BUROHAPPOLD ENGINEERING

The Place

Structural Steel – Project Specification

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Introduction

National Structural Steelwork Specification for Building Construction

The National Structural Steelwork Specification for Building Construction 5th edition CE Version dated October 2010[NSSS], published by the SCI and BCSA (Publication No.52/10), is incorporated into the contract along with any additions or modifications required by the Employer. The additions or modifications are given in this **Project Specification**. The additions and modifications include a preamble, following which the references are to the relevant sections and clauses in the NSSS, and extra clauses with appropriate numbering. Additions and modifications take precedence over the published NSSS clauses in the event of conflict or ambiguity.

Preamble

This specification deals with the materials, fabrication, erection, and protective coating of structural steelwork for structures as defined on BuroHappold's and the Architect's drawings and in the Definitions section of this specification.

This specification forms part of the tender and contract documents for the Project.

It is deemed that the Steelwork Contractor has inspected this specification, is able to comply with it, and has allowed for all its requirements particularly, but not exclusively, in terms of cost and programme.

Definitions

The definitions below refer to the names in the Definitions section of the NSSS.

'The Works'	**The Place Refurbishment**
	Refurbishment of The Place, Apartment Hotel
	Ducie Street, Manchester, M1 2TP
'Employer'	TBC
	For the purposes of this specification the Employer is defined as the contractor
'Engineer'	Buro Happold Engineering – Sara Lonsdale
	2nd Floor, Eastgate,
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'Architect'	Archer Humphryes Architects Central House, 142 Central Street, London EC1V 8AR 0207 251 8555 David Archer - david@archerhumphryes.com
'Inspection Authority'	Manchester City Council Manchester City Council Growth and Neighbourhoods Directorate Planning, Building Control and Licensing Section PO Box 532 Level 6 Town Hall Extension Manchester M60 2LA 0161 234 4354 a.parker-roberts@manchester.gov.uk

'Employer'	In addition to the definition in the NSSS, the main contractor has a responsibility for acceptance of the of the Steelwork Contractor's erection method statement and programme.
'Design Drawings'	Delete the definition in the NSSS. Replace with: BuroHappold's, the Architect's and other designers' (where appropriate) drawings are the 'Design Drawings'. General dimensions, setting-out requirements, and any specific details are defined on these drawings, sufficient for the design of connections, completion of the Fabrication and Erection Drawings, and detailed setting-out by the Steelwork Contractor. Proprietary structural elements such as purlins and sheeting rails will be shown in general terms such that the Steelwork Contractor can complete his drawings which will include all connections, sag rods, struts etc.

Add these definitions:

'Subcontractors'	Other subcontractors responsible for design, detailing and construction of elements of the project. In particular, other subcontractors with whom the Steelwork Contractor must co-ordinate and liaise, both in terms of construction and design/detailing.

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'Other Designers'	Design team members other than the Engineer and Architect. Includes specialist sub-contractors, theatre designers, interior designers.
'Steelwork Contractor'	The Contractor and Steelwork Contractor references should be deemed interchangeable with respect to the provision of the Works referenced within this specification on the basis that the Steelwork Contractor will be a sub-contractor to the Main Contractor.

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1 Project Specification for Structural Steelwork

1.1.1 Provision of Information

It is the responsibility of the Employer to provide appropriate information for the intended works. The non-exhaustive checklists given in Tables 1.1 to 1.7 set out information that is to be shown on the Design Drawings or given in the Project Specification.

1.1.2 Reference to National Structural Steelwork Specification

The National Structural Steelwork Specification for Building Construction 5th Edition (CE Version) is incorporated into the contract along with any additions or modifications required by the Employer.

1.1.3 Precedence where there is a conflict

Where there is a conflict in specified requirements the Project Specification takes precedence over other documents.

