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
- American Welding Society, Inc. (AWS)
- AWS D1.1-90 Structural Welding Code Steel
- American Society for Testing and Materials (ASTM, 1993)
- Technical specification AR-0914 - Paintings
- 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

5.1 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

6.0 REFERENCE STANDARDS

a. American Society for Testing and Materials (ASTM)

b. Japanese Industrial Standard (JIS)

c. Technical Specification AR-0404 - Cement Mortar

7.0 GENERAL PROCEDURES

7.1 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.

7.2 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.

7.3 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.

8.0 MATERIALS

8.1 General

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

8.2 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.

8.3 Primer

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

8.4 Screed

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

8.5 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.

9.0 CONSTRUCTION REQUIREMENTS

9.1 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.

9.2 Installation

9.2.1 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.

TS – 08110 – STEEL DOOR AND FRAME

1.0 DESCRIPTION OF WORK

The work shall cover the furnishing of materials, labour, tools, equipment, fabrication and installation of steel door and frame as shown in the Drawings or as specified herein.

2.0 REFERENCE STANDARDS

a. American Society for Testing and Materials (ASTM)

b. Standar Industri Indonesia (SII)

c. Japanese Industrial Standard (JIS)

d. American Welding Society (AWS)

e. Technical Specification AR 0821 – Finish Hardware

f. Technical Specification AR 0825 – Glass and Glazing

g. Technical Specification AR 0914 – Painting

3.0 GENERAL PROCEDURES

3.1 Samples and Technical Data

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

Technical data shall be completed with mill certificate.

3.2 Shop Drawing

The contractor shall prepare and submit Shop Drawings showing details of various parts, method of suspension, dimensions and any other required details to the Engineer for review and approval.

3.3 Handling and Storage

Doors and frames shall be delivered in a package to prevent damage due to handling or weather. All parts of frame shall be packaged together. Each door shall be packaged individually.

Immediately after delivery, doors and frames shall be properly stacked and protected prior to and after installation.

3.4 Identification

Each door and frame assembly shall be marked with the appropriate door number which shall be die-stamped on the hinge jamb of frames and on the hinge edge of doors near the top hinge, and legible in the completed installation.

3.5 Hardware

The contractor shall submit to the Engineer for approval a comprehensive schedule of proposed hardware listing by each door and frame, using door numbers, clearly indicating manufacturer, catalogue number, design or pattern, material and finish for each item of hardware. Hardware samples shall be submitted to the Engineer for approval, as specified in Technical Specification AR 0821.

4.0 MATERIALS

4.1 Door and Frame

Steel door and frame shall be constructed from steel material complying to SII, AS, ASTM standard or equal which shall consist of the following materials :

- Steel plate for door panel in specified thickness and size.
- Steel profile for door frame in specified shape and size.
- Steel door and frame shall be constructed and fabricated in accordance with the design and dimension as specified in the Drawings.

4.2 Hardware

All locks and fittings shall be corrosion proof, provided by one manufacturer, and shall have provision to be incorporated in a master key system by means of interchangeable cylinders, and shall be in accordance with the Technical Specification AR 0821.

4.3 Glass and Glazing

Glass and Glazing, if required, shall be in accordance with the requirements of Technical Specification AR 0825.

5.0 CONSTRUCTION REQUIREMENTS

5.1 Fabrication

5.1.1 Doors

Doors shall be nominally 45 mm thick, formed of two panels of minimum 1,2 mm thick, full flush to both faces of the frame, with seamless faces and bevelled vertical edges. Seams or vertical edges shall be welded continuous full length. Top and bottom edge seams shall be spot welded or continuous welded.

Internal stiffeners shall be spaced and specified by the Drawings and according to the approved Shop Drawings.

Adequate plate reinforcement shall be provided for hinges, lock boxes and other surface hardware.

Vision panel openings for glass lights in doors shall have fixed glass stops one side and removable glazing beads on the other side.

Where external doors have openings for glass panels, fixed glass stops shall be on outside door face.

5.1.2 Frames

Frames for doors shall be combination of steel profile as specified in the Drawings and the approved Shop Drawings. Frame shown fastened to the structure by means of exposed bolts shall have anchors fabricated to detail. Frames not otherwise shown shall have anchors fabricated to standard pattern for the wall construction indicated.

Adequate plate reinforcement shall be provided for hardware.

