



**Australian Technical Infrastructure Committee**  
**ATIC Suite of Schemes**

**ATIC Scheme 10 - Requirements for bodies certifying  
manufacturers of structural steel products**

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Authority to Issue



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(i) **Foreword**

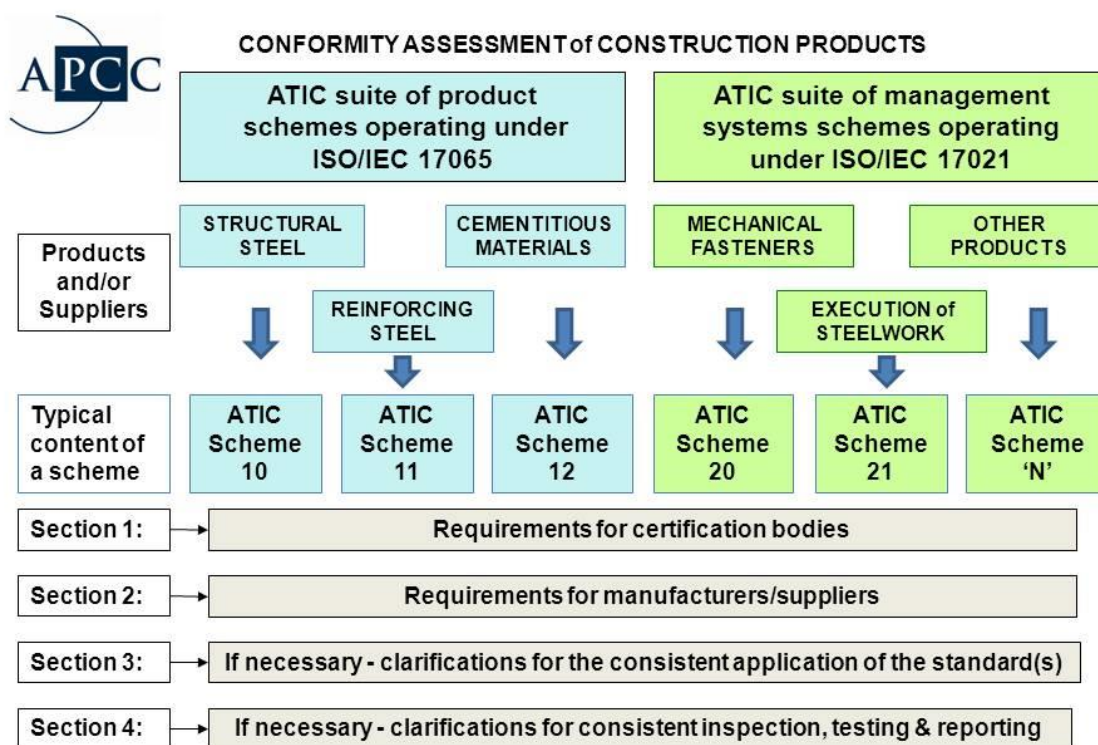
**The Australasian Procurement and Construction Council Inc (APCC)** sought JAS-ANZ assistance to develop and publish a scheme for the certification of products used in critical infrastructure and building construction. During the course of development it was noted that APCC had broader intentions that would require a suite of schemes with a common structure to facilitate integration through technical specifications and in operation.

APCC is the peak council of departments responsible for procurement, construction and asset management policy for the Australian, State and Territory governments and the New Zealand Government. Papua New Guinea is an associate member.

APCC has established itself as a national reference point for both government and industry on best practices, principles and emerging issues in procurement, construction and asset management disciplines.

**The Australian Technical Infrastructure Committee (ATIC)** is a technical group under the umbrella of APCC. ATIC is progressively producing a suite of standard technical specifications (ATIC-SPEC) for construction materials which operate in parallel with the existing Water Services Specification (WS-SPEC).

**Diagram 1 – What the ATIC suite of schemes might look like**



## Section 1 Requirements for bodies certifying manufacturers of structural steel products

### 1 Scope

ISO/IEC 17065 is the International Standard that sets down the requirements for bodies certifying products, processes and services.

The major headings in the ATIC Scheme, excluding the Annex headings, have been reproduced from ISO/IEC 17065. The clause numbering in this Section refers to the specific clauses of 17065, e.g., a reference to clause 4.1.2.2 is a reference to that applies directly to that specific clause of ISO/IEC 17065.

The ATIC Scheme supplements, but does not diminish the requirements of ISO/IEC 17065. The requirements of ISO/IEC 17065 *are not duplicated in this document or its subsequent parts and shall be referred to separately.*

The term '**should**' is used in this Scheme to indicate recognised means of meeting the requirements of the standard. A certification body can meet these in an equivalent way provided this can be demonstrated to JAS-ANZ.

The term '**shall**' is used in this Scheme to indicate those provisions which, reflecting the requirements of the relevant standard, are mandatory.

### 2 Normative references

AS/NZS ISO 9001:2008	Quality management systems – Requirements
ISO/IEC 17043:2010	Conformity assessment – General requirements for proficiency testing
ISO/IEC 17065:2012	Conformity assessment - requirements for bodies certifying products, processes and services
ISO 19011:2011	Guidelines for quality and/or environmental management system auditing

Additional normative references are provided where relevant in subsequent Sections of this Scheme.

### 3 Terms and definitions

#### Divisions of certification

See Section 2, Tables 2.1.

#### Facility (factory)

Place or amenity provided for the particular purpose of manufacturing structural steel products. Can be a building or group of buildings where structural steel products are manufactured.

#### Major nonconformity

A deficiency where the product does not conform to the product standard, or a situation that raises significant doubt about the ability of the client's management system to consistently produce conforming product.

A major nonconformity may lead to suspension or withdrawal of certification. The CB shall require an agreed corrective action plan that may include a range of responses depending on the nature of the deficiency and the distribution of the nonconforming product.

#### Nonconformity

A deficiency in the application of the management system as prescribed by this scheme. Any deficiency that is not adequately addressed may lead to a major nonconformity. The CB shall require an agreed corrective action plan and timetable for resolution.

**Production Line**

An arrangement in a facility in which structural steel products manufactured are passed through a set linear sequence of mechanical or manual operations.

**Renewal**

The reissuing of certification after expiry on the basis of a formalised review of compliance with current requirements

**Site**

A group of facilities that share a common management, located in geographical proximity.

**4 General requirements**

4.1 (Informative) This scheme requires the CB to:

- Review the manufacturing process and system documentation used to establish compliance with this scheme.
- Conduct a review of system records and test evidence used to demonstrate compliance with this scheme.
- Commission independent testing to the extent required by this scheme.
- Review internal and external quality audit reports to evaluate the adequacy of internal controls over the process and product.
- Perform technical reviews of long term quality test data.
- Evaluate interpretations of test results.
- Conduct an annual audit of the manufacturing facilities in accordance with this scheme.

**4.1.2 Certification agreement**

4.1.2.2 The certification agreement shall require the client and their suppliers of test evidence to comply with the requirements of this scheme including ensuring that laboratories participate in proficiency testing (PT) and provide evidence of satisfactory performance in accordance with this scheme.

