4.10 **Acid etching for concrete and plaster surfaces** shall be muriatic acid, best commercial standard.

5.0 **Painting schedule.**

A. PAINTING / RE-PAINTING OF CONCRETE SURFACES
1. New or Unpainted Plain Surfaces:
   a. Prime Coat : One (1) coat of flat wall latex paint
   b. Top coat : Two (2) coats of latex paint, flat for ceiling; satin for walls

2. Old Unpainted Surfaces:
   a. Apply two (2) coats of satin latex paint

B. PAINTING / RE-PAINTING OF STEEL FRAMES
1. New or Unpainted Surfaces:
   a. Prime Coat: Two (2) coats of red lead primer on area
   b. Top Coat: Two (2) coats of quick-drying enamel paint

2. Old Painted Surfaces:
   a. Spot prime or apply a full primer on rusty bare metal area that has been treated properly free of rust.
   b. Apply two (2) coats of quick-drying enamel paint

Color Scheme - verify from the Architect and/or End-User.

~ END OF SECTION ~

~ END OF DIVISION ~

DIVISION 10 SPECIALTIES

SECTION 10.06.20.13 TOILET AND BATH ACCESSORIES

1 GENERAL

1.1 DESCRIPTION OF WORK

A. Toilet accessory items included in this section:
Grab bars

B. Mounting heights are specified in the Toilet Accessory Schedule or shown on interior elevations.
C. Related Section: Mirrored glass is specified in Division 8, Section "Glass and Glazing".

1.2 References

A. American Iron and Steel Institute (AISI)
B. American Society of Testing and Materials (ASTM)

1.3 SUBMITTALS

Product Data: Submit product data for each toilet accessory item shown on drawings or schedule, including details of construction relative to materials, dimensions, gages, profiles, method of mounting, specified options, and finishes.

1.4 QUALITY ASSURANCE

A. Inserts and Anchorage: Furnish inserts and anchoring devices as recommended by the manufacturer.
B. Single-Source Responsibility: Provide products of same manufacturer for each type of accessory unit and for units exposed to view in same areas.

1.5 PROJECT CONDITIONS

Coordination: Coordinate accessory locations, installation, and sequencing with other work to avoid interference and to assure proper installation, operation, adjustment, cleaning, and servicing of toilet accessory items.

2 PRODUCTS

2.1 MATERIALS

A. Stainless Steel: AISI Type 302/304, with polished No. 4 finish, 0.034 inch (22 gage) minimum thickness, unless otherwise indicated.

B. Brass: Leaded and unleaded, flat products, ASTM B19; rods, shapes, forgings, and flat products with finished edges, ASTM B16, castings, ASTM B30.

C. Sheet Steel: Cold-rolled, commercial quality ASTM A366, 0.040 inch (20 gage) minimum, unless otherwise indicated. Surface preparation and metal pretreatment as required for applied finish.

D. Galvanized Steel Sheet: ASTM A527, G60.

E. Chromium Plating: Nickel and chromium electro-deposited on base metal, ASTM B456, Type SC 2.

F. Baked Enamel Finish: Factory-applied, gloss white, baked acrylic enamel coating.

G. Galvanized Steel Mounting Devices: ASTM A153, hot-dip galvanized after fabrication.

H. Fasteners: Screws, bolts, and other devices of same material as accessory unit or of galvanized steel where concealed.

2.2 GRAB BARS

Stainless Steel Type: Provide grab bars with wall thickness not less than 18 gauge (0.050 inch) and as follows:

A. Mounting: Concealed, manufacturer's standard flanges and anchorages, adequate to support a 113 kg (250 lb) load applied in any direction for a period of five minutes.

B. Clearance: 38 mm (1-1/2 inches) clearance between wall surface and inside face of bar.

C. Gripping Surfaces: Smooth, satin finish.

D. Heavy-Duty Size: Outside diameter of 38 mm (1-1/2 inches).

2.3 FABRICATION

A. Surface-Mounted Toilet Accessories: Except where otherwise indicated, fabricate units with tight seams and joints, exposed edges rolled. Hang doors or access panels with continuous stainless steel piano hinge. Provide concealed anchorage wherever possible.

B. Recessed Toilet Accessories: Except where otherwise indicated, fabricate units of all welded construction, without mitered corners. Hang doors or access panels with full-length stainless steel piano hinge. Provide anchorage that is fully concealed when unit is closed.

3 EXECUTION

3.1 INSTALLATION

A. Install toilet accessory units in accordance with manufacturers' instructions, using fasteners appropriate to substrate and recommended by manufacturer of unit. Install units plumb and level, firmly anchored in locations and at heights indicated.

B. Secure mirrors to walls in concealed, tamperproof manner with special hangers, toggle bolts, or screws. Set units plumb, level, and square at locations indicated, in accordance with manufacturer's instructions for type of substrate involved.

3.2 ADJUSTING AND CLEANING

A. Adjust toilet accessories for proper operation and verify that mechanisms function smoothly. Replace damaged or defective items.

B. Clean and polish all exposed surfaces in strict accordance with manufacturer's recommendations after removing temporary labels and protective coatings.