1.1.4 Steelwork Contractor's design responsibility

The Steelwork Contractor shall complete the design, co-ordination, and detailing of the following:

- Steelwork connections and joints (including welds and stiffeners as required)
- Steel stairs
- Other proprietary manufacturers' systems – to be designed in accordance with the manufacturers' recommendations
- Secondary steelwork supporting cladding systems
- Secondary steelwork supporting any feature lighting or interior design items
- All steelwork required by the lift manufacturer including lifting beams
- Any other structural elements required for the satisfactory completion of the building subject to the acceptance of the Engineer and Architect
- Steelwork protection system(s)

1.1.5 Conflicts

The contractor must refer to both the Engineer's and the Architect's drawings and report any conflicts.

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1.1.6 Co-ordination

The contractor must co-ordinate dimensional and detail information from both the Architect's and Engineer's drawings in addition to the work of other trades as outlined in 1.1.4 above.

1.1.7 Setting Out

Overall setting-out is shown on the Architect's drawings. Other, detailed, setting-out is shown on the Engineer's drawings.

1.1.8 Temporary Bracing or propping

The Steelwork Contractor is responsible for the design of any temporary bracing or propping that he might require to ensure the safe erection of the works.

1.1.9 Fax Submission

Drawings for review will not be accepted by fax unless otherwise agreed.

1.1.10 Fabrication Drawings

The contractor must use his best endeavours at all times to progress his Fabrication Drawings and the works.

1.1.11 Contractor's Queries and Requests

The Steelwork Contractor's queries and requests for additional information must be tabled at meetings with the Engineer and Architect and/or marked on General Arrangement drawings. Other systems for requests for information are not acceptable unless otherwise agreed in writing.

TABLE 1.1 PROPOSED WORKS

(i) Brief description of the structure.

From reference to anecdotal information the building was originally constructed as a warehouse in 1867, and was known as the London Warehouse. It was later awarded Grade II listed status by English Heritage in 1998, when it was also transformed to an aparthotel. The pertinent structural transformation works involved the removal of localised upper floors to create the atrium space together with the addition of a mezzanine to provide a new office space and localised extension of the upper floors with lightweight materials.

The current building layout retains many of the building's original features spread over seven storeys and accommodates 107 apartments. The superstructure frame comprises predominantly upper floors with masonry vaulted ceilings as part of the original frame and new lightweight floors at higher level floors as noted above. Each floor is supported from wrought iron beams, which in turn span between the internal cast iron columns and perimeter load bearing masonry. Other features include an internal centrally located open atrium space.

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(ii) The intended purpose of the structure.

The proposed works involve the refurbishment of the apartments and commercial areas within The Place. Structural works to this involve the following:

- Formation of riser penetrations through the existing mezzanine floor and masonry arch floors at levels 1 to 6.
- There are a number of modifications to the new mezzanine structure added during the 1998 refurbishment involving demolition of some areas, timber joist infill of current voids and the introduction of a stepped link to an existing stair core.
- Raised floor modifications. A condition survey of the building highlighted an issue with the raised floor which is believed to be present at floors 1-5. A raised access floor containing services and formed from 75x75mm softwood battens at 900mm centres and a marine plywood top is deflecting to unacceptable levels and is causing cracking to the tiled finishes. We propose to rectify this by adding intermediate battens and replacing the plywood topping. The battens will be sized to suit the existing floor depth and fixed directly to the existing fabric with a small diameter proprietary fixing.
- With the Stage 3 proposals a change in the configuration of the stair position with Entrance 2 is proposed. These entails moving the current stair position towards the front elevation. The change in level will the provided by polystyrene filler blocks capped with a 150mm slab. The change in level also means the current lift shaft openings will need to be modified to suit the new level.

(iii) Details of the Site within which the Works will be constructed.

The building is located on the south side of Ducie Street in central Manchester, close to Piccadilly Railway Station.

(iv) The building class in accordance with the Building Regulations.

Class 2B

(v) Those parts of the structure (if any) that are external.

