

Section 3
Metal Works

I. SCOPE OF WORK

The work includes the furnishing and installation of miscellaneous metal necessary to complete the work in accordance with this specifications unless required otherwise on the plans.

II. GENERAL PROVISIONS

The AISC Specification for the Design, Fabrication and Erection of Structural Steel for Buildings, Association of Structural Engineers of the Philippines (ASEP) Handbook of Structural Steel Shapes and Sections shall govern the Work. Welding shall be in accordance with the AWS Code and as herein specified or any other welding standard, approved by the Engineer.

Certification: Two (2) certified copies of mill test reports including names and locations of mills and shops shall be furnished for all structural steel.

Responsibility for Errors: The Contractor shall be responsible for all errors of detailing, fabrication and for the correct fitting of the structural members.

Storage of Materials: The materials shall be stored out of contact with the ground in such manner and location as will minimize contamination and deterioration.

III. MATERIALS

Structural steel shall conform to ASTM A 36. All materials shall be of new stock, free from surface imperfections and shall conform to the applicable ASTM, API Specifications or other equivalent standards.

Steel Plates, Bars and Rods – Plates, bars and rods shall be local standard commercial steel of sizes as indicated on the plans and approve by the Engineer.

Fastener and Anchor Bolts – Fasteners, anchor bolts necessary for the installation of the work shown on the plans shall be of a standard commercial grade approved by the Engineer.

Bolts, Nuts and Washers – Bolts, nuts and washers shall be local standard commercial grade of size as indicated on the plans conforming to ASTM A 325 or AASHTO M164.

Welding – Employ only welding equipment electrodes welding wire and fluxes capable of producing satisfactory welds when used by a qualified welder or welding operator using qualified welding procedures. It shall conform to this AWS D1.1-183, E70XX Series.

IV. DELIVERY OF MATERIALS

Deliver anchor bolts and other anchorage devices which are embedded in cast-in-place concrete construction to the project site in time to be installed before the start of work.

Provide setting drawings, templates, and directions for installation of anchor bolts and other devices.

Number in accordance with shop drawings the materials tested and approved by the Engineer before delivery to the site. Prepare a list showing number, size, quality and quantities of materials.

Transport materials in accordance with material list and transportation. Schedule approved by the Engineer.

Protect materials to prevent damage during transportation. Package and label small parts such as bolts or rivets.

V. FABRICATION

Fabricate structural steel in the shop to the greatest extent possible for transporting in accordance with the AISC Building Code and ASEP Handbook with the modification and additional specified in this section.

The Contractor shall verify all measurements in the field, submit shop drawings to the Engineer showing sizes, gauges, detailed of construction, method of assembly and installation.

Fabrication of work shall not commence until all shop drawings are approved by the Engineer.

Shop connections: As approved by the Engineer.

- a. Provide for bolted or welded connections as shown on the Drawings or as approved by the Engineer.
- b. Use high strength threaded fasteners for bolted connections, except where standard threaded fasteners are permitted.

High strength bolted construction assembly shall be tightened in accordance with Specification for Structural Joints, AISC.

VI. FIELD ERECTION

Steel erection shall conform to the requirements of this specification and to the applicable requirements of AISC “Specification for the Design, Fabrication and Erection of Structural Steel for Buildings”, and the AISC “Code of Structural Practice for Steel Buildings and Bridges”.

Set and wedge or shim loose bearing plates.

Erect individual pieces not deviating from vertical level and alignment more than 1 in 500.

VII. FIELD ASSEMBLY

Assemble structural steel frames accurately to the line and elevations indicated within the specified tolerance.

Align and adjust accurately various members forming parts of a complete frame or structure before fastening.

Fasten splices of compression members after the abutting surfaces have been brought completely into contact.

Clean bearing surfaces and surfaces in permanent contact, of rust and scale before members are assembled.

Splices shall be permitted only where indicated.

Bolt and weld field connections as specified in “Fabrication”.

Remove weld backing strips from welds designated for ultrasonic testing.

Remove run-off tabs and grind surfaces where requested by the Engineer.

Clean weld splatter from surfaces contacted.

