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USACE / NAVFAC / AFCEC / NASA | UFGS-09 29 00 (August 2016)
Change 4 - 02/20

Preparing Activity: NAVFAC | Superseding
UFGS-09 29 00 (May 2011)

UNIFIED FACILITIES GUIDE SPECIFICATIONS

References are in agreement with UMRL dated July 2023
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SECTION 09 29 00

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08/16, CHG 4: 02/20

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SECTION 09 29 00

GYPSUM BOARD
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****
NOTE: This guide specification includes the requirements for gypsum board, cementitious backer units, and accessories intended for use in drywall construction.

Adhere to UFC 1-300-02 Unified Facilities Guide Specifications (UFGS) Format Standard when editing this guide specification or preparing new project specification sections. Edit this guide specification for project specific requirements by adding, deleting, or revising text. For bracketed items, choose applicable item(s) or insert appropriate information.

Remove information and requirements not required in respective project, whether or not brackets are present.

Comments, suggestions and recommended changes for this guide specification are welcome and should be submitted as a Criteria Change Request (CCR).

Reference Section 05 40 00 COLD-FORMED METAL FRAMING for load bearing studwork. Reference Section 09 22 00 SUPPORTS FOR PLASTER AND GYPSUM BOARD for non-loadbearing studs, furring and ceiling suspension systems.
****

****
NOTE: On the drawings, show:

1. Locations of each type of gypsum board, backing board and cementitious backer units, using same terminology as in the specification.

2. Locations and UL or GA design numbers for fire rated gypsum board and cementitious backer unit assemblies.

3. Locations of asphalt impregnated building felt if gypsum sheathing is used or if cementitious backer units are used in wet areas.

****

PART 1 GENERAL

1.1 REFERENCES

****

NOTE: This paragraph is used to list the publications cited in the text of the guide specification. The publications are referred to in the text by basic designation only and listed in this paragraph by organization, designation, date, and title.

Use the Reference Wizard's Check Reference feature when you add a Reference Identifier (RID) outside of the Section's Reference Article to automatically place the reference in the Reference Article. Also use the Reference Wizard's Check Reference feature to update the issue dates.

References not used in the text will automatically be deleted from this section of the project specification when you choose to reconcile references in the publish print process.

****

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI A108.11	(1992; Reaffirmed 2005) Specifications for Interior Installation of Cementitious Backer Units

ASTM INTERNATIONAL (ASTM)

ASTM C475/C475M	(2017; R 2022) Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board
ASTM C514	(2004; R 2020) Standard Specification for Nails for the Application of Gypsum Board
ASTM C557	(2003; R 2017) Standard Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing
ASTM C840	(2020) Standard Specification for Application and Finishing of Gypsum Board
ASTM C954	(2022) Standard Specification for Steel Drill Screws for the Application of Gypsum

	Panel Products or Metal Plaster Bases to Steel Studs from 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness
ASTM C1002	(2022) Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs
ASTM C1047	(2019) Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base
ASTM C1177/C1177M	(2017) Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing
ASTM C1178/C1178M	(2013) Standard Specification for Glass Mat Water-Resistant Gypsum Backing Panel
ASTM C1396/C1396M	(2017) Standard Specification for Gypsum Board
ASTM C1629/C1629M	(2018a) Standard Classification for Abuse-Resistant Nondecorated Interior Gypsum Panel Products and Fiber-Reinforced Cement Panels
ASTM C1766	(2015; R2019) Standard Specification for Factory-Laminated Gypsum Panel Products
ASTM D226/D226M	(2017) Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing
ASTM D412	(2016; R 2021) Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers - Tension
ASTM D624	(2000; R 2020) Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers
ASTM D1037	(2012) Evaluating Properties of Wood-Base Fiber and Particle Panel Materials
ASTM D1149	(2007; R 2012) Standard Test Method for Rubber Deterioration - Surface Ozone Cracking in a Chamber
ASTM D2394	(2017) Standard Test Methods for Simulated Service Testing of Wood and Wood-Base Finish Flooring
ASTM D3273	(2021) Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber

ASTM D5420	(2016) Standard Test Method for Impact Resistance of Flat, Rigid Plastic Specimen by Means of a Strike Impacted by a Falling Weight (Gardner Impact)
ASTM E84	(2023) Standard Test Method for Surface Burning Characteristics of Building Materials
ASTM E90	(2009; R2016) Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements
ASTM E336	(2023) Standard Test Method for Measurement of Airborne Sound Attenuation between Rooms in Buildings
ASTM E695	(2022) Standard Test Method of Measuring Relative Resistance of Wall, Floor, and Roof Construction to Impact Loading

CALIFORNIA DEPARTMENT OF PUBLIC HEALTH (CDPH)

CDPH SECTION 01350	(2017; Version 1.2) Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources using Environmental Chambers

FM GLOBAL (FM)

FM APP GUIDE	(updated on-line) Approval Guide http://www.approvalguide.com/

GREEN SEAL (GS)

GS-36	(2013) Adhesives for Commercial Use

GYPSUM ASSOCIATION (GA)

GA 214	(2010) Recommended Levels of Gypsum Board Finish
GA 216	(2016) Application and Finishing of Gypsum Panel Products
GA 224	(2008) Installation of Predecorated Gypsum Board
GA 253	(2012) Application of Gypsum Sheathing
GA 600	(2015) Fire Resistance Design Manual Sound Control

SCIENTIFIC CERTIFICATION SYSTEMS (SCS)

SCS	SCS Global Services (SCS) Indoor Advantage

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT (SCAQMD)

SCAQMD Rule 1168	(2017) Adhesive and Sealant Applications

UNDERWRITERS LABORATORIES (UL)

UL 2818	(2022) GREENGUARD Certification Program For Chemical Emissions For Building Materials, Finishes And Furnishings
UL Fire Resistance	(2014) Fire Resistance Directory

1.2 SUBMITTALS

****

NOTE: Review Submittal Description (SD) definitions in Section 01 33 00 SUBMITTAL PROCEDURES and edit the following list, and corresponding submittal items in the text, to reflect only the submittals required for the project. The Guide Specification technical editors have classified those items that require Government approval, due to their complexity or criticality, with a "G." Generally, other submittal items can be reviewed by the Contractor's Quality Control System. Only add a "G" to an item if the submittal is sufficiently important or complex in context of the project.

