

DIVISION 9

FINISHES

SECTION: 09900

TITLE: PAINTING

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C. Federal Specification (FS):

| | |
|--------------|--|
| FS TT-C-535A | Catalyzed Epoxy |
| FS TT-E-489F | Enamel, Alkyd, Gloss (For Exterior and Interior Surfaces) |
| FS TT-E-496B | Enamel, Heat-Resisting (400 degrees F), Black |
| FS TT-E-505A | Enamel, Odorless, Alkyd, Interior, High Gloss, White and Light Tints |
| FS TT-E-506K | Enamel, Alkyd, Gloss Tints and White for Interior Use |
| FS TT-E-508C | Enamel, Interior Semigloss, Tints and White |
| FS TT-E-509B | Enamel, Odorless, Alkyd, Interior, Semigloss, White and Tints |
| FS TT-E-529C | Enamel, Alkyd, Semigloss |
| FS TT-E-543A | Enamel, Interior Undercoat, Tints and White |
| FS TT-E-545B | Enamel, Odorless, Alkyd, Interior Undercoat, Flat, Tints and White |
| FS TT-E-1593 | Enamel |
| FS TT-F-1098 | Filler |
| FS TT-P-19 | Paint |
| FS TT-P-29J | Paint, Latex-Base, Interior Flat, White and Tints |
| FS TT-P-30E | Paint, Alkyd, Odorless, Interior, Flat, White and Tints |
| FS TT-P-31 | Paint |
| FS TT-P-37 | Paint |
| FS TT-P-38 | Paint |
| FS TT-P-86G | Paint, Red-Lead-Base, Ready-Mixed |
| FS TT-P-102 | Paint |

| | |
|--------------|--|
| FS TT-P-543 | Paint |
| FS TT-P-615D | Primer Coating, Basic Lead Silico Chromate, Ready-Mixed |
| FS TT-P-641G | Primer Coating, Zinc Dust-Zinc Oxide (for Galvanized Surfaces) |
| FS TT-P-645A | Primer, Paint, Zinc Chromate, Alkyd Type |
| FS TT-P-650 | Paint |
| FS TT-P-1510 | Paint |
| FS TT-P-1511 | Paint |
| FS TT-P-1984 | Paint |
| FS-TT-S-711 | Sealer |

D. Federal Standards (FST):

FST 595A Colors, Vol. 1

E. Military Specifications (MIL):

MIL-DOD-P-15328D Primer (Wash), Pre-Treatment, (Formula No. 117 for Metals)

F. Society of Spray Painting Contractors (SSPC):

SSPC-PA-1

G. Underwriters Laboratories Inc. (UL):

UL DIR Building Materials Directory

1.04 SUBMITTALS

A. Furnish a paint schedule matching this specification and listing the following:

1. Paint system number
2. Where applied
3. FST 595A Color Identification Example (CIE) number for final coat color
4. Cleaning and material preparation
5. FS number of primer

6. Required dry film thickness of primer
7. Final coats:
 - a. Number of final coats
 - a. FS number
 - b. CIE color
 - c. Required dry film thickness
- B. Furnish four copies of certificate of compliance attesting that all paints proposed for use contain not more than 0.06% lead as defined in Paragraph 2.03 of this section. The sole exception is the use of leadbased metal primers in concealed spaces.
- C. Furnish a materials list containing estimated quantities prior to shipment of materials to the job site.
- D. Provide manufacturer's criteria:
 1. Instructions for mixing, thinning, and application
 2. Minimum and maximum application temperatures
 3. Curing and drying times between coats
 4. Application instructions for textured coatings
- E. Select a one quart sample of each batch from the sealed containers.
 1. Take random samples from the material at the site or source of supply.
 2. The contents of the sampled containers shall be thoroughly mixed prior to sampling.
 3. Samples shall be identified by designated name, specification number, batch number, project contract number, intended use, and quantity involved.
 4. Exceptions may be made for small quantities of approved proprietary brands at the discretion of the Department of Energy Contracting Officers Representative (DOE/COR).

- F. Submit for approval the names of the proprietary brands of materials that are proposed to be substituted for the specified materials when the required quantity of a particular color is 25 gallons or less.
- G. Furnish one of the following for batches in excess of 25 gallons:
 - 1. A test report showing that the batch meets all specification requirements.
 - 2. A test report showing that a previous batch of the same formulation as the batch to be used met all specification requirements. Test results shall include weight per gallon, viscosity, fineness of grind, drying time, color, and gloss.

1.05 QUALITY ASSURANCE

- A. Conform to ASTM D16 for interpretation of terms used in this section.
- B. Manufacturer: company specializing in manufacturing paint and finish products with a minimum of three years' experience in work of this type.
- C. Applicator: company specializing in commercial painting and finishing with a minimum of three years' experience in work of this type.

1.06 APPROVALS

- A. Approval of materials will be based upon data and samples furnished.
 - 1. If materials are approved based upon tests, unused samples will be retained in case defects appear during or after application.
 - 2. If the sample tested by the the DOE/COR fails to meet specification requirements, the material represented by the sample shall be replaced.
 - 3. The cost of any retesting will be deducted from the payments due.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site. See Section 01600.
- B. Store and protect products. See Section 01600.

- C. Deliver products to site in sealed and labeled containers.
- D. Container labels shall include manufacturer's name, brand name, type of paint, identity code, color designation, surface preparation, instructions for mixing and thinning, coverage, drying time, and cleanup instructions.
- E. Store paint materials at a minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F in a well-ventilated area unless otherwise specified in manufacturer's instructions.
- F. Take precautions to minimize fire hazards and prevent spontaneous combustion.

1.08 ENVIRONMENTAL REQUIREMENTS

- A. Provide continuous ventilation and heating to maintain surface and ambient temperatures above 45 degrees F for 24 hours before, during, and 48 hours after application of finishes unless otherwise specified in manufacturer's instructions.
- B. Do not apply exterior coatings during rain or snow or when relative humidity is above 50% unless otherwise specified in manufacturer's instructions.
- C. Minimum application temperatures for latex paints: 45 degrees F for interiors, 50 degrees F for exteriors unless otherwise specified in manufacturer's instructions.
- D. Epoxy and moisture cure polyurethane coatings shall be applied only when the temperature is within the minimum and maximum specified by the manufacturer. Moisture cure polyurethane shall not be applied when the relative humidity is below 30%.
- E. Provide a lighting level of 80 foot candles, measured at mid-height of substrate surface, during application of paint or finish.

1.09 EXTRA STOCK

- A. Provide a one-gallon container of each color and a sample of surface texture. Deliver to DOE/COR.
- B. Label each container with color, texture, and room locations in addition to the manufacturer's label.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Paint:

1. Ameritone Paint Corporation
2. Dunn-Edwards Corporation
3. Sinclair Paint and Wall Covering, Inc.

B. Primer sealers:

1. Ameritone Paint Corporation
2. Dunn-Edwards Corporation
3. Sherwin-Williams Company

C. Block filler:

1. Ameritone Paint Corporation
2. Dunn-Edwards Corporation
3. Sherwin-Williams Company

- D. Substitutions: Alternate products, equal in quality and utility to those specified, may be used subject to the approval of the DOE/COR. See Section 01600.

