

# **Technical Specifications**

## **1. CONCRETE**

### **1.1 General**

Unless otherwise authorized by the Project Supervisor, concrete shall be machine mixed. The mixing of concrete or mortar shall not be permitted when the temperature is above 40 C or when the temperature is below 5 C.

### **1.2 Mixing on Site**

- Concrete shall be thoroughly mixed in a batch mixer conforming to the requirements of B.S. 1305 Batch type concrete mixers which will ensure a uniform distribution of the materials throughout the mass.
- All concrete shall be mixed for a period of not less than 1 ½ minutes after all materials, including water, are in the mixer. During the period of the mixing the mixer shall operate at the speed for which it has been designed, but this speed shall be not less than 14 nor more than 20 revolutions per minute.
- The first batch of concrete material placed in the mixer shall contain sufficient excess of cement, sand and water to coat the inside of the drum without reducing the required mortar content of the mix. Upon the cessation of mixing for a considerable period, the mixer shall be thoroughly cleaned.

## **2. METAL WORKS**

### **2.1 Scope**

- These specifications cover ferrous and non-ferrous works intended to be used in the project; all in accordance with the Drawings and as directed by the Project Supervisor.
- The contractor shall ensure of all dimensions on the site and clear them in detailed shop drawings for approval by the Project Supervisor.
- The contractor should provide the Project Supervisor with detailed shopdrawings for aluminum works that will be installed, in addition to providing samples of profiles, method of statement, accessories and hardware in order to have a written approval prior to starting.

### **2.2 Materials**

#### **2.2.1 Steel**

Steel plates, and structural steel shaped sections shall conform to the requirements of edition for structural sections.

### **2.2.2 Aluminum**

The Aluminum used should be approved type by the Palestinian Standards Institute, as indicated in the specifications and Bill of Quantities.

### **2.2.3 Bolts, Nuts and Washers**

- Bolts and nuts shall conform to the requirements of (British Standard)B.S. 4190: I.S.O. metric black hexagon bolts, screws and nuts.(PTA Brand)
- Plain washers shall be made of steel. Taper or other specially shaped washers shall be made of steel or malleable cast iron and shall conform to the requirements of B.S. 4320, metal washers for general Project Supervising purposes.

### **2.2.4 Galvanized Steel Pipes**

Galvanized steel pipes shall conform to the requirements of B.S. 1287 - I.S.O. "Medium Series".

### **2.3 Description of Steel**

- Steel to be used for all the works must be new and have never used before and must be free of rust and crusts. The steel bar,beam or plate should not be welded pieces but one unit.
- The steel profiles and tubes used should be sound and free of defects like buckling, bending, and cracking or other. The tolerances in sections of steel shall not more than 0.30 mm for thickness and 0.50 mm for other dimensions.

### **2.4 Description of Aluminum**

- All of aluminum profiles should be according to the drawings and not be less than the following:
  1. The thickness of aluminum profiles used for sliding doors and windows should not be less than (2mm±0.1)
  2. The thickness of aluminum profiles used for hinged doors and windows should not less than 2 mm.
  3. The thickness of powder coating at profile should not less than 60 micron at least.

### **2.5 Manufacturing and fixing of steel works:**

#### **2.5.1 General**

- The Contractor shall be responsible for the correctness and accuracy of the dimensions of the finished items. He shall therefore carefully check the dimensions indicated on the Drawings, verify any change and ascertain the sizes on the site which will enable him to prepare final working drawings for fabrication and erection purpose.
- Such drawings shall be submitted to the Project Supervisor for his verification and approval.
- Fabrication orders can only take place after the contractor obtains, in writing, the approval of the Project Supervisor for the drawings.

### **2.5.2 Hollow Metal Door Frames**

Hollow metal door's frames shall be made of the profiles and sizes shown on the drawings and obtained from an approved manufacturer. The door frames shall be with minimum 3.0 mm thick, twice laminated steel sections and be delivered to site complete with a factory applied anti-corrosive plastic coating., ties cast to backs of frames for building in and rubber silencers on the frame.

