3.4 Weather

Work shall not be performed when, in the opinion of the Engineer, the weather does not permit satisfactory workmanship, or conditions prevent adequate inspection.

3.5 Welding

All welders shall have valid current licenses. If required by the Engineer, the Contractor shall perform tests of welder's skill. Tests, when required, shall be conducted at no additional expense to the Employer.

3.6 Steel Measuring Tape

The Contractor shall provide the number of precise tapes required for the carrying out of the work (minimum of 3 tapes).

At all times, the ambient temperature shall be recorded and thermal adjustments made to all measurements. Measuring tape used in the fabricator shop of the steel work shall be compatible with those used for site erection of the steel work. The Contractor shall arrange such test as necessary to allow the Engineer to approve the tolerance between the tapes used on either location as negligible. All measurements shall be the Contractors Responsibility.

3.7 Handling and Storage

All steel materials shall be delivered complete with original mill certificates.

All steel materials shall be handled with extreme care, in such a manner so as not to cause excessive scratches or dents, as determined by the Engineer.

Material shall be stored out of contact with the ground in such manner and location as will minimise rusting and corrosion.

4.0 MATERIALS

4.1 General Requirement

All material values shall be in accordance with and as stated in this Specification, unless otherwise noted.

Chemical composition, mechanical properties, dimensions and other qualities of materials are specified in each standard. These material qualities shall be confirmed by a testing prior to shop works whether it is equivalent with the manufacture certificates.

4.2 Structural Steel

4.2.1 All steel material shall be new and be free from defects impairing strength, durability or appearance and shall be of the best commercial quality, and shall comply with the relative standard.

4.2.2 Structural steel shall be standardised products as listed below or their equivalents approved by the Engineer :

a. Pedoman Perencanaan Bangunan Baja untuk Gedung (SNI.1729.1989-F), 2.2.Tegangan-tegangan Baja Tabel 1. Harga Tegangan Dasar.

Steel grade	Tension test requirements		
	Yield Strength kg/mm2	Tensile Strength kg/mm2	Relative Elongation %
St 37 (Bi 37)	24.0	> 37	-

b. JIS G 3101-87 Rolled steel for general structure (SS 400).

c. JIS G 3350-87 Light gauge steels for general structure (SSC 400).

d. JIS G 3444-88 Carbon steel tubes for general structure purposes (STK 400).

e. JIS G 3466-88 Carbon steel square pipes for general structure purposes (STKR 400).

Steel grade	Tension test requirements		
	Yield Strength kg/mm2	Tensile Strength kg/mm2	Relative Elongation %
SS 400	> 24	41 - 52	> 17
SSC.400	> 24	41 - 55	> 21
STK.400	> 24	> 41	> 23
STKR.400	>25	> 41	> 23

f. ASTM A36/A36M-89 Specification for Structural Steel.

Steel Type	Tension test requirements		
	Yield Strength kg/mm2	Tensile Strength kg/mm2	Relative Elongation %
Plates, Bars and shapes	25 - 31 (36 kei)	40-78-56-25 (58-80 kei)	21

4.2.3 Shape and Dimensions

a. The shape and dimension of steel plates, stainless steel plates and other related items shall meet the requirement of the following standards or their equivalents :

- JIS G 3101-87 SS400 Rolled steel for general structure.
- JIS G 4305-91 SUS304 Cold rolled stainless steel plates, sheets and strips.

b. The steel to be used shall not have any structural defects and not be obtrusively corroded. The shape and dimensions shall be according to the relative SII, JIS, ASTM, or equivalent.

c. The dimensional tolerance of structural steel members shall be according to :

- SII 0163-79 Mutu dan Cara Uji Baja Siku Sama Kaki Bertepi Bulat Canai Panas.

- SII 0233-79 Mutu dan Cara Uji Baja Kanal Bertepi Bulat Canai Panas.
- SII 0234-79 Mutu dan Cara Uji Baja Bentuk "I" Bertepi Bulat Canai Panas.
- SII 0999-84 Baja Kanal C Ringan.
- JASS 6-82 Standard of Structural steel tolerances.

4.2.4 Bolts, Nuts, Washers, Anchor Bolt and Plates

Ordinary bolts, nuts and washers shall meet the requirements of the following standards or their equivalents :

- SNI.1729.1989-F St 37 (Bj 37).
- JIS B 1180-85 Hexagon head bolts and hexagon head screws.
- JIS B 1181-93 Hexagon nuts and hexagon thin nuts.
- JIS B 0205-82 Metric coarse screw threads.
- JIS B 1251-84 Spring lock washers.
- JIS B 1256-78 Plain washers.
- ASTM A307-89 Specification for Carbon Steel Externally Threaded Standard Fasteners.
- JIS B 1180-85 and JIS B 1181-93, finishing grade shall be "Medium", precision grade shall be "3rd class" and mechanical properties shall be "4T".

Anchor bolts shall meet the requirements of the following standards or their equivalents :

- SNI.1729.1989-F St 37 (Bj 37).
- JIS G 3101-87 SS 400.
- ASTM A36/A36M-89.

Nuts, washers and screw threads shall be according to standards of ordinary bolt listed above.

Set of high strength bolt shall meet the requirement of the following standard or their equivalent.

- JIS B 1186-79 Set of high strength hexagon bolt, hexagon nut and plain washers for friction grip joint.

Steel grade	Tension test requirements		
	Yield Strength kg/mm	Tensile Strength kg/mm	Relative Elongation %
F10T A	> 90	100-120	14

If the Contractor intends to used torshear type high strength bolt, he shall submit the manufacturer's mechanical and chemical test certificates for approval of the Engineer.

- ASTM A490M-89 Specification for High-Strength Steel Bolts, Classes 10.9 and 10.9.3, for Structural Steel Joints [Metric].

4.2.5 Test of Materials

For standardised items the certificates proving the conformity of the products to the approved standards may be submitted in lieu of tests. However the Engineer may, when necessary, request the Contractor to carry out mechanical tests of the materials at the Contractor's expense.

4.3 Welding Materials

Electrodes to be used for welding shall be standard products conforming to "JIS Z 3211-91 Covered electrodes for mild steel" or equivalent. The appropriate electrodes shall be selected best fitting the type of steel to be welded.

Welding materials other than those stipulated above shall be selected according to the method of welding to be employed.

When base metals of two different yield stress are welded together, filler metal shall be selected based on the base metal which has the higher yield stress.

5.0 PAINTING

5.1 Surface preparation to be painted shall conform to :

- JIS K 3151-68 Phosphatizing compounds under painting.
- JIS K 5633-83 Etching primer.
- FS*1 TT-C-490 (Rev. C)(Amd.1) Cleaning methods for ferrous surfaces and pre-treatments for organic coatings.
- FS*1 TT-P-645 (Rev. A) Primer, paint, zinc-chromate, alkyd type. *1 FS : Federal Specification (America).