3.3. **TOILET ACCESSORY SCHEDULE**

Images provided in the table below are pegs and suggestions on which the CONTRACTOR shall base his actual product search.

All items shall have samples submitted for approval by the END-USERS, the ARCHITECT CONSULTANT and the OETS prior to purchase.

Description	Fixture Image	Quantity
Supply and installation of stainless steel vertical grab bar, 500mm length		4 sets

~ END OF SECTION ~

SECTION 10.21.13 TOILET COMPARTMENTS

1.0 **GENERAL**

1.1 **SECTION INCLUDES**

Solid phenolic core plastic laminate veneered toilet compartments.

1.2 REFERENCES

A. ANSI/ICC A117.1 - Accessible and Usable Buildings and Facilities; 1998.
B. ASTM A 167 - Standard Specification for Stainless and Heat Resisting Chromium-Nickel Steel Plate, Sheet, and Strip; 1999.
C. ASTM A 591 - Standard Specification for Steel Sheet, Electrolytic Zinc-Coated, for Light Coating Weight (Mass) Applications; 1998.
D. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2001.

1.3 SUBMITTALS

A. Product data for materials, fabrication, and installation including catalog cuts of anchors, hardware, fastenings, and accessories.

B. Shop Drawings:
   1. Provide shop drawings for fabrication and installation of compartment assemblies that are not fully described by architectural drawings.
   2. Provide template layouts and installation instructions for anchorage devices built into other work.

1.4 QUALITY ASSURANCE

Field Measurements: Take field measurements prior to component fabrication to ensure proper fitting of work.

Coordination: Furnish inserts and anchorages that must be built into other work for installation of toilet compartments and related items.

1.5 DELIVERY, STORAGE, AND HANDLING

Store products in manufacturer's unopened packaging until ready for installation.

2.0 PRODUCTS

2.1 COMPARTMENTS AND SCREENS

General: Doors, panels, screens, and pilasters assembled into complete compartment system, with cutouts and drilled holes to receive hardware as indicated; processed and fabricated in a craftsmanlike manner; complying with ANSI/ICC A117.1, Accessibility Law (BP 344), and as follows:

2.2 SOLID PHENOLIC CORE PANEL COMPONENTS

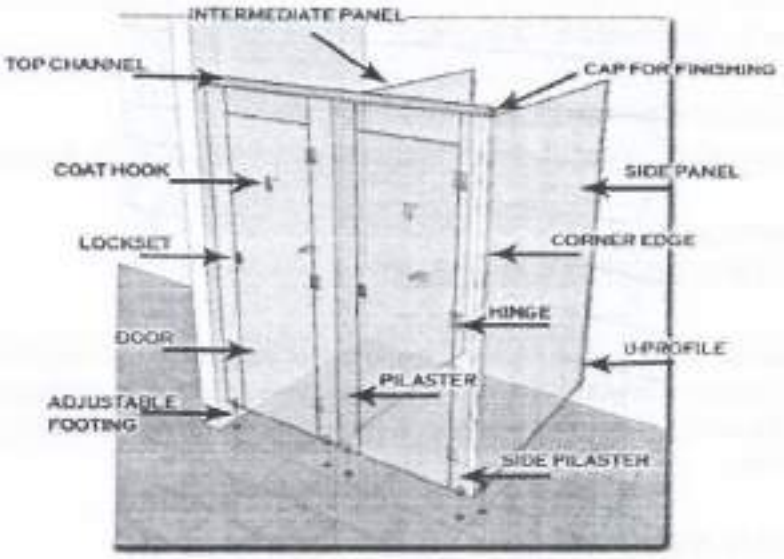
Doors, Panels, and Pilasters: Solid phenolic core with one piece melamine sheets bonded to phenolic resin impregnated Kraft sheets; exposed edge components polished black, chamfered and free of milling marks.

3. Veneer and Core: Flame spread index of 26, maximum; smoke developed index of 450, maximum; when tested in accordance with ASTM E 84 (Class B).
4. Color: To be selected from manufacturer's standard colors.
5. Color: to be approved by the architect consultant and the end/users.
6. Edges: Polished black.
7. Thickness: Doors and Pilasters, 3/4 inch (19 mm); Panels, 1/2 inch (13 mm); minimum.
8. Thickness: 1/2 inch (13 mm), finished.

Hardware - Standard:

9. Brackets: Type 304 stainless steel with Number 4 satin finish hardware.
10. Hinges: Heavy duty cast stainless steel, Type 304 with Number 4 finish; two per door.
    a. Top Hinge: Opposing nylon gravity-acting cam allowing door to be set in various positions.
    b. Bottom Hinge: Free swinging.
    c. Emergency access feature for outside access.
11. Latch and Keeper: Type 304 stainless steel with Number 4 finish; slide latch with combination stop and emergency release feature.
12. Coat Hook: Type 304 stainless steel with Number 4 finish; combination hook and bumper on inswinging doors.
13. Door Pull: Type 304 cast stainless steel with Number 4 finish.
14. Exposed Fasteners: Chrome plated brass or stainless steel.

FLOOR MOUNTED



2.3 ACCESSORY MATERIALS

Pilaster Shoes, and Caps: 20 gage (0.9 mm) thick ASTM A 167, Type 304 stainless steel; not less than 3 inches (76 mm) high; Number 4 satin (brushed) finish.

