DIVISION 15
SANITARY

15 00 00	SANITARY
15 41 00	Plumbing Fixture

1. PART 1 GENERAL

1.1 RELATED DOCUMENTS

1.1.1Technical Architectural Drawings
1.1.2Specifications
1.1.3Requests for Interpretation
1.1.4Product Samples and Brochures
1.1.5Manufacturer's Data Sheets and Certificates
1.1.6Material Safety Data Sheets
1.1.7Work Program and Methodology Submittals

1.2 SUMMARY

This section includes provisions on the performance requirements of plumbing fixtures, fittings, trims, and all plumbing accessories required to complete the project.

1.3 RELATED SECTIONS

1.3.1Joint Sealants
1.3.2Solid Surface Countertops

1.4 GENERAL PROVISION

1.4.1Where indicated on the technical working drawings, provide tank-type water closet, lavatory, urinal, and other accessories necessary to complete toilet and bath units as indicated in the technical plans and drawings.
1.4.2Use Polypropylene (PPRC) pipes and fittings for Cold Water System.
1.4.3Use Poly Vinyl Chloride (PVC Orange) equivalent to Series 1000 and drainage pattern fittings or use High-Density Polyethylene (HDPE).
1.4.4Use solvent cement joint on rubber-o-ring.
1.4.5Use PVC Series 1000 for all downspouts and all underground storm drainage as indicated in the drawings or use High-Density Polyethylene (HDPE).
1.4.6Use PVC Series 1000 for all soil stacks, vent pipes and sanitary drainage piping system. Or use High-Density Polyethylene (HDPE).
1.4.7Pipe sleeves should be 25mm larger than the size of the pipe specified for plumbing lines.
1.4.8Tap-Tee connections for all lavatories and kitchen sinks.
1.4.9Gate valves of branches to supply fixture shall be Crane PN-36 bronze bate valve.
1.4.10 Floor drains at toilets shall be ASA or METMA M-249-13 or approved equal.

1.5 MAINTANANCE, DELIVERY, STORAGE, AND HANDLING

1.5.1Conduct hydraulic and pressure tests at regular intervals from the completed time of installation.
1.5.2Conduct leak tests and immediately repair dysfunctional lines.
1.5.3Deliver plumbing fixtures in sealed protective packaging.
1.5.4Store plumbing fixtures on dry locations. Contain in properly labeled boxes. Include in labels the psi capacity of fixtures, especially check valves and gate valves.
1.5.5Turnover extra materials to owner if materials are considered

1.6 SUBMITTALS

1.6.1PRODUCT APPROVAL ATTACHMENTS

Submit technical product data of plumbing fixtures to be installed. Include samples as required by architect, Include technical data of booster pumps and other necessary plumbing equipment, stating machine brand, product serial number, and brand. Submit maintenance requirements of each machine type, including

3.1.4Install escutcheons at each wall, floor, and ceiling penetration in exposed finish locations, and within cabinets and millwork.
3.1.5Seal fixture to walls, floor, and ceiling using mildew-resistant silicone.

3.2 PROTECTION, ADJUSTING, AND CLEANING

3.2.1Replace all damaged and malfunctioning fixtures, fittings, controls, and other parts of the plumbing system affecting full functionality.
3.2.2Provide protective covering for installed fixture and fittings.
3.2.3Do not allow temporary use of fixtures and facilities until substantial turnover.

END OF SECTION

8. Complete installation of
8. Securing and all payments from building permit to electrical wiring permit, certificate of final inspections, and utility connections.
9. Complete testing of all electrical systems.
10. Complete directories, signages and painting of all electrical work and equipment.
11. Grouting or fire proof sealing of openings in floors and walls after all raceways or ducts are in place and sealing of all such openings if not used.
12. If anything has been omitted or not enumerated in the specifications and the plans of any item of work, which is necessary and usually furnished with the materials and standard practice in electrical installations, then such items must be are hereby included in this electrical work.
13. Provide excavation, backfill, concrete, structural supports, miscellaneous materials, and labor for complete installation of items specified under this division unless otherwise shown.

16.3.2 APPLICATION

A. This section applies to all division of 16, "Electrical" of this project except as specified otherwise in each individual section.

