

TECHNICAL SPECIFICATIONS

Owner : **Philippine Carabao Center**
Project : **Completion of PCC Regional Milk Plant – Phase 2 (Training Center)**
Location : **PCC – USF, Ubay, Bohol**

1. GENERAL INTENTION AND APPLICATION

- a) This Schedule of Materials presents and defines the specific materials intended to be used for the different portions of the structure and to be incorporated in the construction of the project.
- b) This Schedule of Materials shall not be considered as entirely inclusive. It shall be the responsibility of the Contractor to thoroughly study and analyze the plans and specifications, and all their purposed of the various parts or the structures and its appendages. To determine the full extent of the needed materials, method, appliances, equipment, hardware and fixtures of the type and level of quality compatible with those herein specified or indicated in the plans, but which are reasonably inferred there from in order to make the building complete as required.
- c) This Schedule of materials and the Plans and Specifications are intended to complement each other; the Contractor shall provide what one calls for as if called for both.

2. MATERIAL AND WORKMANSHIP

The quality of materials shall be the best of their respective kinds for the intended purpose. All works shall be done in the best and most acceptable manner and on strict conformity with the requirements of the Plans and Specifications and Schedule of Materials.

Sample of all finishing materials, including manufacturer’s certificates shall be submitted by the Contractor for approval by the Architect prior to their purchase, installation or incorporation into the construction. Such required samples shall be furnished free of expenses to the Owner and property marked for identification. The works shall be in accordance with the approved samples. Materials and articles installed or used without such approval of the Architect shall be rejected.

3. GENERAL NOTES

- a) In order that bids will be compared fairly and equally, all proposals shall be based on estimated and materials and of the specific brands mentioned in this Scheduled Materials.
- b) Materials and equipment designated in these Specifications are given as standards. This implies no right on the part of the Contractor or his sub-contractors to contribute other materials for those specified, except the manner herein described.
- c) References in the specifications or in the drawings to specific manufacturer's products or to trades names is for the purposed of establishing the standards of quality demanded. Such references is not intended to be restrictive, and, except where a specific product is necessary to match existing materials or items, the Contractor may apply to the Architect in writing in permission to substitute materials or items other than those specified or implied.

4. SITEWORKS

4.1 Description

Siteworks work consists of site clearance, survey, cutting, imported fill, embankment and construction of ditches for drainage. Work of this section includes all measurement and materials required to complete the supply, execution and construction of site preparation.

4.2 Clearing and Grabbing

The contractor shall clear from all areas planned for the work, all buildings, materials, debris, prior to the cutting and filling work taking all necessary precautions to prevent damage to existing road structures and buildings on other facilities, in the area, which shall not be demolished.

4.3 Survey

Prior to commencement of the work, the contractor shall check the existing bench marks and reference points located in or out of the site as indicated. The contractor shall establish newly standard bench marks and points for the work within the site with the agreement with the Engineer.

5. EARTH WORK

5.1 Scope of Work

Earth works consists of excavation, back filling and disposal of surplus material. Work of this section includes all measure and materials required to complete the design supply, support, use, construction, removal of earth work.

5.2 Excavation

The ground shall be excavated to the lengths, widths and exact depths required for the construction of the works. The contractor shall examine any unsuitable or weak ground materials, standards of which are given below and shall report the situation in writing to the Engineer before executing.

All excavation works shall be kept dry and clean in order that work may not be interfered by water entering the excavation. The contractor shall pump out all water which may occur into the excavation employing such equipment as engines, pumps pipe work, chutes and other necessary to keep the water level below the bottom of the permanent work during the period requirement of the Engineer, raised water shall be conveyed away in such manners as not to cause any nuisance or injury of the occupants of site. If pumping is required it shall be carried out continuously and may not be stopped without the permission of the Engineer.

The sides of the excavation shall be supported as necessary to maintain a vertical face and to prevent fall of any nature at any time during the duration of the excavation. The contractor shall be responsible of the design, supply, fixing and removal of the shoring, sheet piling or any works required to support the side of the excavation.

It is also the contractor's responsibility to protect existing structures and utilities from damage or interruption of service due to excavation work.

5.3 Backfilling

Excavation shall not be backfilled until such structures and properties as drainage, insulation pipes, construction details, and water tightness have been inspected, tested and approved by the Engineer. All backfill material shall be approved and free from vegetable or organic material, mud, refuse, boulders, stones of over 15cm shall be carried out in such away and such generous depths to ensure that the final surfaces after settlement and compaction conforms to the levels indicated in the drawings and specifications.