For Army projects, fill in the empty brackets following the "G" classification, with a code of up to three characters to indicate the approving authority. Codes for Army projects using the Resident Management System (RMS) are: "AE" for Architect-Engineer; "DO" for District Office (Engineering Division or other organization in the District Office); "AO" for Area Office; "RO" for Resident Office; and "PO" for Project Office. Codes following the "G" typically are not used for Navy, Air Force, and NASA projects.

The "S" classification indicates submittals required as proof of compliance for sustainability Guiding Principles Validation or Third Party Certification and as described in Section 01 33 00 SUBMITTAL PROCEDURES.

Choose the first bracketed item for Navy, Air Force, and NASA projects, or choose the second bracketed item for Army projects.

****

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are [for Contractor Quality Control approval.][for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government.] Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Cementitious Backer Units

Glass Mat Water-Resistant Gypsum Tile Backing Board

Water-Resistant Gypsum Backing Board

[Glass Mat Covered or Reinforced Gypsum Sheathing

][Glass Mat Covered or Reinforced Gypsum Sheathing Sealant

][Abuse Resistant Gypsum Board

] Accessories

Submit for each type of gypsum board and for cementitious backer units.

Gypsum Board

[Recycled Content for Gypsum Board; S

][Recycled Content for Paper Facing and Gypsum Cores; S

] VOC Content of Joint Compound; S

SD-04 Samples

Predecorated Gypsum Board; G[, [_____]]

Submit for each color and pattern of predecorated gypsum board. Where colors are not indicated, submit color selection samples of not less than eight of the manufacturer's standard colors.

SD-06 Test Reports

[ASTM E90 Factory Test Report; G[, [_____]]

][ASTM E336 Field Test Report; G[, [_____]]

] SD-07 Certificates

Asbestos Free Materials; G[, [_____]]

Certify that gypsum board types, gypsum backing board types, cementitious backer units, and joint treating materials do not contain asbestos.

Indoor Air Quality for Gypsum Board; S

Indoor Air Quality for Non-aerosol Adhesives; S

Indoor Air Quality for Aerosol Adhesives; S

SD-08 Manufacturer's Instructions

Safety Data Sheets

SD-10 Operation and Maintenance Data

Manufacturer Maintenance Instructions

1.3 CERTIFICATIONS

1.3.1 Indoor Air Quality Certifications

Submit required indoor air quality certifications in one submittal package.

****

NOTE: The Government's preference is for use of products that have been certified for indoor air quality by a third-party organization such as Greenguard or SCS Global Services. However, it must be verified there is a certified product available that is both cost effective and appropriate for the project. Retain the following section when the designer of record confirms local/regional availability of Greenguard or SCS products that does not impact cost effectiveness.

****

[1.3.1.1 Ceiling and Wall Systems

Provide products certified to meet indoor air quality requirements by UL 2818 (Greenguard) Gold, SCS Global Services Indoor Advantage Gold or provide certification or validation by other third-party program that products meet the requirements of this Section. Provide current product certification documentation from certification body. When product does not have certification, provide validation that product meets the indoor air quality product requirements cited herein.

]1.3.1.2 Adhesives and Sealants

Provide products certified to meet indoor air quality requirements by UL 2818 (Greenguard) Gold, SCS Global Services Indoor Advantage Gold or provide certification or validation by other third-party program that products meet the requirements of this Section. Provide current product certification documentation from certification body. When product does not have certification, provide validation that product meets the indoor air quality product requirements cited herein.

1.4 DELIVERY, STORAGE, AND HANDLING

1.4.1 Delivery

Deliver materials in the original packages, containers, or bundles with each bearing the brand name, applicable standard designation, and name of manufacturer, or supplier.

1.4.2 Storage

****

NOTE: Gypsum board provides a sink for adsorbing high short-term emissions of VOCs, formaldehyde, particulates, or other air-borne compounds. Materials with high short-term emissions include, but are not limited to: adhesives, sealants and glazing compounds (specifically those with

petrochemical vehicles or carriers); paint, wood preservatives, and finishes; control and/or expansion joint fillers; hard finishes requiring adhesive installation; gypsum board (with associated finish processes and products); and composite or engineered wood products with formaldehyde binders.

****

Keep materials dry by storing inside a sheltered building. Where necessary to store gypsum board and cementitious backer units outside, store off the ground, properly supported on a level platform, and protected from direct exposure to rain, snow, sunlight, and other extreme weather conditions. Provide adequate ventilation to prevent condensation. Store per manufacturer's recommendations for allowable temperature and humidity range. Do not store gypsum wallboard with materials which have high emissions of volatile organic compounds (VOCs) or other contaminants, including [_____]. Do not store panels near materials that may offgas or emit harmful fumes, such as kerosene heaters, fresh paint, or adhesives. Do not use materials that have visible moisture or biological growth.

1.4.3 Handling

Neatly stack gypsum board and cementitious backer units flat to prevent sagging or damage to the edges, ends, and surfaces.

1.5 QUALIFICATIONS

Furnish type of gypsum board work specialized by the installer with a minimum of [3] [_____] years of documented successful experience.

1.6 SCHEDULING

****

NOTE: Use one or both of the following procedures to minimize the exposure of gypsum wallboard to materials or finishes which have high short-term emissions of VOCs, formaldehyde, particulates, or other air-borne compounds.

****

[The gypsum wallboard must be taped, finished and primed before the installation of the highly-emitting materials, including [_____].] [The gypsum wallboard must be installed after the installation and ventilation period of the highly-emitting materials, including [_____].]

