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Initial Approval

January, 2002

Re-Approved

March, 2018

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Report Owner**The Dow Chemical Company**

1881 West Oak Parkway
Marietta, GA 30062

Approved Manufacturing Locations**The Dow Chemical Company**

1881 West Oak Parkway
Marietta, GA 30062

Product

Voramers MB 3099 Two-Part Polyurethane
Foam Adhesive

Evaluation Report Information

www.dow.com

DOW Contact: Rebekah Patton - (678) 269-1392

General Details

Voramers MB 3099 adhesive is used to bond wood framing to gypsum in ceiling and wall construction without the use of mechanical fasteners. The manufacturing location listed above has an approved Quality Assurance Manual to manufacture the **Voramers MB 3099** Two-Part Polyurethane Adhesive and is inspected quarterly by *Progressive Engineering Inc. (Pei)*.

Product Description

Voramers MB 3099 is a two-part component polyurethane foam adhesive system. It is applied by pumping two components at a 1 to 1 volumetric ratio under pressure through heating equipment to produce one continuous bead. The two components are comprised of "**Voramers MB 3099** Polyol" and "**Voramers ME 3044** Isocyanate". The **Voramers ME 3044** ISO is a pre-mixed standard material shipped from a supplier and the **Voramers MB 3099** Polyol component is manufactured by **The Dow Chemical Company**. This adhesive does not off-gas Formaldehyde into the air.

Containers and Storage

The A & B components are shipped in 250 gallon disposable totes, 55 gallon steel drums and 350 gallon returnable tanks. Storage of these containers should be in an indoor conditioned place between 70°F. and 90°F. Unopened containers will have a storage life of up to six months in these conditions.

General Product Use and Limitations

The gypsum board being used shall be clean and dry with loose dust blown off and free from liquids, oil, grease, etc. Recommended gypsum temperature is greater than 50°F. **Voramers MB 3099** Polyol adhesive shall be applied in an ambient temperature range of 50°F. to 100°F. The adhesive is applied along the intersection of the vertical plane of the wooden member and the horizontal plane of the gypsum board according to **The Dow Chemical Company** Application Instructions. The adhesive temperature at the heater block shall be between 90°F. and 115°F. After the last bead is applied, the structure shall not be moved for a minimum of two minutes. The structure shall stay in the same ambient conditions for the first 24 hours.

Voramers MB 3099 adhesive can be used on 24" and 16" o.c. framing in the walls and ceiling. The fillet beads produced shall be sized per Figure 1 and per Table 2, Note 1 for wall shear design values. A bead shall never be greater than 3" in size. The adhesive beads are applied along one side of field framing and along both sides at gypsum seams.

- The **Voramers MB 3099** adhesive shall be installed according to **The Dow Chemical Company** Application Instructions. A copy of these instructions must be made easily available at the assembly areas.
- This Evaluation is for **Voramers MB 3099** to be applied in an indoor manufacturing facility and is not meant to be applied in an outdoor uncontrolled environment.
- **Voramers MB 3099** adhesive is to be manufactured at **The Dow Chemical Company** plant in Marietta, GA following their approved quality assurance program with unannounced inspections by *Progressive Engineering Inc (Pei)*.
- The use of **Voramers MB 3099** adhesive in a fire rated assembly is not within the scope of this **PER**.
- A vapor barrier cannot be used between the adhesive and the substrates.
- **Voramers MB 3099** is to be applied to the back side standard raw gypsum board only and is not intended for other gypsums such as foil backed, moisture resistant or water resistant gypsums.
- Construction of assemblies using **Voramers MB 3099** and their design values shall be as described in the following test reports.
- Gypsum board may be installed in both non-structural finish material and structural applications within the limits of this **PER**. All gypsum board must be in compliance to ASTM C1396.

Building Code Compliance

Must be used with an approved thermal barrier not less than 1/2" (12.7mm) gypsum wallboard or approved material equivalent in compliance with the requirements of the 2006 IRC, Section R314.4 and the 2009, 2012, and 2015 IRC, Section R316.4.

Must be used with an approved thermal barrier not less than 1/2" (12.7mm) gypsum wallboard or approved material equivalent in compliance with the requirements of the 2006, 2009, 2012, and 2015 IBC, Section 2603.4

Meets or exceeds the requirements of the 2006, 2009, 2012, and 2015 IBC, Section 2603.9 based on large-scale tests and acceptance criteria of UL-1715.

October, 2016 Texas Industrialized Housing and Buildings Administrative Rules - Section: 70.103. (c) (2)

NC Residential Code, 2012 Edition - Section R316.6

ASTM E84-01 - Class A Fire Rating: Flame Spread Index - 10 and Smoke Development Index - 25

Meets or exceeds Acceptance Criteria of UL-1715 for use with 3/8" Gypsum Wallboard after 15 Minute Exposure Requirements, where flames shall not extend to the extremities or through the doorway opening of the tested specimen.