N/A

The default Execution Class is EXC 2.

Table 1.2A Design Checklist

When the Steelwork Contractor carries out detailing of the steelwork and design and detailing of connections based on the member design prepared by the Engineer.

(i) A statement describing the design concept.

(ii) Design Drawings showing all dimensions relevant to the steelwork or, when agreed, equivalent electronic data.

(iii) The design standards to be used for connection design.

(iv) Information necessary to design the connections including forces, moments and their combination required to be transmitted at each joint. Where connection design is to be in accordance with BS5950, or BS EN 1993-1-8, the forces and moments should be the factored values as defined by the code.

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(v) Particulars of any aesthetic, structural or clearance limits to be observed or environmental conditions which may affect detailing.

(vi) Details and locations of any temporary works assumed by the Engineer in the design.

(vii) A schedule of drawings, calculations and other information which the Steelwork Contractor must submit for acceptance.

- General arrangement drawings
- Detailed typical connection drawings
- Shop drawings (although these will not be specifically reviewed)
- Full Calculations for all connections
- Full design and product information for all proprietary items
- Full design information for all secondary and cold rolled steelwork
- Erection method statements
- Details of the proposed protection system including all manufacturer product information
- Foundation plan showing all fixings to be cast into concrete structures by others
- Any additional information that is requested to demonstrate the compliance of the proposed works with the design drawings and specification

(viii) Any part of the steelwork where the manufacturing processes must be restricted e.g. plastic hinge positions.

(ix) Details of any dynamic or vibrating forces and where fatigue is to be considered. Appropriate amendments to this Specification should be included since these factors are outside the intended scope.

(x) The material grade and designation of steel to be used, including the standard number, material grade and impact quality (see Table 2.1).

(xi) Positions on the structure where additions and stiffeners are required to develop the strength of the member, and where notching may affect member stability, including stiffeners required around service holes and in tubular joints. However, see (xvi) below for the requirement of the Steelwork Contractor to coordinate steelwork details with the work of other trades.

(xii) Any grades of bolt assemblies and their coatings which are specifically required.

(xiii) Details of the fixings or bolts to the foundations or walls designed by the Engineer, or a statement indicating that the Steelwork Contractor has to design these items and prepare a Foundation Plan Drawing (see 3.3).

(xiv) Any prescriptive requirements on thickness and type of bedding material (grout) to be used under column base plates.

(xv) Requirement for any particular type of fabrication detail and/or restriction on types of connection to be used.

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(xvi) The Details of cutouts, holes or fittings required for use by others may not be shown by the Engineer in their entirety or at all. The Steelwork Contractor must coordinate the size and location of all cutouts, holes and fittings required for completion of the work of other trades, and details shall be included on the fabrication drawings submitted for review and acceptance by the Engineer.

(xvii) Cambers and presets which have to be provided in fabrication so that continuous frames and other steelwork can be erected to the required geometry.

TABLE 1.3 WORKMANSHIP – CHECKLIST

Information required by the steelwork contractor

(i) No hard stamping or other permanent forms of identification may be used to exposed elements of steelwork.

(ii) Refer to Buro Happold structural drawings.

(note: standard welding procedure requirements are in 5.3).

(iii) N/A.

(iv) N/A.

(v) Welds on all exposed steelwork to be fully ground flush to achieve a high level of architectural finish and subject to approval by architect.

No double jointing of welds to running tracks of overhead crane(s).

(vi) All structural steelwork to be Execution Class 2 (EXC2) in accordance with CE Marking regulations

TABLE 1.4 ERECTION – CHECKLIST

Note: Information for some of these erection items may be provided separately by the Employer, or subject to negotiation.

Information required by the steelwork contractor

(i) Refer to relevant Architects drawings for position of datum level and setting-out lines.

(ii) Refer to the Architect's drawings for details of the envisaged site set up.