16.3.3 SUBMITTALS

A. Obtain approval before procurement, fabrication, or delivery of items to the jobsite. Partial submittals will not be acceptable and will be returned without review. Submittals shall include the manufacturer""s name, trade name, place of manufacture, catalog model or number, nameplate data, size, layout, dimensions, capacity, project specification and paragraph reference.

1. Shop Drawings: In addition to the requirements of the Contract Clauses, shop drawings shall meet the following requirements. Drawings shall be a minimum of 20 inches by 30 inches in size, except as specified otherwise. Drawings shall include wiring diagrams and installation details of equipment indicating proposed location, layout and arrangement, control panels, accessories, piping, ductwork, and other items that must be shown to assure a coordinated installation.

   Wiring diagrams shall identify circuit terminals and indicate the internal wiring for each item of equipment and the interconnection between each item of equipment. Drawings shall indicate adequate clearance for operation, maintenance and replacement of operating equipment devices. If equipment is disapproved, revise drawings to show acceptable equipment and resubmit.

2. Manufacturer""s Data: Submittals for each manufactured items shall be current manufacturer""s descriptive literature of cataloged products, equipment drawings, diagrams, performance and characteristics curves, and catalog cuts.
3. Publication Compliance: Where equipment or materials are specified to conform to industry and technical society publications of organizations such as Philippine National Standards (PNS), Japanese Industrial Standards (JIS), International Electrotechnical Commission (IEC), British Standards (BS), American National Standards Institute (ANSI), American Society for Testing and Materials (ASTM), and Underwriters Laboratories, Inc. UL), submit proof of such compliance. The label or listing by the specified organization will be acceptable evidence of compliance. In each of the publications referred to herein, consider the advisory provisions to be mandatory, as though the word "shall" had been substituted for "should" whenever it appears. Interpret references in these publications to the "authority having jurisdiction", or words of similar meaning, to mean the Engineer. In lieu of the label or listing, submit a certificate from an approved independent testing organization, adequately equipped and competent to perform such services, stating that the item has been tested in accordance with the specified organization""s test methods and that the item conform to the specified organization""s publication.
4. Certificates of Compliance: Submit manufacturer""s certifications as required on product, materials, finish and equipment indicated in the technical sections. Certifications shall be documents prepared specifically for

16.3.7 POSTED OPERATING INSTRUCTIONS

A. Furnish approve operating instructions for system and equipment indicated in the technical sections for use by operation and maintenance personnel.

B. Operating instructions shall include wiring diagrams, control diagrams, and control sequence for each principal system and equipment. Print or engrave operating instructions and frame under glass or in approved laminated plastic. Post instructions as directed. Attach or post operating instructions adjacent to each principal system and equipment including start-up, property adjustment, operating, lubrication, shutdown, safety precautions, procedure in the event of equipment failure, and other items of instructions as recommended by the manufacturer of each system or equipment. Provide weather-resistant materials or weatherproof enclosures for operating instructions exposed to the weather. Operating instructions shall not fade when exposed to sunlight and shall be secured to prevent easy removal or peeling.

16.3.8 INSTRUCTION TO OWNER PERSONNEL

A. Where indicated in the technical sections, furnish the services of competent instructors to give full instruction to owner personnel in the adjustment, operation, and maintenance of systems and equipment, including pertinent safety requirements as required. Each instructor shall be thoroughly familiar with all parts of the installation and shall be trained in operating theory as well as practical operation and maintenance work. Instruction shall be given during the first regular work week after the equipment of system has been accepted and turned over to the owner for regular operation. The number of man-days (8-hours) of instructions furnished shall be as specified in each individual sections. Instructions to owner personnel shall be at no cost to the Owner.

16.3.9 DELIVERY AND STORAGE

A. Handle, store, and protect equipment and materials in accordance with the manufacturer""s recommendations and with the requirements of Philippine Electrical Code. Replace damaged or defective items with new items.

16.3.10 CATALOGUED PRODUCTIONS/SERVICE AVAILABILITY

A. Materials and equipment shall be current products by manufacturers regularly engaged in the production of such products. Products shall have been in satisfactory commercial or industrial use for 2 years prior to bid opening. The 2-year period shall include applications of equipment and materials under similar circumstances and of similar size. The 2-year period shall be satisfactorily completed by a product for sale on the commercial market through advertisements or manufacturer""s catalogs. Product having less than a 2-year field service record will be acceptable if a certified record of satisfactory field operation for not less than 6000 hours, exclusively of the manufacturer""s factory or laboratory tests, is furnished. The equipment items shall be supported by service organizations which are reasonably convenient to the equipment installation in order to render satisfactory service to the equipment or a regular and emergency basis during the warranty period of the contract.