2.02 MATERIALS

A. General:

1. Materials shall conform to the requirements listed in Paragraph 3.12.
2. When 25 gallons or less of a material of a particular color is required, an approved proprietary brand of that material, equal in quality and utility, may be substituted subject to the approval of the DOE/COR.

B. Exterior oil paint shall conform to the following:

1. White: FS TT-P-102 or MIL-P-52324, Class 2.
2. Light tints: FS TT-P-102 or MIL-P-52324, Class 2.

3. Red or brown: FS TT-P-31.
4. Other deep colors: FS TT-P-37.

C. Ferrous metal primer shall conform to one of the following:

1. FS TT-P-86G, Type I or II.
2. FS TT-P-615D, Type I, II, or V.
3. FS TT-P-645A.

D. Fungicide:

1. Paint specified for all coats applied to fabrics and vapor barrier jackets over insulation shall contain a fungicide that will not adversely affect the color, texture, or durability of the coating.
2. Paint shall contain a fungicide incorporated into the paint by the manufacturer meeting the fungus-resistance test specified in FS TT-P-19.

E. International orange enamel shall conform to one of the following:

1. FS TT-E-489F, color number 12197-1.
2. FS TT-E-1593, color number 12197.

2.03 HAZARDOUS MATERIALS RESTRICTION

A. Lead:

1. Paint shall contain not more than 0.06% lead by weight (calculated as lead metal) in the total nonvolatile content of the paint.
2. The sole exception is the use of leadbased metal primers in concealed spaces.

B. Mercury: Mercurial fungicides shall not be used.

2.04 COLORS AND TINTS

A. Colors and tints shall conform to FST 595A and shall match the respective color specimens listed on the color schedule of the Drawings.

1. The color of the undercoat shall vary slightly from the color of the next coat.

PART 3 EXECUTION

3.01 INSPECTION

- A. Verify that existing surfaces are ready to receive work.
- B. Examine surfaces to be finished prior to commencement of work. Report to the DOE/COR any condition that may affect proper application.
- C. Beginning of application means Contractor and Applicator accept the existing surfaces and substrate.

3.02 PREPARATION

A. General:

1. 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.
2. Exposed ferrous metals, including nails on or in contact with surfaces to be painted, shall be spot primed with zinc chromate primer.
3. Surfaces to be painted shall be cleaned before applying paint or surface treatments.
 - a. Oil and grease shall be removed with clean cloths and solvents prior to mechanical cleaning.
 - b. Solvents shall be of low toxicity with a flash point in excess of 100 degrees F.
 - c. Cleaning shall be programmed so that dust and other contaminants will not fall on wet or newly painted surfaces.

B. Concrete and masonry surfaces.

1. Surface shall be allowed to dry at least 30 days before painting.
2. Glaze, efflorescence, laitance, dirt, grease, oil, asphalt, surface deposits of free iron, and other foreign matter shall be removed prior to painting.
3. The dry concrete surface shall be treated with the manufacturer's recommended conditioner prior to application of the first coat.

C. Ferrous surfaces:

1. Preparation:

- a. Ferrous surfaces that have not been shop-coated shall be solvent cleaned.
- b. Surfaces that contain loose rust, loose mill scale, and other foreign substances shall be mechanically cleaned by power wirebrushing or sandblasting.
- c. Minute amounts of residual rust that cannot be removed except by thorough blastcleaning and tight mill scale that cannot be removed by applying a sharp knife to any edge will be allowed to remain.

2. Painting:

- a. One coat of ferrous metal primer shall be applied to all surfaces to receive paint.
 - b. The semi-transparent film applied to some pipes and tubing at the mill is not to be considered as a shop coat, but shall be overcoated with the specified ferrous metal primer prior to application of finish coats.
3. Protect shop-coated ferrous surfaces from corrosion by treating and touching up corroded areas immediately upon detection.

D. Galvanized, aluminum, aluminum alloy, lead, copper, and other non-ferrous surfaces to be painted shall be solvent cleaned and treated with vinyl wash coat.

E. Gypsum board:

1. Check for unfinished nail holes, popped nails, dislodged corners and edges, and exposed joint edges.
2. Surfaces shall be dry. Remove all loose dirt and dust by brushing with a soft brush or rubbing with a dry cloth.
3. Apply 3 coats of sanded finish with the texture specified.
4. Surfaces to receive epoxy paint shall have all joints, cracks, holes, and other defects repaired with patching plaster, filled out flush and smooth, and sanded prior to painting.

- F. Mastic-type surfaces shall be prepared by removing all foreign material.
- G. Fabric covering insulation on pipes, ducts, tanks, and other equipment shall be given a coat of sizing to which subsequent paint coats will adhere permanently.
 - 1. The sizing shall be applied so as to completely seal the surface.
 - 2. Add a sufficient amount of fungicidal agent to the sizing and each subsequent coat of paint to render the fabric mildewproof.
 - 3. The fungicidal agent shall be a type that will not adversely affect the color, texture, or durability of the paint or sizing.
 - a. 4% tetrachlorophenol is acceptable for oilbase materials and chlorinated rubber paint.
 - b. 4% sodium tetrachlorophenate is acceptable for water emulsion paints and size.
 - c. Percentages are based upon nonvolatile content of the paint.

3.03 MIXING AND THINNING

A. General:

- 1. Thin paint, when necessary, to suit conditions of surface, temperature, weather, and method of application.
 - a. Use no more than one pint of suitable thinner per gallon.
 - b. The use of thinner shall not preclude obtaining adequate coverage.
- 2. Paints of different manufacturers shall not be mixed.

B. Epoxy:

- 1. Mix two component systems in accordance with manufacturers' instructions.
- 2. Thin the first coat, when necessary, to ensure proper penetration and sealing. Comply with the manufacturer's instructions.

C. Vinyl type wash coat:

1. MIL-DOD-P-15328D wash coat shall be mixed by adding one volume of acid component to four volumes of resin component. The acid component shall be used within 8 hours.
2. The material may be thinned with normal butyl alcohol or 99% isopropyl alcohol, if required to maintain a wet spray.

3.04 APPLICATION

A. General:

1. Paint may be applied by brush, roller, or spray unless otherwise specified.
2. At time of application, paint shall show no signs of deterioration.
3. Uniform suspension of pigments shall be maintained during application.
4. Paint shall be applied so that finished surfaces are free from runs, drops, ridges, waves, laps, brush marks, and variations in color, texture, and finish.
5. Covering shall be complete.
6. Each coat shall be applied as a film of uniform thickness.
7. Rollers for applying paints and enamels shall be the type designed for the coating to be applied and the surface to be coated.
8. Special attention shall be given to ensure that all surfaces including edges, corners, crevices, welds, and rivets receive a film thickness equal to that of adjacent surfaces.
9. Adequate ventilation shall be provided during paint application.
10. Respirators shall be worn by all persons engaged in spray painting.
11. Adjacent areas shall be protected by the use of drop cloths or other approved devices.