5.4 Compaction

All soil fill material used shall be thoroughly compacted by mechanical means until the specified degree of compaction is obtained. The filling material shall be approved by the Engineer and placed of even layers of the depth not greater

than 30cm. A power roller of at least 10 tons shall make at least 10 trips for each layer unless specified.

Every effort shall be made to compact the fill of the material at its optimum moisture content for compaction. In any case, the dry density of compacted soil shall not be less than 95% of the value obtained in the standard laboratory test. When spade will not permit the use of rollers, other types of approved equipment shall be used to achieve the same degree of compaction specified. Filling and compacting around pipes, cables and conduits shall be done by hands using selected materials to depth of the least 50cm above such pipes, cables and conduit.

6. STRUCTURAL SPECIFICATIONS

6.1 Concrete

F_{cl} = 20.7 Mpa (3000 psi) for wall footing, column, beams, slab on grade and pedestal.

6.1.1 Cement

Portland cement for all structural concrete shall conform to ASTM C 150, for all concrete construction below ground level and water retaining structures, sulfate resisting Portland cement type II of ASTM C150 or equivalent shall be used and for above ground level type I shall be used. The contractor shall provide appropriate dry, well ventilated weather and water proof sheds of capacity sufficient to store cement so that the cement can be stored in such a manner as to prevent deterioration or intrusion of foreign matter. The cement shall be used as soon as possible after delivery.

6.1.2 Aggregates

All aggregates shall conform to the requirements of ASTM C 150 or equivalent and locally available aggregates failing to meet above mentioned specifications but which have been shown by special test or to actual service to produce concrete of adequate strength and durability maybe used when authorized by the Engineer. The aggregates shall be dense, hard durable and free from harmful amount of reactive minerals and other chemical compound and shall conform to the above mentioned standards. Samples of aggregates used in the work shall be provided from the same aggregates resources stockpile at the site and be submitted to the laboratory authorized by the employer and the written approval of the authorized laboratory shall be given to the Engineer.

6.1.3 Water

Water use in mixing concrete shall be clean and free from injurious of oils, acids, alkalis, salts, organic material or other substance which maybe deleterious to concrete or reinforcement. The temperature of water use for making concrete in hot weather shall be low enough to attain the proper mixing temperature of concrete, and in any case shall be lower than 30 degree centigrade. The contractor shall store on the site an adequate supply of fresh water to meet all needs.

6.1.4 Concrete Mixes

Concrete shall be proportioned to have the following specified compressive strengths, as determined by the specified testing and test evaluation procedure; specified compressive strength (fc) shall be as indicated in the drawings.

6.1.5 Water-Cement Ratio

Water-Cement Ratio shall be determined so as to achieve the required workability and to obtain the specified concrete strength which shall be subject to the approval of the Engineer.

6.1.6 Curing

Curing shall start as soon as practical after placing or finishing concrete shall be cured with water unless membrane curing is employed. The surface of place concrete shall be covered with damped mats or other approved materials for a suffocation period taking into consideration weather condition during the period. Horizontal surfaces shall be covered by a suitable methods so as to avoid the effect of sunshine, drying wind and other harmful effects, vertical surfaces such as walls and column sides shall be wetted for a sufficient period by sprinkling water to forms or other suitable methods.

6.1.7 Test of Concrete

Work cylinder test shall be made of concrete sampled during the works. Samples shall be taken for each new grade concrete, for each 100 m3 of concrete when the same grade is being used continuously, except for lean concrete and other non-load bearing concrete. The number of all test shall not less than 3 for each compressive strength test, all test shall performed in accordance of ASTM C. 39, and shall be carried out in an authorized laboratory. If the result of the 28 day test is unsatisfactory, all concrete work shall be stopped and shall not proceed further without the written permission of the Engineer. If

the test prove that the concrete is not satisfactory it shall be cut out, removed and replaced by the contractor.

6.2 Reinforcing Steel

FY = 230 Mpa for wall footing, column pedestal, column Beams and slab on grade.

6.2.1 Reinforcement

This article should be apply to the fabrication and erection of reinforcing the steel bars. The materials to be used shall be specified in section 6.2 of this specification.