Commence application only after the area scheduled for gypsum board work is completely weathertight. The heating, ventilating, and air-conditioning systems must be complete and in operation prior to application of the gypsum board. If the mechanical system cannot be activated before gypsum board is begun, the gypsum board work may proceed in accordance with an approved plan to maintain the environmental conditions specified below. Apply gypsum board prior to the installation of finish flooring and acoustic ceiling.

1.7 ENVIRONMENTAL REQUIREMENTS

****

NOTE: Gypsum board is a thin sheathing that will be

adversely affected by extreme or non-uniform drying conditions and by rapid changes in temperature. It should not be used in spaces where adequate environmental control cannot be obtained.
****

Do not expose the gypsum board to excessive sunlight prior to gypsum board application. Maintain a continuous uniform temperature of not less than 10 degrees C 50 degrees F and not more than 27 degrees C 80 degrees F for at least one week prior to the application of gypsum board work, while the gypsum board application is being done, and for at least one week after the gypsum board is set. Shield air supply and distribution devices to prevent any uneven flow of air across the plastered surfaces. Provide ventilation to exhaust moist air to the outside during gypsum board application, set, and until gypsum board jointing is dry. In glazed areas, keep windows open top and bottom or side to side 75 to 100 mm 3 to 4 inches. Reduce openings in cold weather to prevent freezing of joint compound when applied. For enclosed areas lacking natural ventilation, provide temporary mechanical means for ventilation. In unglazed areas subjected to hot, dry winds or temperature differentials from day to night of 10 degrees C 20 degrees F or more, screen openings with cheesecloth or similar materials. Avoid rapid drying. During periods of low indoor humidity, provide minimum air circulation following gypsum boarding and until gypsum board jointing complete and is dry.

[1.8 FIRE RESISTIVE CONSTRUCTION

****
NOTE: For fire-resistive assemblies, drawing details must follow the tested and approved designs. Tested and approved designs are published by gypsum wallboard manufacturers, Underwriters Laboratory, and Factory Mutual, and are included in the Gypsum Association Fire Resistance Design Manual.
****

Comply with specified fire-rated assemblies for design numbers indicated per UL Fire Resistance or FM APP GUIDE.

]PART 2 PRODUCTS

2.1 MATERIALS

****
NOTE: Check ASTM C840, GA 216 and ANSI A108.11 for details of materials, fasteners, and application.
****

Conform to specifications, standards and requirements specified. Provide gypsum board types, gypsum backing board types, cementitious backing units, and joint treating materials manufactured from asbestos free materials only. Submit Safety Data Sheets and manufacturer maintenance instructions for gypsum materials including adhesives.

2.1.1 Gypsum Board

****
Use materials with recycled content where appropriate for use. Verify suitability,

availability within the region, cost effectiveness and adequate competition (including verification of bracketed percentages included in this guide specification) before specifying product recycled content requirements. A resource that can be used to identify products with recycled content is the "Comprehensive Procurement Guidelines (CPG)" page within the EPA's website at http://www.epa.gov. Other products with recycled content are also acceptable when meeting all requirements of this specification.

Section allows establishing recycled content requirements based on either the gypsum board product in its entirety, or on the paper facing and gypsum core separately. Include the first bracketed sentence if specifying a recycled product in its entirety; include the second bracketed sentence if specifying a recycled product based on its separate components. Research shows the product is available from US national manufacturers above the minimum recycled content of the first bracket. Some manufacturers and regions have higher percentages (for components that have a threshold less than 100 percent). Based on research, insert desired minimum percentages into the empty set of brackets.
****

ASTM C1396/C1396M.[Gypsum board must contain a minimum of [5][10][_____] percent post-consumer recycled content, or a minimum of [20][40][_____] percent post-industrial recycled content. Provide data identifying percentage of recycled content for gypsum board.][Paper facings must contain a minimum of 100 percent recycled paper content. Gypsum cores must contain a minimum of [95][_____] percent post-industrial recycled gypsum content. Provide data identifying percentage of recycled content for paper facing and gypsum cores.] Provide gypsum wall board and panels meeting the emissions requirements of CDPH SECTION 01350 (limit requirements for either office or classroom spaces regardless of space type). Provide certification or validation of indoor air quality for gypsum board.

2.1.1.1 Regular

****
NOTE: Use tapered and featured edge gypsum board with embedding and finishing compounds when a very flat surface is required, such as long walls with lighting at the end of the wall and down or up lighted walls.
****

1200 mm 48 inch wide, [12.7] [15.9] mm [1/2] [5/8] inch thick, [tapered][, tapered and featured] edges. [Provide tapered and featured edge gypsum board [in Rooms [_____]] [as indicated].]

2.1.1.2 Foil-Backed

1200 mm 48 inch wide, [12.7] [15.9] mm [1/2] [5/8] inch thick, [tapered] [tapered and featured] edges.

2.1.1.3 Type X (Special Fire-Resistant)

1200 mm 48 inch wide, [12.7] [15.9] mm [1/2] [5/8] inch thick, [tapered] [tapered and featured] edges.

2.1.1.4 Mold Resistant / Anti-Microbial Gypsum

ASTM D3273. 1200 mm 48 inch wide, [12.7] [15.9] mm [1/2] [5/8] inch thick, [tapered][tapered and featured] edges.

2.1.2 Gypsum Backing Board

****
NOTE: When thicker board is needed, replace the term "backing board" with "coreboard", and change dimension to 19.05 to 25.4 mm 3/4 to 1 inch, depending on system used.
****

ASTM C1396/C1396M, gypsum backing board must be used as a base in a multilayer system.

2.1.2.1 Regular

1200 mm 48 inch wide, [12.7] [15.9] mm [1/2] [5/8] inch thick, square edges.

2.1.2.2 Foil-Backed

1200 mm 48 inch wide, [12.7] [15.9] mm [1/2] [5/8] inch thick, square edges.

2.1.2.3 Type X (Special Fire-Resistant)

1200 mm 48 inch wide, [12.7] [15.9] mm [1/2] [5/8] inch thick, square edges.