12. The first coat on gypsum board shall include repeated touching up of suction spots or overall application of primer or sealer to produce a uniform color and gloss.
13. Steel glazed doors and sashes shall be given both coats of paint within three weeks of the time they are glazed, but not before the glazing material has set. Paint shall overlay glass slightly above the sight line.
14. Paints, except waterthinned types, shall be applied only to surfaces that are completely free of surface moisture as determined by sight or touch.
15. In no case shall paint be applied to surfaces upon which there is visible frost or snow.
16. Floor sealer coat shall be given additional touchup coats necessary to eliminate dull spots.
17. Excess sealer shall be wiped off after each coat.

B. Coating progress:

1. Sufficient time shall elapse between successive coats to permit proper drying. This period shall be modified as necessary to suit adverse weather conditions.
2. Oilbase or oleoresinous solvent type paints shall be considered dry for recoating when the following conditions exist:
 - a. The paint feels firm.
 - b. The paint does not deform or feel sticky under moderate pressure of the thumb.
 - c. The application of another coat of paint does not cause lifting or loss of adhesion of the undercoat.

C. Epoxy, moisture cure, and polyurethane coatings: follow manufacturer's instructions for application, curing, and drying time between coats.

D. Masonry surfaces may be coated by brush, roller, or spray, except filler coats.

1. Cement emulsion filler shall be vigorously scrubbed into the surface with a stiff bristle brush having tampico or palmyra bristles not longer than 2 1/2 inches.

2. At least 24 hours shall elapse before applying exterior emulsion paint over cement emulsion filler coat.
3. When the ambient temperature is in excess of 85 degrees F, cement emulsion filler surfaces shall be lightly dampened with a fog spray of potable water immediately prior to application of the paint.
4. Solvent thinned filler shall be applied to thoroughly dry surfaces by brush, allowed to set for 3 to 5 minutes or until the filler becomes tacky, and the excess filler material removed with a rubber squeegee.
5. Surface voids shall be filled.
6. Surface irregularities need not be completely filled.
7. The material shall not be applied over caulking compound.

E. Metal surfaces:

1. First coats other than vinyl paints or vinyl type wash coats shall be applied by brush.
2. Vinyl paint system for exterior ferrous surfaces subject to severe atmospheric exposures shall be applied in accordance with applicable provisions of SSPC-PA-1.
3. The primer shall have a minimum dry film thickness of 1.2 mils.

F. Time between surface preparation and painting: surfaces that have been cleaned, pretreated, and otherwise prepared for painting shall be given the specified first coat as soon as practicable to avoid any deterioration of the prepared surface.

G. Vinyl type wash coat shall be applied by brush or spray at a rate of 250 to 300 square feet per gallon to yield a dry film thickness of 0.3 to 0.5 mil.

1. A wet spray shall be maintained at all times.
2. Surfaces shall be permitted to dry for at least one hour and shall be recoated as soon as practicable (within 24 hours) to avoid any deterioration or accumulation of dust or dirt.

H. Existing surfaces:

1. Interior and exterior surfaces to be repainted shall receive surface preparation as specified in Paragraph 3.02.
 - a. Surfaces shall receive the paint specified in the Painting Schedule.
 - b. One or more coats shall be applied to provide complete coverage.

3.05 PIPE IDENTIFICATION

A. Color code marking:

1. Piping systems in mechanical equipment rooms, pipe chases, and in other areas which are accessible for maintenance operations shall be painted with bands of colors and legends as designated.
2. For pipe 1/2 inch nominal diameter or less, a brass identification tag shall be fastened securely with heavy stainless steel wire at specified locations.
3. Tags shall be 1 1/2 inches high with depressed black figures 1/2 inch high.
4. Water, gas, and heating piping in finished spaces such as offices and quarters shall not be colorbanded, but painted matching the interior space as directed.

B. Identification band painting:

1. Pipes which are finished-painted and designated to be identification-painted shall be banded with one coat of enamel gloss conforming to FS TT-E-506K applied over one coat of enamel undercoat conforming to FS TT-E-543A.
2. Pipes coated with asphalt varnish shall be cleaned to bare metal with solvents or other means for the extent of the required band dimensions. The area shall then be prime-coated with red lead paint conforming to FS TT-P-86G and given the two coats of paint specified above.

C. Banding and legends shall be applied to the following locations:

1. The piping adjacent to each valve and each strainer.
2. Each branch and riser at take-off.

3. Both sides of each passage through wall, floor, and ceiling construction.
 4. Each passage to underground.
 5. Straight pipe runs with 40 foot maximum spacing.
- D. Colors shall conform to FST 595A and shall be as follows:

| Color | Gloss Number |
|--------|--------------|
| White | 17875 |
| Yellow | 13655 |
| Black | 17038 |
| Green | 14260 |
| Red | 11105 |

- E. Band and letter size:

| Outside Diameter of Pipe of Covering (Inches) | Width of Color Band (Inches) | Size of Legend Letters and Numerals (Inches) |
|---|------------------------------------|--|
| 3/4 to 1 1/4 | 8 | 1/2 |
| 1 1/2 to 2 | 8 | 3/4 |
| 2 1/2 to 6 | 12 | 1 1/4 |
| 8 to 10 | 24 | 2 1/2 |
| Over 10 | 32 | 3 1/2 |

- F. Legends shall be painted in required colors of letters on color band.
1. Place legend to enable reading from operating positions.
 2. Place the legend below the horizontal center line of pipe located some distance above the operator's normal line of vision. See ANSI A13.1.
 3. Paint arrows adjacent to each legend to indicate material flow direction under normal operation.

G. Color bands:

| Material | Band | Letters | Band Legend |
|--------------------------|--------|---------|-----------------------|
| Acetylene, welding | Yellow | Black | Acetylene |
| Compressed air | Green | White | Compressed Air |
| Fire protection water | Red | Black | Fire Protection Water |
| Fuel gas | Yellow | Black | Fuel Gas |
| Hot water, plumbing | Green | Black | H.W. |
| Hot water return | Yellow | Black | H.W. Return |
| Hot water supply | Yellow | Black | H.W. Supply |
| Oxygen, welding | Yellow | Black | Oxygen |
| Potable water | Green | Black | Potable Water |

H. Pipe markers (option):

1. Identification bands may be colored, pressure-sensitive, adhesive tape at the option of the Contractor.
2. The band color, band legend, and the size of the letters and numerals shall be as specified.

3.06 SURFACES TO BE PAINTED

- A. Surfaces listed in Paragraph 3.09 of this section will receive the surface preparation, paints, and number of coats prescribed in the Paint Schedule.
- B. Surfaces listed in Paragraphs 3.07 of this section are not included in the Paint Schedule.

3.07 SURFACES NOT REQUIRING PAINTING

- A. The following items will not require painting:
 1. All shop painted items.
 2. All factory painted items of equipment.

