Barrier Management Symposium

January 29, 2016

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Nestor Sanchez, USG Corporation
Learning Objectives

1. Explore the gypsum mineral and its impact on fire resistance in a systems basis
2. Understand the different types of gypsum core and their relation to fire resistance
3. Determine recognized methods for repair installed gypsum panels
4. Innovative Technology
Fire Containment – Compartmentalize
Gypsum Mineral

- Calcium Sulfate
- CaSO₄·2H₂O
- 20% water by weight
Gypsum Mineral

- ASTM E 119 2hr. 1900° F
Gypsum Mineral

1” back  950° F
Gypsum Mineral

2” back  220° F
Gypsum Mineral

4” back  180° F
Gypsum Mineral

6” back 130° F
Hose Stream Test - Exposed Side
Cold-Formed Steel Background

33 Mils = 20ga  
43 Mils = 18ga  
54 Mils = 16ga

68 Mils = 14ga  
97 Mils = 12ga
1 to 4 Hour Ratings
Gypsum Core Types

Three (3) Types of Gypsum Cores

• Regular Core
• Type X
• Type C
Panel Strength Comparison

- Simple Test @ 1850°F
- 13” x 13” x 5/8” Panels
- Regular, Type X & Type C Panels
- 12lb - 9oz. loading
Significance of Test

• Type X core $\neq$ Type C core

• Specify board type per UL design

• Specified panel must be installed
Floor-Ceiling Prior to Test
GA-605 – Gyp. Panel Products for use in UL Classified Systems

- Free to download
- www.gypsum.org
- Gyp. Mfg. UL Type & Product Name
- www.UL.com

Fire Resistance Directory

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<table>
<thead>
<tr>
<th>COMPANY NAME</th>
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<tr>
<td>American Gypsum</td>
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<tr>
<td>CertainTeed Gypsum, Inc./CertainTeed Canada Inc.</td>
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<td>Georgia-Pacific Gypsum</td>
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<td>National Gypsum Company</td>
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<td>PASCO Gypsum</td>
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<td>Trenton Island</td>
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<td>United States Gypsum Company/CSC, Inc.</td>
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**American Gypsum Company**

<table>
<thead>
<tr>
<th>UL Type Designation</th>
<th>Product Name</th>
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<tbody>
<tr>
<td>1/2&quot; ProFlex® Type C</td>
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<tr>
<td>5/8&quot; FireBloc® Type C</td>
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<tr>
<td>1/2&quot; M-Bloc® Type C with Mold Resistance</td>
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<tr>
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<tr>
<td>5/8&quot; Aquabloc® Type X</td>
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<tr>
<td>5/8&quot; Interior Sheathing Type X</td>
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<tr>
<td>5/8&quot; Softi® Type X</td>
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<td>5/8&quot; Vision Type X</td>
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<tr>
<td>5/8&quot; Smoother® Type X</td>
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<tr>
<td>5/8&quot; M-Bloc® Type X with Mold Resistance</td>
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<tr>
<td>5/8&quot; M-Bloc® AB Type X Above and Mild Resistance</td>
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<tr>
<td>5/8&quot; FireBloc® CP Gypsum Lay-In Ceiling Panels</td>
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<tr>
<td>1&quot; Shaft Liner</td>
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<tr>
<td>1&quot; M-Bloc® Shaft Liner with Mold Resistance</td>
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GA-605 Type “C”: Ex. Mfg. Name & UL Type

- American Gypsum: AG-C
- CertainTeed: ProRoc Type C
- GP: Type 5
- LaFarge: Type LGFC-C/A
- National Gypsum: Type FSW-C
- Pabco: Type PG-C & Type C
- Temple-Inland: Fire Rated Type TG-C
- USG: Type C

* not all mfg.’s “C” core panels listed. See mfg.
American Gypsum: Type AGX-1, AGX-11
CertainTeed: ProRoc Type X
GP: Type 9
LaFarge: Type LGFC6A
National Gypsum: Type FSW
Pabco: Type PG-11
Temple-Inland: Fire Rated Type X
USG: Type SCX

* not all mfg.'s “X” core panels listed. See mfg.
Orientation of Gypsum Panels on Walls

- Perpendicular to the studs (horizontally applied)
- Parallel to the studs (vertically applied)
Orientation of Gypsum Panels on Walls

- Conventional studs (minimum 25 gauge)
- Light gauge studs (equivalent thickness)
Orientation of Gypsum Panels on Walls

On Conventional Studs

• Vertical application – Standard

• Horizontal application – Referenced in the IBC and GA 600 – Based on an old test

• Achieved by most wallboard manufacturers at UL
Orientation of Gypsum Panels

On Light Gauge Studs

• Vertical application – Standard - Most manufacturers

• Horizontal application – Only achieved at UL with certain manufacturers
Fire Performance

Light Gauge Steel Stud Construction – UL U419

- Perpendicular (horizontal) installation with aligned horizontal joints
  - Top-down construction

1-hr Rated System Horizontal Without Backing
VERTICALLY
1 HOUR GYPSUM BOARD APPLIED WALL

STUDS 16” O.C.

JOINTS IN FINISH LAYERS TO RECEIVE PERF-A-TAPE AND JOINT COMPOUND
Repair Gypsum Panels

- Incidental Tears
- Small Indentation
- Fractured Core
- “Crease in Panel”
- Back Paper Damage
Repair Small Holes

[Diagram showing repair process for small holes in a wall, including existing gypsum panel, patch, runner, type "S" screw, and tape & finish with USG joint finish system.]
Repair Large Holes

Partial Elevation - 1
Innovations

• Mold – Resistant Boards
• Lightweight Gypsum Panels Regular Core
• Lightweight Gypsum Panels
• Dust Control Joint Compound
Resources

- U.L. Fire Resistance Directory
- Gypsum Association
- Manufacturers’ Catalogs
- Technical Websites
  - UL Ultimate Fire Wizard
  - GA Association – gypsum.org
  - Steel Framing Alliance – steelframing.org
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