3 DRAWINGS

3.1 GENERAL

3.1.1 Scope

1 This Part specifies the requirements for drawings associated with structural steelwork.

2 Related Parts and Sections are as follows:

This Section

Part 5..... Welding
Part 6..... Bolting
Part 7..... Accuracy of Fabrication
Part 8..... Erection
Part 9..... Accuracy of Erected Steelwork

Section 1 General

3.1.2 References

1 The following standards are referred to in this Part:

BS 499.....Welding terms and symbols

BS 1192.....Construction and drawing practice (ISO 4157)

BS 4640.....Classification of metal working machine tools by types

3.1.3 General Requirements

1 All design, fabrication and erection drawings shall be made in accordance with BS 1192 Parts 1 and 2.

2 All welding symbols shall conform to BS 499 Part 2.

3.2 GENERAL ARRANGEMENT DRAWINGS

3.2.1 Marking System

1 Every component which is to be individually assembled or erected shall be allocated an erection mark.

2 Members which are identical in all respects may have the same erection mark.

3.2.2 General Arrangement Drawings (Marking Plans)

1 Drawings shall be prepared by the Contractor showing plans and elevations at a scale such that the erection marks for all members can be shown on them. Preferred scales are 1:100 or larger.

2 The drawings shall show the grid locations as indicated on the design drawings, main dimensions, member levels and centre lines. Details at an enlarged scale should also be made if these are necessary to show the assembly of members.

3.3 FOUNDATION PLAN DRAWINGS

3.3.1 General Requirements

1 Foundation Plan Drawings shall show the base location, position and orientation of columns, the marks of all columns, any other members in direct contact with the foundations, their base location and level, and the datum level.

2 The drawings shall show complete details of fixing steel or bolts to the foundations, method of adjustment and packing space.

3.4 FABRICATION DRAWINGS

3.4.1 Fabrication Shop Drawings

1 Fabrication Drawings shall show all necessary details and dimensions to enable fabrication of components to proceed.

3.4.2 Attachments to Facilitate Erection

1 The Fabrication Drawings shall show details of holes and fittings necessary to provide for lifting and erection of components (see Clause 8.2.1 of this Section).

2 Unless specifically agreed otherwise, such holes and fittings may remain on the permanent structure. Account shall be taken of Clause 5.4.5 of this Section when detailing the welding of temporary attachments.

3.4.3 Welding

1 Any requirements for edge preparations for welds shall be indicated on the Fabrication Drawings. Welding inspection requirements which differ from those specified in Clause 5.5.5 of this Section shall be indicated on the drawings.

3.4.4 Packings, Clearances and Camber

1 When preparing Fabrication Drawings, the Contractor shall make provision for the following:

(a) packings which may be necessary to ensure proper fit-up of joints (see Clauses 6.3.1 and 6.5.1 of this Section)

(b) the need for clearances between the fabricated components so that the permitted deviations in fabrication and erection are not exceeded (see Parts 7 and 9 of this Section)

(c) the Engineer's requirements for pre-set or cambers.

3.4.5 Hole Sizes

1 Holes shall be shown on the Fabrication Drawings to the following sizes:

(a) for ordinary bolts and HSFG bolts:

(i) not exceeding 24mm diameter - 2 mm greater than the bolt diameter

(ii) greater than 24mm diameter - 3 mm greater than the bolt diameter

(b) For holding down bolts:

(i) 6mm greater than the bolt diameter, but with sufficient clearance to ensure that a bolt, whose adjustment may cause it to be out of perpendicular, can be accommodated through the base plate (see Table 9.1 Item 3 of this Section).

(c) For fitted bolts:

(i) in accordance with Clause 6.2.8 of this Section.

3.4.6 Holding Down Bolt Covers

1 Holding down bolt details shall include provision of loose cover plates or washers with holes 3 mm greater than the holding down bolts.

3.4.7 Connections to allow Movement

1 Where the connection is designed to allow movement, the bolt assembly used shall remain secure without impeding the movement.

3.4.8 Machining Note

1 Any machining requirements shall be clearly noted on the Fabrication Drawings.

3.4.9 Drilling Note

1 The Fabrication Drawings shall indicate those locations where holes shall be drilled in accordance with the situations noted below (see also Clause 4.7.3 of this Section):

(a) in non-slip connections for HSFG bolts

(b) at locations where plastic hinges are assumed in the design analysis

(c) in elements of rigid connections where yield lines are assumed;

(d) where repetition of loading makes fatigue critical to the member design

(e) where the design code of practice does not permit punched holes.

3.4.10 HSFG Faying Surfaces

1 When considering the coefficient of friction to use in the design of high strength friction grip bolted connections, the following values are to be used:

(a) unless the Engineer advises otherwise, untreated surfaces which are in accordance with BS 4604 may be considered as having a slip factor of 0.45; masking shall be used to keep the surfaces free of protective treatments.

(b) surfaces which have been machined, or given any type of treatment, shall have the slip factor determined by tests carried out in accordance with BS4604 Part1.

3.5 ERECTION DRAWINGS

3.5.1 Erection Method Statement

1 When necessary to amplify the information given in his erection method statement, the Contractor shall prepare Erection Drawings.

3.5.2 Temporary Steelwork

1 Details and arrangements of temporary steelwork necessary for erection purposes shall be shown on the Erection Drawings.

3.6 DRAWING ACCEPTANCE

3.6.1 Acceptance by the Engineer

1 Drawings made by the Contractor shall be submitted to the Engineer for acceptance in the period designated by the Employer.

3.6.2 Meaning of Acceptance

1 Acceptance by the Engineer of drawings prepared by the Contractor means that the Contractor has correctly interpreted the design requirements and that the Engineer accepts the Connection Design.

2 Acceptance does not relieve the Contractor of the responsibility for accuracy of his calculations, detail dimensions on the drawings, nor the general fit-up of parts to be assembled on site.

3.6.3 Acceptance Classification

1 The designations given in Table 3.1 shall be used by the Engineer when accepting drawings:

Table 3.1
Acceptance Classification of Drawings

Ref.	Classification	Meaning

1	Accepted or Reviewed or Approved or No Comment	Drawing is accepted and may be released for construction
2	Accepted subject to comments	Drawing must be amended in line with the comments, and re -submitted for acceptance.
3	Not Accepted	Drawing must be amended in the way indicated and re-submitted for acceptance.

3.7 AS ERECTED DRAWINGS

3.7.1 General Requirements

1 On completion of the contract, the Contractor shall provide the Engineer with one set of paper prints of "As Erected" drawings comprising:

(a) general Arrangement Drawings

(b) fabrication Drawings

(c) drawings made after fabrication showing revisions

(d) the fabrication drawing register.

END OF PART