B. The following items shall not be painted:

1. Elastomeric sealants.
2. Fire detection elements.
3. Finish hardware.

3.08 CLEANING

- A. Cloths, cotton waste, and other debris that might constitute a fire hazard shall be placed in enclosed metal containers and removed at the end of each day.
- B. Upon completion of the work, staging, scaffolding, and containers shall be removed from the site in an approved manner.
- C. Paint and other deposits upon adjacent surfaces shall be removed.
- D. The entire job shall be left clean and acceptable to the DOE/COR.

3.09 PAINTING SCHEDULE

- A. The Painting Schedule prescribes the surfaces to be painted, required surface preparation, and the number and types of coats of paint.
- B. Contractor's options (example):

| Surface | 1st Coat | 2nd Coat | 3rd Coat |
|--|--------------|----------------------------------|----------------------------------|
| Exterior wood surfaces not otherwise specified | FS TT-P-1984 | FS TT-P-19 or FS TT-P-1510 | FS TT-P-19 or FS TT-P-1510 |

Explanation: in the example, the Contractor shall use FS TT-P-1984 for the first coat. The Contractor has the option of using FS TT-P-19 or FS TT-P-1510 for the second and third coats. The Contractor shall not mix this option by using FS TT-P-19 for one coat and FS TT-P-1510 for the other coat.

- C. Shop painted items:
 1. Surfaces of items finish painted by the manufacturer or specified to be finish painted under other sections of the specifications are exempted from the requirements for surface preparation and painting.

2. Shop primed items shall receive surface preparation and finish painting as required by this section.
- D. Surface preparation: the statement as previously specified under column heading "Surface Preparation" of the Painting Schedule refers to Paragraph 3.02 of this section.
- E. Gypsum board, unless otherwise specified:
1. Surface preparation: as previously specified for each type of surface.
 2. First coat: FS TT-P-29J.
 3. Second coat: FS TT-P-29J.
 4. Third coat: none
- F. Interior walls and ceiling in toilet areas except ferrous surfaces, unless otherwise specified:
1. Surface preparation: as previously specified for each type of surface.
 2. First coat: FS TT-P-29J or FS TT-P-650, Type I.
 3. Second coat: FS TT-P-543A or FS TT-E-545B.
 4. Third coat: FS TT-E-505A, FS TT-E-506K, or FS TT-E-529C.
- G. Interior exposed ferrous surfaces, unless otherwise specified:
1. Surface preparation: as previously specified or per FS TT-P-86G, Type II.
 2. First coat: FS TT-P-30E.
 3. Second coat: FS TT-P-30E.
 4. Third coat: none
- H. Interior unpainted ferrous surfaces in exposed areas having unpainted adjacent surfaces:
1. Surface preparation: solvent cleaning and wire brushing; no pretreatment.
 2. First coat: FS TT-V-51F.

3. Second coat: none
 4. Third coat: none
- I. Ferrous surfaces of mechanical and electrical equipment that has been factory primed:
1. Surface preparation: solvent clean as specified.
 2. First coat: FS TT-E-489F, Class A.
 3. Second coat: FS TT-E-489F, Class A.
 4. Third coat: none
- J. Ferrous surfaces of mechanical and electrical equipment that has been factory finished:
1. Clean as required.
 2. Do not paint.
- K. Metal interior trim and doors except in toilet areas:
1. Surface preparation: as previously specified for each type of surface.
 2. First coat: FS TT-E-543A or FS TT-E-545B.
 3. Second coat: FS TT-E-505A or FS TT-E-506K.
 4. Third coat: none
- L. Interior metal surfaces in toilet areas:
1. Surface preparation: as previously specified for each type of surface unless prefinished.
 2. First coat: FS TT-E-543A or FS TT-E-545B.
 3. Second coat: FS TT-E-505A, FS TT-E-506K, or FS TT-E-509B.
 4. Third coat: none.
- M. Interior and exterior galvanized surfaces unless otherwise specified:
1. Surface preparation: as previously specified.
 2. First coat: FS TT-P-641G, Type II.

3. Second coat: FS TT-P-30E.
 4. Third coat: same as adjacent surfaces.
- N. Convector enclosures, electrical conduit runs, prefinished electrical ducts, metallic tubing, uninsulated ducts and pipes, pipe hangers, louvers, grilles, and air outlets in areas having painted adjacent surfaces specified:
1. Surface preparation: as previously specified.
- Type of paint on adjacent surfaces determines the requirements:
- | | Gloss | Semi-gloss | Flat |
|-----------------|------------------------------------|------------------------------------|-------------|
| 2. First coat: | FS TT-E-543A or FS TT-E-545B | FS TT-E-543A or FS TT-E-545B | FS TT-P-30E |
| 3. Second coat: | FS TT-E-506K or FS TT-E-505A | FS TT-E-508C or FS TT-E-509B | FS TT-P-30E |
| 4. Third coat: | none | none | none |
- O. Interior and exterior metal surfaces subject to high temperature (up to 400 degrees F):
1. Surface preparation: solvent cleaning and wire brushing; no pretreatment.
 2. First coat: FS TT-E-496B, Type II.
 3. Second coat: FS TT-E-496B, Type II.
 4. Third coat: none.
- P. Exposed-to-view cotton or canvas fabric covering over insulation on pipes, tanks, and other equipment; interior.
1. Surface preparation: as previously specified.
 2. First coat: FS TT-P-30E.
 3. Second coat: FS TT-P-30E or FS TT-P-29J.
 4. Third coat: none.

- Q. Exposed-to-view paper facing of vapor barrier jackets over pipe or duct insulation:
1. Surface preparation: as previously specified.
 2. First coat: match adjacent areas.
 3. Second coat: match adjacent areas.
 4. Third coat: none.
- R. Exposed-to-view pre-sized or adhesive finished glass cloth over insulation on pipes, ducts, and equipment, interior:
1. Surface preparation: remove foreign matter.
 2. First coat: FS TT-P-30E.
 3. Second coat: FS TT-P-30E.
 4. Third coat: none.
- T. Exterior ferrous metal surfaces exposed:
1. Surface preparation: as previously specified.
 2. First coat: FS TT-E-489F, Class A, exterior oil paint.
 3. Second coat: FS TT-E-489F, Class A, exterior oil paint.
 4. Third coat: none.
- T. Interior concrete masonry units.
1. Surface preparation: as previously specified. Fill surface of concrete masonry units with FS TT-F-1098 filler.
 2. First coat: FS TT-P-29J
 3. Second coat: FS TT-E-543A or FS TT-E-545B
 4. Third coat: FS TT-P-1511, Type I
- U. Exposed interior caulking compound:
1. Surface preparation: as specified in Section 07900.
 2. First coat: FS TT-P-38.