2.1.3 Regular Water-Resistant Gypsum Backing Board

****
NOTE: For adhesive applied ceramic tile in wet areas (tubs, shower enclosures, saunas, steam rooms, gang shower rooms, etc.), use cementitious backer units (Tile Council of America (TCA) Handbook) as a substrate. Specify ASTM C1396/C1396M or ASTM C1178/C1178M for all other tiled areas including areas where only ceramic or quarry tile base is to be installed, and for ceilings in humid areas. When using water-resistant gypsum backing board at tile applications, the metal studs should not be spaced more than 406 mm 16 inches o.c. Specify moisture resistant gypsum board ASTM C1396/C1396M for humid areas that are not exposed to direct moisture.

When using moisture resistant board on ceilings, spacing of supports should be no more than 305 mm 12 inch on center.
****

****
NOTE: Additives used to produce water-resistant gypsum board ("green board") may include VOCs. Water-resistant types may be difficult to recycle.
****

ASTM C1396/C1396M

2.1.3.1 Regular

1200 mm 48 inch wide, [12.7] [15.9] mm [1/2] [5/8] inch thick, tapered edges.

2.1.3.2 Type X (Special Fire-Resistant)

1200 mm 48 inch wide, [12.7] [15.9] mm [1/2] [5/8] inch thick, tapered edges.

2.1.4 Glass Mat Water-Resistant Gypsum Tile Backing Board

ASTM C1178/C1178M

2.1.4.1 Regular

1200 mm 48 inch wide, [12.7] [15.9] mm [1/2] [5/8] inch thick, square edges.

2.1.4.2 Type X (Special Fire-Resistant)

1200 mm 48 inch wide, [12.7] [15.9] mm [1/2] [5/8] inch thick, square edges.

[2.1.5 Glass Mat Covered or Reinforced Gypsum Sheathing

****
NOTE: This section should be used where exterior gypsum sheathing with water resistance is required (i.e. cavity sheathing over metal studs with brick veneer or as substrate for EIFS systems). Always use asphalt impregnated felt paper for sheathing protection. For additional protection or if recommended by the manufacturer, choose the paragraph for sheathing sealant.
****

****
NOTE: Glass-fiber reinforced types may be difficult to recycle.
****

Exceeds physical properties of ASTM C1396/C1396M and ASTM C1177/C1177M. Provide [12.7] [15.9,] mm [1/2][5/8] inch, gypsum sheathing. Provide gypsum board of with a noncombustible water-resistant core, with glass mat surfaces embedded to the gypsum core or reinforcing embedded throughout the gypsum core. Warrant gypsum sheathing board for at least twelve months against delamination due to direct weather exposure. Provide continuous, asphalt impregnated, building felt to cover exterior face of sheathing. [Seal all joints, seams, and penetrations with compatible sealant.]

[2.1.5.1 Glass Mat Covered or Reinforced Gypsum Sheathing Sealant

Provide sealant compatible with glass mat covered or reinforced gypsum sheathing, rubber washers for masonry veneer anchors, and other associated cavity wall components such as anchors and through wall flashing. Provide sealants for glass mat covered or reinforced gypsum sheathing board edge seams and veneer anchor penetrations recommended by the glass mat covered or reinforced gypsum sheathing manufacturer and have the following performance requirements:

a. ASTM D412: Tensile Strength, 551 kilopascals 80 psi
b. ASTM D412: Ultimate Tensile Strength (maximum elongation), 1172 kilopascals 170 psi
c. ASTM D624: Tear Strength, dieB, 4.7 kN/m 27 ppi
d. ASTM D1149: Joint Movement Capability after 14 Days cure, plus or minus 50 percent.

]][2.1.6 Abuse Resistant Gypsum Board

****

Note: Abuse Resistant Gypsum Board Should Be Used When Abuse Or Vandalism Of Walls Is Anticipated And Gypsum Board Is The Only Wall Material Alternative Feasible. Consult Manufacture For Use Restrictions Of Abuse Resistant Gypsum Board On Exterior Walls. This Product Requires A Minimum Of 20 Gauge Metal Framing As Support, Coordinate with Section 09 22 00 SUPPORTS FOR PLASTER AND GYPSUM BOARD.

Some products rely on lexan backing for penetration resistance. The impervious layer will act as a vapor barrier which may not be desirable in certain wall systems and climates.

None of the paper faced gypsum products have high resistance to abrasion. Consider high strength veneer plaster on wall systems using abuse resistant gypsum wallboard, coordinate with Section 09 26 00 VENEER PLASTER.

****

1200 mm 48 inch wide, 15.9 mm 5/8 inch thick, tapered edges. Reinforced gypsum panel with imbedded fiber mesh or lexan backing tested in accordance with the following tests. Hard body impact test must attain a Level 2 performance in accordance with ASTM C1629/C1629M. Provide fasteners that meet manufacturer requirements and specifications stated within this section. Abuse resistant gypsum board, when tested in accordance with ASTM E84, have [a flame spread rating of 25 or less and a smoke developed rating of 50 or less for [_____]] [and] [a flame spread rating of 75 or less and a smoke developed rating of 100 or less for [_____]].

2.1.6.1 Soft Body Impact Test

ASTM E695 or ASTM D2394 for impact penetration and deformation. ASTM E695 using a 27.2 kg 60 lb leather bag filled with steel pellets, resisting no less than 407 N-m 300 ft. lb. cumulative impact energy before failure or ASTM D2394 using 139.7 mm 5.5 inch hemispherical projectile resisting no

less than 357 N-m 264 ft. lb. before failure. Provide test specimen stud spacing a minimum 406 mm 16 inch on center.

2.1.6.2 Hard Body Impact Test

Comply with hard body impact test in accordance with ASTM C1629/C1629M Classification Level 2.

2.1.6.3 Surface Abrasion Test

Comply with test surface abrasion test in accordance with ASTM C1629/C1629M.