(iii) N/A

(iv) Refer to Buro Happold and Archer Humphryes drawings

(v) Refer to Buro Happold structural drawings.

(vi) Refer to contract preliminaries for details of all underground services, overhead cables or site obstructions.

(vii) Refer to Buro Happold drawings for any specific assumptions regarding the method of erection. Generally there are no specific limitations on the method of erection, although full method statements will be required from the steelwork fabricator for comment by the Engineer prior to construction. The existing masonry walls act as the main stability elements to the building. Care is to be taken not to disturb these walls during construction.

(viii) N/A

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(ix) The responsibility of the steelwork interfaces with other trades is to be determined.

(x) A Safe Site Handover certificate and other information necessary so that the Steelwork Contractor can comply with Section 8 (see 8.3.1). To be provided by the main contractor.

TABLE 1.5 PROTECTIVE TREATMENT - CHECKLIST

Information required by the steelwork contractor

(i) Refer to item (ii).

(ii) Paint treatments to comply with CIRIA Report 174 specifications (refer also to Appendix E of NSSS) :-

External Steel	-	CIRIA Specification E-1
General Internal Steelwork	-	CIRIA Specification I-1
Internal Exposed Steel (see item (v))	-	CIRIA Specification I-2
Internal concealed Steelwork*	-	All steel, connectors and connecting plates to be galvanised to BS 729 or CIRIA Specification I-3.

*Applies to any steel in 'cavity' walls in clear separation outside the vapour barrier of cladding systems – refer to the architectural drawings for locations.

(iii) The steelwork contractor is to be responsible for the touch-up of damaged areas and cleaning of surface treatments on Site to restore damaged areas to the original surface specification and thickness.

(iv) Requirements for fire protective coating to be provided by the Main Contractor to meet the specified fire resistance period. **The steelwork contractor is to ensure the compatibility of any paint finishes in these areas with the applied protective coating specified by the Architect.**

(v) Requirements for decorative coatings to be provided by the Main Contractor to meet the Architects specification. **The steelwork contractor is to ensure the compatibility of any paint finishes in these areas with the applied decorative coating specified by the Architect**.

TABLE 1.6 INSPECTIONS AND TESTS – CHECKLIST

Information required by the steelwork contractor

(i) Inspections or tests to be carried out or witnessed by the Employer, Engineer or Inspection Authority.

(ii) The period of advance notice required for these additional requirements.

TABLE 1.7PROGRAMME - CHECKLIST

Note: Programme dates may be those suggested by the Steelwork Contractor and accepted by the Employer.

Information required by the steelwork contractor

(i) The date(s) of issue of the Design Drawings or data for construction and other information necessary for the progress of the Works will be made.

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(ii) The period to be provided in the Steelwork Contractor's programme for acceptance of submitted information.

(iii) The date(s) by which the Site is expected to be ready with prepared and cured foundations and compliant with the Safe Site Handover Certificate

(iv) The proposed starting and completion dates for erection of steelwork and the dates when other contractors' activities are expected to interface with the steelwork erection programme.

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2 Materials

2.2.1 Storage

Correct typographic error in NSSS from "(See 2.6.1)" to read "(See 2.2.1)"

2.3 Welding Consumables

2.3.1 Welding Consumables Standards

The Trade Contractor must ensure that the hydrogen levels in welding consumables are compatible with the preheat requirements of the joints.

2.9 Precluded Materials

The following materials are specifically precluded from the Works and all specifications relating to the Works:

- High alumina cement or concrete
- Woodwool slabs as permanent shuttering
- Calcium chloride in admixtures for use in reinforced concrete
- Asbestos in any form
- Sea dredged aggregates for use in reinforced concrete unless otherwise instructed by the client see the concrete spec for information about sea dredged aggregates
- Calcium silicate bricks
- Urea formaldehyde
- Materials or products containing lead which can be inhaled, ingested or absorbed.
- Vermiculite containing fibrous dust

The Steelwork Contractor is to ensure that all efforts be made and using the best information available to him that that these substances are not incorporated into the Works.