3. Second coat: same as adjacent areas.
4. Third coat: same as adjacent areas.

END OF SECTION

DIVISION 10

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SECTION 10160
METAL TOILET COMPARTMENTS

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SECTION 10160

METAL TOILET COMPARTMENTS

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Metal toilet compartments
- B. Urinal screens

1.02 RELATED WORK

- A. Section 09111 - Metal Stud Framing, Furring, and Lathing Systems
- B. Section 09310 - Ceramic Tile
- C. Section 09900 - Painting
- D. Section 10800 - Toilet Accessories

1.03 REFERENCES

- A. American Society for Testing and Materials (ASTM):
 - ASTM A167 Stainless and Heat Resisting Chromium-Nickel Steel Plate, Sheet and Strip
- B. Federal Specifications (FS):
 - FS RR-P-1352 Partitions, Toilet, Complete

1.04 SUBMITTALS

- A. Submit shop drawings, product data, samples, and manufacturers' installation instructions. See Section 01300.
- B. Indicate on shop drawings: partition plan and elevation views; dimensions; details of wall, and floor brackets; and door swings.
- C. Provide product data on panel construction, hardware, and accessories.
- D. Submit two 3 inch x 3 inch samples illustrating panel finish, color, and sheen.

1.05 QUALITY ASSURANCE

- A. Manufacturer: company specializing in manufacture of metal toilet components with a minimum of three years' experience in work of this type.
- B. Installer: company with a minimum of three years' experience in work of this type.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Sonymetal
- B. Global Steel Products
- C. Ampco Products Inc.
- D. Substitutions: Alternate products, equal in quality and utility to those specified, may be used subject to the approval of the Department of Energy Contracting Officers Representative (DOE/COR). See Section 01600.

2.02 MATERIALS

- A. Components shall conform to FS RR-P-1352, Type I, Style A.
 - 1. Dimensions of toilet enclosures shall be as shown on the Drawings.
 - 2. Panels to receive toilet-paper holders as specified in Section 10800 shall be reinforced for the support of those items.
 - 3. Trim-face color and field color shall be chosen by the DOE/COR from manufacturer's standard colors.
- B. Head rails: hollow steel tube, 1 inch x 1 5/8 inch with cast-socket wall brackets
- C. Attachments: heavy-duty, extruded aluminum brackets
- D. Screws and bolts: stainless steel, tamperproof
- E. Hardware: chromeplated nonferrous cast pivot hinges, gravity type, adjustable for door-close positioning; nylon bearings; thumb-turn door latches; door strikes and keepers with rubber bumpers; cast-alloy chrome-plated coat hooks and bumpers

2.03 FABRICATION

- A. Fabricate components of sheet steel in accordance with FS RR-P-1352.
 - 1. Panel and door faces: 20 gauge
 - 2. Pilaster faces: 18 gauge
 - 3. Reinforcement: 12 gauge
- B. Doors: 1 inch thick x 28 inches wide x 58 inches high; sheet-steel faces, pressure bonded to sound-deadening cores
- C. Panels: 1 inch thick x 60 inches wide x 58 inches high; sheet-steel faces, pressure bonded to sound-deadening cores
- D. Urinal screens: wall-hung flush type; 1 1/4 inches thick x 18 inches wide x 42 inches high; zinc-coated steel faces, pressure bonded to sound-deadening cores
 - 1. The 42 inches of the panel abutting the wall shall have concealed reinforcement from the top to the bottom.
- E. Pilasters: 1 1/4 inch thick, constructed same as doors, sized to suit cubicle width and spacing
- F. Pilaster shoes: formed stainless steel, conforming to ASTM A167, Type 304; number 4 finish
- G. Doors, panels, urinal screens, and pilasters: formed and closed edges; mitered and welded corners, ground smooth
- H. Factory finishing
 - 1. Cleaned, degreased, and neutralized
 - 2. Phosphatized surfaces
 - 3. Painted one prime coat and two finish-coats of baked enamel

PART 3 EXECUTION

3.01 INSPECTION

- A. Verify that site conditions are ready to receive work, and dimensions are as indicated on the Drawings.
- B. Verify correct locations of plumbing fixtures, built-in framing, anchorages, and bracing.

- C. Beginning of installation means Contractor and Installer accept existing surfaces and conditions.

3.02 INSTALLATION

- A. Install partitions and urinal screens secure, plumb, and level and in accordance with manufacturer's instructions.
- B. Maintain 3/8 inch space between walls and panels and between walls and end pilasters.
- C. Attach panel and screen brackets securely to walls using manufacturer-approved anchoring devices.
- D. Attach panels, screens, and pilasters to brackets with through-sleeve tamperproof bolts and nuts.
- E. Locate headrail joints at pilaster center lines.
- F. Conceal floor fastenings with pilaster shoes.

3.03 ADJUSTING

- A. Adjust for floor variations with screw jacks through steel saddles integral with pilasters.
- B. Adjust and align door hardware to maintain a uniform clearance not more than 3/16 inch at vertical edges.
- C. Adjust hinges to locate standard doors in partially opened position when unlatched.
- D. Adjust hinges on outswing doors to return to closed position.

3.04 CLEANING

- A. Remove protective maskings.
- B. Clean surfaces.
- C. Replace damaged or scratched components with new material.
- D. Field touch-up of scratched or damaged enamel finishes will not be permitted.

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SECTION: 10270

TITLE: ACCESS FLOORING

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- PART 1 GENERAL
- 1.01 Work Included

 - 1.02 Related Work

 - 1.03 References

 - 1.04 Submittals

 - 1.05 Quality Assurance

 - 1.06 Performance Requirements

1.07 Sequencing

1.08 Extra Materials

PART 2 PRODUCTS

2.01 Acceptable Manufacturers

2.02 Materials

2.03 Fabrication

PART 3 EXECUTION
 3.01 Inspection

 3.02 Preparation

 3.03 Installation

 3.04 Adjusting

 3.05 Cleaning

 3.06 Protection

DIVISION 10

SPECIALITIES

SECTION: 10508

TITLE: METAL LOCKERS AND OVERHEAD BASKETS

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PART 1 GENERAL

1.01 Work Included

1.02 Related Work

1.03 References

1.04 Submittals

1.05 Quality Assurance

1.06 Delivery, Storage and Protection

PART 2 PRODUCTS

2.01 Metal Lockers

2.02 Overhead Clothes Storage Baskets

2.03 Benches

PART 3 EXECUTION

3.01 Inspection

3.02 Installation

3.03 Adjusting

3.04 Cleaning

DIVISION 10

SPECIALTIES

SECTION: 10605

TITLE: WIRE MESH PARTITIONS

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| 3.05 | Cleaning | 5 |

SECTION 10605

WIRE MESH PARTITIONS

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Wire mesh wall and ceiling partitions
- B. Access doors and gates

1.02 RELATED WORK

- A. Section 03001 - Plain and Reinforced Concrete
- B. Section 05120 - Structural Steel and Miscellaneous Metal
- C. Section 08700 - Builder's Hardware

1.03 REFERENCES

- A. American Society for Testing and Materials (ASTM):
 - ASTM A36 Structural Steel
 - ASTM A853 Steel Wire, Carbon, for General Use
 - ASTM F934 Standard Colors for Polyvinylchloride
 (PVC) Coated Chain Link Fence Materials

1.04 SUBMITTALS

- A. Submit shop drawings, product data, samples, and manufacturer's installation instructions. See Section 01300.
- B. Indicate on shop drawings: plan and vertical dimensions; elevations; component details; head, jamb, and sill details; and locations of hardware.
 - 1. Include framed openings, screen materials, bearings, anchors, welds, and types and locations of fasteners and accessories.

