

Section VI. Specifications

A. GENERAL CONDITIONS and SCOPE OF WORKS

The work to be executed under this contract shall include the furnishing of all materials, labor, tools, and equipment and everything listed, mentioned or as scheduled on the drawings herein specified or both for the demolition of existing building and subsequent complete **Repair and Renovation of BOC Gymnasium** at aforementioned location as per plans and specifications.

All works to be done shall be in the highest quality of workmanship to the fullest intent and meaning of the plans and specifications unless otherwise specified.

PLANS and SPECIFICATIONS:

All drawings, small scale and detail drawings are intended to collaborate with the specifications and to form part thereof, where figures are given, they are to be followed in preference to measurement by scale. Anything shown in the drawings and not mentioned in the specifications or vice-versa or anything not expressly set forth in either but which is reasonably implied shall be furnished and installed as thought specifically shown in mentioned both.

Project Title: **Repair and Renovation of BOC Gymnasium**

Location : Gate 3, South Harbor, Port Area, Manila

Owner : Bureau of Customs

I. CONCRETE and MASONRY WORKS:

1. DELIVERY, STORAGE AND HANDLING OF MATERIALS

1.1 All materials shall be so delivered, stored and handled as to prevent the inclusion of foreign materials and the damage of the materials by water or breakage.

1.2 Packed materials shall be so delivered and stored in the original packages until ready for use.

1.3 Packages showing evidence of water or other damages shall be rejected.

2. WATER

2.1 Water to be use in mixing concrete shall be free from oil, alkali and organic matter on other deleterious substance and shall be reasonably clear and clean. The use of brackish water is not allowed.

3. PORTLAND/POZZOLAN CEMENT

3.1 Portland /Pozzolan cement shall be, of any standard commercial brand in standard 40kgs

4. FINE AGGREGATES

4.1 Fine aggregates or sand used in composition of concrete shall be clean, strong and uncoated grains, free from injurious amount of dust, lumps or flaky particles and shall not contain more than 5% clay.

5. COARSE AGGREGATES

5.1 Coarse aggregates or gravel shall be well graded as top size ranging from 6mm up to the size, which readily pass between all reinforcing bars and between reinforcement and forms.

6. METAL REINFORCEMENT

6.1 Reinforcing bars shall be standard commercial, deformed steel such as steel or other locally available equivalent.

6.2 Steel bars shall be free from dust scales, splices in bars shall be made at the critical points of maximum stresses.

6.3 Tie wire shall be standard commercial G.I. wire gauge no. 16.

7. CONCRETE HOLLOW BLOCKS

7.1 Where the use of CHB is indicated, they shall be true to size without cracks or spurs or other defects which may impair their strength or durability. They shall have three cones.

7.2 All concrete hollow blocks shall be a product of a reputable manufacturer.

8. EXECUTION

8.1 Construct form sufficiently tight to prevent leakage securely braced to prevent displacement and to support construction loads, forms shall not be removed until concrete is set.

9. CONCRETE MIXER

Use of Concrete Mixer

1. Class “A” concrete-(20Mpa concrete) for all columns, footings, beams, stiffener, slabs mixture (1:2:4)
2. Class “B” concrete-(17.5Mpa concrete) for all wall footing, slabs and stairs on fill and CHB fillers mixtures (1:3:5)
3. Class “A” mortars-1:3 by volume for all plastering works.

II. CARPENTRY and JOINERY WORKS:

1. SCOPE

1.1 The work covered in this section of the specifications consist of furnishing all items, articles, labors, equipment, materials and other mentioned or scheduled on drawings and in performing all operations and methods necessary and required for the completion of all carpentry and joinery works together with the installation of all exterior and interior finished carpentry in accordance with the applicable drawing and full size details.

1.2 All doors and windows, transoms or other openings where so indicated on plans and all framing coming in contact with concrete shall be anchored by means of 20d nails spaced not more than 20cm apart. All frames shall be riveted, molded and cut with wash and undercut for water drip.

2. PROTECTION and STORAGE

2.1 Lumber shall be protected and kept under cover both in transit and in the jobsite, and shall be carefully piled off the ground and be insured of proper drainage, ventilation and protection from weather.

