

Construction Industry Master Format Polypropylene Casework

Part 1 General

1.1 Description of Work

All polypropylene casework shall be furnished, installed and shall be demonstrated to properly perform in accordance with the function specified herein.

1.2 Products Included

- A. Polypropylene Casework
- B. Polypropylene Acid Storage Cabinets

1.3 Related Sections

- A. Division 6: Wood Backing in Walls for Laboratory Casework and Accessory Anchorage.
- B. Division 9: Metal Backing in Walls for Casework and Accessory Anchorage.
- C. Division 15: Mechanical
- D. Division 16: Electrical

1.4 Delivery, Storage and Handling

- A. Schedule delivery of casework and other equipment so that spaces are sufficiently complete to allow for installation immediately following delivery.
- B. Protect finished surfaces from soiling or damage during handling and installation.
Cover working surfaces with cardboard. Mark in large lettering "NO STANDING". The equipment comes with a protective film that should be left in place while handling.
- C. When ambient temperatures are below -20°F, careful handling is recommended.

1.5 Project Conditions

- A. Do not deliver or install equipment until the following conditions have been met:
 - 1. Windows and doors are installed and the building is secure and weathertight. Space heated to at least 40°F.
 - 2. Ceiling, overhead ductwork, and lighting are installed.
 - 3. All painting is completed and floor finish is installed.
 - 4. Casework and related materials require the interior building temperature not to exceed 90°F to avoid undue structural fatigue and damage.

1.6 Submittals

- A. Product Data: Submit manufacturer's data for each item of casework furnishings and equipment. Include component dimensions, configurations, construction details, joint details and attachments. Indicate location, size and service requirement for each utility connection. See Specification Division 1 for additional general requirements.
- B. Shop Drawings: Provide scalable drawing(s) of each case, illustrating front, side and top views. Drawings shall include all options, special features, component dimensions, construction details and tolerances. Particular attention shall be given to installation interfaces as required by other trades (plumbing fixtures, exhaust connections, electrical requirements, etc.). Drawings shall be available on electronic format for viewing using AUTOCAD, 2000..
- C. Material Samples: Submit 3" x 3" product material samples as required.
- D. Hardware Samples: Provide samples of door and drawer pulls and hinges. May include scaled-down versions of cases to confirm construction requirements.
- F. Submit detailed seismic anchorage and attachment drawings and calculations complying with all Uniform Building Code requirements and regulations for seismic restraint (where applicable).
- G. Certifications: Submit certification stating that items in this section are installed per applicable referenced codes, standards, specifications and are complete and ready for intended function.

1.7 Quality Assurance

- A. Single Source Responsibility: Casework and accessories included in this section shall be manufactured or furnished by the same manufacturer or laboratory furniture supplier for single responsibility.
- B. The supplier for work in this section shall use manufacturers with production facilities including all tools, equipment and special machinery necessary for specializing in the fabrication and installation of the type of casework specified, with skilled personnel, factory trained workmen and an experienced engineering department. Each shall have the demonstrated knowledge, ability and the proven capability to complete an installation of this size and type within the required time limits:
 - 1. Ten years or more experience in the manufacture of polypropylene casework and equipment of type specified.
 - 2. Ten installations of equal or larger size and requirements within the last five years.

1.8 References

- A. Comply with all applicable trade standards, ordinances, building codes and regulations and those standards and references listed (where applicable)
- B. American Society for Testing and Materials (ASTM)
 - 1. D - 4101 Group 1, Class I, Grade II
 - 2. E162 - 76
 - 3. D 570 – Water Absorption of Plastics
 - 4. E 84 – Test method for Surface Burning Characteristics of Building Materials.
 - 5. D 695 – Compressive Properties of Rigid Plastics
 - 6. D 790 – Flexural Properties of Unreinforced/Reinforced Plastics
 - 7. D 638 – Tensile Strength and Elongation of Plastics
- C. National Electrical Manufacturers Association (NEMA)
- D. CPSC Std. 16 CFR 1201 – Safety Glazing Materials in Buildings
- E. American National Standards Institute (ANSI)
 - 1. ANSI/ISO/ASQC Q9001-1994 – Quality Systems

