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SECTION 10 01 10  
MAINTENANCE OF INFORMATION SPECIALTIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes supplementing the existing exterior wall-mounted, dimensional letter sign facing Tulane Avenue.

1. Supplement the existing sign to replicate the original to read:

B R E W I N G D I X I E C O M P A N Y I N C
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- a. Remove first letter E to make way for new E.  
b. Provide new letters W, X, C, O, M, A, Y, and the first E.  
c. All other letters are existing and shall remain as is.
2. Protection of existing letters during construction.

1.2 DEFINITIONS

- A. Consolidate: To strengthen loose or deteriorated materials in place.
- B. Design Reference Sample: A sample that represents the Architect's prebid selection of work to be matched; it may be existing work or work specially produced for the Project.
- C. Dismantle: To disassemble and detach items by hand from existing construction to the limits indicated, using small hand tools and small one-hand power tools, so as to protect nearby historic surfaces; and legally dispose of dismantled items off-site, unless indicated to be salvaged or reinstalled.
- D. Existing to Remain: Existing items that are not to be removed or dismantled.
- E. Match: To blend with adjacent construction and manifest no apparent difference in material type, species, cut, form, detail, color, grain, texture, or finish; as approved by Architect.
- F. Reconstruct: To remove existing item, replicate damaged or missing components, and reinstall in original position.
- G. Refinish: To remove existing finishes to base material and apply new finish to match original, or as otherwise indicated.
- H. Reinstall: To protect removed or dismantled item, repair and clean it as indicated for reuse, and reinstall it in original position, or where indicated.
- I. Remove: Specifically for historic spaces, areas, rooms, and surfaces, the term means to detach an item from existing construction to the limits indicated, using hand tools and hand-operated

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power equipment, and legally dispose of it off-site, unless indicated to be salvaged or reinstalled.

- J. Repair: To correct damage and defects, retaining existing materials, features, and finishes while employing as little new material as possible. Includes patching, piecing-in, splicing, consolidating, or otherwise reinforcing or upgrading materials.
- K. Replace: To remove, duplicate, and reinstall entire item with new material. The original item is the pattern for creating duplicates unless otherwise indicated.
- L. Replicate: To reproduce in exact detail, materials, and finish unless otherwise indicated.
- M. Reproduce: To fabricate a new item, accurate in detail to the original, and in either the same or a similar material as the original, unless otherwise indicated.
- N. Restore: To consolidate, replicate, reproduce, repair, and refinish as required to achieve the indicated results.
- O. Retain: To keep existing items that are not to be removed or dismantled.
- P. Reversible: New construction work, treatments, or processes that can be removed or undone in the future without damaging historic materials unless otherwise indicated.
- Q. Salvage: To protect removed or dismantled items and deliver them to Owner[ ready for reuse].
- R. Stabilize: To provide structural reinforcement of unsafe or deteriorated items while maintaining the essential form as it exists at present; also, to reestablish a weather-resistant enclosure.
- S. Spray:
  - 1. Low-Pressure Spray: 100 to 400 psi (690 to 2750 kPa); 4 to 6 gpm (0.25 to 0.4 L/s).
  - 2. Medium-Pressure Spray: 400 to 800 psi (2750 to 5510 kPa); 4 to 6 gpm (0.25 to 0.4 L/s).
  - 3. High-Pressure Spray: 800 to 1200 psi (5510 to 8250 kPa); 4 to 6 gpm (0.25 to 0.4 L/s).
- T. Strip: To remove existing finish down to base material unless otherwise indicated.

### 1.3 PRECONSTRUCTION TESTING

- A. Preconstruction Testing Service: Engage a qualified maintenance specialist to perform preconstruction testing on each type of historic metal.
  - 1. Select sizes and configurations of existing work to adequately demonstrate capability of products to comply with requirements.
  - 2. Test maintenance methods for effectiveness and compliance with specified requirements.
  - 3. Notify Architect seven days in advance of the dates and times when testing will be performed.

### 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include recommendations for application and use. Include test data substantiating that products comply with requirements.

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- B. Shop Drawings: For repair and replacement of decorative metal items and components. Show location and extent of replacement work, with enlarged details of replacement parts indicating materials, profiles, methods of attachment, accessory items, and finishes. Include field-verified dimensions and the following:
1. Full-size patterns with complete dimensions for new decorative metal components and their jointing, showing relation of existing to new components.
  2. Templates and directions for installing anchor bolts and other anchorages.
  3. Identification of each new metal item and component and its location on the structure in annotated plans and elevations.
  4. Provisions for expansion, weep holes (if any), and support devices as required for each location and exposure.
  5. Provisions for sealant joints if required.
- C. Samples for Initial Selection: For the following:
1. Each type of decorative metal item and component with factory-applied color finishes.
  2. Sealant Materials: See Section 079200 "Joint Sealants."
  3. Include similar Samples of accessories involving color selection.
- D. Samples for Verification: For the following items in sizes indicated, finished as required for use in the Work:
1. Each type of new material to be used for replacing existing or missing decorative metal; 6 inches (150 mm) long in least dimension or whole item.
    - a. Patterns for Casting: Before manufacturing new cast components, submit the actual patterns from which molds will be made for casting new components. Package and ship to prevent loss or damage, or make patterns available for inspection by Architect at fabrication plant.
    - b. For new castings, provide one of each shape, color, and texture of component, suitable and ready for installation. Make this submittal after acceptance of patterns for casting.
  2. Fittings and brackets.
  3. Each type of exposed connection between components. Show method of finishing components at intersections.
  4. Each type of exposed finish prepared on metal of the same alloy to be used for the Work of this Section; 6 inches (150 mm) long in least dimension.
  5. Sealant Materials: See Section 079200 "Joint Sealants."
  6. Accessories: Each type of anchor, accessory, and miscellaneous support in required finishes.

## 1.5 QUALITY ASSURANCE

- A. Source Limitation for Replacement Cast Materials: Obtain castings for decorative metal from single source from single manufacturer.
- B. Preinstallation Conference: Conduct conference at Project site.

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## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Pack, deliver, and store decorative metal items in suitable packs, heavy-duty cartons, or wooden crates; surround with sufficient packing material to ensure that products will not be deformed, cracked, or otherwise damaged.
- B. Store decorative metal inside a well-ventilated area, away from uncured concrete and masonry and protected from weather, moisture, soiling, abrasion, extreme temperatures, and humidity.
- C. Protect strippable protective covering on decorative metal from exposure to sunlight and high humidity, except to the extent necessary for the period of decorative metal installation.

## 1.7 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with maintenance of decorative metal only when existing and forecasted weather conditions are within the environmental limits set by each manufacturer's written instructions and specified requirements.
- B. Concealed and undocumented historic items, relics, and similar objects encountered during maintenance remain Owner's property. Carefully dismantle and salvage each item or object.

# PART 2 - PRODUCTS

## 2.1 METAL MATERIALS

- A. General: Provide decorative metal materials composed of the alloys, forms, and types that match existing metals and have the ability to receive finishes matching existing finishes unless otherwise indicated. Exposed-to-view surfaces exhibiting imperfections inconsistent with existing materials are unacceptable.

## 2.2 CLEANING MATERIALS

- A. Manufacturers of Chemical Cleaners: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. Back to Nature Products Company.
  - 2. Dumond Chemicals, Inc.
  - 3. Hydroclean; Hydrochemical Techniques, Inc.
  - 4. PROSOCO, Inc.
- B. Water: Potable.
- C. Hot Water: Water heated to a temperature of 140 to 160 deg F (60 to 71 deg C).
- D. Job-Mixed Detergent Solution: Solution prepared by mixing 2 cups (0.5 L) of tetrasodium polyphosphate, 1/2 cup (125 mL) of laundry detergent, 5 quarts (5 L) of 5 percent sodium hypochlorite bleach, and 15 quarts (15 L) of hot water for every 5 gal. (20 L) of solution required.

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- E. Nonacidic Liquid Chemical Cleaner: Manufacturer's standard mildly alkaline liquid cleaner, formulated for removing organic soiling from ordinary building materials including polished stone, brick, copper, brass, bronze, aluminum, stainless steel, plastics, wood, and glass.

## 2.5 MISCELLANEOUS MATERIALS

- B. Welding Electrodes and Filler Metal: Select according to AWS specifications for metal alloy welded; use metal type and alloy as recommended by producer of metal to be welded or filled and as required for color match, strength, and compatibility in fabricated items.
- C. Brazing Rods: For copper-alloy components, provide type and alloy as recommended by producer of metal to be brazed and as required for color match, strength, and compatibility in fabricated items.
- D. Fasteners: Fasteners of same basic metal as fastened metal unless otherwise indicated. Use metals that are noncorrosive and compatible with each metal joined.
1. Match existing fasteners in material and in type of fastener unless otherwise indicated.
  2. Use concealed fasteners for interconnecting decorative metal components and for attaching them to other work.
  3. For exposed fasteners, use Phillips-type machine screws of head profile flush with metal surface unless otherwise indicated.
  4. Finish exposed fasteners to match finish of metal fastened unless otherwise indicated.
- E. Anchors: Adhesive type or Expansion type with bolt heads of same basic metal as fastened metal unless otherwise indicated. Use metals that are noncorrosive and compatible with each metal anchored.
1. Strength: Capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and equal to four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488 conducted by a qualified independent testing agency.
- F. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107/C 1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.
- G. Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with water at Project site to create pourable anchoring, patching, and grouting compound.
1. Water-Resistant Product: At exterior locations, provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating, and that is recommended by manufacturer for exterior use.
- H. Sealant Materials:
1. Provide manufacturer's standard chemically curing, elastomeric 100 percent silicone sealant complying with applicable requirements in Section 079200 "Joint Sealants."
  2. Colors: Provide colors of exposed sealants to match colors of metals in which sealant is placed unless otherwise indicated.

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- I. Masking Tape: Nonstaining, nonabsorbent material; compatible with chemical solutions being used and substrate surfaces; and that will easily come off entirely, including adhesive.
  - J. Miscellaneous Products: Base selection of materials and methods of use on the following, subject to approval of a mockup:
    - 1. Previous effectiveness in performing the work involved.
    - 2. Little possibility of damaging exposed surfaces.
    - 3. Consistency of each application.
    - 4. Uniformity of the resulting overall appearance.
    - 5. Do not use products or tools that could do the following:
      - a. Remove, alter, or in any way harm the present condition or future preservation of surfaces, including surrounding surfaces not in contract.
      - b. Leave an unintended residue on surfaces.

## 2.6 METAL FABRICATION

- A. Fabricate decorative metal items and components in sizes and profiles to match existing decorative metal, with accurate curves, lines, and angles. Mill joints to a tight, hairline fit. Form assemblies and joints exposed to weather to resist water penetration and retention.
- B. Provide rebates, lugs, and brackets necessary to assemble components and to attach to existing work. Drill and tap for required fasteners. Use concealed fasteners where possible; use exposed fasteners to match existing work.
- C. Comply with AWS for recommended practices in welding and brazing. Provide welds and brazes behind finished surfaces without distorting or discoloring exposed side. Clean exposed welded and brazed joints of flux, and dress exposed and contact surfaces.
- D. Castings: Fabricate castings free of warp, cracks, blowholes, or other defects that impair strength or appearance. Grind, wire brush, sandblast, and buff castings to remove seams, gate marks, casting flash, and other casting marks.
  - 1. Finish castings to match existing decorative metal work.
  - 2. Replacement Casting for Handrail Bracket: Duplicate existing handrail bracket on the cast-iron railing of first-floor stairs in the lobby. Make molds from this bracket to create new cast-iron brackets.
- E. Date Identification: Emboss on a concealed, interior surface of the metal body of each new component, in easily read characters, "MADE <Insert year>." Manufacturer's name may also be embossed.