2.2 Materials shall be delivered unduly long before it is required for the proper conduct of the work.

3. FASTENINGS

3.1 Fastening shall be common nails, due in specified flat head wood screw where specified or call for.

3.2 Conceal fastening as far as possible and where not possible locate them in a conspicuous place where nailing is permitted through woodwork face, conceal nail head.

III. FORMWORKS:

1. Forms shall result in a final structure that conforms to the shape, line in dimensions of the member as required by the design drawing and specification. Forms shall be substantial and sufficiently tight to prevent leakage of the mortar. Forms and their support shall be designed so as not to damage previously placed structure.

2. **REMOVAL of FORMS and FALSE WORKS**

2.1 Forms shall be removed according to the following scheduled

2.1.1. COLUMNS 2 DAYS

2.1.2. BEAMS

2.1.2.1. SLIDING 15 DAYS

2.1.2.2. BOTTOMS 15 DAYS

IV. FOOTINGS, FOUNDATION and WALLS:

The bottom of all excavation for footing and foundation shall be in distributed earth properly leveled off, tamped and approved by the engineer. Excavation shall be entirely free of water during pouring of concrete, hence the use of water pump if necessary.

V. STEEL TRUSSES and ROOFING WORKS:

1. All materials and accessories shall be free from rust or any other form of corrosion.
2. Steel trusses shall be done in accordance with the plans and drawings, all plates, angle bars and C-purlins shall be pre-painted to installation and re-painted on welded joints.
3. Roofing materials shall be multi-tile pre-painted long span or its equivalent with similar design and quality sheets should be kept dry when stacked, store clear of the ground and under cover should sheets become wet, they must be dried and fillet stacked to allow air circulation. Storage should be kept to a minimum; all sheets shall be installed in accordance to the manufacturer's specification and by persons specializing on the same.

VI. ROOFING MATERIALS

A. HIGH RIB METAL ROOFING

This item shall consist of furnishing all plant, equipment, tools, materials and labor required to perform and complete the high rib metal roofing, together with related accessories such as ridge, hip rolls, valleys, gutters, flashings, straps and rivets, soldering and downspout when called for on the Plans all in conformity with this Specifications.

VI – IA MATERIAL REQUIREMENTS

1. HIGH RIB GALVANIZED IRON

- a. Hi Rib galvanized iron (G.I.) sheets, including plain G.I. sheets for roofing accessories, shall be cold – rolled meeting ASTM-153 and with spelter coating of zinc not less than 0.381kg/m^2 .
- b. Unless otherwise specified or shown on Plans, roofing sheets shall be 0.50 mm thick provided in long span sizes to minimize end lapping.
- c. Sheets shall weigh not less than 4.14kg./m^2 and shall be marked or stamped showing the thickness, size, amount of zinc coating, brand and name of manufacturer.
- d. Test specimens shall stand being bent through 180 degrees flat on itself without fracture of the base metal and without flaking of the zinc coatings.

VI – IIA ROOF ACCESSORIES

A. Strap Fasteners

Strap fasteners shall be 0.50mm thick by 2.5cm. wide and sufficiently long to bend up to the opposite face of the purlins with corners chipped off at the riveting ends.

B. Rivets and washers

1. Rivets and washers shall be galvanized mild iron and shall not be less than 5mm diameter and 10mm length.
2. Washers shall not be less than 1.5mm thick and 20mm in outside diameter and shall provide snug fit to the rivet.

C. Soldering Lead

Soldering lead shall have a composition of 50 % lead, conforming to ASTM B-32. Rivets and burrs for lap joints of gutters, downspouts and flashings shall be copper or aluminium not less than No. 8 or 3.175 diameter.