Bars shall be tied at all intersections excepts where spacing is less than 30 mm in each direction, when alternate intersections shall be tied. Distance from the forms shall be maintained by means of stays, blocks, hangers or other approved supports. Blocks for holding reinforcement from contacts with the forms shall be pre-cast mortar blocks of approved shape or dimensions of approved chairs. Layers of bars shall, be separated by pre-cast mortar blocks or by other equally suitable devices.

The use of pebbles, pieces of broken stone or bricks, metal pipe and wooden blocks or metal chairs shall not be permitted. Unless otherwise on the drawings or required by the structural Engineer, the minimum distance between bars shall be 400mm. Reinforcement in any member shall be placed and then expected and approved by the Engineer before the placing of concrete commences. Bundled bars shall be tied together by not more than 1.80 meters intervals. It shall be supported by suitable chairs and spaces or by metal hangers. On the ground and where otherwise subject to corrosion, concrete or other suitable no corrodible materials shall be use for supporting reinforcement. Where the concrete surface will be exposed to the weather in the finish structure or where rust would impair the appearance or finish of the structure, all reinforcement supports, within specified concrete covers, shall be galvanized or made of a suitable non-corrodible material. Concrete all be protection for reinforcement shall be as indicated, in accordance with ACI 318.

6.2.2 Bending and Anchorage

Building specifications shall be drawn as applicable with the accordance with the approved codes, and each reinforcement bars shall be bent to the exact

dimensions specified to the relevant specifications. Bars shall not be welded without the approval of the Engineer, all splices or overlaps shall comply entirely with the requirements of proved.

6.2.3 Fixing of Reinforcement

The steel reinforcement shall be assembled to the exact shapes and dimensions as approved by the Engineer. The rods shall have the approved cross-sectional area and shall be fixed accurately in the moulds. The ends of all tying wires shall be tued to main body of the concrete and shall be allowed to project towards the surface. Spacing blocks shall be used to ensure accurate cover to the reinforcement and these blocks shall be of precast concrete of strength at least equal to that of the concrete being placed.

No temporary supports for the reinforcement shall be allowed to be reinforcement shall have been thoroughly cleaned and made free of all loss rust.

Unless otherwise specified or shown on the drawings, minimum cover shall be determined in accordance of AC 318-77 as indicated on the following table.

DESCRIPTION	Min. Cover Thickness
Cast against and permanently exposed to Earth	75 mm
Expose to Earth and weather	40-50 mm
Not exposed to weather and Earth	20-40 mm

6.2.4 Splices

Generally, avoid splices in slabs, beams and girders at points of maximum stress. Splices maybe allowed only as shown or noted in the plans.

Splices in adjacent shall be staggered a minimum distance of 40 bar diameters.

6.2.5 Form Work

This section covers the fabrication, erection and removal of forms and other necessary works thereof, including material and design of forms. All works covered by this sections shall conform to ACI 347.

6.3 Masonry

$f_{cl} = 4.83 \text{ Mpa (700 psi)}$ for all CHB wall.

6.3.1 Mortar

All mortar of concrete blocks shall conform to ASTM C-476-71, 2500 psi in 28 days, and shall consist of one part Portland cement by volume, $\frac{1}{4}$ part hydrated lime and 3 parts damp, loose sand, plus water.

6.2.3 Reinforcing Steel

All reinforcement steel for concrete masonry units shall be structural grade, billet steel deformed bars conforming to the requirements of ASTM A-615 with yield strength of 230 Mpa.

6.3.3 Water

Water used in mixing mortar shall be clean and free from injurious amounts of oil, acid, alkalies, salt, organic materials or other substance that may be deleterious to concrete or steel.

6.3.4 Grout

All grout shall be machine-mixed in accordance with ASTM C-94 and shall consist of one part Portland cement, 2 $\frac{1}{2}$ part sand, 2 part sea gravel, and adequate water to produce a concrete of 10 inches slump, and shall have an ultimate compressive strength of 200 psi of 28 days.

6.4 Structural Steel

$F_y = 250 \text{ Mpa (A-36)}$ for roof framing and all other steel.

All anchor/machine bolts shall conform to ASTM A-325.

6.4.1 Rolled Heavy Shapes

ASTM A6/A6M hot-rolled shape with a flange thickness exceeding 2 in. (50 mm) are considered to be rolled heavy shapes. Rolled heavy shapes used as

members subject to primary tensile forces due to tension or flexure and sliced or connected using complete-joint-penetration groove welds that fuse through the thickness of the flange of the web. The structural design documents shall require that such shapes be supplied with Charpy V-notch (CVN) impact test results in accordance with ASTM A6/A6M, Supplementary Requirement S30, with Charpy V-notch impact test for Structural-Shapes Alternate Core Location. The impact test shall meet a minimum average value of 20 ft-lb (27 J) absorbed energy at a maximum temperature of +70 (+21°C).

