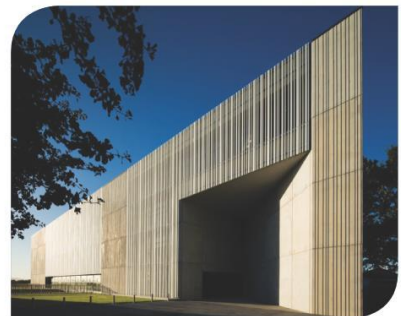


# NEW ZEALAND STRUCTURAL STEELWORK SPECIFICATION IN COMPLIANCE WITH AS/NZS 5131



REPORT NO 112.2018

**STEEL CONSTRUCTION NEW ZEALAND  
ENDORSED BY HERA**

New Zealand Structural Steelwork Specification in Compliance with AS/NZS 5131  
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- To promote awareness of the advantages of steel construction
- To promote excellence in the delivery of steel construction solutions
- To encourage training and career development within the steel construction sector

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## ACKNOWLEDGEMENTS

This edition of the Specification has been prepared under the guidance of an SCNZ steering committee and has been peer reviewed by a range of representatives and organisations as listed below. The contribution of these entities for the benefit of the New Zealand steel community is gratefully acknowledged.

The Specification has been adapted from the Australian Steel Institute National Structural Steelwork Specification and SCNZ acknowledges the Australian Steel Institute for granting permission to use this intellectual property.

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## REVISION REGISTER

Revision No.	General Description	Date

### NOTE:

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## FOREWORD

This generic specification has been configured to be applicable to general structural steel framing for buildings and structures. The specification is intended to be the implementation tool used to embed the requirements defined in the recently published new New Zealand Standard AS/NZS 5131 'Structural Steelwork – Fabrication and Erection' into engineering and steelwork procurement practice in New Zealand.

The intent of this specification is to standardise the development of structural steelwork related project requirements across New Zealand, which will significantly improve efficiencies in project delivery, cost, quality, compliance and long term value. In combination with SCNZ 'Steel Fabrication Certification' (SFC) and contingent certification of Structural Steel Contractors, our community can expect risk minimised, fit-for-purpose, value engineered outcomes for structural steelwork projects in New Zealand.

### Scope

This specification covers the scope in AS/NZS 5131. It therefore addresses areas including materials used for fabrication, cutting, holing, shaping, welding, bolting, surface preparation, corrosion protection, shop assembly, handling, transport and erection. It also includes recognition of the particular requirements in AS/NZS 5131 for architecturally exposed structural steel (AESS) and cold formed purlins and girts used in conjunction with structural steelwork. Future revisions will address composite construction and fire protection.

### Structure of this document

AS/NZS 5131 places significant reliance on the 'Construction Specification' to define the project specific variables. The Construction Specification includes technical specifications (such as this document), the project drawings and associated documentation. Consequently, this specification has been structured in such a way as to minimise reference to requirements that are already called up in AS/NZS 5131. Rather, focus is placed on those requirements where choices are required for project specific selections. In general, these are classified as '**Particular Requirements**' in the following specification.

The specification is structured into sections, with Sections 4 to 14 generally similar in scope to correspondingly named sections in AS/NZS 5131. Sections 1 to 3 of this specification cover project design context and the relationship between the specification, Standards and other project documentation.

AS/NZS 5131 documents a foundation of 'good practice', applicable irrespective of project type, embedded in which are a range of project specific selections that need to be addressed to configure the generic specification for project specific use. These selections, which are documented throughout the body of AS/NZS 5131, are conveniently summarised in Tables B1 and B2 of Appendix B of AS/NZS 5131 and are presented as:

- Selections that are **mandatory** (Table B1): if the project contains material or components applicable to the selection, then the construction specification must document a choice for this particular selection.
- Selections that are **optional** (Table B2): if the project contains material or components applicable to the selection, then the construction specification may choose to address this particular selection.

Each of Sections 6 to 14 in this specification present these selections. The user needs to make choices for mandatory selections that are within the scope of the project and decide which of the optional selections are required for project specific selections.

## Using this document

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This generic specification may be used in a number of ways by relevant stakeholders (engineers, procurers or specifiers):

1. Essentially 'as is', in which case the specifier should delete the informative commentary and user instructions and input any mandatory or optional 'particular requirements' needed for the specific project in Sections 6 to 14.
2. Edited to suit the particular style of specification adopted by the specifier and then used as the company 'standard steelwork specification'. This standard specification then requires selection of 'particular requirements' for specific projects, as per item 1 above.
3. Used as a basis for modification of the specifier's existing specifications, to be consistent with the requirements of AS/NZS 5131. If this option is adopted, the specifier needs to ensure the various 'particular requirements' are appropriately addressed.

It should be noted that the majority of simpler projects will not require selection of any optional requirements and the resulting specification will therefore be simpler and standardised.

Informative material is included in a green text box thus:

This is informative material and should be deleted in the final project specification

Instructions to the user to add relevant material are shown thus: *[ Add itemized list defining scope ]* and should be deleted from the final project specification.

Selections which are optional are followed by *[Optional]*. Optional selections have default null requirement text "No additional requirements" and hence can be left in the final specification if so desired. There is merit in keeping these default null selections, as the structure of the resulting 'standard specification' will therefore remain similar across projects and stakeholders, contributing to industry familiarity and highlighting when extra-ordinary selections are made.

Sections 6 to 14 of this specification typically contain sub-sections headed 'Particular requirements'. These requirements are determined from AS/NZS 5131 as needing to be defined in the Construction Specification (this specification) in either a mandatory or optional sense. Requirements marked as *[Optional]* may be deleted if not required. Other requirements must be addressed if they are within the scope of the project, otherwise they may be left with the null requirement text or deleted.

### Additional items not covered

There are a number of additional related items not covered in this specification that should be covered elsewhere in the project documentation, including:

- Details of any environmental rating tool applicable
- Design development, where required
- Site safety
- Safety in design
- Environmental sustainability in design
- Corrosion environment and atmospheric corrosivity category.

**Revision of this document**

This document is designed to be updated regularly based on review and feedback we receive. We encourage you to provide feedback to improve the document. All feedback will be considered for subsequent revisions.

## NEW ZEALAND STRUCTURAL STEELWORK SPECIFICATION IN COMPLIANCE WITH AS/NZS 5131

### 1.0 GENERAL

#### 1.1 Scope of work – structural steel

##### 1.1.1 Extent

The work covered in this Specification consists of:

1. The supply of materials and fabrication of structural steel components for the Works, as shown and described on the Project Drawings and in this Specification;
2. The supply of all associated welding consumables and bolted connection components for both in-shop and on-site assembly of the Works;
3. Shop detailing documentation;
4. Surface preparation;
5. Corrosion protection, including 'touch-up' repairs;
6. Handling and storage of all materials and components;
7. Loading and transportation of fabricated components to the job site;
8. Erection of the components and assemblies on-site;
9. Fixing of adjoining building elements connected to or supported on the structural steel;
10. The quality control of all materials, components, assemblies and processes associated with the scope of work; and
11. The compliance management of all materials, components and finished assemblies associated with the scope of the work.

##### 1.1.2 Inclusions

Generally, the following:

*[Add itemised list of components of the project]*

##### 1.1.3 Exclusions

Specifically, the following:

*[Add itemised list of components specifically excluded]*

##### 1.1.3 Deemed to be included

*[Add itemised list of items deemed to be included]*

The specifier should carefully review the generic scope presented above and edit as required for the specific project.

This specification covers the scope in AS/NZS 5131. It therefore addresses areas including materials used for fabrication, cutting, holing, shaping, welding, bolting, surface preparation, corrosion protection, shop assembly, handling, transport and erection. It also includes recognition of the particular requirements in AS/NZS 5131 for architecturally exposed structural steel (AESS) and cold formed purlins and girts used in conjunction with structural steelwork. Future revisions will address composite construction and fire protection.



#### 1.1.4 Co-ordination with other trades:

The Structural Steel Contractor shall allow for the extent of liaison and coordination necessary with adjoining trades to identify all necessary fitments, flashing plates, brackets, holding down bolts and the like that either support or are supported by, or otherwise interact with the steelwork under scope of this project.

All work shall be undertaken in accordance with the Project Drawings and shall comply with the various New Zealand Standards and other reference documents as prescribed in this technical specification

#### 1.1.5

This Specification forms part of the *Contract Documents*

### 1.2 Other Documents

Read this Specification in conjunction with the other *Contract Documents*.

### 1.3 Definitions

For the purposes of this specification, the definitions included in AS/NZS 5131 and the following apply:

- **Contractor:** is the Person with overall responsibility for construction of the building, so named in the Contract Documents and as defined by NZS 3910
- **Construction Reviewer:** is responsible for review of the structural steelwork covered by this specification
- **Design Engineer:** is responsible for design of the structural steelwork covered by this specification
- **Engineer:** The Engineer is the Engineer to the contract as defined by NZS 3910
- **Structural Steel Contractor:** is responsible for fabrication, erection, surface treatment and corrosion protection of the structural steelwork covered by this specification.
- **Hold point:** an identified point in a process beyond which the relevant work cannot proceed without approval.
- **Project Drawings:** the set of drawings that describe in a diagrammatic fashion the extent and detail of the Works and the relationship of the Works to the overall construction. The Project Drawings may include the detail necessary to fabricate and erect the Works, depending on the contractual relationships established for the project.
- **Steelwork:** the fabricated structural steel.
- **Witness point:** An identified point in a construction process at which an activity is observed.

### 1.4 Abbreviations

For the purposes of this specification, the following abbreviations apply:

- **AESS:** Architecturally exposed structural steelwork
- **CC:** Construction Category (CC1, CC2, CC3, CC4)
- **ESM:** Erection Sequence Methodology
- **FC:** Fabrication Category (FC1, FC2)
- **IL:** Importance Level
- **ILAC:** International Laboratory Accreditation Cooperation
- **ITP:** Inspection and Test Plan
- **MDR:** Manufacturer's Data Report
- **NDE:** Non-Destructive Examination
- **PC:** Coating quality level
- **QP:** Quality Plan

- **SC:** Service Category (SC1, SC2)
- **SCNZ:** Steel Construction New Zealand
- **SDoC:** Supplier Declaration of Conformity
- **SFC:** Steel Fabrication Certification
- **UNO:** unless noted otherwise
- **WPQR:** Welding Procedure Qualification Record
- **WQR:** Welder Qualification Record
- **WPR:** Welding Procedure Record
- **WPS:** Welding Procedure Specification

### **1.5 Health and Safety**

All work covered by this Specification must be undertaken in accordance with the requirements of the Health and Safety in Employment Act and the Contractor's health and safety workplan.

## 2.0 Responsibilities

### 2.1 Responsibilities

Table B.3 of AS/NZS 5131 details a list of responsibilities to be assigned. Unless otherwise assigned under the scope of the project contract the responsibilities assigned to the Structural Steel Contractor shall be as per appendix B and this specification.

For completeness, Appendix B of this specification lists the range of responsibilities that need to be assigned and suggested party. The contractual documentation should ensure these responsibilities are assigned.