**4.2 Management of impartiality**

*No additional requirements*

**4.3 Liability and financing**

*No additional requirements*

**4.4 Non-discriminatory conditions**

*No additional requirements*

**4.5 Confidentiality**

*No additional requirements*

**4.6 Publicly available information**

*No additional requirements*

**5 Structural requirements**

**5.1 Organizational structure and top management**

*No additional requirements*

## 5.2 Mechanism for safeguarding impartiality

*No additional requirements*

## 6 Resource requirements

### 6.1 Certification body personnel

*No additional requirements*

### 6.2 Resources for evaluation

*No additional requirements*

## 7 Process requirements

### 7.1 General

*No additional requirements*

### 7.2 Application

7.2.1 The CB shall require the client to:

- a) supply a copy of its documented policies and procedures, which as a minimum must cover the production process controls and management system associated with production of the product
- b) state which standard(s) the product is to be certified to.
- c) state whether the product has been tested in accordance with the relevant requirements of this Scheme, and if so, supply copies of test reports.
- d) provide a description of the process to be used to ensure that suppliers of test evidence are required to comply with the relevant sections of this Scheme.
- e) state whether production or prototype sampling is undertaken. If a prototype, describe the production schedule.

### 7.3 Application review

*No additional requirements*

### 7.4 Evaluation

#### Planning

7.4.1.1 The audit plan shall include:

- (a) the identification of the products that are to be selected for verification testing, and associated sampling requirements and frequency;
- (b) the specification of the type of tests to be applied to the samples;
- (c) the requirements for witnessing of sampling and testing;
- (d) all the relevant items prescribed in Table 1.1.

7.4.1.2 The scope of the initial audit shall be in accordance with Table 1.1 and include

- a) on-site audits of all facilities manufacturing product within the scope of certification, and covering all production lines used to produce product within the scope of certification;
- b) evidence of conformity with all of the requirements of this scheme within the scope of the application;

**Table 1.1: Scope of the evaluation**

Items	Initial	Surveillance	Quarterly	Variation
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## ATIC SCHEME 10, SECTION 1

	Compliance Audit	Audits	reporting	[Clause 7.10]
(a) Review QMS audit & manage outcomes	●	●	--	--
(b) Critical QA elements (non-conformance, non-conforming product, corrective action)	●	●	--	--
(c) Assess management review outcomes	●	●	--	--
(d) Input/source material management	●	●	--	--
(e) Change to Input/source material management	--	--	--	●
(f) Manufacturing process	●	●	--	--
(g) Change to manufacturing process	--	--	--	●
(h) Equipment management	●	●	--	--
(i) Changes to manufacturing equipment	--	--	--	●
(j) Traceability	●	●	--	--
(k) Product testing and test data	●	●	●	●
(l) Inspection	●	●	--	●
(m) CB Validation testing and test data	●	●	--	--
(n) Changes to test & inspection equipment & regime	●	●	--	--
(o) Significant changes	--	●	●	●

Notes: ● Applicable as relevant to the client and the facilities responsible for each steel product.

### Assign team members

7.4.2.1 All auditors and the audit team leader shall have:

- a) tertiary qualifications in a relevant technical field and at least five years of relevant technical experience in the specific manufacturing environment, or
- b) at least ten years of relevant technical experience in the specific manufacturing environment; and
- c) the quality management systems knowledge and skills detailed in ISO 19011; and
- d) the personal attributes detailed in ISO 19011.

7.4.2.2 At least one person on the audit team (of one or more persons) shall also have:

- a) the demonstrated ability to interpret test results directly relevant to the scope of the audit.

7.4.2.3 The witnessing of laboratory test activities shall only be performed by an auditor/technical expert that has:

- a) demonstrated knowledge of the application of ISO/IEC 17025 including at least five years active involvement in product evaluation of similar products in a laboratory; and
- b) the demonstrated ability to interpret test results directly relevant to the scope of the audit.

7.4.2.4 The CB shall inform the client of the names of the members of the audit team who will carry out the audit, with sufficient notice to appeal against the appointment of any team member.

### Additional information

7.4.3 The audit team shall review the outcomes of the ISO 9001 quality management system certification for each facility including:



- a) Confirm that an ISO 9001 certification has been issued by a certification body that is accredited by an International Accreditation Forum (IAF) Multilateral Recognition Arrangement (MLA) signatory.
- b) Confirm that the scope of ISO 9001 certification includes the sites and activities relevant to the scope of the product certification.
- c) Where a single ISO 9001 certification has been obtained across multiple sites, review of this single management system will be accepted.
- d) Review of internal and external quality audit reports pertaining to the facilities in the division and range of certification as defined in Section 2.
- e) Confirm that actions are being taken on any nonconformities identified during the previous ISO 9001 audit.
- f) Confirm that the client keeps records of all complaints made known to it relating to compliance with this scheme including actions taken to correct any deficiencies.
- g) Manufacturing procedures and/or quality plans for products in the certification application.
- h) Review the effectiveness of the management system for product realization (e.g., product quality plans).

**Production samples**

7.4.4.1 For each test required by the product standard, a minimum of three samples of the product shall be taken by the CB. The samples shall:

- a) be taken in accordance with the standard;
- b) be taken at random and representative of the product production;
- c) allow for product traceable information to be permanently marked on each sample.
- d) two samples are for testing by the client and the CB.
- e) one sample is retained for possible dispute resolution

**Progressive feedback**

7.4.4.2 At all on-site audits the audit team shall hold a closing meeting with the client's management, prior to concluding the on-site audit. At the closing meeting, the audit team shall:

- a) explain its audit findings regarding the client's conformity with the standard and provide the opportunity for questions about the findings
- b) if applicable, provide the client with documented major nonconformities and nonconformities, explanatory comments, and the close out dates
- c) summarise any audit follow-up activities
- d) explain the requirements for surveillance audits.

7.4.6.1 Where a nonconformity is identified, the CB shall require the client to provide within 30 days, an agreed corrective action plan and timetable for implementation.

7.4.6.2 Where a major nonconformity is identified, the CB shall require the client to provide, an agreed corrective action plan and timetable for implementation as soon as practicable. This plan shall ensure the client takes all necessary steps to prevent the supply of nonconforming product and, to the extent practicable and commensurate with the risks, immediately notify significantly affected parties.

## **Reporting**

- 7.4.9.1 The CB's audit reports shall include:
- a) a brief description of the client
  - b) identification of the product
  - c) a statement of the requirements to which conformity has been assessed
  - d) an executive summary of the overall findings (conclusions) of the audit, including comments on the effectiveness of the client's production process controls and management system associated with production of the product, and a summary of major nonconformities and nonconformities identified during the stage 2 audit
  - e) details of the evaluation activities
  - f) details of personnel and equipment used to provide traceability of the results
  - g) results of the evaluation activities in sufficient detail to verify conformity (or nonconformity)
    - Information on fulfilment of the specified requirements from the data supplied for the inspection and testing review.
    - Copy of the final inspection and testing programme.
    - Identification of any samples selected and tested
    - Result for all inspections and tests, including testing performed by the CB.
    - Confirmation that the laboratory is accredited for the scope of the test by an ILAC signatory accreditation body.
  - h) positive and negative observations as appropriate.
- 7.4.9.2 Reports of surveillance or follow-up audits shall include:
- a) close out of each major nonconformity and nonconformity revealed previously
  - b) any useful comparison with the results of previous audits.
- 7.4.9.3 A separate report is to be provided for each facility.

## **7.5 Review**

- 7.5.1 The person or persons conducting the review must have sufficient knowledge and experience to understand:
- a) the report and findings;
  - b) the accumulative risk arising from multiple findings;
  - c) the requirements of the scheme and standards; and
  - d) the test methods and test data

## **7.6 Certification decision**

- 7.6.1 The CB's procedures shall ensure that any major nonconformity is resolved as per Clause 7.4.6.2 before certification is granted.