5.1.3 Installation

Frame shall be aligned parallel to the wall, vertical members shall be plumbed in two directions and horizontal head members shall be levelled. Frame anchors shall be built-in and fastened rigidly to the wall.

Welded unit frames shall have removable temporary spreaders fitted so that the spreaders may be easily removed after installation of the frames.

Doors and hardware shall be installed and adjusted to operate smoothly and freely without binding, sticking or excessive clearance. Openings for glass lights shall be left ready for glazing.

5.2 Painting

Where required to be rust-proofed by zinc chromate primer, all internal doors, door frames and reinforcing plates shall be shot blasted and thoroughly cleaned before treatment. The outer part of steel doors and frames shall be painted and finished in colour as specified by Colour Scheme. Primer and finish paint shall be in accordance with Technical Specification AR 0914.

AR-- 0824-- ALUMINIUM DOORS AND WINDOWS

1.0 DESCRIPTION OF WORK

The work shall cover the provision and installation of aluminium doors, windows and frames as shown in the Drawings or as specified herein, including labour supervision, materials, equipment and incidentals required and necessary to complete the system.

2.0 REFERENCE STANDARDS

a. American Society for Testing and Materials (ASTM)

b. Standar Industri Indonesia (SII)

c. Technical Specification AR-0714 - Caulking and Sealing

d. Technical Specification AR-0821 - Finish Hardware

e. Technical Specification AR-0825 - Glass and Glazing

3.0 GENERAL PROCEDURES

3.1 Samples and Technical Data

Samples of sections and finishes which shall include proposed types of aluminium extrusion, anodising, colour and finishing, shall be submitted to the Engineer for approval prior to delivery.

Samples of the aluminium products shall be tested in a laboratory designated by the Engineer or should be provided with tested data.

This shall include the test for :

- Coat thickness
- Staining
- Weight
- Corrosion
- Cost of samples and testing shall be the Contractor's responsibility

3.2 Shop Drawing

Shop Drawing which shall include all detailing, framing, fastening and anchoring system of the work, shall be prepared by the Contractor and shall be submitted to the Engineer for approval prior to installation.

All dimensions shall be verified on the field and shall be shown in the Shop Drawings.

The Contractor shall be responsible for any discrepancies on the dimensions and final fitting of all parts of the work, co-ordination with other work, and all necessary work to accommodate the work covered in this section, so as to achieve the intentions of the design.

3.3 Handling and Storage

Aluminium work and fittings shall be supplied in accordance with the Drawings, free form twists, buckles and defects.

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

All items shall be kept clean and free from droppings of mortar, plaster, paint and others.

4.0 MATERIALS

4.1 Aluminium

All aluminium work for doors, windows and frames shall be as manufactured by a manufacture who has had the prior approval of the Engineer.

Unless otherwise specified, all doors, windows and louver sections shall be of anodised extruded aluminium alloy, fitted out with standard manufacturer's hardware and neoprene weather-stripping and flashing.

4.2 Glass and Glazing

Glass for aluminium doors and windows shall be in accordance with Technical Specification AR-0825.

Neoprene/gasket for glazing of aluminium works shall be in accordance with Technical Specification AR-0825.

4.3 Finish Hardware

All locks and fittings shall be in accordance with the requirements of Technical Specification AR-0821.

4.4 Aluminium Perforated Sheet

Aluminium perforated sheet for parapet and others as indicated in the drawings, shall have the following characteristics :

- Thickness of 3 mm
- Hole of 7 mm diameter
- Hole distance of 50 mm
- Hole pattern indicated in the drawing
- Item to be substituted shall be approved by the Engineer.

5.0 CONSTRUCTION REQUIREMENTS

5.1 Fabrication

No work shall commence on fabrication or erection until the Shop Drawings submitted by the Contractor have been approved by the Engineer.

All components shall be accurately manufactured and assembled to the correct shape and size as set forth in the Drawings, and be fitted in locations shown thereon.

5.2 Installation

The first installed item should be approved by the Engineer as the standard and sample for the next installation.

The Contractor shall be responsible for the sound construction of the components.
Where joints are not detailed in the Drawings, they shall be positioned and constructed so that they will transmit the loads and resist the stresses to which they will be subjected.

All components shall be true to the pattern.

When fixed direct to masonry or concrete reveals, the frame shall be provided with angle fixing lugs at not exceeding 0.5 m centres.