5.2 Rust preventive paint shall be conform to :

- JIS K 5627-84 Zinc chromate anticorrosive paint.
- SSPC*2 PS 8.01-82 One-Coat Rust Preventive Painting System with Thick-Film Compounds.
- *2 SSPC : Steel Structures Painting Council (America).

6.0 CONSTRUCTION REQUIREMENTS

6.1 General

The Contractor shall give the Engineer one (1) week's notice before commencing any major fabrication segment, such as enclosing the sides of any major structure.

Steel items shall be of the sizes, shapes and construction as indicated or specified.

Prior to the fabrication, all the necessary measurements shall be verified and checked in accordance with the quality control procedures of the AISC requirements.

Unless otherwise specified, the items shall be fabricated in accordance with an efficient shop method.

The Contractor shall be responsible for correction of all errors and omissions in detailing, layout and fabrication at his own cost.

6.2 Location of Fabrication

Structural steel shall be fabricated and assembled in the Contractor's shop or yard or in location as approved by the Engineer.

Basically welding at the field shall not be permitted.

6.3 Welding

6.3.1 Welder

The qualification of welder shall, in principle, conform to the respective stipulations of "JIS Z 3801-79 Standard qualification procedure for welding technique" according to a type of welding to be carried out. The welder shall have more than recent one year of continuous experience in structural welding and shall receive the approval of the Engineer.

If the Engineer has any doubts of the welder qualification although an approval has been given, the Engineer may direct to carry out examination tests in accordance with relevant JIS or other equivalent standards or may cancel the approval.

6.3.2 Preparation of materials

a. Edge Preparation

Groove angle shall be in accordance with the design and shop drawings. However it may be modified according to a type of welding to be carried out with the approval of the Engineer.

Grooves shall be made to the shape as stipulated above by automatic gas cutting or other mechanical methods. Manual gas cutting may be allowed under inevitable situations with the approval of the Engineer.

b. Welding Material

Electrodes shall be carefully handled and due precaution shall be taken so as not to use electrodes which have their covering materials peeled, contaminated, deteriorated and exposed to moisture.

Welding materials shall be stored dry, and shall be sufficiently dried before their use in case they have been exposed to moisture.

6.3.3 Assembly of Elements

Accurate assembly of elements shall be achieved by using proper jigs.

Where fillet welding shall be carried out the element shall be closely adhered to the base metal as possible.

Temporary welding shall be held at a minimum and shall avoid areas where it is structurally or erection wise impeding. Where it becomes part of the permanent welding the welding shall be without faults.

6.3.4 Welding Equipment and Ancillary Equipment

A welding equipment shall be of a type best meeting the requirements for a material and dimension of joints to be welded and be able to achieve and even welding.

Ancillary equipment shall have the required performance characteristics and shall be well maintained.

6.3.5 Cleaning of Base Metal

Welding surface of the base metal shall be sufficiently cleaned of slag, moisture, dirt, corrosion, oils, paints or other contaminants before welding.

6.3.6 Welding Works

Currents, voltage etc. :

Welding shall be done at proper speed, correct current and voltage according to a type and position of welding.

Jigs :

Shop welding shall, whenever possible, be done facing downwards using a rotating jig positioner.

Pre-heating :

Steel elements shall be pre-heated as required according to plate thickness and type of materials.

Welding :

Method and sequence of welding shall be planned so as not to cause any strain or to leave residual stress.

Before or during the permanent welding, temporary welding shall be removed, if the temporary welding has any damage.

Finished state :

The surface of welding shall have an uniform wave pattern, and size and length of welding shall not be less than a dimensions shown in the Drawings. The size of welding nay be larger than specified but shall not be overtly large or be irregular in pattern.

The welded part shall not have cracks, incomplete, fusion, lack of penetration, slag inclusion, pits, blowholes, undercutting, overlapping unevenness of legs or other faults.

Fillet welding :

In case of equal leg fillet welding, it shall not be overt difference between the two legs.

A dept of reinforcement of weld shall be less than 0.1S + 1 mm (S : the specified fillet size).

Arc :

Special care shall be taken to prevent lack of penetration and slag inclusion at the starting point of arc. An arc shall be moved along the base metal or the element to be welded whether it is the beginning of a weld or a continuation of a bead.

Care shall be taken so as not to cause cracks in the bead of the arc end.

Cleaning of welded surfaces :

Slag and spatters shall be removed from the welded surfaces and around surface of the welding.

6.3.7 Weather Conditions

Welding shall not be done when a welding surface is wet due to rain or other reasons or when strong winds are blowing. However if the position of weld and the welder is adequately protected and proper curing of the base metal

is carried out, welding may be carried out after confirmation of no remained moisture on the surface, and with the Engineer's approval.

6.3.8 Correction of Materials

Warping caused in the materials shall be corrected by mechanical means or by heating in such a way as not to cause any pernicious affect to the materials.

6.3.9 Inspection of Welding

During and after welding proper in-shop inspection shall be performed. Defective portions shall be corrected repeatedly to the satisfaction of Engineer. The charge shall be counted as Contractors Cost.

After welding and after the above mentioned in-shop inspection the weld shall be inspected by the Engineer's. However the above may be abbreviated with the Engineer's approval by submission of the result of the in-shop inspection.

6.4 Bolt Connections

Hole Diameter

All holes for bolted connections shall be of a diameter 0.25 mm larger than bolts used, unless otherwise indicated.

Hole Fabrication

All holes shall be drilled at right angles to the surface of the metal and shall not be enlarged by burning. Enlarging of holes shall be by reaming only with the approval of the Engineer.

Holes shall be clean-cut without torn or roughed edges

Outside burs resulting from drilling or reaming operations shall be removed with a tool making a 0.15875 cm bevel. All holes shall be drilled and reamed as necessary prior to application of protective coating.

Hole Reinforcement

Where holes are provided for the connection of equipment or for cable and piping access, and affect any major structural members, said members shall be reinforced adequately as designated by the Engineer.

6.5 Cutting, Shearing and Clipping

Shearing, flame cutting and clipping shall be done carefully and accurately by a mechanically guided tool. All edges shall be left free of slag. Any bevelled edge that has been damaged shall be restored to the minimum tolerances.

6.6 Fabrication Tolerances

The location of each member is essential to the design of the structure. Each member shall be accurately located as shown in the Drawings, within the fabrication tolerances given in AISC.

6.7 Product Inspection

In-shop inspection report of finished products shall be submitted to the Engineer for approval.

After the in-shop inspection, the products shall be inspected by the Engineer. The product shall be laid in a way not to hinder inspection and instruments necessary for inspection.

Faulty portions shall be promptly rectified.