1.9 Materials

- A. Appendix 1: Typical Chemical Resistance Properties for Polypropylene Materials.
- B. Appendix 2: Properties of Polypropylene Standard and Flame Retardant Materials.
- C. Appendix 3: Properties of Polycarbonate (Lexan™) Material
- D. Appendix 4: Properties of DuPont Teflon™ PFA Coatings
- E. Appendix 5: Properties of RIE 1000 Series PTFE Coatings

1.10 Warranty

- A. Provide a written warranty that work shall be free from defects in materials and workmanship for a period of 1 year from the date of acceptance or Substantial Completion whichever is later. Stipulate that defects that develop within the warranty period shall be removed, repaired and replaced at no additional cost to the Owner. Defects include, but are not limited to:
 - 1. Weld or structural failure
 - 2. Shifts or failures of connected components
 - 3. Failure of hardware
 - 4. Warping or deflection of case surfaces

Part 2 - Products

2.1 Polypropylene Casework

- A. Manufacturer:
 - 1. Design of polypropylene casework is based on products manufactured by NuAire, Inc. All casework shall be the product of one manufacturer.

Each casework unit shall have a completely welded shell assembly (case), which shall be rigid and self-supporting for use interchangeability in a group of cases or for single unit use. Each unit shall be complete such that units can be relocated at any time without requiring application of finished ends or other such parts.

2. Products of other polypropylene casework manufacturers may be used as an approved equal provided they meet the product characteristics specified herein. No known equal.
3. For manufacturers and/or suppliers not listed, submittal for approval must be received by the Architect 10 calendar days prior to bid. No exceptions.

B. General Design Requirements:

1. Casework required under this specification will be referenced as:
 - a) Vented Acid Storage Cabinets
 - b) Drawer Units
 - c) Door (sink) Units
 - d) Combination Units
 - e) Wall Units
 - f) Tall Storage Cabinets
 - g) Fume Hood Bases
 - h) Accessories (filler and closure panels, drying racks, sink attachment hardware, shelves, etc.)
2. Casework product configuration
 - a) Provide in sizes and configurations as shown on the drawings. See also NuAire, Inc. Product Brochure

C. Performance Requirements

1. Structural performance requirements. Casework components shall withstand the following minimum loads without damage to the components or to the casework operation:
 - a) Base unit load capacity: 50#/square ft.
 - b) Drawer units: 25#/Drawer; 30-inch maximum width.
 - c) Wall units: 75# Total weight per 24-inch unit.
 - d) Load capacity for shelves of base units, wall units and tall cases, without center support: 25#/shelf.

D. Case Construction:

1. All base, wall, tall and vented storage cases shall be constructed from fully stress relieved, homogeneous color, (standard or flame-retardant) polypropylene sheet material of dimensions specified in the drawings. All casework shall be manufactured to a 1/32-inch dimensional tolerance and shall be square to within 1/16-inch in any dimension. Each case shall be self-supporting and accurately mate with adjoining cases.
2. All top, bottom, sides, vertical posts and front case surfaces shall be constructed from 1/2-inch thick (standard or flame-retardant) polypropylene sheet material. As much as practical, side/back/bottom pieces shall be V-grooved out of a single sheet to form a seamless, fold-up exterior. All other surfaces shall be continuously welded where required using 5/32-inch diameter weld rod material resulting in a totally enclosed case designed to protect the interiors from dust, vermin and spilled liquids.