### 3.0 REFERENCED DOCUMENTS

#### 3.1 Standards

The following Standards and codes applicable to and referenced in this Specification shall be regarded as describing the minimum standard of materials and workmanship to be provided:

Standard	Title
AS 1111	ISO metric hexagonal commercial bolts and screws
AS/NZS 1163	Cold-formed structural steel hollow sections
AS/NZS 1214	Hot-dip galvanized coatings on threaded fasteners (ISO metric coarse thread series) (ISO 10684:2004, MOD)
AS/NZS 1252.1	High-strength steel bolt assemblies comprising bolts, nuts and washers for structural engineering – Part 1: Technical requirements
AS/NZS 1252.2	High-strength steel bolt assemblies comprising bolts, nuts and washers for structural engineering – Part 2: Verification testing
AS/NZS 1554	Structural steel welding (several parts, as applicable)
AS/NZS 1594	Hot-rolled steel flat products
AS/NZS 2312.1 <sup>1</sup>	Guide to the protection of structural steel against atmospheric corrosion by the use of protective coatings – paint coatings
AS/NZS 2312.2 <sup>1</sup>	Guide to the protection of structural steel against atmospheric corrosion by the use of protective coatings – hot-dip galvanizing
AS 3597	Structural and pressure vessel steel – Quenched and tempered plate
AS/NZS 3678	Structural steel – Hot-rolled plates, floorplates and slabs
AS/NZS 3679.1	Structural steel – Part 1: Hot-rolled bars and sections
AS/NZS 3679.2	Structural steel – Part 2: Welded I sections
NZS 3404	Steel structures
ISO 3834	Quality requirements for fusion welding of metallic materials (several parts, as applicable)
AS/NZS 4600	Cold-formed steel structures
AS/NZS 4680	Hot-dip galvanized (zinc) coatings on fabricated ferrous articles
AS/NZS 5131	Structural steelwork – Fabrication and erection
SA TS 101	Design of post-installed and cast-in fastenings for use in concrete
SA TS 102	Structural steel – Limits on elements added
SA TS 103	Welding to AS/NZS 1554 Parts 1, 5 and 7 – Limits on boron in parent materials
SNZ TS 3404.1	Durability requirements for steel structures and components

Note: 1. Alternatively as per SCNZ Steel Advisor MAT1010 acceptance to mechanical requirements of AS/NZS 1252:1996 and dimensional requirements of AS/NZS 1252:1983

Documents listed refer to their latest issue complete with amendments that are current at the time of preparing the Contract Documents.

#### 3.2 Other referenced documents

This technical specification shall be read in conjunction with:

1. SCNZ Report No 111:2018, *New Zealand Guide to the Sourcing of Compliant Structural Steels*
2. SCNZ Steel Advisor, MAT1010, *Practice Note on the Sourcing of Compliant High Strength Structural Bolts*
3. SCNZ Steel Advisor, MAT1011, *Practice Note on the Sourcing of Threaded Rod Used for Foundation Bolts*
4. [List additional documents]

The specifier should edit and augment these suggested normative reference documents with documents specific to the project.

## 4.0 DESIGN, DOCUMENTATION AND QUALITY CONTROL / MANAGEMENT

### 4.1 Construction Category

In accordance with the requirements of AS/NZS 5131 the Construction Categories for the project are defined in the table below:

	Element	Importance Level	Service Category	Fabrication Category	Construction Category
1	All structural steelwork UNO.	IL2	SC1	FC1	<b>CC2</b>
2	<i>[Provide a list of drawings, components or assemblies where a different CC to above is required]</i>	<i>[IL2]</i>	<i>[SC2]</i>	<i>[FC1]</i>	<b><i>[CC3]</i></b>

In accordance with the requirements of AS/NZS 5131, a Construction Category or Categories shall be assigned to the structure described by the scope of work. Construction Categories (CC1 to CC4) may apply to the whole of the structure, to a part of the structure or to specific details. A structure can include several Construction Categories.

Guidance on the calculation of the Construction Category can be found in Appendix C of AS/NZS 5131 and is based on the 'Importance Level' (IL), the 'Service Category' (SC) and the 'Fabrication Category' (FC).

### 4.2 Treatment grades

Unless noted otherwise in the Project Drawings, for the elements on this project, the treatment grades according to AS/NZS 5131 shall be:

	Element	Treatment grade
1	All painted structural steelwork UNO.	P2
2	<i>[Provide a list of drawings, components or assemblies which are intended to be painted where a different treatment grade to above applies]</i>	<i>[P3]</i>

Treatment grades (P1 to P3 in AS/NZS 2312 and AS/NZS 5131) are related to the expected life of the corrosion protection and may be related to the type of corrosion protection system used in a particular area of the structure. Refer to Clause 9.8.4 of AS/NZS 5131 for a definition of the treatment grades.

Treatment grades may apply to the whole structure or to a part of the structure or to specific details. A structure can include several treatment grades. A detail or group of details will normally be ascribed one treatment grade.

Refer HERA report R4-133 'New Zealand steelwork corrosion and coatings guide' or ISO 8501-3 for more information.

Notes:

1. Unless AESS is required, surface preparation to treatment grades is not necessary for galvanized products.
2. The galvanized surface may require surface preparation if is to be painted after galvanizing.
3. Intumescent coatings may require specific surface preparation and assessment for compatibility with corrosion protection systems. The specifier should review manufacturer data in this regard.

#### 4.3 Quality Assurance

The Structural Steel Contractor shall maintain a quality management system to Appendix D of AS/NZS 5131 relevant to the project Construction Category and the project Coating Quality level. In addition, Factory Production Control (FPC) for welding fabrication shall comply with AS/NZS ISO 3834.3 for CC2 and AS/NZS ISO 3834.2 for CC3 and CC4.

#### 4.4 Structural Steel Contractor Qualification

The Structural Steel Contractor shall have Steel Fabrication Certification to at least the defined Construction Category level through Steel Construction New Zealand and HERA Certifications Ltd.

The Steel Fabrication Scheme (SFC) provides an independent expert assessment that the Structural Steel Contractor's quality assurance system meets the requirement of AS/NZS 5131.

#### 4.5 Quality documentation

Provide quality documentation as required by Clause 4.5.1 of AS/NZS 5131.

Provide a Quality Plan as required by Clause 4.5.2 of AS/NZS 5131.

Clause 4.5.1 of AS/NZS 5131 requires the specified quality documentation for CC2, CC3 and CC4 categories.

According to Clause 4.5.2 of AS/NZS 5131, a Quality Plan is optional for Category CC2 and mandatory for Categories CC3 and CC4.

#### 4.6 Identification and traceability

The Structural Steel Contractor shall implement systems to ensure identification and traceability complying with AS/NZS 5131 for the appropriate Construction Category, including by all subcontractors.

Identification and traceability of materials and components is a key requirement of AS/NZS 5131. All stakeholders in the supply chain must implement systems to support the performance requirements of AS/NZS 5131. Importantly, subcontracted services need to ensure continuity of requirements.

#### 4.7 Purchasing – components and subcontracted services

The processes and documentation required for purchasing of components or subcontracted services shall meet the requirements of Clause 4.6 of AS/NZS 5131.

All stakeholders in the supply chain must implement systems to support the performance requirements of AS/NZS 5131. Importantly, purchasing process needs to ensure continuity of requirements.

#### 4.8 Submittals

The submittals required are defined in AS/NZS 5131. A summary of all submittals are provided in appendix A.

In particular, submittals shall include the following:

##### 4.8.1 Personnel

For a Structural Steel Contractor not certified under the Steel Fabrication Certification scheme submit qualifications and competencies of the following key personnel to the Construction Reviewer.

- a. Fabrication supervisors
- b. Welding supervisors
- c. Coatings supervisors
- d. Erection supervisors
- e. Fastening supervisors
- f. Independent Inspectors (see Appendix C)

##### 4.8.2 Quality Plan and ITPs

The requirements for submission of Quality Plans and ITP's are provided in Section 13. The Structural Steel Contractor shall submit ITPs to the Design Engineer for review. For a Structural Steel Contractor not certified under the Steel Fabrication Certification scheme quality documentation and Quality Plan shall be submitted to the Design Engineer.

##### 4.8.3 Products and materials

###### 4.8.3.1 Origin of steel

The requirements in AS/NZS 5131 for documentation to demonstrate compliance with New Zealand Standards apply.

Steel shall be supplied in accordance with SCNZ Report 111:2018 *New Zealand Guide to the Sourcing of Compliant Structural Steels* for the nominated construction category. Provide documentation,

verification test reports and a 'Supplier Declaration of Conformity' as required. The Structural Steel Contractor shall submit steel source steel list as described in the SCNZ Report to the Design Engineer for review. Evidence of conformity meeting the requirements of the SCNZ Report shall be submitted to the Construction Reviewer for review. Responsibility for acceptance of steel remains with the Contractor and Structural Steel Contractor.

#### **4.8.3.2 Chemical composition of steel**

In addition to the requirements of the New Zealand Standards for structural steel (refer Section 5.2), the steel shall also comply with the following requirements for boron content:

- (a) the material test certificates shall report all elements required by the New Zealand Standards listed above, plus total boron.
- (b) If boron is not specified on the material test certificates, then the material shall be tested to determine the total boron.

Parent steel materials with a total boron equal to or exceeding 0.0008% will require requalification of welding procedures in accordance with SA TS 103 Structural steel welding – Limits on boron in parent materials.

#### **4.8.3.3 Bolts**

Provide documentation demonstrating compliance to the relevant Standard (refer Section 5.3) prior to delivery of bolts to site. Bolts delivered to site without complete documentation shall be rejected.

The high strength structural bolts for this project are required to have verification testing in accordance with SCNZ Steel Advisor MAT1010. Provide documentation and a 'Supplier Declaration of Conformity' as defined in Steel Advisor MAT1010.

#### **4.8.3.4 Footing Bolts**

Provide documentation demonstrating compliance to the relevant Standard (refer Section 5.10) prior to delivery of footing bolts to site. Footing bolts delivered to site without complete documentation shall be rejected.

The high strength threaded rod for this project are required to have verification testing in accordance with SCNZ Steel Advisor MAT1011. Provide documentation and a 'Supplier Declaration of Conformity' as defined in Steel Advisor MAT1011.

#### **4.8.4 Shop drawings**

The Structural Steel Contractor at their expense shall prepare shop drawings and any supporting documentation providing the range of information required for the shop detailing documentation in AS/NZS 5131.

Shop drawings are to include all provisions documented in all project drawings and any other relevant documents across all design disciplines involved in the project to show full construction details. Where discrepancies are noted in the drawings, it shall be the duty of the Contractor to notify the Design Engineer of these discrepancies as soon as they become evident.

Shop drawing numbers shall be maintained. Changes to shop drawings shall be clouded.

The Structural Steel Contractor is to submit all proposed changes to the documented design for approval prior to submitting shop drawings for approval.

The shop drawings shall be reviewed by the Design Engineer for design concept and general arrangement only. Allow two(2) weeks for review. The accuracy and adequacy of the shop drawings are the Contractors responsibility.