2.1.6.4 Indentation Test

ASTM D5420 or ASTM D1037 for indentation resistance. ASTM D5420 using a .907 kg 32 oz weight with a 16 mm 5/8 inch hemispherical impacting head dropped once 915 mm 3 feet creating not more than 3.5 mm 0.137 inch indentation or ASTM D1037 using no less than 213 kg 470 lb weight applied to the 11.13 mm 0.438 inch diameter ball to create not more than a 0.5 mm 0.0197 inch indentation depth.

]2.1.7 Factory-Laminated Gypsum Board

****
NOTE: Specify Factory-laminated gypsum panels when using wall or ceiling assemblies to comply with high performance acoustical separation assemblies (laboratory tested assemblies STC 45 and above) noted in applicable DoD Unified Facilities Criteria (UFC). Such rooms and spaces can include conference rooms, partitions between living units, medical rooms and offices, rooms containing noise-generating equipment such as mechanical rooms, and secure spaces that are required to meet IC Tech Spec - for ICD/ICS 705, Technical Specifications for Construction and Management of Sensitive Compartmented Information Facilities. Coordinate on drawings location(s), laboratory testing number, sound rating performance and composition of each sound rated assembly.
****

[ASTM C1766, [regular] [Type X], 1200 mm 48 inch wide, [12.7] [15.9] mm [1/2] [5/8] inch thick, sound dampening gypsum panel products composed of [two [or more]] factory-laminated gypsum panel laminated into a composite panel.

][2.1.7.1 ASTM E90 Factory Test Report

****
NOTE: Include the following when using wall or ceiling assemblies intended to comply with acoustical separation assemblies noted in applicable DoD Unified Facilities Criteria (UFC) or perimeter of secure spaces that are required to meet IC Tech Spec - for ICD/ICS 705.
****

Submit Factory Test Report for proposed STC Rated wall assembly. Test

reports must be prepared by an independent acoustical laboratory qualified under the National Voluntary Laboratory Accreditation Program (NVLAP) by the National Institute for Science and Technology (NIST). Test reports must indicate that the sound transmission classification (STC) of the proposed wall [and ceiling] assembly, based on tests at 16 third-octave band frequencies from 125 to 4,000 hertz, is no less than STC 50 for STC 45 assemblies and no less than STC 55 for STC 50 assemblies when tested in accordance with ASTM E90.

]2.1.8 Predecorated Gypsum Board

****
NOTE: Predecorated gypsum board is available only in 1200 mm 48 inch wide panels. Interior finish materials for exits, hospitals, individual rooms with capacity for 5 or more persons must have a flame spread rating of 25 or less and smoked developed rating of 50 or less. Interior finish materials for other locations must have flame spread rating of 75 or less and smoke developed rating of 100 or less. Flame spread rating greater than 75 and smoke developed rating greater than 100 are not permitted. Refer to UFC 3-600-01, "Fire Protection Engineering for Facilities," for further guidance on specifying flame spread and smoke developed ratings.
****

****
NOTE: If the optional phrase "as selected" is not used to designate a color (and pattern), insert a manufacturer's name and color (and pattern) designation in the blank and add the following to the end of this paragraph "The manufacturer's name and catalog designation are provided in order to describe the color (and pattern) desired. Other manufacturer's products having a similar color (and pattern) will be acceptable."
****

****
NOTE: Insert designations of rooms or areas in which different flame spread and smoke developed ratings are required.
****

ASTM C1396/C1396M, [regular] [Type X] gypsum board, 1200 mm 48 inch wide, [12.7] [15.9] mm [1/2] [5/8] inch thick, with a decorative wall covering (Class I) [or coating (Class II)] applied in-plant by the gypsum board manufacturer. The color [and pattern] of wall covering must be [_____] [as selected]. Provide [_____] color [and pattern] wall covering selected. [Furnish gypsum board with square edges, and a slight bevel to produce a shallow vee joint. Wrap all coverings around edges.] Furnish a predecorated gypsum board with [a flame spread rating of 25 or less and a smoke developed rating of 50 or less for [_____]] [and] [a flame spread rating of 75 or less and a smoke developed rating of 100 or less for [_____]].

2.1.9 Cementitious Backer Units

****
NOTE: For adhesive applied ceramic tile in wet areas (tubs, shower enclosures, saunas, steam rooms, gang shower rooms), specify only cementitious backer units.
****

In accordance with the Tile Council of America (TCA) Handbook.

2.1.10 Joint Treatment Materials

ASTM C475/C475M. Product must be low emitting VOC types with VOC limits not exceeding 50 g/L. Provide data identifying VOC content of joint compound. [Use all purpose joint and texturing compound containing inert fillers and natural binders, including lime compound. Pre-mixed compounds must be free of antifreeze, vinyl adhesives, preservatives, biocides and other slow releasing compounds.]

2.1.10.1 Embedding Compound

Specifically formulated and manufactured for use in embedding tape at gypsum board joints and compatible with tape, substrate and fasteners.

2.1.10.2 Finishing or Topping Compound

Specifically formulated and manufactured for use as a finishing compound.

2.1.10.3 All-Purpose Compound

Specifically formulated and manufactured to serve as both a taping and a finishing compound and compatible with tape, substrate and fasteners.

2.1.10.4 Setting or Hardening Type Compound

Specifically formulated and manufactured for use with fiber glass mesh tape.

2.1.10.5 Joint Tape

Use cross-laminated, tapered edge, reinforced paper, or fiber glass mesh tape recommended by the manufacturer.

2.1.11 Fasteners

2.1.11.1 Nails

ASTM C514. [For predecorated gypsum board provide special nails with factory coated heads of color to match wall covering materials as recommended by the predecorated gypsum board manufacturer.]

2.1.11.2 Screws

ASTM C1002, Type "G", Type "S" or Type "W" steel drill screws for fastening gypsum board to gypsum board, wood framing members and steel framing members less than 0.84 mm 0.033 inch thick. ASTM C954 steel drill screws for fastening gypsum board to steel framing members 0.84 to 2.84 mm 0.033 to 0.112 inch thick. Provide cementitious backer unit screws with a

polymer coating.

