

SECTION TABLE OF CONTENTS

DIVISION 09 - FINISHES

SECTION 09250

GYPSUM WALLBOARD

PART 1 GENERAL

- 1.1 REFERENCES
- 1.2 SYSTEM DESCRIPTION
  - 1.2.1 Fire-Rated Construction
- 1.3 SUBMITTALS
- 1.4 DELIVERY, STORAGE AND HANDLING
- 1.5 ENVIRONMENTAL CONDITIONS

PART 2 MATERIALS

- 2.1 GYPSUM BOARD
- 2.2 TRIM, MOLDINGS, AND ACCESSORIES
  - 2.2.1 Joint Tape and Compound
  - 2.2.2 Trim, Control Joints, Beads, Stops and Nosings
- 2.3 FASTENINGS
- 2.4 INSULATION

PART 3 EXECUTION

- 3.1 INTERIOR WALL FRAMING
  - 3.1.1 Blocking
- 3.2 SUSPENDED CEILING
  - 3.2.1 Light Fixtures
- 3.3 APPLICATION OF GYPSUM BOARD
- 3.4 BACKING BOARD
- 3.5 TRIM, MOLDINGS, AND ACCESSORIES INSTALLATION
- 3.6 INSULATION
  - 3.6.1 Vapor Retarder
  - 3.6.2 Acoustic Insulation
- 3.7 TAPING AND FINISHING
- 3.8 FIRE-RESISTANT ASSEMBLIES
- 3.9 PATCHING

-- End of Section Table of Contents --

SECTION 09250

GYPSUM WALLBOARD

PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 36	(1997) Gypsum Wallboard
ASTM C 79/C 79M	(1997) Treated Core and Nontreated Core Gypsum Sheathing Board
ASTM C 475	(1994) Joint Compound and Joint Tape for Finishing Gypsum Board
ASTM C 630/C 630M	(1996a) Water-Resistant Gypsum Backing Board
ASTM C 665	(1995) Mineral Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing
ASTM C 754	(1997) Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products
ASTM C 800	(1994) Glass Fiber Blanket Insulation
ASTM C 840	(1998) Application and Finishing of Gypsum Board
ASTM C 931/C 931M	(1995a) Exterior Gypsum Soffit Board
ASTM C 1002	(1998) Steel Drill Screws for the Application of Gypsum Board or Metal Plaster Bases
ASTM C 1047	(1998) Accessories for Gypsum Wallboard and Gypsum Veneer Base

GYPSUM ASSOCIATION (GA)

GA 216	(1996) Application and Finishing of Gypsum Board
GA 600	(1997) Fire Resistance Design Manual

UNDERWRITERS LABORATORIES (UL)

## 1.2 SYSTEM DESCRIPTION

### 1.2.1 Fire-Rated Construction

Joints of fire-rated gypsum board enclosures shall be closed and sealed in accordance with UL test requirements or GA requirements, and as required to meet pressurization requirements. Penetrations through rated partitions and ceilings shall be sealed tight in accordance with tested systems. Fire ratings shall be as indicated.

### 1.3 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

#### SD-04 Drawings

Fire-Resistant Assemblies; FIO.

Drawings and installation details for the 2 hour fire resistant assembly.

### 1.4 DELIVERY, STORAGE AND HANDLING

Materials shall be delivered in original containers bearing the name of manufacturer, contents, and brand name. Materials shall be stored off the ground in a weathertight structure for protection. Gypsum boards shall be stacked flat, off floor and supported to prevent sagging and warpage. Adhesives and joint materials shall be stored in accordance with manufacturer's printed instructions. Damaged or deteriorated materials shall be removed from jobsite.

### 1.5 ENVIRONMENTAL CONDITIONS

Environmental conditions for application and finishing of gypsum board shall be in accordance with ASTM C 840. During the application of gypsum board, a room temperature of not less than 40 degrees F shall be maintained.

## PART 2 MATERIALS

Miscellaneous items not otherwise specified shall be as recommended by the gypsum manufacturer and approved prior to use.

### 2.1 GYPSUM BOARD

Gypsum board shall have square-cut ends, tapered or beveled edges and shall be maximum possible length. Gypsum board thickness shall be as shown. Gypsum board shall be 48 inches wide.

- a. Standard Gypsum Board. ASTM C 36
- b. Fire-Rated Gypsum Board. ASTM C 36, Type X or Type C as required.

c. Water-Resistant Gypsum Board. ASTM C 630/C 630M, regular, with water-resistant paper faces, paintable surfaces, and maximum permissible length.

d. Exterior Gypsum Soffit Board. ASTM C 931/C 931M, regular.

## 2.2 TRIM, MOLDINGS, AND ACCESSORIES

### 2.2.1 Joint Tape and Compound

Joint tape shall conform to ASTM C 475 and shall be as recommended by gypsum board manufacturer. Compound for taping, embedding, finishing and topping shall conform to ASTM C 475. Compound specifically formulated shall be correctly used as intended by the manufacturer.

### 2.2.2 Trim, Control Joints, Beads, Stops and Nosings

Items used to protect edges, corners, and to provide architectural features shall be in accordance with ASTM C 1047.

## 2.3 FASTENINGS

Screws shall conform to ASTM C 1002. Screws shall be self-drilling and self-tapping steel, Type G for gypsum board to gypsum board, Type S for wood or light-gauge steel framing, Type W for wood framing. Powder-driven fasteners may be used only when approved in writing.

## 2.4 INSULATION

a. Vapor Retarder. Polyethylene, 4-mil thickness.

b. Acoustic Insulation. ASTM C 800, provide full height at walls between Rooms 206 and 207, and between Rooms 205 and 207.

c. Thermal Insulation. ASTM C 665, Type I; 3-1/2 inches thick R-15.

## PART 3 EXECUTION

### 3.1 INTERIOR WALL FRAMING

Steel framing and furring members shall be installed in accordance with ASTM C 754 and Section 05400. Members shall be in alignment and spaced as detailed on the drawings with a maximum of 16 inches on center. Runners shall be aligned accurately at the floor and ceiling and securely anchored.

#### 3.1.1 Blocking

Blocking shall be provided as necessary for mounted equipment. Blocking shall be metal or wood and shall be cut to fit between framing members. Blocking shall be rigidly anchored to the framing members. Under no circumstances will accessories or other wall mounted equipment be anchored directly to gypsum wallboard.

### 3.2 SUSPENDED CEILING

Suspended ceiling system framing shall be installed in accordance with ASTM C 754. Hang runners with 12 gauge galvanized wire; space runners at 48" o.c. and space wire at 48" maximum along runners. Attach to the work

overhead by suitable means; wire to steel beams or to auxiliary members provided under this section, spanning between steel beams. Attach to concrete with suitable drill-in expansion anchors or shoot-in anchors. Coordinate with precast supplier to avoid drilling or shooting near pre-stress strands. Snap in furring tees at 16" o.c. Provide wall track all around. Support members shall be provided as required at ceiling openings for access panels, recessed light fixtures, and air supply or exhaust.

### 3.2.1 Light Fixtures

Light fixtures shall not be supported directly from suspended ceiling runners. Hanger wires for recessed or surface mounted light fixtures shall be anchored to structure at four corners of light fixtures, and additional wires shall be provided at appropriate locations to carry the weight of light fixtures.

### 3.3 APPLICATION OF GYPSUM BOARD

Gypsum board shall be installed in accordance with ASTM C 840 and GA 216 and as specified. Paragraph 17.3.1 GENERAL of ASTM C 840 which permits usage of water resistant gypsum board as a base for adhesive application of ceramic or plastic tile on ceilings, does not apply. Edges and ends of gypsum boards shall be cut to obtain neat fitting joints. All ends of gypsum board shall occur over framing members or other solid backing, except where treated joints occur at right angles to framing or furring members. End joints of adjoining boards shall be staggered, and shall be staggered on opposite sides of wall. Boards shall be applied with moderate contact without forcing in place. Holes for pipes, fixtures or other small openings shall be cut with a tool which will provide a neat fit. Screws shall be driven so that the heads are slightly below the plane of paper face. Fracturing the paper face or damaging the core shall be avoided. Trim shall be installed at external and internal angles formed by the intersecting gypsum board surfaces with other surfaces. Corner beads shall be installed to vertical and horizontal corners in accordance with manufacturer's published instructions.