16.3.11 MANUFACTURER'S RECOMMENDATIONS

A. Where installation procedures or any part thereof are required to be in accordance with manufacturer""s recommendations, furnish printed copies of the recommendations prior to installation. Installation of the item shall not proceed until recommendations are received. Failure to furnish recommendations shall be cause for rejection of the equipment or material.

16.3.12 RECORD DRAWINGS

A. Contractor shall keep in field, and open for inspection by the Owner""s Representative, an accurate current, progressive record of actual installation of electrical system. On completion of work, contractor shall deliver to Owner""s Representative, marked prints showing actual routing of conduits and ducts, location and elevation of outlets, circuit numbers of lighting and power circuits, installation details of lighting fixtures, power panels, etc.

B. Contractor will be permitted to make changes to meet field conditions or material delivery conditions which may arise. However, in each instance, proposed change must be submitted in form of drawings or sketches for approval and acceptance by Owner""s Representative.

P. Color coding of wires shall be as follows

A. Neutral – white
B. Ground – green
C. Line 1 – black
D. Line 2 – red
E. Line 3 – blue

16.4 PRODUCTS

16.4.1.1 Standard Products

All materials shall be new and high quality which shall conform to the specification and other applicable standards as to its location and purpose. All materials shall meet the requirements of Bureau of Product Standards and shall bear the inspection label whenever standards have been established. The contractor shall submit to the project engineer and owner for approval shop drawings, catalog data or samples of materials and electrical equipment before procurement.

16.4.2 Approval of Materials

The Contractor shall submit for approval a complete description of all materials to be used in the work. The description shall include catalog numbers, illustrations, diagrams, dimensional data, etc., as required to describe fully the materials.

16.4.3 Conduit and Conduit Fittings

Conduit shall be rigid metal conduit, hot dip galvanized, conforming to ANSI Standard C80.1, "American Standard Specifications for Rigid Steel Conduit, Zinc Coated" unless shown otherwise in the drawings. The conduit fittings and covers, shall be galvanized, sherardized or cadmium plated, grey iron or malleable iron casting. Composite rubber gasket shall be provided on all openings requiring covers. Outlets and pull boxes shall be of size and type shown in the drawings.

16.4.4 Wires and Cables

A. All wires shall be copper, soft-dawn and annealed of 98% conductivity. These shall be smooth and true and of a cylindrical form and within 1% of the actual size called for.

B. All wires shall comply with Bureau of Product Standards and shall bear the PS label.

C. Wires shall be as manufactured locally as approved by the engineer.

16.4.5 Outlets

Each outlet in the wiring or raceway system shall be provided with an outlet box to suit the conditions encountered. Boxes for exposed work or in wet locations shall be of the cast metal type having threaded hubs. Boxes for concealed work shall be the cadmium-plated or zinc-coated sheet metal type. Each box shall have sufficient volume to accommodate the number of conductors entering the box in accordance with the requirements of the National Electrical Code / Philippine Electrical Code. Boxes shall not be less than 40mm deep unless lower boxes are required by structural conditions that are specifically approved by the Architect. Ceiling and bracket outlet boxes shall not be less than 100mm octagonal except that smaller boxes may be used where required by the particular fixtures to be installed. Switch and receptacle boxes shall be approximately 100mm x 54mm x 40mm. Telephone outlets shall be 100mm square except that 100mm x 54mm x 40mm boxes may be used where only one raceway enters the outlet. Boxes installed in concealed locations shall be set flush with the finished surfaces and shall be provided with the proper extension rings or plaster covers where required. Boxes shall be installed in a rigid satisfactory manner and shall be supported by bars hangers in frame construction or shall be fastened directly with wood. Location of outlets shown on the drawings are approximates; the Contractor shall study the building each outlet so that the lighting

c. Provide outline drawings with dimensions, and equipment ratings for voltage, amperage and short circuit.