2.1.11.3 Staples

1.5 mm thick No. 16 USS gage flattened galvanized wire staples with 11.1 mm 7/16 inch wide crown outside measurement and divergent point for base ply of two-ply gypsum board application. Use as follows:

Length of Legs	Thickness of Gypsum Board
28.6 mm 1-1/8 inches	12.7 mm 1/2 inch
31.8 mm 1-1/4 inches	15.9 mm 5/8 inch

2.1.12 Adhesives

Provide non-aerosol adhesive products used on the interior of the building (defined as inside of the weatherproofing system) meeting either emissions requirements of CDPH SECTION 01350 (limit requirements for either office or classroom spaces regardless of space type) or VOC content requirements of SCAQMD Rule 1168. Provide aerosol adhesive products used on the interior of the building (defined as inside of the weatherproofing system) meeting either emissions requirements of CDPH SECTION 01350 (limit requirements for either office or classroom spaces regardless of space type) or VOC content requirements of GS-36. Provide certification or validation of indoor air quality for non-aerosol adhesives applied on the interior of the building (inside of the weatherproofing system). Provide certification or validation of indoor air quality for aerosol adhesives used on the interior of the building (inside of the weatherproofing system).

2.1.12.1 Adhesive for Fastening Gypsum Board to Metal Framing

****
NOTE: Use adhesive only where screw type fastener attachment to metal framing is not possible to avoid difficulty with future gypsum recycling.
****

[Not permitted.][Type recommended by gypsum board manufacturer.]

2.1.12.2 Adhesive for Fastening Gypsum Board to Wood Framing

****
NOTE: Use adhesive only where screw type fastener attachment to wood framing is not possible to avoid difficulty with future gypsum recycling.
****

[Not permitted.][ASTM C557.]

2.1.12.3 Adhesive for Laminating

****
NOTE: Use adhesive only where screw type fastener attachment is not possible to avoid difficulty with future gypsum recycling.
****

[Not permitted.][Adhesive attachment is not permitted for multi-layer gypsum boards. For laminating gypsum studs to face panels, provide adhesive recommended by gypsum board manufacturer.]

2.1.13 Gypsum Studs

Provide 25 mm one inch minimum thickness and 150 mm 6 inch minimum width. Studs may be of 25 mm one inch thick gypsum board or multilayers fastened to required thickness. Conform to ASTM C1396/C1396M for material and GA 216 for installation.

2.1.14 Shaftwall Liner Panel

****
NOTE: Shaftwall panels are typically used for elevators, stairwells and mechanical chases that penetrate rated floor systems. When using shaftwall system, edit Section 09 22 00 SUPPORTS FOR PLASTER AND GYPSUM BOARD to include shaftwall liner panel metal studs.
****

ASTM C1396/C1396M. Conform to the UL Fire Resistance for the Design Numbers(s) indicated for shaftwall liner panels. Manufacture liner panel for cavity shaftwall system, with water-resistant paper faces, bevel edges, single lengths to fit required conditions, [25.4 mm] [19.05 mm] [1 inch] [3/4 inch] thick, by 610 mm 24inch wide.

2.1.15 Accessories

****
NOTE: In areas of high humidity or project locations with Environmental Severity Classifications (ESC) of C3 thru C5, use PVC or plastic trim and accessories. Galvanized metal will rust over time. Humid project locations are those in ASHRAE climate zones 0A, 1A, 2A, 3A, 3C, 4C and 5C (as identified in ASHRAE 90.1). See UFC 1-200-01 for determination of ESC for project locations.
****

ASTM C1047. Fabricate from [corrosion protected steel][or][plastic] designed for intended use. Accessories manufactured with paper flanges are not acceptable. Flanges must be free of dirt, grease, and other materials that may adversely affect bond of joint treatment. Provide prefinished or job decorated materials. [For predecorated gypsum board provide prefinished metal or plastic trim to match predecorated gypsum board.]

2.1.16 Asphalt Impregnated Building Felt

Provide a 6.7 kg 15 lb asphalt moisture barrier over glass mat covered or reinforced gypsum sheathing. Conforming to ASTM D226/D226M Type 1 (No. 15) for asphalt impregnated building felt.

2.1.17 Water

Provide clean, fresh, and potable water.

PART 3 EXECUTION

3.1 EXAMINATION

3.1.1 Framing and Furring

Verify that framing and furring are securely attached and of sizes and spacing to provide a suitable substrate to receive gypsum board and cementitious backer units. Verify that all blocking, headers and supports are in place to support plumbing fixtures and to receive soap dishes, grab bars, towel racks, and similar items. Do not proceed with work until framing and furring are acceptable for application of gypsum board and cementitious backer units.

3.1.2 [Gypsum Board] [and] [Framing]

Verify that surfaces of [gypsum board] [and] [framing] to be bonded with an adhesive are free of dust, dirt, grease, and any other foreign matter. Do not proceed with work until surfaces are acceptable for application of gypsum board with adhesive.

3.1.3 [Masonry] [and] [Concrete] Walls

Verify that surfaces of [masonry] [and] [concrete] walls to receive gypsum board applied with adhesive are dry, free of dust, oil, form release agents, protrusions and voids, and any other foreign matter. Do not proceed with work until surfaces are acceptable for application of gypsum board with adhesive.

3.1.4 Building Construction Materials

Do not install building construction materials that show visual evidence of biological growth.

3.2 APPLICATION OF GYPSUM BOARD

****

NOTE: Coordinate with the drawings to ensure that all types of gypsum board specified are indicated. Terminology on the drawings should be identical to that in the specifications.

****

****

NOTE: Allow adhesive bonding of gypsum board and substrate members only when required for proper installation.

****

****

NOTE: Use of special clips designed to provide support at wall corners and wall-ceiling intersections in lieu of backup studs or blocking minimizes framing, and is approved except where not permitted in fire rated assemblies. Include gypsum or ceiling board over framing sentence when appropriate with design and meets industry guidance and requirements for fire rated assemblies.