Provide one copy in Adobe PDF format.

The specifier should decide what form and extent of shop detailing submission is required. Electronic-only submission can save costs and time.

#### **4.8.5 Execution details**

##### **4.8.5.1 Subcontractors**

Submit names and contact details of any proposed fabricator, detailer, surface preparation contractor, painter/galvanizer and erector/installer.

##### **4.8.5.2 Fabrication**

Provide documentation to demonstrate a Structural Steel Contractor having Steel Fabrication Certification to at least the defined Construction Category level through Steel Construction New Zealand and HERA Certification Ltd will be utilised for the Works.

Approval to use a non-SFC certified Structural Steel Contractor must be formally requested and approved by the Principal and the Engineer. In this case, documentation shall be provided to demonstrate compliance with AS/NZS 5131. Additional independent inspection shall also be required for a non-SFC certified Structural Steel Contractor as described in appendix C.

SCNZ recommends for a Structural Steel Contractor not certified under SFC that a provisional sum be provided for the Tender Evaluation Team to engage a structural steel contractor assurance specialist, familiar with New Zealand standards and steelwork of similar scale and complexity, to review documentation to demonstrate compliance with AS/NZS 5131.

SCNZ recommends for Construction Category 3 that a non-SFC certified Structural Steel Contractor must provide certification to ISO9001 and ISO3834 as part of the documentation to demonstrate compliance with AS/NZS 5131.

SCNZ recommends additional independent inspection be undertaken to provide an additional level of confidence in the overall quality of the work and to demonstrate compliance with AS/NZS 5131 and this specification..

##### **4.8.5.3 Information required for Code Compliance Certificate (PS3)**

When the works are sufficiently complete that they are ready for application to the Territorial Authority for a Code Compliance Certificate, or otherwise at key handover dates for this section of the works, the Structural Steel Contractor will be required to certify to the main Contractor that all compliance items covered by this specification have been carried out in full accordance with all Contract Documents and Contract Instructions in the form of a Producer Statement - Construction. This statement will be required to be completed prior to the issue of the Producer Statement – Construction Review by the Construction Reviewer for the whole or sections of the works as appropriate.

##### **4.8.5.4 Erection documentation**

Submit the 'Erection Sequence Methodology' (ESM) as defined in AS/NZS 5131 for review by the Design Engineer. The adequacy of ESM are the Contractor's responsibility.

If required by the ESM, submit calculations to justify the adequacy of the structure for the intended erection methodology.

The 'Erection Sequence Methodology' (ESM) is recommended for projects where a risk assessment has been undertaken and indicates the need. The scope and extent of the ESM is an outcome of the risk planning workshops.

#### **4.8.5.5 Connections**

For bolted connections, submit inspection records for completed installation to the Construction Reviewer.

For bolted connections not fully documented, submit proposals for approval by Design Engineer.

For bolted connections requiring rectification, submit proposals for approval before proceeding to the Design Engineer.

For anchor bolts that do not meet documented location tolerances, submit proposals for rectification for approval before proceeding to the Design Engineer.

For temporary connections, if not documented, submit proposals for approval to the Design Engineer.

If splicing of structural members is proposed, submit details for approval to the Design Engineer.

Where alternative anchors are proposed, submit documentation for approval by the Design Engineer to substantiate the anchor capacity to carry the load where mechanical or chemical anchors are required or proposed for the support or fixing of structural steel.

#### **4.8.5.6 Steelwork exposed to view**

Submit details of proposed member, connection and component marking for steelwork identified as AESS or otherwise exposed to view to the Design Engineer.

#### **4.8.5.7 Rectification works**

Proposals for rectification works shall be submitted in writing and approved before being undertaken to the Design Engineer.

#### **4.8.6 As-built documentation**

Submit the survey of erected structural steelwork to verify the structure and components have been installed as defined on the Project Drawings to the tolerances defined in AS/NZS 5131 and this specification.

Submit as-built documentation.

#### **4.8.7 Non-conforming Work**

Where a section of the Works does not comply with the requirements of the specification and the Project Drawings (including requirements for inspection and testing), the Structural Steelwork Contractor shall submit a non-conformance report detailing the non-conformance and the proposed rectification method for approval by the Construction Reviewer.

#### **4.8.8 Manufacturers Data Report (MDR)**

Submittals are required in the form of a fabricator's MDR, the structure and contents of which is defined in the following table. The MDRs shall be made available for the Construction Reviewer to review.

Content	Required		
	CC1	CC2	CC3/CC4
<b>Scope of work:</b>			
Insert a brief description of the contract Scope of Work applicable to the MDR at the front of report.	✓	✓	✓
<b>Section 1 – Design and detailing:</b>			
Design calculations (if relevant)			
Technical queries / requests for information		✓	✓
Authorised deviations		✓	✓
Material and equipment lists			
Drawing list including revision number		✓	✓
General arrangement drawings		✓	✓
Marking plans		✓	✓
Shop detail and vendor drawings		✓	✓
Assembly drawings (where applicable)		✓	✓
As-built drawings		✓	✓
3D model(s) (if applicable)			
<b>Section 2 – Steel fabrication:</b>			
Signed off ITPs for each stage of the work		✓	✓
Final Inspection Check Sheets or Reports	✓	✓	✓
Evidence of conformity to the requirements of SCNZ 111:2018	✓	✓	✓
High strength bolt verification test documentation	✓	✓	✓
Material and consumable map for traceability			✓
Welding consumables certificates		✓	✓
Welding Procedure Specifications (WPS)	✓	✓	✓
Welding Procedure Qualification Records (WPQR)	✓	✓	✓
Welder Qualification Records (WQR)	✓	✓	✓
Material Heat Traceability Records		✓ (partial)	✓ (full)
Inspection and Non Destructive Testing (NDT) Records	✓	✓	✓
NDT Personnel Certifications		✓	✓
Production Test Plate Reports (if applicable)			
NDT records identifying location and the welder		✓	✓
Weld maps identifying welders and WPS used for each weld			✓
Mechanical Test Records (if required)			✓
Heat Treatment Records		✓	✓
Map for identifying heat treatment records against welds and/or location			✓
Inspection records for shop installed bolted connections		✓	✓
Non-conformances, concessions and technical queries	✓	✓	✓
Procedure for modification or repair of existing structures		✓	✓
Final release certificate (works) or Inspection Release and Handover Certificate (Site)		✓	✓
<b>Section 3 – Corrosion Protection:</b>			
Signed off ITPs for each stage of the work		✓	✓
Material batch numbers and test certificates		✓	✓
Surface preparation Records		✓	✓
Coating application and thickness records		✓	✓

<b>Section 4 – Structural Steel Erection:</b>			
Signed off ITPs for each stage of the work		✓	✓
Installation record sheets		✓	✓
Approved Erection Sequence Methodology (ESM) (as required based on risk assessment)			
Any records described in preceding sections that may be relevant to Site Erection		✓	✓
<b>Section 5 – Statutory Approvals, Registrations and Certificates</b>			
Lifting equipment certification (if applicable)			

Note: ✓ = required

The specifier should review these selections and adjust the required options accordingly. The default selections are recommended by SCNZ.

The supply of 3D models as a deliverable from design and detailing is preferred.

Submissions in the form of an MDR are not mandatory in AS/NZS 5131.

## 4.9 Inspection

### 4.9.1 Inspection scheduling

#### 4.9.1.1 Bookings:

*[Optionally, provide direction on process and timing for booking inspections]*

#### 4.9.2 Off-site witness points

The Structural Steel Contractor shall give the Construction Reviewer 2 working days' notice so that inspection may be made of the following:

- Materials including welding consumables prior to fabrication
- Testing of welding procedures and welder qualification tests
- Commencement of shop fabrication
- Commencement of welding
- Prior to placement of root runs of complete penetration butt welds
- High strength bolt tensioning (when completed in shop)
- Completion of fabrication prior to surface preparation
- Surface preparation prior to protective coating
- Completion of protective coating prior to delivery to site

#### 4.9.3 On-site witness points

The Structural Steel Contractor shall give the Construction Reviewer 2 working days' notice so that inspection may be made of the following:

- Steelwork on site before commencement of erection
- Anchor bolts in position before casting in
- Column bases prior to grouting
- Installation and tensioning of bolts in categories /TB or /TF
- Completion of erection prior to any encasing, field protective coating or fixing of cladding
- Mechanical or chemical anchor proof load testing
- Reinforcement and formwork in place prior to any encasement
- After any grouting, encasement, fire protection or field protective coating is completed

- The loading and unloading of temporary works

#### 4.9.4 Hold points

The required hold points and submission details are defined in Appendix A. Hold points will be released after written approval.

The specifier should review these hold points for applicability for the specific project.

## 5.0 MATERIALS AND COMPONENTS

### 5.1 General

Members and components shall be packed, supported, lifted and transported in a manner to prevent distortion, loss of camber or damage to the steelwork and its protective coating.

Damaged items shall be reported and rectified or replaced. Where rectified, the method of rectification shall be subject to approval.

Documentation supplied with materials and components shall conform to the requirements of AS/NZS 5131.

### 5.2 Structural steel

All structural steel materials and components shall conform to the following table UNO:

Component	To conform with Standard	Grade
Hot rolled steel sections	AS/NZS 3679.1; TS 102	300; 350; 300L0; 300S0; 350L0; 300L15; 350L15
Plates and flats	AS/NZS 3678; AS/NZS 1594; TS 102 AS/NZS 1594; TS 102	250; 300; 350; 400; 450; WR350; 250L0; 300L0; 350L0; 300L15; 350L15 HA250; HA300; HA350; HA400 HW350
Hollow sections: Circular Square Rectangular	AS/NZS 1163; TS 102	C250L0; C350L0; C450L0 C350L0; C450L0 C350L0; C450L0
Welded beams and columns	AS/NZS 3679.2; TS 102	300; 400
Shear studs (composite slab to steel)	AS/NZS 1554.2	380
Quench & tempered plate	AS 3597	500; 600; 700; 900; 1000
Purlins and girts	AS 1397	G250; G300; G350; G450; G500; G550

Note: Plate to AS/NZS3678 Grade 350 (*can/cannot*) be substituted for AS/NZS3678 Grade 300

The specifier should review these steel grades and delete or add as required. The specifier must identify the location of these steel grades.

Hot rolled steel sections, plates and flats are available in multiple impact grades. Where required, check with manufacturer.

A common request from fabricators is substitution of G350 plate for G300 flat bar. The specifier should review the acceptance of this and amend note accordingly.

### 5.3 Bolt assemblies

#### 5.3.1 Bolt Designation

Designation	To conform with New Zealand Standard	Tightening process	Property class
4.6/S	AS 1111	Snug tight	4.6
8.8/S	AS/NZS 1252.1	Snug tight	8.8
8.8/TB	AS/NZS 1252.1	Fully tensioned to NZS 3404 as a bearing type joint	8.8

8.8/TF	AS/NZS 1252.1	Fully tensioned to NZS 3404 as a friction type joint. Connecting surfaces to be left uncoated.	8.8
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The connecting surfaces of friction type joints may be coated if the friction coefficient of the coated joint has been tested according to AS/NZS 5131 Appendix G.

