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		April 2011
KLM Technology Group #03-12 Block Aronia, Jalan Sri Perkasa 2 Taman Tampoi Utama 81200 Johor Bahru Malaysia	<b>FABRICATION AND ERECTION SPECIFICATION  FOR STRUCTURAL STEEL</b>  <b>(PROJECT STANDARDS AND SPECIFICATIONS)</b>	

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## SCOPE

This Project Standard and Specification covers all structural steel work. Whenever a difference exists between the design drawing and this Project Standard and Specification, the drawing shall govern.

## GENERAL

Structural steel consists of the steel work for buildings, structures and pipe supports. Structural steel also consists of steel work for the farming of bridge connections between structures and equipment inside and outside the building as required.

## MATERIAL

### 1. Structural steel

All structural steel shall conform to ASTM A36, JIS SS400 or equal.

### 2. Bolts and Nuts

- a. Common bolts shall be M16 bolt unless otherwise noted, and shall conform to ASTM A307, JIS SS400 or equal.
- b. High-strength bolts shall be M20 bolt unless otherwise noted, and shall conform to ASTM A325M TYPE I or equal. One high-strength bolt assembly shall consist of a hex head structural bolt, a hex nut and a circular washer.
- c. Washers: round washers shall conform to ASTM F436M or equal. Beveled washers shall be square, smooth, and sloped so that contact surfaces of bolt head and nut are parallel.

## SHOP DETAILS AND FABRICATION

The contractor shall conform to the following shop detailing and fabrication requirements unless shown otherwise on drawings.

1. All connections which are not detailed or otherwise noted on drawings shall be shop welded and field-bolted.
2. Bolts for field connection shall be high-strength bolts in bearing type connections unless noted otherwise on drawings. Do not omit any paints from the contact surfaces within the joints.
3. The contractor shall furnish and install erection clips for fit-up of welded connections.

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4. Ample clearance shall be provided for field erection.
5. Gusset plates shall be 6 mm thick minimum.
6. All sharp corners and burrs shall be removed before shop priming.

### **SHOP DRAWINGS AND ERECTION PROCEDURES**

Shop drawings shall be submitted for approval. Drawing shall show the size, length, and type of each weld. Along with the shop drawings, the contractor shall furnish two copies of detailed erection procedure, including sequence of erection and temporary staging. Approval of shop drawings shall be interpreted as approval of general methods and arrangement only, and shall not constitute verification of dimensions or quantities. The contractor shall be responsible for the accuracy of fabrication and erection fit-up.

### **PIECE-MARKING**

Each shipping piece shall be clearly marked. The location of the mark shall be on the left-hand end of the piece as detailed. On the erection drawing the mark shall be in corresponding in-place position.

The pipe support number, as shown on the design drawings, shall be a part of the piece-marking on all supports.

### **INSPECTION AND TESTS**

The material to be furnished shall be subjected to inspection and tests in the mill and shop. However, inspection in the shop or mill will not relieve the contract or the responsibility to furnish satisfactory materials.

### **FABRICATION**

Structural steel shall be fabricated and assembled in the shop to the greatest extent possible. Shearing, flame cutting, and chipping shall be done carefully and accurately. Sole plate of beams shall have full contact with the flanges. Fillers under end angles shall not project beyond the back of the angles. Clearance between the ends of spliced web plates shall not exceed 6 mm. Assembled pieces shall be taken apart if necessary for the removal of burrs and shavings produced by the reaming operation.

1. Connections: Shop and field connections may be either bolted or welded. One-sided or other types of eccentric connections will not be permitted unless shown in detail and approved on the shop drawings. Unfinished bolts shall not