### 3.4 BACKING BOARD

Gypsum board used as a substrate to receive ceramic tile shall be in accordance with ASTM C 840, System X.

### 3.5 TRIM, MOLDINGS, AND ACCESSORIES INSTALLATION

Trim, moldings and accessories shall be installed in accordance with GA 216.

### 3.6 INSULATION

#### 3.6.1 Vapor Retarder

Vapor retarder shall be installed with joints over framing members. Joints shall be lapped for the full width of the framing members.

#### 3.6.2 Acoustic Insulation

Acoustic insulation shall be installed full height of wall in conformance with manufacturer's instructions to create an effective barrier to sound transmission.

### 3.7 TAPING AND FINISHING

Gypsum board taping and finishing shall be performed in accordance with ASTM C 840. Boards shall be kept free of dirt, oil and other foreign matter that could cause a lack of bond. Screw heads, dents, gouges, and cut-outs shall be filled with joint compound and sanded. Accessories at exposed joints, edges, corners, openings, and similar locations shall be taped, floated with joint compound, and sanded to produce surfaces ready for gypsum board finishes.

### 3.8 FIRE-RESISTANT ASSEMBLIES

The typical gypsum wallboard assembly shall be constructed to meet the 1 hour fire rated assembly indicated in GA 600, assembly WP1200. A 2 hour fire rated assembly located around stairs and in the paint room is indicated on the drawings. Gypsum wallboard construction for 2 hour fire-rated assemblies shall be in accordance with UL Fire Resist Dir, or GA 600.

### 3.9 PATCHING

Surface defects and damage shall be corrected as required to leave gypsum board smooth, uniform in appearance, and ready to receive finish as specified.

-- End of Section --

SECTION TABLE OF CONTENTS

DIVISION 09 - FINISHES

SECTION 09310

CERAMIC TILE

PART 1 GENERAL

- 1.1 REFERENCES
- 1.2 SUBMITTALS
- 1.3 DELIVERY AND STORAGE
- 1.4 ENVIRONMENTAL REQUIREMENTS

PART 2 PRODUCTS

- 2.1 TILE
  - 2.1.1 Glazed Wall Tile
- 2.2 SETTING-BED
- 2.3 WATER
- 2.4 MORTAR, GROUT, AND ADHESIVE
- 2.5 SEALANT

PART 3 EXECUTION

- 3.1 PREPARATORY WORK AND WORKMANSHIP
- 3.2 GENERAL INSTALLATION REQUIREMENTS
- 3.3 INSTALLATION OF WALL TILE
  - 3.3.1 Workable or Cured Mortar Bed
  - 3.3.2 Dry-Set Mortar and Latex-Portland Cement Mortar
  - 3.3.3 Organic Adhesive
- 3.4 INSTALLATION OF FLOOR TILE
  - 3.4.1 Workable or Cured Mortar Bed
  - 3.4.2 Ceramic Tile Grout
- 3.5 EXPANSION JOINTS
  - 3.5.1 Walls
  - 3.5.2 Floors
- 3.6 CLEANING AND PROTECTING

-- End of Section Table of Contents --

SECTION 09310

CERAMIC TILE

PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI A108.1A	(1992) Installation of Ceramic Tile in the Wet-Set Method, with Portland Cement Mortar
ANSI A108.1B	(1992) Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex Portland Cement Mortar
ANSI A108.4	(1992) Installation of Ceramic Tile with Organic Adhesives or Water Cleanable Tile Setting Epoxy Adhesive
ANSI A108.5	(1992) Installation of Ceramic Tile with Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar
ANSI A118.1	(1992) Dry-Set Portland Cement Mortar
ANSI A118.4	(1992) Latex-Portland Cement Mortar
ANSI A118.6	(1992) Ceramic Tile Grouts
ANSI A137.1	(1988) Ceramic Tile

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 185	(1997) Steel Welded Wire Fabric, Plain, for Concrete Reinforcement
ASTM C 144	(1997) Aggregate for Masonry Mortar
ASTM C 150	(1997) Portland Cement
ASTM C 206	(1984; R 1997) Finishing Hydrated Lime
ASTM C 207	(1991; R 1997) Hydrated Lime for Masonry Purposes
ASTM C 373	(1988; R 1994) Water Absorption, Bulk Density, Apparent Porosity, and Apparent

Specific Gravity of Fired Whiteware  
Products

ASTM C 648	(1998) Breaking Strength of Ceramic Tile
ASTM C 847	(1995) Metal Lath
ASTM C 1026	(1987; R 1996) Measuring the Resistance of Ceramic Tile to Freeze-Thaw Cycling
ASTM C 1027	(1984; R 1990) Determining Visible Abrasion Resistance of Glazed Ceramic Tile
ASTM C 1028	(1996) Determining the Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull-Meter Method

TILE COUNCIL OF AMERICA (TCA)

TCA Hdbk	(1997) Handbook for Ceramic Tile Installation
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1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Data

Tile Data; FIO.

Catalog cuts shall be submitted for tile, setting-bed, mortar, grout and adhesive. A copy of the manufacturers standard warranty or performance guarantee shall be included.

SD-06 Instructions

Manufacturers Instructions; FIO.

Manufacturers preprinted installation and cleaning instructions shall be submitted for tile, mortar and grout.

SD-13 Certificates

Certificates of Compliance; FIO.

Certificates indicating conformance with specified requirements shall be submitted for all tile, mortar, grout and adhesive. A master grade certificate shall be furnished for tile.

SD-14 Samples

Tile; GA.

Samples of all tile and accessories shall be submitted. Samples shall be of sufficient size to show color range, pattern, tile type, and joints.

### 1.3 DELIVERY AND STORAGE

Materials shall be delivered to the project site in manufacturer's original unopened containers with seals unbroken and labels and hallmarks intact. Materials shall be kept dry, protected from weather, and stored under cover in accordance with manufacturer's instructions.

### 1.4 ENVIRONMENTAL REQUIREMENTS

Ceramic tile work shall not be performed unless the substrate and ambient temperature is at least 50 degrees F and rising. Temperature shall be maintained above 50 degrees F while the work is being performed and for at least 7 days after completion of the work. Carbon dioxide build-up shall be controlled in temporary heated areas by adequate ventilation and/or venting exhaust flues to the outside.

## PART 2 PRODUCTS

### 2.1 TILE

Tile shall be standard grade or better conforming to ANSI A137.1. The tile grade provided shall be available in a minimum of 30 colors. Containers shall be grade sealed. Seals shall be marked to correspond with the marks on the signed master grade certificate. Tile shall be impact resistant with a minimum breaking strength for wall tile of 90 lbs and 250 lbs for floor tile in accordance with ASTM C 648. Tile for cold climate projects shall be rated frost resistant by the manufacturer as determined by ASTM C 1026. Water absorption shall be 0.50 maximum percent in accordance with ASTM C 373. Floor tile shall have a minimum coefficient of friction of 0.50 wet and dry in accordance with ASTM C 1028. Floor tile shall be Class III-Medium Heavy as rated by the manufacturer when tested in accordance with ASTM C 1027 for abrasion resistance as related to foot traffic.

#### 2.1.1 Glazed Wall Tile

Glazed wall tile and decorative casework tile and trim shall be cushion edged with matte glaze. Tile shall be 2 by 2 inches and in colors as selected by the Contracting Officer. A cove base of the same size shall be provided at all wall-floor intersections.

### 2.2 SETTING-BED

The setting-bed shall be composed of the following:

- a. Portland Cement. Cement shall conform to ASTM C 150, Type I, white for wall mortar and gray for other uses.
- b. Sand. Sand shall conform to ASTM C 144.
- c. Hydrated Lime. Hydrated lime shall conform to ASTM C 206, Type S or ASTM C 207, Type S.
- d. Metal Lath. Metal lath shall be flat expanded type conforming to ASTM C 847, and weighing not less than 2.5 pounds per square yard.
- e. Reinforcing Wire Fabric. Wire fabric shall conform to ASTM A 185. Wire shall be either 2 x 2 inch mesh, 16/16 wire or 1-1/2 x 2 inch

mesh, 16/13 wire.

### 2.3 WATER

Water shall be potable. River water shall not be used.

### 2.4 MORTAR, GROUT, AND ADHESIVE

Mortar, grout, and adhesive shall conform to the following:

- a. Dry-Set Portland Cement Mortar. ANSI A118.1.
- b. Latex-Portland Cement Mortar. ANSI A118.4.
- d. Ceramic Tile Grout. ANSI A118.6; sand portland cement grout for "heavy set" work and dry-set grout for "dry set" work.

