The Contractor shall ensure that the safety requirements and health provisions laid down in IS : 818-1968, Code of Practice for safety and health requirements in electric and gas welding and cutting operations, are complied with during welding operations. The Contractor shall also provide equipment for eye and face protection during welding as laid down in IS: 1179-1967. Fire precautions shall be taken in accordance with IS 3016-1982, Code of practice for fire precautions in welding and cutting operations.

10.15 Erection:

10.15.1 Erection work shall be performed in accordance with the general construction schedule. A scheme shall be worked before the commencement of the erection which shall also contain rules for safety precautions as detailed in IS: 7205-1974. Safety code for erection of structural steel works.

10.15.2 Anchor bolts for fastening of steel structures shall be set in designed positions and grouted along with foundations. Alternatively anchor bolts should be provided in the concrete foundation with bolt boxes and anchor channels for the purpose of flexibility and grouted after final alignment and levelling Column.

10.15.3 The gaps between the bearing surface of foundation and bottom of the structure to be erected shall be filled properly by cement grouting. Grouting shall be done after the verification and proper positioning of the structures but before encasing the structures with concrete if specified.

10.15.4 Damaged structural members shall be examined and rectified or replaced as directed.

10.15.5 The erected parts of the structures shall be stable during all the stages of erection; and structural elements to be erected shall be stable and strong to bear erection loads.

10.15.6 Working on the already erected structures is permitted only after they are finally fixed. Erection of structures of each tier for high structures shall be executed only after fastening of lower tier by the permanent or temporary fastening devices as per schedule of execution of work and certified for safety.

10.15.7 The joint and mating surface including the mating planes, strips and filler or spacers shall be cleaned of dust, rut and water.

10.15.8 Erected structural members shall be firmly fastened by bolts and drifts, permanent or provisional tacking, crossing bars and so on before the erection crane hook is removed.

10.15.9 The trusses shall be lifted only at nodes. The trusses above 12 m span shall not be singed at the apex, as it will develop compression stresses in the bottom tie member. It shall be lifted by slinging at two mid points of rafters, which shall be temporarily braced by a wooden member of suitable section. After the trusses are placed in position purlins and wind bracings shall be fixed as soon as possible. The end of truss which faces the prevailing winds shall be fixed with holding down bolts and the other end kept free to move. In case of small truss of span say up to 12 mm the free end of the truss shall be laid on steel plate as per design and the holes for holding down bolts shall be made in the form of oblong slot as to permit the free movement of the truss end. For large spans, the free end of the truss shall be provided with suitable rocker and roller bearing where indicated.

10.15.10 Erection Joints:

While erecting, holes to be riveted shall be fitted with temporary bolts and drifts of diameter equal to those of the holes. It is necessary to install drifts for accurate matching of holes. Number of bolts and drifts shall not be less than 40 percent of total number of holes. Forces applied to drifts shall be same as approved for rivets. Number of drifts shall be 10 percent of number of holes.

10.15.11 The number, size and length of tack welds in erection forces shall be as indicated. For the erection joints which do not bear the erection forces the length of tack welds shall be minimum 10 percent of tube designed weld length of the joint.
10.15.12.1 Welding, riveting and final fastening of permanent bolts shall be done only after the inspection of the structural elements for their positions. Head bolts and nuts shall perfectly be in touch with the surfaces of structures and washers.

10.15.13 Tolerance Allowed in Erection;

10.15.13.1 Building without crane:

The maximum tolerance for-line and level of steel structure shall be ±3 mm on any part of the structure. The structure shall not be out of plumb more than 5 mm on each 10 meter section in height and not more than 8 mm per 30 metre section. These tolerances shall apply to all parts of structure unless otherwise specified.

10.15.13.2.1 Tolerance allowed in erection of steel structure containing cranes shall be as per following table:

<table>
<thead>
<tr>
<th>Component</th>
<th>Table</th>
<th>Tolerance Allowed</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Main Columns and Roof Posts</strong></td>
<td>(a) Shifting of column’s axis at foundation level with respect to building line: (i) In longitudinal direction (ii) In lateral direction</td>
<td>+/-5 mm</td>
</tr>
<tr>
<td></td>
<td>(b) Deviation of both major column axis From vertical between Founaation and other member connection levels: (i) For a column upto and including 10m height, (ii) For a column greater than 10m but less than 40m height</td>
<td>+/-5.00 mm from true vertical +/-5 mm from true vertical for any 10M length measured between connection levels but not more than +/-8.00mm for 30 M length</td>
</tr>
<tr>
<td></td>
<td>(c) For adjacent pairs of columns across the width of the building prior to placing of truss.</td>
<td>+/-5.00 mm on true span</td>
</tr>
<tr>
<td></td>
<td>(d) For any individual column deviation of any bearing or resting level from levels shown on drawings.</td>
<td>+/-5.00 mm</td>
</tr>
<tr>
<td></td>
<td>(e) For adjacent pairs of columns either across the width of buildings or longitudinally level difference allowed between bearing or seating level supposed to be at the same level.</td>
<td>+/-5.00 mm</td>
</tr>
<tr>
<td><strong>Truss</strong></td>
<td>(a) Deviation at centre of span of upper chord member from vertical plane running though centre of bottom chord. (b) Lateral displacement of top chord at centre of span from vertical plane running through centre of supports.</td>
<td>1/500 of the span or 10mm whichever is less 1/250 of depthon truss or 20mm whichever is less</td>
</tr>
</tbody>
</table>

STEEL REINFORCEMENT

10.16 Steel Reinforcement for concrete

Steel Reinforcement shall be of mild steel plain bars, high strength deformed bars manufactured by thermo mechanical treatment process (TMT), steel wire fabrics and of grade / types as indicated.

10.16.1 Mild steel plain bars shall be grade I or grade II as indicated and conforming to IS 432 (part I) - 1982, Specification for mild steel and medium tensile steel bars. Alternatively mild steel bars shall be of grade E 250 conforming to IS 2062.

10.16.2 High strength Deformed Bars shall be produced by thermo mechanical treatment process (TMT)