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SECTION 12 31 00
MANUFACTURED METAL CASEWORK

PART 1 - GENERAL

1.1 DESCRIPTION:

- A. This section specifies metal casework, VA standard cabinets and related accessories, including base cabinets, wall cabinets, and full height cabinets.

1.2 RELATED WORK

- A. Color of casework finish: Section 09 06 00, SCHEDULE OF FINISHES

1.3 QUALITY ASSURANCE:

- A. Approval by Contracting Officer Representative (COR) is required of manufacturer and installer based upon certification of qualifications specified.
- B. Manufacturer's Qualifications:
1. Manufacturer is regularly engaged in design and manufacture of metal of scope and type similar to requirements of this project for a period of not less than five (5) years.
 2. Manufacturer has successfully completed at least three (3) projects of scope and type similar to requirements of this project.
 3. Submit manufacturer's qualifications and list of projects.
- C. Installer Qualifications:
1. Installer has completed at least three (3) projects in ~~least~~ ^{last three (3)} ~~five (5)~~ years in which these products were installed.
 2. Submit installer qualifications.

1.4 SUBMITTALS:

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Certificates:
1. Manufacturer's Certificate of qualifications specified.
 2. Certificate of installer's qualifications specified.

C. Manufacturer's Literature and Data:

1. Brochures showing name and address of manufacturer, and catalog or model number of each item incorporated into the work.
2. Manufacturer's illustration and detailed description.
3. List of deviations from contract specifications.
4. Locks, each kind.

D. Shop Drawings (1/2 Full Scale):

1. Showing details of casework construction, including kinds of materials and finish, hardware, accessories and relation to finish of adjacent construction, including specially fabricated items or components.
2. Fastenings and method of installation.
3. Location of service connections and access.

E. Samples:

1. Metal plate, 6 inch square, showing chemical resistant finish, in each color.

F. Manufacturer's warranty.

1.5 WARRANTY:

- A. Construction Warranty: Comply with FAR clause 52.246-21 "Warranty of Construction".
- B. Manufacturer Warranty: Manufacturer shall warranty their wood casework for a minimum of five (5) years from date of installation and final acceptance by the Government. Submit manufacturer warranty.

1.6 APPLICABLE PUBLICATIONS:

- A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in the text by basic designation only.
- B. American Society for Testing and Materials (ASTM):
A36/A36M-14.....Carbon Structural Steel
A240/A240M-14.....Chromium and Chromium-Nickel Stainless Steel
Plate, Sheet, and Strip for Pressure Vessels
and for General Applications

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- A283/A283M-13.....Low and Intermediate Tensile Strength Carbon
Steel Plates
- A568/A568M-14.....Steel, Sheet, Carbon and High-Strength, Low-
Alloy Hot-Rolled and Cold-Rolled, General
Requirements
- A794/A794M-12.....Standard Specification for Commercial Steel
(CS), Sheet, Carbon (0.16% Maximum to 0.25%
Maximum) Cold Rolled
- B456-11.....Electrodeposited Coatings of Copper Plus Nickel
Plus Chromium and Nickel Plus Chromium C1036-
11(R2012).....Flat Glass
- C1036-12e1.....Heat-Strengthened and Fully Tempered Flat Glass
- C1172-14.....Laminated Architectural Flat Glass
- C. American National Standard Institute:
Z97.1-09(R2010).....Safety Glazing Material used In Buildings
- D. Builders Hardware Manufacturers Association (BHMA):
A156.1-13.....Butts and Hinges
A156.9-10.....Cabinet Hardware
A156.5-14.....Auxiliary Locks and Associated Products
A156.11-14.....Cabinet Locks
A156.16-13.....Auxiliary Hardware
- E. American Welding Society (AWS):
D1.1/D1.1M-10.....Structural Welding Code Steel D1.3/D1.3M-
05(R2008)....Structural Welding Code Sheet Steel
- F. National Association of Architectural Metal Manufacturers (NAAMM):
AMP 500 Series.....Metal Finishes Manual
- G. U.S. Department of Commerce, Product Standard (PS):
PS 1-09.....Construction and Industrial Plywood
- H. Underwriters Laboratories Inc. (UL):
325-06(R2013).....Door, Drapery, Gate, Louver, and Window
Operators and Systems 437-
08(R2013).....Key Locks

I. Federal Specifications (Fed. Spec.):

A-A-55615.....Shield, Expansion; Nail Expansion (Wood Screw
and Lag Bolt Self-Threading Anchors)

J. Scientific Equipment and Furniture Association (SEFA):

2.3-10.....Installation of Scientific Laboratory Furniture
and Equipment

PART 2 - PRODUCTS

2.1 MATERIALS:

A. Sheet Steel:

1. ASTM A794/A794M, cold rolled, Class 1 finish, stretcher leveled.
2. Other types of cold rolled steel meeting requirements of
ASTM A568/A568M are acceptable for concealed parts.