6.8 Painting

6.9 Shop Painting

After fabrication and inspection structural steel shall receive two full shop coats of anti-corrosive paint per the relative stipulation.

Surfaces to be embedded or to come with concrete shall not be painted.

6.10 Finish Coating

Application of finish coating refer to Technical Specification AR-0914.

6.11 Galvanizing

Provide as indicated or specified. Galvanize after fabrication where practicable.

Method of galvanizing shall conform to JIS H 8641-82 Zinc Hot Dip Galvanizing, and the weight of zinc coating shall average not less than 275 g/m² (21 microns).

The testing of galvanizing shall conform to JIS H 0401-83 Methods of Test for Hot Dip Galvanized Coatings.

Use galvanizing repair paint for galvanizing damaged part caused by handling, transporting, cutting, welding or bolting. Do not heat surfaces where repair paint has been applied to.

6.12 Erection

Erection of structural steel shall be as specified in Technical Specification CS-0502.

CS – 0502 – STRUCTURAL STEEL ERECTION

1.0 DESCRIPTION OF WORK

This work shall consist of the erection of structural steel. This specification describes all work, materials and required performance for structural steel erection.

1.1 REFERENCE STANDARDS

a. Pedoman Perencanaan Bangunan Baja untuk Gedung (SNI.1729.1989-F)

b. Japanese Architectural Standard Specification for Steel Work (JASS 6, 1982)

c. American Institute of Steel Construction (AISC) :

- AISC M013-83 Detailing for Steel Construction
- AISC M013-84 Engineering for Steel Construction
- AISC M016-89 Manual of Steel Construction ASD

d. American Welding Society, Inc. (AWS) :

- AWS D1.1-90 Structural Welding Code Steel

e. American Society for Testing and Materials (ASTM, 1993)

f. Technical specification AR-0914 - Paintings

g. Technical specification AR-0501 - Structural Steel Fabrication

2.0 GENERAL PROCEDURES

2.1 Shop Drawing

Shop Drawings and other data requirements shall be submitted to the Engineer prior to erection and installation of all structural steel, for further review and approval.

2.2 Procedures and Sequence

Prior to scheduled erection of the structure, the Contractor shall submit to the Engineer an installation procedure and sequence with supporting calculations to verify that sufficient engineering has been done to ensure a successful erection, for approval.

Prior to starting field erection, the Contractor shall furnish the Engineer with the following information :

- Roof structure erection.
- Plant of erection equipment and scaffolding.
- Details of crane foundation, erection and removal.
- Temporary staying and bracing.
- Required erection accessories.
- Shipping and delivery (including schedule).
- Temporary storage yard and handling methods.
- Temporary electric supply.

- Erection sequence, procedures and methods.
- Erection tolerances and methods for maintaining.
- Equipment and procedures for tightening erection bolts.
- Setting anchor bolts and base plates.
- Painting.
- Field inspection.
- Safety measures proposed.

2.3 Pick-Up

Contractor shall be responsible for the structural adequacy of any structure or portion of structure which he lifts or moves. Contractor shall perform the structural analysis necessary to ensure that installation will be made without damage to the structure.

Contractor may submit pickup method for erection work for Engineer's approval. Any additional materials and fabrication cost required to withstand the loadings introduced by the alternate pickup method shall be furnished by Contractor at no additional cost to the Engineer.

2.4 Environmental Conditions

Do not erect roof structure during heavy or gusty wind conditions.

3.0 MATERIALS

3.1 Anchor Bolts, Bolts, Nuts and Fastening

Anchor bolts, bolts, nuts and fastenings shall comply with Technical Specification CS-0501.

Type and sizes shall be as indicated in the Drawings and the approved Shop Drawing.

3.2 Welding Electrodes

Type of welding electrodes shall be in accordance with Technical Specification CS-0501.

3.3 Grout

Grout for filling anchor's holes, baseplate's pad and others as indicated on the Drawings shall be made of cement material, of non-shrinkage and non-metallic type approved by the Engineer.

3.4 Finish Paint

Finish paint for steel surfaces shall be in accordance with Technical Specification AR-0914.

4.0 CONSTRUCTION REQUIREMENTS

4.1 Installation Tolerances

The Contractor shall install the structure on the designated erection site. Contractor shall verify condition of existing site prior to commencing installation procedures and shall report to the Engineer any conditions which would preclude installation of structure to the AISC tolerances.

All structures shall be erected within tolerances set forth in the AISC specifications unless otherwise stated. Any erected member of structure shall be self supporting to any external forces likely to be exerted while erection is in progress. Any temporary bracing added to the structure for self support and alignment shall be designed to withstand all conditions of loading during erection.

4.2 Bolt Tightening

Prior to the erection, all bolts, connections, alignments, grades, materials and facilities shall be thoroughly worked out.

Bolt tightening shall be done by calibrated torque wrench in order to determine the necessary bolt tension.

Bolt holes shall be aligned so that bolts can be placed without damaging threads. Bolt heads and nuts shall rest squarely against the metal.

Unfinished bolts transmitting shear shall be threaded to such a length that no more than one thread will be within the grip of the structural members.

The bolts shall be of length that will extend entirely through but no more than 6.35 mm beyond the nuts. Bolts heads and nuts shall be drawn tight against the work surface with a suitable wrench not less than 38 cm.

Bolt heads shall not be tapped with a hammer while the nut is being tightened. After having been finally tightened, the nuts shall be brushed and painted.

4.3 Grouting

4.3.1 Moulds/formwork shall be designed so that the grout is surcharged throughout the grouting operation. Good access should be provided.

Moulds/formwork shall have been prepared and surfaces/parts to be grouted are clean, dry and free from oil, grease and other contaminants likely to impair bond. Dust has to be blown from pockets.

Anchors, fixing bolts and base plates shall have been elevated prior to grouting.

The weather at the time of grout application being held, shall be in accordance with the requirements of the grout manufacturer.

The mixing comparison between grout and water shall be in accordance with the manufacturer instruction.

Mixing is carried out mechanically, by force action mixer or a suitable mixing paddle attachment to a slow speed drill.

Grout might be poured or pumped into the mould, or as specified by the manufacturer's instruction.

Gentle vibration will aid flow.

Use of straps or chains will aid flow where distances of over 1 m are involved (sawing action of the strap or chain promotes sympathetic flow of the grout- the technique must be used with discretion to avoid the creation of voids).

Flow of grout must be maintained until the grout has completely filled the void and has risen for the full length of the form on the opposite side. Grouting must take place from one side only.

4.4 In-site Painting

4.4.1 Where shop painting is damaged during transportation, the Engineer may instruct the Contractor that the structural steel shall be given 2 full coat of anti-corrosive paint in the Site. One coat immediately after off-loading and one coat prior to erection. The paint to be used shall be of the same make and type of the same manufacturer of the shop coat. Portion to be embedded in concrete shall not be painted.