Overhead Bracing: Continuous extruded aluminum, anti-grip profile, with clear satin anodized finish, with returns and anchors.

Anchorages and Fasteners: Manufacturer's standard chromium-plated exposed fasteners finished to match hardware with theft-resistant type heads (one-way).

15. Concealed Steel Fasteners: Zinc-plated, rust-resistant, protective coating.

16. Overhead Braced: Galvanized steel supports and leveling bolts at pilasters to suit floor conditions as recommended by manufacturer; provisions for setting and securing overhead bracing at top of each pilaster; pilaster shoe to conceal supports and leveling mechanism.

17. Floor Mounted: Galvanized steel anchorage devices with threaded rod, lock washers, and leveling adjustment nuts at pilasters to permit structural connection at floor; pilaster shoe to conceal supports and leveling mechanism.

STAINLESS STEEL STANDARD FITTINGS

3.0 EXECUTION

3.1 INSTALLATION

General: Install in accordance with manufacturer's instructions.

18. Install compartment units rigid, straight, plumb and level.
19. Provide clearance of not more than 1/2 inch (13 mm) between stiles and panels and not more than 1 inch (25 mm) between panels and walls.
20. Secure panels to walls with not less than two brackets attached near top and bottom of panel.
21. Locate wall brackets so holes for wall anchorages occur in masonry or tile joints.
22. Secure panels to stiles with not less than two brackets located to align with brackets at wall.
23. Secure panels in position with manufacturer's recommended anchoring devices.
24. Level, plumb, and tighten installation with devices furnished.

Overhead Braced Compartments:

25. Secure stile to floor.
26. Secure overhead brace to each stile with fasteners supplied.
27. Hang doors and adjust so tops of doors are parallel with overhead brace when doors are in closed position.

Floor Mounted Compartments:

28. Set stile units with anchorages having not less than 2 inches (51 mm) penetration into structural floor, unless otherwise recommended by manufacturer.
29. Hang doors and adjust so tops of doors are level with tops of stiles when doors are in closed position.

Screens:

30. Attach with anchoring devices as recommended by manufacturer to suit supporting structure.

31. Set unit to provide support and to resist lateral impact.

Hardware Adjustment: Adjust and lubricate hardware for proper operation. Set hinges on in-swing doors to hold open approximately 30 degrees from closed position when unlatched. Set hinges on out-swing doors (and entrance swing doors) to return to fully closed position.

3.2 PROTECTION

Clean exposed surfaces of compartment systems using materials and methods recommended by manufacturer, and provide protection for installed products as necessary until completion of project.

Touch-up, repair or replace damaged products before Substantial Completion.

~ END OF SECTION ~

~ END OF DIVISION ~

DIVISION 26 ELECTRICAL

1.0 GENERAL PROVISIONS

1.1 **Application.** This section applies to all section of Division 16, "Electrical" of this project except as specified otherwise in each individual section.

1.2 **Scope of Work .** This section covers the requirements for the provision of a complete and operable electrical installation including all labor, supervision, materials, equipment, tools, apparatus, transportation, warehousing, rigging, scaffolding and other equipment and services necessary to accomplish the electrical installation, complete.

A. Tapping sets of wires to existing electrical lines.
B. Supply and installation of electrical fixtures and necessary supports, flexible conduits, fittings, connectors, etc.
C. Painting of exposed conduit, supports, pull boxes,
D. Consumables.
E. Chipping, boring and restoration.
F. Mobilization /Demobilization.
G. Testing and Commissioning.

2.0 **Best standard practice of the trade.** Install all equipment and materials in a neat and professional manner. Leave all exposed parts of the electrical work in a neat, clean and usable condition, with painted surfaces unblemished and polished surfaces re-polished.

2.1 **The work as laid out on drawing** is to some extent diagrammatic and the location thereon indicated may be approximate only, except where fixed by dimensional notations or architectural elevation. Adhere to the location indicated as much as possible and if significant deviation is necessary request direction from the Construction Architect/Engineer.

2.2 **If anything has been omitted** in any item of work usually furnished which are necessary for the completion of electrical works as outlined herein, such items must be hereby included in the electrical works.

2.3 **Repairs, cutting and patching.** Perform cutting necessitated by installation of the electrical work and repair all damage affected on existing and new construction. Patch to match the surrounding work to the satisfaction of the Construction Architect/Engineer.

3.0 **Quality assurance.**

3.1 **Materials** shall by a popular brand of manufacturer as specified herein and as approved by the Construction Architect/Engineer.

3.2 **Electrical equipment and materials** shall conform to the applicable requirement. Underwriter's Laboratories (UL), National Fire Protection

Association (NFPA), National Electrical Manufacturer's Association (NEMA) and other related publications.

3.3 **Workmanship** shall be equal to the best standard practice recognized and adopted for this trade.

3.4 **Inspection and test** shall be conducted by the Contractor in the presence of the Construction Architect/Engineer.

4.0 **Application codes, regulations and requirements.**

4.1 **Applicable codes and regulations.**

A. Philippine Electrical Code.
B. Bureau of Labor Standards.
C. National Fire Protection Association
D. National Electrical Code, latest edition.
E. Power Company Regulations.
F. Regulations of all other authorities having jurisdiction.