B. Structural Steel: ASTM A283/A283M or ASTM A36/A36M.

C. Fasteners:

1. Exposed to View: Chrome plated steel or stainless steel, or finished
to match adjacent surface.
2. Provide round head or countersunk fasteners where exposed in
cabinets.
3. Expansion Bolts: Fed Spec. A-A-55615. Do not provide lead or plastic
shields.
4. Nuts: Fed Spec FF-N-836. Type III, Style 15 where exposed.
5. Sex Bolts: Capable of supporting twice the load.

2.2 MANUFACTURED PRODUCTS:

- A. When two (2) or more units are required, use products of one (1)
manufacturer.
- B. Manufacturer of casework assemblies is to assume complete
responsibility for the final assembled unit.
- C. Provide products of a single manufacturer for parts which are alike.

2.3 CASEWORK FABRICATION:

A. General:

1. Welding: Comply with AWS Standards D1.1/D1.1M and D1.3/D1.3M.

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2. Reinforce with angles, channels, and gussets to support intended loads, notch tightly, fit and weld joints.
3. Constructed of sheet steel, except where reinforcing required.

B. Minimum Steel Thickness:

0.035 inch (20 gage)	Drawer fronts, backs, bodies, closure plates or scribe and filler strips less than 3 inches wide, sloping top, shelf reinforcement channel and shelves. Toe space or casework soffits and ceilings under sloping tops.
0.047 inch (18 gage)	Base pedestals, casework top sides, back, and bottom panels, closure scribe and filler strips 3 inches or more. Reinforcement for drawers with locks. Tables legs, spreaders and stretchers, when fabricated of cold rolled tubing. Metal for desks; except legs and aprons. Door exterior and interior panels, flush or glazed. Cross rails of base units. Front bottom rails, back bottom rails; rails may be 0.059 inch (16 gage) thick. Uprights or posts. Top corner gussets.
0.059 inch (16 gage)	Aprons, apron division, reinforcing gussets, table legs, desk legs and aprons, spreaders and stretchers when formed without welding. Toe base gussets, drawer slides, and other metal work. Front top rails and back rails except top back rails may be 0.047 inch (18 gage) thick.
0.074 inch (14 gage)	Drawer runners door tracks.
0.104 inch (12 gage)	Base unit bottom corner gussets and leg sockets.
0.12 inch (11 gage)	Reinforcement for hinge reinforcement inside doors and cabinets.

C. Casework Construction:

1. Welded assembly.
2. Fabricate with enclosed uprights or posts full height or width at front. Include sides, backs, bottoms, soffits, ceilings under sloping tops, headers and rail, assembled to form an integral unit.

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3. Form sides to make rabbeted stile, 3/4 to 1-1/8 inch wide, closed by channel containing shelf adjustment slots.
4. Make bottom of walls units flush, double panel construction.
5. Make top and cross rails of "U" shaped channel.
6. Provide enclosed backs and bottoms in cabinets, including drawer units.
7. Provide finish panel on exposed cabinet backs.
8. Do not install screws and bolts in construction or assembly of casework, except to secure hardware, applied door stops, accessories, removable panels, and where casework is required to be fastened, end to end or back to back.
9. Fabricate casework, except benches, and desks with finished end panels.
10. Close flush exposed soffits of wall hung shelving, knee spaces in counters, and toe spaces at bases.
11. In base units with sinks provide one (1) piece, lowered backs.
12. In base units with doors provide removable backs.
13. Provide reinforcing for hardware.
14. Size Dimensions:
 - a. Use dimensions shown on construction documents or within tolerances specified.
 - b. Tolerance

	Depth	Nominal Dim inch	Plus Tolerance inch	Minus Tolerance inch
	Depth	12	25	0
	Width	- -	0	25
Wall Hung Cabinet	Height	- -	25	25
Counter	Height	- -	25	25

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Mounted Cabinet				
Floor Standing Cabinet	Height	- -	25	0

1) Full height cabinets shown on construction documents are to be the same height back to back.