Meets or exceeds Acceptance Criteria of UL-1715 for use with 1/2" Gypsum Wallboard after 15 Minute Exposure Requirements, where flames shall not extend to the extremities or through the doorway opening of the tested specimen.

Meets or exceeds Acceptance Criteria of UL-1715 for use with 5/8" Gypsum Wallboard after 15 Minute Exposure Requirements, where flames shall not extend to the extremities or through the doorway opening of the tested specimen.

Meets or exceeds adhesion of gypsum panels to wood for 200°F Stability and 30 Minute Exposure Requirements of the 2012 IBC, Section 803.10 Stability.

Tested to

Pei Standard No. 89-1 - Simple Span Ceiling or Roof Diaphragm Shear Resistance Test Procedure for Manufactured Homes

Pei Standard No. 93-7 - Performance Requirements for Fastening Gypsum Board to Wood Framing using a Two-Part Urethane Adhesive

Pei Standard No. 93-8 - Ceiling Board Dead Load Test Procedure

ASTM C 557 - Standard Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing

ASTM E 72 - Standard Test Methods of Conducting Strength Tests of Panels for Building Construction

ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials

UL-1715 - UL Standard for Safety Fire Test of Interior Finish Material

2012 IBC 803.10 - Wall and Ceiling Finishes Stability at 200°F

Test Reports for Voramer MB 3099 Adhesive.

Table 1: Wall Shear Designs^{1,2}

Framing				Gypsum Orientation	Gypsum Brand	Single or Double Sided	Ultimate Load PLF ³	Test Report #
Top Plate	Bott. Plate	Studs	Stud Spacing					
1x3	1x3	2x3	16" o.c.	5/16" Vertical	GA-Pacific	Single	635.6	2002-0641
					American Gyp	Single	485.6	2004-0924(A)
					USG Gyp	Single	505.7	2004-0924(B)
					GA-Pacific	Single	502.6	2004-0924(C)
				1/2" Horizontal	USG Gyp	Single	606.1	2004-0924(D)
					GA-Pacific	Single	574.4	2004-0924(E)
					American Gyp	Single	534.3	2004-0924(F)
					AG - Eagle Roc	Single	627.4	2004-1084(A)
					USG Gyp	Single	649.6	2008-1260
					National Gyp	Single	704.8	2008-1642
					ProRoc	Single	754.7	2008-1780
					USG MH UL-TB	Single	824.0	2012-1569(U)
					2x3	2x3	2x3	16" o.c.
5/16" Vertical	USG MH TB	Single	520.0	2014-1760				

Notes:

1. Bead sizes as described in each test report
2. Tested in Accordance to ASTM E72 - Static Wall Racking Tests
3. Ultimate load does not include any required safety factors

Design Values

Ceiling Diaphragm Design Load = **202 plf** (11' 8" minimum width x 52'-0" Maximum diaphragm span - using 5/16" Gypsum)
 Ceiling Diaphragm Design Load = **240 plf** (15' 6" minimum width x 52'-0" Maximum diaphragm span - using 5/16" Gypsum)
 Ceiling Diaphragm Design Load = **214.9 plf** (17' 6" minimum width x 52'-0" Maximum diaphragm span - using 1/2" Gypsum)
 Ceiling Dead Load Resistance = **15.5 psf** (using 5/16" Gypsum)

Note:

Ceiling Diaphragm and Dead Load Resistance testing is valid for all gypsum boards listed below, as long as the gypsum manufactured maintains a third party product listing showing compliance to ASTM C1396.

Gypsum Brands Tested for Ceiling use

- | | |
|-------------------------------------------------|--------------------------------------------------------------------|
| 1/2" American Gypsum Ceiling Board | 5/16" Gold Bond Gypsum Board |
| 1/2" CertainTeed Gypsum Easi-Lite™ Gypsum Board | 5/16" USG SHEETROCK® MH Gypsum Ceiling Panels |
| 1/2" CertainTeed Gypsum Interior Ceiling Board | 1/2" USG SHEETROCK® Brand MH UltraLight Ceiling Panels ULTRA-BASE™ |
| 5/16" Georgia-Pacific Gypsum Board | 5/8" Gold Bond® Brand Firecode Type X Gypsum (Dead Load use only) |