## **7.7 Certification documentation**

- 7.7.1 Valid certifications shall be published on the JAS-ANZ website. [www.jas-anz.org/register](http://www.jas-anz.org/register)

## **7.8 Directory of certified products**

*No additional requirements*

## **7.9 Surveillance**

- 7.9.1.1 The CB shall maintain a surveillance programme that demonstrates how all of the requirements of this scheme are covered at least annually.

- 7.9.2.1 The CB shall require the client to submit quarterly test data for the products manufactured in that period to monitor long term quality conformance with the requirements of the standard.
- 7.9.2.2 Annual surveillance audits shall include the items listed in Table 1.1 and:
- a) a review of any changes to services, organisational structure or personnel;
  - b) a review of the effectiveness of process controls and management system;
  - c) confirmation that relevant ISO 9001 certification is current and not suspended;
  - d) inspecting and testing a representative sample of certified products;
  - e) a review of cumulative results based on the inspection and test results submitted by the client to the CB at three monthly intervals;
  - f) a review of the effectiveness of responses to nonconformities identified during internal and external audits; and
  - g) use of marks and/or any other reference to certification.
- 7.9.2.3 The CB shall promptly take appropriate action, which may include an extraordinary surveillance audit, if a written detailed complaint about a certified product is received from ATIC.

## **7.10 Changes affecting certification**

- 7.10.1 The CB shall have an effective procedure for ensuring that scope extension audit will be required if significant changes occur.

## **7.11 Termination, reduction, suspension or withdrawal of certification**

- 7.11.3 The CB shall immediately advise ATIC of suspension or withdrawal of certification.

## **7.12 Records**

*No additional requirements*

## **7.13 Complaints and appeals**

*No additional requirements*

# **8 Management system requirements**

## **8.1 Options**

*No additional requirements*

## **8.2 General management system documentation (Option A)**

*No additional requirements*

## **8.3 Control of documents (Option A)**

*No additional requirements*

## **8.4 Control of records (Option A)**

*No additional requirements*

## **8.5 Management review (Option A)**

*No additional requirements*

### **8.5.1 General**

*No additional requirements*

8.5.2 Review inputs

*No additional requirements*

8.5.3 Review outputs

*No additional requirements*

**8.6 Internal audits (Option A)**

*No additional requirements*

**8.7 Corrective actions (Option A)**

*No additional requirements*

**8.8 Preventive actions (Option A)**

*No additional requirements*

## Appendix A – Factory Production Control (FPC) Checklist

### (Informative)

This informative appendix is provided to assist certification bodies for assessment of factory production control. The Tables in this appendix address the management of product, raw materials, manufacturing process and equipment by division of certification.

Also within the tables, the applicability of each steel product is identified with the symbol “●”.

#### A.1 Raw material management

The items related to the quality, inspection and storing of raw materials are shown in Tables A.1.1 and A.1.2. If referenced each item to be applied in accordance with the respective provisions of the relevant Standard..

**Table A.1.1: Raw material management of hot-rolled steels & welded I sections for structural purposes**

Raw Material Items	Division of Steel Products				Quality of Raw Materials	Acceptance Inspection Methods	Storage
	Hot-rolled Plates & Floor plates to AS/NZS 3678	Hot-rolled Bars & Sections to AS/NZS 3679.1	Welded I Sections to AS/NZS 3679.2				
1. Hot metal (liquid metal)	●	●	--		Chemical composition	Review the raw material items.  For steel that is re-rolled, the appearance and dimensions of input steel to be visually confirmed by inspection. Other qualities may be checked by any of the following i) Any 'AS' or other standard as marked ii) Suppliers reports & test/inspection certificates iii) Where the long term stability of the supplier is confirmed, check the brand, model or batch and appearance. iv) Identification markings on the plate/coil/strip v) Records	The raw materials to be stored by category with distinct division of lots.  Ingots, semi-finished products, plates, sheets & strips to have unique identification markings and measures to prevent damage (eg: handling, moisture, dust, temperature, chemicals, etc.) to the appearance, dimensions and mechanical properties of the product.
2. Ferrous scrap	●	●	--		Grade		
3. Ferroalloy	●	●	--		Chemical composition		
4. Ingot or semi-finished products	●	●	--		Chemical composition, appearance, shape, dimension, cross-sectional flaw of semi-finished steel		
5. Deoxidisers	●	●	--		Chemical composition		
6. Slag forming fluxes	●	●	--		Chemical composition		
7. Plate, coil & strips	--	--	●		Chemical composition, appearance & dimensions.		
8. Cutting tips	--	--	●		Type, properties		
9. Gases	●	●	●				
10. Welding consumables	--	--	●				
Notes: - The raw materials to have the requirements specified.							

**Table A.1.2: Raw material management of cold-formed steels for structural purposes**

Raw Material Items	Division of Steel Products				Quality of Raw Materials	Acceptance Inspection Methods	Storage
	Cold-formed Hollow Sections to AS/NZS 1163						
1. Coils and/or strips: a) Chemistry, appearance, dimensions, mechanical properties b) Production process and attributes	<ul style="list-style-type: none"><li>•</li><li>•</li></ul>				Chemical composition, appearance, and dimensions. Mechanical properties are optional	Review the raw material items.  Other qualities may be checked by any of the following:	The raw materials to be stored by category with distinct division of lots.  Also check measures to prevent damage from moisture, dust, and chemicals to the appearance dimensions and mechanical properties of the product.
2. Original steel tubes: a) Chemistry, appearance, dimensions, mechanical properties b) Uniformity of zinc coating	<ul style="list-style-type: none"><li>•</li><li>--</li></ul>				Chemical composition, appearance, dimensions and mechanical properties	i) Markings on the coil/strip from the supplier.  ii) Supplier test certificates/ reports	
3. Lubrication agent	<ul style="list-style-type: none"><li>•</li></ul>				Type, properties	iii) Where the long term stability of the supplier is confirmed, check the brand and appearance, of lubricating agents & acids.  iv) Records	
4. Rust preventative agent	<ul style="list-style-type: none"><li>•</li></ul>				Type, properties		
5. Acids	<ul style="list-style-type: none"><li>•</li></ul>				Chemical composition and concentration		
6. Induction coil or contact tip	<ul style="list-style-type: none"><li>•</li></ul>				Material property, shape and dimensions		
Notes: - The raw materials listed above, to be included in the factory production manual for each product category and manufacturing method as used in each factory.							

## A.2 Manufacturing process management

The items related to the management of each process and specific management method, quality characteristics, inspection methods and working methods are shown in Tables A.2.1 and A.2.2. If referenced each item to be applied in accordance with the respective provisions of the relevant Standard.

