. Verify adhesion of the liquid flashing at the start of the project, as generally only silicone based materials will adhere to *Dow Corning*[®] DefendAir 200. Dow Corning is not aware of any liquid flashing currently on the market that would negatively affect the performance of the *Dow Corning*[®] DefendAir 200 when used either over or under the *Dow Corning*[®] DefendAir 200. Project-specific adhesion and compatibility testing can be performed.

Dow Corning[®] DefendAir 200 is compatible with silicone sealants. It can also contact non-silicone sealants with no negative effects, but the non-silicone sealant should be allowed to cure prior to applying *Dow Corning*[®] DefendAir 200. In all cases, adhesion between the two materials should be verified with field adhesion testing. In general, *Dow Corning*[®] DefendAir 200 will adhere to cured sealants of any chemistry. Only silicone sealants would be expected to adhere to *Dow Corning*[®] DefendAir 200.

Dow Corning[®] DefendAir 200 is compatible with rigid foam board insulation.

Please contact your local Dow Corning sales development professional for further assistance.

Example of Quality Control Wet Mil Thickness Form

Date _____

Project Name _____

Project Address _____

Reading Number	Elevation	Floor	Location/Drop	Gauge Reading	Initials
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					



The color shown is approximate only. While every precaution is taken to ensure that color standards are maintained, they cannot be guaranteed.

Tinting *Dow Corning*® DefendAir 200 to Medium Gray

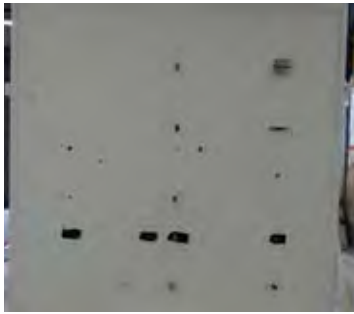
Dow Corning® DefendAir 200 is a liquid-applied, water-based silicone air and weather barrier (supplied as a white coating). If there is a need for a darker air barrier membrane, such as applications behind open joint rain screen systems, it is possible to tint *Dow Corning*® DefendAir 200 to medium gray. It will be tinted at the local distributor based on a formulation supplied by Dow Corning. *Dow Corning*® DefendAir 200 is not available to be ordered in any other color.

To tint *Dow Corning*® DefendAir 200 to medium gray, use Colortrend® Lamp Black (B-9Y5, 888-9907) pigment. A 5-gallon pail of *Dow Corning*® DefendAir 200 should receive 15 oz. (6 shots) of pigment to tint to the proper color.

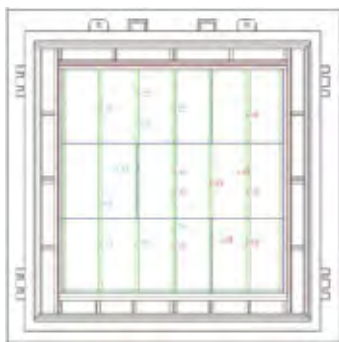
If other colors are desired, one 10-mil wet (5-mil dry) coat of *Dow Corning*® AllGuard Silicone Elastomeric Coating can be applied over the 30-mil wet (15-mil dry) application of *Dow Corning*® DefendAir 200. *Dow Corning*® AllGuard is compatible with, and will adhere to, *Dow Corning*® DefendAir 200. *Dow Corning*® DefendAir 200 should be allowed to dry for a minimum of 24 hours and all quality control for *Dow Corning*® DefendAir 200 should be performed before any *Dow Corning*® AllGuard is applied.

If *Dow Corning*® AllGuard is applied over *Dow Corning*® DefendAir 200, *Dow Corning*® DefendAir 200 will continue to meet or exceed all of the published standards. The one change will be a reduction in the vapor permeability of the coating combination. The new vapor permeability for the 15 mils of *Dow Corning*® DefendAir 200 and 5 mils of *Dow Corning*® AllGuard when tested per ASTM E96 is 4.77 perms per Method A (dry cup/dessicant method) and 19.97 perms per Method B (wet cup/water method).

If you have questions, please contact your local Dow Corning Sales Development Professional.