3. All exterior surfaces shall be flat. There shall be NO exposed exterior welds, when installed. Where welding is done on exterior panels, the protruding weld shall be shaved flush with the surrounding material's surface. Interior welds need not be finished. All exposed ends, fronts and sides of base, wall, tall and vented storage cases, when installed, must have a parent material finish. No exposed butt welds. No exceptions.
4. All base and vented cases shall have 3-inch wide full-length front and rear stretchers at the top welded in place to facilitate counter top and/or fume hood attachment. No exceptions.
5. All base and tall cases, unless otherwise specified, shall have 4-inch high by 3-inch deep toe kick recess. The toe space rail shall extend up and forward to engage the bottom rail to form a smooth, fully enclosed, all welded toe space.
6. The interior right and left sides of all base, tall, wall and vented storage cases shall have pre-drilled and counter-bored holes (to accept polypropylene plugs) in each corner (total of eight) for fastening cases together. The predrilled holes shall be offset from on the right side from the left. Wall cases shall have (in addition), a pre-drilled connection point provided every 12-inches, 2-inches from the inside top starting 2-inches from each side. A 1-1/2-inch stainless steel washer shall be used as a backer when fastening the case to the wall into the backer. Polypropylene caps shall be provided to cover the fastening hardware.
7. For each door opening on all base cases, there shall be a removable access panel on the back of the case for access to utilities. All access panels shall be flush mounting, sized to permit reasonable chase access, be 1/4-inch thick (nominal) and are removable from inside of the case, via #8-32 x 1/2-inch polypropylene flat-head screws.
8. All exposed cut edges and corners must be beveled, cleaned, and deburred for a finished appearance. All cabinets must have rounded corner door & drawer aperture openings.

E. Door Construction:

1. All doors shall be constructed from 1/2-inch thick polypropylene sheet material with all corners square and all edges beveled and deburred. For door inlay construction, all inside edges shall be beveled and deburred. All inlays shall be 1/4-inch thick.
2. Doors shall be kept closed without mechanical devices, such as catches or latches. Doors that rebound upon closing are not acceptable. 1/2-inch diameter magnets with a 2.0 mil PTFE based coating shall be imbedded into doors and cabinet frames. A polypropylene plug shall cover the coated magnet to match the parent material on the inside frame. The magnets shall be aligned opposite each other on the inside top and bottom of each door and the inside top and bottom each the cabinet frame. The magnet on the door is held in place by an adhesive coupled with a tight friction fit. For doors that exceed 30-inches in height, magnets shall be located on 24-inch centers. The magnetic closing mechanism shall require a positive 5-lb pull before opening.

3. All door hinges shall be mounted flush to the inside surface of the door and recessed flush into the front opening edge of the frame such that only the barrel is visible to relieve stress on the screws. All fasteners shall be #8-32 x 3/8-inch polypropylene countersunk screws to attached the hinge to the door and 1/4-inch x 3/4-inch polypropylene countersunk screws to attach the hinge to the frame. For doors higher than 30-inches, hinges shall be installed on 24-inches centers. Welding is not acceptable.
4. Door wire-type pulls shall be molded polypropylene, recessed 1/8-inch into the front and fastened from the inside with two #10-32 x 1-inch countersunk PTFE based coated screws. [Recessed finger handles, where required, shall protrude no more than 1/2-inch from the door front and permit a 3/4-inch deep finger grip. They shall be fastened to the door front using 1/4-inch x 3/4-inch countersunk polypropylene screws.]
5. All doors shall have a 1-inch wide reveal on the hinged side of door, a 1/2-inch wide reveal on the top and bottom, and a 1/2-inch reveal between two opposing closing doors or the case edge for single door cases.
6. Framed transparent doors shall use 3/16-inch tempered glass, acrylic or polycarbonate material, as specified. All such doors shall have a 2-1/2-inch wide exterior border and all inside corners shall have a 1-inch radius. The transparent material shall be recessed into the back of the door and welded in place around its perimeter such that resultant weld bead shall not protrude beyond the parent material.
7. Framed sliding transparent doors shall have a minimum of two 1/8-inch thick by 3/4-inch diameter polypropylene free rolling wheels with nonmetallic bearing pins that are set into machined slots in the bottom of the door frame such that only 1/16-inch of the wheel is exposed. The wheel shall travel within separate machined channels in the bottom and top of the case frame. The top channel shall be 1/2-inch deeper than the bottom channel to permit the door to be raised up and out of the bottom channel for cleaning and maintenance. For doors exceeding 30-inches in height, three wheels shall be provided.
8. Unframed sliding transparent doors shall be 3/16-inch thick tempered glass or polycarbonate with ground and polished edges. Doors shall slide freely in separate machined top and bottom channels of the case frame. The top channel shall be 1/2-inch deeper than the bottom channel to permit the door to be raised up and out of the bottom channel for cleaning and maintenance. 1-inch diameter finger holes shall be provided in lower opposite corners (3-inches in and 3-inches up) of each door.