2) Manufacturer's Tolerance for the same Length, Depth or Height of Cabinet: Not to exceed 0.0625 inches.

D. Base Pedestals:

1. Provide adjustable leveling bolts accessible through stainless steel plugs, or notch in the base concealed when resilient base is applied.
2. Except where flush metal base is shown on construction documents, provide toe space at front recessed 3 inches.

E. Doors:

1. Hollow metal type, flush and glazed doors not less than 5/8 inch thick.
2. Fabricate flush metal doors of two (2) panels formed into pans with corners welded and ground smooth. Provide flush doors with a sound deadening core.
3. Fabricate glazed metal doors with reinforced frame and construct either from one (1) piece of steel, or have separate stiles and rails mitered and welded at corners, and welds ground smooth.
 - a. Secure removable glazing members with screws to back of doors.
 - b. Install glass in rubber or plastic glazing channels.
4. Provide sheet steel hinge reinforcement inside doors.
5. Sliding doors: Provide stops to prevent bypass.
6. Doors removable without use of tools except where equipped with locks.

F. Drawers:

1. Drawer fronts to be flush hollow metal type not less than 5/8 inch thick with sound deadening core. Fabricate of two (2) panels formed into pans. Weld and grind smooth corners of drawer fronts.
2. Form bodies from one (1) piece of steel, weld to drawer front.
3. Provide reinforcement for locks and provide rubber bumpers at both sides of drawer head to cushion closing.
4. Equip with roller suspension guides.

2.4 ACCESSORIES (NOT USED)

2.5 HARDWARE:

- A. Factory installed.
- B. Exposed hardware, except as specified otherwise, satin finished chromium plated brass or nickel plated brass or anodized aluminum.
- C. Cabinet Hardware: ANSI BHMA A156.9.
 1. Door/Drawer Pulls: B02011.
 - a. One (1) for drawers up to 23 inches wide.
 - b. Two (2) for drawers over 23 inches wide.
 - c. Provide drawer and door pulls of a design that can be operated with a force of 5 pounds or less, with one (1) hand and not require tight grasping, pinching or twisting of the wrist.
 2. Drawer Slides:
 - a. Provide B05051 for drawers over 6 inches deep.
 - b. Provide B05052 for drawers 3 to 6 inches deep.
 - c. Provide B05053 for drawers less than 3 inches deep.
 3. Butt Hinges:
 - a. B01351, minimum 0.072 inch thick chrome plated steel leaves.
 - b. Minimum 0.139 inch diameter stainless steel pins.
 - c. Full mortise type, five (5) knuckle design with 2 1/2 inch high leaves and hospital type tips.
 - d. Two (2) hinges per door except use three (3) hinges on doors 48 inches and more in height. Use stainless steel leaves for tilting bin doors.
 - e. Do not weld hinges to doors or cabinets.

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4. Door silencers: LO3011 or LO3031.
 - a. Install two (2) rubber bumpers each door.
 - b. Silencers set near top and bottom of jamb.

2.6 METAL FINISHES:

- A. Comply with NAAMM AMP 500 series and as specified.
- B. Steel Cabinets including Closures and Filler Strips:
 1. Acid resisting finish except hardware and stainless steel.
 2. After fabrication of cabinet submerge in a degreasing bath, and thoroughly rinse to remove dirt and grease, and other foreign matter.
 3. Apply non-metallic phosphate coating, then finish with baked-on acid resisting enamel not less than 0.001 inch thick.
 4. Finish resistant to action of the following reagents when 10 drops are applied to the surface and left open to the atmosphere for period of one (1) hour.

Hydrochloric Acid 37 percent	Ethyl Alcohol
Phosphoric Acid 75 percent	Methylethyl Keytone
Sulfuric Acid 25 percent	Acetone
Glacial Acetic Acid	Ethyl Acetate
Sodium Hydroxide 10 percent	Ethyl Ether
Sodium Hydroxide (concentrated)	Carbon Tetrachloride
Hydrogen Peroxide 5 percent	Xylene
Formaldehyde 37 percent	Phenol 85 Percent

5. Color of finish is specified in Section 09 06 00, SCHEDULE FOR FINISHES.

2.7 VA standard cabinets (NOT USED)

2.8 PRODUCTS OF OTHER COMPONENTS DIRECTLY RELATED TO CASEWORK (NOT USED)

PART 3 - EXECUTION

3.1 COORDINATION:

- A. Begin only after work of other trades is complete, including wall and floor finish completed, ceilings installed, light fixtures and diffusers installed and connected, and area free of trash and debris.
- B. Verify location and size of mechanical and electrical services as required and perform cutting of components of work installed by other trades.
- C. Verify reinforcement of walls and partitions for support and anchorage of casework.
- D. Coordinate with other Divisions and Sections of the specification for work related to installation of casework systems to avoid interference and completion of service connections.