4.4.2 Damage to the paint surface erection shall be mended immediately after completion of erection. In-site shall be painted as in above.

Spray painting shall not be carried out in the Site.

Finish coat shall be applied where shown in the Drawings per the stipulations of Technical Specification AR-0914.

The finish paint shall be of the same manufacturer of the shop coat.

4.5 Temporary Erection Braces

Contractor may use temporary erection braces, at his cost, during any phase of the work.

4.6 Inspection

Inspect field assemblies and bolted connections.

AR – 0509 – ORNAMENTAL METALS

1.0 DESCRIPTION OF WORK

The work under this Specification shall comprise the supply of labour, materials and the performance of all work necessary to install ornamental metals in relation to architectural works as indicated in the Drawings.

It shall include but not be limited to the following :

- Entrance Gate
- Handrails and railings
- Metal stairs and stair railings

2.0 REFERENCE STANDARDS

a. American Society for Testing and Materials (ASTM)

b. American Institute of Steel Construction (AISC)

c. American Welding Society (AWS)

d. Japanese Industrial Standard (JIS)

e. Standar Industri Indonesia (SII)

f. Technical Specification AR-0914 - Painting

g. Technical Specification CS-0501 - Structural Steel Fabrication

h. Technical Specification CS-0502 - Structural Steel Erection

3.0 GENERAL PROCEDURES

3.1 Samples and Mill Testing

Samples completed with mill certificates covering the chemical, physical, charpy v-notch properties and the heat treatment data of all metals to be used shall be submitted to the Engineer for approval prior to fabrication.

All testings shall be performed on a sample of the finished product.

3.2 Shop Drawings

A Shop Drawing and list of materials of pre-fabricated items falling into this category shall be submitted to the Engineer for approval prior to fabrication. After the approval, no deviations or alterations shall be made in the finally accepted shop drawings by the Contractor without written consent from the Engineer.

The following items shall be included on the shop drawings as applicable :

- Materials specification,
- Piece mark numbers,
- List of material parts,
- Dimensions (exact length and shape) and weight,
- Fabrication details,
- Welding details,
- Painting requirements,
- Shop splice details and locations.

3.3 Inspection and Testing

The material to be furnished under this Specification shall be subject to inspections and tests in the mill, shop and field by the Engineer. However, inspection in the mill or shop will not relieve the Contractor of the responsibility to furnish new and first quality of materials and workmanship.

The Contractor shall perform and pay the cost of all sampling and testing of materials and work required, including any product demonstration proposed by the Engineer.

The Engineer reserves the right to reject any material or fabricated item if at any time before final acceptance of the structure, the following condition occurs :

- The materials supplied does not conform to this Specification.
- The fabricated items does not conform to the drawings or Specification.
- Modification has been made without the written approval from the Engineer.

3.4 Handling and Storage of Material

Materials shall be stored out of contact with the ground in such manner and location as will minimise rusting and corrosion.

All metals shall be handled with extreme care, in such a manner as not to cause excessive scratches or dents, as determined by the Engineer.

All imperfections must be thoroughly inspected and any deep cuts or serious abrasions shall be repaired and ground smooth. Plate repair procedure shall be submitted to the Engineer for approval. No other grinding shall be permitted on base material to remove surface imperfections except as to prepare surface for welding.

Burning shall not be used to straighten or to bend material, except by written consent of the Engineer.

4.0 MATERIALS

4.1 General

All metals shall be new and be free from defects impairing strength, durability or appearance, and shall be of the best commercial quality.

4.2 Steel Profile

Unless otherwise specified, steel profile shall conform to ASTM A.36.

Items to be substituted shall be approved by the Engineer.

4.3 Steel Pipe

Steel pipe for handrails, railings and others as indicated in the Drawings shall conform to AISI 304. Diameter of pipes shall be as specified in the Drawings.

4.4 Perforated Aluminium Sheet

Perforated aluminium sheet for parapet and others as indicated in the drawings, shall have the following characteristic :

- Thickness of 3 mm

- Hole of 7 mm diameter
- Hole distance of 50 mm
- Hollow pattern indicated in the drawing
- Item to be substituted shall be approved by the Engineer

4.5 Stainless Steel Plate

Stainless steel plate for floor divider and corner protector should be made of bent stainless steel plate as shown on the drawings.

4.6 Expanded Metal

Expanded metal lath for catwalk and others as indicated on the drawings shall be used the product of expanded metal lath type GR 50080, nominal thickness 5 mm or approved equal.

4.7 Bolts, Nuts and Washers

Bolts, nuts and washers material shall conform to ASTM A-307-78, and shall be cadmium plated.

Bolts dimension shall be conform to ANSI B-18.2.1.-1972 and nuts dimension shall conform to ANSI B-18.2.2.-1972.

4.8 Anchor Bolts

Anchor bolts shall be made of steel round bar of Bj.40 grade, in diameter and length as indicated in the Drawings.

4.9 Hangers and Supports

Hangers and/or supports for ceiling frame shall be made of steel profile in sizes and forms as shown in the Drawings.

5.0 CONSTRUCTION REQUIREMENTS

5.1 General

Prior to the fabrication, all the necessary measurements shall be verified and checked in accordance with the quality control procedures of the AISC requirements.

Design and members and connections for any portion of the structures not indicated in the Drawings shall be completed by the Contractor and indicated in the Shop Drawings.

The Contractor shall be responsible for correction of all errors and omissions in detailing, layout and fabrication at his own cost.

5.2 Workmanship

Ornamental metal items shall be of the sizes, shapes and constructed of materials as indicated or specified in Drawings.

Unless otherwise specified, the items furnished shall be an approved product, fabricated in accordance with an efficient shop method.

Fabrication of ornamental metals shall be carried out in accordance with the Drawings, the approved Shop Drawings, this Specification and Technical Specification CS-0501.

For fabrication of work exposed-to-view, use only materials which are smooth and free of surface blemishes including pitting, seam marks, roller

marks, rolled trade names and roughness. Remove blemishes by grinding, or by welding and grinding, prior to cleaning, treating and application of surfaces finishes.

5.3 Fabrication and Installation

5.3.1 General

Installation of ornamental metals in types, sizes and shapes as indicated in the Drawings and this Specification shall be in accordance with Technical Specification CS-0502.

Anchor bolts, anchor bolt assemblies and hook bolts shall be furnished and installed in conformity with the Drawings and as directed by the Engineer. All steel anchorage embedded to concrete shall be properly cleaned of rust, loose scales, oil and other objectionable matter in order to have a good bond to the concrete.

Provide and co-ordinate anchorage of the type indicated with the supporting structure. Fabricate and space anchoring devices to provide adequate support for the intended use of the work.