F. Drawer Construction:

1. Drawers shall be constructed from ½-inch thick polypropylene sheet material with sides, back and bottom V-grooved out of a single sheet to form a seamless, square, fold-up exterior. Prior to folding, an adhesive shall be applied to the V-groove, then folded and finally tack welded to form a seamless and easily cleanable interior. Where the ends of the back meet the top of the sides, the sides shall be mechanically attached via ¼ by 1-inch PVC hex head screws to the back top ends of the drawer. The front of the drawer shall be seam welded from the outside of the drawer proper, forming a strong and rigid structure.
2. All drawer slides shall consist of a full length ½-inch by 1-1/2-inch polypropylene runner, welded to the sides or center support of the case, that engages a 9/16-inch wide by 3/8-inch deep machined slot on each drawer side acting as a guide. The glide slot/runner shall provide smooth and non-binding drawer operation.
3. Molded polypropylene flexible stops shall be provided to prevent the drawer from being inadvertently withdrawn from the drawer slides. The stops shall be securely welded to the lower rear side of the drawer and permit full extension of the drawer. The stops, when squeezed against the sides, shall permit the drawer to be easily removed.
4. Wire-type pulls shall be provided on all drawers. The pulls shall be molded polypropylene, recessed 1/8-inch into the front and fastened from the inside with two #10-32 x 1-inch countersunk polypropylene screws. Two wire pulls shall be furnished on drawers wider than 24-inches.
5. Drawer reveal overlay shall be 1/2-inch on each side and 1/2-inch on the top and bottom. Drawers of exact sizes shall be interchangeable and easily removed without the use of tools.

G. Accessories - Closure Panel and Filler Construction:

1. Closure and filler panels of all types including knee space panels shall be defined in the elevation and plan views for each location. They shall consist of, but not limited to: (1) inside and outside corners between cases, (2) end case enclosure to wall, (3) front plumbing access panels, (4) base filler panels, (5) wall case filler panels, (6) wall case ceiling enclosures, etc.
2. Knee space rear closure panels shall be the full height and width under the countertop. The knee space shall provide an access panel to the chase area. The access panel shall be ¼-inch polypropylene, recessed flush, and fastened with #8-32 x 1/2-inch polypropylene flat head screws. A 3-inch by full width polypropylene strip shall be attached to the countertop at the front of the knee space. Where required, the strip shall be replaced by a "pencil" drawer unit.

3. All closure and filler panels shall be fabricated using a minimum of ½-inch thick polypropylene sheet material. Where required the panels shall have attachment returns with pre-drilled and counter-bored holes for fastening to adjoining cases/walls, etc. Where knee spaces are placed side-by-side and exceed 48-inches in width, a 1-inch thick support panel shall divide the two spaces and be attached to the floor with ½-inch diameter polypropylene pegs imbedded into the floor.
4. Sink attachment hardware shall be provided for all sink units where specified and shall be integral part of the case, not the countertop. Two vertical 2-inch by 4-inch bars shall be welded to the side walls of the case and full width of the case at the top, 4-inches from front and rear walls that accommodate the sink in between. On the bottom of the bars are 1-inch threaded holes on 1-1/2-inch centers to which four 1-inch diameter threaded rods shall be hung. Between each perpendicular set of hanging rods, a horizontal bar shall be fastened by a 1-inch threaded polypropylene bolt. The rod/bar combination shall be positioned such that they shall capture the left and right side of the bottom of the sink.

H. Shelf Construction:

1. Shelves shall be constructed from ½-inch thick polypropylene sheet stock. All shelves shall have a 1-inch downward return on the front and back that shall be formed by a folded, welded V-groove forming a seamless exterior. Where specified the shelf shall be installed with the return “up” and additional returns on the ends to act as a seismic restraining or liquid retaining lip.
2. Shelves shall be supported on both ends by two molded polypropylene pegs on each side wall and in the center for shelves over 30-inches in length with one or more pegs on the back and the front. A series of matching holes on 2-inch centers shall be drilled into the side and back panels for adjusting shelf positions.