3.2 INSTALLATION:

- A. Install casework in accordance with manufacturer's written instructions.
 - 1. Install in available space; arranged for safe and convenient operation and maintenance.
 - 2. Align cabinets for flush joints except where shown otherwise on construction documents.
 - 3. Install with bottom of wall cabinets in alignment and tops of base cabinets aligned level, plumb, true, and straight to a tolerance of 1/8 inch in 96 inches.
 - 4. Install corner cabinets with hinges on corner side with filler or spacers sufficient to allow opening of drawers.
- B. Support Rails:
 - 1. Install true to horizontal at heights shown on construction documents; maximum tolerance for uneven floors is plus or minus 1/2 inch.
 - 2. Shim as necessary to accommodate variations in wall surface not exceeding 3/16 inch at fastener.
- C. Wall Strips:

1. Install true to vertical and spaced as shown on construction documents.

2. Align slots to assure that hanging units will be level.

D. Plug Buttons:

1. Install plug buttons in predrilled or prepunched perforations not used.

2. Use chromium plate plug buttons or buttons finish to match adjacent surfaces.

E. Seal junctures of casework systems with mildew-resistant silicone sealants.

3.3. CLOSURES AND FILLER PLATES:

A. Close openings larger than 1/4 inch wide between cabinets and adjacent walls with flat, steel closure strips, scribed to required contours, or machined formed steel fillers with returns, and secured with sheet metal screws to tubular or channel members of units, or bolts where exposed on inside.

B. Secure filler plates to casework top members, unless shown otherwise on construction documents.

C. Secure filler plates more than 6 inches in width top edge to a continuous 1 x 1 inch 1/16 inch thick steel formed steel angle with screws.

D. Finish closure strips and fillers with same finishes as cabinets.

3.4 FASTENINGS AND ANCHORAGE:

A. Do not anchor to wood ground strips.

B. Provide hat shape metal spacers where fasteners span gaps or spaces.

C. Use 1/4 inch diameter toggle or expansion bolts, or other appropriate size and type fastening device for securing casework to walls or floor. Use expansion bolts shields having holding power beyond tensile and shear strength of bolt and breaking strength of bolt head.

D. Use 1/4 inch diameter hex bolts for securing cabinets together.

E. Use 1/4 inch by minimum 1-1/2 inch length lag bolt anchorage to wood blocking for concealed fasteners.

- F. Use not less than No. 12 or 14 wood screws with not less than 1 1/2 inch penetration into wood blocking.
- G. Space fastening devices 12 inches on center with minimum of three (3) fasteners in 3 or 4 foot unit width.
- H. Anchor floor mounted cabinets with a minimum of four (4) bolts through corner gussets. Anchor bolts may be combined with or separate from leveling device.
- I. Secure cabinets in alignment with hex bolts or other internal fastener devices removable from interior of cabinets without special tools. Do not use fastener devices which require removal of tops for access.
- J. Where units abut end to end, anchor together at top and bottom of sides at front and back. Where units are back to back, anchor backs together at corners with hex bolts placed inconspicuously inside casework.
- K. Where type, size, or spacing of fastenings is not shown or specified on construction documents, show on shop drawings proposed fastenings and method of installation.

3.5 ADJUSTMENTS:

- A. Adjust equipment to insure proper alignment and operation.
- B. Replace or repair damaged or improperly operating materials, components or equipment.

3.6 CLEANING:

- A. Immediately following installation, clean each item, removing finger marks, soil and foreign matter resulting from work of this section.
- B. Remove from job site trash, debris and packing materials resulting from work of this section.
- C. Leave installed areas clean of dust and debris resulting from work of this section.

3.7 INSTRUCTIONS:

- A. Provide operational and cleaning manuals and verbal instructions in accordance with Article INSTRUCTIONS, SECTION 01 00 00, GENERAL REQUIREMENTS.

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