



## Hydrocal® FGR

Whether your next design project is restoration, new construction, or high-end residential, HYDROCAL® FGR Gypsum Cement from United States Gypsum Company can open the door to many three-dimensional possibilities. A great variety of finished items, formerly made from conventional plaster, wood, concrete, stone, and other materials, can be duplicated at less cost using the unique properties of HYDROCAL FGR Gypsum Cement.

Used for Glass-Reinforced Gypsum (GRG) fabrication, HYDROCAL FGR Gypsum Cement is an alpha-hemihydrate gypsum-based material that has a low water demand. This results in high strength, high density pieces that can be fabricated for a variety of architectural applications, such as column covers, light coves, wall and ceiling moldings, cornices, coffers, and more. And because it is made by a company with over 100 years of experience in the building industry, you can be sure that you are getting the best product available.

HYDROCAL FGR Gypsum Cement sets fast, develops high strength, and permits fabrication of strong, resilient glass-reinforced gypsum products. These durable products are fire-resistant, are adaptable to deep patterns, accept most coatings, help overcome the building fire code problems of many plastics, and cost about 2/3 less than filled polyesters.

And the design possibilities are endless: The economical price and fabrication flexibility allow you to duplicate existing pieces for renovation projects or create your own masterpieces quickly and easily.

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### Features

- Versatile – An easily decorated surface accepts most oil-base, alkyd, or latex paints, and most stains, lacquers, varnishes, or shellacs to create just the right finish for your application.
- Thin and Lightweight – HYDROCAL FGR Gypsum Cement panels 1/10 in. thick weigh only 9 to 10 lb. per sq. ft., reducing the costs of reinforcing the building.
- Strong – Because HYDROCAL FGR Gypsum Cement is reinforced with glass fibers it is strong and durable. Test results show a flexural strength of 4,000 psi, flexural modulus of  $2.1 \times 10^6$  psi, and impact strength of 8.0 to 8.8 psi.\*
- Fire Resistant – Laboratory fire tests conducted on varying thicknesses of HYDROCAL FGR Gypsum Cement (with 5% to 6% glass fiber content and without face coating) substantiate its non-combustibility and show no appreciable fuel contribution and zero flame spread.
- Easy to Install – HYDROCAL FGR Gypsum Cement can be pre-cast off-site allowing less work in the field.

\* Modified Charpy method per ASTM D256-93A.

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### Comparative Tests

- The following table compares typical physical test results of glass-reinforced gypsum with other

products for related uses:

Products	Density (lb./ft <sup>3</sup> )	Flexural Strength (psi)	Modulus of Elasticity (x 10 <sup>6</sup> psi)	Impact (ft. lb./in.)	Fiber Content (wt. %)
Glass-Reinforced Gypsum	103-112	3200-4000	2.1-2.2	8.0-8.8	5-6
Plaster of Paris	72	900	0.68	4.8-5.0	--
Fiber-Reinforced Plastics	91	18000	0.8	13.0	25
Hardboard <sup>1</sup>	53/58	3800/4400	0.46/0.56	3.4/4.3	97
Gypsum Board <sup>1</sup>	44	420/1400	0.1/0.2	--	--
Plywood	38	2000	1.6	--	--

<sup>1</sup>Properties may vary with the direction fabrication. Thus, properties for both directions are given.

## Typical Physical Properties

Matrix	HYDROCAL FGR Gypsum Cement
Set Time	90-120 min. (FGR-115, spray application) 50-70 min. (FGR-95, hand application)
Consistency	25-30 cc
Glass Fiber	5-6% by weight Type E chopped to 3/4" length
Flexural Strength	3200-4000 psi
Modulus of Elasticity in Flexure	2.1-2.2 10 <sup>6</sup> psi
Ultimate Tensile Strength	1200-1400 psi
Modulus of Elasticity in Tension	2.7-3.8 x 10 <sup>6</sup> psi
Impact Strength	8.0-8.8 ft. lb./in. *
Thermal Conductivity	4.0-4.2 Btu/hr. x ft. <sup>2</sup> x °F
Specific Heat	0.253 Btu/lb. x °F
Flammability	Zero flame spread Zero smoke contribution. (Per ASTM 136-94A.)
Rockwell Hardness	M72
Dielectric Strength	Same as air when dry; conductive when wet
Density	103-112 lb./ft. <sup>3</sup>
Thermal Coefficient of	8.3 x 10 <sup>D6</sup> in./in./°F

Expansion	
Coverage	100 lb. of Hydrocal FGR Gypsum Cement 125 ft. <sup>2</sup> - 1/10" thick

\* Modified Charpy method per ASTM D256-93A.