D. Fabricated Metal Roof Accessories

1. Ridge, hip rolls, valleys, flashings and counter flashings, gutters and downspouts, when ever required, shall be fabricated from plain G.I. sheets gauge No. 26.
2. Gutters and downspouts shall be 0.60 mm thick unless otherwise specified on Plans. Wire basket strainers shall be gauge 14, galvanized, aluminium or stainless steel.
3. If stainless steel is specified for gutter and flashings use gauge 24, 0.60mm thick plain sheet with standard commercial size of 120cm. x 240cm. cut to sizes for fabrication.
4. Roof ventilators, whenever required, shall be fabricated from gauge 26, 0.50mm thick plain G.I. sheets and constructed to the dimensions and details shown on Plans.
5. Bending of plain G.I. sheets for various accessories shall be done by machine press. Hand bending shall not be permitted.

VI – IIIA ROOF ACCESSORIES

A. Preparatory Work

1. Preparatory to the installation of the high rib G.I. roofing, purlins should have been placed and spaced properly to fit the length of roofing sheets to be installed.
2. The centre line of the purlins at end laps shall be 15 cm. from the bottom line of end laps and intermediated purlins are placed equidistant with each other.
3. Ascertain that the top of the purlins should be at the same plane.

B. Installation of High Rib G.I. Sheet

1. Provide an end laps of 25cm. minimum length. Each sheet shall be fastened temporarily by 1.83mm diameter by 2.5 cm. long galvanized flat-head nails at valleys of corrugations covered by side or end laps.
2. Succeeding upper rows of High Rib G.I. sheets shall be installed in the same manner until the entire roof area is covered.

3. Valleys, ridge, hip rolls and flashings when required, shall be installed before fastening the roofing sheets with galvanized straps and rivets or with G.I. roofing nails and washers.
4. One strap shall be riveted at each alternate rib at the gutter line, the ridge line and end laps and the straps bent around and nailed to the purlins.
5. Rivets shall be provided with a galvanized mild iron washer below and one lead and one galvanized washer above the street.
6. Rivets shall be sufficiently long to permit forming a hemispherical head. Riveting shall be done such that the lead washer shall be compressed to provide a water tight fit around the rivet.

C. Installation of Roofing Accessories

1. Ridge, Hip and Valley Roll

- a. Ridge and Hip rolls shall lap at least 25 cm. over roof sheets and together shall be riveted at every second corrugation.
- b. Valleys shall lap at least 45 cm. each way under the roofing and shall be secured to the framework with galvanized nails, placed below the roof sheets.
- c. Rivets alongside of the valley shall be at every second corrugation.

B. PRE-PAINTED METAL SHEET

This item consist of furnishing all pre-painted metal sheet materials, tools and equipment, plant including labor required in undertaking the proper installation complete as shown on the Plans and in accordance with this Specifications.

VIII – IB MATERIAL REQUIREMENTS

All pre-painted metal sheet and roofing accessories shall be oven – baked painted true to profiles indicated on the Plans.

Pre – painted roofing sheets shall be fabricated from cold rolled galvanized iron sheets specially tempered from cold rolled galvanized iron sheets specially tempered steel for extra strength and durability. It shall conform to the material requirements defined in PNS 67: 1985.

Profile sections in identifying the architectural moulded rib to be used are: Regular corrugated, Quad – rib, Tri- wave, Rig-wave, Twin rib, etc. Desired color shall be subject to the approval of the Architect.

1. Gutters, valleys, flashings, Hip and Ridge roll shall be fabricated from gauge 24 (.6mm) thick cold rolled plain galvanized iron sheets specially tempered steel. Profile section shall be as indicated on the Plans.
2. Fastening hardware shall be of galvanized iron straps and rivets. G.I. straps are of .50mm thick x 16mm gauge 26 and standard G.I. rivets.
3. Base metal thickness shall correspond to the following gauge designation available locally as follows:

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Base Metal Thickness	Designated Gauge
.40mm thick	Gauge 28
.50mm thick	Gauge 26
.60mm thick	Gauge 24
.80mm thick	Gauge 22

Length of roof sheets available in cut from 5 feet to 12') long. Long span length up to 18 meters. Special length by arrangements.