### 5.3.2 Bolt assembly verification

High strength bolt assemblies shall be verified to MAT1010. Documentation to meet the requirements of MAT1010 shall be provided.

SCNZ strongly recommends that high strength bolt assembly verification to MAT1010 is specified, given the demonstrable issues with ensuring bolt compliance in today's procurement environment.

### 5.3.3 Bolt finish

All bolts shall be hot dip galvanized to AS/NZS 1214.

### 5.4 Welding consumables

Welding consumables shall conform to the requirements of NZS 3404, based on the yield strength of the steel to be welded, as defined in the table below:

Nominal yield strength of steel to be welded	To conform with New Zealand Standard
≤ 500 MPa	AS/NZS 1554.1
>500MPa; ≤ 690 MPa	AS/NZS 1554.4

The nominal tensile strength of weld metal,  $f_{uw}$ , shall be 490 MPa UNO.

The designation of welding consumables has recently been harmonised internationally. Refer to SCNZ Steel Advisor WEL1002 for further details.

The specifier should adjust the stated weld metal tensile strength to suit the design basis.

For welds subject to earthquake loads, for steel types 2S, 5S, 3 and 6, the welding consumables shall have a Ships' Classification Societies Grade 3 approval.

### 5.5 Mechanical and chemical anchors

Mechanical and chemical anchors shall meet the requirements defined in SA TS 101.

### 5.6 Studs and shear connectors

Studs and shear connectors shall meet the requirements defined in AS/NZS 5131.

### 5.7 Special fasteners

Special fasteners shall meet the requirements defined in AS/NZS 5131.

### 5.8 Fasteners for thin gauge components

Fasteners for thin gauge components shall meet the requirements defined in AS/NZS 5131.

## 5.9 Locking devices

Where required, locking devices to prevent loosening of fasteners are noted on the Project Drawings. Locking devices shall meet the requirements of AS/NZS 5131.

## 5.10 Footing bolts

Footing bolts shall meet the requirements of AS/NZS 5131. High strength threaded rod shall meet the requirement of Steel Advisor MAT1011.

## 5.11 Grouting materials

Materials used for grouting under steel base plates and bearing plates shall meet the requirements defined in AS/NZS 5131.

## 5.12 Testing

### 5.12.1 Lamellar tearing

Joint details which are susceptible to lamellar tearing (LT) are indicated on the project drawings as "LT susceptible". The identified plate in joints that have been assessed as 'LT susceptible' shall be ultrasonically tested to AS 1710 Class 1.

The proposed Welding Procedure for 'LT susceptible' details shall be approved before work is executed.

### 5.12.2 Z-plate requirement

Joints that are designated 'LT susceptible' (see clause 5.12.1) and further require plate to a nominated Z-value are indicated on the project drawings with a designated Z-value. The plate identified in these joints shall be ordered to the designated Z-value and shall be ultrasonically tested to AS 1710 Class 1.

The susceptibility of the joint to lamellar tearing is a function of material properties, joint and weld details, and service conditions. Guidance is provided in Appendix H of AS/NZS 1554.1:2014 for the choice of Z-qualities to avoid lamellar tearing in welded connections subject to tension stresses in the through-thickness direction.

Available design Z-values for plate according to AS/NZS 3678 is Z15, Z25 or Z35. Steel plate can be order to the required Z quality or tested in through thickness direction.

'LT susceptible' joints include cruciform joints and T-butt joints at or near plate cut edges.



## 6.0 PREPARATION, ASSEMBLY AND FABRICATION

### 6.1 General

All fabrication including operations comprising cutting, shaping, holing and assembly into fabricated components shall conform to the requirements of AS/NZS 5131.

Particular requirements from AS/NZS 5131 are outlined in Section 6.2, together with a reference to the applicable clause in AS/NZS 5131.

For the 'Particular requirements' detailed below, in cases where it is stated that the items are "designated on the Project Drawings" the specifier should ensure, where appropriate, the items are designated on the Project Drawing set.

### 6.2 Particular requirements

	<b>Clause in AS/NZS 5131</b>
<b>6.2.1 Architecturally exposed structural steelwork (AESS)</b> Areas applicable to AESS are designated on the Project Drawings. Refer Section 10 for further details.	6.1.5
<b>6.2.2 Identification and traceability</b>	6.2
<b>6.2.2.1 Hard stamping:</b> Areas where hard stamping is prohibited are designated on the Project Drawings.	
<b>6.2.2.2 Identification marks:</b> Areas where identification marks are not permitted or shall not be visible after completion are designated on the Project Drawings.	6.2
<b>6.2.3 Cutting</b>	
<b>6.2.3.1 Cutting processes:</b> No additional requirements. <i>[State if any cutting processes are specifically excluded] [Optional]</i>	6.5.1
<b>6.2.3.2 Yielding regions:</b> Yielding regions for Category 1,2 & 3 seismic members are designated on the Project Drawings.	6.5.1
<b>6.2.3.3 Fatigue detail category:</b> Details with fatigue detail category $\geq 80$ MPa are designated on the Project Drawings.	6.5.2
<b>6.2.4 Holing</b>	
<b>6.2.4.1 Friction-type connections:</b> Friction-type connections are designated on the Project Drawings in the manner detailed in Section 5.3.1.	6.7.4
<b>6.2.4.2 Weld access holes</b> Weld access holes shall not be filled in with weld metal unless otherwise approved by Design Engineer. <i>[List whether weld access holes are allowed and any additional execution requirements]</i>	6.7.7
<b>6.2.4.3 Yielding regions:</b> Yielding regions for Category 1,2 & 3 seismic members are designated on the Project Drawings.	6.13.1
<b>6.2.5 Full contact bearing surfaces</b> Full contact bearing surfaces are designated on the Project Drawings.	6.8
<b>6.2.6 Assembly</b>	
<b>6.2.6.1 Camber and preset:</b> Camber and preset requirements are designated on the Project Drawings.	6.9

<b>6.2.6.2 Assembly check:</b> No additional requirements. <i>[List of assemblies where templates, accurate measurements or trial assembly is required, if any] [Optional]</i>	6.10
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## 7.0 WELDING

### 7.1 General

Welding shall conform to the requirements of AS/NZS 5131 and AS/NZS 1554 (different parts as applicable.) Fabricator's Factory Production Control (FPC) shall comply with AS/NZS ISO 3834.3 for CC2 and AS/NZS ISO 3834.2 for CC3 and CC4.

Particular requirements from AS/NZS 5131 are outlined in Section 7.2, together with a reference to the applicable clause in AS/NZS 5131.

For the 'Particular requirements' detailed below, in cases where it is stated that the items are "designated on the Project Drawings" the specifier should ensure, where appropriate, the items are designated on the Project Drawing set..

### 7.2 Weld category

The weld categories shall be as per the table below UNO:

Element	Weld category (GP/SP/FP)
Primary structure (main structural members and connections)	SP
Secondary structure (minor components including cleats)	GP

Weld categories for specific details are indicated on the project drawings.

The specifier should ensure weld categories are designated on the Project Drawings.

GP weld category should be specified for secondary structures as it offers most cost effective solution compared to SP welds. Suitability of SP and GP weld categories for different applications and service conditions is discussed in the Section 1.6, AS/NZS 1554.1

### 7.3 Particular requirements

	Clause in AS/NZS 5131
<b>7.3.1 General</b>	
<b>Additional welding requirements:</b> No additional requirements. <i>[List any additional requirements for welding] [Optional]</i>	7.1.2
<b>7.3.1.1 Weld details:</b> Weld category, size, type and extent are designated on the Project Drawings and clause 7.2.	7.1.3
<b>7.3.1.2 Non-destructive examination:</b> Extent of non-destructive examination (NDE) is given in Section 13.3.4	7.1.3
<b>7.3.2 Welding plan</b> No additional requirements. <i>[List any additional items to be included in the welding plan] [Optional]</i>	7.2.2
<b>7.3.3 Welding processes</b> No additional requirements. <i>[List any alternative welding processes permitted] [Optional]</i>	7.3
<b>7.3.4 Qualification of welding procedures and welding personnel</b>	
<b>7.3.4.1 Impact tests:</b> No additional requirements. <i>[List areas where impact tests are required] [Optional]</i>	7.4.1.1
<b>7.3.4.2 Welding production testing:</b>	7.4.1.2

No additional requirements. <i>[List areas where welding production testing is required] [Optional]</i>	
<b>7.3.4.3 Qualification of welders:</b> No additional requirements. <i>[Specify if the role of examiner or examining body is to be undertaken by other than the welding coordinator] [Optional]</i>	7.4.2
<b>7.3.4.4 Qualification of welding supervisor or coordinator:</b> No additional requirements. <i>[Specify if for CC3 work the welding supervisor or coordinator needs specific technical knowledge] [Optional]</i>	7.4.3
<b>7.3.5 Preparation and execution of welding</b>	
<b>7.3.5.1 Temporary attachments:</b> Areas where welding of temporary attachments are not permitted are designated on the Project Drawings.	7.5.6
<b>7.3.5.2 Run-on/run-off tabs:</b> No additional requirements. <i>[State if run-on/run-off tabs shall be used] [Optional]</i>	7.5.9.1
<b>7.3.5.3 Backing plates:</b> No additional requirements. <i>[State whether permanent steel backing plates must not be used] [Optional]</i>	7.5.9.2
<b>7.3.5.4 Post-weld heat treatment:</b> No additional requirements. <i>[State if post-weld heat treatment is required for specific welded components] [Optional]</i>	7.5.14
<b>7.3.5.5 Arc strikes:</b> No additional requirements. <i>[State if certain members do not require treatment for arc strikes] [Optional]</i>	7.5.15.1
<b>7.3.5.6 Dressing of butt welds:</b> No additional requirements. <i>[State if any additional dressing of finished butt welds is required] [Optional]</i>	7.5.15.1
<b>7.3.6 Additional seismic welding requirements</b>	
<b>7.3.6.1 Welding of continuity stiffeners in earthquake resisting members</b> <i>[List any additional execution requirements for rolled sections with elements greater than 32 mm thick]</i>	7.5.16
<b>7.3.6.2 General (Welding consumables requirements)</b> Welds subject to earthquake load or effects are designated on the Project Drawings. <i>[List any additional requirements for welding consumables for welds subject to earthquake loads]</i>	7.5.17
<b>7.3.6.3 Removable steel backing</b> The weld access holes required for weld backing shall comply with section 6.2.4.2. Weld access holes shall not be filled in with weld metal unless otherwise approved by the Design Engineer. <i>[List any additional execution requirements]</i>	7.5.17.2
<b>7.3.6.4 Permanent steel backing</b> The weld access holes required for weld backing shall comply with section 6.2.4.2. Weld access holes shall not be filled in with weld metal unless otherwise approved by the Design Engineer. <i>[State if permanent weld backing bar is permitted. List any additional execution requirements for welding with permanent backing bar]</i>	7.5.17.3
<b>7.3.7 Acceptance criteria</b>	
<b>7.3.7.1 Alternative acceptance criteria:</b> No additional requirements. <i>[State if there are any acceptance criteria other than that in AS/NZS 1554] [Optional]</i>	7.6.1

<p><b>7.3.7.2 Alternative assessment of nonconformity:</b>          No additional requirements.  <i>[State if there are any alternative assessment criteria for nonconformity other than that in AS/NZS 1554] [Optional]</i></p>	7.6.1
<p><b>7.3.7.3 Fatigue design assumptions:</b>          No additional requirements.  <i>[List any additional execution requirements necessary to comply with the fatigue design assumptions]</i></p>	7.6.3

## 8.0 MECHANICAL FASTENING

### 8.1 General

Mechanical fastening shall conform to the requirements of AS/NZS 5131.