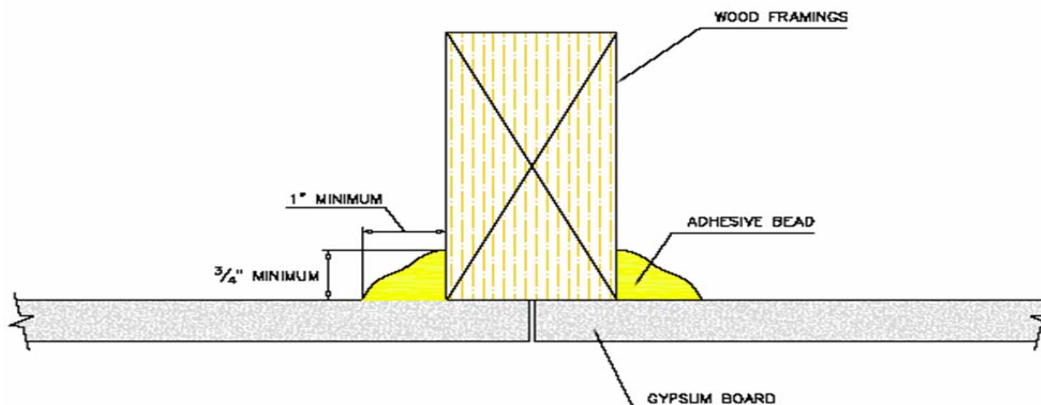


FIGURE 1 : Ceiling use bead sizes

Product Labeling

Each cylinder shipped of **Voramers MB 3099** that is covered by this **PER** must have a label attached with at least the following information:

1. **The Dow Chemical Company** Name and Address
2. Date of manufacture or Lot No.
3. Shelf life information
4. This **PER** Number & *Pei* **ES** Logo
5. Component name

Acceptable Evaluation Marks**Product Documentation**

- A Product Evaluation Service Agreement between *Pei Evaluation Service*[®] and **The Dow Chemical Company**
- A Follow-up Inspection Service Agreement between *Progressive Engineering Inc.* and **The Dow Chemical Company**
- A SDS for **Voramers MB 3099** Polyol - Dated: 3/31/2015
- A SDS for Voramers MB 3044 Isocyanate - Dated: 6/11/2015
- Voramers[™] Industrial Adhesive User Manual - Dated: January, 2002
- Opinion Letter - Dated: April 15, 2005

Ceiling Diaphragm Test Reports

- A *PEI* test report no. 2001-1461 - Full Scale Cathedral Ceiling Diaphragm Test on a 15'-6" x 52'-0" Ceiling using Voramers[®] MB 3099/Voramers[®] ME 3044 Adhesive - Dated: 11/5/2001
- A *PEI* test report no. 2001-1464 - Full Scale Ceiling Diaphragm Test on a 15'-6" x 52'-0" Flat Ceiling using Voramers[®] MB 3099/Voramers[®] ME 3044 Adhesive - Dated: 11/2/2001
- A *PEI* test report no. 2001-1504 - Full Scale Ceiling Diaphragm Test on a 11'-8" x 52'-0" Flat Ceiling using Voramers[®] MB 3099/Voramers[®] ME 3044 Adhesive - Dated: 11/5/2001
- A *PEI* test report no. 2001-1505 - Full Scale Cathedral Ceiling Diaphragm Test on a 11'-8" x 52'-0" Ceiling using Voramers[®] MB 3099/Voramers[®] ME 3044 Adhesive - Dated: 10/24/2001 - Revised: 11/8/2001
- A *PEI* test report no. 2012-0690 - Full Scale Ceiling Diaphragm Test on a 17'-6" x 52'-0" Cathedral Ceiling using Voramers[®] MB 3099/Voramers[®] ME 3044 Adhesive and 1/2" American Gypsum Ceiling Board - Dated: 5/10/2012

Ceiling Dead Load Test Reports

- A *PEI* test report no. 2001-1506 - Ceiling Dead Load Test using Voramers 3099 and 5/16" Gypsum - Dated: 9/28/2001 - Revised - 5/8/2002
- A *PEI* test report no. 2002-1383 - Ceiling Dead Load Test using Voramers[®] MB 3099 and 5/8" Gypsum - Dated: 8/23/2002

Stability at 200°F Test Report

- A *PEI* test report no. 2013-0631 - 2012 IBC 803.10 Wall and Ceiling Finishes Stability at 200°F Using Voramers[®] MB 3099 Two-Part Polyurethane Adhesive - Dated: 5/20/2013

PEI Standard 93-7 Test Report

- A *PEI* test report no. 2002-1291 - PEI Standard No. 93-7 Test on Voramers[®] MB 3099/Voramers[®] ME 3044 Adhesive - Dated: 10/4/2002

ASTM E84 Test Report

- A test report file no. FH-1317 - Surface Burning Characteristics ASTM E-84-01 Dow Chemical Corporation - Voramers MB 3099 / Voramers ME 3044 - Dated: 5/30/2002

UL-1715 Test Reports

- A test report no. RCB 0302 - UL-1715 Fire Test of Interior Finish Material - using 1/2" Gypsum - The Dow Chemical Company - Dated: 11/11/2003
- A test report no. RCB 0304 - UL-1715 Fire Test of Interior Finish Material - using 3/8" Gypsum - The Dow Chemical Company - Dated: 11/13/2003
- A test report no. RCB 0501 - UL-1715 Fire Test of Interior Finish Material - using 5/8" Gypsum - The Dow Chemical Company - Dated: 5/4/2005