VIII – IIB CONSTRUCTION REQUIREMENTS

1. Before any installations begin, the Contractor shall ascertain that the top faces of the purlins are in proper alignment.
2. Correct the alignment as necessary in order to have the top faces of the purlins on an even plane.
3. Sheets shall be handled carefully to prevent damage to the paint coating. Lift all sheets or sheet packs on to the roof frame with the overlapping down-turned edge facing towards the side of the roof where installation will commence, otherwise the sheets will have to be turned end to end during installation.
4. Start roofing installation by placing the first sheet in position with the down turned edge in line with other building elements and fastened to supports as recommended.
5. Place the down-turned edge of the next sheet over the edge of the first sheet, to provide side lap and hold the side lap firmly in place.

Continue the same procedure for the subsequent sheets until the whole roofing area is covered and or adopt installation procedure provided in the instruction manual for each type of molded rib profile.

6. For walling applications follow the procedure for roofing but allow a minimum end lap of 10 cm. for vertical walling.
7. **End lap.** In case handling or transport consideration requires to use two or more end lapped sheets to provide full length coverage for the roof run, install each line of sheets from bottom to top or from eave line to apex of roof framing. Provide 15 cm. minimum end lap.
8. **Anchorage.** Pre- painted steel roofing sheets shall be fastened to the wood purlins with standard length G.I. straps and rivets.
9. For steel Frame up to 4.5 mm thick, use self-drilling screw No.12 by 3.5 cm. long hexagonal head with neoprene washer.
10. For steel support up to 5mm thick or more, use threaded cutting screw No.12 by 4.0 cm. long hexagonal head with neoprene washer.
11. For side lap fastener use self drilling screw No. 10 by 1.6 cm. long hexagonal head with neoprene washer.
12. Valley fastened to lumber and for walling, use self drilling wood screw No. 12 by 2.6 cm. long hexagonal head with neoprene washer.
13. Valley Fastener to steel supports, use self drilling screws, hexagonal head with neoprene washer, drill size is 5mm diameter.
14. In cutting pre-painted steel sheets t place the exposed color side down, cutting shall be carried out on the ground and not over the top of other painted roofing product.
15. **Power cutting or drilling** to be done or carried out on pre-painted products already installed or laid in position, the area around holes or cuts shall be masked to shield the paint from hot filings.
16. **Storage and Protection.** Pre-painted steel roofing, walling products and accessories should be delivered to the job site in strapped bundles.
17. Sheets and or bundles shall be neatly stacked in the ground and if left in the open it shall be protected by covering the stack materials with loose tarpaulin.

IX. CEMENT FINISH for CONCRETE SURFACE, WALL PAPERS:

1. All concrete surfaces including those indicated as cement plaster finish on drawings in all interior walls and other concrete surfaces without specified finish, shall be done and applied in accordance with the following specific provisions;
2. Immediate after the prepared of the forms, all projecting wires and other design for trying forms shall be cut of at least by open surface finishes. All hole voids, depression and the design shall be enlarge, roughened mortar with the same grade as that even surface similar of concrete surface all to the satisfaction of the engine crack shall be current and the

side dove tailed to a depth of at least 5cm and shall thereafter be filled with a mortar of the same grade as that in the original surfaces.

VII. DOORS and WINDOWS:

1. All panel doors shall be made of hard wood, all flush type doors shall be made of marine plywood and all other doors specified in the plan must be manufactured in accordance to its sizes and by a manufacturer of good quality.
2. Doors shall be extended through the full width of sills with ten on and mortised joints glued well and planed. It shall hang straight and true to plump.
3. Windows shall be of size and type indicated in the schedule and as specified therein.

VIII. HARDWARE:

1. Where the exact type of finishing hardware specified is not adaptable type as having as nearly practicable the same operation and quality as the ones specified shall be used upon the approval of the engineer.
2. Use 4" nickel-plated cabinet handle (heavy duty)
3. All locks shall be new and in good condition in any commercial brand available and shall be installed in the doors frames at the same height of 90cm from finished floor line.
4. Each panel of hinged door shall be hanged on loosed pin hinges for doors 1.50m but less than 2.00m high and one additional loose pin for every additional 0.65m height of door or fraction thereof.
5. All hinges shall be chromium plated nickel brass or it local equivalent having similar quality.