Ceilings insulated with heavy or compressed insulation (such as cellulose, mineral wool, or compressed fiberglass batts) may require 16 mm 5/8 inch gypsum board.
****

Apply gypsum board to framing and furring members in accordance with ASTM C840 or GA 216 and the requirements specified. Apply gypsum board with separate panels in moderate contact; do not force in place. Stagger end joints of adjoining panels. Neatly fit abutting end and edge joints. Use gypsum board of maximum practical length; select panel sizes to minimize waste. Cut out gypsum board to make neat, close, and tight joints around openings. In vertical application of gypsum board, provide panels in lengths required to reach full height of vertical surfaces in one continuous piece. Lay out panels to minimize waste; reuse cutoffs whenever feasible. Surfaces of gypsum board and substrate members may [not]be bonded together with an adhesive[, except where prohibited by fire rating(s)]. Treat edges of cutouts for plumbing pipes, screwheads, and joints with water-resistant compound as recommended by the gypsum board manufacturer. Minimize framing by floating corners with single studs and drywall clips.[Install [16 mm5/8 inch] [_____] gypsum or [13 mm 1/2 inch] [_____] ceiling board over framing at [610 mm24 inch] [_____] on center.] Provide type of gypsum board for use in each system specified herein as indicated.

3.2.1 Application of Single-Ply Gypsum Board to Wood Framing

Apply in accordance with ASTM C840, System I or GA 216.

3.2.2 Application of Two-Ply Gypsum Board to Wood Framing

Apply in accordance with ASTM C840, System II or GA 216.

3.2.3 Adhesive Nail-On Application to Wood Framing

Apply in accordance with ASTM C840, System III or GA 216. This method may be used in lieu of ASTM C840, System I at the option of the Contractor.

3.2.4 Semi-Solid Gypsum Board Partitions

Provide in accordance with ASTM C840, System IV or GA 216 .

3.2.5 Solid Gypsum Board Partitions

Provide in accordance with ASTM C840, System V or GA 216.

3.2.6 Adhesive Application to Interior Masonry or Concrete Walls

Apply in accordance with ASTM C840, System VI or GA 216.

3.2.7 Application of Gypsum Board to Steel Framing and Furring

Apply in accordance with ASTM C840, System VIII or GA 216.

3.2.8 Arches and Bending Radii

Apply gypsum board in accordance with ASTM C840, System IX or GA 216.

3.2.9 Gypsum Board for Wall Tile or Tile Base Applied with Adhesive

****

NOTE: For adhesive applied ceramic tile in wet areas (tubs, shower enclosures, saunas, steam rooms, gang shower rooms), specify cementitious backer board (in accordance with the Tile Council of America Handbook) as the substrate; specify ASTM C1178/C1178M glass mat water-resistant backing board or ASTM C1396/C1396M water-resistant gypsum backing board for other tiled areas including areas where only ceramic or quarry tile base is to be installed.

****

In dry areas (areas other than tubs, shower enclosures, saunas, steam rooms, gang shower rooms), apply glass mat water-resistant gypsum tile backing board [or water-resistant gypsum backing board] in accordance with ASTM C840, System X or GA 216.

3.2.10 Exterior Application

Apply exterior gypsum board (such as at soffits) in accordance with ASTM C840, System XI or GA 216.

3.2.11 Glass Mat Covered or Fiber Reinforced Gypsum Sheathing

****

NOTE: Choose the bracketed option below if sealant will be applied to sheathing joints and penetrations in addition to the asphalt impregnated building felt.

****

Apply glass mat covered or fiber reinforced gypsum sheathing in accordance to gypsum association publications GA 253. Follow gypsum sheathing manufacturer's requirements of design details for joints and fasteners and be properly installed to protect the substrate from moisture intrusion. Do not leave exposed surfaces of the glass mat covered or fiber reinforced gypsum sheathing beyond the manufacturer's recommendation without a weather barrier cladding. Provide continuous asphalt impregnated building felt over sheathing surface in shingle fashion with edges and ends lapped a minimum of 150 mm 6 inch. Properly flash the openings. [Seal all joints, seams, and penetrations with a compatible silicone sealant.]

3.2.12 Floating Interior Angles

****

NOTE: Use of special clips designed to provide support at wall corners and wall-ceiling intersections in lieu of backup studs or blocking minimizes framing, and is approved except where not permitted in fire rated assemblies. Include gypsum or ceiling board over framing sentence when appropriate for design and meets industry guidance and requirements for fire rated assemblies.

****

Minimize framing by floating corners with single studs and drywall clips. Locate the attachment fasteners adjacent to ceiling and wall intersections in accordance with ASTM C840, System XII or GA 216, for

[single-ply] [and] [two-ply] applications of gypsum board to wood framing.

3.2.13 Control Joints

Install expansion and contraction joints in ceilings and walls in accordance with ASTM C840, System XIII or GA 216. Fill control joints between studs in fire-rated construction with firesafing insulation to match the fire-rating of construction.

3.2.14 Application of Foil-Backed Gypsum Board

Apply foil-backed gypsum board in accordance with ASTM C840, System XIV or GA 216.

3.2.15 Application of Predecorated Gypsum Board

Apply predecorated gypsum board in accordance with GA 224. Attach predecorated gypsum board with adhesive and fasteners as recommended by the manufacturer. Conceal fasteners in the finished work.

3.2.16 Application of Abuse Resistant Gypsum Board

Apply in accordance with applicable system of ASTM C840 as specified or GA 216. Follow manufacturers written instructions on how to cut, drill and attach board.

[3.2.17 Application of Factory-Laminated Gypsum Board

Apply in accordance with manufacturer instructions for testing sound assembly. Face of laminated surface must not be on finished side of assembly.

]3.3 APPLICATION OF CEMENTITIOUS BACKER UNITS

3.3.1 Application

In wet areas (tubs, shower enclosures, saunas, steam rooms, gang shower rooms), apply cementitious backer units in accordance with ANSI A108.11. Place a 7.6 kg 15 lb asphalt impregnated, continuous felt paper membrane behind cementitious backer units, between backer units and studs or base layer of gypsum board. Place membrane with a minimum 150 mm 6 inch overlap of sheets laid shingle style.