## 2.7 FINISHES, GENERAL

- A. Finish(es) of new work shall match finish(es) of existing similar components.
- B. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

- D. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. General: Protect persons, motor vehicles, building site, plants, surrounding surfaces of building being restored, and surrounding buildings from harm resulting from maintenance of decorative metal.
1. Erect temporary protective covers over walkways and at points of pedestrian and vehicular entrance and exit that must remain in service during course of maintenance Work.
- B. Comply with chemical-product manufacturer's written instructions for protecting building and other surfaces against damage from exposure to its products. Prevent chemical solutions from coming into contact with people, motor vehicles, landscaping, buildings, and other surfaces that could be harmed by such contact.
1. Cover adjacent surfaces with materials that are proven to resist chemical solutions being used unless the solutions will not damage adjacent surfaces. Apply masking agents to comply with manufacturer's written instructions. When no longer needed, promptly remove masking to prevent adhesive staining.
  2. Keep wall wet below area being treated to prevent streaking from runoff.
  3. Do not apply chemical solutions during winds of sufficient force to spread them to unprotected surfaces.
  4. Neutralize and collect alkaline and acid wastes for disposal off Owner's property.
  5. Dispose of runoff from operations by legal means and in a manner that prevents soil erosion, undermining of paving and foundations, damage to landscaping, and water penetration into building interiors.

### 3.2 MAINTENANCE PROCEDURES, GENERAL

- A. General: Have maintenance of decorative metal work directed and performed by a qualified maintenance specialist. Ensure that maintenance specialist's field supervisors are present when decorative metal work begins and during its progress. In treating historic items, disturb them as minimally as possible and as follows.
1. Stabilize decorative metal to reestablish structural integrity and weather resistance while maintaining the existing form of each item.
  2. Stop the progress of deterioration and corrosion by removing deteriorated coatings and corrosion and reapplying protective coatings.
  3. Repair items where stabilization is not sufficient to stop progress of deterioration.
  4. Repair items in place and retain as much original material as possible.
  5. Replace or reproduce historic items where indicated or scheduled.
  6. Make maintenance of materials reversible whenever possible.
  7. Install temporary protective measures to stabilize decorative metal that is indicated to be completed later.

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- B. Mechanical Coating Removal: Use only the most gentle mechanical methods, such as scraping and wire brushing, that will not abrade metal substrate. Do not use abrasive methods such as sanding or power tools except as indicated as part of the maintenance program and approved by Architect.
- C. Repair Decorative Metal Item: Match existing materials and features, retaining as much original material as possible to complete the repair.
1. Unless otherwise indicated, repair decorative metals by patching, piecing-in, splicing, or otherwise reinforcing metals with new metal matching existing metal.
  2. Where indicated, repair decorative metal by limited replacement matching existing material.
- D. Replace Decorative Metal Component: Where indicated, duplicate and replace items with new metal matching existing metal.
1. Replace heavily deteriorated or missing parts or features of decorative metal with compatible materials, using surviving prototypes to create patterns or molds for duplicate replacements.
  2. Do not use substitute materials unless otherwise indicated.
  3. Compatible substitute materials may be used.

### 3.3 CLEANING

- A. General: Use only those methods indicated for each type of decorative metal. Apply materials to all surfaces, corners, contours, and interstices, to provide a uniform final appearance without streaks. After work is complete, remove protection no longer required. Remove tape and adhesive marks.
1. Brushes: Use wire brushes of same metal composition as metal being treated. Use brushes that are resistant to chemicals being used. Do not use plastic-bristle brushes if natural-fiber brushes will resist chemicals being used.
  2. Spray Equipment: Use spray equipment that provides controlled application at volume and pressure indicated, measured at spray tip. Adjust pressure and volume to ensure that spray methods do not damage surfaces.
    - a. Equip units with pressure gages.
    - b. Unless otherwise indicated, hold spray tip at least 6 inches (150 mm) from surface and apply material in horizontal, back-and-forth sweeping motion, overlapping previous strokes to produce uniform coverage.
    - c. For chemical spray application, use low-pressure tank or chemical pump suitable for chemical indicated, equipped with cone-shaped spray tip.
    - d. For water-spray application, use fan-shaped spray tip that disperses water at an angle of 25 to 50 degrees.
    - e. For high-pressure water-spray application, use fan-shaped spray tip that disperses water at an angle of at least 40 degrees.
    - f. For heated water-spray application, use equipment capable of maintaining temperature between 140 and 160 deg F (60 and 71 deg C) at flow rates indicated.
- B. Water Cleaning: Clean with[ hot] water applied by [low] [medium] [high]-pressure spray. Supplement with bristle brush. Use small brushes to remove soil from joints and crevices.



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- C. Detergent Cleaning: Scrub surface with detergent solution and bristle brush until soil is thoroughly dislodged and can be removed by rinsing. Use small brushes to remove soil from joints and crevices. Dip brush in solution often to ensure that adequate fresh detergent is used and that surface remains wet.
1. Rinse with hot water applied by low or medium-pressure spray to remove detergent solution and soil.
  2. Repeat cleaning procedure where required to produce cleaning effect established by mockup.

#### 3.4 FIELD QUALITY CONTROL

- A. Inspectors: Owner will engage qualified independent inspectors to perform inspections and prepare test reports. Allow inspectors use of lift devices and scaffolding, as needed, to perform inspections.
- B. Notify inspectors in advance of times when lift devices and scaffolding will be relocated. Do not relocate lift devices and scaffolding until inspectors have had reasonable opportunity to inspect work areas at locations of lift devices or scaffolding.

#### 3.5 PAINTING STEEL UNCOVERED DURING THE WORK

- A. Inspect steel exposed during historic treatment. Where Architect determines that the steel is structural or that it cannot be totally removed for other reasons, prepare and paint the steel as follows:
1. Remove paint, rust, and other contaminants according to SSPC-SP 2, "Hand Tool Cleaning," as applicable to comply with paint manufacturer's recommended preparation.
  2. Immediately paint exposed steel with two coats of antirust coating, following coating manufacturer's written instructions and without exceeding manufacturer's recommended rate of application (dry-film thickness per coat).
- B. If on inspection and rust removal the thickness of a steel member is found to be reduced by more than 1/16 inch (1.6 mm), notify Architect before proceeding.

END OF SECTION 050170

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SECTION 10 11 00  
VISUAL DISPLAY UNITS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section specifies tackboards and markerboards and related items.
- B. Boards may be either factory or field assembled.
- C. Where shown, assemble both markerboards and tackboards into a single unit.

1.2 RELATED WORK

- A. Color of markerboard writing surface: Section 09 06 00, SCHEDULE FOR FINISHES.
- B. Tackable panels at Architectural Woodwork desks: Section 09 84 33, Sound-Absorbing Wall Units.

1.3 QUALITY ASSURANCE

- A. Boards shall be the products of one manufacturer.

1.4 SUBMITTALS

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES.
- B. Shop Drawings: Identifying all parts by name and material and showing design, construction, installation, anchorage and relation to adjacent construction.
- C. Manufacturer's Literature and Data:
  - 1. Markerboard
  - 2. Tackboard.
- D. Samples:
  - 1. 300 by 300 mm (six by six inches), each color, mounted on backing.
    - a. Markerboard writing surface.
    - b. Tackboard.
  - 2. Aluminum trim, 300 mm (six inch) length.
  - 3. Each accessory (after approval, may be used in the work).

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1.5 APPLICABLE PUBLICATIONS (Latest edition unless otherwise noted.)

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- B. National Association of Architectural Metal Manufacturers (NAAMM):
  - 1. AMP 500 Series Metal Finishes Manual
  - 2. AMP 501 Finishes for Aluminum
- C. American Society for Testing and Materials (ASTM):
  - 1. B221/B221M Aluminum and Aluminum Alloy Extruded Bars, Rods, Wire, Shapes and Tubes
- D. Composite Panel Association (CPA):
  - 1. A208.1 Particleboard
  - 2. A135.4-Basic Hardboard

## PART 2 - PRODUCTS

## 2.1 MARKERBOARD

- A. Markerboards shall consist of a writing surface, snap on aluminum frame, chalk trough, mullions, display rail and accessories, grounds and other items specified and shown.

## 2.2 FABRICATION

- A. Materials:
  - 1. Aluminum, extruded: ASTM B221.
  - 2. Backing: Hardboard, AHBA A135.4 or particleboard, CPA A208.1.
- B. Components:
  - 1. Writing Surface: Factory assembly consisting of face sheet of 24 gauge sheet steel with porcelain enamel markerboard texture finish conforming to PEI S-100, laminated to a hardboard or particleboard backing, 9 mm to 13 mm (3/8 to 1/2-inch) thick, and a 0.13 mm (0.005-inch) thick aluminum foil back sheet laminated to back-face.
  - 2. Tackboards:
    - a. Tackable Face: Composite material of natural cork impregnated with vinyl plastic binders to form resilient 1/4" thick homogenous sheet.
    - b. Backing: 1/4" hardboard.
  - 3. Frames (Trim): Extruded aluminum, 1.5 mm (0.060-inch) thick, snap-on type, approximate face width 10 mm (3/8 inch), depth and configuration as required to return to wall and engage clips.
  - 4. Marker Trough: Extruded aluminum, 2.34 mm (0.092-inch) thick, not less than 75 mm (3-inch) projection from writing surface with grooved top surface, closed ends and return to wall surface at underside. Design to be snap-on type with concealed fasteners.

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- 5. Accessories: Fabricate from aluminum with holders from spring steel. Design to suit display. Furnish accessories as follows:
    - a. Mullions: Snap-on type, same material and face width as frames, designed to finish flush with frame.
    - b. Grounds: Continuous zinc-coated (galvanized) steel or extruded aluminum members designed to support the markerboard writing surface and clips for snap-on frames, map rail and chalk tray.
    - c. Clips: Manufacturer's standard as required to support frame, mullions, and marker trough.
  - C. Markerboards 3660 mm (12 feet) or less in length shall be in one piece. Larger units shall have one joint at center. Joints shall have metal spline, with faces in same plane and edges shall touch along entire length.
  - D. Combination Tackboards and Markerboards: Provide with mullion to separate the two boards.
  - E. Orientation: Unless otherwise shown on drawings, orient boards with long side vertical.
  - F. Finish exposed aluminum surfaces as follows:
    - 1. AA 45 chemically etched medium matte, with clear anodic coating Class II Architectural, 0.4 mils thick (AA-M12C22A32).

### PART 3 - EXECUTION

#### 3.1 INSTALLATION, GENERAL

- A. Install units in accordance with the manufacturer's installation instructions, use concealed fasteners.
- B. Inspect surfaces and related construction to receive units. Partitions shall have reinforcing to receive fasteners. Verify type and placement of reinforcement.
- C. Do not proceed with the installation until reinforcement is in place and surfaces are flat.
- D. Assemble units as specified by the manufacturer.

#### 3.2 INSTALLATION OF BOARDS

- A. Mount boards with concealed mechanical fasteners; use mounting clips designed for concealed mounting.
- B. Grounds designed to receive clips for snap-on trim shall be continuous and be secured 300 mm (12 inches) on center. Space clips 300 mm (12 inches) on center.
- C. Miter trim at corners, conceal fasteners. Modify trim as required to conform to surrounding construction details.

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**SECTION 10 11 16**  
**CUSTOM RAIL-MOUNTED MARKERBOARDS****PART 1 - GENERAL****1.1 SUMMARY****A. Section Includes:**

1. Bottom rolling/top supported sliding glass panels, manually operated, with hardware.
2. Openings in glass panels for pulls.
3. Special marker coating for glass panels

**B. Related Sections:**

1. Overhead steel supports: 05 50 00, Metal Fabrications. Pre-punch overhead support to receive hanger rods in accordance with markerboard manufacturer's layout for the job.
2. Glass and Glazing: Section 08 80 0010, Interior Glazing.