IX. PAINTING WORKS:

This section of the specification covers the complete painting and finishing of the wood surface, the painting of plasters, concrete, unfinished metal and other surfaces through the interior and exterior of the building.

1. The work covered by this section of the specification consist in the proper preparation of surfaces, the furnishing of labor, materials, tools, appliances, scaffoldings and other necessary equipment and in the performing of all operations in connection with painting, varnishing and wall paper works, complete in accordance with color schemes and as specified therein.

2. All paint materials shall meet the requirements of the specifications by the standardization committee on supplies and shall be delivered on the job in the original containing, with labels intact and seal unbroken.
3. Tinting colors for all paints shall be colors in oil, ground and pure in linseed oil, and for the highest grade obtainable.
4. Color pigments shall be used to produce the exact shades paint, which shall conform to the approved color scheme of the building.
5. Except as otherwise noted, color of the priming coat shall be lighter than the body coat and color of the body lighter than the finished coat. The first coat shall be white.
6. Wood surfaces shall be thoroughly cleaned, smoothly had pressed and well sandpaper before any paint or oil finished is applied.
7. Before applying paint or wall paper to concrete cement plaster or other cement finishes, etc., this surfaces must be allowed to dry thoroughly.
8. Use quality paints for all surfaces to be painted.

X. PLUMBING WORKS, TOILET FIXTURES and TILEWORKS:

1. All works, comply with the requirement and provision of the National Plumbing Code of the Philippines.
2. All fixtures shall be separately trapped. The traps shall be placed as near as possible to the fixtures.
3. No fixtures shall be double trapped.
4. Horizontal waste lines shall be secured by hook to the building frames or embedded in concrete whenever necessary.
5. Horizontal waste line receiving the discharge from two or more fixtures shall be provided with vents connected to the station at least 1.20m from floor level.
6. Connection of the water closet shall be made to soil pipe by means of charges and asbestos packing without the use of water, cement.
7. Waste pipe potable water line pipes shall be extended to all the fixtures outlets and equipment from the gate valve near the riser.
8. Provide and installed complete floor drain shown on plan, brass or nickel plated 4"x4" with waste line, P-trap and vents.
9. All pipes, fitting traps, fixture, appurtenances and devices of plumbing and drainage system shall be inspected and approved by the engineer to ensure compliance with all requirements of all codes and regulation referred in these specifications.
10. Use PPR Type 3 pipes for all cold-water lines.
11. Use any commercial brand sanitary pipes, fittings, accessories, materials and all works obviously necessary for the proper functioning of all specification or indicated in the drawing are included in this works.

12. Use 60x30cm non-skid tile for flooring and 60x30cm glazed wall tiles and partitions. Other tile sizes shall be referred as per specifications.
13. Wall to be finished with glazed tiles or elsewhere indicated as such in the drawings, shall be chipped off, cleaned thoroughly with wire brush, washed with clean water and painted up solid with 1:2 cement mortar before applying wainscoting.
14. The tiles and their accessories shall be free from imperfection that affects their quality, appearance and strength. The tile should be thoroughly soaked in water before installation. All tiles for wainscoting shall be set to correct grades and level true to lines, laid even and shall be set truly vertical in accordance with the details shown on the drawing the tiles shall be firmly laid on 1:2 cement paste.
15. Glazed tiles shall be cushion-edge locally manufactured of the sized or type and pattern shown on drawing and/or specified above. Use synthetic granite and non-skid and glazed tile.
16. Use quality type for toilet fixtures as approved by end user.

XI. ELECTRICAL WORKS:

The work to be undertaken here under includes the furnishing of all labor, materials, equipment, tools and supervision to the project and to be completed the good working condition of the electrical system for the proposed building.

1. All works here under shall comply with the requirement of the latest edition of the National Electrical Code of the Philippines and the Rules and Regulations of the MERALCO.

2. MATERIALS and WORKMANSHIP

All materials shall be unused brand new and shall conform with the standard of the underwriter laboratories in every case where such a standard has been establish for the particular type of materials to be installed.