5.0 **Structural conditions.** Obtain the consent of the Construction Architect/Engineer before installing conduits, which will pass through or interfere with any structural members or where notching, boring or cutting of the structure is necessary to accommodate the electrical work.

6.0 **Materials.**

6.1 **Lighting Fixtures and Lamps.** All fixtures shall be completely wired and installed including all lamps and/or tubes, transformers, ballasts, supports, brackets, canopies, globes and other parts and devices necessary for complete installation and operation.

6.2 **LED fixture units** shall be complete. The fixture shall be accessible for maintenance and shall be directly connected to 220 volts system as shown in the plans.

6.2.a **Warranty.** Three (3) years unit warranty on installation and materials.

6.3 **Wires and cables.**

6.3.1 **Wires and cables for lighting** Sizes and type of wires shall be as indicated, and shall pass the stringent quality requirements set by the Philippine standards.

6.3.2 **All wires** shall be copper, soft-drawn and annealed; shall be of ninety-eight (98%) conductivity; shall be smooth and true and of a cylindrical form; and shall be within one percent (1%) of the actual size called for THWN

6.3.3 **Splices:** Make splices in accessible locations. Make splices in conductors 5.5 mm2 and smaller with an insulated pressure type connector. Make splices conductors 8

mm2 and larger with a solderless connector and cover with an insulation material equivalent to the conductor insulation.

6.3.4 **Wires or cables for lighting and power systems** shall be PVC insulated, unless specified, the minimum size of wire shall be 3.5mm THHN/THWN and larger shall be stranded copper.

6.4 **Conduit.**

6.4.1 **Conduit for interior systems** shall be PVC pipes with complete accessories.

6.4.2 **No conduit** shall be used in any system smaller than 20 mm. diameter thick type nor shall have more than four ninety-degree bends in any one run, and where necessary, pull boxes shall be provided as directed.

6.4.3 **No wire** shall be pulled into any conduit until the conduit system is complete in all details; in the case of concealed work, until all rough plastering or masonry has been completed; in the case of exposed work, until the conduit has been completed in every detail.

6.4.4 **The ends of all conduits** shall be tightly plugged to exclude plaster, dust and moisture while the building is in the process of construction. All conduits shall be reamed to remove all burrs.

6.5. **All pipes and fittings on exposed work** shall be secured by means of metal clips spaced at maximum of 1.5 m, which shall be held in place by means of a machine screw. When running over concrete surfaces, the screws shall be held in place by expansion sleeves. All pipes on exposed work shall run at right angles to and parallel with the surrounding walls and shall conform to the form of the ceiling. No diagonal runs shall be allowed and all ends and offsets shall be avoided as far as possible. Where necessary, conduit fittings shall be used. Piping, in all cases shall run perfectly straight and true, satisfactory to the Construction Architect/Engineer.

6.6 **Outlet boxes and fittings.**

6.6.1 **All outlets of whatever kind for all systems** shall be provided with a suitable fitting which shall be either a box or other device specially designed to receive the type of fittings to be mounted thereon.

6.6.2 **The Contractor** shall consult the Construction Architect/Engineer as to the nature of the various fittings to be used before installing his outlet fittings. This has to conform to the appliance design finish.

6.6.3 **In the case of fixtures, their outlet fittings** shall be provided with suitable fixture supports of a size and kind required by the fixture to be hung. Fixture studs in general shall be 10 mm.

6.6.4 **All outlets on exposed conduit work** shall be cast alloy conduit fittings of proper type.

6.6.5 **At all outlets on concealed conduit work**, provide galvanized pressed steel outlet boxes of standard make.

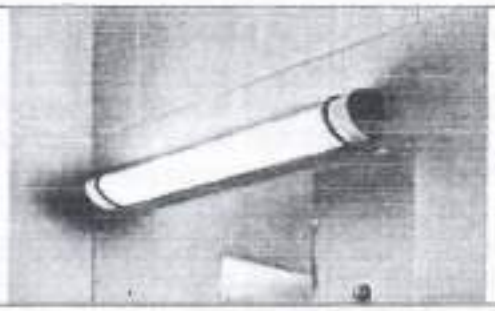
7.0 **Junction and pull boxes.** Junction and pull boxes, of code gauge steel, shall be provided as indicated or as required for facilitating the pulling of wires and cables. Pull boxes in finished places shall be located/installed with the permission of and to the satisfaction of the Construction Architect/Engineer.

8.0 **Wall switches.** Wall switches shall be rated at 15 amperes, 250 volts, one-way, as required. The type of switch shall be tumbler-operation. Color, plating and appearance of wall plates shall be submitted for approval by the Architect prior to the purchase of wall switches and face plates. Switches shall conform to the best commercial standard.

9.0 **Lighting Fixture Schedule**

Images provided in the table below are pegs and suggestions on which the CONTRACTOR shall base his actual product search.

All items shall have samples submitted for approval by the END-USERS, the ARCHITECT CONSULTANT and the OETS prior to purchase.

