

DESIGN FREEDOM  
**Hydrocal® FGR Gypsum Cement**  
**USG**



**HYDROCAL® FGR Gypsum Cement-**  
A strong, thin gypsum cement that provides  
unlimited architectural possibilities.

## Column Domes



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, often at less cost using the unique properties of HYDROCAL FGR Gypsum Cement.

Used/or 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 interior 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 almost 100 years of experience in the building industry, you can be sure that you are getting the best product available.

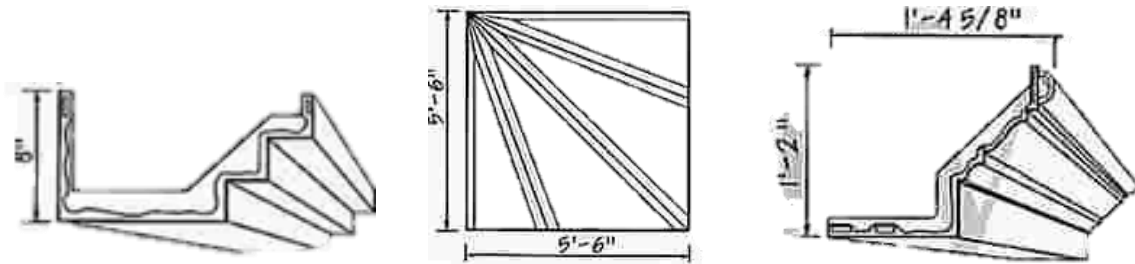
HYDRO CAL FGR Gypsum Cement sets fast, develops high strength and permits fabrication of strong, resilient glass-reinforced gypsum products. These durable products are fire-resistant, are adaptable to deep patterns, accept most coatings, help overcome the building fire code problems of many plastics, and cost about 23 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.



Elevator Lobby for Scudder, Stevens & Clark Financial Offices



Old Saint Patricks Church basement renovation

**Light Covers**

HYDROCAL FGR Gypsum Cement can be cast into lightweight, interior architectural elements, like these tent-shaped light covers, giving you the freedom to change the atmosphere of a space without expensive reinforcement costs.

## Capitals & Cornices



New construction, restoration in Nashville, Tennessee

HYDROCAL FGR Gypsum Cement provides fabrication flexibility, making it easy to produce everything from simple, elegant cornices to richly ornate capitals and medallions.



Bank of America historical restoration

## Offsets



HYDROCAL FGR Gypsum Cement erases limitations when renovating damaged areas without compromising historical beauty—architectural design elements can be pre-cast offsite from original pieces to exacting detail and easily decorated with a wide range of finishes.

HYDROCAL® FGR Gypsum Cement's great looks combine with the following features to provide all the design freedom you need:

- **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**— $\frac{1}{10}$  in. thick HYDROCALFGR Gypsum Cement panels weigh only 9 to 10 lb. per sq. ft., reducing the costs of reinforcing the building.
- **Strong**—Because HYDROCALFGR 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 ft. lb./in.
- **Fire Resistant**—Laboratory fire tests conducted on varying thicknesses of HYDROCALFGR Gypsum Cement (with 5% glass fiber content and without face coating) substantiate its noncombustibility and show no appreciable fuel contribution and zero flame spread. (The tests were conducted in accordance with ASTM E136-94A "Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 °C")
- **Easy to Install**—HYDROCALFGR Gypsum Cement can be precast off-site allowing less work in the field and reduction of on-site costs.

## 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 of 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 $\frac{3}{8}$ " length
Flexural Strength	3200-4000 psi
Modulus of Elasticity in Flexure	2.1-2.2 x 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. <sup>†</sup>
Thermal Conductivity	4.0-4.2 Btu x in./hr. x ft. <sup>2</sup> °F
Specific Heat	0.253 Btu/lb. °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 Expansion	8.3 x 10 <sup>-6</sup> in./in./°F
Coverage	100 lb. of HYDROCAL FGR Gypsum Cement 125 ft. <sup>2</sup> - 1/10" thick

## Architectural Specifications

### Part I—General

#### 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.
- B. Paint systems.
- C. Acoustical systems.

- D. Plaster systems.
- E. Work installed but furnished under other sections.
- F. Work furnished but installed under other sections.

### 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/XXXM1: Standard Specification for FGR Glass and Fiber Reinforced Gypsum Parts.
- C. ASTM CXXX/XXXM1: 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."

### 1.05 Submittals

- A. System details: Submit manufacturer's catalogue 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 constructions. Submit shop drawing details and reflected ceiling plans if necessary to indicate ceiling modules and related lighting and mechanical. 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.

### 1.06 Delivery, Storage, and Handling

- A. Raw materials: All raw materials, except water, shall be delivered and stored in their original unopened pack- ages 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 labelled 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.

## 1.07 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 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 sus- pension 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

### 1.01 Manufacturer and Materials

- A. Alpha-calcium sulphate hemihydrate plaster: HYDROCAL FGR-95 or 115 Gypsum Cement as manufactured by United States Gypsum Company, Industrial Gypsum Division, Chicago, Illinois, U.S.A.
- 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.
- C. Water: Potable without impurities that affect the setting of gypsum cements.
- D. Mixing
  1. Combine and mix HYDROCAL FGR Gypsum Cement to water according to United States Gypsum Company’s recommendations to form a slurry.
  2. Combine the slurry with not less than 5% by weight glass fiber reinforcement to form the architectural detail not less than 1/89 in thickness.
- E. Accessories
  1. Fasteners and inserts: As recommended by the engineer and or fastener manufacturer for specific application.
  2. Adhesive: As recommended by manufacturer where required.
  3. Sealant: SHEETROCK® brand Acoustical Sealant.



4. Joint treatment: See Product Folder SA927 Gypsum Panels & Accessories.

SHEETROCK Joint Tape

SHEETROCK Fiberglass Drywall Tape

SHEETROCK Setting-Type (DURABONDT)

Or lightweight setting-Type (Easy Sande) joint compounds.

F. Performance

1. Shell thickness minimum 1/19 thickness.

2. Surface burning characteristics: Material shall be non-combustible having a flame spread/smoke developed values less than 0/10.

## Part III—Execution

### 1.01 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.

All cast work (except Nashville work) courtesy of McNulty Bros., Chicago, Illinois. Nashville cast work and photos courtesy of Cast Design & Supply, Shelbyville, Tennessee.

**SAFETY FIRST!** Follow good safety and industrial hygiene practices during handling and installing of all products and systems. Take necessary precautions and wear the appropriate personal protective equipment as needed. Read material safety data sheets and related literature on products before specification and/or installation.

**NOTICE:** We shall not be liable for incidental and consequential damages, directly or indirectly sustained, nor for any loss caused by application of these goods not in accordance with current printed instructions or for other than the intended use. Our liability is expressly limited to replacement of defective goods. Any claim shall be deemed waived unless made in writing to us within thirty (30) days from date it was or reasonably should have been discovered.,

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IG338/119