### 2.5 SEALANT

Sealant shall be as specified in SECTION 07900 CAULKING AND SEALING.

## PART 3 EXECUTION

### 3.1 PREPARATORY WORK AND WORKMANSHIP

Surface to receive tile shall be inspected and shall conform to the requirements of ANSI A108.1A or ANSI A108.1B for surface conditions for the type setting bed specified and for workmanship.

### 3.2 GENERAL INSTALLATION REQUIREMENTS

Tile work shall not be started until roughing in for mechanical and electrical work has been completed and tested, and built-in items requiring membrane waterproofing have been installed and tested. Tile in three colors and the patterns indicated shall be applied in the areas shown on the drawings, except that tile need extend not more than 1 course behind tops and edges of lockers. Note balance of locker wall shall be painted in accordance with SECTION 09900 PAINTING, GENERAL. Floor tile installation shall not be started in spaces requiring wall tile until after wall tile has been installed. Tile shall be installed with the respective surfaces in true even planes to the elevations and grades shown. Special shapes shall be provided as required for sills, jambs, recesses, offsets, external corners, and other conditions to provide a complete and neatly finished installation. Tile bases and coves shall be solidly backed with mortar.

### 3.3 INSTALLATION OF WALL TILE

Wall tile shall be installed in accordance with the TCA Hdbk, method W-221 for solid backing; and method W-241 for metal studs.

#### 3.3.1 Workable or Cured Mortar Bed

"Heavy Set Tile" in Rooms 106, 108, and Room 205 as shown, shall be installed over a 3/4-inch to one-inch thick plastic mortar bed or a cured mortar bed at the option of the Contractor. A 4 mil polyethylene membrane, metal lath, and scratch coat shall also be installed. Workable mortar bed, materials, and installation of tile shall conform to ANSI A108.1A. Cured mortar bed and materials shall conform to ANSI A108.1B.

### 3.3.2 Dry-Set Mortar and Latex-Portland Cement Mortar

Dry-set shall be used to install tile in accordance with ANSI A108.5.

### 3.3.3 Organic Adhesive

Tile over water-resistant gypsum board walls and decorative casework tile shall be installed with organic adhesive method. Organic adhesive installation of ceramic tile shall conform to ANSI A108.4.

## 3.4 INSTALLATION OF FLOOR TILE

Floor tile shall be installed in accordance with TCA Hdbk, method F111, F112, F114 or F121.

### 3.4.1 Workable or Cured Mortar Bed

"Heavy Set" floor tile shall be installed over a workable mortar bed or a cured mortar bed at the option of the Contractor. Workable mortar bed materials and installation shall conform to ANSI A108.1A. Cured mortar bed and materials shall conform to ANSI A108.1B. Joints between quarry tile shall be between 1/4 inch and 3/8 inch in width and shall be uniform in width.

### 3.4.2 Ceramic Tile Grout

Ceramic tile grout shall be prepared and installed in accordance with ANSI A108.10.

## 3.5 EXPANSION JOINTS

Joints shall be formed as indicated and sealed as specified in Section 07900 JOINT SEALING.

### 3.5.1 Walls

Expansion joints shall be provided at control joints in backing material. Wherever backing material changes, an expansion joint shall be installed to separate the different materials.

### 3.5.2 Floors

Expansion joints shall be provided over construction joints, control joints, and expansion joints in concrete slabs. Expansion joints shall be provided where tile abuts restraining surfaces such as perimeter walls, curbs and columns and at intervals of 24 to 36 feet each way in large interior floor areas and 12 to 16 feet each way in large exterior areas or areas exposed to direct sunlight or moisture. Expansion joints shall extend through setting-beds and fill.

## 3.6 CLEANING AND PROTECTING

Upon completion, tile surfaces shall be thoroughly cleaned in accordance with manufacturer's approved cleaning instructions. Acid shall not be used for cleaning glazed tile. Floor tile with resinous grout or with factory mixed grout shall be cleaned in accordance with instructions of the grout manufacturer. After the grout has set, tile wall surfaces shall be given a protective coat of a noncorrosive soap or other approved method of

protection. Tiled floor areas shall be covered with building paper before foot traffic is permitted over the finished tile floors. Board walkways shall be laid on tiled floors that are to be continuously used as passageways by workmen. Damaged or defective tiles shall be replaced.

-- End of Section --

SECTION TABLE OF CONTENTS

DIVISION 09 - FINISHES

SECTION 09411

BONDED TERRAZZO

PART 1 GENERAL

- 1.1 REFERENCES
- 1.2 SUBMITTALS
- 1.3 DELIVERY AND STORAGE
- 1.4 ENVIRONMENTAL REQUIREMENTS

PART 2 PRODUCTS

- 2.1 MATERIALS

PART 3 EXECUTION

- 3.1 TERRAZZO PROPORTIONS
  - 3.1.1 Underbed
  - 3.1.2 Terrazzo Topping
- 3.2 INSTALLATION
  - 3.2.1 Joints
  - 3.2.2 Precast Treads and Risers
  - 3.2.3 Brass Logo
  - 3.2.4 Underbed
  - 3.2.5 Terrazzo Topping
  - 3.2.6 Curing
  - 3.2.7 Finishing
    - 3.2.7.1 Rough Grinding
    - 3.2.7.2 Grouting
    - 3.2.7.3 Fine Grinding
- 3.3 CLEANING AND SEALING
- 3.4 PROTECTION

-- End of Section Table of Contents --

SECTION 09411

BONDED TERRAZZO

PART 1 GENERAL

This section covers the furnishing and installation of terrazzo floor and base finishes as scheduled and specified, including all divider strips, trim, and accessories as required. Include monolithic terrazzo, terrazzo finish for shower receptors and sinks, and precast terrazzo treads and risers.

1.1 REFERENCES

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

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 33	(1997) Concrete Aggregates
ASTM C 150	(1997) Portland Cement
ASTM C 171	(1997) Sheet Materials for Curing Concrete
ASTM C 309	(1997) Liquid Membrane-Forming Compounds for Curing Concrete

NATIONAL TERRAZZO & MOSAIC ASSOCIATION (NTMA)

NTMA-01	(1995) Terrazzo Information Guide
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1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Data

Terrazzo Data and Literature; FIO.

Catalog cuts for the terrazzo shall be submitted. Color charts shall be submitted. Maintenance literature provided by the terrazzo manufacturer shall be submitted. A copy of the manufacturer's standard warranty or performance guarantee shall be included.

SD-04 Drawings

Terrazzo Flooring; GA.

Shop drawings shall indicate the type, size, and layout of divider strips. Also submit shop drawings of precast treads and risers.

## SD-14 Samples

Terrazzo Flooring; GA.

Two 6 x 6 in (minimum) samples of terrazzo produced from the materials which the Contractor proposes using and the colors selected by the Contracting officer shall be submitted. Two 6 in lengths of each type divider and control joint strip.

### 1.3 DELIVERY AND STORAGE

Materials shall be delivered in the manufacturer's unopened containers marked with the brand name. Materials shall be delivered, handled, and stored in a manner that will prevent deterioration and contamination.

### 1.4 ENVIRONMENTAL REQUIREMENTS

Areas to receive terrazzo shall be maintained at a temperature above 50 degrees F 24 hours prior to the time mixtures are placed and until completely cured.