Description	Fixture Image	Quantity
5 watts, 220 volts ceiling mounted LED light in square white frame finish		8 units
12 watts, 220 volts ceiling mounted LED light in square white frame finish		17 units
12 watts, 220 volts wall mounted LED light fixture, metal base with secure acrylic diffuser		11 units

~ END OF SECTION ~

~ END OF DIVISION ~

SECTION 22 PLUMBING

SECTION 22.43 HEALTHCARE TOILET FIXTURES

1.0 GENERAL

1.1 DESCRIPTION OF WORK

A. Toilet fixtures included in this section:
Water Closets
Lavatories
Hand Bidets / Hand Sprays
Urinals
Faucets
Shower heads and valves

B. Mounting heights are specified in the Toilet Accessory Schedule or shown on interior elevations.
C. Related Section: Mirrored glass is specified in Division 8, Section "Glass and Glazing".

1.2 SUBMITTALS

Product Data: Submit product data for each toilet fixture item shown on drawings or schedule, including details of construction relative to materials, dimensions, gages, profiles, method of mounting, specified options, and finishes.

1.3 QUALITY ASSURANCE

A. Inserts and Anchorage: Furnish inserts and anchoring devices as recommended by the manufacturer.
B. Single-Source Responsibility: Provide products of same manufacturer for each type of accessory unit and for units exposed to view in same areas.

1.4 PROJECT CONDITIONS

Coordination: Coordinate accessory locations, installation, and sequencing with other work to avoid interference and to assure proper installation, operation, adjustment, cleaning, and servicing of toilet accessory items.

2.0 PRODUCTS

2.1 MATERIALS

A. Stainless Steel: AISI Type 302/304, with polished No. 4 finish, 0.034 inch (22 gage) minimum thickness, unless otherwise indicated.

B. Brass: Leaded and unleaded, flat products, ASTM B19; rods, shapes, forgings, and flat products with finished edges, ASTM B16, castings, ASTM B30.

C. Sheet Steel: Cold-rolled, commercial quality ASTM A366, 0.040 inch (20 gage) minimum, unless otherwise indicated. Surface preparation and metal pretreatment as required for applied finish.

D. Galvanized Steel Sheet: ASTM A527, G60.

E. Chromium Plating: Nickel and chromium electro-deposited on base metal, ASTM B456, Type SC 2.

F. Baked Enamel Finish: Factory-applied, gloss white, baked acrylic enamel coating.

G. Galvanized Steel Mounting Devices: ASTM A153, hot-dip galvanized after fabrication.

H. Fasteners: Screws, bolts, and other devices of same material as accessory unit or of galvanized steel where concealed.

2.2 **FABRICATION**

A. Surface-Mounted Toilet Accessories: Except where otherwise indicated, fabricate units with tight seams and joints, exposed edges rolled. Hang doors or access panels with continuous stainless steel piano hinge. Provide concealed anchorage wherever possible.

B. Recessed Toilet Accessories: Except where otherwise indicated, fabricate units of all welded construction, without mitered corners. Hang doors or access panels with full-length stainless steel piano hinge. Provide anchorage that is fully concealed when unit is closed.

3.0 EXECUTION

3.1 **INSTALLATION**

A. Install toilet fixtures in accordance with manufacturers' instructions, using fasteners appropriate to substrate and recommended by manufacturer of unit. Install units plumb and level, firmly anchored in locations and at heights indicated.

3.2 **ADJUSTING AND CLEANING**

A. Adjust toilet fixtures for proper operation and verify that mechanisms function smoothly. Replace damaged or defective items.

B. Clean and polish all exposed surfaces in strict accordance with manufacturer's recommendations after removing temporary labels and protective coatings.

4.0 TOILET FIXTURE SCHEDULE

Images provided in the table below are pegs and suggestions on which the CONTRACTOR shall base his actual product search.

All items shall have samples submitted for approval by the END-USERS, the ARCHITECT CONSULTANT and the OETS prior to purchase.

Description	Fixture Image	Quantity
Pedestal lavatory		7 sets

Rectangular under counter lavatory w/ EV pop-up, P-trap and bracket (540L x 365W x 200H mm)		4 sets
Stainless steel single-lever lavatory faucet		7 sets
Lavatory faucet with self-powered controller, sensor at tip of spout (flow rate: 2L/min)		4 sets
Wall-mounted mop faucet		2 sets
Shower head, mixer and faucet	  	7 sets
Hand bidet/spray		13 sets

Elongated, close coupled water closet with soft-closing seat and cover w/ metal hinges and slip-in connector; minimum water pressure: 0.05 Mpa-0.75Mpa; Rough-in 305mm		13 sets
Wall-hung urinal with back inlet, complete with fittings and accessories (365L x 444H x 200D mm)		1 set
Concealed urinal sensor (flush volume: 2.5-5L), battery operated (through back inlet) complete with fittings and accessories		1 set

~ END OF SECTION ~

SECTION 22.05.29 HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Hangers and Supports including:
   a. Metal pipe hangers and supports.
   b. Trapeze pipe hangers.
   c. Fastener systems.
   d. Pipe stands.