Type /TB and /TF bolts are to be tightened using either the part-turn method or load indicating washers. Where the part-turn method is used, the nut and shank are to be clearly marked to allow easy visual identification of degree of turn.

Where load indicating washers are proposed, provide manufacturer installation data to the engineer prior to installation. Ensure all washers required by the manufacturer are installed in the correct location relative to the part to be turned prior to tightening.

Particular requirements from AS/NZS 5131 are outlined in Section 8.2, together with a reference to the applicable clause in AS/NZS 5131.

### 8.2 Particular requirements

	Clause in AS/NZS 5131
<b>8.2.1 Bolts, nuts and washers</b>	
<b>8.2.1.1 Locking of nuts:</b> No additional requirements. <i>[Where required to secure nuts against loosening from vibration, state:            (a) Location (or state location indicated on Project Drawings)            (b) Whether by tightening or alternative means] [Optional]</i>	8.2.3
<b>8.2.1.2 Washers:</b> No additional requirements. <i>[State if washers are required under both the bolt head and nut, to limit the potential for touch-up painting from paint damage caused by the tightening process] [Optional]</i>	8.2.4
<b>8.2.2 Preparation of contact surfaces on connected plies</b>	
<b>8.2.2.1 Coating of friction-type connection surfaces</b> Friction type connection surfaces are not to be coated unless noted otherwise on the project drawings <i>[If friction-type connection surfaces are to be coated, state coating type. Note that coated surfaces will require testing according to AS/NZS 5131]</i>	8.4.2
<b>8.2.3 Tensioning of high strength bolts</b>	
<b>8.2.3.1 Part-turn tightening:</b> No additional requirements. <i>[State whether location marks to measure part-turn method need to be permanent] [Optional]</i>	8.5.6
<b>8.2.4 Specialised fasteners</b> No additional requirements. <i>[For any specialised fasteners, state:</i> <ul style="list-style-type: none"> <li>• Requirements</li> <li>• Any procedure testing required</li> <li>• Inspection procedures</li> <li>• Training procedures for installation personnel] </li></ul>	8.7
<b>8.2.5 Installation of mechanical and chemical anchors</b> Mechanical and chemical anchors, where required, are noted on the project drawings <i>[Where mechanical or chemical anchors are used, identify either:            (a) the manufacturer, anchor designation and embedment length; or            (b) the design actions on the anchor]</i>	8.8.1

## 9.0 SURFACE TREATMENT AND CORROSION PROTECTION

### 9.1 General

Surface treatment and corrosion protection shall conform to the requirements of AS/NZS 5131.

If a paint coating system is required, the specifier will need to determine the actual coating system using AS/NZS 2312.1 or similar documentation. AS/NZS 5131 does **not** give guidance on paint system selection (generic type, thickness, number of coats, etc). It provides the specification once the system has been selected.

The Coating Quality Level (PC1, PC2) shall be assessed according to AS/NZS 5131.

The Coating Quality Level (PC1 or PC2) is a function of the corrosion category and type of preparation. Clause 9.2.1 of AS/NZS 5131 provides guidance on assessment of the Coating Quality Level.

Particular requirements from AS/NZS 5131 are outlined in Section 9.2, together with a reference to the applicable clause in AS/NZS 5131.

### 9.2 Particular requirements

	Clause in AS/NZS 5131
<b>9.2.1 Requirements for painting and galvanizing</b>	
<b>9.2.1.1 Requirements for painting:</b> <i>[Specify key requirements for painting, as appropriate:</i> <ul style="list-style-type: none"> <li>(a) Areas to be coated and coating specification</li> <li>(b) Colour and gloss requirements and paint Standards</li> <li>(c) Specifications for any special areas (bolted connections, concrete to steel interfaces, wet areas and the like)</li> <li>(d) Specifications for any on-site repair of handling damage</li> <li>(e) Any requirement to record environmental conditions during paint application and curing and special paint manufacturer instructions</li> <li>(f) Surface preparation and surface cleanliness inspection requirements</li> <li>(g) Requirements for limits on fabrication defects, intermittent welds or weld surface quality</li> <li>(h) Need and method for sealing intermittent welds</li> <li>(i) Surface profile measurement requirements</li> <li>(j) Checks for presence of, measurement of and removal of soluble salts and non-visible contaminants</li> <li>(k) Dry film thickness requirements</li> <li>(l) Curing requirements</li> <li>(m) Requirements for limits of pin holes, misses and other paint defects</li> <li>(n) The level of inspection required</li> <li>(o) The record keeping required] </li></ul> <div style="border: 1px solid green; padding: 5px; margin-top: 10px;"> <p>The specifier may prepare a separate painting specification to cover these requirements. In this case, the separate painting specification should be referenced from this document.</p> </div>	9.2.3.1
<b>9.2.1.2 Requirements for hot-dip galvanizing:</b> Hot-dip galvanizing shall comply with AS/NZS 4680. <i>[In addition, specify key requirements for galvanizing, as appropriate:</i> <ul style="list-style-type: none"> <li>(a) Any special coating thickness or repair requirements</li> </ul>	9.2.3.2

<p>(b) <i>The nature, chemical composition and mechanical properties of the product to be galvanized and its end use, including the location of any significant surfaces</i></p> <p>(c) <i>Any special detailing requirements, such as venting and draining</i></p> <p>(d) <i>Any special or supplementary requirements of the coating</i></p> <p>(e) <i>The level of inspection required]</i></p>	
<p>It is not normally necessary to specify the coating thickness for steelwork galvanized to AS/NZS 4680 or fasteners to AS/NZS 1214 as this is mandated in the Standards.</p>	
<b>9.2.2 Preparation of steel surfaces</b>	
<p><b>9.2.2.1 Preparation of exterior steelwork</b></p> <p>No additional requirements.</p> <p><i>[State whether abrasive blast cleaning of exterior steelwork to other than Sa2.5 is required]</i></p>	9.3.2
<p><b>9.2.2.2 Testing for soluble salts:</b></p> <p>No additional requirements.</p> <p><i>[State whether testing of surfaces for presence of soluble salts is required]</i></p> <p><i>[Optional]</i></p>	9.3.2
<p><b>9.2.2.3 Weather resistant steel surfaces:</b></p> <p>No additional requirements.</p> <p><i>[For any weather resistant steel surfaces, state:</i></p> <p style="padding-left: 20px;">(a) <i>Any special requirements for blast cleaning</i></p> <p style="padding-left: 20px;">(b) <i>Any procedures to prevent contamination</i></p> <p style="padding-left: 20px;">(c) <i>Any procedures for treatment when in contact with other steels]</i> <i>[Optional]</i></p>	9.3.5
<p><b>9.2.2.4 Surfaces in contact with concrete:</b></p> <p>No additional requirements.</p> <p><i>[State if any surface protection extending past the first 50mm is required for steelwork embedded in concrete]</i> <i>[Optional]</i></p>	9.3.7
<b>9.2.3 Abrasive blasting</b>	
<p><b>9.2.3.1 Abrasive blast cleaning:</b></p> <p>No additional requirements.</p> <p><i>[State any special requirements for abrasive blast cleaning, other than the requirements of AS1627.4]</i> <i>[Optional]</i></p>	9.4.1
<p><b>9.2.3.2 Alternative surface finishes:</b></p> <p>No additional requirements.</p> <p><i>[State if any alternative surface finish for abrasive blast cleaning, other than that specified in AS/NZS 5131]</i> <i>[Optional]</i></p>	9.4.4
<b>9.2.4 Sealing of enclosed spaces</b>	
<p><b>9.2.4.1 Enclosed spaces:</b></p> <p>No additional requirements.</p> <p><i>[State if there are any requirements for surface preparation and corrosion protection of surfaces in enclosed spaces. State if the same or a different (or no) coating system is to be used on such regions]</i> <i>[Optional]</i></p>	9.6.1
<p><b>9.2.4.2 Sealed spaces:</b></p> <p>No additional requirements.</p> <p><i>[State weld quality for any sealed spaces. State any sealants or welding procedures required for such regions]</i> <i>[Optional]</i></p>	9.6.1
<b>9.2.5 Fabrication and welding considerations</b>	
<p><b>9.2.5.1 Rectification of surface defects:</b></p> <p>The fabricator shall rectify any surface defects not meeting the requirements of AS/NZS 5131.</p> <p><i>[If other than fabricator, state who is responsible for rectification of defects in surfaces to be painted]</i></p>	9.8.3
<b>9.2.5.2 Surfaces to be painted:</b>	9.8.4



<p>No additional requirements.  <i>[State if a treatment grade other than P2 is required for surfaces to be painted]</i>  <i>[Optional]</i></p> <p>P2 requires chamfered edges, welds dressed smooth etc. This should be adequate for most atmospheric situations so will not require additional specification. For internal unseen regions, level P1 should be sufficient, and for severe environments (immersed, underground, splash zone – see Appendix C in AS/NZS 2312) P3 should be specified. P3 is the default in AS/NZS 5131 for AESS.</p>	
<p><b>9.2.5.3 Surfaces to be galvanized:</b>  No additional requirements.  <i>[For surfaces intended to be galvanized, state if treatment other than that required by AS/NZS 4680 is required]</i> <i>[Optional]</i></p>	9.8.4
<p><b>9.2.5.4 Treatment of cut edges:</b>  No additional requirements.  <i>[State extent of treatment of cut edges, if additional to Clause 6.5 in AS/NZS 5131]</i> <i>[Optional]</i></p>	9.8.5
<p><b>9.2.5.5 Welding and repair of pre-coated steel:</b>  Welding and repair of pre-coated steel shall be in accordance with the manufacturer's written instructions  <i>[State method for welding of pre-coated steel and repair of coating after welding, if other than to manufacturer's instructions]</i></p>	9.8.6
<p><b>9.2.6 Application of paint coatings</b></p>	
<p><b>9.2.6.1 Monitoring of conditions:</b>  Air and surface temperatures, relative humidity and dew point shall be regularly monitored and recorded.  <i>[State whether regular monitoring and recording of air and surface temperatures, relative humidity and dew point can be waived]</i> <i>[Optional]</i></p> <p>In most cases, regular monitoring should be undertaken</p>	9.9.10
<p><b>9.2.6.2 Testing of film continuity:</b>  No additional requirements.  <i>[State whether testing of film continuity is required]</i> <i>[Optional]</i></p>	9.9.16
<p><b>9.2.6.3 Testing of degree of cure:</b>  No additional requirements.  <i>[State whether testing of degree of cure is required]</i> <i>[Optional]</i></p>	9.9.17
<p><b>9.2.6.4 Corrosion protection of fasteners:</b>  No additional requirements.  <i>[State whether corrosion protection of fasteners by other than galvanizing is required]</i> <i>[Optional]</i></p>	9.9.18
<p><b>9.2.7 Application of galvanized coatings</b></p>	
<p><b>9.2.7.1 Control of distortion:</b>  No additional requirements  <i>[State provisions for stress relieving where it is expected distortion may occur]</i></p>	9.10.4
<p><b>9.2.7.2 Galvanizing process – double dipping:</b>  Double dipping of galvanized components is permitted, subject to written approval for the particular components.  <i>[State if double dipping is permitted]</i> <i>[Optional]</i></p>	9.10.5
<p><b>9.2.7.3 Galvanizing process – test lot:</b>  No additional requirements.  <i>[State if an initial test lot for galvanizing is required]</i> <i>[Optional]</i></p>	9.10.5
<p><b>9.2.7.4 End use of galvanized components:</b>  No additional requirements.</p>	9.10.6