## PART 2 PRODUCTS

### 2.1 MATERIALS

a. PORTLAND CEMENT. Portland cement shall conform to ASTM C 150, Type I.

b. SAND. Sand shall conform to ASTM C 33 for fine aggregate.

c. MARBLE CHIPS. Marble chips shall be of domestic origin of sizes, colors and portion of chips as selected by the Contracting Officer's Representative.

d. DIVIDER STRIPS. Divider strips shall be in accordance with NTMA-01. Divider strips shall be brass, 1-1/4 in deep, set for 1/2 inch topping, with 1/8" heavy top.

e. PRECAST TREADS AND RISERS. Precast treads and risers shall be constructed to match with the other terrazzo work. Abrasive inserts shall be installed in grooves in the treads after the grinding has been completed.

f. COLORANTS. Colorants shall be alkali-resistant and nonfading. Colors and intensity will be selected by the Contracting Officer.

g. CURING MATERIAL. Curing material shall be either liquid membrane-forming compound, wet sand, polyethylene sheeting, or water. Liquid membrane-forming compound shall conform to ASTM C 309, Type I. Polyethylene sheeting shall conform to ASTM C 171.

h. TERRAZZO CLEANER. Terrazzo cleaner shall be biodegradable, phosphate free and shall have a pH factor between 7 and 10 and be of a type specially prepared for use on terrazzo.

i. SEALER. Sealer shall have a pH factor between 7 and 10 and be a penetrating type specially prepared for use on terrazzo. The sealer

shall not discolor or amber the terrazzo and shall produce a slip resistant surface. Flash point of sealer shall be in accordance with NTMA-01.

j. BRASS LOGO. Brass Logo shall be constructed of brass that matches the divider strips. The thickness of the letters and numeral is to be 3/16 inches.

k. REINFORCEMENT. Reinforcing shall conform to applicable requirements in SECTION: CONCRETE REINFORCEMENT.

## PART 3 EXECUTION

### 3.1 TERRAZZO PROPORTIONS

#### 3.1.1 Underbed

Underbed shall be composed of one part portland cement to four parts sand. Water shall be added to provide workability at as low a slump as possible.

#### 3.1.2 Terrazzo Topping

Topping shall be composed of one 94 pound bag of portland cement per 200 pounds of marble chips and approximately 5 gallons of water. Color pigment shall be added as needed but not to exceed 2 pounds per bag of cement. Water shall be added in sufficient quantity to provide workability at as low a slump as possible.

### 3.2 INSTALLATION

Terrazzo topping shall be placed on concrete subfloor after specified curing time of subfloor, as recommended by the terrazzo installer, for maximum bonding to subfloor. To prevent cracking, the terrazzo shall not be placed on concrete subfloor approximately one week following concrete installation.

#### 3.2.1 Joints

Expansion joints shall be filled with sealant and backer rods in accordance with SECTION: CAULKING AND SEALANTS, and also with NTMA recommendations. Divider strips shall be placed directly over concrete subfloor expansion joints for all conditions possible.

#### 3.2.2 Precast Treads and Risers

Set treads and risers in cement mortar bed with mechanical anchorage at both ends of each tread, as shown or similar. Joints between precast units, and butting other construction, shall be filled solidly with mortar colored to match the matrix in the terrazzo. Complete work shall be straight, plumb, uniform, and show good workmanship throughout.

#### 3.2.3 Brass Logo

The brass logo is to be welded to a mounting mesh of matching material with straps. Each letter is to be welded to the mesh with a minimum of three straps while the large numeral is to be welded to mesh with a minimum of six straps. The space from the top of mesh to bottom of logo plate is to be 3/4 inches to insure a solid poured fill. A recess in the concrete subfloor is to be provided. Before grinding, a slight rise of terrazzo

material is to surround all of the elements of the logo. After grinding, the terrazzo is to be flush with the surrounding floor and the top of all of the elements of the brass logo.

#### 3.2.4 Underbed

Surfaces of concrete subfloor shall be cleaned and saturated with water in accordance with NTMA-01. Excess water shall be removed from the subfloor before slushing and brooming with neat cement paste. The underbed shall be placed on the concrete subfloor and shall be screeded to an elevation 1/2 inch below the finished floor. Divider strips shall be installed in the semiplastic underbed. The underbed shall be firmly troweled along the edges to insure positive anchorage of the divider strips. Control joint strips shall be installed over subfloor expansion joints and shall extend the full depth of the underbed.

#### 3.2.5 Terrazzo Topping

The underbed shall be slushed and broomed in accordance with NTMA-01 with neat cement paste of the same color as required for the topping. The topping shall be placed in panels formed by divider strips and shall be troweled level with the top of the strips. The troweled surface shall be seeded with chips in the same color proportions as contained in the terrazzo mix, troweled and rolled with heavy rollers until excess water has been extracted. The terrazzo shall be troweled to a uniform surface disclosing the lines of the divider strips.

#### 3.2.6 Curing

The terrazzo shall be cured until the topping develops sufficient strength to prevent lifting or pulling of terrazzo chips during grinding.

#### 3.2.7 Finishing

Finishing shall be in accordance with NTMA-01.

##### 3.2.7.1 Rough Grinding

After topping has cured the terrazzo shall be ground with fine grit stones or with comparable diamond plates, followed with finer grit stones.

##### 3.2.7.2 Grouting

After rough grinding, the floor shall be cleansed with clean water and rinsed. After removing excess rinse water, the floor shall be grouted using identical portland cement, color and pigments as used in the topping taking care to fill voids. After the grout has attained its initial set, the surface shall be cured for a minimum of 72 hours.

##### 3.2.7.3 Fine Grinding

After grout has cured, the surface shall be ground with fine grit stones until all grout is removed from the surface. Upon completion of grinding, terrazzo shall show a minimum of 70 percent of marble chips.

#### 3.3 CLEANING AND SEALING

The terrazzo shall be washed with a neutral cleaner and where required shall be cleaned with a fine abrasive to remove stains or cement smears.

The cleaned surfaces shall be rinsed. When dry, a terrazzo sealer shall be applied in accordance with the manufacturer's directions.

#### 3.4 PROTECTION

The terrazzo work shall be covered and protected from damage until completion of the work of all other trades.

-- End of Section --

SECTION TABLE OF CONTENTS

DIVISION 09 - FINISHES

SECTION 09510

ACOUSTICAL CEILINGS

PART 1 GENERAL

- 1.1 REFERENCES
- 1.2 GENERAL REQUIREMENTS
- 1.3 SUBMITTALS
- 1.4 DELIVERY AND STORAGE
- 1.5 ENVIRONMENTAL REQUIREMENTS
- 1.6 SCHEDULING

PART 2 PRODUCTS

- 2.1 ACOUSTICAL UNITS
- 2.2 SUSPENSION SYSTEM
- 2.3 HANGERS
- 2.4 REVEAL MOLDING

PART 3 EXECUTION

- 3.1 INSTALLATION
  - 3.1.1 Suspension System
  - 3.1.2 Reveal Molding
  - 3.1.3 Acoustical Units
- 3.2 CLEANING

-- End of Section Table of Contents --

SECTION 09510

ACOUSTICAL CEILINGS

PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 423	(1999) Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method
ASTM C 635	(1995) Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-In Panel Ceilings
ASTM C 636	(1996) Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels
ASTM E 119	(1995a) Fire Tests of Building Construction and Materials
ASTM E 1264	(1990) Standard Classification for Acoustical Ceiling Products
ASTM E 1414	(1991a) Standard Test for Airborne Sound Attenuation Between Rooms Sharing a Common Ceiling Plenum
ASTM E 1477	(1998a) Luminous Reflectance Factor of Acoustical Materials by Use of Integrating-Sphere Reflectometers

UNDERWRITERS LABORATORIES (UL)

UL Fire Resist Dir	(1997) Fire Resistance Directory (2 Vol)
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1.2 GENERAL REQUIREMENTS

Acoustical treatment shall consist of sound controlling units mechanically mounted on a ceiling suspension system. The unit size, texture, finish, and color shall be as specified. The location and extent of acoustical treatment shall be as shown on the drawings.

1.3 SUBMITTALS

Government approval is required for submittals with a "GA" designation;

submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Data

Acoustical Ceiling System; FIO.

Manufacturer's descriptive data, catalog cuts, and installation instructions shall be submitted. Manufacturer's standard performance guarantees or warranties that extend beyond a one year period shall be provided. Data attesting to conformance of the proposed system to Underwriters Laboratories requirements for the fire endurance rating listed in UL Fire Resist Dir shall be submitted.

SD-14 Samples

Acoustical Units; GA.

Two samples of each type of acoustical unit and each type of suspension grid tee section showing texture, finish, and color.

1.4 DELIVERY AND STORAGE

Materials shall be delivered to the site in the manufacturer's original unopened containers with brand name and type clearly marked. Materials shall be carefully handled and stored in dry, watertight enclosures. Immediately before installation, acoustical units shall be stored for not less than 24 hours at the same temperature and relative humidity as the space where they will be installed.

1.5 ENVIRONMENTAL REQUIREMENTS

A uniform temperature of not less than 60 degrees F nor more than 80 degrees F and a relative humidity of not more than 75 percent shall be maintained before, during, and after installation of acoustical units.