**Table A.2.1 – Manufacturing process management of hot-rolled steels & welded I sections for structural purposes**

Process Items	Division of Steel Products				Management Items (#)	Quality Characteristics (#)	Management and Inspection Methods (#)
	Hot-rolled Plates & Floor-plates to AS/NZS 3678	Hot-rolled Bars & Sections to AS/NZS 3679.1	Welded I Sections to AS/NZS 3679.2				
1. Melting	•	•	--		Raw material composition (including fluxes), steel making time, molten steel temperature, oxygen quality, ferroalloys, deoxidizers, ladle treatment.	Chemical composition	Chemical composition
2. Casting a) Ingots b) Continuous casting	•	•	--		Casting temperature & casting rate plus a) Top heat retention, rest time, mould type. b) Cooling condition, mould flux, mould level.	Appearance, shape, surface	--
3. Ingot processing a) Mill b) Forging	•	•	--		Reheating temperature, residence time, extraction temperature plus a) Rolling temperature, end cut-off quantity. b) Forging temperature, forging direction, forging ratio, cut-off quality.	--	--
4. Repairing of semi-finished product	•	•	•		Flaw detection, flaw criteria, flaw removal method	Appearance, shape, dimension, flaw depth	--
5. Semi-finished product cutting	•	•	•		Appearance, cutting rule	Appearance, shape, dimension	--
6. Heating	•	•	--		Reheating temperature, residence time	Appearance	--
7. Slitting	--	•	--		Slit width	Dimension, shape	--
8. Rolling or forging	•	•	--		Pass schedule, rolling temperature	Appearance, shape, dimension	Mechanical property
9. Levelling or straightening	•	•	--		Method, roll setting, roll wear	Appearance, shape, dimensions	--
11. Heat treatment	--	•	--		Pre-set temperature, retention time or line speed, cooling condition	Mechanical property	Mechanical property
12. Cutting	•	•	•		Cutting, dimension	Appearance, shape	Geometry

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Process Items	Division of Steel Products				Management Items (#)	Quality Characteristics (#)	Management and Inspection Methods (#)
	Hot-rolled Plates & Floor-plates to AS/NZS 3678	Hot-rolled Bars & Sections to AS/NZS 3679.1	Welded I Sections to AS/NZS 3679.2				
13. Conditioning	•	•	--		Appearance, shape, dimension, packaging	Appearance, shape, dimension, packaging	--
14. Welding	--	--	•		AS 1554, Grade SP	Visual, tensile, non-destructive tests	--
15. Marking	•	•	•		Method, position, information	Appearance	--
<p># Common Aspects:</p> <p>i) Records for the following management items and quality characteristics shall be made.</p> <p>ii) Inspection methods, treatment of defective goods (rejected lots), etc. to be stipulated and implemented</p> <p>Notes:</p> <ul style="list-style-type: none"> <li>- The processes listed above, to be included in the factory production manual for each product category and manufacturing method as used in each factory.</li> <li>- The processes listed above may not be in order, and any changes to the order to not reduce product quality.</li> </ul>							



**Table A.2.2 – Manufacturing process management of cold-formed steels for structural purposes**

Raw Material Items	Division of Steel Products				Management Items	Quality Characteristics	Management and Inspection Methods
	Cold-formed Hollow Sections to AS/NZS 1163						
1. Electric resistance welding method	•						
2. Tube forming/sizing	•				Electric current/voltage values (electric power value)	Appearance, dimension (outer diameter/thickness) , mechanical property	Mechanical property
3. Conditioning	•					Appearance, dimension	Dimension
4. Marking	•				Marking method, position and item	Appearance	--
<p>Notes: - The raw materials listed above, to be included in the factory production manual for each product category and manufacturing method as used in each factory.</p> <p>- The processes listed above may not be in order, and any changes to the order to not reduce product quality.</p> <p>- Each batch to be totally manufactured in the same factory, except that galvanizing may need be done at another site.</p>							

### A.3 Equipment management

The items related to the management of manufacturing equipment, processing equipment and inspection equipment, are shown in Tables A.3.1 and A.3.2.

**Table A.3.1 – Equipment management of hot-rolled steels & welded I sections for structural purposes**

Equipment Items	Division of Steel Products				Management Methods
	Hot-rolled Plates & Floor-plates to AS/NZS 3678	Hot-rolled Bars & Sections to AS/NZS 3679.1	Welded I Sections to AS/NZS 3679.2		
<b>1. Manufacturing equipment</b> a) Steel making b) Casting equipment c) Bloom mill or forging equipment d) Semi- finished products repairing equipment e) Heating furnace f) Slitter g) Forming equipment h) Rolling equipment or forging equipment i) Straightening equipment j) Heat treatment equipment k) Cutting equipment l) Conditioning equipment m) Welding equipment n) Marking equipment	• • • • -- -- • • • • • • • • •	• • • • • • • • • • • • • • •	-- -- -- -- -- -- -- -- -- • • -- • •		1) Manufacturing equipment to have a performance necessary to achieve the product qualities specified in the relevant Standard  2) The inspection equipment items to have the capability of testing/inspecting the qualities specified in the relevant Standard  3) A rule of check-and-repair, check-and-calibration, for the equipment items, to be specified to ensure the performance and accuracy necessary to achieve the product qualities specified in the relevant Standard.
<b>2. Inspection Equipment</b> a) Chemical analysis equipment b) Dimensional analysis equipment c) Mass measurement equipment d) Tensile testing machine e) Bending test machine f) Impact testing machine g) Through-thickness testing equipment h) Ultrasonic test equipment	• -- • • • • • • •	• • • • • • • -- --	• • • • • • • -- •		
Notes: - The manufacturing and inspection equipment listed above, to be included in the factory production manual for each product category and manufacturing method as used in each factory.  - The manufacturing equipment shown above to be used in the manufacturing process					

**Table A.3.2 – Equipment management of cold-formed steels for structural purposes**

Equipment Items	Division of Steel Products				Management Methods
	Cold-formed Hollow Sections to AS/NZS 1163				
<b>1. Manufacturing equipment</b> a) Initial forming/welding equipment b) Tube finishing/sizing equipment c) Conditioning equipment d) Marking equipment	<ul style="list-style-type: none"><li>•</li><li>•</li><li>•</li><li>•</li></ul>				1) Manufacturing equipment to have a performance necessary to achieve the product qualities specified in the relevant Standard  2) The inspection equipment items to have the capability of testing/inspecting the qualities specified in the relevant Standard  3) A rule of check-and-repair, check-and-calibration, for the equipment items, to be specified to ensure the performance and accuracy necessary to achieve the product qualities specified in the relevant Standard.
<b>2. Inspection Equipment</b> a) Chemical analysis (if present & not from steel supplier) b) Tensile testing machine c) Non-destructive test system (weld & tube) d) Sizer e) Ferrite grain size equipment (if present) f) Mass measurement equipment	<ul style="list-style-type: none"><li>•</li><li>•</li><li>•</li><li>•</li><li>•</li><li>•</li></ul>				
Notes: - The manufacturing and inspection equipment listed above, to be included in the factory production manual for each product category and manufacturing method as used in each factory.  - The manufacturing equipment shown above to be used in the manufacturing process					

#### **A.4 Product management**

The items relating to the quality, inspection and storing of products are shown in Tables A.4.1 and A.4.2, and include all the first party Product Conformity methods and identified 'Product Conformity Evaluation' requirements. Also each item to be applied in accordance with the respective provisions of the relevant Standard.