Exposed connections with hairline joints which are flush smooth shall be formed using concealed fasteners wherever possible. Use exposed fasteners of the type indicated or, if not indicated, use cross-recessed flat head (countersunk) screws or bolts.

Handrails and Railings.

Adjust railings prior to securing in place to assure proper matching at butting joints and correct alignment throughout their length. Plum post in each direction. Secure posts and rail ends to building construction.

Post shall be welded to steel base with flange, angle types or floor types as required by conditions or by the Drawings. Then post with its base shall be bolted to the supporting members as described in the Drawings.

Aluminium perforated sheet shall be installed in accordance with the drawing.

5.4 Floor Divider

Adjust every floor divider so that the upper surface in the same plane with each respective finish floor level.

Scare every floor divider to its respective base with anchors as shown on the drawing before filing work started.

Metal floor divider should be covered with protective plastic coating before handling owner of the work.

5.5 Protective Coating/Painting

Unless otherwise noted, all ornamental metal works shall be anti-rust coated and finished in colours as specified in Colour Scheme which shall be issued later.

Paints and painting works shall be carried out in accordance with the requirements of Technical Specification AR-0914.

AR – 0602 – CARPENTRY

1.0 DESCRIPTION OF WORK

The work shall include the provision and treatment of all architectural wood work, and shall consist of, but not be limited to the following :

- Ceiling Frame
- Wood doors/windows and frames
- Partitions
- Ceiling cornice
- Eaves grilles
- Fascia and gable board
- Counter
- Cabinet
- Rafter
- Wooden curtain box
- Black board
- And others as indicated in the Drawings.

2.0 REFERENCE STANDARDS

a. Peraturan Konstruksi Kayu Indonesia (PKKI)

b. Persyaratan Umum Bahan Bangunan di Indonesia (PUBI)

c. Technical Specification AR-0821 - Finish Hardware

d. Technical Specification AR-0825 - Glass and Glazing

3.0 GENERAL PROCEDURES

3.1 Samples

Samples of proposed material shall be submitted to the Engineer for approval prior to delivery.

All timber, plywood, boards and wood flooring shall be obtained from an approved supplier who will guarantee the quality and moisture content for the purpose it is required.

3.2 Handling and Storage

All lumber shall be delivered to the site in undamaged condition, stored in fully covered and well naturally ventilated areas protected from extreme climate changes in temperature and humidity or rain.

Interior finish shall be stored at the site in approved weather tight enclosures, good naturally ventilated and shall not be brought into the building until the plastering work has been completed and is completely dry.

4.0 MATERIALS

4.1 Lumber

4.1.1 Quality

Lumber shall be grade A, class II and with durability and strength in accordance with PKKI and as listed hereunder for the respective purposes to be used in the work.

It shall be free from wane, sap, clefts, shakes, radial cracks and bark pockets.

Long loose and large dead knots, decay and insect attack material is not acceptable.

4.1.2 Moisture Content

Except as specified hereinafter, all lumber shall be kiln-dried, and at time of delivery the moisture content shall be within the following limits :

- Interior structural, carcassing, battens 15 - 18 %
- Interior finishing lumber 12 - 15 %
- Great care shall be taken to ensure that it does not materially change during transit, storage, erection and drying out to the natural conditions.

4.1.3 Type of Lumber

Type of lumber which shall be used, shall be as follows :

a. Selected lumber shall be Kamper Samarinda which shall have a good appearance and finishing qualities. Lumber which shall receive natural/transparent finishes shall be practical clear, or of high quality and generally clear. Lumber which shall receive paint finishes shall be suitable for receiving high quality paint finishes.

b. Lumber for general construction and utility purposes shall be suitable for better type construction for good standard construction use, such as Bengkirai.

4.2 Plywood

All interior plywood for transparent finish shall be selected for uniformity of colour and graining, free from splits, scratches and blemishes.

The minimum number of plies required for plywood shall minimum be 3 plies for 4 to 9 mm thick.

Plywood that is consisted of chips or small rest material at the middle of its plies should not be used.

Plywood to be pressure-preservative treated shall be fully-waterproofed type. Grade for preservative-treated plywood shall not be less than that specified for the specific use.

Plywood shall be clean and smoothly sanded on 2 (two) sides.

4.3 Trim

Materials for trim shall be the species specified herein or approved equal, designed as indicated for such items as ceiling cornice, handrailing, wall skirting, pattern in accordance with grading rules for the species for such items as door, fascias, gables, baseboards and can be assembled and

sanded at the mill insofar as practicable, in maximum practicable length, and with permitted finger joints when paint finishes are to be received.

Sample of factory work shall be submitted to the Engineer for approval, prior to mass production.

4.4 Fasteners

All rough hardware required for execution of the work such as nails, screws, bolts, anchors and other shall be hot dip galvanized steel in suitable size as required or as indicated in the Drawings.

4.5 Adhesive

All glue or adhesives used shall be water resistant, such as neoprene based/synthetic resin based product or equal.

4.6 Glass and Glazing

Glass and glazing for door, window and partitions shall comply with Technical Specification AR-0825.

4.7 Finish Hardware

Finish hardware for doors and windows shall comply with Technical Specification AR-0821.

5.0 CONSTRUCTION REQUIREMENTS

5.1 Sizes and Patterns

Lumber shall be surfaced four sides, and dressed size of lumber shall conform to the applicable provisions of PKKI.

Lumber shall be worked to such patterns as indicated or specified.

5.2 Preservative Treatments

All items of wood and plywood to be permanently incorporated in the building or structure shall be preservative treated in a closed retort except as specified for softwood lumber and plywood. Treated materials which are cut shall have cut surfaces well brushed-coated with the preservative used in the original treatment.

5.3 Workmanship

Finished work shall be dressed and sanded, free from machine and tool marks, abrasions, raised grain or other defects on surfaces exposed to view in the finished work. Joint shall be tight and so formed to conceal shrinkage. Mortice and tenon joints shall be set in glue with wedges and for interior work may be pinned.

Glass and glazing installation shall be carried out in accordance with Technical Specification AR-0825.

Hardware installation for doors and windows shall be carried out in accordance with Technical Specification AR-0821.

5.4 Rafters

Rafters shall be notched and have full and solid bearing on plates. Toe-nail rafters to purlins, ridge, valley, hip member with at least three 75 mm nails and roof edge strips.

5.5 Counter and Cabinets works

All finish counter and cabinet works shall be carried out by an approved contractor having specialised in the work as its primary business for at least 10 years, and having performed satisfactorily work of this type and magnitude.

Complete the work this section in accordance with the standards for "Custom Grade" work in the latest edition of the "Architectural" Woodwork Quality Standard of the Architectural Woodwork Institute.

Employ only craftsmen who are thoroughly skilled in the various crafts, and who are completed familiar with the specified requirements. Provide the services off a competent foreman or supervisor who shall be available at all times during the progress of the work of this Section and who shall be designated as the single point off contact within the subcontractor's organisation for matters in connection with the work of this Section.