1.6 SCHEDULING

Interior finish work such as plastering, concrete and terrazzo work shall be complete and dry before installation. Mechanical, electrical, and other work above the ceiling line shall be completed and heating, ventilating, and air conditioning systems shall be installed and operating in order to maintain temperature and humidity requirements.

PART 2 PRODUCTS

2.1 ACOUSTICAL UNITS

Acoustical units shall have an exposed grid system and shall conform to ASTM E 1264, Class A, and the following requirements:

Type: I or III. Acoustical units shall have a minimum recycled material content of 18 percent.

Noise Reduction Coefficient, NRC=0.55 minimum by ASTM C 423(Fissured Pattern with Heavy Texture)

Nominal Size: 24 by 24 inches, and minimum 5/8" thick

Edge Detail: Reveal (tegular)

Finish: Factory-applied white finish

Light Reflectance, LR=0.70 minimum by ASTM E 1477

Ceiling Attenuation Class, CAC=35 minimum by ASTM E 1414.

Fire Resistance: Acoustical ceiling systems shall be rated for fire endurance in accordance with ASTM E 119. The fire endurance rating shall be listed in the UL Fire Resist Dir. Ceiling assembly rating shall be 1-1/2 hour, minimum.

## 2.2 SUSPENSION SYSTEM

Suspension system shall be exposed-grid and shall conform to ASTM C 635 for intermediate-duty systems. Surfaces exposed to view shall be aluminum or steel with a factory applied light-gray baked enamel finish. Ceiling suspension system components shall be treated to inhibit corrosion. Wall molding shall have a flange of not less than 15/16 inch and shall be provided with inside and outside corner caps.

## 2.3 HANGERS

Hangers shall be galvanized steel wire. Hangers and attachment shall support a minimum 300 pound ultimate vertical load without failure of supporting material or attachment.

## 2.4 REVEAL MOLDING

Reveal molding shall be factory-finished metal trim to provide a 3/8" wide by 3/4" deep shadow line at the perimeter of the installation.

# PART 3 EXECUTION

## 3.1 INSTALLATION

Acoustical work shall be provided complete with necessary fastenings, clips, and other accessories required for a complete installation. Mechanical fastenings shall not be exposed in the finished work. Hangers shall be laid out for each individual room or space. Hangers shall be placed to support framing around beams, ducts, columns, grilles, and other penetrations through ceilings. Main runners and carrying channels shall be kept clear of abutting walls and partitions. At least two main runners shall be provided for each ceiling span. Wherever required to bypass an object with the hanger wires, a subsuspension system shall be installed, so that all hanger wires will be plumb.

### 3.1.1 Suspension System

Suspension system shall be installed in accordance with ASTM C 636 and as specified herein. There shall be no hanger wires or other loads suspended from underside of steel decking. Hangers shall be plumb and shall not press against insulation covering ducts and pipes. Where hangers must be splayed (sloped or slanted) around obstructions, the resulting horizontal force shall be offset by bracing, countersplaying, or other acceptable

means.

### 3.1.2 Reveal Molding

Reveal molding shall be provided where ceilings abut vertical surfaces. Wall molding shall be secured not more than 3 inches from ends of each length and not more than 16 inches on centers between end fastenings.

### 3.1.3 Acoustical Units

Acoustical units shall be installed in accordance with the approved installation instructions of the manufacturer. Edges of acoustical units shall be in close contact with metal supports, with each other, and in true alignment. Acoustical units shall be arranged so that units less than one-half width are minimized.

## 3.2 CLEANING

Following installation, dirty or discolored surfaces of acoustical units shall be cleaned and left free from defects. Units that are damaged or improperly installed shall be removed and new units provided as directed.

-- End of Section --

SECTION TABLE OF CONTENTS

DIVISION 09 - FINISHES

SECTION 09720

WALLCOVERINGS

PART 1 GENERAL

- 1.1 REFERENCES
- 1.2 SUBMITTALS
- 1.3 DELIVERY AND STORAGE
- 1.4 ENVIRONMENTAL REQUIREMENTS

PART 2 PRODUCTS

- 2.1 WALLCOVERINGS
  - 2.1.1 Vinyl Wallcovering
- 2.2 WALL LINER
- 2.3 EDGE GUARDS
- 2.4 PRIMER AND ADHESIVE

PART 3 EXECUTION

- 3.1 EXAMINATION
- 3.2 SURFACE PREPARATION
- 3.3 INSTALLATION
  - 3.3.1 Wall Lining
  - 3.3.2 Vinyl and Fabric Wallcovering
  - 3.3.3 Edge Guards
- 3.4 CLEAN-UP

-- End of Section Table of Contents --

SECTION 09720

WALLCOVERINGS

PART 1 GENERAL

This section shall include the furnishing and installation of vinyl wall covering (indicated in Room Finish Schedule as "VINYL WALLCOVERING") as shown and as specified. Work also includes substrate preparation to the extent required and/or as specified hereinafter.

1.1 REFERENCES

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

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM E 84 (1996a) Surface Burning Characteristics of Building Materials

ASTM F 793 (1993) Standard Classification of Wallcovering by Durability Characteristics

1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Data

Wallcovering and Accessories; FIO.

Catalog cuts for the wall covering documentation stating physical characteristics, flame resistance, mildew and germicidal characteristics shall be submitted. Installation instructions for wall coverings and accessories shall be submitted. Cleaning and maintenance instructions shall be submitted.

SD-14 Samples

Wallcovering and Accessories; GA.

Two samples of each type, pattern, and color of wall covering required shall be submitted. Samples shall be minimum 5 inches by 7 inches and of sufficient size to show pattern and repeat. Two samples of each type of edge guard are also required.

1.3 DELIVERY AND STORAGE

Materials shall be delivered to the site in manufacturers original unopened containers labeled with manufacturers name, pattern, texture, size and

related information. Materials shall be stored in accordance with the manufacturer's instructions in a clean dry ventilated area with temperature maintained above 60 degrees F for two days prior to installation.

#### 1.4 ENVIRONMENTAL REQUIREMENTS

Areas to receive wallcovering shall be maintained at a temperature above 60 degrees F for 7 days before, during, and 7 days after application.

### PART 2 PRODUCTS

#### 2.1 WALLCOVERINGS

##### 2.1.1 Vinyl Wallcovering

Vinyl wallcovering shall be a vinyl coated woven or nonwoven fabric with germicidal additives and shall conform to ASTM F 793, Types I or II. Pattern and color shall be as selected by the Contracting Officer from manufacturer's standard colorways and patterns. A polyvinyl fluoride film, 0.0005 inch thick, shall be factory applied to the wall covering. The film shall be transparent medium gloss.

#### 2.2 WALL LINER

Wall liner shall be a non-woven polyester cellulose blend having a minimum weight of 3.7 ounces per square yard and a total minimum thickness of 0.013 inches. Wall liner shall have a Class A flame spread rating of 0-25 and smoke development rating of 0-50 when tested in accordance with ASTM E 84.

#### 2.3 EDGE GUARDS

Edge guards shall be 3/32 inch thick and shall cover 3/4 inch each side of corner at right angles. Edge guards shall be clear vinyl from the same lot and color.

#### 2.4 PRIMER AND ADHESIVE

Primer and adhesive shall be of a type recommended by the wallcovering manufacturer and shall contain a non-mercury based mildewcide. Adhesive shall be strippable type.

### PART 3 EXECUTION

#### 3.1 EXAMINATION

Contractor shall inspect all areas and conditions under which wallcoverings are to be installed. Contractor shall notify in writing of any conditions detrimental to the proper and timely completion of the installation. Work will proceed only when conditions have been corrected and accepted by the installer.

#### 3.2 SURFACE PREPARATION

Wallcovering shall not be applied to surfaces that are rough, that contain stains that will bleed through the wallcovering, or that are otherwise unsuitable for proper installation. Cracks and holes shall be filled and rough spots shall be sanded smooth. Surfaces to receive wallcovering shall

be thoroughly dry. Plaster surfaces shall age at least 30 days prior to installation of vinyl wallcoverings. Interior surfaces of exterior masonry walls shall be sealed to prevent moisture penetration, then primed with a wallcovering primer in accordance with the manufacturer's instructions. Moisture content of plaster, concrete, and masonry shall be tested with an electric moisture meter and reading shall be not more than 5 percent. Masonry walls shall have flush joints. Concrete and masonry walls shall be coated with a thin coat of joint compound or cement plaster as a substrate preparation. To promote adequate adhesion of wall lining over masonry walls, the walls shall be primed as recommended by the wall lining manufacturer. Surface of walls shall be primed as required by manufacturer's instructions to permit ultimate removal of wallcovering from the wall surface. Primer shall be allowed to completely dry before adhesive application.