**Table A.4.1: Product management of hot-rolled steels and welded I sections for structural purposes**

Product Quality Items	Division of Steel Products				Production Inspection Methods	Product Storage
	Hot-rolled Plates & Floor-plates to AS/NZS 3678	Hot-rolled Bars & Sections to AS/NZS 3679.1	Welded I Sections to AS/NZS 3679.2			
1. Designation	•	•	•		Inspection methods to the requirements of the product Standards	Appropriate product storage conditions to be specified  Distinction between conforming and non-conforming product to be identified
2. Manufacturing process:						
a) Steel making	•	•	--			
b) Delivery condition	•	--	--			
c) Plate supply	--	--	•			
d) Plate cutting	--	--	•			
e) Plate welding	--	--	•			
3. Chemical composition:						
a) Cast analysis	•	•	•			
b) Product analysis	•	•	--			
c) Residual analysis	•	•	--			
4. Manufacturing tolerances:						
a) Dimensions	•	•	•			
b) Flatness	•	--	--			
c) Mass	--	•	--			
d) Pattern depth	•	•	--			
e) Straightness	--	•	•			
5. Freedom from defects:						
a) Visual inspection	•	•	•			
b) Imperfections	•	--	--			
c) Defects	•	--	--			
d) Repair grinding	•	•	--			
e) Repair welding	•	•	•			
f) Non destruct testing (# On request)	#	--	#			
6. Test procedures:						
a) Sampling position, preparation	•	•	•			
b) Weld quality	--	--	•			
7. Mechanical properties:						
a) Tensile	•	•	•			
b) Impact	•	•	--			
c) Through thickness tensile	•	--	--			
d) Heat treatment	•	--	--			
8. Identification and certification:						
a) Identification	•	•	•			
b) Inspection documents, test certification	•	•	•			
9. Tests specified by customers	•	•	•			
Note: Production inspection may be carried out either as a final inspection or between processes (intermediate inspection).						

**Table A.4.2: Product management of cold-formed steels for structural purposes**

Product Quality Items	Division of Steel Products				Production Inspection Methods	Product Storage
	Cold-formed Hollow Sections to AS/NZS 1163					
1. Classification and designation	•				Inspection methods to the requirements of the product Standards	Appropriate product storage and conditions to be specified  Distinction between conforming and non-conforming product to be identified
2. Steel feed						
a) Manufacturing process	•					
b) Welding	•					
3. Chemical composition	•					
4. Manufacturing tolerances						
a) External dimensions	•					
b) Thickness	•					
c) CHS out-of-roundness	•					
d) RHS/SHS concavity/convexity	•					
e) RHS/SHS squareness of sides	•					
f) RHS/SHS external corner profile	•					
g) RHS/SHS twist	•					
h) Straightness	•					
i) Mass per metre	•					
5. Freedom from defects					Inspection methods to the requirements of the product Standards	Appropriate product storage and conditions to be specified  Distinction between conforming and non-conforming product to be identified
a) Free of laminations, surface flaws and other detrimental defects	•					
b) Weld seam position	•					
c) Weld seam defects	•					
6. Mechanical properties						
a) Tensile strength	•					
b) Yield strength	•					
c) Elongation	•					
d) Cold flattening test (CHS only)	•					
e) Bendability	•					
f) Impact test	•					
g) Ferrite grain size [Item 6(f) optional]	•					
7. Appearance	•				Inspection methods to the requirements of the product Standards	Appropriate product storage and conditions to be specified  Distinction between conforming and non-conforming product to be identified
8. Marking (individual member or bundle)	•					
9. Special quality requirements	•					
Note: Production inspection may be carried out either as a final inspection or between processes (intermediate inspection).						

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## Section 2 Requirements for manufacturers of certified structural steel

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### 1 Introduction

The JAS-ANZ/ATIC Technical Committee produced this Section for the certification of the manufacture of structural steel.

### 2 Normative references

Refer to the normative references for the relevant appendices in Section 3.

### 3 Terms and definitions

#### Divisions of certification include -

Hot-rolled structural steel, welded structural steel and cold-formed structural steel.

#### Range of certification refers to -

The grades and sections within a division.

### 4 Application for certification

#### 4.1 General

A client shall supply the following information with an application for certification:

(i) For facilities:

- List all facilities from which the client organisation produces product to the Standard(s) for which certification is sought. Clearly identify each facility for which certification is sought as well as each facility for which certification is not sought.
- Provide evidence of Quality Management System (QMS) certification, for each facility to be included within the scope of certification, and by a certifier accredited or accepted by JAS-ANZ.
- Production facilities at each factory and production lines in each facility.
- Identify the laboratories used by each facility and provide details of their accreditation status (clause 5.1) and provide evidence of the following.
  - Copies of PT program reports issued to any such testing facilities demonstrating that the facilities have achieved satisfactory results during the past 2 years, for all the test methods included in the product Standards
  - That the bodies issuing such PT program reports are independently accredited by third parties to ISO/IEC 17043 for all the relevant PT activities, or are registered and in the process of achieving such accreditation.
- Any previous applications for product certification under this scheme.

(ii) Division - for each division of certification requested:

- Product identification, labelling and marking
- Raw materials for each facility from Section 1, Appendix A.
- Details of any previous product applications including those refused or withdrawn.

- (iii) Range - for each range of certification requested:
- Product Conformity Evaluation
  - Details of each grade
  - Estimated production quantities for each grade
  - Section ranges to be certified for each grade
  - Any current product certifications for each grade
  - Examples of product test and inspection documents.

## **4.2 Scope of application for product certification**

- 4.2.1 An application for certification shall identify the Division of Certification, Scope of Certification (and referenced standards) and the location of all Facilities as illustrated in Table 2.1.

**Table 2.1: Division and range of certification and manufacturing facilities**

Division of Certification	Scope of Certification			Facilities
	Division of Steel Products	Standard	Range, i.e., Grades and Sections	
Hot-rolled structural steel	Plates & floor-plates	AS/NZS 3678	Refer to the Standard	Melting & casting. Hot-rolling. Processing. Heat treatment.
	Sections & bars	AS/NZS 3679.1	Refer to the Standard	
Welded structural steel	Welded I sections	AS/NZS 3679.2	Refer to the Standard	Plate cutting. Beam welding.
Cold-formed structural steel	Hollow sections black	AS/NZS 1163	Refer to the Standard	Forming, welding & sizing.

- 4.2.2 The client for certification shall provide the following information with the application:

- (i) For each facility for which certification is required:
- All factories and facilities manufacturing product to the Standard for which certification is required
  - Quality Management System (QMS) certification at each factory to be considered for certification and accreditation details of the QMS CB
  - Production facilities at each factory and production lines in each facility.
  - An external inspection body shall only be used, if it holds accreditation to ISO/IEC 17020 for the scope of the inspection activity
  - Testing facilities used by each factory and details of the testing facilities accreditation to ISO/IEC 17025
  - Any previous applications for product certification under this scheme.
- (ii) Division - for each division of certification requested:
- Product identification, labelling and marking
  - Raw materials for each factory from Section 1, Appendix A.
  - Details of any previous product certifications under this scheme including those refused or withdrawn.

- (iii) Range - for each range of certification requested:
- Product Conformity Evaluation
  - Details of each grade
  - Estimated production quantities for each grade
  - Section ranges to be certified for each grade
  - Any current product certifications for each grade
  - Examples of product test and inspection documents.

#### **4.3 Quality management systems**

4.3.1 The manufacturer shall provide evidence of having a certified quality system including the following (all references are to ISO 9001), for each factory and production facility involved:

- Details of quality certificate and certification scope.
- A flow schematic of the production inspection and testing systems with particular emphasis on tracking and identification of product.
- Quality manuals, procedures and work instructions or standard operating procedures.
- Review of internal and external quality audit reports pertaining to the facilities in the division and range of applied for certification (see Clause 8.2.2)
- Management responsibility (see Section 5).
- Product realization (see Section 7).
- Measurement, analysis and improvement of the products' specified requirements (see Section 8).
- Manufacturing procedures and/or quality plans for products in the certification application.