All aluminium parts in contact with cement or plaster shall be protected by colourless varnish or plastic coating.

All aluminium parts in contact with steel elements shall be coated with special paint as recommended by aluminium manufacturer, so as to prevent electrolytic deterioration of aluminium composition.

Various non-aluminium fixtures attached to aluminium sections shall be of materials which will not react electrolytically, such as stainless steel, nylon, neoprene and others.

All fastenings shall be concealed, unless otherwise required. All joints shall be flush-joints with all cutting and drilling done before anodising.

Lock, door closer and hinge shall be provided as specified by the Drawings and in accordance with Technical Specification AR-0821.

Sealant shall be used in strict accordance with the manufacturer's recommendation and in accordance with Technical Specification AR-0714.

Installation for Aluminium perforated sheet indicated on the drawing.

5.3 Guarantee

The Contractor shall furnish to the Owner, a written guarantee covering the satisfactory installation, operation and condition of all aluminium doors and windows as specified herein for a period of one year after the date of final acceptance. During this period the Contractor shall repair or replace any defective work at his expense.

AR – 0825 – GLASS AND GLAZING

1.0 DESCRIPTION OF WORK

This work shall cover the provision and installation of all glass, mirror and glazing as shown in the Drawings and as specified herein.

2.0 REFERENCE STANDARDS

a. Standar Industri Indonesia (SII)

b. Persyaratan Umum Bahan Bangunan di Indonesia (PUBI)

c. American Society for Testing and Materials (ASTM)

d. Technical Specification AR-0602 – Carpentry

e. Technical Specification AR-0824 – Aluminium Doors and Windows

f. Technical Specification AR-1011 – Washroom Accessories

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.

3.2 Handling and Storage

Glass and mirror shall be neatly stored in a clean dry place and be protected from damage. Sheets shall be separated by an approved material, placed to minimise stress on the glass while in storage. Sheets which have been delivered in a damp condition shall be separated and dried before storage.

Glass and mirror shall not be stored laid flat.

4.0 MATERIALS

4.1 Glass

All glass for exterior or interior doors and windows, unless noted elsewhere, shall be selected clear float or obscured glass sheet such as Asahi product or approved equal, with nominal thickness depending on table glass sheet area or as indicated in the Drawings.

4.2 Mirror

Mirrors shall be selected clear mirror sheet such as Asahi product or approved equal, with nominal thickness as specified by the Drawings.

4.3 Neoprene/Gasket

Neoprene/gasket or other equal synthetic material shall be used throughout, unless otherwise specified, for all glazing in metal/aluminium frames.

Type and dimension of neoprene/gasket shall be made suitable for each metal/aluminium frame.

5.0 CONSTRUCTION REQUIREMENTS

5.1 General

Drawings only indicate approximate glass size. True sizes and proper edge clearances shall be determined by field measuring the actual unit to receive

the glass, and by following glazing dimensions and instructions provided there by.

Each glass and/or mirror sheet shall be clearly labelled and marked of type, thickness and other data required.

All labels shall to be removed after the Engineer's approval.

All glass, mirrors and glazing shall be installed in accordance with the manufacturer's installation instruction.

A sample of finished installed glass such as window or door shall be approved by the Engineer prior to mass production.

5.2 Installation

5.2.1 Clearances and Cutting Tolerances

Clearances and cutting tolerances shall be as follows:

a. Nominal face clearance between glass and frame shall be 3 mm.

b. Nominal edge clearance between glass and frame shall be 6 mm all around.

c. Minimum rabbet depth shall be 16 mm.

d. Maximum cutting tolerances for all glass shall be + 3 mm or - 1.5 mm.

e. Gasket clearance, depending on the gasket used, an additional clearance should be set.

5.2.2 Preparation of Surface for Glazing

Operative sashes shall move freely and properly in the frame of the unit prior to glazing. Movable items shall be secured, fixed, or in a closed and locked position until glazing compound has thoroughly set.

The surfaces of all rabbets shall be clean and dry and shall be primed with one coat of primer as specified by the neoprene/gasket manufacturer.

Prior to setting, glass surfaces to which neoprene/ gasket is to be applied shall be clean of dust, moisture, slip sheet chemicals or shop coating applied by the glass manufacturer.

5.3 Mirror Installation

Mirrors shall be installed with mirror screws which have stainless steel caps, at places as indicated by the Drawings.

Screws shall be placed strongly to hold mirror in its place.