1.05 QUALITY ASSURANCE

- A. Manufacturer: company specializing in manufacture of wire-mesh partition materials with a minimum of three years' experience in work of this type.
- B. Installer: company with a minimum of three years' experience in work of this type.

1.06 DESIGN REQUIREMENTS

- A. Design partition system to provide for movement of components without damage, undue stress on fasteners, or other detrimental effects when subjected to design loads.
- B. Design system to accommodate construction tolerances and deflections of structural members and provide clearances at openings.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Acorn Iron and Metal Works
- B. Kentucky Metal Products Company
- C. Miller Wire Works
- D. Standard Wire and Steel Works
- E. Substitutions: alternate products, equal in quality and utility to those specified, may be used subject to the approval of the Department of Energy Contracting Officers Representative (DOE/COR). See Section 01600.

2.02 MATERIALS

- A. Mesh, crimped-steel wire in accordance with ASTM A853, securely attached to frame members:
 - 1. Heavy-duty partitions: 6 gauge wire woven into 2 inch mesh
- B. Frames:
 - 1. Framing members: 1/4 inch minimum thickness, cold-rolled from ASTM A36 steel
 - 2. Stiffening bars: for free-standing partitions, provide flat bar stiffener posts between abutting panel frames.
 - a. Provide stiffeners adequate to limit deflection to 2 inches when subjected to a 200 pound force applied horizontally at top rail.
 - 3. Roof-mesh beams: connect to corner posts and support the dead load with a deflection less than one inch at center of span.

4. Floor shoes: cast iron, sized to suit vertical framing and to provide a 3 inch clear space between finished floor and horizontal frame members. Furnish units with set screws for leveling.
 5. Hardware and cylinders for locks are supplied by wire-mesh partition manufacturer. See Section 08700.
 6. Galvanize: accessories and materials after fabrication.
- C. Polyvinylchloride (PVC) coated wire mesh and frames.
1. PVC shall be plasticized and thoroughly compounded so that there is full dispersement of pigments, stabilizers, and other components.
 2. Color shall be as selected by the DOE/COR in accordance with ASTM F934.
 3. Class 2, bonded, PVC-coated wire shall have a primer which is thermally cured onto galvanized steel wire. The PVC shall be thermally fused and bonded to the primer.
 - a. Galvanized steel wire shall be coated with zinc by either the hot-dip or electrolytic process.
 - b. PVC-coated wire shall be woven into fabric without tears or cuts which reveal the substrate.
 4. Posts and fittings shall be coated to match the fabric.
 - a. Metal surfaces shall have a coating of 0.9 ounces of zinc per square foot.
 - b. Finish coating shall be 7 to 10 mils of PVC thermally fused to the zinc coating.

PART 3 EXECUTION

3.01 INSPECTION

- A. Verify that surfaces and openings are ready to receive the work.
- B. Verify that measurements are as shown on the Drawings.
- C. Beginning of installation means Contractor and Installer accept existing conditions.

3.02 STORAGE

- A. Materials shall be delivered to the site in undamaged condition, stored out of contact with the ground, and protected by a weathertight covering.
- B. When materials suffer consequential damage, the DOE/COR will reject the materials.
- C. In instances of minor damage restoration may be allowed subject to the approval of the DOE/COR.
 - 1. For galvanized materials the abraded, scarred, or rusty areas shall be cleaned and touched up with high-content zinc-dust primer.
 - 2. For PVC-coated materials the damaged areas shall be touched up with liquid PVC in accordance with the Manufacturer's instructions.

3.03 INSTALLATION

- A. Erect partitions plumb, level, aligned properly, fastened securely and rigidly in place, and in accordance with the Manufacturer's recommendations.
- B. Provide additional field bracing as necessary for installation.
- C. Install all bolts, hardware, and accessories.
 - 1. Orient bolts and set screws to be removable only from inside the cages.

3.04 ADJUSTING

- A. Adjust hinged doors, panels, and gates for smooth operation.
- B. Maximum variation from plumb or level: 1/4 inch
- C. Maximum misalignment from true position: 1/4 inch

3.05 CLEANING

- A. Remove temporary protection from prefinished surfaces.
- B. Clean surfaces.

END OF SECTION

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SECTION: 10800
TITLE: TOILET ACCESSORIES

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SECTION 10800
TOILET ACCESSORIES

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Toilet, shower, and washroom accessories
- B. Attachment hardware

1.02 RELATED WORK

- A. Section 08800 - Glass and Glazing
- B. Section 09111 - Metal Stud Framing, Furring, and Lathing Systems
- C. Section 09260 - Gypsum Board System
- D. Section 09310 - Ceramic Tile
- E. Section 10160 - Metal Toilet Compartments

1.03 REFERENCES

- A. American Iron and Steel Institute (AISI):
 - AISI 302/304 Stainless Steel
- B. American Society for Testing and Materials (ASTM):
 - ASTM A366 Steel, Carbon, Cold-Rolled Sheet, Commercial Quality
 - ASTM A386 Zinc Coating (Hot-Dip) on Assembled Steel Products
 - ASTM B456 Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium
- C. Federal Specifications (FS):
 - FS QQ-B-613 Brass
 - FS QQ B-626 Brass
- D. National Electrical Manufacturers Association (NEMA):
 - NEMA LD-3 High Pressure Decorative Laminates

1.04 SUBMITTALS

- A. Submit product data, samples, and manufacturer's installation instructions. See Section 01300.
- B. Provide product data on accessories describing size, finish, details of function, and attachment methods.
- C. Submit two samples of each component illustrating color and finish. Samples may be installed in building after approval by the Department of Energy Contracting Officers Representative (DOE/COR).

1.05 QUALITY ASSURANCE

- A. Manufacturer: company specializing in manufacture of toilet and bath accessories with a minimum of three years' experience in work of this type.
- B. Installer: company with a minimum of three years' experience in work of this type.

1.06 KEYING

- A. Supply 4 keys for each accessory to DOE/COR.
- B. Master key all accessories.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Bobrick Washroom Equipment, Inc.
- B. Bradley Corporation
- C. Charles Parker Company
- D. Substitutions: Alternate products, equal in quality and utility to those specified, may be used subject to the approval of the DOE/COR. See Section 01600.

2.02 MATERIALS

- A. Stainless steel: 22 gauge minimum, AISI 302/304, and polished #4 finish, unless otherwise indicated
- B. Brass: leaded and unleaded, flat products, FS QQ-B-613; rods, shapes, forgings, and flat products with finished edges, FS QQ B-626
- C. Sheet steel: 20 gauge minimum conforming to ASTM A366 unless otherwise indicated; surface preparation and metal pretreatment as required for applied finish

- D. Chromium plating: nickel and chromium electrodeposited on base metal, ASTM B456, Type SC2
- E. Steel mounting devices: galvanized after fabrication to conform to ASTM A386
- F. Plastic laminate: general-purpose fire-rated type in accordance with NEMA LD-3; 0.125 inch thick; finish, color, and pattern to be selected by the DOE/COR from the manufacturer's samples
- G. Adhesive: two-component epoxy type, waterproof
- H. Fasteners: screws, bolts, and other devices of same material as accessory unit or of galvanized steel where concealed
- I. Expansion shields: fiber, lead, or rubber as recommended by accessory manufacturer for component and substrate

2.03 FABRICATION

- A. Weld and grind smooth joints of fabricated components.
- B. Form exposed surfaces from single sheet of stock, free of joints, and without distortion.
- C. Protect surfaces from scratches or dents.
- D. Back paint components where contact is made with building finishes to prevent electrolysis.
- E. Assemble and package components complete with anchors and fittings.
- F. Provide steel anchor plates, adapters, and components for installation.
- G. Hot-dip galvanize hidden, unpainted ferrous-metal fastening devices.
- H. Stamped names or labels are not permitted on exposed faces of toilet accessory units unless otherwise indicated.