#### **5 Initial compliance audit**

5.1 The client shall demonstrate full compliance with this scheme and the relevant normative requirements for the full scope of the application prior to certification being granted. This shall include:

- Verification that the reported mill test and inspection reports are valid and comply with the requirements of this Scheme and the relevant product Standards.
- For routine production steel grades, verification of the client's capability to meet the specified characteristics by a review of the inspection and test results for the steel grade.
- For a newly implemented grade, a review of the initial test programme for the steel grade.
- If required by the CB, the results of any additional programme of testing of product samples.

5.2 Test evidence shall be in the form of a compliant test report issued by a laboratory that is accredited for the scope of the test by an ILAC signatory accreditation body. The client shall provide:

- Documents demonstrating the accreditation status of the laboratory in the field and class for each test referenced in this Scheme and the relevant product standards;
- Method of verification of the results of tests, with regard to fulfilment of specified requirements of the product Standard;
- Documented procedure for determining and retesting invalid tests;
- Documented procedure to be followed when inspection and test results do not meet product specification.



- 5.3 The client shall maintain evidence to demonstrate that test samples are traceable to production and taken in accordance with a method that ensures they are representative of production. This can be achieved either by all samples being taken by a Testing Laboratory accredited for such sampling, or that the sampling is carried out in accordance with an applicable international standard.
- 5.4 The client shall provide data covering the inspection and test performance history for each grade and section within the scope of the application to demonstrate production capability for the range, time and volume of production.
- For each product and steel grade in the range of certification applied for the client shall provide a tabulated summary of the inspection and test results for all valid inspections and valid tests of products as defined in the product standard or product conformance requirements.
  - The tabulation of product and steel grade results shall be further subdivided on changes in manufacturing method in each of the facilities applied for in the certification (eg: changes in chemistry and/or rolling practice at each factory).
  - For numeric data the tabulation shall include the number of results in the test population plus minimum, maximum, mean and standard deviation for each test in each subdivision.
  - For each steel grade group, include a statistical presentation method showing performance stability.
  - Additional statistical data may be supplied such as of distributions, tests of normality and probability plots.
  - Non numeric data shall be reported in an agreed format.
- 5.5 Results for several steel grades that are produced from the same aim chemistry and utilising the same manufacturing method, may be grouped together in the tabulation. The manufacturer shall provide a validation for each product in the group establishing the common aim chemistry and manufacturing processes.
- 6 Additions or alterations**
- 6.1 The client's-certified production activities shall not deviate from those specified for the scope of certification. A scope extension audit will be required if a significant change is planned to occur.
- 6.2 The client shall have a procedure for identifying and immediately reporting to the CB any proposed additions or alterations to the range of certified products.

**Table 2.2: Significant Changes to Variables**

Variables	Change
<b>Steel &amp; Welded I Sections</b>	
Steelmaking process (eg: electric, BOF)	Site or method
Ladle refining	Site or method
Casting (continuous)	Site or facility
Processing (ie: normalize or roll)	Site or method
Cutting equipment & welding consumables	Site method or materials
<b>Cold-formed Steel</b>	
Coil and or strip feed	Site or method
Tube forming	Site or method
Marking	Site or method

6.3 Table 2.2 lists the minimum variables that comprise a process change. Once a facility, steel grade, and processing have been certified, modifications to important steelmaking and/or processing that may affect the ability of the manufacturer to meet the requirements of the specification shall be immediately reported to the CB as an addition or alteration.

6.4 New editions of a product standard shall also constitute a change.

## **7 Surveillance audits by the CB**

7.1 Every three months the licensee shall report the test and inspection results specified in Section 2, Clause 5.4.

## Section 3 Requirements for certified structural steel products

### 1 Introduction

This Section sets out the technical requirements for the manufacture and supply of structural steel products, for application in buildings, civil works, rail and similar infrastructure, either loose or incorporated in fabrications or other finished products.

### 2 Additional normative references

AS/NZS 1050	Methods for the analysis of iron and steel – Sampling iron and steel for chemical analysis
AS/NZS 1050.1	Part 1: Sampling iron and steel for chemical analysis
AS 1391	Metallic materials—Tensile testing at ambient temperature
AS/NZS 1163:2009	Cold-formed structural steel hollow sections
AS/NZS 1544	Method for impact tests on metals
AS/NZS 1554.2	Part 2: Charpy V-notch
AS/NZS 1554	Structural steel welding
AS/NZS 1554.1	Part 1: Welding of steel structures
AS/NZS 3678:2011	Structural steel – Hot-rolled plates, floor-plates and slabs
AS/NZS 3679.1:2010	Structural steel - Hot-rolled bars and sections
AS/NZS 3679.2:2010	Structural steel - Welded I sections

### 3 Additional terms and definitions

#### 3.1 Product acronyms used in Appendices 3.A to 3.D:

- Cold-formed hollow sections: rectangular (RHS), circular (CHS), square (SHS)
- Hot-rolled bars and sections: universal beams (UB), universal columns (UC), equal angles (EA)
- Welded structural steel: welded beams (WB), welded columns (WC)

### 4 Product Conformity Evaluation

#### 4.1 Product Conformity shall be demonstrated by:

- Initial Type testing; and
- Factory production control that includes a minimum sampling and testing frequency plan.

#### 4.2 The Product Conformity requirements for the above are specified in Appendices 3.A to 3.D. If the Product Conformity Evaluation is not completed, or the product does not conform to the criteria detailed in these Appendices, the manufacturer cannot claim that products meet the requirements of this scheme.

#### 4.3 The requirement for using a 'minimum sampling and testing frequency plan' does not exclude the use of statistical testing. However it is beyond the scope of this document to attempt to address the huge array of possible methods that could be adopted. Hence it must remain the responsibility of the manufacturer to demonstrate that alternative methods and procedures are in place, and achieve the specified requirements.

## **Appendix A - Product conformity evaluation for AS/NZS 1163 cold formed structural steel hollow sections**

### **A.1 Introduction**

This appendix sets out the means by which Product Conformity Evaluation with this Technical Specification can be demonstrated by the manufacturer by:

- Initial type testing; and
- Factory production control including a minimum sampling and testing frequency plan.

### **A.2 Additional normative references**

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### **A.3 Additional terms and definitions**

**The terms and definitions from ISO 404 and the following, apply:**

#### **Cast (heat) analysis**

A chemical analysis representative of the cast (heat) determined by the steel maker in accordance with his own procedures. [Ref: ISO 404]

#### **Factory production control (FPC)**

Factory production control comprises operational techniques and all measures necessary to regulate and maintain the conformity of the product to the requirements of the relevant product standard. Ref: ISO 9229]

### **A.4 Initial Type Testing**

#### **A.4.1 General**

An initial type testing program shall be carried out in accordance with Clause A.4.2 under the sole responsibility of the manufacturer of the products before they are first placed onto the market. A design and development system conforming to the requirements of ISO 9001, Clause 7.3, shall be used to satisfy the requirements.

Such a program shall be carried out for the steel sections with the highest requirements for tensile and impact properties that a manufacturer places on the market. Additional programs are required for sections with lower strengths and higher impact property requirements. The testing program shall include sections with the largest and smallest ratio ranges as specified in Tables 6 and 7, AS/NZS 1163.

Initial type testing shall be performed on first application of the specification. Tests previously performed in accordance with the provisions of the specification (same product, same characteristic(s) test method, sampling procedure, system of attestation of conformity, etc) may be taken into account. In addition the initial type testing shall be performed at the beginning of a new method of production, using a new facility or equipment.