### 3.3 INSTALLATION

#### 3.3.1 Wall Lining

Wall lining shall be installed over masonry walls that are to receive wallcovering. Lining shall be installed in accordance with the manufacturer's installation instructions. Lining shall be installed perpendicular to wallcovering to prevent overlapping of seams between lining and wallcovering.

#### 3.3.2 Vinyl and Fabric Wallcovering

Wallcovering shall be installed in accordance with the manufacturer's installation instructions. Glue and adhesive spillage shall be immediately removed from wallcovering face and seams with a remover recommended by the manufacturer. After the installation is complete, the fabric wallcovering shall be vacuumed with a ceiling to floor motion.

#### 3.3.3 Edge Guards

Edge guards shall be installed where shown on the drawings and in accordance with the manufacturer's printed instructions. Edge guards shall run from top of base to ceiling in a continuous length.

### 3.4 CLEAN-UP

Upon completion of the work, wallcovering shall be left clean and free of dirt or soiling. Surplus materials, rubbish, and debris resulting from the wallcovering installation shall be removed and area shall be left clean.

-- End of Section --

SECTION TABLE OF CONTENTS

DIVISION 09 - FINISHES

SECTION 09900

PAINTING, GENERAL

PART 1 GENERAL

- 1.1 REFERENCES
- 1.2 SUBMITTALS

PART 2 PRODUCTS

- 2.1 GENERAL
  - 2.1.1 Definition
  - 2.1.2 Packaging, Labeling, and Storage
  - 2.1.3 Colors and Tints
  - 2.1.4 Quality Assurance Provisions
- 2.2 MATERIALS
  - 2.2.1 High Ratio Zinc Silicate Coating System
  - 2.2.2 Hazardous Materials Restrictions
  - 2.2.3 Lead
  - 2.2.4 Mercury

PART 3 EXECUTION

- 3.1 GENERAL
  - 3.1.1 Environmental Conditions
- 3.2 INSTALLATION
  - 3.2.1 Surface Preparation
    - 3.2.1.1 Concrete and Masonry Surfaces
    - 3.2.1.2 Ferrous Surfaces
    - 3.2.1.3 Gypsum Board Surfaces
    - 3.2.1.4 Wood Surfaces
    - 3.2.1.5 High Ratio Zinc Silicate Coating System
    - 3.2.1.6 Nonferrous Metallic and Galvanized Surfaces
  - 3.2.2 Mixing and Thinning
  - 3.2.3 Application
    - 3.2.3.1 Ventilation
    - 3.2.3.2 First Coat
    - 3.2.3.3 Time Between Surface Preparation and Painting
    - 3.2.3.4 Coating Progress
    - 3.2.3.5 Masonry Surfaces
    - 3.2.3.6 Metal Surfaces
    - 3.2.3.7 High-Ratio Zinc Silicate Coating
  - 3.2.4 Pipe Color Code Marking
  - 3.2.5 Surfaces To Be Painted
  - 3.2.6 Surfaces Not Requiring Painting
  - 3.2.7 Surfaces For Which Painting is Prohibited
- 3.3 CLEANING
- 3.4 TABLE I - COLOR CODES FOR MARKING PIPE
- 3.5 TABLE II - COLOR CODE MARKING SIZES

3.6 TABLE III - PAINTING SCHEDULE

-- End of Section Table of Contents --

SECTION 09900  
PAINTING, GENERAL

PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI A13.1 (1996) Scheme for the Identification of Piping Systems

AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS (ACGIH)

ACGIH Limit Values (1996) Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 520 (1995) Zinc Dust Pigment

COMMERCIAL ITEM DESCRIPTIONS (CID)

CID A-A-1500 (Rev A; Notice 1) Sealer, Surface (Latex Block Filler)

CID A-A-1546 (Rev A) Rubbing Varnish

CID A-A-2246 (Rev B) Paint, Latex (Gloss, Interior)

CID A-A-2247 (Basic) Paint, Latex (Semigloss, Interior)

CID A-A-2248 (Basic) Paint, Latex, (Flat, Interior)

CID A-A-2867 (Basic) Coating, Polyurethane, Single Component Moisture Cure, Aliphatic

CID A-A-2994 (Basic) Primer Coating, Interior, for Walls and Wood

FEDERAL SPECIFICATIONS (FS)

FS TT-E-2784 (Rev A) Enamel (Acrylic-Emulsion, Exterior Gloss and Semigloss) (Metric)

FS TT-P-38 (Rev E) Paint, Aluminum (Ready Mixed)

STEEL STRUCTURES PAINTING COUNCIL (SSPC)

SSPC Paint 23	(1982) Latex Primer for Steel surfaces
SSPC Paint 25	(1991) Red Iron Oxide, Zinc Oxide, Raw Linseed Oil and Alkyd Primer (Without Lead and Chromate Pigments)
SSPC Paint 27	(1991) Basic Zinc Chromate-Vinyl Butyral Wash Primer
SSPC SP 1	(1982) Solvent Cleaning
SSPC SP 3	(1995) Power Tool Cleaning
SSPC SP 7	(1994) Brush-Off Blast Cleaning
SSPC SP 10	(1994) Near-White Blast Cleaning

## 1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

### SD-01 Data

Paint Data; FIO.

The Contractor shall submit the proposed paint manufacturer(s) and products to be used, intended use, quantity represented, and some form of evidence (product labels, catalog cuts, or certification) that the products meet the specifications.

### SD-14 Samples

Paint Colors; GA.

Color strips of each paint product (including primers) shall be submitted. Each color shall be clearly assigned to location of use.

## PART 2 PRODUCTS

### 2.1 GENERAL

#### 2.1.1 Definition

The term "paint" as used herein includes emulsions, enamels, paints, stains, varnishes, sealers, cement-emulsion filler, and other coatings, whether used as prime, intermediate, or finish coat.

#### 2.1.2 Packaging, Labeling, and Storage

Paints shall be in sealed containers that legibly show the designated name, formula, or specification number, batch number, color, quantity, date of manufacture, manufacturer's formulation number, manufacturer's directions including any warnings and special precautions, and name of manufacturer. Pigmented paints shall be furnished in containers not larger than 5 gallons. Paints shall be stored on the project site or segregated at the

source of supply sufficiently in advance of need to allow 30 days for testing. Emulsion paints shall be stored to prevent freezing.

### 2.1.3 Colors and Tints

Colors shall be as selected by the Contracting Officer. Tinting of vinyl-type paints shall be done by the manufacturer. Stains shall conform in shade to manufacturer's standard color. The color of primers shall be compatible with the color and tint of the overlying coats.

### 2.1.4 Quality Assurance Provisions

When samples are tested, approval of materials will be based on tests of the samples; otherwise, materials will be approved based on test reports furnished with them. If materials are approved based on test reports furnished, samples will be retained by the Government for testing should the materials appear defective during or after application. In addition to any other remedies under the contract, the cost of retesting defective materials will be at the Contractor's expense.

## 2.2 MATERIALS

Products shall be as listed herein and in the PAINTING SCHEDULE. Where a factory finish (shop coat) is available, products will be accepted subject to the Contracting Officer's approval.

### 2.2.1 High Ratio Zinc Silicate Coating System

The high ratio zinc silicate coating system shall be a ready-to-mix, two-component material. The components shall be furnished in separate companion containers. (The zinc dust shall be in one container and the liquid silicate vehicle in the other container.) The zinc dust pigment shall conform to the requirements of ASTM D 520. The liquid vehicle portion of the high-ratio zinc silicate shall be high-ratio (5.3:1, SiO<sub>2</sub>, K<sub>2</sub>O) potassium silicate and shall be manufactured under U.S. Patent 4162169 issued to the National Aeronautics and Space Administration (NASA).

The high-ratio zinc silicate shall meet the following quantitative requirements:

Zinc in Dry Film	90% minimum
Solids by Volume	60% +1
Dry Time @ 75 F	
To Touch	15-30 minutes
To Topcoat	2 hours
Ratio (SiO <sub>2</sub> :K <sub>2</sub> O)	5.3:1
Weight per gallon in pounds	24.87 +.5
VOC content, pounds per gallon	0

### 2.2.2 Hazardous Materials Restrictions

Paints and painting practices shall comply with all applicable state and local laws enacted to insure compliance with Federal Clean Air Standards.