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3 Information Provided by the Steelwork Contractor

Add the following:

3.4.11 Coordinated Connection Details for the Work of Other Trades

Include details of welded elements and bolted assemblies to allow connection of other building elements to the steel frame without on-site welding and drilling and in a manner that will preclude damage to paint and other coatings.

3.6 Drawing or Information Review

In clauses 3.6.1, 3.6.3, 3.6.4 and 3.6.5 delete all instances of 'Engineer' and replace with 'Engineer and Architect'.

3.6.2 Extent of submissions

Add the following:

(iii) Test Certificates for all materials utilised for the construction including certified mill test reports for each heat of steel per clause 2.1.2 above, all welding consumables per clause 2.2, all bolt assemblies per 2.3 and shear studs per 2.4.

(iv) Manufacturer's Instructions and Details for all protective treatments per clause 2.5 sufficient to define the nature and location of all surface preparation and coating processes and to demonstrate the compatibility of each coating with the process and/or coating which precedes it.

(v) Foundation and Wall Interface Information as defined in Section 3.3. Detailed setting out of holding down bolt assemblies and other interface details provided by the Steelwork Contractor must be coordinated with the Employer's programme requirements. As-constructed concrete and holding down bolt assemblies shall be surveyed on site by the Steelwork Contractor prior to erection and submitted to the Engineer and Architect for Record.

(vi) Fabrication drawings as defined in Section in 3.4. Preparation and submission of fabrication drawings should not normally commence until Connection Design calculations of clause 3.6.2(ii) have been reviewed and accepted by the Engineer and Architect, and the Steelwork Contractor shall sequence his work accordingly and make appropriate time allowance for review and acceptance of Contractor submittals by the Engineer and Architect.

(vii) All Welding Documentation as defined in Section 5.1 for record keeping purposes. The submittals shall provide a rational system to permit the Engineer and Architect to correlate WPS's to particular welds indicated on fabrication drawings.

(vii) The erection method statement defined in Clause 8.1.1 and erection information defined in Section 3.5. In particular, all on site welding shall be indicated on erection drawings submitted for review and acceptance by the Engineer and Architect. The method statement need not be submitted concurrently with detailed erection information and indeed for complex structures it is recommended to obtain Engineer and Architect acceptance of the erection method statement prior to developing detailed erection information.

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Add the following :

3.8 Co-ordination

The Steelwork Contractor shall co-ordinate his design, drawing and detailing with other Subcontractors and Other Designers. In particular he shall detail where necessary and co-ordinate all fixings for glazing, cladding (including brick and blockwork), internal partitions, ceilings etc that are required to complete the Works. The Steelwork Contractor's design and detail drawings shall include all relevant fixings to the Works.

3.9 Programme

3.9.1 Submission of Programme

The Steelwork Contractor shall submit a programme for acceptance by the Engineer, Architect and Employer showing as a minimum the following information:

- The phased dates for which information for areas of the Works is required by the Steelwork Contractor to allow him to start his calculations, drawings and design.
- Steel procurement.
- The phased dates on which the Steelwork Contractor will issue his drawings, broken-down into General Arrangement, foundation details, connection details, Fabrication Drawings, and the elements of the Works.
- Phased dates for issue of design calculations and their acceptance.
- The proposed sequence of fabrication which must be broken-down into areas of the Works.
- Details for submission of materials and protective coatings.

3.9.2 Timescale for Review

The Steelwork Contractor shall allow a period of 10 working days from receipt of each document at their offices for the Engineer and Architect to review calculations, drawings, method statements and any other documents.

3.9.3 Phased Release of Fabrication Drawings

All Fabrication Drawings shall be issued in a phased manner in accordance with the agreed programme.