3. SERVICE ENTRANCE

Service entrance shall be 220-250 volts, single phase, 2 wires, 60 cycles as indicated in the plan. The service entrance installation shall be part of the electrical works as indicated therein. The service entrance conduit and accessories shall be installed in the nearest power source up to service entrance cap and the work shall be done in accordance with the latest specification required by Electric Company.

4. DISTRIBUTION SYSTEM

The distribution system shall be 2 wire, 220 volts.

5. WIRING METHOD

- 5.1 All wiring shall be installed in standard polyvinyl conduit of the Philippines manufacture or equal and shall conform to the underwriter's standards in code.
- 5.2 Conduit shall not be less than 1.5cm nominal diameter and where so indicated, sizes on the plans are minimum two or more ducts shall be installed in lieu of the larger size.
- 5.3 All wire shall be copper under no circumstance will aluminum or other metallic conductors be permitted helps. All materials to be used shall be new and approved by the underwriters laboratories.
- 5.4 All joints in junction boxes, those for feeders and service wire shall be joint by 3m scotch lock. Provide proper sizes and installed according to the manufacturers specification for service and feeder conductors, tape shall be made with heavy duty all brass or copper solder less connectors.

6. OUTLET and SWITCH BOXES

- 6.1 All boxes shall be hard plastic, approved product of reputable manufacturer.
- 6.2 All ceiling and wall bracket outlet boxes shall be of deep rectangular flush type gang boxes or section switch boxes shall be installed where required.
- 6.3 All boxes, including junction and pull boxes shall be sufficient size to provide free space for all conductors enclosed in the box in addition to the fittings. Such as witch mechanism, receptacles, fixtures slabs, that may contain in the box.

7. OUTLET and SWITCH BOXES

- 7.1 Suitable single pole and three way switches of the flush tumbler type with an appropriate white plastic or aluminum cover plate shall be provided where indicated on the plans.
- 7.2 All convenience outlet receptacles shall be flushed or wall mounted type of various kinds as indicated in the drawings with suitable cover plates.
- 7.3 Switches and receptacles are indicated in the drawings as close as possible to the desired points, however actual constructions condition may require the change of location and in such cases the

attention of the engineer shall be called for the final location. The engineer may direct minor changes in the location of the switches and receptacles depending solely on his engineering judgment.

7.4 Unless otherwise directed by the engineer, outlet shall be mounted at the following heights above the floor or steps.

7.4.1. Wall switches 1.50m.

7.4.2. Wall brackets 2.00m.

7.4.3. Convenience outlet 0.30m.

7.5 Use flush type switches

8. PANELBOARD

Wall mounted gauge no.16 steel sheet, baked enamel finish (color gray), 1 enclosure with grounding terminal bus with lugs.

9. CIRCUIT BREAKER

Main: 3-Pole, 240V, Bolt-on Industrial type MCCB

Branch circuit: 2-Pole, 240V, Bolt-on type CB

Individual CB: indoor-NEMA 1 enclosure

Outdoor- NEMA 3R enclosure

Minimum interrupting capacities: 10kaic

Only one single brand shall be used on the entire project requirements

10. WIRES AND CABLES

THHN/THWN copper wire stranded 600 volts insulation pressure, minimum size of wire for lighting and power system shall be 3.5 sq. mm (AWG no.12 stranded) and must be color coded.

Line 1 - Red

Line 2 - Yellow

Line 3 - Blue

Ground - green

11. ELECTRICAL LIGHTING FIXTURES

11.1 Tube light

LED tube lamp, with recessed type luminaire mirrored reflector and louver. Aluminum heat sink, No UV and RF interference, patented heat sink with or without optical diffuser, longer life than

incandescent and fluorescents. No mercury, no ballast required, wide voltage input range and constant current design, solid state, high shock and vibration resistant, mercury free, 60%-plus savings in energy consumption, quite, no noise, no flickering. Products brand are compliance in accordance with CE, UL and FCC testing standards.

11.2 Pin light

LED lamp with diamond design reflector white ceiling rim recessed mounted or round LED panel light white 6-24w power variant, shall be low maintenance, rust proof, highly efficient, longer life span, environmental friendly, less power consumption.