5.4 Replacement and Cleaning

Each panel of glass shall be marked immediately after glazing with whiting or similar to signify completion.

Checked, broken and imperfect glass shall be replaced at no additional cost to the Owner. Upon completion of the work, all glass surfaces shall be thoroughly cleaned, with all labels, paint spots and other defacements removed.

Care and caution shall be taken not to scratch glass surface. Washing down shall be with mild soap or neutral detergent and water. Paraffin, turpentine, petroleum or similar solvents may be used for removing persistent marks.

AR – 0903 – CEILINGS

1.0 DESCRIPTION OF WORK

This work shall cover the furnishing and installation of all ceilings frames and panels as indicated in Drawings and/or hereinafter specified.

2.0 REFERENCE STANDARDS

a. American Society for Testing and Materials (ASTM)

b. National Fire Protection Association (NFPA)

c. Standar Industri Indonesia (SII)

d. Technical Specification AR-0602 – Carpentry

e. Technical Specification AR-0721 – Building Insulation

f. Technical Specification AR-0914 – Paintings

3.0 GENERAL PROCEDURES

3.1 Samples and Technical Data

Prior to material delivery, Contractor shall submit samples and technical data to the Engineer for approval.

3.2 Shop Drawing

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

3.3 Handling and Storage

All materials shall be delivered to the project site in original containers, bundles or packages with seals unbroken and labels intact, and shall be stored in a clean dry place and protected from damage.

4.0 MATERIALS

4.1 Fibre Cement Board

Fibre cement board in designated areas such as toilets and storage or generally wet areas, shall have 6 mm minimum in thickness, such as Harflex or approved equal.

Size shall be as indicated in the Drawings.

4.2 Ceiling Frames

4.3 Wood Frames

Ceiling frames of wood in size as indicated in the Drawings shall be used to hold fibre cement board in designated room as indicated in the Drawings.

These wood frames shall be in accordance with Technical Specification AR-0602.

4.4 Structural Support Members

Structural support members for holding adjustable rods, lighting fixtures, air conditioning accessories and others specified, shall be of steel profile in

shape and sizes as indicated by the Drawings. A Shop Drawing is needed to be submitted by the Contractor.

This structural support shall comply with the requirements of SII.

4.5 Wood Trim

Wood trim for ceiling cornice shall be in accordance with the Technical Specification AR-0602.

4.6 Wood Board

Wood board shall comply with the requirement of Technical Specification AR-0602, in thickness and size as indicated in the drawing.

5.0 CONSTRUCTION REQUIREMENTS

5.1 General

Prior to commencement of herein referenced ceiling board work, rooms and areas having ceiling shall have windows, doors, glazing, air conditioning system and moisture producing construction work completed.

Ceiling tile grid shall be established using the centreline of perimeter tiles, in order to balance the pattern, and to ensure no cuts less than one-half of tile width or as indicated in the Drawings.

5.2 Fibre Cement

Prior to fibre cement installation in storage rooms, all wood ceiling frames shall have preservative treatment as specified in Technical Specification AR-0602.

Fibre cement tile in storage rooms shall be installed to ceiling frame by nail or other fasteners as recommended by the fibre cement manufacturer.

Jointing between fibre cement tile in storage rooms shall be done by giving distance/joint 5 mm.

5.3 Painting

Fibre cement ceiling panel shall be painted in accordance with Technical Specification AR-0914 in colour as specified by Colour Scheme which shall be given separately.

Structural support members which are made of steel shall be anti-rust coated with suitable paint in colour as specified by Colour Scheme.

Type of paint and painting work shall be in accordance with Technical Specification AR-0914.

5.4 Cleaning and Protection

Following erection, dirty or discoloured surfaces of ceiling and runners shall be cleaned in accordance with the manufacturer's recommendations and left free from defects.

Damaged or improperly installed components shall be removed and be replaced as directed by the Engineer without any additional cost to the Owner.

AR – 0914 – PAINTING

1.0 DESCRIPTION OF WORK

This work shall consist of the provision and application of all shop and field painting work, for all the structural and non-structural components of the buildings, including all surfaces designated to be painted as shown in Drawings or Colour Scheme and in related Specifications, unless otherwise noted.

This work shall include but will not be restricted to supply of labour, materials, scaffolding and tools to be used for preparation of surfaces, application of paint, making good any defects and cleaning of any splashes to other work. All coating shall be as required in this Specification or determined by the Engineer.