6.4.2 Bolts, Washers and Nuts

Bolt, washer and nut material conforming to one of the following ASTM specification is specified in section 6.4 of this specification.

6.4.3 Welding

Must conform welding electrodes for manual shielded metal-arc welding to E60 series of ASTM Specifications A233 and to AWS Specification A5.1 & A5.5.

6.4.4 Test of Concrete Structural Steel

Materials test reports made by the fabricator or a testing laboratory shall constitute sufficient evidence of conformity with one of the ASTM standards listed in Section A3.1a. For hot-rolled structural shapes, plates and bars such test shall be made in accordance with ASTM A568/A568M; for tubing and pipe such, test shall be made in accordance with the requirement of the applicable ASTM standards listed above for those product forms.

7. Finishes

7.1 Cement Finishes

All masonry unit work not specified with finishing expose to view shall be cement plastered. Plastering work shall be coordinated. Scaffolding shall be amply strong, well braced, tied securely and inspected regularly. Over loading of scaffolding shall not be permitted.

- ❖ Wall finishes – all interior CHB wall should be leveled and plaster cement finish.
- ❖ Wall Finish – all Exterior CHB wall should be plaster cement finish.

7.2 Ceramic Tile Work

The ceramic tiles in flooring and dado shall be of first class quality as specified the item specification and shall be approved by the Engineer. The tiles shall be of standard size without warp and of straight edges, true and even shape and size and of uniform color the tile surface shall be of fine gray texture, dense and homogeneous. The thickness of the tile shall as per the item specification. The tiles shall be submerged in water till the bubbles cease. Before spreading the setting bed, establish lines of borders and center of the fieldwork in both directions to permit the pattern to be laid with a minimum of cut tiles.

Clean concrete sub-floor then moisten but not soak. Afterwards sprinkle and spread the mortar on the setting bed.

Keep tile joints parallel and straight over the entire area by using edges.

7.3 Painting

The work to be executed under this section shall include the furnishing of all materials, labor, tools and ladders, scaffolding and other facilities necessary for the satisfactory performance of all work necessary to complete all surfaces throughout the interior and exterior of building, except as otherwise specified.

The contractors, providing the labor, materials or both for this project are specifically referred to the General Contractor plans, to the General Conditions of the specifications, to all the sections of the specifications and to the various other sub-contract documents which may affect the completion of any sub-contract work.

The contractor shall examine all section of this specification and perform all paintings called for the rein.

7.3.1 Materials

All paint materials shall meet the requirements of the Philippine National Standard Specification for Painting. Paint shall be brought to the site in tightly closable containers, if nothing in the contrary is stipulated in the specifications. The containers shall be marked in a durable manner with the following:

❖ Maker

- ❖ Paint and relevant thinner
- ❖ Gross and net weights
- ❖ Date of supply by the maker's factory

The openings of the containers shall leave enough room for a stirring appliance. All containers shall be kept tightly closed until the contents are to be used. Immediately prior to use of the contents and before pouring into smaller containers for working purposes, any skin shall be removed and the contents stirred thoroughly, if necessary with a stirring appliance.

Paints, thinners and filling cements which are not required for immediate use shall be protected against the action of roast and heat. Only thinners supplied by the makers or paints of those described by them as suitable shall be use for adjusting paints for working consistency. The instructions of the maker shall be followed in this respect.

The quality of paints shall be from no solid sediment and most slight skin in an unopened containers within 6 months calculated from the makers delivery date. A paint has formed a solid sediment or more than just slight skin in a container by the time of use. Sediment shall be regarded as solid if it cannot be dispelled quickly and complete by stirring.

7.3.2 Colors and Samples

All colors shall be subjected to the approval of the Architect. Tinting of matching colors shall be done under the supervision of the Architect. In all cases, a sample shall be applied on the job and the architect must give his approval before work is commenced. If required, 3 panels, 200 mm x 250 mm (8" x 10") of each color and finish shall be prepared in advance.