Sample wall tested with fasteners through brick ties and z-gurts



Sample layout of fasteners through wall



Wall tested for air, water and structural performance

Penetrations through *Dow Corning*[®] DefendAir 200

For air barriers to be effective in preventing air and water infiltration, they must remain continuous across the entire building envelope. This means it is best to address all penetrations prior to the installation of the air barrier so that the air barrier is the final layer. In some applications, it becomes necessary to penetrate the air barrier after it is applied to the façade. In these cases, proper preparation of the air barrier and penetrations is critical to maintain continuity of the air and water barrier. Dow Corning has evaluated the performance of 26 fasteners installed through *Dow Corning*[®] DefendAir 200 Silicone Air and Water Barrier. The testing was carried out per ASTM using the following parameters: Dow Corning has evaluated the performance of 26 fasteners installed through *Dow Corning*[®] DefendAir 200 silicone air and water barrier. The testing was carried out per:

- ASTM E283 Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen
- ASTM E331 Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference
- ASTM E330 Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference

Test Method	Testing Parameters
ASTM E283	25, 50, 75, 100, 150 and 300 Pa
ASTM E331	Positive load of 730 Pa; water applied at a rate of 3.4 L/m ² min ASTM E331(5.0 gal/ft ² hr) for 15 min
ASTM E330	+/- 1440 Pa and held for 10 sec E330(Limit set based on pull-out strength of fasteners tested)
ASTM E283	25, 50, 75, 100, 150 and 300 Pa

The following parameters were used:

The walls tested were constructed of ½ inch exterior sheathing over steel studs. The sheathing joints and screw heads were sealed per recommendations described in the Application Manual. *Dow Corning*[®] DefendAir 200 was then spray applied at a 15-mil dry film thickness and was allowed to dry for 24 hours prior to the installation of any of the fasteners.

Most of the fasteners were tested using five different preparation methods:

1. Plain (no additional sealing of the fastener)
2. Same as (1) but with the fastener installed at an angle
3. Fastener pre-sealed on the shaft using *Dow Corning*[®] 791 Silicone Weatherproofing Sealant
4. Fastener cap-sealed using *Dow Corning*[®] 791 Sealant
5. *Dow Corning*[®] 791 Sealant was trowel-applied to the surface of the air barrier at a thickness of 30 mils wet. This coat of sealant was allowed to cure for 24 hours before the fastener was installed through it.

Summary of Test Results

All fasteners that were tested maintained an airtight seal without any additional sealing. However, there were mixed results when water presentation was tested. Based on our results, Dow Corning makes the following recommendations for fastener penetrations:

- All fasteners that have a shaft diameter of < ¼ inch, which are installed such that the head does not penetrate the air barrier/sheathing, do not require any additional sealing, pre- or post-installation, to maintain an air- and water-tight barrier.
- Fasteners with a shaft diameter > ¼ inch may require additional preparation to maintain an air- and water-tight barrier.
- The best option to seal a fastener is to apply sealant behind the fastener before it is installed. The sealant may or may not cure before the fastener is installed. One example of doing this is to apply a bead of *Dow Corning*[®] 791 Sealant behind a z-gurt, press the z-gurt into place, then install the fastener through both the z-gurt and the sealant. Cap sealing over the fastener was not found to be as robust of a sealing method.
- If the stud is missed by the fastener, it is best practice to remove the fastener and seal the hole using *Dow Corning*[®] 791 Sealant.
- Fasteners are available for attaching insulation that have a small enough diameter to not require extra steps to seal them when used with *Dow Corning*[®] DefendAir 200.

For more information on the *Dow Corning*[®] Air Barrier System, please contact your local representative or visit BuildaBetterBarrier.com.