SEE RFI 04106:  
OVERHEAD  
FRAMING IS TO BE  
A DELEGATED  
DESIGN BY THE  
SUBCONTRACTOR.

**1.2 REFERENCES (Latest edition unless otherwise noted.)****A. National Association of Architectural Metal Manufacturers (NAAMM):**

1. Metal Finishes Manual.

**1.3 DESIGN REQUIREMENTS DESCRIPTION****A. The Drawings show aesthetic design intent and stacking configuration. Products provided must conform to design intent shown and stacking configuration.**

1. Deflection Limits: Deflection normal to glazing plane is limited to 1/350.

**B. Delegated Design: Design glass panels and support systems, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.****1.4 SUBMITTALS****A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.****B. Shop Drawings: Prepared by system manufacturer. Shop Drawings shall be signed and sealed by a qualified professional engineer, responsible for their preparation, and include the manufacturer's name and trademark on each shop drawing. Include complete elevations of all systems; details and methods of anchorage; details of construction; finishes; methods of assembly; location and installation of hardware and reinforcement for same; size, shape and thickness of materials; joints and connections; details of joining with other work.**

1. Furnish layout for hanger supports to Section 05 50 00, Metal Fabrications.

**C. Samples:**

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1. Exposed metal facing or framing materials showing proposed finish, clearly identified as to type of finish.
    - a. Samples of extrusions shall be minimum 12" long.
    - b. Materials installed shall be within range of approved samples.
  2. Glass: Minimum 12 x 12 inches; show proposed writing surface, interlayer color, pull, and edge treatment.
- D. Sliding Panel Hardware: Provide complete description of all components including track and top support for panels.
- E. Product Data: Furnish manufacturer's written data including fabrication, finishing, hardware, accessories and other components of work.
- F. Maintenance Data: Furnish written instructions to Owner describing recommended materials and methods for proper maintenance.
1. Provide adjusting wrenches and other tools necessary for panel adjustment and maintenance.
  2. Tag tools for positive identification and deliver to Owner prior to acceptance of work.
  3. Recommended materials and methods for proper maintenance of sliding panels.

#### 1.5 QUALITY ASSURANCE

- A. Manufacturer: Provide units produced by a firm with not less than five (5) years of successful experience in fabrication of sliding glass panels of type required for this project.
- B. Coordinate installation of markerboard with work of other trades. Provide installation templates, inserts, and anchorage devices so as to avoid delays in other work.
- C. Installer Qualifications: Manufacturer's authorized representative who is factory-trained and approved for installation of units required for this Project.
- D. Engineering Responsibility: Prepare data for markerboard system, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in systems similar to those indicated for this Project.
- E. Manufacturer's Certifications: See SUBMITTALS above.
1. Design Certification Submit material manufacturer's certification that he has reviewed the design specifications and that his materials, and products provided by this Section, are appropriate for the conditions shown on drawings.

#### 1.6 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Pack and brace panels carefully. No damaged assemblies will be accepted.
- B. Store materials at job site so as to prevent damage to members or assemblies, and protect from corrosion or deterioration.
- C. Protect exposed surfaces against damage by staining, abrasion or other injury.

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## 1.7 WARRANTY

- A. Special Warranty: Manufacturer and installer agree to repair or replace components of markerboard systems that do not comply with requirements or that fail in materials or workmanship within specified warranty period. Warranty to provide full labor and materials as required to restore system to meet requirements of specification and restore or replace defective materials without cost to Owner.
1. Failures include, but are not limited to, the following:
    - a. Structural failures including excessive deflection.
    - b. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
    - c. Failure of operating components.
    - d. Failure of writing surface.
  2. Warranty Period: 5 years from date of Substantial Completion
- B. Defective Work:
1. Promptly undertake corrective action upon receipt of written notice from the Owner of defective work discovered during the warranty period.
  2. Pay for exploratory work necessary to determine the cause of the defect.

## PART 2 - PRODUCT

### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Virginia Glass.
  2. Blumcraft of Pittsburgh.
  3. Dorma.
  4. Modernfold.
  5. C.R. Laurence.
  6. Avanti Systems USA

### 2.2 MATERIALS

- A. General: Provide sheet metals selected for their surface flatness, smoothness and freedom from surface blemishes where exposed to view in the finished unit. Do not use materials whose exposed surfaces exhibit pitting, seam marks, roller marks, variations in flatness exceeding those permitted by referenced standards for stretcher-leveled metal sheet, stains, discoloration or other imperfections.
- B. Exposed Metal:
1. Stainless steel, typical.
- C. Stainless Steel:
1. Type: Austenitic grades, AISI Type as follows:
    - a. Interior: 304.

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2. Sheet, Plate, and Flat Bars: ASTM A666.
- D. Aluminum:
1. Extruded Shapes: ASTM B221 (ASTM B 221M), with strength and durability characteristics of not less than Alloy 6063-T5.
  2. Sheet: ASTM B209.
- E. Rails: Top and bottom, solid extruded aluminum, rectangular profile. Cover all exposed surfaces with stainless steel cladding.
1. Sizes: See drawings.
- F. Steel Supports: Manufacturer's standard, mild steel. RFI 8524 for clarification
- G. Anchorages and Fastenings: Manufacturer's standard, concealed except where otherwise indicated. Finish heads of exposed fasteners to match adjacent metal surfaces. Do not use exposed fasteners except where approved by Architect.
- H. Glass: Provide clear laminated glass in compliance with Section 08 80 10, Interior Glazing for safety glass with special 2 mm interlayer.
1. Minimum Thickness: Not less than 3/8-inch; increase thickness as needed for application..
  2. Glass shall be certified by the Safety Glazing Certification Council in compliance with: ANSI Z97.1.
    - a. CPSC 16 CFR Part 1201 Category II.
  3. Exposed Edges: Stainless steel trim.
- I. Sliding Panel Hardware:
1. Bottom Track: Manufacturer's standard extruded metal suitable for heavy rolling panels and long life.
  2. Overhead Suspension:
    - a. Track:
      - 1) Manufacturer's standard aluminum channel housing designed to support panels.
      - 2) Equipped with separate brackets for hanger attachment.
    - b. Hangers: Threaded rods and nuts, manufacturer's standard.
    - c. Trolley Assembly: Manufacturer's standard steel wheels with nylon tread and life-time lubricated steel ball bearings.
  3. Rollers: Manufacturer's standard steel wheels with nylon tread and life-time lubricated steel ball bearings.
  4. Stops: Provide rubber cushioned stop in overhead track to limit panel movement in both directions and pull from hitting adjacent panel.
  5. Locks: None.
- J. Miscellaneous Materials: Provide all incidental accessory materials, tools, methods and equipment required for fabrication and installation of work of this Section as indicated on drawings, and not furnished by other sections.



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## 2.3 FABRICATION

- A. Fabricate glass panel units to sizes and configuration shown with members closely fitted to joints, reinforced and mechanically joined or welded as required. Dress welds flush and finish to match adjacent surfaces. Countersink heads of exposed fasteners, if any.
- B. Metal Finishes:
  - 1. Stainless Steel: NAAMM #4 Satin finish, typical all exposed metal.
  - 2. Aluminum: Baked enamel, custom color as selected by Architect to match adjacent ceiling finish.
- C. Marker Board Finish: Provide permanent finish on one face suitable for writing with standard dry-erase markers and markings erasable with standard erasers.
  - 1. Basis of Design: "ViviChrome Scribe" by Forms+Surfaces .
    - a. Interlayer: Special 2 mm thick, magnetic.
    - b. Color: See Finish Legend.
- D. Fabricate using all glass assembly with continuous rails top and bottom.
- E. Pulls: Provide openings in glass panels as shown.
- F. Glass: Fabricate edges in accordance with requirements of Section 08 80 10, Glazing, and as follows:
  - 1. Vertical edges: As needed for metal trim.
  - 2. Edges housed in frame: Per manufacturer's recommendations.
  - 3. Pulls: Provide smooth surfaces with not less than 1/8-inch radius on edges of both faces.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install system in accordance with manufacturer's printed instructions and approved shop drawings.
- B. Attach and level overhead track to steel beam provided under Section 05 50 00. Metal Fabrications. If needed, provide concealed overhead steel framing as required to brace assembly to structure. Install bottom track for plumb alignment with overhead track.
- C. Set glass units level, plumb, and true to line with sliding panel hardware.
- D. Paint concealed contact surfaces of dissimilar materials, including metal in contact with concrete work, with a heavy coating of bituminous paint, or provide other separation as recommended by manufacturer.
- E. Adjust panels and hardware to operate smoothly and function properly.

## 3.2 CLEANING AND PROTECTION

- A. After installation, clean glass panels and other contiguous components following procedure recommended by manufacturer.

END OF SECTION

SECTION 10 21 13  
TOILET COMPARTMENTS**REFERENCE RFI 02496  
FOR TOILET  
COMPARTMENT  
CHANGES FROM 02116.**

## PART 1 - GENERAL

## 1.1 DESCRIPTION

- A. This Section includes painted steel toilet compartments configured as toilet enclosures and urinal screens.
- B. Support:
  - 1. Compartments: Floor-mounted, overhead braced.
  - 2. Urinal Screens: Wall mounted.
  - 3. Vestibule Screens: "Post to ceiling".

## 1.2 RELATED WORK

- A. Colors of baked enamel finish: Section 09 06 00, Schedule for Finishes.
- B. Metal stud framing: Section 09 22 16 - Non-Structural Metal Framing.
- C. Ceramic/Porcelain Tiling: Section 09 30 13.
- D. Grab bars and toilet room accessories: Section 10 28 00, Toilet, Bath, and Laundry Accessories.

## 1.3 SUBMITTALS

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Samples:
  - 1. Color: Prime coat of paint on 150 mm (six-inch) square of metal panel with baked enamel finish coat over half of panel for each color.
  - 2. Construction: Provide sample showing internal construction of stile and door; reinforcing, if any; type of finish; and hardware.
- C. Manufacturer's Literature and Data: Specified items indicating all hardware and fittings, material, finish, and latching.
- D. Shop Drawings: Construction details at 1/2 scale, showing installation details, anchoring and leveling devices, and dimensioned elevations showing location of toilet accessories supported by toilet compartment.
- E. Manufacturer's certificate, attesting that zinc-coatings conform to specified requirements.

## 1.4 QUALITY ASSURANCE

- A. Comply with requirements in GSA's CID-A-A-60003, "Partitions, Toilets, Complete."

- B. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84, or another standard acceptable to authorities having jurisdiction, by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
  - 1. Flame-Spread Index: 25 or less.
  - 2. Smoke-Developed Index: 95 or less.
- C. Regulatory Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA) and Architectural Barriers Act (ABA) Accessibility Guidelines for Buildings and Facilities" and ICC/ANSI A117.1 for toilet compartments designated as accessible.

## 1.5 JOB CONDITIONS

- A. Verify dimensions at site prior to fabrication.

