

XII. Reinforcing Steel Bars

This item shall consist of furnishing, bending, fabricating, and placing of steel reinforcement of the type, size, shape, and grade required per standard specifications and in conformity with the requirements shown on the plans or as directed by the Engineer.

1. The Reinforcing Steel Bars shall conform to the latest specification of the ACI and the National Structural Code of the Philippines with a minimum grade equivalent to Grade 40 (276 MPa) unless otherwise specified or as directed by the Engineer.
2. Shop drawings/ Rebar cutting list shall be submitted by the Contractor for TPC approval before rebar fabrication and installation.
3. Submission of shop drawings/Rebar Cutting list for evaluation/ approval shall be submitted 7 days before rebar fabrication.
4. All cut off points of RSB in all tie beams, suspended beams, and girder must be observed as specified on plans and as per approved design and as per standard construction practices and methodology.
5. Reinforcing Steel bars shall undergo material testing for strength verification.
6. The Contractor shall submit to the TPC and PMC a mill certificate of reinforcing steel bars for yield strength verification and its content.
7. Steel bars shall not be coated with form oil.
8. Standard hooks, Splicing, and Development length shall be observed on site.
9. All Hooks for stirrup/lateral ties and main reinforcement shall be seismic hooks.
10. This scope includes all reinforcing bars required for reinforced concrete works including other items where it is necessary as per plan and specifications.

XIII. Structural Concrete

This item shall consist of furnishing, placing, and finishing concrete in all structures **except pavements** per this Specification and conforming to the lines, grades, and dimensions shown on the plans. Concrete shall consist of a mixture of Portland cement, fine aggregate, coarse aggregate, admixture when specified, and water mixed in the proportions specified or approved by the Engineer.

1. Structural concrete must attain a minimum compressive strength $f_c' = 21.0$ MPa (3000 Psi) at 28 days and as per structural specification.
2. Use clean fine aggregates & crushed gravel (maximum 19mm \emptyset) as per plan and structural specification for Structural members. The use of uncrushed gravel is prohibited.
3. Concrete pouring of columns shall be terminated anywhere within the upper thirds of the column clear height.
4. Monolithic concrete pouring of slab on fill/suspended slab/girder and beams shall be observed.
5. This scope includes the concrete pouring of the framing system before masonry works.
6. Proper concrete sampling and testing shall be done on-site as per specifications.
7. Proper concrete curing must be observed on site.
8. Lean concrete must be provided for column footings with a minimum thickness of 50mm.
9. Proper concrete pouring methodology shall be observed on-site to avoid the segregation of aggregates.
10. This scope includes all reinforced concrete works (See detail of column footing, column, tie beams, beams and girders, ramps, stairs, lintel Beams, canopies, concrete baffles, and sun-breakers, and slabs).
11. Structural Concrete shall attain its acceptable strength before Stripping/Dismantling of bottom forms.

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12. This scope also includes the construction of foundation, column footings, columns, tie beams, girders, beams, slab-on-grade, suspended slabs, canopies, and other items necessary as per plan and specifications.

PART C. STRUCTURAL STEEL AND ROOFING WORKS

XIV. STRUCTURAL STEEL WORKS

This item shall consist of steel structures and the steel structure portions of composite structures, constructed in reasonably close conformity with the lines, grades and dimensions shown on the plans or established by the Engineer

The work will include the furnishing, fabricating, hauling, erecting, welding and painting of structural metals called for in the special provisions or shown on the plans. Structural metals will include structural steel, rivet, welding, special and alloy steels, steel forgings and iron castings. This work will also include any incidental metal construction not otherwise provided for, all in accordance with these specifications, plans and special provisions.