## **2.6 Workmanship**

### **2.6.1 Aluminum elements**

- The glass used should be transparent glass with a thickness of 4 mm or if stated otherwise.
- The Aluminum used is coated with hot dipped polyester powder (paint thickness should not less than 60 microns).
- Aluminum should be colored type and color choice as instructed by supervisor Project Supervisor.
- Those screws should have enough size and length to fix the frames strongly as required and the approval of Project Supervisor.
- The hardware and accessories should be made of aluminum (Allen key corners, rails, locks, handles... etc.) of the same type of profiles required and shall be of solid hardware durable and shaped.
- The used wheel rollers should be spherical ball bearing.
- The locks should be secured and from approved type by the Project Supervisor.
- The closing kit and tapes used to prevent water and air leakage.
- The Project Supervisor approval should be obtained for the color and appearance of the coating surface of aluminum before industrialization and supplying materials.
- Gap spaces between aluminum and architectural openings for doors and windows should be packed with a silicon paste injected from both sides to ensure full closure. The color of silicon must be fit to the color of aluminum.
- The contractor is responsible for all works of aluminum during and after installation until handing over the project.
- Installation of glass must be using strip of rubber between aluminum and glass from inside and outside.

### **2.6.2 Steel elements**

- All steel works should be done with professional manner and welding must be hidden, not appeared on the face and polished.
- All steel parts shall be accurately set out, cut, framed, assembled and executed using proper bolts or welding electrodes.
- All cut parts shall be sawn cut; no oxygen burning shall be permitted except for pipe supports.
- All welding shall be electrical welding, clean and of proper workmanship. All cut parts and welded sections shall be ground, even and filed smooth with rounded edges.

- No allowable showing any signs of knocks or any type of cavity in steel and should be all contact links arbitrator well without leaving any vacuum or clear signals welding redundant on the face
- Costs of making holes well done and recovered are responsible of contractor with his own costs.
- Making doors and windows accurately and proficiently duly taking into account that are made all welding by professionals and skilled labors with expertise in this area, and automatically clean all welded links and to get a smooth surface without protrusions Stored all produced parts prior to installation in a dry place and the process of being transfer without scratches.
- The contractor shall provide samples of any section for approval by Project Supervisor before Fix door's frames.
- All work shall be erected plumb and true to lines and rigidly secured to walls, floors or ceilings as shown on Drawings and to the satisfaction of the Project Supervisor.
- Welding work is along the flat welding (stitching along the line of welding)

### **2.6.3 Welding**

- Welding surfaces shall be clean, free cobalt, rust and other materials that will have the opposite effect on the welding by skilled professionals with expertise in this area.
- Prohibits a welding operations in the up-normal weather conditions such rain, strong winds, or when temperatures fall to zero (0 °c), unless action was taken to ensure that the impact of these conditions on welding operations, and the approval of Project Supervisor.
- The intensity of electricity used in welding operations shall be located within the established range of welding rods, and then welding process is the movement of fluctuations consecutive start of the first welding and so close, and being removed from the slag welding operations abreast so that each layer of the welding layers completely clean before the following class action.
- Prohibits any subsequent operations for one welding process unless after the disclosure of welding by Project Supervisor and approval, and is not being disclosed mentioned before passing 72 hours after the end of operations.
- Must provide workers with masks, protective glasses and gloves, and necessary to safe them during welding operations.
- Welding work is along the flat welding (stitching along the line of welding).

### **2.7 Galvanized steel covers**

- Galvanized steel covers shall be galvanized mild steel with raised threads of Durbar pattern or similar approved by the Project Supervisor.
- The covers shall support on galvanized mild steel frames. The frames shall have mitered and welded corners, with welded fishtail anchors at not greater than 1m centers, all galvanized after fabrications.

### **3. ROOFING, WATERPROOFING AND THERMAL INSULATION**

#### **3.1 Preparation**

- All surfaces must be clean sound, and free from oil, grease and all loosely adherent materials.
- Wire brush, sand blast or grit blasting may be used to remove any surplus adhered to steel.
- The contractor must submit a request for all materials for Project Supervisor approval.

#### **3.2 Materials**

##### **3.2.1 Rubber**

The rubber water-stop shall be fabricated from a high-grade, tread-type compound. The basic polymer shall be natural rubber or a synthetic rubber.

##### **3.3 Thermal Insulation**

Criteria, design aspects, implementation methodology and relevant materials of the thermal insulation must be according to the Palestinian Code for Energy Efficient Building and using the supplementary Guidelines.

### **4. PLUMPING AND SANITARY INSTALLATIONS**

#### **4.1 Drainage and Waste Systems**

- These systems shall be subject to a water test prior to being covered and also tested for water tightness after backfilling.
- On any section of the pipe under test the head of water applied shall not be less than 3.00 meters and not greater than 6.00 meters. Tests shall be maintained for 20 minutes, and any defects shall be rectified and the test reapplied to the complete satisfaction of the Project Supervisor.