#### **A.4.2 Minimum type test sampling and testing**

The initial type testing program comprises of routine testing at a higher frequency to establish the capabilities of the manufacturing process to produce the steel product. Table A.1 provides the minimum sampling and testing frequency plan for type testing. The results of all type tests shall conform to the requirements of AS/NZS 1163.

### **A.5 Production testing**

#### **A.5.1 Minimum batch sampling and testing**

The manufacturer shall ensure that all products conform to the minimum frequency requirements of production testing as defined in Table A.2.

**Table A.1 - Type Tests to AS/NZS1163**

Characteristic	Clause	Requirement	Test Method	Frequency *
<b>Product Type Tests</b>				
Designation	5	Steel grade designation correct	Visual	Once
Manufacturing process	6	Determine steel feed stock & steel making process	Records inspection, or initial supplier Letter of Compliance	Each heat
Chemical composition	7	Cast/product analysis	Records inspection	Each heat, minimum of 5
Manufacturing tolerances	8	External dimensions	Gauging equipment	Each heat, minimum of 5 produced after set-up
		Thickness		
		CHS out-of-roundness		
		RHS/SHS concavity/convexity		
		RHS/SHS squareness of sides		
		RHS/SHS external corner profile		
		RHS/SHS twist		
		Straightness	Straight edge, string line & gauges	
Freedom from defects	9.1 9.2.1 9.2.2	Free of laminations, surface flaws & other detrimental defects	Visual	Each heat, minimum of 5 produced after set-up
		Weld seam position	Visual and/or gauging equipment	
		Weld seam defects	NDE	Visual - continuous
Mechanical properties	10 & 11.1	Tensile strength, yield stress & elongation	To Clauses 10 & 11	Each heat, minimum of 5, 6 tests each
	10 & 11.2	Impact toughness		
	10 & 11.3	Cold flattening (CHS with OD ≤ 168.3 mm only)		
Identification	13.1.1	Individual length markings	Visual	Each length, or bundle, minimum of 5 produced after set-up
	13.1.2	Bundle pack markings		

\* Set-up is achieved after the manufacturing process is stable.

## A.6 Factory production control

### A.6.1 General

The manufacturer shall establish, document and maintain a factory production control (FPC) system to ensure that the products placed on the market conform to the stated performance characteristics. The FPC system shall consist of procedures, regular inspections and tests and/or assessments and the use of the results to control raw and other incoming material or components, equipment, the production process and the product.

FPC, in compliance with the requirements of this document, including the provisions of Appendix A, shall be included in the ISO 9001 quality management system.

### A.6.2 Equipment

**Testing** - All weighing, measuring and testing equipment shall be calibrated and regularly inspected according to documented procedures, frequencies and criteria.

**Manufacturing** - All equipment used in the manufacturing process shall be regularly inspected and maintained to ensure use; wear or failure does not cause inconsistency in the manufacturing process. Inspections and maintenance shall be carried out and recorded in accordance with the manufacturer's written procedures.

**Table A.2 - Production Testing to AS/NZS 1163**

Characteristic	Clause	Requirement	Test Method	Frequency *
<b>Minimum Sampling &amp; Testing Frequency Plan</b>				
Manufacturing process	6	Determine steel feed stock and steel making process	Records inspection or initial supplier Letter of Compliance or on-going certification	Each heat
Chemical composition	7	Cast & product analysis	Records inspection	Each heat
Manufacturing tolerance	8	External dimensions	Gauging equipment	Once per slit coil
		Thickness		
		CHS out -of-roundness		
		RHS/SHS concavity/convexity		
		RHS/SHS squareness of sides		
		RHS/SHS external corner profile		
		RHS/SHS twist		
		Straightness	Straight edge, string line or gauges	One test per batch
		Mass per unit length	Weighing equipment	Each tensile test
Freedom from defects	9.1	Free of laminations, surface flaws & other detrimental defects	Visual inspection	Each tensile test
	9.2.1	Weld seam position	Visual or	Continuous
			Gauging equipment	One test per batch
	9.2.2	Weld seam defects	NDE	Visual – continuous
Mechanical properties	10 & 11.1	Tensile strength, yield stress & elongation	To Clauses 10 & 11	To Clause B2.2 & statistical sampling to Clause B2.3
	10 & 11.2	Impact strength		
	10 & 11.3	Cold flattening		One test per batch
Identification	13.1.1	Individual length markings	Visual inspection	Each hour
	13.1.2	Bundle pack markings	Visual inspection	Each pack
Test reports & certificates	13.2	Test reports & certificates	Visual inspection & records	Each certificate

\* Time is operating hours

### **A.6.3 Raw materials**

The specification of all incoming raw materials shall be documented, as shall the inspection scheme for ensuring their conformity. All manufacturing process and steel feed shall comply with the requirements of AS/NZS 1163, Clause 6.

### **A.6.4 Product testing and evaluation**

The manufacturer shall establish procedures to ensure that the stated values of all the characteristics are maintained. The characteristics and the means of control shall be in accordance with the minimum requirements listed in Table A.2.

## **A.7 Non-conforming products**

### **A.7.1 General**

The manufacturer shall have written procedures, specifying the processing of non-conforming product.

### **A.7.2 Retests**

The requirements of AS/NZS 1163, Clause B2.2.3 shall apply.

**A.7.3 Repair**

All repaired product shall be inspected for compliance to AS/NZS 1163.

**A.8 Documentation**

**A.8.1 General**

The results of all testing programs shall be recorded and such records shall be maintained and be made available for inspection for a period of at least 5 years after the date when that last product to which the test program refers to was delivered. Documentation shall include information to be supplied to the purchaser, plus manufacturing process, physical and mechanical properties, inspection and testing, and test procedures.

## Appendix B - Product conformity evaluation for AS/NZS 3678 structural steel – hot rolled plates, floor plates and slabs

### B.1 Introduction

This appendix sets out the means by which Product Conformity Evaluation with this Technical Specification can be demonstrated by the manufacturer or supplier by:

- Initial type testing; and
- Factory production control including a minimum sampling and testing frequency plan.

### B.2 Additional normative references

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### B.3 Additional terms and definitions

The terms and definitions from ISO 404 and the following, apply.

#### Cast (heat) analysis

A chemical analysis representative of the cast (heat) determined by the steel maker in accordance with his own procedures. [Ref: ISO 404]

#### Factory production control (FPC)

Factory production control comprises operational techniques and all measures necessary to regulate and maintain the conformity of the product to the requirements of the relevant product standard. [Ref: ISO 9229]

**Table B.1 - Type Tests to AS/NZS 3678**

Characteristic	Clause	Requirement	Test Method	Frequency *
<b>Product Type Tests</b>				
Designation	5	Steel grade designation correct	Visual	Once
Manufacturing process	6.1	Determine steel making process	Records inspection	Each heat
	6.2	Determine delivery condition		
Chemical composition	7.2 & 7.3	Cast & product analysis	AS 1050	Each heat
	7.3	Residual elements analysis		
Manufacturing tolerances	8	Gauge	AS 1365	Each product rolled
		Width & length		First plate after set-up, then each 8 hours *
		Flatness, edge camber & out-of-square		First plate after set-up, then each 120 hours *
Freedom from defects	9.2	Surface defects	Visual	Each plate, top & bottom
Mechanical properties	11.1	Tensile strength, yield stress & elongation	To Clauses 10 & 11	<u>As rolled</u> : test 6 parent patterns from each heat for minimum of first 5 heats after set-up <u>Normalized</u> : test each discrete piece loaded into the heat treatment unit
	11.2	Toughness for impact tested grades		
	11.3	Reduction of area for through-thickness tested grades		
Identification & certification	12.1	Identification	Visual	Each plate
	12.2	Inspection documents & test certificates	Records inspection	Each document

\* Time is operating hours



## **B.4 Initial Type Testing**

### **B.4.1 General**

An initial type testing program shall be carried out in accordance with Clause B.4.2 under the sole responsibility of the manufacturer of the products before they are first placed onto the market. A design and development system conforming to the requirements of ISO 9001, Clause 7.3, shall be used to satisfy the requirements.