## 1.6 APPLICABLE PUBLICATIONS

- A. Publications listed below form a part of this specification to the extent referenced. Publications are referenced in the text by the basic designation only.
- B. Federal Specifications (Fed. Spec.):
  - 1. FF-B-575C Bolt, Hexagon and Square
- C. Code of Federal Regulations (CFR):
  - 1. 40 CFR 247 Comprehensive Procurement Guidelines for Products Containing Recovered Materials
- D. Commercial Item Descriptions (CID):
  - 1. A-A-1925 Shield, Expansion (Nail Anchors)
  - 2. A-A-60003 Partitions, Toilet, Complete

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. Metal Partitions: Smooth, level, furniture grade steel, hot dipped galvanized with minimum zinc coverage of 0.0075". Galvanized sheet steel pressure laminated to honeycomb core; full perimeter interlocking edges, welded and ground smooth; sealed, waterproof construction.
- B. Overhead Braces: Continuous, satin finish anodized, aluminum extrusion; anti-grip profile.
- C. Urinal Screens: Same material as "Metal Partitions" above..
- D. Institutional Hardware: Heavy duty stainless steel operating hardware and accessories, including hinges, latch and keeper, pulls, door stop/bumper, and coat hook for each compartment. Latch units shall have emergency access capability. Hardware shall comply with ADA requirements. Stainless steel devices as follows:

1. Attachments:
  - a. Screws: Stainless steel TORX head screws, typical. Provide machine screws for inserts. Provide sex-type bolts for through-bolt applications.
  - b. Inserts: Threaded brass inserts; provide for door hardware only; inserts not required for brackets and other attachments.
  - c. No hardware exposed to view outside of compartment except for the following conditions:
    - 1) Handicap out swinging doors.
    - 2) Brackets at end conditions; see "Brackets" below.
  - d. Use expansion bolts, for anchoring to solid masonry or concrete.
  - e. Use toggle bolts, for anchoring to hollow masonry or stud framed walls.
2. Hinges: Upper pivots and lower hinges adjustable to hold doors open 30 degrees.
3. Keeper: 8 gage (4.4 mm).
  - a. U-slot to engage bar of throw latch.
4. Stops: 11 gage (3.2 mm) with rubber bumper; two required to prevent door from being kicked out of compartment.
5. Brackets:
  - a. Stirrup Type: Ear or U-brackets; stainless steel.
6. Coat Hook: Combination hook and rubber-tipped bumper, sized to prevent in-swinging door from hitting compartment-mounted accessories.
7. Women's stalls provide additional coat hook, mounted at approximately 42 inches above floor and reachable from the water closet.
8. Wheelchair Toilets:
  - a. Upper pivots and lower hinges to hold out swinging doors at 5 degrees open.
  - b. Provide U-type stainless steel doors pulls, approximately four inches long on pull side.
  - c. Provide two coat hooks on interior side of door. One at 48" AFF and other at manufacture's standard height.
  - d. Bumper on out swinging door
9. Latching devices and hinges for handicap compartments shall comply with ADA requirements

## 2.2 FABRICATION

### A. Toilet-Enclosure Style: Overhead braced..

1. Reinforcement:
  - a. Provide threaded steel inserts and reinforcement for installation of hardware, fittings, brackets, and accessories.
  - b. Where grab bars attached to toilet partitions, provide concealed internal reinforcement.

### B. Panels, Doors, and Pilasters:

1. Pilasters: Concealed anchorage device designed for positive adjustment laterally and vertically and to hold pilaster in rigid position; reinforce as required for installation of hardware.
    - a. Panel Thickness: 1-1/4 inch.
    - b. Face Thickness: Minimum 18-gage (0.050" thick).
    - c. Extend pilasters from floor to overhead brace.
  2. Dividing panels: 1-inch thick, minimum 20-gage material, sizes and configurations as required; reinforce as required for support of hardware and accessories specified here and, elsewhere.
  3. Doors: 1-inch thick, minimum 22-gage material; reinforce as required for installation of hardware.
    - a. Door Size and Swings: Unless otherwise indicated, provide 24-inch-wide, in-swinging doors for standard toilet compartments and 36-inch-wide, out-swinging doors with a minimum 32-inch- wide, clear opening for compartments designated as accessible.
  4. Panels and doors to be 58" high to clear floor by nominal 12".
  5. Finish:
    - a. Typical: Factory-applied baked synthetic enamel finish standard with manufacturer on all exposed surfaces; color as selected from manufacturer's full line.
    - ~~b. Enclosure Panels adjacent to Urinals: Stainless steel.~~
- C. Urinal-Screen Style: CID Type III, Style D (wall hung), Similar to panel construction except stainless steel, with integral full-height flanges for wall attachment, and maximum 1-1/4 inches (32 mm) thick, minimum 18-gage material; reinforce as required for installation.
1. Option: Full height Stainless steel U-Type bracket.
  2. Wall anchor plate drilled for 4 anchors on both sides of screen.
  3. Screen 24 inches wide and 42 inches high.
- D. Special Features.
1. Reinforcing: Special concealed reinforcing in core construction of panels scheduled to receive grab bars; reinforcing to be sufficient to support minimum 300 lbs.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. General: Comply with manufacturer's written installation instructions and as follows:
1. Install units rigid, straight, plumb and with all horizontal lines level.
  2. Conceal evidence of drilling, cutting and fitting in finish work.
  3. Maximum Clearances:
    - a. Pilasters and Panels: 1/2 inch.
    - b. Panels and Walls: 1 inch.
- B. Panels and Pilasters:

1. Support panels, except urinal screens, and pilaster abutting building walls near top and bottom by stirrup supports secured to partitions with through-bolts.
2. Provide at least three stirrup brackets, attached top and bottom, at panels and posts to walls; all top brackets in a single plane; all center brackets center between top and bottom brackets, all bottom brackets in a single plane.
3. Secure stirrups to walls with at two suitable anchoring devices for each stirrup.
4. Secure panels to faces of pilaster near top and bottom with stirrup supports, through-bolted to panels and machine screwed to each pilaster.
5. Secure edges of panels to edges of pilasters near top and bottom with "U" shaped brackets.

C. Urinal Screens:

1. Anchor urinal screen flange to walls with minimum of four bolts both side of panel.
2. Space anchors at top and bottom and equally in between.

3.2 ADJUSTING

- A. Hardware Adjustment: Adjust and lubricate hardware according to hardware manufacturer's written instructions for proper operation. Set hinges on in-swinging doors to hold doors open approximately 10 degrees from closed position when unlatched. Set hinges on out-swinging doors to return doors to 5 degrees from fully closed position.

--- E N D ---

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SECTION 10 26 00  
WALL AND DOOR PROTECTION

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section specifies wall guards (crash rails or bumper guards), handrail/wall guard combinations, corner guards and high impact wall covering.
- B. Handrails: Provide adequate strength to conform to requirements of Building Code.
- C. Alternate: See Section 01 23 00, Alternates for work affecting this Section.

1.2 RELATED WORK

- A. Structural steel corner guards: Section 05 50 00, METAL FABRICATIONS.
- B. Armor plates and kick plates not specified in this section: Section 08 71 00, DOOR HARDWARE.
- C. Color and texture of aluminum and resilient material: Section 09 06 00, SCHEDULE FOR FINISHES and FINISH LEGEND in drawings.

1.3 SUBMITTALS

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Shop Drawings: show design and installation details.
- C. Manufacturer's Literature and Data:
  - 1. Handrail/Wall Guard Combinations.
  - 2. Wall Guards.
  - 3. Corner Guards.
- D. Test Report: Showing that resilient material complies with specified fire and safety code requirements.

1.4 DELIVERY AND STORAGE

- A. Deliver materials to the site in original sealed packages or containers marked with the name and brand, or trademark of the manufacturer.
- B. Protect from damage from handling and construction operations before, during and after installation.
- C. Store in a dry environment of approximately 21° C (70 degrees F) for at least 48 hours prior to installation.

1.5 APPLICABLE PUBLICATIONS

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



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B. American Society for Testing and Materials (ASTM):

- A167-99(R2009)      Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip
- B221-08      Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes
- D256-06      Impact Resistance of Plastics
- D635-06      Rate of Burning and/or Extent and Time of Burning of Self-Supporting Plastics in a Horizontal Position
- E84-09 Surface Burning Characteristics of Building Materials

C. The National Association of Architectural Metal Manufacturers (NAAMM):

- AMP 500-06      Metal Finishes Manual

D. National Fire Protection Association (NFPA):

- 80-10      Standard for Fire Doors and Windows

E. Society of American Automotive Engineers (SAE):

- J 1545-05      Instrumental Color Difference Measurement for Exterior Finishes.

F. Underwriters Laboratories Inc. (UL):

- Annual Issue      Building Materials Directory

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. Stainless Steel: ASTM A167, Type 302B.

- B. Aluminum Extruded: ASTM B221, Alloy 6063, Temper T5 or T6.

C. Resilient Material:

1. Extruded and injection molded acrylic vinyl or extruded polyvinyl chloride meeting following requirements:
  - a. Minimum impact resistance of 1197 ps (25 ft lbs per sq.ft) when tested in accordance with ASTM D256 (Izod impact, ft.lbs. per inch notch).
  - b. Class 1 fire rating when tested in accordance with ASTM E84, having a maximum flame spread of 25 and a smoke developed rating of 450 or less.
  - c. Rated self extinguishing when tested in accordance with ASTM D635.
  - d. Material shall be labeled and tested by Underwriters Laboratories or other approved independent testing laboratory.
  - e. Integral color with all colored components matched in accordance with SAE J 1545 to within plus or minus 1.0 on the CIE-LCH scales.
  - f. Same finish on exposed surfaces.

### 2.2 CORNER GUARDS

- A. Resilient, Shock-Absorbing Corner Guards: Surface mounted type with 6 mm 1/4-inch corner) // formed with 3-inch legs unless otherwise shown.

1. Snap-on corner guard formed from resilient material, minimum 2 mm (0.078-inch) thick, free floating on a continuous 1.6 mm (0.063-inch) thick extruded aluminum retainer. Provide appropriate mounting hardware, cushions and base plates as required.
  2. Provide factory fabricated end closure caps at top and bottom of surface mounted corner guards.
- B. Stainless Steel Corner Guards: Fabricate of 1.6 mm (0.0625-inch) thick stainless steel. Form guards of dimensions and to contour shown. Provide with beveled edges and slight bend near edges for tight fit to wall. Form with tight radius.
1. CG-1: L-shape with 3-1/2" legs.
  2. CG-2: Custom n-shaped devices for designated partition ends; 3-1/2" legs.
  3. CG-2A: Same as CG-2 except 1-1/2" legs.
  4. CG-3: Custom angle as shown; 3-1/2" legs.
  5. CG-7: L-shape with 1" legs

## 2.3 WALL GUARDS AND HANDRAILS

- A. Resilient Wall Guards and Handrails:
1. Handrail/Wall Guard Combination: Snap-on covers of resilient material, minimum 2 mm (0.078-inch) thick, shall be free-floated on a continuous, extruded aluminum retainer, minimum 1.8 mm (0.072-inch) thick, anchored to wall at maximum 760 mm (30 inches) on center.
    - a. HNDRL-2: 5-1/2 inch high device with continuous anti-ligature closure bracket.
  2. Wall Guards (Crash Rails): Snap-on covers of resilient material, minimum 2.8 mm (0.110-inch) thick, shall be free-floated over 50 mm (two-inch) wide aluminum retainer clips, minimum 2.3 mm (0.090-inch) thick, anchored to wall at maximum 600 mm (24 inches) on center, supporting a continuous aluminum retainer, minimum 1.6 mm (0.062-inch) thick; or, shall be free-floated over a continuous extruded aluminum retainer, minimum 2.3 (0.090-inch) thick anchored to wall at maximum 600 mm (24 inches) on center. Curved profiles; heights as indicated on Finish Legend.
  3. Metal Wall Guards (Crash Rails) CR-3 & CR-4: Stainless steel devices, 1/4" (6.4mm) thick with 2" (50.8mm) radiused ends standard. Heights as scheduled; see Finish Legend. Provide with stainless steel pipe or tube brackets.
  4. Provide handrails and wall guards (crash rails) with prefabricated and closure caps, inside and outside corners, concealed splices, cushions, mounting hardware and other accessories as required. End caps and corners shall be field adjustable to assure close alignment with handrails and wall guards (crash rails). Screw or bolt closure caps to aluminum retainer.
- B. Stainless Steel Handrails: Construct 1-1/2" O.D. handrails, with brackets, of stainless steel tubing to design shown. Include pre-formed inside and outside corner and end caps. Factory weld bracket to wall plate and provide snap-on escutcheon to conceal mounting device and fasteners.