3.3.2 Joint Treatment

ANSI A108.11.

3.4 FINISHING OF GYPSUM BOARD

Tape and finish gypsum board in accordance with ASTM C840, GA 214 and GA 216. Finish plenum areas above ceilings to Level 1 in accordance with GA 214. Finish water resistant gypsum backing board, ASTM C1396/C1396M, to receive ceramic tile to Level 2 in accordance with GA 214. Finish walls and ceilings to receive a heavy-grade wall covering or heave textured finish before painting to Level 3 in accordance with GA 214. Finish walls and ceilings without critical lighting to receive flat paints, light textures, or wall coverings to Level 4 in accordance with GA 214. Unless otherwise specified, finish all gypsum board walls, partitions and ceilings to Level 5 in accordance with GA 214. Provide

joint, fastener depression, and corner treatment. Tool joints as smoothly as possible to minimize sanding and dust. Do not use self-adhering fiber glass mesh tape with conventional drying type joint compounds; use setting or hardening type compounds only. Provide treatment for water-resistant gypsum board as recommended by the gypsum board manufacturer. Protect workers, building occupants, and HVAC systems from gypsum dust.

3.4.1 Uniform Surface

Wherever gypsum board is to receive eggshell, semigloss or gloss paint finish, or where severe, up or down lighting conditions occur, finish gypsum wall surface in accordance to GA 214 Level 5. In accordance with GA 214 Level 5, apply a thin skim coat of joint compound to the entire gypsum board surface, after the two-coat joint and fastener treatment is complete and dry.

[3.4.2 Metal Trim for Predecorated Gypsum Board

Finish edges, ends, and joints of predecorated gypsum board, except prefinished vee joints and monolithic type joints, with metal or plastic trim selected to match the gypsum board finish.

]3.5 SEALING

Seal openings around pipes, fixtures, and other items projecting through gypsum board and cementitious backer units as specified in Section 07 92 00 JOINT SEALANTS. Apply material with exposed surface flush with gypsum board or cementitious backer units.

[3.5.1 Sealing for Glass Mat or Reinforced Gypsum Board Sheathing

Apply silicone sealant in a 9.5 mm 3/8 inch bead to all joints and trowel flat. Apply enough of the same sealant to all fasteners penetrating through the glass mat gypsum board surface to completely cover the penetration when troweled flat. [Do not place construction and materials behind sheathing until a visual inspection of sealed joints during daylight hours has been completed by Contracting Officer.]

]3.6 FIRE-RESISTANT ASSEMBLIES

****

NOTE: Coordinate with the drawings to ensure that UL or GA design numbers are indicated for fire-resistant assemblies. If review of building code requires pressurized enclosures, include the following:

Pressurized fire-rated gypsum board enclosures must allow the mechanical and electrical life-safety systems to operate in accordance with the design intent. Air pressure within elevator shaft must be 360 Pa. 7.5 psf. Air pressure within stair shaft must be 240 Pa. 5.0 psf. Maximum mid-span deflection must be L/360.

****

Wherever fire-rated construction is indicated, provide materials and application methods, including types and spacing of fasteners,[wall[and ceiling] framing] in accordance with the specifications contained in [

UL Fire Resistance for the Design Number(s) indicated], [or] [GA 600 for the File Number(s) indicated]. Joints of fire-rated gypsum board enclosures must be closed and sealed in accordance with UL test requirements or GA requirements. Seal penetrations through rated partitions and ceilings tight in accordance with tested systems.

[3.7 SOUND RATED ASSEMBLIES

****

NOTE: Construction practices have an influence on final STC ratings of assemblies. Flanking sound patterns, the integrity of the assembly, and construction methods factor into the STC rating of the completed assembly. Include the following section when using wall or ceiling assemblies intended to meet the acoustical separation assembly requirements in applicable DoD Unified Facilities Criteria (UFC). Such rooms and spaces can include conference rooms, partitions between living units, medical patient rooms and offices, rooms containing noise-generating equipment such as mechanical rooms, and secure spaces that are required to meet IC Tech Spec - for ICD/ICS 705, Technical Specifications for Construction and Management of Sensitive Compartmented Information Facilities. Coordinate on drawings location(s), laboratory testing number, sound rating performance and composition of each sound rated assembly.

****

When sound rated assemblies are required, provide materials and application methods, including panels, insulation, types and spacing of fasteners,[wall[and ceiling] framing] in accordance with the contract document and the description of the assembly in the ASTM E90 Factory Test Report. Seal partitions continuously with acoustical foam or sealant (both sides) and finished to match wall wherever it abuts another element such as the floor, ceiling, wall, column, mullion, or another system or assembly.

]3.8 PATCHING

Patch surface defects in gypsum board to a smooth, uniform appearance, ready to receive finishes. [Remove predecorated gypsum board which cannot be restored to like-new condition. Provide new predecorated gypsum board.]

3.9 SHAFTWALL FRAMING

Install the shaftwall system in accordance with the system manufacturer's published instructions. Coordinate bucks, anchors, blocking and other items placed in or behind shaftwall framing with electrical and mechanical work. Patch or replace fireproofing materials which are damaged or removed during shaftwall construction.

[3.10 SOUND RATED ASSEMBLY FIELD TESTING

****

NOTE: Include the following when field-testing is required for wall or ceiling assemblies intended to comply with acoustical separation assemblies noted

in applicable DoD Unified Facilities Criteria (UFC) or perimeter of secure spaces that are required to meet IC Tech Spec - for ICD/ICS 705. For secure spaces that are to comply with IC Tech Spec - for ICD/ICS 705, this may be documented in the Construction Security Plan.
****

Provide third party testing of sound rated assemblies tested in accordance with ASTM E336. Provide the ASTM E336 Field Test Report verifying that the installed assemblies perform no less than five ASTC rating points below the ASTM E90 Factory Test Report. Examine, modify adjust, and retest any installation not meeting the STC Rating until compliance is obtained.

] -- End of Section --