<i>[For galvanized components, state any special provisions relating to end use of the component to be galvanized] [Optional]</i>	
<b>9.2.7.5 Adherence of coating:</b> No additional requirements. <i>[For galvanized components, state any special provisions for adherence of coating] [Optional]</i>	9.10.8
<b>9.2.7.6 Wet storage staining:</b> Wet storage staining shall be removed. <i>[For galvanized components, state if removal of wet storage staining is not required] [Optional]</i>	9.10.10

## 10.0 ARCHITECTURALLY EXPOSED STRUCTURAL STEEL

### 10.1 General

Architecturally exposed structural steel (AESS) shall conform to the requirements of AS/NZS 5131.

Areas to be treated as AESS and the AESS category (1,2,3,4 or C) are designated on the Project Drawings.

Architecturally sensitive connection details are indicated on the Project Drawings.

Particular requirements from AS/NZS 5131 are outlined in Section 10.2, together with a reference to the applicable clause in AS/NZS 5131.

The engineer should carefully assess the appropriate AESS categories for the components of the project, based on the requirements in AS/NZS 5131. In general, it is expected that AESS 2 (for elements viewed at a distance) and AESS 3 (for elements viewed at close range) will be the categories most commonly specified.

The SCNZ publication 'Guide for Specifying Architecturally Exposed Structural Steel' provides further information.

For the 'Particular requirements' detailed below, in cases where it is stated that the items are "designated on the Project Drawings" the specifier should ensure, where appropriate, the items are designated on the Project Drawing set.

### 10.2 Particular requirements

	Clause in AS/NZS 5131
<b>10.2.1 General</b>	
<b>10.2.1.1 Category AESS C elements:</b> Where applicable, AESS C elements are designated on the Project Drawings. <i>[Where required, designate any elements that are to have custom treatment on the Project Drawings and note here any special requirements]</i>	10.3
<b>10.2.1.2 Visual samples:</b> No additional requirements. <i>[State if there is a requirement for any visual samples and, if so, the form of visual sample] [Optional]</i>	10.3
<b>10.2.2 Tolerances</b> No additional requirements. <i>[State whether any special tolerances are required for AESS] [optional]</i>	10.5

Areas designated as AESS may require a specific coating system, or special finish requirements (e.g. no runs and sags, overspray etc.)

## 11.0 STRUCTURAL STEELWORK ERECTION

### 11.1 General

Structural steelwork erection shall conform to the requirements of AS/NZS 5131.

Particular requirements from AS/NZS 5131 are outlined in Section 11.2, together with a reference to the applicable clause in AS/NZS 5131.

The steelwork erection contractor shall supply and install all temporary bracing and the like necessary for the safe erection of the structure.

The contractor shall be responsible for the temporary stability of the structure during construction.

### 11.2 Particular requirements

	Clause in AS/NZS 5131
<b>11.2.1 Site planning</b>	
<b>11.2.1.2 Lifting equipment:</b> No additional requirements. <i>[State whether the steelwork erection contractor shall ensure registered lifting equipment has proof of registration available for inspection on site] [Optional]</i>	11.2.5
<b>11.2.1.3 Erection sequence methodology:</b> An Erection Sequence Methodology (ESM) shall be prepared if assessed as required by AS/NZS 5131. <i>[State whether an Erection Sequence Methodology (ESM) is required] [Optional based on assessment of risk]</i>	11.5.1
<b>11.2.2 Temporary erection (trial assembly)</b>	
No additional requirements. <i>[State whether steelwork shall be temporarily erected at the fabrication works for review and sign-off by a competent person] [Optional]</i>	11.5.10
<b>11.2.3 Supports</b>	
<b>11.2.3.1 Temporary shims and packers:</b> Temporary shims and packers used during erection shall be removed. <i>[State whether temporary shims and packers may be left in place once erection has been completed] [Optional]</i>	11.6.3
<b>11.2.3.2 Grouting at supports:</b> No additional requirements. <i>[State if any treatment of the steelwork, baseplates, bearings or concrete surfaces is required before grouting] [Optional]</i>	11.6.4
<b>11.2.4 Erection drawings</b>	
No additional requirements. <i>[State whether specific erection drawings and calculations shall be prepared and by whom] [Optional] (if not, the shop detail drawings will be used)</i>	11.7

### 11.3 Transportation and delivery

Components noted as AESS shall be marked and particular care taken to meet the requirements for handling in AS/NZS 5131.

The Structural Steel Contractor shall perform all work necessary to ensure safe loading, transportation, unloading and storage of structural steel. The Work shall consist of loading at the fabricator's plant, transporting to the site, and unloading and storing at the site, including temporary works for access.

Structural steel shall be loaded for shipping in such a manner that it can be transported and unloaded at its destination in the correct orientation for erection without being excessively stressed, deformed, or otherwise damaged.

Structural steel shall be stockpiled in such a manner to avoid excessive stress, deformation or other damage while stored.

Fabricated steelwork shall be delivered to site in such sequence as shall minimise time for erection, and exposure to potential damage. Where exposure times exceed the protective treatment manufacturer's recommendations, the Contractor shall make arrangements for temporary protection, alter the treatment specification accordingly, or allow for the appropriate maintenance treatment before closing in.

The Structural Steel Contractor shall make all arrangements necessary with relevant authorities for transportation of steelwork

## 12.0 GEOMETRICAL TOLERANCES

### 12.1 General

Fabrication and erection tolerances shall conform to the requirements of AS/NZS 5131.

Particular requirements from AS/NZS 5131 are outlined in Section 12.3, together with a reference to the applicable clause in AS/NZS 5131.

### 12.2 Class for functional tolerances

The tolerance class for functional tolerances shall be Class 1 UNO on the project drawings.

Class 1 tolerances are the default requirement in AS/NZS 5131 and should be acceptable for most steelwork construction. They are generally equivalent to what has been specified in NZS 3404.

Class 2 tolerances are tighter and might be considered for higher specification work such as major bridges and the like. AS/NZS 5131 suggests Class 2 should be considered for CC3 and CC4 structures or components.

Class 1 and Class 2 tolerances are tabulated in Appendix F of AS/NZS 5131.

### 12.3 Particular requirements

	<b>Clause in AS/NZS 5131</b>
<p><b>12.3.1 Special or additional tolerances</b>            No additional requirements.  <i>[State whether there are any special or additional tolerances, in which case the following should be defined:</i></p> <ul style="list-style-type: none"> <li>(i) <i>Any amendment to specific tolerances in AS/NZS 5131</i></li> <li>(ii) <i>Parameters and permissible values for any special or additional tolerances</i></li> <li>(iii) <i>Whether the special or additional tolerances apply to all affected components or particular components] [Optional]</i></li> </ul>	12.1

## 13.0 INSPECTION, TESTING AND CORRECTION

### 13.1 General

Inspection, testing and correction shall conform to the requirements of AS/NZS 5131.

A quality plan shall be prepared as required covering each stage of the fabrication of the structure.

Particular requirements from AS/NZS 5131 are outlined in Section 13.3, together with a reference to the applicable clause in AS/NZS 5131.

Additional independent inspections requirements are specified in Appendix C for a Structural Steel Contractor without SFC certification.

### 13.2 Additional Project Specific Testing

#### 13.2.1 Testing of 'LT susceptible joints'

Completed welded joints which are indicated on the project drawings as 'LT susceptible' shall be ultrasonically tested to AS 2207 and AS/NZS 1554.1. The extent of ultrasonic testing is detailed on the project drawings.

AS/NZS 1554.1 Appendix H and WTIA Tech Note TN06 'Control of lamellar tearing' provides guidance on the selection of materials and connection details to avoid lamellar tearing.

### 13.3 Particular requirements

	Clause in AS/NZS 5131
<b>13.3.1 Inspection personnel</b>	
<p><b>13.3.1.1 Competency of inspection personnel:</b> Independent inspection of welding shall be performed by a welding inspector with the following qualifications:</p> <ol style="list-style-type: none"> <li>1. A Certification Board of Inspection Personnel (CBIP) New Zealand Welding Inspector qualification and/or</li> <li>2. International Institute of Welding (IWI) diploma as an IIW Welding Inspector, at the appropriate level.</li> </ol> <p>Inspection of a protective coatings systems in locations with surface-specific corrosivity of C3 to CX shall be performed by a New Zealand Certification Board for Inspection Personnel or NACE International certified coating inspector, or ACA hot dipped galvanized certified inspector.</p> <p><i>[State whether specific competencies, such as particular qualifications, are required for certain inspection personnel] [Optional]</i></p>	13.2
<p>AS/NZS 5131 provides guidance on the expected competency of inspection personnel. Additional requirements may be appropriate for particular structures.</p>	
<b>13.3.2 Inspection of materials and components</b>	
<b>13.3.2.1 Inspection and test plan (ITP):</b>	13.3.2