## 2.4 DOOR PROTECTION

- A. Item is indicated on "Schedule Notes" on Drawing 8A1600 and locations indicated on the Door Schedule as "R24".
- B. Fabricate door protection items from stainless steel material, minimum 6.35 mm (0.25-inch) thick.
- C. Coordinate door protection material requirements with door suppliers to insure fit for all components.

- D. Door Handle Protector: Surface applied device fabricated from stainless steel with #4 satin finish.
1. Size: Minimum 20 inches long x 3 inches high.
  2. Configuration: J-shaped with 10" flat and 10" beveled zones with flat areas for screw attachment. Flat zone to project not less than door lever, but not less than 3 inches and have reverse flange for attachment. Provide 2 holes each end for screw attachment.
  3. Basis of Design: "Sani-Rail Flush Mount Door Handle Protector w/Reverse Flange" by Life Science Products, Inc.

## 2.5 HIGH IMPACT WALL COVERING

- A. Resilient Type: PWC-1, 2, 3, & 5;-Fabricate from vinyl acrylic or polyvinyl chloride resilient material minimum 1 mm (0.040 inch) thick designed specially for interior use.
- B. Metal: SSTW-1, Stainless steel; 302/304 alloy, minimum 0.060" thick.
1. Size: Height as indicated on drawings; length not less than 48" in runs and not less than 16 inches at end of runs.
  2. Finish: No. 4 satin finish.
  3. Countersink for oval head screws at corners, at 12 inch centers on sides, and at each stud at top and bottom.
  4. Edges: Smooth, free of burrs and sharp edges.
- B. Rigid Type: PWC-4; Glass Fiber Reinforced Plastic (FRP) panels, 0.075 inch thick, with smooth face. Provide with trim accessories in matching color to panels.
1. Class A fire rated per ASTM E 84.
  2. Tensile Strength: 7 x 103 psi; ASTM D 638.
  3. Barcol Hardness: 50; ASTM D 2583.
  4. Izod Impact: 11.0 ft-lb/in notched 0.59 J/mm; ASTM D 256.
  5. Product Identification: Finish side identification and confirmation of meeting Class A interior finish requirements after installation and while in service, without labels.
- C. Coordinate with door //guard rail// protection material and supplier for proper fit, installation and color.
- D. Provide adhesive as recommended by the wall covering manufacturer.

## 2.6 FASTENERS AND ANCHORS

- A. Provide fasteners and anchors as required for each specific type of installation.
- B. Where type, size, spacing or method of fastening is not shown or specified, submit shop drawings showing proposed installation details.

## 2.7 FINISH

- A. In accordance with NAAMM AMP 500 series.
- B. Aluminum:
1. Exposed aluminum: AAC22A31 chemically etched medium matte, with clear anodic coating, Class II Architectural, 0.4 mil thick.
  2. Concealed aluminum: Mill finish as fabricated, uniform in color and free from surface blemishes.

- C. Stainless Steel: NAAMM finish Number 4.
- D. Resilient Material: Embossed texture and color in accordance with SAE J 1545 and as specified in Section 09 06 00, SCHEDULE FOR FINISHES or Finish Legend.

## PART 3 - INSTALLATION

### 3.1 RESILIENT CORNER GUARDS

- A. Install corner guards on walls in accordance with manufacturer's instructions.

### 3.2 STAINLESS STEEL CORNER GUARDS

- A. Mount guards on external corners of interior walls, partitions and columns as shown.

SPEC WRITER NOTE: Edit to suit type of guards specified and details shown on the drawings.

- B. Where corner guards are installed on exposed masonry wall, partitions or columns, anchor corner guards to existing walls with 6 mm (1/4-inch) oval head stainless steel countersunk expansion or toggle bolts. Grout spaces solid between guards and backing with Portland cement and sand mortar.
- C. Where corner guards are installed on gypsum board, clean surface and anchor guards with a neoprene solvent-type contact adhesive specifically manufactured for use on gypsum board construction. Remove excess adhesive from around edge of guard and allow to cure undisturbed for 24 hours.

### 3.3 RESILIENT HANDRAIL, WALL GUARD COMBINATIONS, AND RESILIENT WALL GUARDS (CRASH RAIL)

- A. Secure guards to walls with brackets and fasteners in accordance with manufacturer's details and instructions.

### 3.5 STAINLESS STEEL WALL GUARDS

- A. Space brackets at not more than three feet on centers and anchor to the wall in accordance with manufacturer's installation instructions.

### 3.6 IMPACT WALL COVERING

- A. Surfaces to receive protection shall be clean, smooth and free of obstructions.
- B. Install protectors after frames are in place but preceding installation of doors in accordance with approved shop drawings and manufacturers specific instructions.
- C. Apply with adhesive in controlled environment according to manufacture's recommendations.
- D. Metal Wall Protection: Attach metal panels to wall with screws and adhesive. Mount bottom of panels on top of new base. Joints between adjacent panels not to exceed 3/32". Provide continuous ribbon of adhesive at top, bottom, and studs.

### 3.7 DOOR PROTECTION

- A. Surface mount to designated doors. Mount as recommended by manufacturer so top of device does not interfere with door lever operation and is approximately ½-inch lower than tip of lever in its lowest position.

--- E N D ---

SECTION 10 28 00  
TOILET, BATH, AND LAUNDRY ACCESSORIES

## PART 1 - GENERAL

## 1.1 DESCRIPTION

- A. This section specifies manufactured items usually used in dressing rooms, toilets, baths, locker rooms and at sinks in related spaces.
1. Section includes field mock-up and load test for designated products.
- B. Items Specified:  
Note: Text in parenthesis, ( ), defines the term used on the drawing for the item.
1. Paper towel dispenser (PAPER TOWEL DISP).
  2. Combination paper towel dispenser and disposal unit (PAPER TOWEL DISP/WASTE).
  3. Sanitary Napkin Disposal (SAN. NAPKIN DISPOSAL).
  4. Sanitary Napkin and Tampon Dispenser (SANITARY NAPKIN DISPENSER).
  5. Seat cover dispenser (SEAT COVER DISP).
  6. Toilet tissue dispenser (TOILET PAPER).
  7. Grab Bars (GRAB BARS).
  8. Shower curtains.
  9. Shower curtain rods.
  10. Shower seat.
  11. Clothes hooks, robe or coat.
  12. Soap dispenser.
  13. Soap dishes.
  14. Mop Racks with Utility Shelf.
  - ~~15. Stainless steel shelves at wheelchair lavatory.~~
  16. Baby Changing Station.
- C. Products Supplied But Not Installed Under This Section:
1. Shower Soap Dish Shelf (SDS-1): Furnish to Section 09 30 13, Ceramic Porcelain Tiling for installation. Include manufacturer's written installation instructions.
- D. Basis of Design: Basis of Design is listed for some products as a convenience for bidders; however, subject to compliance with the requirements, manufacturers offering similar products are not excluded.
- E. VA-Furnished, Contractor-Installed: See Medical Equipment Activation Report.
1. Mop racks with utility shelf.
- F. VA-Furnished and Installed (VV) Accessories:
1. Paper products.
  2. Soap
  3. PTD-2, Paper Towel Dispenser
  4. SD-1, Soap Dispenser

## 1.2 RELATED WORK

- A. Plastic laminate shelving: Section 06 40 00 - Architectural Woodwork.
- B. Solid surface towel dispenser (PTD-3) & shelf unit: Section 06 61 16, SOLID SURFACING.

- C. Color of finishes: Section 09 06 00, Schedule for Finishes.
- D. Lists of toilet accessories: Toilet Accessory Legend in Drawings.
- E. Unframed mirrors (MR-1, 2 & 3): Section 08 80 10. INTERIOR GLAZING.

### 1.3 SUBMITTALS

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Shop Drawings:
  - 1. Each product specified.
  - 2. Paper towel dispenser and combination dispenser and disposal units.
  - 3. Shower Curtain rods, showing required length for each location.
  - 4. Grab bars, showing design and each different type of anchorage.
  - 5. Show material and finish, size of members, and details of construction, installation and anchorage of mop racks.
  - 6. Show blocking and attachments required for shower seat and grab bars.
  - 7. Attachments: Identify recommended type and size of fasteners for load-supporting accessories including, but not limited to, shower seats and grab bars. Confirm blocking shown or specified is adequate for device and recommended fasteners.
- C. Samples:
  - 1. Shower curtain; minimum 12" x 12" sample.
  - 2. One of each type of accessory specified.
  - 3. After approval, samples may be used in the work.
- D. Manufacturer's Literature and Data:
  - 1. All accessories specified.
  - 2. Show type of material, gages or metal thickness in inches, finishes, and when required, capacity of accessories.
  - 3. Show working operations of spindle for toilet tissue dispensers.
  - 4. Mop racks.

### 1.4 QUALITY ASSURANCE

- A. Each product shall meet, as a minimum, the requirements specified, and shall be a standard commercial product of a manufacturer regularly presently manufacturing items of type specified.
- B. Accessories to comply with UFAS requirements.
- C. Each accessory type shall be the same and be made by the same manufacturer.
- D. Each accessory shall be assembled to the greatest extent possible before delivery to the site.
- E. Include additional features, which are not specifically prohibited by this specification, but which are a part of the manufacturer's standard commercial product.
- F. Load Test Mockup: Provide mock-up and load test for one device of each type. Mockup may be included in the finished Work, but must be performed as soon as possible to allow remedial action for devices not yet installed, if needed. Perform tests in presence of Resident Engineer, Architect, Construction Manager, and representative of device.

1. Where failure occurs in the device, such device must be re-designed and replaced at no cost to Owner. Where failure occurs in the attachment or blocking, such attachment must be re-designed and replaced at no cost to Owner.
2. Load Test Description: Load device with weights for full rated load as stated in manufacturer's literature. Leave load in place for time period indicated for specific device. Device shall remain firmly attached to wall with no discernable effects on wall, finish, or permanent deformation to device or wall.
3. Devices:
  - a. Fold Down Shower Seat. Test for 30 minutes.

#### 1.5 PACKAGING AND DELIVERY

- A. Pack accessories individually to protect finish.
- B. Deliver accessories to the project only when installation work in rooms is ready to receive them.
- C. Deliver inserts and rough-in frames to site at appropriate time for building-in.
- D. Deliver products to site in sealed packages of containers; labeled for identification with manufacturer's name, brand, and contents.

#### 1.6 STORAGE

- A. Store products in weathertight and dry storage facility.
- B. Protect from damage from handling, weather and construction operations before, during and after installation in accordance with manufacturer's instructions.

