ALPHA SYSTEMS

Ceiling Dead Load Tests
Using 1/2" Fiberock

2/28/2000

This test report contains thirteen (13) pages, including the cover sheet. Any additions to, alterations of, or unauthorized use of excerpts from this report are expressly forbidden.

2000-326
1. **TITLE**
   
   Ceiling board dead load test per PEI Standard No. 93-8.

2. **OBJECTIVE**
   
   To apply load to a ceiling sample, representative of a dead load on ceiling board, until a failure is reached.

3. **TESTED FOR**
   
   Alpha Systems  
   5120 Beck Drive  
   Elkhart, IN 46516

4. **TESTING ORGANIZATION**
   
   Progressive Engineering, Inc.  
   58640 State Road 15  
   Goshen, IN 46528

5. **TESTING PERSONNEL**
   
   Test Engineer - Evor F. Johns, P.E.  
   Director of Testing - Greg A. Weeden  
   Technician - Scott Gruver  
   Technician - Bradd Weddell

6. **TEST SPECIMEN**
   
   A. **Materials**
      
      I. Gypsum - 48" x 96" x 1/2" Fiberock Brand MH gypsum fiber panel.  
      II. Joists - 2 x 6 No. 2 grade SPF.  
      III. Alpha Systems Alphaseal 5200 two-part polyurethane adhesive.

   B. **Construction Steps**
      
      I. One (1) piece of gypsum was laid on a flat jig.  
      II. Three (3) 2 x 6s were laid on the gypsum at 24" o.c. Both ends of the 2 x 6 had 0" gap along the gypsum.
III. The average bead size of the Alphaseal 5200 on the wood was 1/2".
The average bead size of the Alphaseal 5200 on the gypsum was 7/8".
The ceiling samples remained on the jig for 5 minutes. After the 5 minutes, the samples were moved and stacked where they remained for a minimum of 24 hours until they were tested.

7. TEST PROCEDURE

A. The samples were placed in a vacuum test fixture. Polyethylene film was applied over the samples, in a manner such that load was applied directly to the gypsum, then enclosed by taping the film to the fixture. See drawings for details.

B. Dial indicators were placed at the center line of the ceiling sample, one at each 2 x 6 and one on the gypsum between each 2 x 6.

C. A vacuum load was applied with a Shop Vac and measured with a water manometer. Load was applied in 2 PSF increments for the samples, with a residual deflection measurement taken between each increment. Deflection measurements were taken up to 14 PSF the load was applied until a failure was reached.

8. TEST RESULTS

See the attached deflection charts for actual deflections measured.

Average ultimate load reached

Test No. 1 = 48.9 PSF
Test No. 2 = 52.0 PSF
Test No. 3 = 52.0 PSF
Average = 50.9 PSF

Allowable load under the Manufactured Home Construction and Safety Standards.

50.9/2.5 safety factor = 20.3 PSF
9. CONCLUSION

Based on the data obtained from this test; a ceiling dead load of 20.3 PSF can be obtained from a ceiling constructed as follows:

A. 1/2" Fiberock Brand MH gypsum fiber panel.
B. Alpha Systems Alphaseal 5200 two-part urethane adhesive.
C. A gap of 0" between joist or truss and gypsum.
### CEILING DEAD LOAD TEST

- **Gap Between Wood and Gypsum:** Zero
- **Gypsum Brand Used:** USG Fiberock
- **Gypsum Thickness:** 1/2"
- **Truss Spacing:** 2' o.c.
- **Date:** 2/28/2000
- **Test Sample Size:** 4' x 8'
- **Gypsum Clear Span:** 96"
- **Temperature:** 65 degree F.
- **Humidity:** 25%

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**Ultimate Load:** 48.9 PSF

**Failure:** Fiber failure along center stud.
### CEILING DEAD LOAD TEST

**Gap Between Wood and Gypsum:** Zero  
**Gypsum Brand Used:** USG Fiberock  
**Gypsum Thickness:** 1/2”  
**Truss Spacing:** 2’ o.c.  
**Date:** 2/28/2000  
**Test Sample Size:** 4' x 8'  
**Gypsum Clear Span:** 96”  
**Temperature:** 65 degree F.  
**Humidity:** 25%

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**Test No. 2**

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**Ultimate Load:** 52.0 PSF

**Failure:** Fiberock broke in center of bay
**CEILING DEAD LOAD TEST**

Gap Between Wood and Gypsum: **Zero**
Gypsum Brand Used: USG Fiberock
Gypsum Thickness: 1/2"
Truss Spacing: 2' o.c.
Date: 2/28/2000

**Test No. 3**

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Ultimate Load: **52.0 PSF**

Failure: Fiber failure along center stud.
Dead Load Test
With 0" Gap

Deflection in inches

Load in P.S.F.

Load-Average
- Test No.3-Residual
- Test No.3-Load
- Test No.2-Residual
- Test No.2-Load
- Test No.1-Residual
- Test No.1-Load
- Residual Average

Deflection in inches
ALPHA SYSTEMS ALPHASEAL 5200

48" x 96" x 1/2" USG Fiberock Brand MH Gypsum fiber board

2 x 6 #2 GRADE S.P.F.

"0" GAP BETWEEN GYPSUM & 2 x 6

"0" GAP BOTH ENDS

THIS DRAWING IS A PART OF TEST REPORT NO. 2000-326

PROGRESSIVE ENGINEERING, INC.
TESTING LABORATORY

56540 State Road 15
GOSHEN, INDIANA 46528
Telephone (513) 523-0237
SECTION A-A

- Vacuum holes
- 4x12 steel tubing frame
- Dial indicators
- Wall sample
- Polyethylene sheeting taped to tube
- 2x4 bearing
- I-beam to support dial indicators
- I-beam support

TEST SET-UP
4x12 STEEL TUBING FRAME

2x4 BEARINGS

WATER MANOMETER

VACUUM

CENTER-LINE OF CLEAR SPAN

WALL SAMPLES

- DEFLECTION GAUGE LOCATIONS

NOTES:
Test Set-up

Test No. 1 at Failure
Test No. 2 at Failure

Test No. 3 at Failure