2.04 FACTORY FINISHING

- A. Galvanizing: 1.25 ounces per square yard in accordance with ASTM A386
- B. Shop-primed ferrous metals: pretreat and clean, apply one coat primer and bake

- C. Enamel: pretreat and clean, apply one coat primer and a minimum of two coats baked enamel.
- D. Chrome plating: Type SC2 satin finish in accordance with ASTM B456
- E. Stainless steel: #4 satin finish

PART 3 EXECUTION

3.01 INSPECTION

- A. Examine substrates, previously installed inserts and anchorages necessary for mounting toilet accessories.
- B. Beginning of installation means Contractor and Installer accept existing surfaces and conditions.

3.02 STORAGE

- A. Materials shall be delivered to the site in undamaged condition, stored out of contact with the ground, and protected by a weathertight covering.
- B. When materials suffer consequential damage, the DOE/COR will reject the materials.
- C. In instances of minor damage restoration may be allowed subject to the approval of the DOE/COR.

3.03 SEQUENCING

- A. Coordinate the work of this section with the placement of reinforcement for anchor attachments.

3.04 INSTALLATION

- A. Install toilet accessory units in accordance with Manufacturer's instructions.
 - 1. Use fasteners which are appropriate to substrate and recommended by Manufacturer of unit.
 - 2. Install units plumb and level.
- B. Adjust toilet accessories for proper operation and verify that mechanisms function smoothly.

END OF SECTION

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TITLE: DOCK BUMPERS

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 - 1.05 Quality Assurance

 - 1.06 Delivery, Storage and Protection

PART 2 PRODUCTS
 2.01 Acceptable Manufacturers

 2.02 Materials

PART 3 EXECUTION
 3.01 Inspection

 3.02 Installation

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EQUIPMENT

SECTION: 11180

TITLE: MINE LAMP CHARGING SYSTEM

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| PART 3 | EXECUTION | |
| 3.01 | Scheduling | 3 |
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PART 1

GENERAL

1.01

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1.02

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1.05

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SPECIAL CONSTRUCTION

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H&N SPECIFICATION
HNNWSI-13121.A

| | |
|-----------|---|
| ASTM A307 | Carbon Steel Externally Threaded Standard Fasteners |
| ASTM A325 | High-Strength Bolts for Structural Steel Joints |
| ASTM A386 | Zinc-coating (Hot-Dip) on Assembled Steel Products |
| ASTM A446 | Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Structural (Physical) Quality |
| ASTM A490 | Quenched and Tempered Alloy Steel Bolts for Structural Steel Joints |
| ASTM A500 | Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes |
| ASTM A501 | Hot-Formed Welded and Seamless Carbon Steel Structural Tubing |
| ASTM A525 | Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, General Requirements |
| ASTM A570 | Hot-Rolled Carbon Steel Sheet and Strip, Structural Quality |
| ASTM E84 | Surface Burning Characteristics of Building Materials, Test for |

C. American Welding Society (AWS):

AWS D1. Structural Welding Code

D. Factory Mutual Engineering and Research Corporation (FM):
Approval Guide

E. Federal Specifications (FS):

FS HH-I-521 Insulation Blankets, Thermal, Mineral Fiber

F. Underwriters Laboratories Inc. (UL):

Building Materials Directory

1.04 SUBMITTALS

- A. Submit shop drawings, design data, calculations, product data, and manufacturer's installation instructions. See Section 01300.

B. Indicate on the shop drawings:

1. Profiles, sizes, spacing, and locations of structural members; connections; attachments; openings; fasteners; cambers; and loads.
2. Welded connections using standard AWS symbols; show weld lengths.
3. Anchor bolt sizes and locations.
4. Wall and roof system dimensions, panel layout, general construction details, anchorage, and method of installation.

1.05 QUALITY ASSURANCE

- A. Manufacturer: company specializing in manufacture of pre-engineered buildings with a minimum of three years' experience in work of this type
- B. Installer: company with a minimum of three years' experience in work of this type and approved by manufacturer
- C. Prepare shop drawings and calculations under the direction of a Professional Engineer, registered in the State of Nevada.

1.06 DESIGN CRITERIA

- A. Design members to withstand dead, live, seismic, and wind loads calculated in accordance with applicable codes.
- B. Provide thermal resistance of roof and wall systems as shown on the Drawings.

1.07 WARRANTY

- A. Provide a 20-year manufacturer's warranty for exterior prefinished surfaces.
- B. Guarantee prefinished coat against chipping, cracking, crazing, blistering, peeling, chalking, or fading.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Butler Manufacturing Company
- B. American Buildings Company
- C. Metallic-Braden Building Company

- D. Substitutions: alternate products, equal in quality and utility to those specified, may be used subject to the approval of the Department of Energy Contracting Officers Representative (DOE/COR). See Section 01600.

2.02 FRAMING MATERIALS

- A. Steel, 1/8 inch thick or more, shall conform to ASTM A36.
1. Uncoated steel less than 1/8 inch thick shall conform to ASTM A570.
 2. Galvanized light gauge steel shall conform to ASTM A446, A-90 coating designation for 18 gauge or heavier.
- B. End wall columns: factory-welded built-up I shapes or cold-formed sections fabricated from minimum 14 gauge material
- C. Wind bracings: ASTM A36 adjustable threaded steel rods, 1/2 inch minimum diameter
- D. Foundation tie rods:
1. Piers at rigid frame bases are to be tied with threaded tie rods, where indicated on the Drawings.
 2. All bars are to be minimum A36 steel and spliced with sleeve nuts.
 3. Welding is not permitted.
 4. Tie-rod splices are to be staggered and the entire length of tie rod is to be encased in concrete after tensioning.
 5. The DOE/COR is to be notified prior to tensioning.
- E. Secondary framing: girts, purlins, eave struts, end-wall beams, base channels, sill angles, end-wall structural members (except columns and beams), purlin spacers, and flange and sag bracing shall be 16 gauge minimum cold-formed galvanized steel.
- F. Structural pipe columns shall conform to ASTM A500 or ASTM A501.
- G. Shop connections:
1. Conform to the AISC SPEC or the AISI SPEC, as applicable. Welding shall conform to AWS D1.1.
 2. Holes for bolts shall be made in the shop.