7.3.3 Workmanship

All work shall be done by skilled mechanics in a workmanlike manner. All painting materials shall meet the requirements of stress and shall be in accordance with the relevant standards. All coatings shall be of proper consistency and well brushed so as to show the minimum of brush marks. All brushes shall be clean and in a good condition, with heavy brushes preferred. Light brushes shall be clean and in a good condition, with heavy brushes preferred.

No painting shall be done under conditions that are unsuitable for the production of good result. No oil painting shall be done in damp weather.

Application of succeeding coats shall strictly follow the over-coating times specified by the paint manufacturer. Exterior painting under wet conditions is not allowed. Painting coats are intended to cover the surfaces perfectly, further coat shall be applied to attain the desired evenness of the paint application.

All finish shall be uniform as to sheen, color and texture, except when glazing is required.

7.3.4 Paint Application

Materials, which are subject to working instructions, shall be treated according to these instructions, unless stipulated differently by the relevant paint manufacturer.

Paint, gloss and coating may be worked manually or by machines, unless a particular execution has been stipulated in the specifications. The surface shall be smooth, if not otherwise stipulated in the specifications, such as finely or coarsely granulated.

Any paint, gloss and coating shall be applied without filling to create a uniform surface, a flowing surface with the required materials according to instruction manuals, of white or light shade, unless otherwise stated in the specifications.

Drying periods prescribed by the manufacturer shall be observed, for open surfaces, as well as for edges or irregular surfaces. All edges at doors, windows, skirting, sockets shall be of sharp and straight line.

New concrete and masonry surfaces must be thoroughly naturalized either by brush or spray with a solution of 2 kg of zinc sulfate to each gallon of water. Surfaces shall be tested to ascertain that alkalinity is removed; otherwise a second treatment with the same solution shall be applied.

Metal works shall be kept clean and free from corrosion following installation. Abraded surfaces shall be retouched prior to finish painting using the same type of paint as prime coat. Galvanized metal shall be weathered or pickled with the approved metal primer in accordance with printed instruction of the manufacturer.

Where components parts of steel or aluminum alloys meet, joints shall be sealed so that no moisture can penetrate between the contact surfaces. Rivet and bolt heads, protruding corners, sharp section edges and places of difficult access shall be pre-treated.

The paint shall be applied in coats which are as uniform as possible. The first priming coat shall be applied by brush. Further coats shall be by brush if nothing to the contrary is stipulated in the Specifications.

Smaller and specially shaped brushes shall be used for rivet and bolt heads, protruding corners, sharp section edges and places of difficult access. When applying paint by spray-gun, the object to be sprayed shall not be contaminated by water or oil in the compressed air.

7.4 Aluminum Composite Panel

Aluminum Composite Panel (ACP) must be composed of polyethylene core sandwiched between the two sheets of aluminum. It must be strong, lightweight approximately 5.5 kg/per sq.m. but must be exceptionally flat.

7.4.2 Composition

- Two sheets of aluminum
- Front side aluminum coated with polyvinylidene fluoride PVDF
- Core is made with anti-toxic low density polyethylene @ (0.92 g/sq.cm)
- Rear side aluminum coated with chrome polyester. Thickness must be 4mm, minimum standard.

7.4.3 Framing

Framing must be made of aluminum to prevent corrosion of the panels.

8. Panel Doors, Aluminum Doors, Windows and Frames

This section includes all labor, equipment and the performances of all operations necessary to furnish and install all aluminum doors, windows and frames of the project as indicated on drawings and specifications. All related works needed to have this work completed shall also form part of this section.

8.1 Samples

Samples of aluminum doors and windows shall be one full size of each door and window type complete with hardware and accessories and submitted to the Architect for approval.

8.2 Product Handling

Use care in handling materials during transportation and at the job site Store upright on wood platform in a dry location and undercover. Factory finish-painted doors and frames shall be individually packed in polyethylene sheets and cartons to prevent damage to finish and shall be properly stored.

8.3 Materials

8.3.1 Aluminum

Aluminum shall be extruded aluminum. All aluminum section shall be 6063-T5 alloy and all casting shall be S43 alloy. All aluminum section shall be fabricated of the brand approved by the Architect. This specification shall also be for the aluminum encasement for the deformed bar grillwork.

8.3.2 Finish

Finish for all aluminum doors, windows and frames shall be as approved by the Architect.

8.4 Installation

All frames shall be rigidly installed, plumed and in true alignment. Follow with strict compliance the manufacturer's instruction for installation.