1. All materials to be incorporated in the metal works shall be of good quality. Before incorporation in work, all materials shall have been inspected/accepted by the Project Monitoring Committee.
2. Structural material either plain or fabricated shall be stored above the ground upon platforms, skids or other supports. It shall be kept free from dirt, grease or other foreign matter and shall be protected as far as practicable from corrosion.
3. Structural Steel Frames need be coated with Red Oxide Primer prior to installation and/or after welding works were done.
4. No welding works shall be done on areas coated with paint.
5. Shop drawings shall be submitted by the contractor for TPC approval prior to fabrication and installation.
6. Submission of shop drawings for evaluation/approval shall be submitted 7 days prior to fabrication and installation.
7. Workmanship and finish shall be in accordance with the best general practice. Portions of the work exposed to view shall be finished neatly. Shearing, flame cutting, and chipping shall be done carefully and accurately.
8. All materials for metal works to be used shall be brand new. Usage of scrap and tarnishing metals is strictly prohibited. The Contractor shall promptly remove and replace any scrap, old, and used materials installed on site.
9. The Contractor shall deliver all materials to be used in accordance with the required specifications as follows:

XIV.A. Structural Steel Roof Truss

- a. Use 2L50x50x6mm thk angle bars for top and bottom chord for truss 1 and lateral truss. (see detail for verification)
- b. Use 2L75x75x6mm thk angle bars for top and bottom chord for truss 2. (see detail for verification)
- c. Use 2L50x50x6mm thk angle bars for verticals and diagonal members of all trusses. (UNO)
- d. Structural Steel Frames shall conform to ASTM A36 (248 MPa).
- e. All connections shall be full weld with minimum thickness of 6mm.

XIV.B. Structural Steel Purlins

- a. Provide and install LC150x50x25x2.0mm thk. cold form purlins spaced @ 600mm o.c.
- b. Steel Purlins yield strength must be 245 MPa.
- c. Connections shall be spot weld.

XIV.C. Metal Structure Accessories (Anchor Bolts)

- a. Provide and install 16mm diameter A325 anchor bolts with standard nuts and washers specified as per plan.

XIV.D. Metal Structure Accessories (Steel Plates)

- a. Provide and install 16mm A36 thick Base Plate and 6mm thk. Gusset Plate as per plan.
- b. All connections shall be full weld with minimum thickness of 6mm.

XIV.E. Metal Structure Accessories (Sagrods)

- a. Provide and install 10mm sagrods (Grade 40) as per plan.
- b. Connections shall be spot weld.

XV. Roofing Sheets and Accessories

The work includes all labor, materials, tools and equipment necessary to install roofing materials and all appurtenant work in connection with the work as shown on the Drawing/Plans and as specified herein.

1. Use Long Span Pre-painted G.I. Roofing Sheets (Forest Green) with total coated thickness of 0.50mm. Adopt 1 ½ side corrugations.
2. Provide Pre-Painted Ridge Roll and Pre-Painted Hip Roll with total coated thickness of 0.60mm. Adopt 300mm standard end lapping. Lay a bead of sealant where the next piece of ridge/valley roll will overlap. Make sure to fastening the ridge/valley roll properly spaced at 100mm.
3. This item also includes roof insulation as per plan.
4. Use 6mmØ J-Bolts with neoprene washer for Metal Purlins spaced at every two corrugations.
5. Provide masonry wall or roof enclosure at the junction of the new and existing roofing.
6. In laying out the placement of J-bolts, make sure that it will be aligned right in the middle of the purlins to fasten it accurately. Drilling points should be located at the crown of every two corrugations of the roofing material. Lay a bead of sealant at every drilling point.
7. If needed, provide a guide chord stretched out from end to end of the purlin to establish the desired alignment to minimize errors in drilling holes on the roofing sheets. In case of errors, immediately apply roof sealant on the area to prevent leaks.
8. Before fastening the nut, fit a neoprene gasket then a washer bigger than the gasket.
9. In fastening the nut, precaution must be observed to avoid warping of the roofing sheets.
10. Apply roof sealant on connections and end lapping that may also cause leaks.