D. SWITCH INTERIOR

1. All switches shall have switchblades that are visible when the switch is OFF and the cover is open.

2. Lugs shall be front removable and UL Listed for aluminum or copper [75o C conductors (30-100 Ampere) or 75oC conductors (200-600 Ampere)].

All current carrying parts shall be plated to resist corrosion.

E. SWITCH MECHANISM

Switch operating mechanism shall be quick-make, quick-break (60,100 and 200 ampere, 2-pole and 3-pole devices). Provisions for padlocking the switch in the OFF position with at least three padlocks shall be provided.

100 ampere, 3-pole Type 1 devices shall be supplied with a quick make, quick break dual cover interlock mechanism to prevent opening of the switch cover when the switch is ON and prevent turning the switch ON when cover is open. The interlock mechanism shall be capable of being bypassed by use of a special key supplied with the device.

16.4.10 Lamp and Lighting Fixtures

Lamp and lighting fixtures of type and sizes as specified in the drawings shall be furnished and installed complete.

1) Incandescent lamps shall be inside frosted lamp, 220 volts, wattage as indicated in the plan.
2) Fluorescent lamps shall be the pre-heat type, cool white color characteristics and shall have complete HPF ballast and starter. Or led driver.
3) Wall switches shall be of the totally enclosed type. Bodies shall be thermosetting plastic compound. Wiring terminals shall be of the screw type. Not more than three switches shall be installed in a single plate position.
4) Fixtures shall conform to Underwriters'" Laboratories, Inc. standard UL57. Fixtures are designated by letters and illustrated on the drawings. Illustrations shall be indicative of the general type desired and shall not restrict selection to fixtures of any particular manufacturer. Fixtures of similar design and equivalent light distribution and brightness characteristics having equal finish and quality may be acceptable but subject to the approval of the Architect.
5) Furnish all materials specified herein or indicated on the drawings.
6) All lighting fixtures, ballasts and lighting controls shall be UL listed and bear a UL label or IEC equivalent.
7) Fixtures shall be selected from fixture schedule from the description of the fixture with consideration to mounting, number and types of lamps, and reference notes contained in the fixture schedule and in accordance with these specifications. The fixture catalogue number is provided for easy reference only.
8) Ballasts and transformers shall be suitably rated for operation on electrical system voltage to which they are to be connected.
9) Acceptable Manufacturers: Philips, GE or approved equal.
10) Source bulbs from a single manufacturer for uniformity of color rendering indices.
11) Source all casing/luminaires from a single manufacturer to ensure uniformity.
12) Replace all dysfunctional accessories with new ones. All electrical and lighting fixtures shall be fully functional upon turnover of project.
13) Warrant lighting devices for two (2) years, or as required by legal codes.
14) PIN LIGHTS, RECESSED TYPE
    i.CASING: Recessed; ceiling mounted, flushed type, circular disc shape, 116mm diameter. Body of casing shall be of aluminum or steel make, hairline or satin finish.

B. INSTALLATION

1. When installing service electrical utilities, install such that facilitation of service maintenance, repair, and component replacement is not obstructed.

C. CLEANING AND PROTECTION

1. Replace all broken parts, i.e. ballasts, lamps, and casings damaged during construction.
2. Ensure luminaires are dust free at the time of substantial completion.
3. Turnover extra material fixtures to owner for maintenance and parts replacements.

16.5 CCTV SYSTEM

16.5.1 General

The contractor shall furnish and install a complete, operational, Closed Circuit Television system as shown on the drawing and in accordance with these specifications.

All equipment, devices, materials and installation methods shall be applicable to the purpose/function, location and weather condition.

All equipment to be installed shall be brand new and shall include all accessory equipment required whether or not specifically mentioned in these specifications. If latest model of the indicated components herein are available, the contractor shall furnished the said latest model.

Any deviation from these specifications shall require the submittal of the proposed substitute's technical specification sheets and/or manufacturer's brochure properly highlighted to show that the proposed substitution/s meet or exceed the material and operational specifications set herein. Incomplete submittals may be rejected without the need of explanation.

Contractor shall also coordinate with the owner/user and/or architect the exact location of DVR and monitors prior to layout of conduits and cables.