<p>An ITP shall be prepared covering the inspection against the relevant Standards for the materials and components.</p> <p>AS/NZS 5131 recommends an ITP is prepared for Construction Categories CC2, CC3 and CC4.</p>	
<p><b>13.3.2.2 Non-conforming steel or components:</b> If the documentation supplied does not meet the requirements of AS/NZS 5131, the steel or components shall be treated as non-conforming and treated as unidentified steel according to the requirements of AS/NZS 5131.</p>	13.3.7
<p><b>13.3.2.3 Testing of non-conforming steel or components:</b> Testing of non-conforming steel or components shall be to the requirements of AS/NZS 5131.</p> <p>If testing of non-conforming steel or components is undertaken to establish conformity, the type and extent of testing must be consistent with that specified in AS/NZS 5131 and sufficient to establish a proper statistical basis. Single or limited test results do not usually present a rational statistical basis.</p>	13.3.8
<p><b>13.3.3 Inspection of preparation and assembly</b></p>	
<p><b>13.3.3.1 Inspection and test plan (ITP):</b> An ITP shall be prepared covering the inspection against the items specified in Section 13.5.1 of AS/NZS 5131.</p> <p>AS/NZS 5131 recommends an ITP is prepared for Construction Categories CC2, CC3 and CC4.</p>	13.5.1
<p><b>13.3.4 Inspection of welding</b></p>	
<p><b>13.3.4.1 Welding inspector for NDE other than visual means</b> The Structural Steel Contractor shall employ an independent weld inspector to carry out NDE other than visual means.</p>	13.6.1.1
<p><b>13.3.4.2 Inspection and test plan (ITP):</b> An ITP shall be prepared covering the inspection against the items specified in Section 13.6.1.2 of AS/NZS 5131. <i>[Optional for CC1, CC2. Mandatory for CC3, CC4]</i></p> <p>AS/NZS 5131 requires an ITP is prepared for Construction Categories CC1 and CC2 under certain circumstances. ITP's are mandatory for CC3 and CC4.</p>	13.6.1.2
<p><b>13.3.4.3 Scope of inspection after welding:</b> The extent and type of NDE shall be as per Table I6 and I7 of AS/NZS 5131. The weld failure consequence and seismic demand are designated on the project drawings.</p> <p>The extent and type of NDE is 'recommended' in AS/NZS 5131, as it is a reflection of the confidence in the fabrication process. It is acceptable to vary these recommendations based on knowledge of specific fabricator competency or confidence gained during the fabrication process for the project. SCNZ recommends that the visual examination and scanning to Table I6 be performed by the SFC certified Structural Steel Contractor as first-party in-house inspection. Independent Inspection is required for non-SFC Structural Steel Contractors.</p>	13.6.2.2
<p><b>13.3.4.3 Assessment of weld defects:</b> No additional requirements. <i>[State whether fracture mechanics may be used to assess weld defects] [Optional]</i></p>	13.6.2.5
<p><b>13.3.4.4 Welds on enclosed spaces:</b></p>	13.6.4



No additional requirements. <i>[State whether any additional NDE is required for seal welds] [Optional]</i>	
<b>13.3.5 Inspection of mechanical fastening</b>	
<b>13.3.5.1 Inspection and test plan (ITP):</b> An ITP shall be prepared covering the inspection against the items specified in Section 13.7.1 of AS/NZS 5131.  <div style="border: 1px solid green; padding: 2px;">AS/NZS 5131 recommends an ITP is prepared for Construction Categories CC2, CC3 and CC4.</div>	13.7.1
<i>[State whether there are any special inspection requirements] [Optional]</i>	
<b>13.3.5.2 Non-conforming mechanical fasteners:</b> If the documentation supplied does not meet the requirements of AS/NZS 5131, the mechanical fasteners shall be treated as non-conforming until such time as it can be reliably established that the mechanical fasteners meet the requirements of AS/NZS 5131.	13.7.4
<b>13.3.5.3 Testing of mechanical fasteners:</b> If testing of mechanical fasteners is undertaken to establish conformity, the type and extent of testing shall be consistent with that specified in AS/NZS 5131 and shall be sufficient to establish a proper statistical basis. Single or limited test results shall not be acceptable.	13.7.5
<b>13.3.6 Inspection of fully tensioned high strength bolted connections</b>	
<b>13.3.6.1 Sampling plan:</b> No additional requirements. <i>[State whether a sampling plan different to that complying with the principles of ISO 2859-5 is required] [Optional]</i>	13.7.8
<b>13.3.7 Inspection of mechanical and chemical anchors</b>	
<b>13.3.7.1 Proof testing:</b> No additional requirements. <i>[State whether proof testing of a sample of anchors is required, and particular requirements if other than in BS 8539] [Optional]</i>	13.7.11
<b>13.3.8 Inspection of surface treatment</b>	
<b>13.3.8.1 Inspection and test plan (ITP):</b> For Coating Quality Level PC2, an ITP shall be prepared covering the inspection against the items specified in Section 13.8.1 of AS/NZS 5131. <i>[State whether there are any special inspection requirements] [Optional]</i>	13.8.1
<b>13.3.9 Inspection of paint coatings</b>	
<b>13.3.9.1 Inspection and test plan (ITP):</b> For Coating Quality Level PC2, an ITP shall be prepared covering the inspection against the items specified in Section 13.9.1 of AS/NZS 5131. <i>[State whether there are any special inspection requirements] [Optional]</i>	13.9.1
<b>13.3.10 Inspection of galvanized coatings</b>	
<b>13.3.10.1 Inspection requirements:</b> Inspection shall be undertaken according to the requirements of AS/NZS 4680.	13.10.1
<b>13.3.10.2 Additional or special inspection requirements:</b> No additional requirements. <i>[State any additional or special inspection requirements, including acceptance inspection, sampling requirements and acceptance criteria] [Optional]</i>	13.10.1
<b>13.3.11 Inspection of erection</b>	
<b>13.3.11.1 Inspection and test plan (ITP):</b> An ITP shall be prepared covering the inspection against the items specified in Section 13.11.1 of AS/NZS 5131.  <div style="border: 1px solid green; padding: 2px;">AS/NZS 5131 mandates an ITP is prepared for Construction Categories CC2, CC3 and CC4.</div>	13.11.1
<b>13.3.11.2 Additional or special inspection requirements:</b>	13.11.1

<p>No additional requirements.  <i>[State any additional or special inspection requirements, including acceptance inspection, sampling requirements and acceptance criteria] [Optional]</i></p>	
<p><b>13.3.11.3 Location and frequency of measurements:</b>  No additional requirements.  <i>[State if positional accuracy of the erected steelwork is to be measured under other than self-weight of steelwork only. If so, specify permissible deviations and movements due to imposed loads] [Optional]</i></p>	13.11.7
<p><b>13.3.12 Inspection of secondary structural elements</b></p>	
<p><b>13.3.12.1 Inspection of installation:</b>  An ITP shall be prepared covering the inspection of purlins and girts against the items specified in Section 13.12.2 of AS/NZS 5131.</p> <div style="border: 1px solid green; padding: 5px; margin-top: 10px;"> <p>AS/NZS 5131 lists mandatory inspection items but does not mention an ITP as required.</p> </div>	13.12.2

## **14.0 SITE MODIFICATIONS AND REPAIR**

### **14.1 General**

Site modifications and repair shall conform to the requirements of Section 14 of AS/NZS 5131.

### **14.2 Particular requirements**

No site modification to any steel member, connection component, mechanical fastener, weld or corrosion protection shall be made without a detailed written procedure. The written procedure shall be approved by the Construction Reviewer.

## Appendix A

The following information is to be forwarded to the Engineer (Design Engineer or Construction Reviewer) for review, comment and records as described in this specification.

### A.1 Submittals Structural Steel Constructor with SFC

Specification Clause	Item	Timeframe	Hold/Witness
4.8.2, 13.3.2.1, 13.3.3.1, 13.3.4.1, 13.3.5.1, 13.3.8.1, 13.3.9.1, 13.3.11.1	ITPs for: <ul style="list-style-type: none"> <li>• Material and components</li> <li>• Preparation, assembly and fabrication</li> <li>• Welding</li> <li>• Mechanical fastening</li> <li>• Surface treatment (for PC2 only)</li> <li>• Paint Coatings (for PC2 only)</li> <li>• Erection</li> </ul>	Prior to commencing each stage of work	Hold
4.8.3.1	Steel Source List	Prior to ordering steel	Hold
4.8.3.1	Evidence of Structural Steel Conformity	Prior to fabrication commencing	Hold
4.8.3.3	Bolts Documentation	Prior to delivery to site	Hold
4.8.3.4	Footing Bolts Documentation	Prior to delivery to site	Hold
4.8.4	Shop Drawings	Prior to commencing fabrication	Hold
4.8.5.1	Subcontractor details	Prior to first procurement of material	Witness
4.8.5.2	Evidence of certification under SFC scheme	Prior to commencing fabrication	Hold
4.8.5.3	Producer Statement (PS3)	At completion of works	Hold
4.8.5.4	Erection Sequence Methodology	Prior to commencing erection	Hold
4.8.5.5	Bolt Installation Inspection records	Regularly from commencement of bolting	Witness
4.8.5.5	Proposals for bolted connections not fully documented	Prior to fabrication	Hold
4.8.5.5	Proposal for bolting connection requiring rectification	Prior to further	Hold
4.8.5.5	Proposal for anchor bolts not meeting location tolerances	Prior to further erection	Hold
4.8.5.5	Proposal for alternate anchors	Prior to erection	Hold
4.8.5.6	Marking Steelwork exposed to view	Prior to commencing fabrication	Hold
4.8.6	Survey of erected structural steelwork	Completed erected steelwork prior to any	Hold

		encasing or fixing of cladding	
4.8.6	As-built documentation	At completion of works	Hold
4.8.7	Non-conforming Work	As required	Witness
4.8.8	Manufacturers Data Report	At completion of works	Hold
5.12.1	Welding Procedure for 'LT susceptible' details	Prior to commencement of welding	Hold

## A.2 Submittals Structural Steel Constructor without SFC

Specification Clause	Item	Timeframe	Hold/Witness
4.8.1	Personnel	Prior to fabrication commencing	Hold
4.8.2	Quality Documentation, Quality Plan	Prior to fabrication commencing	Hold
4.8.2, 13.3.2.1, 13.3.3.1, 13.3.4.1, 13.3.5.1, 13.3.8.1, 13.3.9.1, 13.3.11.1	ITPs for: <ul style="list-style-type: none"> <li>• Material and components</li> <li>• Preparation, assembly and fabrication</li> <li>• Welding</li> <li>• Mechanical fastening</li> <li>• Surface treatment (for PC2 only)</li> <li>• Paint Coatings (for PC2 only)</li> <li>• Erection</li> </ul>	Prior to commencing each stage of work	Hold
4.8.3.1	Steel Source List	Prior to ordering steel	Hold
4.8.3.1	Evidence of Structural Steel Conformity	Prior to fabrication commencing	Hold
4.8.3.3	Bolts Documentation	Prior to delivery to site	Hold
4.8.3.4	Footing Bolts Documentation	Prior to delivery to site	Hold
4.8.4	Shop Drawings	Prior to commencing fabrication	Hold
4.8.5.1	Subcontractor details	Prior to first procurement of material	Hold
4.8.5.3	Producer Statement (PS3)	At completion of Works	Hold
4.8.5.4	Erection Sequence Methodology	Prior to commencing erection	Witness
4.8.5.5	Bolt Installation Inspection records	Regularly from commencement of bolting	Witness
4.8.5.5	Proposals for bolted connections not fully documented	Prior to fabrication	Hold
4.8.5.5	Proposal for bolting connection requiring rectification	Prior to further bolt connection	Hold
4.8.5.5	Rectification proposal for anchor bolts not meeting location tolerances	Prior to further erection	Hold