The following fasteners were tested and successfully passed air and water testing without any additional treatment of the fastener:

- #10 screws
- #12 screws
- #12 screws through foam insulation
- Blok-Lok[®] brick ties using #12 screws
- Elco[®] EAF 460
- Elco[®] EAF 480
- Elco[®] EAF 681
- Hilti[®] ¼ x 2¼ TORX HWH
- Hilti[®] 3/16 x 1¼ TORX HWH
- Hilti[®] ¼ x 1¼ TORX HWH S/S
- Hilti[®] ¼ x 1¼ TORX HWH
- Kovach panel attachment (including through z-gurts)
- SFS Intec Sx5/12-5, 5 x 35
- SFS Intec Sx5/12-S16-5, 5x35-W-B
- SFS Intec Sx3/20-S16-6x60-W-B
- SFS Intec Sx3/5-S16-6x40-W-B
- SFS Intec Sx14/12-5, 5x40
- 12-14 x 2 HWH SDS2 Z TEK 3
- 12-14 x 2 HWH DRIL-FLEX #3 TEK 3 STALGARD[®]
- 12-24 x 2 HWH DRIL-FLEX TEK 5 CL
- ¼-20 x 2 HWH DRIL-FLEX #4 STALGARD[®]
- ¼ x 1-¾ HWH TAPCON[®]
- 10 x ¾ PHIL MOD TRUSS HEAD ZINC
- TW-S-D13-5, 5 x 29 TRESPA[®] EXPOSED SCREW

Contact Us

Learn more about the *Dow Corning*[®] Silicone Air Barrier System and our full range of High Performance Building Solutions, including service and support, at BuildaBetterBarrier.com.

Dow Corning has sales offices, manufacturing sites, and science and technology laboratories around the globe. Find local contact information at dowcorning.com/ContactUs.

BuildaBetterBarrier.com

Images: AV23695, AV22643, AV23084, AV23432, AV23434, AV23433

HANDLING PRECAUTIONS

PRODUCT SAFETY INFORMATION REQUIRED FOR SAFE USE IS NOT INCLUDED IN THIS DOCUMENT. BEFORE HANDLING, READ PRODUCT AND SAFETY DATA SHEETS AND CONTAINER LABELS FOR SAFE USE, PHYSICAL AND HEALTH HAZARD INFORMATION. THE SAFETY DATA SHEET IS AVAILABLE ON THE DOW CORNING WEBSITE AT DOWCORNING.COM, OR FROM YOUR DOW CORNING SALES APPLICATION ENGINEER, OR DISTRIBUTOR, OR BY CALLING DOW CORNING CUSTOMER SERVICE.

LIMITED WARRANTY INFORMATION – PLEASE READ CAREFULLY

The information contained herein is offered in good faith and is believed to be accurate. However, because conditions and methods of use of our products are beyond our control, this information should not be used in substitution for customer's tests to ensure that our products are safe, effective and fully satisfactory for the intended end use. Suggestions of use shall not be taken as inducements to infringe any patent.

Dow Corning's sole warranty is that our products will meet the sales specifications in effect at the time of shipment.

Your exclusive remedy for breach of such warranty is limited to refund of purchase price or replacement of any product shown to be other than as warranted.

TO THE FULLEST EXTENT PERMITTED BY APPLICABLE LAW, DOW CORNING SPECIFICALLY DISCLAIMS ANY OTHER EXPRESS OR IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE OR MERCHANTABILITY.

DOW CORNING DISCLAIMS LIABILITY FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES.

[®]™ Trademark of the Dow Chemical Company.

Dow Corning is a registered trademark of Dow Corning Corporation. The Corning portion of the Dow Corning trademark is a trademark of Corning Incorporated, used under license.

ColorTrend is a trademark of Dow Corning Corporation.

Blok-Lok[®] is a registered trademark of Hobbell, Inc.

Elco[®] is a registered trademark of Elco Construction Products Corporation.

Hilti[®] is a registered trademark of Aktiengesellschaft Corporation.

STALGARD[®] is a registered trademark of Acument Intellectual Properties, LLC.

DensGlass[®] is a registered trademark of Georgia-Pacific Gypsum LLC.

Securock[®] is a registered trademark of USG Corporation

Tapcon[®] is a registered trademark of Illinois Tool Works, Inc.

Trespa[®] is a registered trademark of Trespa International B.V.

©2016, 2017 Dow Corning Corporation, a wholly owned subsidiary of The Dow Chemical Company.

All rights reserved.

30023823

Form No. 63-6165C-01