#### 1.7 APPLICABLE PUBLICATIONS

- A. Publications listed below form a part of this specification to the extent referenced. Publications are referenced in the text by the basic designation only. Latest edition unless otherwise noted.
- B. Uniform Federal Accessibility Standards (UFAS)
- C. American Society for Testing and Materials (ASTM):
  1. A167 Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip.
  2. A176 Stainless and Heat-Resisting Chromium Steel Plate, Sheet, and Strip
  3. A269 Seamless and Welded Austenitic Stainless Steel Tubing for General Service
  4. A312/A312M Seamless and Welded Austenitic Stainless Steel Pipes
  5. A653/A653M Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
  6. B221 Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes
  7. B456 Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium
  8. D635 Rate of Burning and/or Extent and Time of Burning of Self Supporting Plastics in a Horizontal Position



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- 9. F446 Consumer Safety Specification for Grab Bars and Accessories  
Installed in the Bathing Area.
  - 10. A269 Seamless and Welded Austenitic Stainless Steel Tubing for General  
Service
- D. The National Association of Architectural Metal Manufacturers (NAAMM):
- 1. AMP 500 Series Metal Finishes Manual
  - 2. AMP 500-505-88 Metal Finishes Manual and Finishes for Stainless Steel
- E. American Welding Society (AWS):
- 1. D10.4 Welding Austenitic Chromium-Nickel Stainless Steel Piping and Tubing
- F. Federal Specifications (Fed. Specs.):
- 1. FF-S-107C (2) Screw, Tapping and Drive
  - 2. FF-S-107C Screw, Tapping and Drive.
  - 3. WW-P-541E(1) Plumbing Fixtures (Accessories, Land Use) Detail Specification

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. Aluminum: ASTM B221, alloy 6063-T5 and alloy 6463-T5.
- B. Stainless Steel:
  - 1. Plate or sheet: ASTM A167, Type 302, 304, or 304L, except ASTM A176 where Type 430 is specified, 0.0299-inch thick unless otherwise specified.
  - 2. Tube: ASTM A269, Alloy Type 302, 304, or 304L.
- C. Stainless Steel Tubing: ASTM A269, Grade 304 or 304L, seamless or welded.
- D. Stainless Steel Pipe: ASTM A312; Grade TP 304 or TP 304L.
- E. Steel Sheet: ASTM A653, zinc-coated (galvanized) coating designation G90.
- F. Joint Compound: As specified under Section 09 29 00, Gypsum Board.

### 2.2 FASTENERS

- A. Exposed Fasteners: Stainless steel or chromium plated brass, finish to match adjacent surface.
- B. Concealed Fasteners: Steel, hot-dip galvanized (except in high moisture areas such as showers or bath tubs use stainless steel).
- C. Toggle Bolts: For use in hollow masonry or frame construction.
- D. Hex bolts: For through bolting on thin panels.
- E. Expansion Shields: Lead or plastic as recommended by accessory manufacturer for component and substrate for use in solid masonry or concrete.

## F. Screws:

1. ASME B18.6.4.
2. Fed Spec. FF-S-107, Stainless steel Type A.

## G. Adhesive: As recommended by manufacturer for products to be joined.

## 2.3 FINISH

## A. In accordance with NAAMM AMP 500 series.

## B. Anodized Aluminum:

1. AA-C22A41: Chemically etched medium matte, with clear anodic coating, Class I Architectural, 0.7-mil thick.
2. AA-C22A44: Chemically etched medium matte with electrolytically deposited metallic compound, integrally colored coating Class I Architectural, 0.7-mil thick finish. Dyes will not be accepted.

## C. AA-M32: Mechanical finish, medium satin.

1. Chromium Plating: ASTM B456, satin or bright as specified, Service Condition No. SC2.
2. Stainless Steel: NAAMM AMP 503, finish number 4.
3. Ferrous Metal:
  - a. Shop Prime: Clean, pretreat and apply one coat of primer and bake.
  - b. Finish: Over primer apply two coats of alkyd or phenolic resin enamel, and bake.
4. Nylon Coated Steel: Nylon coating powder formulated for a fluidized bonding process to steel to provide a hard smooth, medium gloss finish, not less than 0.3 mm (0.012-inch) thick, rated as self-extinguishing when tested in accordance with ASTM D635.

## 2.4 FABRICATION - GENERAL

## A. Welding, AWS D10.4.

## B. Grind dress, and finish welded joints to match finish of adjacent surface.

## C. Form exposed surfaces from one sheet of stock, free of joints.

## D. Provide steel anchors and components required for secure installation.

## E. Form flat surfaces without distortion. Keep exposed surfaces free from scratches and dents. Reinforce doors to prevent warp or twist.

## F. Isolate aluminum from dissimilar metals and from contact with building materials as required to prevent electrolysis and corrosion.

## G. Hot-dip galvanized steel, except stainless steel, anchors and fastening devices.

## H. Shop assemble accessories and package with all components, anchors, fittings, fasteners and keys.

## I. Key items alike.

## J. Provide templates and rough-in measurements as required.

- K. Round and deburr edges of sheets to remove sharp edges.
- 2.5 COMBINATION PAPER TOWEL DISPENSER AND DISPOSAL UNITS (PTD-1)
- A. Recessed type.
- B. Fabricate of stainless steel.
- C. Dispensing capacity for 600 C fold, 800 multifold, or 1,100 standard single fold paper towels.
- D. Form face frames, from one piece.
- E. Cabinet and frames fabricated of 0.91 mm (0.0359-inch) thick stainless steel.
- F. Provide 1.5 mm (0.059-inch) full face door with continuous stainless steel piano hinge and two tumbler locks, keyed alike.
- G. Provide removable waste receptacle approximately 34 liter (9 gallon) capacity, fabricated of 1.50 mm (0.059-inch) thick stainless steel.
- H. Size:
1. Recessed Unit: Nominal 54" H x 17-1/4" W x 6" deep cabinet.
- I. Basis of Design: Model 9462 by ASI.
- 2.6 TOILET TISSUE DISPENSERS
- A. Large (Jumbo) Size Rolls (TPD-1):
1. Double roll, surface-mounted type for 9-inch diameter rolls with 3" or 2-1/4" diameter cores.
  2. Stainless steel, 18 gage (0.050"). Fabricate seamless door from one piece with integral rigidizing ribs and two tissue level viewing slots. Hang door on stainless steel pivot hinges and held closed with tumbler lock keyed to other toilet accessories.
  3. Fabricate dispensing mechanism from high impact chemical and flame retardant ABS. When one roll is depleted, other roll can be selected by shifting panel lever at bottom of unit.
  4. Size: Nominal 20-3/4"w x 11-3/8"h x 6-3/16" deep.
  5. Basis of Design: No. 0040 by ASI.
- 2.7 GRAB BARS (GB)
- A. Fed. Spec WW-P-541/8B, Type IV, bars, surface mounted, Class 2, grab bars and ASTM F446.
- B. Fabricate of stainless steel.
1. Stainless steel: Grab bars, flanges, mounting plates, supports, screws, bolts, and nuts and washers with concealed mount, except grab bars mounted at floor.
  2. Configurations:
    - a. Typical: Straight.
    - b. Where Shown: L-shaped.
- C. Bars:

1. Fabricate from 32 mm (1-1/4 inch) or 38 mm (1-1/2 inch) outside diameter tubing.
    - a. Stainless steel, minimum 1.2 mm (0.0478 inch) thick.
    - b. Length: See Toilet Accessory Legend in drawings.
  2. Fabricate in one continuous piece with ends turned toward walls, except where grab bars are shown continuous around three sides of showers, bars may be fabricated in two sections, with concealed slip joint between.
  3. Continuous weld intermediate support to the grab bar.
  4. Finish: Provide peened finish for normal grip surfaces.
- D. Flange for Concealed Mounting:
1. Minimum of 2.65 mm (0.1046 inch) thick, approximately 75 mm (3 inch) diameter by 13 mm (1/2 inch) deep, with provisions for not less than three set screws for securing flange to back plate.
  2. Insert grab bar through center of the flange and continuously weld perimeter of grab bar flush to back side of flange.
- E. In lieu of providing flange for concealed mounting, and back plate as specified, grab rail may be secured by being welded to a back plate and be covered with flange.
- F. Back Plates:
1. Minimum 2.65 mm (0.1046 inch) thick metal.
  2. Fabricate in one piece, approximately 6 mm (1/4 inch) deep, with diameter sized to fit flange. Provide slotted holes to accommodate anchor bolts.
- 2.8 SHOWER CURTAINS
- A. Fabric: Polyester. See FINISH LEGEND for color, patterns and Basis of Design manufacturer.
- B. Liner: Clear vinyl, minimum 0.008" thick.
- C. Size:
1. Width: As shown on drawings plus 10% for fullness.
  2. Height: As needed based on height of rod, attachment rings, and 1-inch clearance at floor.
- D. Fabrication:
1. Heading: Triple fold and reinforced with a strip of no-tear buckram. Height as needed to accommodate grommets.
  2. Side and Bottom Hems: Double fold; not less than 1 inch wide.
  3. All hems are "normal"; facing shower.
- E. Grommets: Non-ferrous non-staining metal, stainless steel or chrome-plated brass devices. Provide at each end and space at 6 inches between.
- F. Hooks: Stainless steel or chrome-plated brass devices for round shower rods. Provide one hook for each grommet.
1. Basis of Design: #204-1 by Bobrick.
- 2.9 SHOWER CURTAIN RODS (SR-1)
- A. Stainless steel tubing, ASTM A569, minimum 1.27 mm (0.050 inch) wall thickness, 32 mm (1 1/4 inch) outside diameter.

- B. Flanges, stainless steel rings, 66 mm (2 5/8 inch) minimum outside diameter, with 2 holes opposite each other for 6 mm (1/4 inch) stainless steel fastening bolts. Provide a set screw within the curvature of each flange for securing the rod.
- C. Intermediate support for rods over 1800 mm (six feet) long. Provide adjustable ceiling flanges with set screws, tubular hangers and stirrups.

#### 2.10 SHOWER SOAP DISH SHELF (SDS-1)

- A. Nominal 7 x 5 x 2-1/2 inch deep, 20 gage, recessed stainless steel shelf unit with 5" x 3-5/8" soap compartment with rounded corners. Bottom soap shelf is dimpled to prevent soap slippage. Unit has nominal 3/4" wide flange which allows 5/8" lap to finish wall substrate. Include mounting clamp.
  - 1. Basis of Design: #0400 by ASI.
- B. Furnish to Section 09 30 13, Ceramic Porcelain Tiling for installation. See "Products Supplied But Not Installed Under This Section" under SUMMARY in Part 1 above.

#### 2.11 CLOTHES HOOKS-ROBE OR COAT (CH)

- A. CH-1: Typical.
  - 1. Fabricate hook units either of chromium plated brass with a satin finish, or stainless steel, using 6 mm (1/4 inch) minimum thick stock, with edges and corners rounded smooth to the thickness of the metal, or 3 mm (1/8 inch) minimum radius.
  - 2. Fabricate each unit as a single hook on a single shaft, integral with or permanently fastened to the wall flange, provided with concealed fastenings.
  - 3. Basis of Design: See Toilet Accessory Legend in drawings.
- B. CH-2: For housekeeping areas only.
  - 1. Hook strip; all stainless steel. 3 formed 12 gage hooks 2.65 mm ((0.1046-inch) thick on 4" x 24" 18 gage channel-shaped back plate 1.2 mm (0.047-inch) thick with 3/8" deep flanges.
  - 2. Basis of Design: #B-232 x 24 by Bobrick.

#### 2.12 MOP RACKS WITH UTILITY SHELF

- A. See "VA-Furnished, Contractor-Installed" under DESCRIPTION in Part 1 above.