16.5.2 Submittals

Manufacturers Submit data for all materials and equipment to be incorporated in the work. Submit shop drawings for the overall system and each major component. Drawing shall illustrate how each item of equipment will function, system schematic diagram, one line diagram and equipment layout. Submit three copies of operating and maintenance manual.

16.5.3 SYSTEM COMPONENTS

The system components shall consist of Indoor and outdoor Cameras, Digital Video Recorders, and Monitors.

Indoor Camera

- IP Rating: IP66
- Horizontal Resolution: 640 TVL, Effio-E DSP
- Minimum Illumination: 0.1 Lux at F1.2 (0 Lux When IR LED On)
- Lens: 3.6mm Fixed Lens
- S/N Ratio: More Than 52dB
- IR LEDs: 850μm, 24 IRS
- IR Distance: 70ft Depending on Scene Reflectance
- Day/Night: Auto ICR (IR Cut-Filter Removal)
- Video Standard: NTSC
- Electronic Shutter: Auto: 1/60-1/15,000 Sec
- Video Output: 1.0Vp-p, 75Ω, BNC

render the contractor liable for any additional material and/or equipment required for the proper installation and operation of the system.

Contractor shall also coordinate with the owner/user and/or architect the exact location of DVR and monitors prior to layout of conduits and cables.

16.5.5 GUARANTEE

All equipment to be furnished herein shall be guaranteed for one (1) full year to be free from defects in material and workmanship under normal use. The contractor shall have on hand service units and parts for any and all components in the system, which may require future service and/ or maintenance so as to minimize system down time.

16.6 STAND ALONE FIRE DETECTION AND ALARM SYSTEM (FDAS)

16.6.1 GENERAL:

The Contractor shall furnish and install a complete, operational Fire Detection and Alarm System (FDAS) as shown on the drawings and as covered by these specifications.

The entire installations shall conform to the latest edition of NEC Article 760 and NFA 72. All wiring shall be Circuit integrity (CI) type cable, UL Listed brand.

The entire system shall be the standard products of one manufacturer except where indicated and to ensure that it meets stringent Life Safety the Underwriter's Laboratories, Inc shall list standards. (UL) and Factory Mutual, Inc. (FM).

Only a duly authorized representative shall install the entire system of the manufacturer who shall be able to refer to existing similar installations 10 years or older in proper operation.

Any deviations or substitutions from these specifications shall require submittals to the consulting engineer for approval of original manufacturer's brochures, technical manuals and an original manufacturer's certification that the substitution proposed meets and/or exceeds the operational and material specifications set herein. The brochures and technical manuals shall clearly indicate by highlighting all particular entries showing conclusively point-by-point that the specifications are indeed met or exceeded. Acceptance of the system for installation shall not be construed to indicate that compliance with specifications has been attained. This shall be determined upon actual testing and observation of system operational features.

All FDAS panels, devices and components shall be of the latest model of its series, old models shall not be accepted. Indicated model in this specifications are current models, offer latest models available in the market.

. 16.5.2 Submittals

Manufacturers Submit data for all materials and equipment to be incorporated in the work. Submit shop drawings for the overall system and each major component. Drawing shall illustrate how each item of equipment will function, system schematic diagram, one line diagram and equipment layout. Submit three copies of operating and maintenance manual.

16.5.3 SYSTEM COMPONENTS

- Stand Alone Smoke Detector (here called smoke detector for short) detects smoke produced by a fire and gives alarm signals in time.
- Using optical smoke sensing parts and art of state production technologies, it has a stable performance, esthetical appearance and can be easily installed, no commission required. It is designed to monitor fires may occur in places such as houses, all kinds of shops, pubs, bars and etc.
- Built-in a buzzer can give an alarming sound aloud and silence it. Two AA 1.5V LR6 alkaline batteries will be operating up to three years.

This section shall include all labor, materials, equipment and the performance of all operations and connection with the supply and installation work of the air conditioning units, complete in strict accordance with this part of specifications and the applicable drawings and subject to the terms & conditions of the contract.

17.1.2 SCOPE OF WORK

a. WORK INCLUDED:

This includes furnishing of all materials, labor equipment & accessories for the complete Installation, testing & adjustment, ready for use of proposed air-conditioning System. Drawing and specifications are considered as mutually explanatory and all works called for by one and not the other shall be performed as though called for by both. In cases of conflicting information, the Architect and Engineer shall be notified at once in writing. Where incidental equipment or appurtenances are required, and not listed as shown, same shall be furnished as required for a complete air conditioning system. The work shall include, but not necessarily be limited to the following item.