5.6 Interior Wall and Partitions

Where finished surface shown exposed or painted wood, careful workmanship and finishing shall be required.

Discoloured or broken units, smeared or damaged surfaces, and joints of uneven thicknesses shall be the cause for rejection of works or portion thereby.

The necessary cutting and fitting of all concrete masonry units around switch boxes, piping, conduit and others, shall be carefully co-ordinated between trades and neatly finished by experience workmanship.

5.7 Ceiling Joints

Size as indicated and set accurately and in alignment. Toe-nails joints to all plates with not. Less than three 15 mm nails frame openings in ceilings with headers and trimmers.

Apply fibre cement board horizontally where indicated.

5.8 Black Board

Wall shall be have a hanger for install the black board. Black board's dimension indicated in the drawing.

5.9 Finish Treatment

5.10 Transparent Finish

Finish treatment for all wood surfaces shall be matched for compatibility of grain and colour adjoining members. Type of finish transparent and application shall be in accordance with the requirements of Technical Specification AR-0916.

5.11 Paint Finish

For paint finish treatment, matching for compatibility is not required.

AR – 0705 – WATERPROOFING

1.0 DESCRIPTION OF WORK

This work shall include furnishing material, labour, tools and installation of waterproofing at places as indicated in the Drawing.

The works shall include but not be limited to the following :

- Exterior and interior horizontal waterproofing where shown
- Flashing and sealing treatment
- Setting flashing collars, clamping rings and like devices for pipe, conduit or structural penetration

2.0 REFERENCE STANDARDS

a. American Society for Testing and Materials (ASTM)

b. Japanese Industrial Standard (JIS)

c. Technical Specification AR-0404 - Cement Mortar

3.0 GENERAL PROCEDURES

3.1 Samples and Technical Data

Prior to delivery, sample and technical data of materials to be used shall be submitted to the Engineer for review and approval.

3.2 Shop Drawing

The Contractor shall prepare and submit Shop Drawings for Engineer's approval. All Shop Drawings shall be submitted sufficiently in advance of field requirements to allow ample time for checking. All submittal shall be complete and shall contain all required and detailed information.

In the event of any discrepancy between one Drawing and another or between the Drawing and this Specification, the Contractor shall bring such a discrepancy to the attention of the Engineer for resolution.

3.3 Handling and Storage

All materials shall be delivered in good condition, free from any defect, and shall be completed with label, technical data and data required as specified.

All materials shall be orderly kept in their packages and shall be kept free from damage.

4.0 MATERIALS

4.1 General

All material for waterproofing shall come from a proven product approved by the Engineer.

4.2 Waterproofing

Waterproofing membrane shall have a minimum 1.0 mm thick phable self-adhesive membrane composed of high strength polyethylene, factory coated on one side with a layer of rubberised asphalt.

It shall adhere tightly and permanently to the substrate to form a continuous water barrier without using job applied adhesives, hot materials, mechanical fastening or special equipment.

Waterproofing membrane shall have the following characteristics :

- Shall not rot or mildew,
- Withstands extreme climates,
- Shall have uniform thickness,
- Quick installation, such as Bituthene 2000 or approved equal.

4.3 Primer

Primer for all concrete or masonry surface shall be from the same manufacturer of waterproofing membrane.

4.4 Screed

Screed material shall be in accordance with the requirement of cement mortar as specified in Technical Specification AR-0404.

4.5 Synthetic Rubber Coating

Synthetic rubber coating waterproofing shall be an organic solvent type composed mainly of neoprene rubber and hypalon rubber.

It shall adhere tightly and shall have a big advantage of being able to be used on all kinds of surfaces.

Synthetic rubber coating shall have the following characteristics :

- Light,
- It can be coloured,
- Flame retardant,
- It can be formed,

Such as NS Pearl by Nisshin Kogyo or approved equal. Colour shall be as determined by the Engineer.

5.0 CONSTRUCTION REQUIREMENTS

5.1 General

Installation work required in this Specification shall be performed only with manufacturer's authorised representative in attendance.

For surface with drain outlet, they shall have slope ± 1% toward the drain outlet.

Prior to installation of the membrane. The drain outlet shall have been installed.

5.2 Installation

5.2.1 Surface preparation

Smooth, monolithic concrete or masonry surfaces are required for proper membrane adhesion.

Surfaces shall be free of voids, spalled areas, loose aggregate and sharp protrusions, with no coarse aggregate visible.

Broom finishes shall not be used.

Concrete must be cured and dry before application of waterproofing membrane.

Clean surface to removed dust, loose stones and debris by using broom, vacuum cleaner or compressed air.

5.2.2 Priming

Apply primer to designated concrete or masonry surface with a lambs wool roller in appropriate thickness as specified by the waterproofing membrane manufacturer.

Allow primer to dry or until tack free.

Prime only the area which will be covered with membrane in a working day.

Metal or other dense surfaces do not require priming, but shall be clean, dry, free from loose paint, rust or other contaminants.

Areas not covered with membrane in 24 hours shall be re-primed.

5.2.3 Temperature

Apply waterproofing membrane only in fair weather when air and surfaces temperature are above 5°C.

5.2.4 Sealing Edges

For vertical applications, waterproofing membrane should be applied over the edge of the slab or over the top of the foundation or parapet wall. If the membrane is terminated on the vertical surface, a reglet or counter flashing may be used or the membrane may be terminated on the concrete by pressing very firmly to the wall. Press edges with a metal or hardwood tool such as a hammer or knife handle.

Failure to use heavy pressure at terminations can result in a poor seal.

Nailing of the membrane is usually not required.

Apply mastic or caulking to all vertical and horizontal terminations.

5.2.5 Sealing Seams

All edge and end seams shall be overlapped at least 65 mm, or as recommended by the membrane's manufacturer.

For this purpose, a guideline shall be printed on the membrane.

5.2.6 Corner Details

Cover all inside and outside corner with an initial strip a minimum of 30 cm wide centred on the axis of the corner, followed by the full with membrane application. Outside corners shall be free of sharp edges. Inspect surfaces adjacent to all corners and repair if necessary to provide a smooth dense surface. Inside corners shall receive a fillet formed with latex modified cement mortar and a double coverage of membrane as described above.

5.3 Protection

Waterproofing membrane shall be protected to avoid damage from other trades, construction materials or backfill.

Protection shall be used on foundation wall and horizontal surface with light traffic.

Protect horizontal decks with heavy construction traffic with 3 mm asphalt hardboard.

For reinforced concrete structural slabs placed over the waterproofing membrane, a heavy protection layer such as 25 mm sand : cement screed

or equivalent is recommended. Protection shall be installed the same day the membrane is applied or immediately after 24 hour flood testing. No waiting before backfilling or applying tapping slabs is necessary.