- H. Bolts, nuts, and washers: ASTM A307, ASTM A325, ASTM A490, or in accordance with AISC SPEC.
- I. Nonshrink grout: premixed compound consisting of nonmetallic aggregate, cement, water reducing and plasticizing agents, developing minimum compressive strength of 2400 psi in 2 days and 7000 psi in 28 days.

2.03 WALL AND ROOF SYSTEM MATERIALS

- A. Sheet steel stock: ASTM A446, Grade A; zinc-coated (galvanized) to ASTM A525 G-90 designation. Sheets shall be not less than 24 gauge for siding and 22 gauge for roofing.
- B. Wall and roof insulation conforming to FS HH-I-521.
 - 1. Flexible glass-fiber blankets, where required on the Drawings.
 - 2. The insulation shall have a vapor barrier.
 - a. Open-mesh glass-fiber scrim and reinforced aluminum foil for enclosed attics or areas which are sheathed or similarly protected
 - b. Vinyl, scrim, or foil for exposed surfaces or areas which may be subjected to moisture buildup.
 - 3. Insulation shall be UL listed or FM approved.
- C. Joint seal gaskets: manufacturer's standard type
- D. Fasteners:
 - 1. Manufacturer's standard type
 - 2. Galvanized in accordance with ASTM A386, 1.25 to 2.0 ounces per square foot
 - 3. Finished to match adjacent surfaces when exposed on the exterior
 - 4. Provide adequate strength
 - 5. Permit weathertight installation
- E. Bituminous paint: asphaltic type
- F. Sealant:
 - 1. Manufacturer's standard type. See Section 07900.
 - 2. Nonstaining, elastomeric, skinning.

2.04 DOORS AND WINDOWS

- A. Provide the types and sizes indicated on the Drawings. See Section 08100.
- B. Provide all standard operating and locking hardware of the building manufacturer. See Section 08700.
- C. Doors shall be fabricated from steel flat sheet and extruded or rolled shapes.
- D. Doors, including swing doors, shall be insulated and have dustproof and watertight closures at bottoms and a complete system of weatherstripping.
 - 1. Weatherstrip and closures shall be the heaviest duty commercial grade available.
 - 2. Flashing shall be provided over door tracks and at other critical locations to prevent wind-driven rain and dust from entering the building.

2.05 FRAMING FABRICATION

- A. Fabricate members in accordance with AISC SPEC for plate, bar, tube, or rolled structural shapes.

2.06 WALL AND ROOF SYSTEM FABRICATION

- A. Siding: as indicated on the Drawings, lapped with male and female edges and fitted with continuous gaskets.
- B. Roofing: as indicated on the Drawings, lapped with a standing-seam roof-joint system.
- C. Girts and purlins:
 - 1. Roll-formed structural shapes to receive siding, roofing, and liner sheet
 - 2. Zinc coated in accordance with ASTM A386, Class B
- D. Internal and external corners:
 - 1. Same material thickness and finish as adjacent materials.
 - 2. Profile brake formed, shop cut, and factory mitered to required angles.
- E. Expansion joints: formed as detailed; same material and finish as adjacent materials, where exposed.

- F. Flashings, closure pieces, fascias, infills, and caps:
 - 1. Same materials and finishes as adjacent materials
 - 2. Profiles formed as detailed

- G. Wall louvers:

- 1. Steel frame
- 2. Same finish as adjacent material
- 3. Galvanized-steel insect screens
- 4. Blank sheet metal at unused portions

2.07 GUTTER AND DOWNSPOUT FABRICATION

- A. Same finish as metal roofing.
- B. Form gutters, downspouts, and scuppers of zinc-coated steel; profile and size indicated. Fabricate with connection pieces.
- C. Form sections in maximum possible lengths.
 - 1. Hem exposed edges.
 - 2. Allow for expansion at joints.
- D. Fabricate support straps of same material and finish as roofing metal, color as selected.

2.08 FRAMING FINISH

- A. Framing members and miscellaneous metalwork:
 - 1. Clean, prepare, and shop prime with zinc-chromate primer prior to delivery.
 - 2. Do not prime surfaces to be field welded.
- B. After erection, wirebrush scarred areas and touch up paint.

2.09 ROOFING AND SIDING FINISHES

- A. Interior and exterior surfaces: precoated enamel, color selected by the DOE/COR from manufacturer's standard range.

PART 3 EXECUTION

3.01 FRAMING ERECTION

- A. Erect framing in accordance with AISC SPEC.
- B. Provide for erection and wind loads.
 - 1. Provide temporary bracing to maintain structure plumb and in alignment until completion of erection and installation of permanent bracing.
 - 2. Locate braced bays as indicated on the Drawings.
- C. Set column base plates with nonshrink grout to full plate bearing.
- D. Do not field cut or alter structural members without the approval of the DOE/COR.
- E. After erection, prime welds, abrasions, and surfaces not shop primed with a primer consistent with shop coat.

3.02 WALL AND ROOF SYSTEM INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Exercise care when cutting prefinished material to ensure cuttings do not remain on finished surface.
- C. Fasten cladding to structural supports; align level and plumb.
- D. Locate end laps over supports. Lap panels two inches minimum.
- E. Provide expansion joints where indicated.
- F. Use exposed fasteners for wall systems and concealed fasteners for standing seam roofs.
- G. Install sealant and gaskets to prevent weather penetration.
- H. The finished system shall be free of rattles, noises due to thermal movement, and wind whistles.

3.03 INSULATION INSTALLATION

- A. Apply insulation in accordance with the manufacturer's instructions.
- B. Install insulation with the vapor barrier facing the interior of the building.

- C. Protect exposed insulation in shop or other areas subject to damage.
 - D. Seal all vapor-barrier seams with aluminum-foil tape to ensure a continuous membrane.
 - E. Apply roof insulation and taped seal continuously over the purlins.
 - F. Apply roof sheathing over the insulation.
 - 1. Install fasteners through the insulation into the purlins.
 - 2. Tighten fasteners and compress insulation.
- 3.04 TOLERANCES
- A. Framing members: 1/4 inch from level; 1/8 inch from plumb
 - B. Siding and roofing: 1/8 inch from true position
- 3.05 INSTALLATION OF ACCESSORIES
- A. Install door frames, doors, overhead doors, windows, glass, and louvers in accordance with manufacturer's instructions.
 - B. Seal wall and roof accessories watertight and weathertight with sealant. See Section 07900.
- 3.06 GUTTER AND DOWNSPOUT ERECTION
- A. Secure and support components rigidly.
 - 1. Join lengths with watertight seals.
 - 2. Flash and seal gutters to downspouts.
 - B. Apply bituminous paint on surfaces in contact with cementitious materials.
 - C. Slope gutters minimum 1/4 inch per foot.
- 3.07 WATER TEST
- A. Test all exterior joints, laps, doors, and windows upon completion of building.

H&N SPECIFICATION
HNNWSI-13121.A

- B. Use a fire hose and nozzle with water pressure between 40 and 60 psi at the hydrant.
- C. Repair all leaks and resulting damage to the satisfaction of the DOE/COR.
- D. Retest all repaired areas.

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