4.8.5.5	Proposal for alternate anchors	Prior to erection	Hold
4.8.5.6	Marking Steelwork exposed to view	Prior to commencing fabrication	Hold
4.8.6	Survey of erected structural steelwork	Completed erected steelwork prior to any encasing or fixing of cladding	Hold
4.8.6	As-built documentation	At completion of works	Hold
4.8.7	Non-conforming Work	As required	Witness
4.8.8	Manufacturers Data Report	At completion of works	Hold
5.12.1	Welding Procedure for 'LT susceptible' details	Prior to commencement of welding	Hold
Appendix C	Independent Materials and Components Inspector Reports	Regularly from commencement of fabrication	Witness
Appendix C	Independent Preparation, Assembly and Fabrication Inspector Reports	Regularly from commencement of fabrication	Witness
Appendix C	Independent Welding Inspector Reports (Visual and Non-visual)	Regularly from commencement of welding	Witness
Appendix C	Independent Surface Treatment Inspector Reports	Regularly from commencement of surface treatment	Witness
Appendix C	Independent Paint Coatings Inspector Reports	Regularly from commencement of paint coatings	Witness
Appendix C	Independent Galvanized Coating Inspector Reports	Regularly from commencement of galvanizing	Witness
Appendix C	Independent Erection Inspector Reports	Regularly from commencement of erection	Witness
Appendix C	Independent Fasteners Inspector Reports	Regularly from commencement of fastener installation	Witness
Appendix C	Final Independent Material and Component Inspector Certificate	Prior to PS3 issued	Hold
Appendix C	Final Preparation and Assembly Compliance Inspector Certificate	Prior to PS3 issued	Hold
Appendix C	Final Weld Inspector Compliance Certificate	Prior to PS3 issued	Hold
Appendix C	Final Fastener Inspector Compliance Certificate	Prior to PS3 issued	Hold
Appendix C	Final Surface Preparation Compliance Inspector Certificate	Prior to PS3 issued	Hold
Appendix C	Final Paint Coating Inspector Compliance Certificate	Prior to PS3 issued	Hold
Appendix C	Final Galvanizing Compliance Inspector Certificate	Prior to PS3 issued	Hold

Appendix C	Final Erection Inspector Certificate	Prior to PS3 issued	Hold
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## APPENDIX B

### Responsibilities to be assigned

Appendix B.3 of AS/NZS 5131 tabulates a range of responsibilities detailed in the Standard that need to be assigned. Standards do not assign responsibilities, as this is considered contractual.

For completeness, and to ensure the requirements of the specification are actioned appropriately, the contract documents need to assign at least the following responsibilities to relevant parties. The relevant party depends on the structure of the contract and scope of the project. This appendix provides suggested party to be assigned responsibility.

Responsibility to be assigned	Clause in AS/NZS 5131	Relevant Party Assigned in this Specification
<b>4. Design, specification, documentation and traceability</b>		
Preparation of the construction specification, including the individual parts of the specification	4.1.1	Design Engineer
Where required, preparation of the 'Project BIM brief' or 'BIM management plan'	4.3	Design Engineer
Preparation of the shop detail documentation	4.4.1	Structural Steel Contractor
Approval of shop detail documentation	4.4.4	Refer 4.8.4
Preparation of quality documentation	4.5.1	Structural Steel Contractor
Preparation of quality plan	4.5.2	Structural Steel Contractor
Preparation of as-built documentation	4.5.4	Structural Steel Contractor
Preparation of purchasing procedure	4.6.1	Structural Steel Contractor
Responsibility for operating the purchasing procedure	4.6.1	Structural Steel Contractor
<b>5. Materials</b>		
Responsibility for operation of quality management system	5.1.2	Structural Steel Contractor
<b>6. Preparation, assembly and fabrication</b>		
Responsibility for operation of quality management system	6.1.2	Structural Steel Contractor
Preparation of work method statements	6.1.3	Structural Steel Contractor
Responsibility for supervision	6.12	Structural Steel Contractor
<b>7. Welding</b>		
Responsibility for operation of quality management system	7.1.1	Structural Steel Contractor
Preparation of welding plan	7.2.1	Structural Steel Contractor
Responsibility for welding coordination	7.4.3	Structural Steel Contractor
<b>8. Mechanical fastening</b>		
Responsibility for operation of quality management system	8.1.2	Structural Steel Contractor
Responsibility for preparation of work method statements	8.1.3	Structural Steel Contractor
Responsibility for supervision	8.9	Structural Steel Contractor
<b>9. Surface treatment and corrosion protection</b>		
<b>9.2 Planning</b>		
Preparation of work method statements	9.2.3	Structural Steel Contractor
<b>9.9 Application of paint coatings</b>		
Responsibility for supervision	9.9.20	Structural Steel Contractor
<b>9.10 Application of galvanized coatings</b>		
Responsibility for supervision	9.10.11	Structural Steel Contractor



<b>11. Erection</b>		
Preparation of safety plan	11.2.1	Structural Steel Contractor
Responsibility for operation of quality management system	11.2.2	Structural Steel Contractor
Preparation of work method statements	11.2.3	Structural Steel Contractor
Preparation of Erection Sequence Methodology (ESM)	11.5	Structural Steel Contractor
Review of ESM	11.5	Refer 4.8.5.3
Preparation of erection drawings	11.7	Structural Steel Contractor
Responsibility for supervision	11.9	Structural Steel Contractor
<b>13. Inspection, testing and correction</b>		
Responsibility for inspection and testing for each stage of the project	13.2	Structural Steel Contractor
<b>14. Site modifications during erection and modification and repair of existing structures</b>		
Preparation of detailed written procedure	14.2	Structural Steel Contractor

## APPENDIX C

### Independent Inspection for non-SFC Structural Steel Contractors

#### C.1 General

The Contractor shall employ independent inspectors for areas as defined in the following table to demonstrate compliance of Structural Steelwork with AS/NZS 5131 and this specification. The cost of all additional testing or retesting shall be borne by the Contractor.

Independent Inspection Area	Required	
	CC2	CC3/CC4
Materials and Components	✓	✓
Preparation, Assembly and Fabrication		✓
Welding	✓	✓
Fastening		✓
Surface Treatment (PC2 only)	✓	✓
Paint Coatings (PC2 only)	✓	✓
Galvanized Coatings (PC2 only)	✓	✓
Erection		✓

Note: Independent Inspectors may cover more than one area

Independent inspection shall be additional to the Structural Steel Contractor's own in-house inspection and quality assurance. The extent of inspection, testing and review shall be agreed with the Construction Reviewer and to the satisfaction of the Construction Reviewer. If initial reviews find existing procedures or works inadequate, the Construction Reviewer reserves the right to require the extent of review to be increased.

The independent inspectors appointment shall be approved by the Construction Reviewer. The independent inspectors shall have suitable training and experience with New Zealand standards and steelwork of similar scale and complexity as part of this contract acceptable to the Construction Reviewer. Independent inspectors shall hold qualifications as required by AS/NZS 5131 and section 13.3.1.1. The independent inspectors qualification and experience shall be submitted to the Construction Reviewer for acceptance 2 weeks prior to commencing fabrication.

Inspection by the independent inspectors shall be performed in the Structural Steel Contractor's shop to the fullest extent possible. Such inspections shall be in sequence, timely and performed in such a manner as to minimize disruptions in operations and to permit the repair of all non-conforming work while the work is in process.

Inspection of site work shall be carried out promptly, so that correction of non-complying work can be made without unnecessary delays to the progress of the project.

All instructions to the Structural Steel Contractor must be given in writing by the inspectors during the relevant site visit. A copy of those instructions must be sent to the Contractor and the Construction Reviewer.

Reports are required to be provided regularly to the Structural Steel Contractor, main Contractor and Construction Reviewer.

Independent inspectors shall forward to the Contractor and the Construction Reviewer a Final Compliance Certificate when all structural steelwork is complete and prior to the Construction Reviewer issuing its PS4 for the project. This certificate shall cover compliance of all the structural steelwork inspected and referred to in this section of the specification.

Additional specific requirements for independent inspectors are described in the following sections.

### C.2 Independent Materials and Components Inspector

The independent materials and component inspector shall review the qualifications of the Structural Steel Contractor's materials and component in-house inspectors.

The independent materials and component inspector shall review the Structural Steel Contractor's materials and components traceability.

Extent of inspection and testing shall be to AS/NZS 5131 Section 13.3.

Refer to further guidance being developed by SCNZ on the extent of independent inspection.

### C.3 Independent Preparation, Assembly and Fabrication Inspector

The independent materials and component inspector shall inspect the Structural Steel Contractor's preparation, assembly and fabrication.

Extent of inspection and testing shall be to AS/NZS 5131 Section 13.5.

Refer to further guidance being developed by SCNZ on the extent of independent inspection.

### C.4 Independent Welding Inspector

The independent Welding Inspector shall review and approve the Structural Steel Contractor's shop and site welding procedures and inspect, test and re-test shop and site welds as necessary to ensure compliance.

The independent welding inspector shall review the qualifications of the Structural Steel Contractor's in-house inspectors, welding supervisors, and welders.

The welds to be inspected shall be chosen by the independent welding inspector.

The extent of NDE by visual means shall be as per Table I6 of AS/NZS 5131.

The first 2 welds for each weld type shall be visually examined for each welder.

The extent and type of NDE other than by visual means shall be as per Table I7 of AS/NZS 5131.

100% of site welds with a weld failure consequence category A (Major) and B (Moderate) as describe by Section I.2.2.2 of AS/NZS 5131 shall be non-visual, non-destructive tested.

The extent of non-destructive examination after non-compliance shall be as specified in Section I2.2.5 of AS/NZS 5131.

Refer to further guidance being developed by SCNZ on the extent of independent inspection.

### C.5 Independent Fastening Inspector

The independent fastening inspector shall review the qualifications of the Structural Steel Contractor's fastening in-house inspectors.

Extent of inspection and testing shall be to AS/NZS 5131 Section 13.7.

Refer to further guidance being developed by SCNZ on the extent of independent inspection.

### **C.6 Independent Surface Treatment Inspector**

The independent surface treatment inspector shall review the qualifications of the Structural Steel Contractor's surface treatment in-house inspectors.

Extent of inspection and testing shall be to AS/NZS 5131 Section 13.8.

The independent paint coating inspector may also undertake the independent surface treatment inspector role. Refer to further guidance being developed by SCNZ on the extent of independent inspection.

### **C.7 Independent Paint Coating Inspector**

The independent coating inspector shall review the qualifications of the Structural Steel Contractor's coating in-house inspectors

The independent coating inspector shall, in discussion with the coating applicator, produce a specification for the extent and frequency of independent inspection to the approval of the Construction Reviewer, in accordance with AS/NZS 2312.1 Section 9, 2 weeks prior to application of any coating, and that specification shall form part of the Contract Documents.

Refer to further guidance being developed by SCNZ on the extent of independent inspection.

### **C.8 Independent Galvanized Coatings Inspector**

The independent galvanized coating inspector shall review the qualifications of the Structural Steel Contractor's galvanized coating in-house inspectors.

Extent of inspection and testing shall be to AS/NZS 5131 Section 13.10.

Refer to further guidance being developed by SCNZ on the extent of independent inspection.

### **C.9 Erection Inspector**

The independent erection inspector shall review the qualifications of the Structural Steel Contractor's erection in-house inspectors.

Extent of inspection and testing shall be to AS/NZS 5131 Section 13.11.

Refer to further guidance being developed by SCNZ on the extent of independent inspection.