8.5 Workmanship

All joints in frames shall be accurately milled to hair line crack, securely reinforced, weathered and joined by means of concealed fastening whenever possible.

8.6 Cleaning

Doors and frames shall be cleaned with soap and water using a stiff fiber brush and rinsed thoroughly with water. When the frames have been discolored, the contractor shall be responsible to return the frames to its original finish in accordance with the manufacturer's recommendation at his own cost.

9. Thermal and Moisture Protection

Furnish materials and equipment perform labor required to complete fitting and installation of ribbed metal roofing, flashing components, strap and rivet units as well as the application of supplementary materials to make the roof water tight and leak proof.

9.1 Materials

All materials and works shall conform to the provisions of the latest edition of the American Standards for testing and materials (ASTM), Philippine National Standards (PNS), National Building Code of the Philippines and other applicable standards both local and international.

Copy of certification of product conformity to BPS and other standards shall be furnished by the contractor and submitted to the procuring Entity.

9.1.1 Technical Parameters

Roof sheets and roof accessories

- ❖ All pre-painted metal sheet and roofing accessories shall be oven baked painted.
- ❖ Base metal for the pre-painted roofing accessories shall be gauge 24 thick cold rolled galvanized iron sheets.
- ❖ Fasteners shall be threaded cutting screw no.12 x 63mm long hexagonal head with neoprene washers.

9.1.2 Rust-proofing of the roof framing members

- ❖ All materials shall meet the requirements of Standard Specifications of the Standardization Committee on Supplies
- ❖ All paint materials shall be delivered on the job-site in their original containers with labels and sealed unbroken.
- ❖ Base coat shall be epoxy primer of approved brand or red oxide metal primer.

10. Plumbing Works

The work to be done under this division of the specifications of the fabrication, complete in all details, of the plumbing works at the subject premises and all the materials incidental to the proper completion of the installation, except those portion of the work which are expressly stated to be done by others. All works shall be in accordance with the governing Codes and Regulations and with the specifications, except where the same shall conflict with such codes, etc. which later shall then govern. The requirements in regards to materials and workmanship specify the required standards for the furnishings of all labor, materials and appliances necessary for the completion of the work specified herein and indicated in the drawings.

10.1 Codes and Standards

- ❖ PHILIPPINE NATIONAL BUILDING CODE

- ❖ REGULATION OF LOCAL WATERWORKS & SEWERAGE AUTHORITY
- ❖ UNIFORM PLUMBING CODE (UPC)
- ❖ AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)
- ❖ AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)
- ❖ NATIONAL FIRE PROTECTION ASSOCIATION(NFPA)
- ❖ MAREICAN WATERWORKS ASSOCIATION (AWWA)
- ❖ FACTORY MUTUAL (FM)
- ❖ NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

10.2 Materials

All materials shall be used, shall be new and shall conform with the reference codes and standards. Use or materials shall be governed by other requirements, imposed on other sections of these specifications.

10.2.1 Identification of Materials

Each length of pipes, fittings,, traps, fixtures and devise used in the plumbing system shall be case. Stamped or indelibly marked on it's manufacture trademark or name, weight, type and classes or product when required by the standard mentioned above.

10.2.4 Concrete Piping

- ❖ Type – concrete Pipes, ASTM C-78
- ❖ Minimum wall thickness- Plain concrete for 250 mm and smaller pipes, Reinforced concrete for 300 mm and bigger pipes, class IV
- ❖ Joints – Male and Female groove
- ❖ Pipe sealant-cement grout
- ❖ Application – Exterior storm drain piping

10.2.5 Toilet Accessories

Furnish materials and equipment and performed labor required to complete all.

See drawings and details for sizes and locations of work required.

11. Electrical

The general conditions and provisions of the civil works contract, not in conflict with these specifications and drawings, form part of and are included in this section of these specifications.

11.1 Wiring Methods

Wiring shall be Rigid Steel Conduit (RSC) and corrugated, flexible PVC conduit.

11.2 Grounding

Ground resistance shall not exceed 0.5 ohms. Additional ground rods shall be installed when necessary to obtain this amount. Exposed or accessible ground clamps, pressure connectors or ground connections shall be brazed. The CONTRACTOR'S attention is especially called to the double lockout requirements of Rule 2808 of the Philippine Electrical Codes for conduits containing conductors operating at more than 250 volts to ground.

11.3 Panel Boards

Panel board and cabinets shall be specified elsewhere in these Specifications.