1.2 DESIGN / PERFORMANCE REQUIREMENTS

A. General: Except as otherwise indicated, provide factory fabricated piping hangers and supports of the type specified and indicated on the Drawings. Use only one type by one manufacturer for each piping service. Select size of hangers and supports to exactly fit pipe size for bare piping, and to exactly fit around piping insulation with saddle or shield for insulated piping.

B. Design: Design trapeze pipe hangers and equipment supports, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

C. Structural Performance: Hangers and supports for plumbing piping and equipment shall withstand the effects of gravity loads and stresses within limits and under conditions indicated in accordance with ASCE/SEI 7.
    a. Design supports for multiple pipes, including pipe stands, capable of supporting combined weight and thrust loads of supported systems, system contents, and test water.
    b. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
    c. Design seismic-restraint hangers and supports for piping and equipment and obtain approval from authorities having jurisdiction.

1.3 SUBMITTALS
A. Submit under provisions of Section 01 30 00 - Administrative Requirements.
B. Product Data: Manufacturer's data sheets on each product including components to be used, including:
    a. Preparation instructions and recommendations.
    b. Storage and handling requirements and recommendations.
    c. Installation methods.
C. Shop Drawings: Signed and sealed by a qualified professional engineer. Show fabrication and installation details and include calculations for the following:
    a. Trapeze pipe hangers.
    b. Pipe stands.
    c. Equipment supports.
    d. Pipe positioning systems.
    e. Acoustical pipe isolation supports.

~ END OF SECTION ~

SECTION 22 10 00 PLUMBING PIPING SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES
A. PPR pipe, fittings, and valves.
B. PVC pipe, fittings, and valves.
C. Double-containments drain, waste, and vent (DWV) piping and fittings.

1.2 DEFINITIONS
A. DWV: Drain, waste, vent.
B. PVC: Polyvinyl chloride plastic.
C. PPR: Polypropylene random

1.3 SUBMITTALS
A. Submit under provisions of Section 01 30 00 - Administrative Requirements.
B. Product Data: For each product type specified.
C. Shop Drawings: Double containment piping systems.
    a. Piping, supports, spacing.
    b. Drain, vent, and joint details.

D. Coordination Drawings: Piping, specialties in relation to surrounding equipment and services.
   a. To scale: Show piping, equipment locations, and elevations.
   b. Field test reports.
   c. Operation and Maintenance data.

1.4 QUALITY ASSURANCE

A. Regulatory Requirements:
   a. Backflow prevention.
   b. Potable-water piping.
B. Piping: Labeled and marked as determined by approving agency
C. Standards Compliance:
   a. ASTM F 645.
   b. National Plumbing Code of the Philippines (NPCP)
D. Source Limitations: Obtain piping, fittings, valves and accessory equipment from a single manufacturer.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store products in manufacturer's unopened packaging bearing the brand name and manufacturer's identification until ready for installation.
   a. Protect plastic piping from direct sunlight.
      i. Support to prevent sagging and bending.
   b. Protect internal parts, valve ends, and specialties against corrosion, dirt, and damage.
   c. Store valves set in open position.
   d. Storage:
      i. Indoors: Higher than ambient dew point temperature.
      ii. Outdoors: Watertight enclosures off ground.
B. Handling: Comply with manufacturer's recommendations. Avoid damaging components.
   a. Large Valves: Operating handles or stems are not rigging points for slings.

1.6 PROJECT CONDITIONS

A. Do not interrupt service without arranging temporary water-distribution service.
   a. Owner or Owner's representative is to be notified a minimum of two days prior to service interruption.
   b. Do not proceed without written permission.

PART 2 PRODUCTS

2.1 POLYPROPYLENE RANDOM

A. Standards:
   a. IS 15801: 2008
   b. DIN 8077 for Pipes - Dimension
   c. DIN 8078 for Pipes - General Quality requirement & testing
   d. DIN 16962 for Pipe joint assemblies and fittings
   e. DIN 1988 for drinking water pipes.
B. Working temperature:
   a. up to 95°C
C. Working pressure:
   a. PPR PIPES - 10 kg, 16 kg, 20 kg & 25 kg /cm2
   b. PPR FITTINGS - 25 kg /cm2
D. Range:

a. PN 10 - 20mm to 110mm (for cold application)

2.2 PVC PIPE AND FITTINGS

A. Standards:
   a. ASTM D 1784.
   b. ASTM D 1785.
   c. ASTM D 2464.
   d. ASTM D 2466.
   e. ASTM D 2467.
   f. ASTM D2672.
   g. ASTM F480.
B. Material Requirements: ASTM D1784.
   a. Cell classification: 12454.
   b. Physical Dimensions: Comply with ASTM D1785.
C. Pipe Marking to Comply with the following:
   a. ASTM D 1785.
D. Pipe Thread Pressure Reduction: 50 percent of pipe pressure rating when threaded connection is used. Schedule 80 pipe only. Schedule 40 pipe is not to be threaded.
E. Pressure rating at 23 degrees C (73 degrees F) (psi / kPa)
F. Fittings: Third party certified to NSF 14.