#### 2.13 SEAT COVER DISPENSER (SCD-1)

- 1. Fed. Spec WW-P-541/8B, Type I, Class 2-Seat, Style S, Seat Cover Dispenser.
- 2. Type 304, stainless steel, satin finish, all welded construction with beveled opening.
- 3. Dispense half-fold or single fold seat covers.
- 4. Capacity/Size: 500 toilet seat covers. 17-1/4" w x 12-3/4" H x 2-3/8" deep,
- 5. Recess mounted.
- 6. Stainless steel construction.
  - a. 0.76 mm (0.029-inch) thick cabinet
  - b. 1.5 mm (0.059-inch) full face door with continuous stainless steel piano hinge and tumbler lock.
- 7. Basis of Design: #9477 by ASI

## 2.14 NAPKIN &amp; TAMPON DISPENSER (SND-1)

- A. Recessed sanitary napkin/tampon dispenser shall combine two mechanisms into one unit. Dispenser unit shall be factory set at factory to 50 cent operation, but shall be convertible in the field free or one 25 cents, 304 stainless steel with changeable text on door to show cost.
- B. Material, all welded construction; exposed faces shall be satin finish.
1. Door: 16 gage (0.062") with 90 degree returns of nominal 1 inch. Door secured to cabinet with stainless steel piano hinge and two tumbler locks keyed like other toilet accessories.
  2. Cabinet: 20 gage (0.037") with 1" perimeter flange to lay flat against wall.
  3. Pull knobs shall be operable with one hand and less than 5 pounds of force.
  4. Coin Box shall be keyed differently than door tumbler locks.
  5. Capacity: 30 napkins and 27 tampons.
  6. Nominal Size: 27-1/4 inches high x 17-1/4 inches wide x nominal 7 inches deep and can be recessed into a 6-1/4 inches deep wall cavity. If wall cavity depth is less than 6-1/4 inches, provide surface mounted unit.
  7. Basis of Design: No. 9468 by ASI.
- C. SANITARY NAPKIN DISPOSAL (SN-1)
1. Surface-mounted wall unit; 1 gallon (3.8 L) capacity.
  2. Metal Material: Type 304, 0.8mm (22-gage), stainless steel, satin finish.
  3. Nominal Size: 10" high x 7-1/4 inches wide x 3-1/2 inches deep.
  4. Metal Cabinet: Formed seamless construction with bowed front face and gently radiused front vertical edges. Hemmed top edge.
  5. Top Door: Door secured to cabinet with stainless steel piano.
  6. Metal Disposal Panel: Hinged panel in door with concealed spring-loaded, full length piano hinge. Door shall have bottom edge hemmed.
  7. Attachment: Pan head screws at two keyhole slots in cabinet.
  8. Wax Paper Linger Bags: By owner.
  9. Basis of Design: No. 20852 by ASI.
- D. WALL MOUNTED SHOWER SEAT
1. Stainless steel frame, "L"-shaped slotted seat of "white" colored phenolic. 33 inches wide, projects nominal 23 inches from wall. Left and right handed units as suitable for application. Wall blocking provided under Section 09 22 16.
    - a. Color as selected by Architect from manufacturer's full range of colors.
    - b. Rated Load Limit: Not less than 350 lbs.
    - c. Place notification "Maximum Load Limit 300 lbs." on top and bottom of seat in 3/4 inch high letters.
- E. INFANT CHANGING STATION (BCS-HORIZ-1)
1. Horizontal, stainless steel unit, all welded construction. Wall mounted, fold down unit; stainless steel shell; disposable cotton liners with dispenser; nominal 37" long x 25" high x 4" deep, projects nominal 18" in open position. Capable of supporting 400 pounds in open position.
  2. Minimum Metal Thickness: 16 ga (1.6 mm). door; 18 ga. (1.3 mm) flange and cabinet.
  3. Hardware: Recessed pull handle and concealed damped gas spring assist closer.
  4. Bed Liner: High impact plastic shaped to cradle baby's body with smooth finish for easy cleaning.
  5. Accessories: Two bag hooks, folded paper towel dispenser, child protection safety strap with cam buckle adjustment.
  6. Basis of Design: #9013 by ASI.

## 2.15 NON-SCHEDULED ACCESSORIES

- A. Provide the items listed below.
- B. Coat Hooks: In addition to "hooks" scheduled in the Toilet Accessory Groups on Drawings, provide CH-1 coat hooks on back side of doors at the following locations:
  - 1. All offices.
  - 2. All toilet /dressing rooms

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Before starting work notify Resident Engineer in writing of any conflicts detrimental to installation or operation of units.
- B. Verify with the Resident Engineer the exact location of accessories.

### 3.2 INSTALLATION

- A. Set work accurately, in alignment and where shown. Items shall be plumb, level, free of rack and twist, and set parallel or perpendicular as required to line and plane of surface.
- B. Toggle bolt to steel anchorage plates in frame partitions or hollow masonry. Expansion bolt to concrete or solid masonry.
- C. Install accessories in accordance with the manufacturer's printed instructions and ASTM F446.
- D. Install accessories plumb and level and securely anchor to substrate.
- E. Install accessories in a manner that will permit the accessory to function as designed and allow for servicing as required without hampering or hindering the performance of other devices.
- F. Position and install dispensers, and other devices in countertops, clear of drawers, permitting ample clearance below countertop between devices, and ready access for maintenance as needed.
- G. Align mirrors, dispensers and other accessories even and level, when installed in battery.
- H. Install accessories to prevent striking by other moving, items or interference with accessibility.

### 3.3 SCHEDULE OF ACCESSORIES

- A. See Toilet Accessory Legend in Drawings.

### 3.4 CLEANING

- A. After installation, clean as recommended by the manufacturer and protect from damage until completion of the project.

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**SECTION 10 44 13**  
**FIRE EXTINGUISHER CABINETS****PART 1 - GENERAL****1.1 DESCRIPTION**

- A. This section covers recessed fire extinguisher cabinets and fire extinguisher brackets.
  - 1. Typical units: Prime painted.
- B. Fire extinguishers provided by Owner. 10 lb. size unless otherwise noted. Dry chemical type, typical; CO<sup>2</sup> type where noted on drawings.

**1.2 RELATED WORK**

- A. Rough Blocking: Section 06 10 00, Rough Carpentry and Section 09 22 16, Non-Structural Metal Framing.
- B. Color texture and finish: Section 09 06 00, Schedule for Finishes
- C. Field Painting: Section 09 91 00, PAINTING.
- D. Fire Hose Cabinets & Sprinkler Valve Cabinets: Division 21; Fire Protection System

**1.3 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Manufacturer's Literature and Data: Fire extinguisher cabinet indicating fire-rated cabinets where applicable, materials, finishes, installation instruction and rough opening required.
  - 1. Show mounting methods, relationships of box and trim to surrounding construction, door hardware, cabinet type, trim style, and panel style.
- C. Samples: Submit one sample fire extinguisher cabinet for each type or finish, showing specified fixtures and finish

**1.4 QUALITY ASSURANCE**

- A. Equipment and installation to conform to applicable codes and regulations in effect at project location.
- B. Fire-Rated Cabinets: Listed and labeled to comply with requirements in ASTM E 814 for fire-resistance rating of walls where they are installed.

**1.5 COORDINATION**

- A. Coordinate size of fire protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.
- B. Coordinate sizes and locations of fire protection cabinets with wall depths.

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1.4 APPLICATION PUBLICATIONS (Latest edition unless otherwise noted.)

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- B. American Society of Testing and Materials (ASTM): (Latest edition).
  - 1. A1008 Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable.
  - 2. D4802 Poly (Methyl Methacrylate) Acrylic Plastic Sheet

## PART 2 - PRODUCTS 2.1 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B.
- B. Transparent Acrylic Sheet: ASTM D 4802, Category A-1 (cell-cast sheet),

## 2.2 FIRE EXTINGUISHER CABINET

- A. Recessed type, flat trim, of size and design indicated and suitable for fire extinguisher.
- B. Where partition thickness is not sufficient to accommodate a fully recessed unit, provide semi-recessed unit only if acceptable to Resident Engineer.
- C. Coordinate size(s) of fire extinguishers provided by Owner with capacity of cabinets to assure fit. Verify before placing order.
- D. Fire-Rated Tubs: Not required.
- E. Accessories:
  - 1. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as directed by Architect.
  - 2. Identify fire extinguisher in fire protection cabinet with the words "FIRE EXTINGUISHER."
    - a. Location: Applied to cabinet glazing.
    - b. Application Process: Decals.
    - c. Lettering Color: Red.
    - d. Orientation: Vertical.

## 2.2 FABRICATION

- A. Body of Cabinet: Form from sheet steel, construction as follows:
  - 1. Non-Rated Cabinets: 0.9 mm (0.0359 inch) thick.
- B. Door and Trim: Fabricate from 1.2 mm (0.0478 inch) thick sheet steel with all face joints fully welded and ground smooth.
  - 1. Glaze doors with 6 mm (1/4 inch) thick ASTM D4802, clear acrylic sheet, Category B-1, Finish 1.
  - 2. Door Style: Vertical duo.
  - 3. Design doors to open 180 degrees.

4. Provide continuous hinge, pull handle, and adjustable roller catch.

## 2.3 FINISH

- A. Finish interior of cabinet body with baked-on semigloss white enamel.
- B. Finish door, frame with manufacturer's standard baked-on prime coat suitable for field painting

## 2.4 FIRE EXTINGUISHER BRACKETS

- A. Products suitable for extinguisher size and type. For mounting extinguisher in service areas or mechanical rooms.

## PART 3 - EXECUTION

- A. Install fire extinguisher cabinets in prepared openings and secure in accordance with manufacturer's instructions.
- B. Install cabinet as height(s) shown on drawings.
- c. Install fire extinguisher brackets on vertical surfaces where indicated on drawings.

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SECTION 10 51 13  
METAL LOCKERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Standard metal lockers.
2. Locker Type designations on the Drawings include:
  - a. Locker Type 2A. Includes bench by Division 6. Refer to Drawing AOI532.
  - b. Locker Type 2A.1 Same as Type 2A except no bench.

1.2 RELATED WORK

- A. Locker base and bench: Section 06 40 00, ARCHITECTURAL WOODWORK.
- B. Painted walls: Section 09 91 00, PAINTING

1.3 REFERENCES

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only. Comply with latest editions unless otherwise indicated.

1. ASTM International (ASTM):
  - a. A 1008/A 1008M, Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardened.
  - b. A 568/A 568M, Steel, Sheet, Carbon, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, General Requirements for.
  - c. A 653/A 653M, Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  - d. A 924/A 924M, General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
  - e. B 456, Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium.
  - f. D 2092, Preparation of Zinc-Coated (Galvanized) Steel Surfaces for Painting.
2. U.S. Department of Defense (DOD):
  - a. MIL-PRF-22750 (Rev F), Coating, Epoxy, High Solids.
  - b. MIL-PRF-23377 (Rev J; Am 1; Am 2), Primer Coatings: Epoxy, High Solids.
3. U.S. General Services Administration (GSA):

- 
- a. FS AA-L-00486 (Rev J), Lockers, Clothing, Steel.

#### 1.4 SUBMITTALS

- A. Submit in accordance with Section 01 33 23.
- B. Product Data: For each type of product indicated.
- C. Shop Drawings: For metal lockers. Include plans, elevations, sections, details, and attachments to other work.
- D. Samples: For units with factory-applied color finishes.
- E. Maintenance data.
- F. Warranty: Sample of special warranty.

#### 1.5 QUALITY ASSURANCE

- A. Regulatory Requirements: Where lockers are indicated to comply with accessibility requirements, comply with the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA) and Architectural Barriers Act (ABA) Accessibility Guidelines for Buildings and Facilities" and ICC/ANSI A117.1.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver master and control keys or combination control charts to Owner by registered mail or overnight package service.

#### 1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install wood lockers until spaces are enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and humidity conditions at occupancy levels during the remainder of the construction period.

#### 1.8 COORDINATION

- A. Coordinate sizes and locations for Locker Bench.
  - 1. Requirements are specified in Division 06 Section "Architectural Woodwork" for Locker Bench

#### 1.9 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal lockers that fail in materials or workmanship, excluding finish, within specified warranty period.

1. Warranty Period for Knocked-Down Metal Lockers: Two years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, manufacturers offering metal locker products include, but are not limited to, the following:
  1. ASI Storage Solutions Inc.
  2. General Storage Systems Ltd.
  3. Hadrian Manufacturing Inc.
  4. Lyon Workspace Products, LLC.
  5. Penco Products, Inc.
  6. Republic Storage Systems Company.