### 2.2.3 Lead

Except for lead-based metal primers for use in concealed spaces, paints containing lead in excess of 0.06 percent by weight of the total nonvolatile content (calculated as lead metal) shall not be used.

#### 2.2.4 Mercury

Mercurial fungicides shall not be used.

### PART 3 EXECUTION

#### 3.1 GENERAL

##### 3.1.1 Environmental Conditions

Unless otherwise recommended by the paint manufacturer, the ambient temperature shall be between 45 and 95 degrees F when applying coatings other than water-thinned, epoxy, moisture-cure polyurethane, and liquid glaze coatings. Water-thinned coatings will be applied only when ambient temperature is between 50 and 90 degrees F. Epoxy, moisture-cure polyurethane, and liquid glaze coatings will be applied only within the minimum and maximum temperatures recommended by the coating manufacturer. Moisture-cure polyurethane will not be applied when the relative humidity is below 30 percent. Paints, except water-thinned types, shall be applied only to surfaces that are completely free of moisture as determined by sight or touch. In no case shall paint be applied to surfaces which have visible frost or ice.

#### 3.2 INSTALLATION

##### 3.2.1 Surface Preparation

Items not to be painted which are in contact with or adjacent to painted surfaces shall be removed or protected prior to surface preparation and painting operations. Exposed ferrous metals, including nails on or in contact with surfaces to be painted with water-thinned paints, shall be spot-primed with a suitable corrosion-inhibitive primer capable of preventing flash rusting and compatible with the coating specified for the adjacent areas. All surfaces shall be clean and free of foreign matter before application of paint or surface treatments. Oil and grease shall be removed with clean cloths and cleaning solvents prior to mechanical cleaning. Cleaning solvents shall be of low toxicity with a flashpoint in excess of 100 degrees F. Cleaning shall be programmed so that dust and other contaminants will not fall on wet, newly painted surfaces. Items removed prior to painting shall be replaced when painting is completed.

##### 3.2.1.1 Concrete and Masonry Surfaces

Surfaces shall be allowed to cure at least 30 days before painting, except concrete slab on grade which shall be allowed to cure 90 days before painting. Glaze, efflorescence, latence, dirt, grease, oil, asphalt, surface deposits of free iron and other foreign matter shall be removed prior to painting.

- a. Cement-Emulsion Filler. Immediately before coating, concrete masonry surfaces to be painted shall be dampened uniformly and thoroughly, with no free surface water visible, by several applications of potable water with a fog spray, allowing time between the sprayings for water to be absorbed.

##### 3.2.1.2 Ferrous Surfaces

Ferrous surfaces that have not been shop-coated shall be solvent-cleaned. Surfaces that contain loose rust, loose mill scale, and other foreign substances shall be cleaned mechanically with power tools according to SSPC SP 3 or by sandblasting according to SSPC SP 7. After cleaning, one coat of ferrous-metal primer shall be applied to all ferrous surfaces to receive paint other than asphalt varnish and vinyl paint. The semitransparent film applied to some pipes and tubing at the mill is not to be considered a shop coat, but shall be overcoated with the specified ferrous-metal primer prior to application of finish coats. Shop-coated ferrous surfaces shall be protected from corrosion by treating and touching up corroded areas immediately upon detection.

#### 3.2.1.3 Gypsum Board Surfaces

Gypsum board surfaces shall be dry and shall have all loose dirt and dust removed by brushing with a soft brush, rubbing with a dry cloth, or vacuum-cleaning prior to application of the first-coat material.

#### 3.2.1.4 Wood Surfaces

Interior wood surfaces to receive stain including wood doors, and locker and shower room benches shall be stained to the approved shade and lightly sanded.

#### 3.2.1.5 High Ratio Zinc Silicate Coating System

All surfaces to be coated shall be prepared in accordance with SSPC SP 10. A near-white blast cleaned surface is defined as one from which all oil, grease, dirt, mill scale, rust, corrosion products, oxides, paint, or other foreign matter have been completely removed from the surface except for very light shadows, very slight streaks or slight discolorations caused by rust stain, mill scale oxides or slight, tight residues or paint or coating that may remain. At least 95 percent of each square inch or surface area shall be free of all visible residues, and the remainder shall be limited to the light discoloration mentioned above.

A minimum 1-3 mil blast profile is recommended. Excessive profiles above 3 mils will demand more coating material to fill the profile.

All blast media should be clean and free from organic contamination. All compressors shall be equipped with oil/water separators in good working condition. Recycled blast media shall be refurbished and maintained so as not to contaminate surfaces with residual organic materials.

#### 3.2.1.6 Nonferrous Metallic and Galvanized Surfaces

Where such surfaces are specified to be painted, they shall be first washed with clean mineral spirits and then pretreated with a primer conforming to SSPC Paint 27 in accordance with the following instructions: The pretreatment primer shall be mixed by adding 1 volume of acid component (diluent) to 4 volumes of resin component (base solution) slowly and with constant stirring. After mixing, the material shall be used within 8 hours. The pretreatment primer shall be spray applied at a coverage rate of 250 to 300 square feet per gallon of resin component to give a dry film thickness of 0.3 to 0.5 mil. Small areas may be coated by brush or swab. Care shall be exercised in spray application to avoid the deposition of dry particles on the surface. A wet spray shall be maintained at all times by additional thinning with Normal Butanol where required by prevailing

weather conditions. The acid component (diluent), over and above the amount prescribed above, shall not be used for thinning purposes. Surfaces shall receive the first coat of paint after at least 1 but not more than 24 hours drying of the pretreatment primer film.

### 3.2.2 Mixing and Thinning

Unless otherwise recommended by the manufacturer, paints may be thinned immediately prior to application with not more than 1 pint of suitable thinner per gallon when necessary to suit conditions or surface, temperature, weather, and application methods. The use of thinner shall not relieve the Contractor from obtaining complete hiding, full film thickness, or required gloss. Paints of different manufacturers shall not be mixed.

### 3.2.3 Application

All paint shall be applied according to the manufacturer's instructions. Paint may be applied by brush, roller, or spray. At the time of application, paint shall show no signs of deterioration. Uniform suspension of pigments shall be maintained during application. Each coat of paint shall be applied so dry film shall be of uniform thickness and free from runs, drops, ridges, waves, pinholes or other voids, laps, brush marks, and variations in color, texture, and finish. Hiding shall be complete. Rollers for applying paints and enamels shall be of a type designed for the coating to be applied and the surface to be coated. Special attention shall be given to insure that all edges, corners, crevices, welds, and rivets receive a film thickness equal to that of adjacent painted surfaces. Paints, except water-thinned types, shall be applied only to surfaces that are completely free of moisture as determined by sight or touch. Floor sealer shall be given additional touch-up coats as necessary to eliminate dull spots. Excess sealer shall be wiped off after each application.

#### 3.2.3.1 Ventilation

Affected areas shall be ventilated during paint application so that workers exposure to chemical substances shall not exceed limits as established by ACGIH Limit Values. Adequate ventilation shall be provided during paint application. Respirators shall be worn by all persons engaged in spray painting. Adjacent areas shall be protected by approved precautionary measures.

#### 3.2.3.2 First Coat

The first coat on gypsum wallboard and other surfaces shall include repeated touching up of suction spots or overall application of primer or sealer to produce uniform color and gloss. The first coat on both faces of wood doors shall be applied at essentially the same time. Glazed doors and sashes shall be given both coats of paint within 3 weeks of the time they are glazed, but not before the glazing material has set; paint shall overlay glass about 70 mils all around. Each varnish coat shall be sanded lightly prior to application of subsequent coats.

#### 3.2.3.3 Time Between Surface Preparation and Painting

Surfaces that have been clean, pretreated, and otherwise prepared for painting shall be given a coat of the specified first coat as soon as practical after such pretreatment has been completed, but prior to any

deterioration of the prepared surface.

#### 3.2.3.4 Coating Progress

Sufficient time shall elapse between successive coats to permit proper drying. This period shall be modified as necessary to suit weather conditions. Oil-based or oleoresinous solvent-type paints shall be considered dry for recoating when the paint feels firm, does not deform or feel sticky under moderate pressure of the thumb, and the application of another coat of paint does not cause the undercoat to lift or lose adhesion.