AR – 0714 – CAULKING AND SEALING

1.0 DESCRIPTION OF WORK

The work shall consist of caulking, pointing and sealing of joints, sundry apertures and exterior sills, thresholds and like conditions as indicated on the Drawings and/or as specified herein.

The work shall include but not be limited to the followings :

- Caulking and pointing of any areas or specific joints showing potential penetration or seepage of moisture.
- Sealing of joints around frames of doors, windows and other openings in exterior walls.
- Sealing of joints at the intersection of differing materials.

2.0 REFERENCE STANDARDS

a. American Society for Testing and Materials (ASTM)

b. Technical Specification AR-0401 - Unit Masonry

c. Technical Specification AR-0602 - Carpentry

d. Technical Specification AR-0824 - Aluminium Doors and Windows

3.0 GENERAL PROCEDURES

3.1 Sample and Technical Data

Sample and technical data of all specified caulking and sealing compounds intended for use on buildings shall be submitted to the Engineer for approval prior to delivery.

3.2 Storage

All materials shall be delivered to the site in unbroken containers bearing manufacturer's labels, and shall be stored in a clean dry lockable place, and shall be protected from damage and adverse atmospheric conditions and according to the manufacturer recommendation.

4.0 MATERIALS

Unless otherwise specified, all caulking compound shall be a silicone sealant formulation such as Dow Corning 795 Silicone Building Sealant or approved equal that cures in the presence of atmospheric moisture to produce a durable and flexible low-modulus silicone rubber building joint seal.

Caulking compound shall have designed weather ability appropriate to prevailing local conditions that enables it to retain original design properties after prolonged periods of exposure.

Elongation, tensile strength, hardness and adhesion shall not change significantly with ageing or exposure to weather.

Selected material shall have proven ability to withstand the conditions prevailing at the site and written documentation guarantee shall be made available by manufacturer to the Engineer before selection.

5.0 CONSTRUCTION REQUIREMENTS

5.1 Preparatory Work

All areas to be caulked shall be cleaned of all contaminants and impurities. Porous substances shall be cleaned where necessary by grinding, blast cleaning, mechanical abrading or a combination of these methods as required to provide a clean and dry surface for sealant application.

Dust, loose particles and others should be blown out of joints with oil-free compressed air or vacuum cleaned.

Metal or glass surfaces adjacent to masonry should be cleaned by wiping with an oil free rag saturated with solvent such as toluol, or methyl ethyl ketone.

5.2 Joint Design

Sealant shall be no thicker than 12.7 mm and no thinner than 3.2 mm.

5.3 Masking

Areas adjacent to joints shall be masked to assure neat sealant lines. Do not allow masking tape to touch clean surfaces to which the silicone sealant is to adhere. Tooling shall be completed in the most continuous stroke practicable for the joints addressed herein, immediately after sealant application and before a skin form.

Masking shall be removed immediately after tooling.

5.4 Method of Application

Silicone sealant shall be applied in the most continuous sequence practicable for the existing joints on the building. A positive pressure adequate to properly fill and seal the joint width shall be employed. Tool or strike sealant with light pressure to spread the material against the back-up material and joint surfaces.

The sealed joint shall not be disturbed for at least 48 hours. Excess sealant on porous surfaces shall be allowed to cure and then be removed by abrasion or other mechanical means.

AR – 0722 – RAIN GUTTER AND LEADER

1.0 DESCRIPTION OF WORK

This work shall cover the furnishing and installation of all rain gutters and leaders as indicated by the Drawings or hereinafter specified.

2.0 REFERENCE STANDARDS

a. Persyaratan Umum Bahan Bangunan di Indonesia (PUBI)

b. Standar Industri Indonesia (SII)

c. Japanese Industrial Standard (JIS)

d. Technical Specification AR-0714 - Caulking and Sealing

e. Technical Specification AR-0914 - Paintings

3.0 GENERAL PROCEDURES

3.1 Sample and Technical Data

Sample and technical data of proposed materials shall be submitted to the Engineer for approval prior to delivery.

3.2 Shop Drawings

Prior to fabrication and installation, the Contractor shall submit Shop Drawing to the Engineer for approval.

Shop Drawing shall be completed with type of material, dimension, support and other required details.

3.3 Handling and Storage

Immediately after delivery, all materials shall be properly stacked in a clean dry place and protected from damage or abrasion prior to and after installation.

4.0 MATERIALS

4.1 Rain Gutter

Rain gutter shall of PVC complying with JIS 6741, in sizes and forms as indicated by the Drawings.

4.2 Rain Leader

Rain leader shall be of PVC pipes of 8 kg/cm² which shall comply to JIS 6741, such as Pralon or approved equal.

Diameter of PVC pipe shall be as indicated in the Drawings.

4.3 Adhesive

Adhesive for leader connection shall be from a proven product approved by the Engineer.

4.4 Rain Gutter Hook

Rain gutter hook shall consist of steel profile in shape and dimension as specified in the Drawings. All steel material for gutter hook shall comply to the requirement of SII.

5.0 CONSTRUCTION REQUIREMENTS

5.1 Gutters

Rain gutters shall be installed in accordance with the approved Shop Drawings and the manufacturer's recommendations.

Rain gutters shall be stiffened by gutter hook support manufactured by the Contractor, at a minimum distance as specified and at every gutter joint. Steel rain gutter hooks shall be anti-rust painted in colour as specified by Colour Scheme.

Paint materials and painting work shall comply with Technical Specification AR-0914.

5.2 Leaders

Rain ladder's diameter shall be of size and be spaced at the interval shown in the Drawings.

Rain leaders shall be provided with PVC strainers/sieves and other fittings such as knees, outlets and adapters as shown in the Drawings and as appropriate to each case.

Joint connection between gutters or leaders shall be done with an approved adhesive.

Sealant/caulking shall be applied to the joint between gutters and leaders.

Sealant/caulking shall comply with the Technical Specification AR-0714.

Rain leaders shall be securely attached to either the sidings or walls with bolted straps/supports at adequate intervals.

Rain leader straps/supports shall be anti-rust painted in colour as specified by Colour Scheme.

Paints and painting works shall comply with Technical Specification AR-0914.

TS – 07321 – ROOF MATERIALS

1.0 DESCRIPTION OF WORK

The work shall cover the transportation, the furnishing of manpower, tools and materials and installation of roof tiles, ridge cap and other required accessories as indicated in the Drawings..

2.0 STANDARD REFERENCES

a. Persyaratan Umum Bahan Bangunan di Indonesia (PUBI-1982)

b. Standar Industri Indonesia (SII)

c. Technical Specification TS 0501 – Structural Steel Fabrication

d. Technical Specification AR 0602 – Carpentry

e. Technical Specification AR 0914 – Painting

3.0 GENERAL PROCEDURES

3.1 Samples and Technical Data

Samples and technical data of all materials to be used shall be submitted to the Engineer for review and approval, prior to delivery to the site.