2.0 REFERENCE STANDARDS

a. Persyaratan Umum Bahan Bangunan di Indonesia (PUBI)

b. American Society for Testing and Materials (ASTM)

c. Steel Structure Painting Council (SSPC)

d. Swedish Standard Institution (SIS)

e. British Standard (BS).

3.0 GENERAL PROCEDURES

3.1 Detail and Colour Card

Full details and colour card of proposed materials and manufacturers shall be submitted before construction. Failure to do so may lead to rejection of materials on site and failure to meet program requirements.

All materials shall be of such quality as to produce first class and durable finishes and to be at least equal requirements of the relevant standards.

3.2 Sample Panels and Test Areas

Before painting with a particular system commences, the Contractor shall paint test areas or sample panels to demonstrate that the specified thickness and finish to the paint film is being obtained all shall be approved by the Engineer.

The paints, equipment and method of application used for test areas or sample panels shall be representative of those to be used for the work.

Test areas or sample panels shall be retained and shall form the standard for all subsequent work.

Contractor shall be responsible in providing samples and sample panels.

3.3 Delivery and Storage

All coating shall be fresh stock and be of new and first quality, delivered at job site in unopened original manufacturer's containers, and stored in the dry, watertight, lockable enclosure.

All coating materials shall be in sealed containers and labelled so as to plainly show the designated name, formula or specification number, batch number, colour, date of manufacture and manufacturer's directions

3.4 Inspection and Testing

Scaffolding used for painting shall be retained in position while work is being carried out and for a period up to three days after completion, or alternatively, other means shall be provided to give reasonable access for the Engineer to inspect prepared surfaces and paint films.

The Engineer shall have free access to all work locations, and warehousing facilities and the right to inspect the preparation of all surfaces and the application of all paintings.

3.5 Non Conformity

Before any deviation from this Specification, the Engineer shall be consulted. Failure to do so will in no way relieve the Contractor of his responsibility for satisfactory compliance with standards and procedures set forth in this Specification.

The Engineer shall have the right to reject any work which is not carried out in accordance with this or any other applicable Specifications. All expense incurred by the correction of rejected work shall be borne by the Contractor.

Causes for rejection of work or portions shall include but not be limited to the following :

a. Surface preparation considered unsatisfactory by the Engineer for any reason

b. Failure of Contractor to apply the minimum number of coats of the appropriate thickness

c. Failure of Contractor to allow minimum specified drying time between coats.

4.0 MATERIALS

4.1 General

All coating materials shall conform to the specifications shown in the painting schedule herein and to the requirements hereinafter specified.

All primers and finish coats to be used in this work shall be provided by the same designated manufacturer, and shall not be mixed with paint from other sources or of dissimilar compositions.

For the purpose of establishing a basis of quality, the paints specified herein are based upon paints as manufactured by ICI, Danapaints, Moliwex or equal.

4.2 Primers

Primer to be used shall be as following or equal :

a. Alkali Resisting Primer/Alkali Resistant Sealer for masonry, plaster and concrete surfaces

b. Aluminium Wood Primer Sealer for wood surfaces

c. Quick-Drying Metal Primer Chromate/Zinc Chromate Primer for steel and miscellaneous metal surfaces.

4.3 Finish Paints

Finish paint to be used shall be as following or equal :

- Vinyl Acrylic Emulsion/Acrylic Emulsion for masonry, plaster, concrete and wood surfaces
- Vinyl Acrylic Emulsion for wood surfaces
- Synthetic Super Gloss/Synthetic Enamel for steel and miscellaneous metal surfaces.

4.4 Colour and Tints

Designated areas shall be subject to colour selection stated in Colour Scheme or as approved by the Engineer after samples showing alternative colours and textures recommended have been furnished as per point 3.2. above. The same thing shall be carried on for colour, tint or texture of pre-finish surfaces.

Shades of stain shall match the respective colour specimen selected by the Engineer and shall conform to manufacturer's standard colour.

5.0 CONSTRUCTION REQUIREMENTS

5.1 Preliminary, Preparation and Treatment

5.1.1 General

All paints shall be used in accordance with the manufacturer's application instructions and shall comply with the specified standard in SSPC or equal

Hardware, hardware accessories, machined surfaces, plate, lighting fixtures, and similar items in contact with surfaces to be painted shall be removed, masked, or otherwise protected prior to surface preparation and painting operations.