## Architectural Specifications

### Part I – General

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- 1.01 Scope This specification for HYDROCAL FGR Gypsum Cement is a guide in the preparation of a specification which can be adapted to specific projects and conditions. These specifications are not intended to cover every possible job condition, but rather to assist in preparation of specifications.
- 1.02 Related Systems
- A. Gypsum board systems. Section \_\_\_\_\_.
  - B. Paint systems. Section \_\_\_\_\_.
  - C. Acoustical systems. Section \_\_\_\_\_.
  - D. Plaster systems. Section \_\_\_\_\_.
  - E. Work installed but furnished under other sections. Section \_\_\_\_\_.
  - F. Work furnished but installed under other sections. Section \_\_\_\_\_.
- 1.03 Quality Assurance
- A. Subcontractor qualifications: Part manufacturer shall have not less than three years of successful experience in the manufacturing and molding of glass-reinforced gypsum. Installer shall have not less than three years successful experience in the installation of the specified work and be acceptable to the part manufacturer.
  - B. Requirements of regulatory agencies: Codes and regulations of authorities having jurisdiction.
- 1.04 References
- A. ASTM C11: Terminology relating to gypsum and related building materials and systems.
  - B. ASTM CXXX/XXXM<sup>1</sup>: Standard Specification for FGR Glass and Fiber Reinforced Gypsum Parts.
  - C. ASTM CXXX/XXXM<sup>1</sup>: Standard Specification for Molded Glass Fiber Reinforced Gypsum Parts.
  - D. ASTM E84: Test Method for Surface Burning Characteristics of Building Materials.
  - E. CISCA "Glass Reinforced Gypsum, A Guide."
- <sup>1</sup> Currently under review by ASTM.
- 1.05 Submittals
- A. System details: Submit manufacturer's catalog cuts, literature of standard drawings showing details of the system with product conditions clearly identified, and manufacturer's recommended installation instructions.
  - B. Shop drawings: Submit full, complete detailed shop drawings for all Hydrocal FGR Gypsum Cement construction. Submit shop drawing details and reflected ceiling plans if necessary, to indicate ceiling modules

and related lighting and mechanical systems. Show dimensional location of framing and support details for Hydrocal FGR Gypsum Cement items supported by suspension systems.

- C. Samples: Submit Hydrocal FGR Gypsum Cement panel finishes to architect for acceptance.
  
- A. Raw materials: All raw materials, except water, shall be delivered and stored in their original unopened packages in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or delivered materials shall be removed from the premises.
- B. Finished materials:
  - 1. Deliver materials in original unopened containers, clearly labeled with manufacturer's name, item description, specification number, type, and class, as applicable.
  - 2. Storage time on the job site should be as short as possible, and environmental conditions should be as near as possible to those specified for occupancy. Excess humidity during storage can cause expansion of the installation. Chemical changes in the reinforcement mat and coating can be aggravated by excess humidity and cause discoloration when storing even unopened containers. Damaged or deteriorated materials shall be removed from the premises. Immediately before installation, store items at a location where temperature and humidity conditions duplicate ambient during installation and anticipated for occupancy.
  - 3. Installation conditions should be at or near those under standard occupancy conditions of temperature and humidity 60-85°F (16-29°C), no more than 70% relative humidity.
  - 4. Handle in such a manner as to ensure against racking distortion or physical damage of any kind.

1.06  
Delivery,  
Storage, and  
Handling

1.07 Project  
Conditions

- A. Existing conditions: (Include specific alteration work to be completed for project.)
- B. Environmental requirements: Building shall be enclosed with all windows and exterior doors in place and glazed, and the roof watertight before installation of Hydrocal FGR Gypsum Cement systems. Wet work shall be in place, completed and nominally dry with HVAC system in continuous operation. Maintain climate conditions to range from 60-85°F (16-29°C) and relative humidity of not more than 70% before installation of Hydrocal FGR Gypsum Cement system.
- C. Coordination with other work:
  - 1. Coordinate with other work supported by or penetrating through ceiling, including mechanical and electrical work and partition

- systems.
  - 2. Duct work above suspension system and behind wall systems shall be complete and permanent heating and cooling systems operating.
  - 3. Installation to conduit above suspension system and behind wall systems shall be complete before installations of Hydrocal FGR Gypsum Cement System.
- D. Protection: Protect all completed Hydrocal FGR Gypsum Cement system work from damage.

## Part II – Products

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| 1.01<br>Manufacturer<br>and Materials | <ul style="list-style-type: none"> <li>● A. Alpha-calcium sulfate hemihydrate plaster: Hydrocal FGR-95 or 115 Gypsum Cement as manufactured by United States Gypsum Company, Industrial Division Division, Chicago, Illinois, U.S.A.</li> <li>● B. Glass fiber reinforcement: "E" glass fiber (3×49 long chopped glass fiber strands or continuous strand mats of calcia-alumina silicate glass) which conforms to test method D578.</li> <li>● C. Water: Potable without impurities that affect the setting of gypsum cements.</li> <li>● D. Mixing           <ul style="list-style-type: none"> <li>○ 1. Combine and mix Hydrocal FGR Gypsum Cement to water according to United States Gypsum Company's recommendations to form a slurry.</li> <li>○ 2. Combine the slurry with not less than 5% by weight glass fiber reinforcement to form the architectural detail not less than 1/8" in thickness.</li> </ul> </li> <li>● E. Accessories           <ul style="list-style-type: none"> <li>○ 1. Fasteners and inserts: As recommended by the engineer and or fastener manufacturer for specific application.</li> <li>○ 2. Adhesive: As recommended by manufacturer where required.</li> <li>○ 3. Sealant: Sheetrock® brand Acoustical Sealant.</li> <li>○ 4. Joint treatment: See Product Folder SA927 Gypsum Panels &amp; Accessories. Sheetrock Joint Tape Sheetrock Fiberglass Drywall Tape Sheetrock Setting-Type (Durabond®) or Lightweight Setting-Type (Easy Sand™) Joint Compounds.</li> </ul> </li> <li>● F. Performance:           <ul style="list-style-type: none"> <li>○ 1. Shell thickness minimum 1/8" thickness.</li> <li>○ 2. Surface burning characteristics: Material shall be noncombustible having a flame spread/smoke developed values less than 0/10.</li> </ul> </li> </ul> |
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### Part III – Execution

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Installation:

- A. Installer must verify actual field dimensions prior to installation.
- B. Install in accordance with CISCA recommendations, and local building codes.
- C. Install in accordance with manufacturer's current printed recommendations.
- D. Install all Hydrocal FGR Gypsum Cement panels true plumb and level and in accordance with approved shop drawings.
- E. Fasteners as recommended by fastener manufacturer for specific job conditions.