### 2.2 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B, suitable for exposed applications.
- B. Fasteners: Zinc- or nickel-plated steel, slotless-type, exposed bolt heads; with self-locking nuts or lock washers for nuts on moving parts.
- C. Anchors: Material, type, and size required for secure anchorage to each substrate.
  1. Provide nonferrous-metal or hot-dip galvanized anchors and inserts on inside face of exterior walls, and elsewhere as indicated, for corrosion resistance.
  2. Provide toothed-steel or lead expansion sleeves for drilled-in-place anchors.

### 2.3 STANDARD METAL LOCKERS

- A. General: Comply with FS AA-L-00486.
- B. Locker Types (arrangements) as designated on the Drawings:
  1. Type 2A: Double Tier; overall 12"W x 15"D x 60"H; each compartment 12"W x 15"D x 30"H.
- C. Material: Cold-rolled steel sheet; comply with one of the following:
  1. ASTM A 1008/A 1008M or ASTM A 568/A 568M, commercial quality, minimized spangle material. Prepare material surfaces for baked enamel finishing in accordance with FS AA-L-00486.
  2. ASTM A 653/A 653M and ASTM A 924/A 924M, commercial quality, minimized spangle, galvanized steel sheet with not less than Z275 G60 zinc coating. Prepare surface of sheet for painting in accordance with ASTM D 2092, Method A.

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- D. Body and Shelves: Assembled by riveting or bolting body components together. Fabricate from unperforated steel sheet of the following nominal thicknesses:
1. Body: 0.024 inch.
- E. Frames: Channel formed; fabricated from 0.060-inch nominal-thickness steel sheet; lapped and factory welded at corners; with top and bottom main frames factory welded into vertical main frames. Form continuous, integral door strike full height on vertical main frames.
- F. Doors: One piece; fabricated from 0.060-inch nominal-thickness steel sheet; formed into channel shape with double bend at vertical edges and with right-angle single bend at horizontal edges.
1. Doors less than 12 inches wide may be fabricated from 0.048-inch nominal-thickness steel sheet.
  2. Reinforcement: Manufacturer's standard reinforcing angles, channels, or stiffeners for doors more than 15 inches wide; welded to inner face of doors.
  3. Stiffeners: Manufacturer's standard full-height stiffener fabricated from 0.048-inch nominal-thickness steel sheet; welded to inner face of doors.
  4. Sound-Dampening Panels: Manufacturer's standard, designed to stiffen doors and reduce sound levels when doors are closed, of die-formed metal with full perimeter flange and sound-dampening material; welded to inner face of doors.
  5. Door Style: Concealed vents.
- G. Hinges: Welded to door and attached to door frame with no fewer than two factory-installed rivets per hinge, completely concealed and tamper resistant when door is closed; fabricated to swing 180 degrees.
1. Knuckle Hinges: Steel, full loop, five or seven knuckles, tight pin; minimum 2 inches high, or full height piano hinge if manufacturer's standard, by 0.078 inch thick steel sheet minimum. Provide no fewer than three hinges for each door more than 42 inches high.
- H. Recessed Door Handle, Latch, and Latch Strikes: Stainless-steel cup with integral door pull, recessed so locking device does not protrude beyond face of door; pry and vandal resistant.
1. Multipoint Latching: Finger-lift latch control designed for use with built-in combination locks, built-in key locks, or padlocks; positive automatic latching and prelocking.
    - a. Latch Hooks: Equip doors 48 inches and higher with three latch hooks and doors less than 48 inches high with two latch hooks; fabricated from 0.105-inch nominal-thickness steel sheet; welded or riveted to full-height door strikes; with resilient silencer on each latch hook.
    - b. Latching Mechanism: Manufacturer's standard, rattle-free latching mechanism and moving components isolated with vinyl or nylon to prevent metal-to-metal contact, and incorporating a prelocking device that allows locker door to be locked while door is open and then closed without unlocking or damaging lock or latching mechanism.
    - c. Latch Strikes: 0.0787 inch thick steel sheet minimum except may be continuous from top to bottom and fabricated as part of door framing
- I. Combination Padlocks: Key-controlled, three-number dialing combination locks; capable of five combination changes.
- J. Equipment: Equip each metal locker with identification plate and the following unless otherwise

indicated:

1. Double-Tier Units: One double-prong ceiling hook and two single-prong wall hooks.

K. Accessories:

1. Continuous Sloping Tops: Fabricated from manufacturer's standard thickness, but not less than 0.036 0.047 inch nominal-thickness steel sheet.
2. Recess Trim: Fabricated from 0.048-inch nominal-thickness steel sheet.
3. Filler Panels: Fabricated from manufacturer's standard thickness, but not less than 0.036-inch nominal-thickness steel sheet.
4. Finished End Panels: Fabricated from 0.024-inch nominal-thickness steel sheet.

L. Finish: Baked enamel or powder coat complying with FS AA-L-00486 and the following:

1. Primer: MIL-PRF-23377.
2. Topcoat: MIL-PRF-22750.
3. Color(s):
  - a. Interior: Off white, buff or tan, manufacturer's standard.
  - b. Exterior: Custom color(s) to match adjacent painted wall color(s). Frame, body, and fillers same color.

## 2.4 FABRICATION

- A. Fabricate metal lockers square, rigid, and without warp and with metal faces flat and free of dents or distortion. Make exposed metal edges safe to touch and free of sharp edges and burrs.
1. Form body panels, doors, shelves, and accessories from one-piece steel sheet unless otherwise indicated.
  2. Provide fasteners, filler plates, supports, clips, and closures as required for complete installation.
- B. Fabricate each metal locker with an individual door and frame; individual top, bottom, and back; and common intermediate uprights separating compartments. Factory weld frame members of each metal locker together to form a rigid, one-piece assembly.
- C. Knocked-Down Construction: Fabricate metal lockers using nuts, bolts, screws, or rivets for nominal assembly at Project site.
- D. Accessible Lockers: Fabricate as follows:
- E. Hooks: Manufacturer's standard ball-pointed type, aluminum or steel; zinc plated.
- F. Identification Plates: Manufacturer's standard, etched, embossed, or stamped aluminum plates, with numbers and letters at least 3/8 inch high.
- G. Recess Trim: Fabricated with minimum 2-1/2-inch face width and in lengths as long as practical; finished to match lockers.
- H. Finished End Panels: Designed for concealing unused penetrations and fasteners, except for perimeter fasteners, at exposed ends of non-recessed metal lockers; finished to match lockers.



1. Provide one-piece panels for double-row (back-to-back) locker ends.

## 2.5 STEEL SHEET FINISHES

- A. Powder-Coat Finish: Immediately after cleaning and pretreating, electrostatically apply baked-polymer, thermosetting powder finish. Comply with resin manufacturer's written instructions for application, baking, and minimum dry film thickness.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. General: Install level, plumb, and true; shim as required, using concealed shims.
  1. Anchor locker runs at ends and at intervals recommended by manufacturer, but not more than 36 inches o.c. Using concealed fasteners, install anchors through backup reinforcing plates, channels, or blocking as required to prevent metal distortion.
  2. Anchor single rows of metal lockers to walls near top and bottom of lockers.
  3. Anchor back-to-back metal lockers to floor.
- B. Knocked-Down Metal Lockers: Assemble with standard fasteners, with no exposed fasteners on door faces or face frames.
- C. All-Welded Metal Lockers: Connect groups together with standard fasteners, with no exposed fasteners on face frames.
- D. Equipment and Accessories: Fit exposed connections of trim, fillers, and closures accurately together to form tight, hairline joints, with concealed fasteners and splice plates.
  1. Attach hooks with at least two fasteners.
  2. Attach door locks on doors using security-type fasteners.
  3. Identification Plates: Identify metal lockers with identification indicated on Drawings.
    - a. Attach plates to each locker door, near top, centered, with at least two aluminum rivets.
  4. Attach recess trim to recessed metal lockers with concealed clips.
  5. Attach filler panels with concealed fasteners. Locate filler panels where indicated on Drawings.
  6. Attach boxed end panels with concealed fasteners to conceal exposed ends of non-recessed metal lockers.
  7. Attach finished end panels with fasteners only at perimeter to conceal exposed ends of non-recessed metal lockers.

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**SECTION 10 56 27**  
**WIRE STORAGE LOCKERS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section Includes: Wire mesh lockers for bulk storage with doors, including all accessories required for complete installation where shown.

**1.2 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Shop Drawings: Show layout size and location of framing members, doors, method of attachments and manufacturer's specifications including finish and hardware.

**PART 2 - PRODUCTS****2.1 MANUFACTURERS**

- A. Subject to compliance with requirements, manufacturers of products that may be incorporated into the Work include, but are not limited to, the following:
1. Basis of Design: Stor-More® Bulk Storage Lockers by Folding Guard Corp., [www.foldingguard.com](http://www.foldingguard.com).
  2. Acorn Wire and Iron Works.
  3. Kentucky Metal Products Company.
  4. Miller Wire Works.
  5. Wire and Iron Products, Inc.

**2.2 MATERIALS**

- A. Panels: 8 gage (0.164-inch) galvanized welded wire mesh with 1-1/2" x 3" openings.
- B. Frame: 14 gage (0.074 inch) galvanized shapes.
1. Front Frame and Rear Vertical Members: 1-1/2" x 1-1/2" 90° angles.
  2. Header Bar: 3-1/2" x 1" channel.
- C. Doors:
1. Same as "Panels" above.
  2. Hardware: Full height hinged anti-pry locking bar and padlock hasp.
    - a. Single Tier Door: Three 2" x 2" steel pin butt hinges.
    - b. Double Tier Door: Two 2" x 2" steel pin butt hinges each door.
  3. Padlocks: By owner.
- D. Options: Provide the following:
1. Tops: Same as "Panels" above.

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2. Floors: 22 gage (0.029") galvanized sheet with rolled edges not less than 1-1/2 inches high and bolted to vertical corner posts. Provide on single and double tier lockers.
    - a. Reinforcement: Provide minimum 1-1/2" deep reinforcing channels at 12-inch centers.
  3. Cage Backs: Same as "Panels" above.
- E. Miscellaneous: Bolts and accessories as required.
- F. Finish: Galvanized.

### 2.3 SIZES AND QUANTITIES

- A. Single Tier Lockers: 48" W x 48" D x 90" H.
1. Three (3) required.
- B. Double Tier Lockers: 48" W x 48" D x 90" H. Each cage 45" high.
1. 1. Eight (8) required

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install lockers true, plumb and level, all in accordance with manufacturers recommendations.
- B. Provide additional bracing as required by height or length of unsupported lockers to assure stability and limit deflection to manufacturers standards.

## END OF SECTION

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SECTION 10 99 90  
MISCELLANEOUS SPECIALTIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Specialty items as shown on the drawings and as specified hereinafter including all accessories required for complete installation. Contractor to provide installation of all items.
- B. Prohibited Methods: See Section 01 73 00 - Execution.

1.2 SUBMITTALS

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES.
- B. Product Data: Submit manufacturer's catalog cuts and other information showing sizes, materials, finishes, anchorages, and fastenings to adjacent materials and construction.

1.3 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver, store, and handle equipment to prevent damage and disfigurement.
- B. Protect all surfaces from damage during transit and installation.

PART 2 - PRODUCTS

2.1 STEPLADDER HANGER

- A. Wall mounted device fabricated from heavy gage steel wire with industrial coating. Device engages top step of ladder for vertical hanging. Rated for not less than 75 lbs.
- B. Location: Where indicated on drawings
- C. Installation: Attach to wall with two fasteners as recommended by manufacturer.
- D. Subject to compliance with the requirements, manufacturers offering stepladder hanger products include, but are not necessarily limited to the following:
  - 1. Basis of Design: Werner # AC11.

END OF SECTION