I. Vented Storage Construction:

1. The sides, back, top, bottom, front frame and doors of vented storage cases shall be constructed from ½-inch polypropylene. No exceptions. For cases where doors exceed 30-inches in height, hinges and magnetic latches shall be provided on 24-inch centers. Door sills shall be raised 1/2-inch above the bottom of the cabinet to retain spilled liquid within the cabinet.
2. All storage cases shall provide for ventilation of the interior. A 1-1/2-inch NPT threaded (vent) connection shall be welded to the top in each rear corner. Each shelf shall have both a ½-inch space between the front and back walls except where required for support pegs and a 1-inch downward return on all sides for liquid retention. Shelves shall be adjustable on 2-inch centers via molded polypropylene pegs. 6-inches from the bottom of doors, a series of 1-inch diameter holes on 2-inches centers shall permit the flow of air into the case and shall be adjustable by an equivalent offsetting set of holes on the inside of the door. Vent piping and connection to the cabinet is defined in Division 15.

3. Vented base storage cases shall have 1½-inch diameter adjustable levelers that are accessible via a 9/16-inch square-head ratchet, from inside on the cabinet's floor and protected from spills with a ½-inch high rim, covered with a removable cap. A minimum of two (front and rear) levelers shall be provided for each 24-inch section of floor space. The levelers shall thread through a minimum of 1½-inches of material for stability and permit an adjustment of 2-inches.

J. **Hardware:**

1. All hardware shall be non-metallic, highly corrosive resistant and constructed from polypropylene, PVC, PVDF, TFE or as specified. Nylon, Delron or similar materials shall **never** be used. Metallic hardware, where approved, must be coated with a minimum of 2.0 mils of TFE, PTFE or other acceptable corrosive resistant coating and be protected from direct exposure to the ambient via embedment into the polypropylene material.
2. Miscellaneous sinks, drains, tubing, valves, caps, electrical boxes, etc. may be of other acceptable materials where approved by the owner. Polypropylene molded leveling shims shall be provided for final field casework installation.

Part 3 - Execution

3.1 Installation

A. **Casework Installation:**

1. All exterior surface protective masking shall be left in place and removed only when the casework or cabinets are ready for final installation and only on surfaces that will be concealed during installation.
2. Set casework components plumb, square, and straight with no distortion. Shim as required using concealed polypropylene shims and/or internal polypropylene leveling screws, if provided. Securely anchor, on 6-inch centers, the upper toe-kick to the toe-kick backer (previously secured to the floor) via Teflon coated 1-1/4-inch pan-head screws and cover with a polypropylene plug.
3. Align continuous cabinets together with joints flush, tight and uniform within 1/16-inch tolerance. Using 5/8-inch Teflon coated pan-head screws, screw the sides of each case together using pre-drilled holes in each corner on EACH side of both cases. Plug each screw head with a polypropylene plug. Any unused holes shall be plugged.
4. Secure wall cabinets to solid supporting backing material, not to plaster, lath or gypsum board. The connection hardware used shall depend on the backer material provided and be Teflon coated. The securing hardware shall be covered by a machined polypropylene cap from the inside of the case.

3.2 Adjusting

- A. Repair, remove and replace defective work, as directed by Owner's Representative upon completion of installation.
- B. Adjust doors, drawers, hardware, fixtures and other moving or operating parts to function smoothly.

3.3 Cleaning

- A. Remove all remaining visible exterior protective masking.
- B. Clean finished casework, and accessories. Touch up as required, wipe down, and vacuum the interior of the equipment. Note: Polypropylene will carry a static charge and, as such, attract dirt and dust. Alcohol or Acetone is an effective cleaning agent to remove dust and dirt from the surface. Consult MSDS for precautions.

3.4 Protection of Finished Work

- A. Provide all necessary protective measures to prevent casework and equipment from exposure to other construction activity during installation.
- B. Advise contractor of procedures and precautions for protection of installed casework and fixtures from damage by work of other trades.

-- END OF SECTION --