3.9.4 Revisions to Submittals

The programme shall allow for all necessary reasonable revisions to be made to Steelwork Contractor Submittals in response to review comments by the Engineer and Architect.

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3.9.5 Co-ordination with Others

The Steelwork Contractor must co-ordinate his drawing production programme with the release of information programme from the design team. The Steelwork Contractor is part of the final process of design and must recognise this. References to the issue of 'full and final information' are not acceptable.

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4 Workmanship – General

4.1.1 Traceability of Steel Products

Add:

It is a requirement of this specification that all steel pieces for this project shall be traceable to a particular inspection document.

4.8 Curving and Straightening

Add the following:

(vi) Where curved steelwork is shown on the drawings, the method of curving proposed by the contractor shall be appropriate to the radius of bend. Due allowance must be made for any wastage inherent in producing the curved profiles. The following are required:

(i) No surface deformations are to be visible after the curving process.

(ii) Ovality of circular hollow sections is to be limited to that set out in 7.3.7 or 3% of the overall nominal section diameter, whichever is the smaller.

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5 Workmanship – Welding

5.1 Welding General

Add the following:

For the avoidance of doubt, fillet weld sizes noted in this specification and drawings refer to leg length.

5.2 Welder Qualification

5.2.1 Testing

Add to the first paragraph:

Welders shall be tested using same electrode class and welding positions which will be used in the work.

5.3 Welding Procedures

5.3.2 Approval of procedures and procedure tests

Add the following sentence:

Acceptance of WPQRs for use on the project shall be by the written approval of the Inspection Authority, if one has been appointed.

5.3.3 Use of welding procedure specifications (WPSs)

Add the following sentence:

Acceptance of WPSs and of appropriately cross-referenced work instructions shall be by the written approval of the Inspection Authority, if one has been appointed.

Add the following:

5.3.4 Distortion

Procedures to be such that distortion is reduced to a minimum and local distortion rendered negligible in the final structure. Corrections, if necessary, to be undertaken by a method agreed by the Engineer.

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5.3.5. Further Weld Procedure Requirements

5.3.5.1 Submittal of specimens for testing

When specified on the Design Drawings, the Steelwork Contractor is to submit specimens of welded joints and weld metal to an approved testing authority for testing to BS EN 288, or BS EN 287 as shown on the Design Drawings. The Steelwork Contractor must allow in his costs for all necessary testing, trials test pieces and attendance.

5.3.5.2 Temporary or additional welds

No welds, other than those shown on the drawings, not even for temporary attachments, or repair, shall be placed without approval. If temporary welded connections are authorised, their removal shall be in accordance with BS EN 1011-1 : 1998 and BS EN 1011-2 : 2001.

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8 Workmanship – Erection

8.1.7 Grouting

Add the following;

The Steelwork Contractor shall grout all column bases and bolt pockets in accordance with the requirements of BS EN 1993-1-8

8.7 Site Welding

Add the following;

Welding on site is not permitted unless shown on drawings or otherwise approved in writing.

Welding on site is always prohibited when steel temperature is below -15ºC, or when surfaces are wet.

If site welding is authorised the Steelwork Contractor is to submit his detailed written method statement for execution and quality control of on-site welding including details of:

(i) staging platforms

(ii) wind, wet and cold weather protection for welders and materials

(iii) welder names and qualifications for on-site welders. Only welders familiar with the Steelwork Contractor's method statement and fully qualified for the particular welds and welding positions are to be employed for site operations.

(iv) ovens or quivers for heating, and welder procedures for ensuring dry electrodes of appropriate quality in accordance with manufacturer's recommendations.

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10 Protective Treatment

10.1 General

Add the following:

10.1.5 Architectural Requirements

The specification of the colour of the top paint or other coat will be provided by the Architect.

10.1.6 Fire Spread

All coating materials shall comply with Class O Spread of Flame in the Building Regulations.