#### 3.2.3.5 Masonry Surfaces

Masonry surfaces may be coated by brush, roller, or spray, except when using filler coats. When using fillers, surface voids shall be filled; however, surface irregularities need not be completely filled. The filler dry film shall be uniform and free of pinholes. The filler shall not be applied over caulking compound. All surface voids shall be filled and the filler allowed to dry the length of time specified by the manufacturer prior to applying successive coats of paint.

#### 3.2.3.6 Metal Surfaces

First coats other than vinyl paints or vinyl-type wash coats shall be applied by brush. The three-coat paint systems specified for exterior and interior ferrous surfaces shall be applied so that their dry-film thickness at any point shall be not less than 4.0 mils, with the primer having a minimum dry-film thickness of 1.5 mils.

#### 3.2.3.7 High-Ratio Zinc Silicate Coating

The high-ratio zinc silicate coating shall be shop applied, and touched up in the field.

a. Application. All grit shall be removed from the surface by brush, airblast, or vacuum type cleaner prior to applying the coating. Care shall be taken to assure that all blast cleaned surfaces are not contaminated with foreign material prior to applying the coating.

Mixing, thinning, pot life, application procedures, equipment, coverage, and storage shall be according to manufacturer's instructions.

The high-ratio zinc silicate coating shall be applied as soon as possible after blasting, and not after 24 hours have elapsed. The high-ratio zinc silicate shall be applied when the surface temperature is at least 40 degrees F and at least 5 degrees F above the dew point. Surface temperature and dew point shall be checked and recorded. The high-ratio zinc silicate shall not be applied to surfaces which are wet, damp, frosty, or icy.

The high-ratio zinc silicate shall be applied to achieve a minimum 4 mils dry film thickness. Dry film thickness shall be checked when the high-ratio zinc silicate is dry and hard. In most conditions this occurs in 30 minutes.

b. Touchup. Areas to be touched up shall be clean, dry, free from grease, oil, corrosion products and other contaminants. If contaminated, jet wash or scrub with a stiff brush and clear water or brush blast to remove contamination. Light rust may be removed with a

steel brush or mechanical tool. Apply high-ratio zinc silicate with brush or spray.

All welds shall be touched up with IC 531. Before touchup, welds shall be blasted to an SSPC SP 10, Near-White Blast. This blast shall be achieved by spot blasting or grinding. (Special spot blast equipment is available which allows blast and vacuum of the blast residue in a single sweep. This surface preparation method is fast, clean, and relatively inexpensive when compared to open blast or hand grinding methods.

#### 3.2.4 Pipe Color Code Marking

Pipes exposed or concealed in accessible pipe spaces shall be provided with color band and titles adjacent to all valves, except those provided at plumbing fixtures, at not more than 40-foot spacing on straight pipe runs, adjacent to change in direction, and on both sides where pipes pass through walls or floors. Color code marking shall be of the color listed in TABLE I and the size listed in TABLE II. (These tables are based on ANSI A13.1.)

The arrows shall be installed adjacent to each band to indicate the direction of flow in the pipe. The legends shall be printed in upper-case black letters as listed in TABLE I. Letter sizes shall be as listed in TABLE II. Marking shall be painted or applied using colored, pressure-sensitive adhesive markers or standard manufacture. Paint shall be as specified for insulated and uninsulated piping.

#### 3.2.5 Surfaces To Be Painted

Surfaces listed in the PAINTING SCHEDULE, other than those listed in paragraphs SURFACES NOT REQUIRING PAINTING and SURFACES FOR WHICH PAINTING IS PROHIBITED, will receive the surface preparation, paints, and number of coats prescribed in the schedule.

#### 3.2.6 Surfaces Not Requiring Painting

The following listed items will not require painting:

- a. all surfaces in "cable vault" and tunnel
- b. surfaces in the existing Central Control Building Basement, except the new structural steel which is not galvanized
- c. factory finished equipment and fittings

#### 3.2.7 Surfaces For Which Painting is Prohibited

The following listed items shall not be painted:

- a. fire detection elements

### 3.3 CLEANING

Cloths, cotton waste, and other debris that might become a fire hazard shall be put in closed metal containers and removed at the end of each day.

At completion of the work, staging, scaffolding, and containers shall be removed or disposed in a lawful manner. Paint and other deposits on adjacent surfaces shall be removed and the entire job left clean and acceptable.

3.4 TABLE I - COLOR CODES FOR MARKING PIPE

TABLE I - COLOR CODES FOR MARKING PIPE

<u>Material</u>	<u>Band</u>	<u>Arrow*</u>	<u>Legend</u>
Cold water (potable)	White	Black	POTABLE WATER
Auxiliary water	Red	Black	AUX. WATER
Hot water (domestic)	White	Black	H.W.
Boiler feed water	Gray	Black	B.F.
Low temp. water supply (heating)	Gray	Black	L.T.W.S.
Low temp. water return (heating)	Gray	Black	L.T.W.R.
Treated water	Blue	Black	TR. WATER
Chemical feed	Blue	Black	CH. FEED
Compressed air	Gray	Green	COMP. AIR
Bubbler air	Gray	Green	BUBBLER AIR
Freon	Gray	Black	FREON
Fuel oil	Yellow	Black	FUEL OIL
Propane	Yellow	Black	PROPANE
Natural gas	Yellow	Black	NAT.GAS
Gasoline	Yellow	Black	GASOLINE
Irrigation water	Gray	Black	IR. WATER

\*Where black is indicated, white shall be used if necessary to provide contrast.

3.5 TABLE II - COLOR CODE MARKING SIZES

TABLE II - COLOR CODE MARKING SIZES

<u>Outside Diameter of Pipe Covering (Inches)</u>	<u>Width of Color Band (Inches)</u>	<u>Arrow Length x Width (Inches)</u>	<u>Size of Legend Letters and Numerals (Inches)</u>
Less than 1-1/2	1	1-1/2 x 1/2	1/2
1-1/2 to 3-1/2	1	4 x 1	3/4
3-1/2 to 6	2	8 x 2	1-1/4
6 to 9	2	12 x 3	2
9 to 13	2	16 x 4	3
Over 13	6	20 x 5	3-1/2

3.6 TABLE III - PAINTING SCHEDULE

The following painting schedule identifies the surfaces to be painted and prescribes the paint to be used and the number of coats of paint to be applied.

TABLE III. PAINTING SCHEDULE

<u>SUBSTRATE</u>	<u>PAINT (see note 1)</u>
Drywall (general shedule unless noted otherwise)	PRIMER = white drywall primer PAINT = 2 coats interior latex
Drywall in Conf./Break room and kitchen	PRIMER = white drywall primer PAINT = 2 coats acrylic enamel
Interior concrete or masonry walls	PRIMER = CID A-A-1500 PAINT = 2 coats acrylic enamel
Underside of shop-primed (zinc-coated) roof decking	PAINT = 1 coat acrylic enamel
Interior iron and steel (general shedule unless noted otherwise). Louvers/grilles, conduit & pipes, ducts, hangers, etc.	PRIMER = SSPC Paint 23 PAINT = 1 coat acrylic enamel
Factory primed electrical & mechanical equipment (interior ferrous surfaces)	PAINT = 2 coats acrylic enamel
Wood doors, benches, and trim	STAIN = (any commercially available) SEALER = 3 coats rubbing varnish
Exterior iron & steel (general shedule unless noted otherwise)	PRIMER = SSPC Paint 25 PAINT = 2 coats acrylic enamel
Exterior aluminum and aluminum-alloy (excluding handrails)	PAINT = 2 coats CID A-A-2867
Galvanized Surfaces	PRIMER = SSPC Paint 23 PAINT = 1 coat acrylic enamel
Exterior structural steel framing	PAINT = high-ratio zinc silicate coating (shop applied)

Notes:

1. White drywall primer shall meet CID A-A-2994, Type II.  
Interior latex shall meet CID A-A-2246, CID A-A-2247, or CID A-A-2248.  
Acrylic enamel shall meet FS TT-E-2784.  
Rubbing varnish shall meet CID A-A-1546.
2. Exposed interior oil-based chaulking compound shall be primed with an aluminum paint conforming to FS TT-P-38, and then covered with paint sheduled for the adjacent surface.

-- End of Section --