PART 3 EXECUTION

3.1 EARTHWORK

A. Refer to applicable sections in Division 31 for excavating, trenching, and backfilling.

3.2 EXAMINATION

A. Verification of Conditions: Examine areas and conditions under which Work is to be performed and identify conditions that may be detrimental to proper or timely completion.
   a. Rough-in for water-supply, sanitary drainage and vent piping systems: Verify locations; pipe and connection.
   b. Walls and partitions: Suitable thickness.
B. Fixture and Valve Interiors: Clean and free of foreign matter, and corrosion. Remove packing used to prevent disc movement.
   a. Operate valves from fully open to fully closed positions.
   b. Verify guides and seats are clean and free of foreign matter, and corrosion.
C. Threads on Valves Fittings and Fixtures: Inspect valve and mating pipe for form and cleanliness.
D. Mating Flange Faces: Inspect for conditions that may cause leaking.
   a. Bolting: Proper size, length, and material.
   b. Gaskets: Proper size and material composition suitable for application; defect and damage free.
E. Replace defective fixtures and valves with new.
F. Do not proceed until unsatisfactory conditions have been corrected.

3.3 PIPING APPLICATIONS

A. Underground water-service piping:
   a. PVC, schedule 40 and schedule 80 pipe: (DN 20 to DN 200).
   b. Socket fittings.
B. Aboveground and enclosed water-service piping:

a. PVC, Schedule 80 pipe: (DN 20 to DN 200).
    i. Socket fittings.
    ii. Threaded fittings.

3.4 PIPING INSTALLATION

A. See appropriate sections in Division 33 for common requirements for utility piping.
B. Water-Main Connection:
    a. Utility company to provide tap: Coordinate size and location of tap.
    b. Contractor to tap water main: Follow utility company requirements.
C. Install PVC pipe according to ASTM F 645.
D. Tunneling or Jacking: Allowed when necessary not to disturb obstructions.
E. Connect building-water-piping systems at locations and pipe sizes indicated, on outer wall face.
    a. Cap piping. Connect to building when building systems are ready.
F. Pipe joints: Per manufacturer's written instructions.
    a. Join dissimilar pipe materials with adapters compatible with pipe materials being joined.
        i. Underground piping: Restrained joints at directional changes both horizontal and vertical.
        ii. Restrained-joint piping, thrust blocks, anchors, tie-rods and clamps, and other supports.
G. Anchorages
    a. Thrust blocks.
    b. Pipe clamps and tie rods.
H. Restrained joints:
    a. Mechanical.
    b. Set-screw retainers.
    c. Flanged.
    d. Heat-fused.
I. All Fixtures: level and plumb.
J. Attach all support framing to building substrate per manufacturer's written instructions.
K. Wall-mounted fixtures: Install off-the-floor carrier supports. Install accessible, wall-mounted water closets according to ICC/ANSI A117.1.
L. Water-supply piping: Ball or gate shutoff valves on supply to each fixture connected to domestic-water piping.
    a. Locations: easily accessible.
M. Pressure-reducing valves to be downstream of shutoffs.
N. Fixture drain outlets: Install trap and waste piping to be connected to sanitary drainage system.
O. Seismic restraints to be installed on piping.
P. Conceal piping whenever possible except in equipment rooms and service areas.
    a. Diagonal pipe runs are prohibited.
    b. No sagging or bending.
Q. Escutcheons and wall flanges: Wall piping penetrations finished locations.
R. Joints between fixtures and walls: Seal with silicone sealant:
    a. Sanitary, one-part, mildew-resistant. Match colors.
S. Install PVC pipe according to ASTM F 645.

3.5 VALVE INSTALLATION

A. Install products in accordance with manufacturer's instructions, approved submittals, and in proper relationship with adjacent construction.
    a. Valves in horizontal piping to have stems at or above pipe center.

b. Valves to be positioned allowing full stem movement.
c. Valves with threaded connections to have unions at each piece of equipment.
    i. Arrange to allow easy access, service, maintenance, and equipment removal without system shutdown. Provide separate support where necessary.
d. Valve tags and signage:
    i. Comply with Section 23 05 53 - Identification for HVAC Piping and Equipment "Identification for Plumbing Piping and Equipment" for valve tags, schedules and signs on surfaces concealing valves.
    ii. Comply with NFPA 24 as it applies to the piping system in which valves are installed.

3.6 LEAK-DETECTION AND MONITORING SYSTEM INSTALLATION FOR DOUBLE-CONTAINMENT PIPING

A. Install panel where indicated on drawings.
B. System manufacturer to provide factory trained personnel for pre-installation meeting and installation of sensors and electronics.

~ END OF SECTION ~

~ END OF DIVISION ~

DIVISION 44 POLLUTION AND WASTE CONTROL EQUIPMENT

SECTION 44.32.13 ODOR DISPERSING EXHAUST STACKS (VENTILATION SYSTEMS AND EXHAUST FANS)

1.0 **Ventilating system** for the toilets, storage service areas and various utility rooms as shown on the drawings.

2.0 **Preparation of as-built plans and drawings.**

2.1 **The contract drawings** indicate the extent and general arrangements of the air-conditioning and ventilating systems. If the contractor deems deviations from the drawings necessary, details of such deviations and the reason therefore shall be submitted for approval. No such deviations shall be made without the written approval. All works shall be in accordance with the governing codes and regulations and with these specifications. Except where the same is in conflict with such codes regulations, and specifications, the latter shall then govern. The requirements with regard to materials and workmanship and the required standards for the furnishing of all labor, materials, and appliances necessary for the complete installation of the work, are specified herein and are indicated on the drawings. These specifications are intended to provide a broad outline of the required installation but are not intended to include all details of design and construction.