Field correction of fabrication by gas cutting not permitted on any major member in the structural framing without prior approval of the Engineer.

Mark structural steel members of high strength steels to permit visual verification of the grade of steel used.

VIII. PAINTING

Shop Paintings – Except for galvanized surfaces and items to be encased in concrete, clean ferrous metal surfaces shall be given one coat of red lead or zinc chromate primer. Additional coat shall be applied to surface that will be concealed or inaccessible for finish painting.

IX. REPAIR OF DAMAGED COATING

Coated metal damaged in the process of work shall be repaired in 2 manners approved by the Engineer.

X. LIGHT STEEL FRAMING SYSTEM

Light steel framing system will be used for ceiling assemblies of gypsum ceiling board. Provide steel materials for metal support system galvanized coating, ASTM A525; aluminum coating, ASTM A463 on a 55% aluminum-zinc coating. Materials for attachment of gypsum board (suspended and furred ceiling systems) shall conform with ASTM C645. Installation shall conform with ASTM C754, except that framing members shall be 400mm o.c.b.w. unless otherwise indicated in the plans.

XI. SUSPENSION SYSTEM

Suspension system for mineral fiber acoustical lay-in panel and fiberglass ceiling board shall be concealed, direct hung, upward access. Hangers and adhesive shall be as recommended by the manufacturers and approved by the Engineer.

Install the suspension system in accordance with ASTM C636, and the following additional requirements:

- a. Ceiling framing shall consist of 25 mm T-runner sections suspended plumb from structural slab on frame by hanger wires on straps.
- b. Space hangers 1.2 meters on centers each direction. Hangers shall be laid out for each individual room or space. Install additional hangers where required to support the framing around beams, ducts, columns and other penetrations through the ceiling. Hanger wires shall be wrapped around the reinforcing bars of the supporting concrete-slab construction with twists before concrete is placed or shall be shaped into a 100 mm diameter loop and embedded at least 50 mm in the concrete, or shall be attached to approved inserts.
- c. Keep main runners and carrying channels clear of abutting walls and partitions. Provide at least two main runners for each ceiling span.

- d. The acoustical board shall be placed in between. T-runners in full contact with the metal frames. The ceiling system shall be leveled and squared with no sign of deflection.

XII. SPANDREL METAL CEILING

For exterior ceiling, use 0.4 mm metal thick, Rib 2 Spandrel 165, white color as manufactured by DN Sreel or equivalent.

XIII. METAL TOILET PARTITIONS

Toilet partitions shall be the flush-metal type with sound-deadening cores and baked-enamel finish. The partitions shall be provided complete with all fastening, fittings, and hardware necessary for a satisfactory installation.

Steel shall be cold-rolled and zinc-coated steel for face plated of doors, panels, and pilasters shall be stretcher-leveled of standard flatness. Concealed reinforcement may be hot-rolled or cold-rolled steel.

Toilet partitions shall be floor-supported, with pilaster extending from the floor to the top of the panels. Panels and doors shall be gauge 20, approximately 1.5m high, and their bottom edges shall be approximately 250 mm above the floor, unless otherwise indicated in the drawings. The width, from center to center of dividing partitions, shall be as indicated in the drawings.

The work shall be secured to contiguous construction in a rigid and substantial manner, straight and plumb. Evidence of drilling in walls shall be concealed in the finish work. Hardware shall be adjusted for proper alignment, and hinges shall be set to hold the doors about 30 degrees when unlatched. After installation, all exposed surfaces shall be thoroughly cleaned, and all damaged work shall be restored to its original condition, or replaced with new work. The exposed heads of unfinished steel bolts and screws shall be neatly painted to match the color of adjoining partition surfaces, if required.

XIV. URINAL SCREEN

Urinal screen shall be wall hung and to be secured with a minimum of three wall stirrup brackets. It shall have a baked enamel finish.

Secure the work to contiguous construction straight and plumb. In the finished work, conceal evidence of drilling in walls. Screws and bolts shall be stainless steel. After installation, thoroughly clean exposed surface and restore damaged work to its original condition or replace with new work.