Such protection shall be done by workmen skilled in the trades involved. Exposed nails and other ferrous metal on surfaces to be painted with water-based paints shall be spot primed with zinc chromate primer as appropriate to condition, and then a top coat shall be applied

Surfaces to be painted shall be cleaned prior to application of paint or surface treatments. Existing painted surfaces not designated for re-painting shall be cleaned in a manner which shall leave the surface so treated, as possible to new condition, or shall if unpainted, be wire brushed or buffed with a light sanding tool, and touched up to remove all evidence of rust, corrosion or abrasion

Oil and grease shall be removed with clean cloths and cleaning solvents which have low toxicity and flash-point in excess of 38°C

Cleaning and painting shall be scheduled in such a way that ensures dust and other contaminants from the cleaning process do not fall on wet or newly painted surfaces.

5.1.2 Masonry, Plaster and Concrete Surfaces

Masonry, plaster and concrete surfaces to be painted shall be prepared by removing chalk, dust, dirt, grease, oil, asphalt, tar, excessive mortar or mortar droppings and by roughening the surfaces to remove glaze

Surface deposits of free iron shall be removed prior to painting. Immediately before coating, surfaces to be painted shall be uniformly and thoroughly dampened, with no free using a fog spray. Sufficient time shall be allowed to elapse between sprayings to allow water to be absorbed.

5.1.3 Wood Surfaces

Wood surfaces to be painted shall be cleaned to remove dirt, oil and other foreign substances, using mineral spirits, scraper and/or sand paper.

Wood surfaces shall be primed and finish coated as specified by Colour Scheme.

Small, dry seasoned knots shall be surface scraped and thoroughly cleaned before application of the priming coat. Pitch on large, open, unseasoned knots and all other beads or streaks of pitch shall be scraped off, or if still soft, shall be removed with mineral spirits or turpentine and the resinous areas thinly coated with a knot sealer. The surface shall be checked to ensure that finishing nails have been flush set or recessed and filled. Then all holes and surface imperfections shall be primed.

After priming, all holes and imperfections in finish surfaces shall be filled with putty or plastic wood filler, and shall be coloured to match the finish coat.

5.1.4 Steel and Metal Surfaces

All steel and metal surfaces shall have all millscale, dust and rust removed by wire-brushing or shall be dry sandblasted to white metal (Sa 2½/SP-10)

Excessive wire-brushing with power operated, rotary, wire brushes, resulting in a burnished effect to the steel surface, shall be avoided

All steel and metal surfaces contaminated by oil or grease shall be washed with clean white spirit. Oil or grease may, in locations approved by the Engineer, be removed from the surfaces of ferrous surfaces by washing with a proprietary water soluble mixture of solvent and detergent followed by rinsing with clean water

Washing of steel/metal surfaces, where required to remove soluble salt deposits shall be carried out using clean water and where conditions permit, hosepipes and scrubbing brushes shall be used

Surfaces shall be primed with priming paint as soon as possible after completion of the preparation process.

The rate of progress of surface preparation shall be controlled to ensure that preparation and priming are carried out on the same day.

Further surface preparation shall be carried out where there is evidence of rusting or contamination resulting from prolonged exposure before priming.

After the surface is prepared in a manner acceptable to the Engineer, one coat of zinc chromate primer shall be applied to the steel work at the fabrication shop.

Primer shall be applied by brushing to ensure a continuous film without holidays.

Primer coat shall be applied immediately after the surface preparation without any time lag.

Fabricated steel/metal with the shop coat of primer after its erection in the field shall be carefully examined and shall be treated with a touch-up coat of zinc chromate primer wherever the shop coat has been abraded, removed or damaged during transit/erection, defaced during welding/riveting and also over the field welds, bolts and nuts adopted for structure.

After touching up, the second coat of zinc chromate primer shall be applied over the erected steel work.

5.2 Paint Application

5.2.1 General

All finished surfaces shall be free from runs, drops, ridges, waves, laps, brush marks and variation in colour, texture and finish. The covering of each coat shall be complete and each coat shall be so applied as to produce film of uniform thickness.

Special attention shall be given to insure that all surfaces including edges, corners, crevices, welds and rivets receive a film thickness equivalent to that of adjacent painted surfaces.

Adjacent areas and installation shall be protected using drop cloths or other approved precautionary measures. Other material surfaces adjacent to surfaces to receive water-based paints shall be primed and/or touched up prior to the application of water-based paints.