Panel board shall be mounted with their centers at 1.4 meters above the floor unless otherwise dictated by field conditions.

11.4 Wires and Cables

Wires, cables and boxes shall be specified elsewhere in the Plan. No wires shall be drawn into the raceway until works which may cause injury to the wires is completed and until permission is granted by the Engineer in writing. Only powdered lubricant not injurious to cable insulations and raceways shall be used, only when lubrication is necessary.

11.5 Outlets, Switches and Junction Boxes

The Contractor shall install standard boxes at all outlets for lights, power and switches and other points as required by the construction. Boxes shall be of approved design and of such form and dimension as required to serve the kind of fixtures to be used and the number, sizes and arrangement of conduits connecting thereof. The allowable conductor fills as given in Rule 2486 of the Philippine Electrical Code should not be exceeded.

Boxes for outlets on auxiliary systems shall be specified elsewhere in these Specifications or shown in the drawings. All boxes of whatever kind, for all systems shall be provided with a suitable fitting which shall be either a box or other device of locknut and bushing to receive and hold device or fitting to mounted.

11.6 Conduits

Conduit system shall be as specified elsewhere in these Specifications.

Not more than four 90 degrees bends shall occur in any run. When it becomes necessary to have more than four 90 degree bends in any run, an intermediate pull box shall be installed to facilitate the pulling-in of wires.

All conduit runs shall be as called for in drawings. Conduits shall be installed in such a manner as not to weaken or interfere with structure of the building conduits and tubings shall be concealed within finish walls, ceilings, steel, framings or floor slabs. Exposed conduits shall be run parallel to at right angles with lines of the building and shall be securely fastened to walls by means of screws or bolts with expansion sleeves.

Field made bends and offsets shall be avoided when possible, but when necessary shall be made with accordance with manufacturer's recommendations. Trapped raceways shall be avoided where possible. Care shall be made to avoid lodgment of dirt or trash in the conduits, tubing, fitting and equipment during the course of the construction.

11.7 Lightning Fixtures

The Contractor shall furnish and install all lighting fixtures as indicated in the Drawings.

11.8 Shop Drawings and As-Built Drawings

The contractor shall submit to the Engineer with such promptness as not to cause delay in his work or that of any CONTRACTOR, two (2) copies of all shop drawings and schedules required by the work. The Contractor shall make corrections required by the Engineer and submit two (2) corrected copies and other copies as needed. The Engineer's approval of such drawings shall not relieve the C of responsibilities for errors of any sorts.

Upon completion of the project, the Contractor shall submit to the O three (3) sets of "AS-BUILT" drawings which shall be identical to the CONTRACT DRAWINGS except for the said changes and deviations.

11.9 Inspection and Tests

The Engineer or his representative shall be allowed to access to all parts of the works at all time and the Contractor shall furnish such information and assistance as maybe required to make a detailed inspection. Materials and installations shall be subjected to tests as are deemed necessary by the Engineer to properly ascertain their fitness both during and after installation is completed. The cost of such tests shall be borne by the Contractor.

12. SCHEDULE OF MATERIALS REFERENCES

ITEM	BRAND & SUPPLIER	TEL NO.
A. Structural		
- Reinforcing Steel & - Structural Steel	LM Commercial or Approved equal	
B. Masonry		
- CHB	Darunday Construction Supplies Or Approved equal	
C. Tinsmitry		
- G.A.26 Prepainted Rib-type long span Roofing	DN Steel or Approved equal	
- Aluminum Composite Panel (4mmthk.)	DN Steel or Approved equal	
D. Finishes		
- Floor and wall tiles	Mariwasa or Approved equal	
- Paint	Boysen or Approved equal	
E. Doors and Windows		
-(Alum. & glass) Doors & Windows	BQ Glass Masters or Approved equal	
F. Plumbing & Sanitary		
- Plumbing Fixtures (water closet,lavatory etc.)	La FONZA or Approved equal	
- PVC pipes	Atlanta or Approved equal	

G. Electrical

- Lighting fixtures Royu/Philips or Approved equal
- (switches,conv.outlet
Etc.)
- Wiring devices
- Wires & cables Duraflex
- Conduit pipes &Neltex
Fittings w/ supports

H. Furniture & other improvements

- Office table, work station Macro furniture inc. or
- Office chair, cashier station Approved equal
- Dining table, dining chair
- Cabinet, bed.etc.

Prepared and submitted by:

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