1. Supply and installation of air-conditioning units as required in plans.
2. Supply & installation of liquid and suction lines as shown on plans.
3. Supply and installation of supports.
4. Furnish & install the insulated refrigerant copper tube and fittings
5. between the fan coil units and the air cooled condensing units for the
6. split type air-conditioning equipment.
7. *Supply & install the insulated condensate drain pipe from the*
8. different fan coil units to the nearest drain outlets.
9. Supply & install all the required equipment mounting supports on
10. wall/ceiling for the fan coil units and the foundation/support
11. requirement of the air cooled condensing units.
12. Testing & commissioning of entire system.

b. Drawings are intended to show general arrangement and approximate physical sizes of equipment diagrammatically. Every bolt, nut brace, struts, etc., is not necessarily indicated or specified; all such items as maybe required, necessary or incidental to the proper and dependable operation of each system being a requirement of this contract whether specifically referred to or not, must be supplied.

c. Work included in this specification shall consist of, but is not necessarily limited to the following items;
   - Arrange for, obtain and bear the cost of necessary permits, bonds and fees for the Mechanical work.
   - All permits fees, private or government shall be paid by the contractor.
   - Chipping & plastering works necessary for the area covered in the installation of air conditioning units.
   - *Furnish shop drawing and certificates of inspection.*
   - Periodically remove from the jobsite all rubbish and debris resulting from the mechanical work

d. The Contractor shall be deemed to visit the site and acquaint himself with the existing site conditions, means of access and take into account any feature that may affect his tender. No claim for his neglect to do so nor out of any misunderstanding on his part on these conditions shall be entertained. The Contractor shall be responsible for the proper coordination with other trade contractors

17.1.3 APPLICABLE SPECIFICATION, CODES, ORDINANCES, PERMITS AND FEES

17.1.3.1 The work covered in is to install according to the specifications, codes, ordinances and requirements of the following;

- The Philippine Mechanical Code
- National Building Code

17.1.6.4 Unless otherwise indicated or specified, all materials and equipment shall be installed in accordance with the manufacturer's recommendation and in accordance with Philippine Mechanical Code. Cutting structural members for passage of pipes and pipe hangers fastening will not be permitted.

17.1.7 AIRCONDITIONING UNITS

17.1.7.1 PRECISION AIR-CONDITIONING / AIR-CONDITIONING UNITS Split Type / Variable Refrigerant Type (VRF) Air Conditioning Units

Air conditioning units shall be split / VRF type, factory assembled, tested and pre-wired. They shall have the capacities at operating conditions as shown on the equipment schedule.

17.1.8 HANGERS & SUPPORT

17.1.8.1 Pipe Hangers: Steel flat bars, structural grade 7mm minimum thickness, with corrosion protection, shape/type as shown on plan and 13mm diameter bars with corrosion protection as shown on plans.

17.1.8.2 Hangers Installation

- Approved inserts may be used for the support of hangers, anchorage in concrete expansion shield should be used in a horizontal position of the side of the concrete beams and shall be above the bottom reinforcements.
- Increase couplings shall be attached immediately adjacent to the expansion shield.

17.1.9 PIPE SLEEVES

17.1.9.1 Pipe passing through concrete or masonry walls or concrete floors shall be provided with pipe sleeves fitted into place at the same time of construction. Each sleeve shall extend through its respective walls or floor, and be cut flush with each surface. Sleeves in bearing walls, waterproofing membrane floors and wet areas shall be steel pipe or cast iron pipes. Sleeves in non-bearing walls, floors, or ceiling may be steel pipe, cast iron pipe or galvanized sheet metal with lock type longitudinal beam.

17.1.10 MINOR MODIFICATIONS AND TIME COMPLETION

17.1.10.1 The plans as drawn should show conditions as accurately as it is possible to indicate them in scale. The plans are diagrammatically and do not necessarily show all fittings, it's necessary to fit the building conditions. The locations of valve fittings and the fixture shown on the plans are approximate. The Contractor shall be responsible for the proper location in order to make them coordinate with architectural details and instruction.

END OF SECTION