The first coat of paint on concrete surfaces shall include such repeated touching up of suction spots or overall applications of primer-sealer as necessary to produce a uniform colour and gloss.

5.2.2 Coating Progress

Sufficient time shall elapse between application of successive coats to permit acceptable drying. This period shall be modified as necessary to suit varying weather conditions.

When the applied coating is left exposed for long periods, it may develop a whitish layer of zinc salts. This salt layer shall be washed off with fresh water and dried subsequently to facilitate secure intercoat bonding.

Thinner shall not be added to any coating materials unless approved by the manufacturer as necessary for proper application.

Oil base or oleoresinois solvent-type paints shall be considered dry for re-coating when the paint feels firm, does not deform or feel sticky under moderate pressure of the thumb, and the application of another coat of paints does not cause lifting or lessens adhesion of the undercoat.

Coating shall be as follows :

a. Masonry, plaster and concrete surfaces.

- Prime coat : two (2) coats of Alkali Resisting Primer/Alkali Resistant Sealer @ 40 microns thickness.
- Finish coat : two (2) coats of Vinyl Acrylic Emulsion/Acrylic Emulsion @ 35 microns thickness.

b. Wood surfaces.

- Prime coat : two (2) coats of Aluminium Wood Primer sealer @ 30 microns thickness.
- Finish coat : two (2) coats of Vinyl Acrylic Emulsion/Acrylic Emulsion @ 30 microns thickness.

c. Steel and miscellaneous metal surfaces.

- Prime coat : two (2) coats of Quick Drying Metal Primer Chromate/Zinc Chromate Primer @ 40 microns thickness.
- Finish coat : two (2) coats Synthetic Super Gloss/Synthetic Enamel @ 40 microns thickness.

5.2.3 Storage, Mixing and Thinning

At time of application, paint shall show no sign of hard settling, excessive skinning, livering or other deterioration.

Paint shall be thoroughly mixed using electric mixer, stirred, strained in a strict conformance with the manufacturer's recommended procedure and kept uniform consistency during application.

Where necessary to suit conditions of surface, temperature, weather and method of application, package paint may be thinned immediately prior to application in accordance with the manufacturer's directions, but not in excess of 0.5 litre to suitable thinner per 4 litres.

The use of thinner for any reason shall not relieve the Contractor from obtaining complete surface coverage.

No alteration or mixing of materials on premises shall be permitted, except as specified for priming, sizing or undercoats, and where tinting is required to produce proper colour.

5.2.4 Atmospheric Conditions

Paints other than water-based coatings shall be applied only to surfaces that are completely free of surface moisture as determine by sight or touch.

Paint shall be applied in an environment conducive to controlled drying.

5.2.5 Time Between Surface Preparation and Painting

Surfaces that have been cleaned, pre-treated and/or otherwise prepared for painting shall be given a coat of the specified first coat material as soon as practicable after such preparation has been completed, but in any event prior to any deterioration of the prepared surface.

5.2.6 Method of Application

Prime coat for masonry, plaster and concrete surfaces and finish coat may be applied by brush or roller for detail coating brush can be used.

Prime coat for wood surfaces shall be applied by brush and finish coat may be applied by brush or roller.

Prime coat for steel and miscellaneous metal surfaces and finish coat may be applied by spray.

All doors for interior use shall be spray painted.

5.3 Special Requirement

Rollers for applying enamels shall have a short nap.

Brushes used for emulsion paint shall be soaked in water for a period of 2 hours prior to use.

Upon completion of the work, staging, scaffolding and containers shall be removed from the site or disposed of in an approved manner. Paint spots, oil or stains upon adjacent surfaces shall be removed and the entire job left clean and acceptable to the Engineer on final inspection. The scaffolding shall not affect floor or wall surface all damage is Contractors responsibility.

All protective masking applied to surfaces or designated items previous to painting, shall be removed after final coat has been allowed to firm-up sufficiently so that smudged areas result from removal of masking.

5.4 Reinstallation of Removed Items

Following the completion of painting of each space, removed/ covered items as indicated under section 5.1. of this Technical Specification, shall be reinstalled by workmen skilled in the trade involved.

5.5 Protection and Cleaning

Clothes and cotton waste that might constitute a fire hazard shall be placed in closed metal containers or destroyed at the end of each working day.