2.2 **Codes and standards.** Mechanical works shall comply with the codes listed below as applicable.

a. Building: National Building Code
b. Mechanical: The Phil. Mech. Engineering Code 1984 Ed.
c. Electrical: The Phil. Elec. Code 1974 Ed.
d. Fire: The Fire Code of the Phils. P.D. No. 1185
e. Plumbing: The Phil. Plumbing Code

2.3 **Mechanical and equipment selection.** Select manufacturer's standard catalog products to operate within the regularly published ratings for a particular application. Provide first class standard products acceptable to the Owner and/or Construction Architect/Engineer or his representative where a specific kind of quality is not specified.

2.4 **Standard drawings.** As soon as practicable, after award of the contract and prior to installation, complete shop drawings showing the sizes and the type of equipment, together with the complete piping layout and electrical connections shall be submitted for approval. This holds true also for the air distribution of ductwork and actual diffuser locations.

2.5 **As-built plans.** Within a reasonable period but not exceeding ninety (90) days from date of completion and acceptance of the installation, "As-Built" drawings shall be furnished the building Owners through the Construction Architect/Engineer. This shall include all contract drawings with the necessary revisions and modifications resulting in change from the original drawings, supplemented by such schematic, isometric or other type of drawings as may be necessary to provide a clear understanding of the installed system, as-built.

2.6 **Government permits and certificate of inspection.** Prior to start of installation the contractor shall secure a permit from the authorized government agency having jurisdiction over the place of the installation. Before final acceptance by the Owner, a final certificate of inspection and a permit to operate the system shall also be secured from the same government agency.

2.7 **Local laws and ordinances.** Aside from herein specified, the equipment and materials to be furnished and the installation of the system shall conform to local laws, codes, and other ordinances that are in force.

3.0 **Air-conditioning and ventilating units.**

3.1 **Ventilating units.** Furnish and install exhaust fans as shown and as scheduled on the drawings, complete with motors, vibration isolators and mounting devices. They shall be standard products of a reputable manufacturer. Exhaust fans shall be as follows:

1. Ceiling-mounted exhausters shall be cassette centrifugal types as required, direct-driven. The fans shall be statically and dynamically balanced and tested by the manufacturer. They shall be encased with a steel housing that is sufficiently reinforced. Unit shall be furnished with decorative grill and back-draft damper.

The work throughout shall be executed in the most thorough manner to the satisfaction of the Construction Architect/Engineer who will jointly interpret the meaning of the Drawings and Specifications and shall have the power to reject any work and materials which in their judgment are not in full conformance with the intention of plans.

3.2 **Installation.**

a. Protect materials and equipment including piping from dirt and moisture during storage and construction.

b. Make dimensional allowances for special wall finishes.

c. Provide offsets required clearing obstruction.

d. Mechanical equipment, duct and hangers, and supports for same shall not be used for hanging or supporting the work of any other trade.

e. Any equipment and material too large to pass through finished openings shall be moved into the proper space before enclosing of structure is completed.

f. Arrange piping, ductwork, equipment, supports and braces to provide unobstructed access to equipment drives, controls and items requiring maintenance.

g. Confer with all trades concerned in order to properly rough-in for connection of fixtures and equipment.

h. Install products in strict conformance with the manufacturer's

recommendations to ensure compliance with manufacturer's guaranteed performance.

3.3 **Pipe insulation**. Refrigerant and condensate pipe insulation shall be pre-molded flexible closed cell insulation.

3.4 **Warranty and service:**

a. Warranty period is one (1) year unless otherwise defined.

b. The warranty period begins upon acceptance thereof by the Owner and/or his representative. Any time within the period after acceptance and upon proper notice, the contractor shall repair any and all deficiencies including replacement of parts or the entire unit without additional cost to the Owner if such deficiencies have been caused directly or indirectly by inferior materials, faulty workmanship and/or defective design of parts.

c. During the guarantee period, the contractor shall perform free inspection and servicing at least once a month per item of equipment and make adjustments necessary for proper and efficient operation of the system.

d. The contractor shall perform such services in accordance with the recommendation of the equipment manufacturers. Inspection and services should be so scheduled as to entail the least interruptions in the normal hours of usage of the equipment and/or system.

e. The contractor shall indemnify and save harmless the Owner, the Architect and the Engineer from and against all liabilities for damages arising from injuries or disabilities to person or damage to property occasioned by any act or omission of the contractor or any of his sub-contractors, including any and all expenses, legal or otherwise which may be incurred by the Owner, the Construction Architect/Engineer, in the defense of any claim, action or suit.

4.0 **Submittal requirements**

4.1 **Before starting installation,** The contractor shall submit for approval list of materials and equipment to be incorporated in the work. These shall be supported with sufficient descriptive materials such as catalogs, diagrams, and other data published by manufacturer to demonstrate conformance to the contract requirements.

~ END OF SECTION ~

~ END OF DIVISION ~

~ End of Technical Specifications ~