PART D. ARCHITECTURAL FINISHES & OTHER CIVIL WORKS**XVI. Masonry Works**

Contractor shall supply all the specified materials, expertise, supervision, labor, layout, equipment, tools, scaffold and miscellaneous items required for a complete masonry job in accordance with the drawings, plans and specifications as specified herein. All masonry works shall be performed by skilled craftsmen in a workmanlike manner throughout and shall be in accordance with all relevant codes, standards and regulations as deemed necessary.

1. Concrete Hollow Blocks (CHB) shall be applicable for non-load-bearing applications as specified in the drawings. CHB shall have fine, even texture, well defined edges and shall be sound and free from cracks and other defects.
2. Masonry units should be delivered and stored on wooden pallets to prevent moisture absorption from the soil and covered with water-repellent tarps or plastic covers to prevent wetting, staining, or discoloration.

3. Aggregates should be protected against contamination from rain and from blowing dust and soil during construction to prevent staining or reduced mortar bond strength.
4. Different aggregates should be stored in separate stockpiles and all aggregate stockpiles covered with a waterproof tarp or plastic covering when not in use.
5. CHB shall be laid with full mortar coverage on both horizontal and vertical shells. Requirements for the mortar are as follows:
 - Portland Cement: ASTM C150, Type 1
 - Sand: Clear, Sharp, graded from fine to coarse, ASTM C-144
 - Water: Clean and potable
 - Mixture: One (1) part cement, two (2) parts sand
6. If needed, provide a guide chord stretched out from end to end to establish desired CHB alignment.
7. After erecting 4 layers of CHB, observe 3 to 4 hours' interval before proceeding with the next layer of CHB.
8. A 20mm thick gap shall be provided in between walls and columns, walls and beams, walls and slab on top.
9. Provide 20mm thick Styropor as joint filler between walls and columns/ walls and beams/slab on top.
10. The contractor shall establish and ensure desired CHB alignment and plumbness. The Contractor shall reconstruct any inadequate work.
11. This includes all masonry works required for the completion of the building as well as parapet walls, planter box and other decorative masonry works.
12. CHB shall be piled on plank platforms in dry locations, and shall be protected with appropriate cover or other suitable material until laid in the wall. Reinforcement and other metal items shall be protected from the elements. All mortar materials shall be stored under cover in a dry place so that damage from moisture, freezing and other sources are prevented.

XVII.A. 5" Masonry Wall (incl Reinforcing Steel Bars)

- a. Use 5" non-load bearing concrete hollow blocks for exterior walls indicated in the plans.
- b. This item also includes reinforcing steel bars of concrete hollow blocks. Use 10mm diameter RSB spaced at 600mm for vertical reinforcement and 10mm diameter RSB at every three (3) layers of CHB for horizontal reinforcement.
- c. Use gauge no. 16 G.I. tire wire to secure the steel bars into its designated position.

XVII.B. 4" Masonry Wall (incl Reinforcing Steel Bars)

- a. Use 4" non-load bearing concrete hollow blocks mainly for interior walls indicated in the plans.
- b. This item also includes reinforcing steel bars of concrete hollow blocks. Use 10mm diameter RSB spaced at 600mm for vertical reinforcement and 10mm diameter RSB at every three (3) layers of CHB for horizontal reinforcement.
- c. Use gauge no. 16 G.I. tire wire to secure the steel bars into its designated position.

XVII. Doors

This Item shall consist of furnishing all aluminum glass door materials, labor, tools and equipment required in undertaking the proper installation as shown on the Plans and in accordance with this Specification.

1. This scope of work includes fabrication and installation of Doors including all items required to be fabricated like doorjamb and provision of complete accessories including heavy duty handle set and locking devices.
2. This scope of work includes provision of Doors and door frames conforming to the sizes, dimensions and designs as shown and specified in the schedule of doors or as per the bill of materials.
3. Contractor to ensure that all materials to be used shall be in accordance with the required specifications.
 - Use 50mm x 150mm Kiln Dried Luan wood or equivalent for all doors with wooden door jambs.

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