3.2 Shop Drawings

Prior to construction, the Contractor shall prepare and submit to the Engineer, detailed Shop Drawing which cover dimensions, method of installation, and other necessary details, for review and approval.

3.3 Handling and Storage

All materials shall be delivered to the site in good condition, new and free from any crack and defect, completed with label.

All materials shall be stored in a dry place and protected from any damage.

4.0 MATERIALS

4.1 General

All materials to be installed shall be new, from a good quality and shall have been approved by the Engineer.

4.2 Roof Tile

Roof tile shall be manufactured from a good quality glazed ceramic, in colour as specified by Colour Scheme to be issued later, and having the characteristics as follows :

- Water resistant,
- Resistant against climate changing,
- Fire resistant,
- Uniformity in shape and dimension,
- Nominal area 310 mm x 262 mm,
- Effective area 262 x 262 mm,
- Weight of ± 3,2 kg/pc,
- Complying with SII – 0022,
- Such as roof tile of Premium (blue) manufactured by Abadi Jatiwangi or approved equal.

4.3 Accessories

Roof tile shall be completed with accessories which are manufactured from the same material as the roof tile to be used, and shall consist of the following :

- Ridge cap,
- Ridge course,
- Apex,
- Starter,
- Ridge stop,
- Valley flashing,
- And other accessories to be provided, according to the requirements as shown in the Drawings and during installation.

4.4 Rubber Membrane

The rubber membrane for installation beneath roof tiles shall consist of a single ply membrane of EPDM (ethylene propelene diene rubber) of GAFPLY EP or equal.

4.5 Fibre Cement Tiles

Fibre cement tiles shall be as approved by the Engineer.

4.6 Roof Frame

Roof frame made of timber such as purlin and other framing shall comply with the requirements of Technical Specification AR 0602.

Roof frames made of steel such as rafter and/or trusses shall comply with the requirements of Technical Specification CS 0501.

5.0 CONSTRUCTION REQUIREMENTS

5.1 General

Installation of roof tiles and accessories shall be carried out after all roof frames have been finished and have been checked and approved by the Engineer.

Installation of roof tiles and accessories shall be carried out according to the manufacturer's installation instruction.

5.2 Installation

Prior to installation of roof tiles, all roof frames made of steel shall have been properly installed according to Technical Specification CS 0501 and shall have been painted with anti-rust coating according to Technical Specification AR 0914.

Where all roof frames made of timber shall have been properly as much as two (2) times of coating, as specified in Technical Specification AR 0602.

Sizes and lay out of timber framing shall be in accordance with the manufacturer's instruction.

The rubber membrane, shall be placed according tot he manufacturer's recommendations using fixing and sealing materials from the supplier of the membrane. All joints shall be sealed and approved by the Engineer prior to the tile laying.

Roof tiles, ridge cap and other accessories together with gutters (if shown in the Drawings) shall be properly installed, starting from the lowest part

leading to the top by following the inclination of the roof as shown in the Drawings.

AR – 0821 – FINISH HARDWARE

1.0 DESCRIPTION OF WORK

The work shall cover the furnishing and installation of all the hardware for doors and windows as shown in the Drawings and/or hereinafter specified.

2.0 REFERENCE STANDARDS

a. Standar Industri Indonesia (SII)

b. Technical Specification AR-0602 – Carpentry

c. Technical Specification AR-0824 -- Aluminium Door and Window

d. Standard DIN

3.0 GENERAL PROCEDURES

3.1 Samples and Technical Data

Samples and technical data of proposed materials and components specified herein, shall be submitted to the Engineer for approval prior to delivery.

Cost of providing samples shall be the Contractor's responsibility.

3.2 Handling and Storage

Hardware shall be delivered to the project site in the manufacturer's original package. Each article of hardware shall be neatly wrapped and individually packed in a substantial carton or other container, properly identifiable with the permanent hardware schedule, and shall be stored under cover in a clean dry place, free from deleterious influences.

4.0 MATERIALS

4.1 General

All materials specified herein shall be new and of first quality, free of any defect, and the manufacturer having a proven record in this field of manufacturer.

All fittings shall be corrosion-proof in all locations where exposed to a relative humidity of more than 70%.

Except as hereinafter specified, all hardware supplies shall be in accordance with the types indicated below.

4.2 Hardware

4.2.1 Lock sets

All lock sets for external and internal doors (except toilet/WC doors) shall be similar or equal to Dom 333 N type with general master key system.

All lock sets shall consist of the following :

- Lock of cylinder type (complete with 3 keys)
- Handle and plate
- Lock case

4.2.2 Latches

All toilet/WC doors which do not have lock sets shall be provided with latch bolt by knob either side and push button inside which can lock outside knob, and lever handle can be released by turning the inside knob. This type of latch shall be equal or similar to GRIFF.

All windows shall be provided with spring knip type such as Whitmatic or approved equal.

4.2.3 Butt and Hinges

Except otherwise noted, butt hinges for all doors shall be Hinges QR 100 approved equal.

Hinges for all windows shall be Whitco Stay or approved equal, in appropriate sizes suitable with window size and weight.

4.2.4 Flush Bolt

All double doors shall be fitted with flush bolt at both leafs. Flush bolt shall come from an approved product.

4.2.5 Door Closers

All external doors and all doors leading to air conditioned rooms shall be provided with door closer such as GEZE TS.2000 type or approved equal.

4.3 Finishes

Finishes of all hardware shall be in dark brown, unless otherwise specified.

5.0 CONSTRUCTION REQUIREMENTS

5.1 General

Contractor shall submit Shop Drawings for approval prior to delivery and construction.

All fittings shall be installed in accordance with the manufacturer's written instructions and be protected against damage and left in a clean and intact condition at all times.

Unless otherwise shown in the Drawings, all windows shall be hung to the frame with 2 (two) hinges and shall be completed with a latch for each window.

Each door shall be installed to its frame with 3 (three) hinges and shall be provided with lock set, door closer, except otherwise specified.

5.2 Installation

Lock set shall be installed with door pull/handle or latch at 100 cm above the finish floor.

Top hinges for doors shall be installed with the centre-line of hinge not more than 28 cm below the top of door.

Bottom hinges shall be installed with the centreline of hinge not more than 33cm above the finish floor.

Intermediate hinges shall be installed with equal distance between the top and bottom hinges.
Door closer shall be installed in accordance with the manufacturer's installation instruction and each door leaf shall have 1 (one) door closer, except otherwise specified.

Double door shall be provided with flush bolt. The flush bolt shall be installed on the inactive door leaf and the installation shall be in accordance with the manufacturer's installation instruction.