10.1.7 Embedded Elements

All Steelwork partially or wholly embedded in concrete shall have the appropriate cover of concrete or be galvanised to the acceptance of the Engineer.

10.1.8 Temporary Conditions

The steelwork protective system shall include allowance for any temporary environmental conditions encountered before and during construction.

10.1.9 Areas Damaged in Transit

Areas damaged in transit shall be made good to comply with all relevant specification requirements.

10.1.10 Coating materials

Wherever possible to be from one manufacturing batch. Where more than one batch is to be used, keep separate, allocate to distinct parts or areas of the work, and inform the Engineer and Architect accordingly.

Check that all coating materials to be used are recommended by their manufacturers for the particular surface and conditions of exposure, and that they are compatible with each other.

Ensure that any paint system selected is compatible with any fire protection system to be applied.

10.1.11 Inspection

Notify Engineer of projected dates for start of surface preparation and coating.

Give notice before coated members or components leave the works.

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10.1.12 Protection

Adequately protect freshly applied surface coatings from damage.

Exhibit 'Wet paint' signs and provide protective barriers where necessary.

Adequately protect surfaces adjacent to those being covered.

10.1.13 Remedial Work

All remedial work shall be completed to comply with this specification. There shall be no evidence of corrosion or contamination in the completed steelwork.

10.1.14 Execution and supervision of paintwork

The execution and supervision of paintwork should be in accordance with BS EN ISO 12944-7:1998 'Paints and varnishes – Corrosion protection of steel structures by protective paint systems – Part 7: Execution and supervision of paintwork'

10.2 Surface Preparation

Add the following:

10.2.5 Inaccessible Surfaces

The sequence of working to be such as to ensure that surfaces inaccessible after assembly receive the full specified treatment and coating system including, if necessary, local shop application of site coatings. The only surfaces which need not be coated are the internal surfaces of hollow sections which are sealed with fully welded end plates.

10.2.6 Manual Cleaning of Steelwork

Manual cleaning of steelwork in lieu of blast cleaning is not acceptable.

10.2.7 Faying Surfaces of Friction Grip Joints

Blast clean and mask before coating surrounding areas. The masking must adequately protect the faying surface from deteriorations and contamination.

If more than one coat is applied to surrounding areas, step each 30mm back from edge of preceding coat.

Remove masking immediately before bolting, check faying surfaces are free from adhesive and clean with solvent if necessary.

10.2.8 Friction grip bolts in shop painted steelwork

After final tightening of bolts and without delay, thoroughly degrease and clean bare steel at joint edge and prime as specified.

Seal all crevices to bolts and joint perimeters with an appropriate sealant.

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Apply on site touch up to shop applied base and intermediate coats to surrounding areas to match adjacent shop painted areas before applying specified site coatings

10.2.9 Uncoated Fastenings

After erection, thoroughly degrease and clean and, without delay, apply coating(s) to match surrounding shop painted areas before applying specified site coating(s).

10.4 Hot Dip Galvanising

Add the following:

10.4.3 Pre-Galvanizing works

All cutting, welding and drilling to be completed before galvanizing.

10.5 Paint Treatments

Add the following:

10.5.5 Film Thickness

Wet film thickness of each coat to be not less than that required to give the specified dry film thickness. Before starting work prepare and measure test samples to verify the relationship between wet and dry film thickness and submit results to the Engineer and Architect.

Check the thickness of each coat during application using a wet film thickness wheel or comb in accordance with BS 3900-C5 : 1997 also known as BS EN ISO 2808 : 2001

After each coat has dried measure the total accumulated dry film thickness using a magnetic or electromagnetic meter, checked against standard shims and recalibrated regularly as recommended by the manufacturer, the number and position of measurements to be as accepted by the Engineer and Architect.

Over any square metre of coating the average accumulated dry film thickness must equal or exceed the specified thickness, with no reading less than 80% of the specified thickness.