11.3 Cove lighting

Waterproof flexible strip lights warm white 12-24w power consumption, dimension 5000 x 8 x 2.4mm.

11.4 Use approved quality brand for the entire led lights and slim tube led type or other equivalent brand approved by Electrical Engineer.

11.5 Comply with the latest applicable provision and latest recommendation of the following:

Philippine Electrical Code (PEC)

Illuminating Engineering Society (IES)

National Electrical Manufacturers Association (NEMA)

11.6 Use circuit breaker in a good quality.

XII. MECHANICAL WORKS:

A. WATER PUMPING SYSTEM

This item shall consist of furnishing and installation of water pumping system, inclusive of all piping and pipe fittings connections, valves, controls, electrical wirings, tanks and all accessories ready for service in accordance with the approved Plans and Specifications.

MATERIALS REQUIREMENTS

A. Water Pump

The types, sizes, capacities, location, quantity and power characteristics shall be as specified or shown on the plans.

B. Overhead tank

Overhead tank shall be provided with manhole, cover, drain pipes, distribution pipe outlet, overflow pipes and air vent.

Suitable float switch of electrode shall be provided in the tank to stop and start the operation of the pump.

C. Pipes and Fittings

All pipes 10 cm. and larger shall be welded or flanged while smaller sizes shall be screwed.

D. Valves

A gate valve followed by a check valve shall be placed between discharged of pump and tank to prevent backflow of water when pump is in stop.

B. AUTOMATIC WATER SPRINKLER

This item shall consist of furnishing and installation of Automatic Water Sprinkler System, inclusive of all pipings and pipe fittings connections, valves, controls, electrical wiring connection and all other accessories ready for service in accordance with the Plans and Specifications.

MATERIALS REQUIREMENTS

A. Sprinkler Head

- 1.) Type-spray unit, pendant and upright unit
- 2.) Flow capacity, 83 LPM per head
- 3.) Pressure rating
- 4.) Residual pressure – 103 kPa minimum
- 5.) Maximum pressure – 1035 kPa
- 6.) Temperature rating – fusing at 57.5 degrees Celsius to 74 degrees Celsius
- 7.) Finish – chrome-pendant-chrome or brass upright
- 8.) Pipe thread – 13mm nominal
- 9.) Stock of extra heads and tools required

Pendant and upright:

- a.) 6pcs for 300 sprinklers
12 pcs for 300 to 1000 sprinkler

24 pcs for 1000 sprinkler above

- b.) Sprinkler tongs – 2 pcs.
- c.) Sprinkler wrench – 2 pcs.

B. Alarm Check Valve and Fire Alarm System

- 1.) The alarm assembly shall be constructed and installed that any flow of water from the sprinkler system equal to or greater than that from the single automatic head shall result in an audible and visual signal in the vicinity of the building.
- 2.) The alarm apparatus shall be substantially supported and so located and installed that all parts shall be readily accessible for inspection, removal and repair.
- 3.) The actual water flow, through the use of a test connection, shall be employed to test the operation of the sprinkler alarm units as a whole.
- 4.) An approved identification sign shall be installed near the outdoor alarm device in conspicuous positions.

B. ADDITIONAL WORKS:

- 1. In case of additional works not shown in the plans and not specified herein, the Contractor shall be paid an additional amount corresponding to the work added.
- 2. Demolitions and works due to Contractor's fault shall be done by the Contractor without extra compensation to the Owner.

C. ACCEPTANCE OF WORKS:

- 1. As soon as the construction is satisfactory inspected and it conforms to the plans and specifications, the contractor shall submit to the procuring entity's representative a written notice that said building is ready to use and is subject to the latter's approval.
- 2. Within seven (7) days after receipt of notice, his/her authorized representative shall execute notice of approval of the said building.
- 3. Upon inspection of an affidavit that the procuring entity has approved the completion of the building and acceptance thereof, the work is automatically terminated.

Section VII. Drawings

Insert here a list of Drawings. The actual Drawings, including site plans, should be attached to this section.