If at any stage the accumulated dry film thickness is deficient, the Engineer or Architect may require application of additional coat(s). The full top coat thickness must be maintained, notwithstanding any greater than specified undercoat thickness.

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11 Quality Assurance

Add the following clause:

11.1.4 Quality System - Welding

The welding quality system shall be in accordance with BS EN 729 Part 2: 1995.

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12 Specification for Architectural Steelwork Elements

Additional section to NSSS:

12.1 Visual appearance

Where indicated on the design drawings steelwork exposed in the finished building is to be of architectural quality and its visual appearance is important. The finish of the steelwork is to be of a high standard in terms of the visual appearance of the base steelwork, the finish of welds and the quality of the protective coating.

12.2 Surface marks

The base steelwork will not have pits, rolling defects or sections marks.

12.3 Weld surface finish

All visible butt welds are to be ground flush and all other visible welds shall appear smooth and even.

12.4 Paint surface finish

The paint finish will appear smooth, even and any areas that need to be touched up will prepared and treated in such a way that the touch up paint does not appear significantly different to the main area of paint.

12.5

To achieve the required standard of finish, the contractor will:

- Handle and store so as to avoid damage to steelwork and to any protective coatings. Particular care is to be taken with fabrications which may be slender before reaching their final erected state.
- All bundling, packing, handling and transport shall be carried out in a manner designed to prevent damage to the steelwork and to any protective coating
- Marks to be placed in positions which can be checked after erection. In the case of architectural steelwork, this should also be in a position which is not immediately apparent in the finished steelwork.
- Remove dross, burrs and sharp edges by grinding.
- Carefully dress welds to remove slag by light hammering, wire brushing or other methods that do not deform the surface of the weld.
- Procedures to be such that distortion is reduced to a minimum and local distortion rendered negligible in the final structure. Corrections, if necessary, to be undertaken by a method approved by the Engineer and Architect.
- No welds, other than those shown on the drawings even for temporary attachments or repair may be placed without approval. If temporary welded connections are authorized, their welding and removal shall be in accordance with Clause 16 of BS 5135.

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12.6 Sample finish precedents

Samples of steelwork of a suitable standard can be seen on finished projects as follows:

1. Buro Happold Engineering, Manchester Office, 2nd Floor Eastgate, Castle Street, Manchester, M3 4LZ

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13 Working within Existing Buildings

Additional section:

13.1 General Survey Requirements

The Steelwork Contractor shall undertake a survey of the existing structural elements involved in the refurbishment works at The Place, in order to provide himself with sufficient detailed dimensional data in order to complete his General Arrangement and Fabrication Drawings. He must obtain sufficient information in order to identify exact member lengths, precise setting-out, buildability, erection criteria and any other information that he may require.

In addition to this the following areas will need to be surveyed prior to the production of structural construction information:

- The condition of the existing slab at ground floor where existing level of the ground floor slab is to be raised locally and the depth and material of all finishes removed.
- Condition of the masonry arch structures where new risers are to be formed.
- The form and condition of the existing stair core walls adjacent to be mezzanine where the proposed new connection is to be located.
- The form and condition of the floor structure at mezzanine and first floor levels where the new riser is due to be formed adjacent to the existing stair core.
- Confirmation of depth and material of all finishes removed in the soft strip works.
- The form and condition of the existing lift shaft walls where new opening are due to be formed.
- Condition of the Pennine Suite slab to be checked once finishes are removed.
- Exposed foundations at ground floor level where existing slab to be demolished to be confirmed. Excavation work is not to extend below the existing foundations.
- Existing ground floor slab construction and thickness to be confirmed adjacent to section to be lowered.

13.2 Programme

The Steelwork Contractor shall allow in his programme and costs for any site modifications that may be necessary to suit the site conditions.

13.3 Method of Work

The Steelwork Contractor shall use appropriate methods of handling steelwork within the existing building, and these shall be deemed to be included in his programme and costs.

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