Such a program shall be carried out for the grade designation with the highest strength at the most stringent impact designation and largest reduction of area that a manufacturer places on the market. Additional programs are required for lower grade designations with more stringent impact designations and higher reduction of area requirements. The testing program shall include the thickest product in each of the thickness ranges specified in Table 9, AS/NZS 3678.

Initial type testing shall be performed on first application of the specification. Tests previously performed in accordance with the provisions of the specification (same product, same characteristic(s) test method, sampling procedure, system of attestation of conformity, etc) may be taken into account. In addition the initial type testing shall be performed at the beginning of a new method of production, using a new facility or equipment.

### **B.4.2 Minimum type test sampling and testing**

The initial type testing program comprises of routine testing at a higher frequency to establish the capabilities of the manufacturing process to produce the steel product. Table B.1 provides the minimum sampling and testing frequency plan for type testing. The results of all type tests shall conform to the requirements of AS/NZS 3678.

**Table B.2 - Production Testing to AS/NZS 3678**

<b>Characteristic</b>	<b>Clause</b>	<b>Requirement</b>	<b>Test Method</b>	<b>Frequency *</b>
<b>Minimum Sampling &amp; Testing Frequency Plan</b>				
Manufacturing process	6.2	Determine steel making process	Records inspection	Each heat
	6.1	Determine delivery condition		
Chemical composition	7.2 & 7.3	Cast & product analysis	AS/NZS 1050	Each heat
	7.4	Residual elements analysis		
Manufacturing tolerances	8	Gauge	AS 1365	Each product rolled
		Width & length		First plate after set-up, then each 8 hours
		Flatness, edge camber & out-of-square		First plate after set-up, then each 120 hours
Freedom from defects	9.2	Surface defects	Visual	Each hour, top & bottom
Mechanical properties	10 & 11.1	Tensile strength, yield stress & elongation	To Clauses 10 & 11	To Clause B2.2.1
	10 & 11.2	Toughness for impact tested grades		
	10 & 11.3	Reduction of area for through-thickness tested grades		
Identification & certification	12.1	Identification	Visual	Each hour
	12.2	Inspection documents & test certificates	Records inspection	Each record & 7 documents each week

\* Time is operating hours

## **B.5 Production testing**

### **B.5.1 Minimum batch sampling and testing**

The manufacturer shall ensure that all products conform to the minimum frequency requirements of production testing as defined in Table B.2.

## **B.6 Factory production control**

### **B.6.1 General**

The manufacturer shall establish, document and maintain a factory production control (FPC) system to ensure that the products placed on the market conform with the stated performance characteristics. The FPC system shall consist of procedures, regular inspections and tests and/or assessments and the use of the results to control raw and other incoming material or components, equipment, the production process and the product.

FPC, in compliance with the requirements of this document, including the provisions of Appendix B, shall be included in the ISO 9001 quality management system.

### **B.6.2 Equipment**

**Testing** - All weighing, measuring and testing equipment shall be calibrated and regularly inspected according to documented procedures, frequencies and criteria.

**Manufacturing** - All equipment used in the manufacturing process shall be regularly inspected and maintained to ensure use; wear or failure does not cause inconsistency in the manufacturing process. Inspections and maintenance shall be carried out and recorded in accordance with the manufacturer's written procedures.

### **B.6.3 Raw materials**

The specification of all incoming raw materials shall be documented, as shall the inspection scheme for ensuring their conformity. All manufacturing process and steel feed shall comply with the requirements of AS/NZS 3678, Clause 6.

### **B.6.4 Product testing and evaluation**

The manufacturer shall establish procedures to ensure that the stated values of all the characteristics are maintained. The characteristics and the means of control shall be in accordance with the minimum requirements listed in Table B.2.

## **B.7 Non-conforming products**

### **B.7.1 General**

The manufacturer shall have written procedures, specifying the processing of non-conforming product.

### **B.7.2 Retests**

The requirements of AS/NZS 3678, Clause B2.2.2 shall apply.

### **B.7.3 Repair**

All repaired product shall be inspected for compliance to AS/NZS 3678.

## **B.8 Documentation**

### **B.8.1 General**

The results of all testing programs shall be recorded and such records shall be maintained and be made available for inspection for a period of at least 5 years after the date when that last product to which the test program refers to was delivered. Documentation shall include information to be supplied to the purchaser, plus manufacturing process, physical and mechanical properties, inspection and testing, and test procedures.

## Appendix C - Product conformity evaluation for AS/NZS 3679.1 structural steel, Part 1: Hot-rolled bars and sections

### C.1 Introduction

This appendix sets out the means by which Product Conformity Evaluation with this Technical Specification can be demonstrated by the manufacturer or supplier by:

- Initial type testing; and
- Factory production control including a minimum sampling and testing frequency plan.

### C.2 Additional normative references

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### C.3 Additional terms and definitions

The terms and definitions from ISO 404 and the following, apply.

#### Cast (heat) analysis

A chemical analysis representative of the cast (heat) determined by the steel maker in accordance with his own procedures. [Ref: ISO 404]

#### Factory production control (FPC)

Factory production control comprises operational techniques and all measures necessary to regulate and maintain the conformity of the product to the requirements of the relevant product standard. [Ref: ISO 9229]

**Table C.1 - Type Tests to AS/NZS 3679.1**

Characteristic	Clause	Requirement	Test Method	Frequency *
<b>Product Type Tests</b>				
Designation	4	Steel grade designation correct	Visual	Once
Manufacturing process	5	Determine steel making process	Records inspection	Each heat
Chemical composition	6.2	Cast analysis	AS/NZS 1050	Each heat, minimum of 5
	6.4	Residual elements analysis		
Manufacturing tolerance	7.1 & 7.2	Nominal dimensions	Gauging equipment	Minimum of first 30 lengths produced after set-up
	7.1 & 7.2	Straightness	Straight edge, string line & gauges	
	7.2	Mass	Weighing	
Freedom from defects	8.1	Free from pipe, segregation surface flaws & other defects	Visual	Minimum of first 30 lengths produced after set-up
Mechanical properties	10.1	Tensile strength, yield stress & elongation	Clauses 9 & 10	Test 6 from each heat for minimum of first 5 after set-up
	10.2	Impact strength for impact grades		
Identification	11.1.1	Individual length markings	Visual	Minimum of first 30 lengths produced after set-up
	11.1.2	Bundle pack markings		Each bundle

\* Set-up is achieved after the manufacturing process is stable.

## **C.4 Initial Type Testing**

### **C.4.1 General**

An initial type testing program shall be carried out in accordance with Clause C.4.2 under the sole responsibility of the manufacturer of the products before they are first placed onto the market. A design and development system conforming to the requirements of ISO 9001, Clause 7.3, shall be used to satisfy the requirements.

Such a program shall be carried out for the steel sections with the highest requirements for tensile and impact properties that a manufacturer places on the market. Additional programs are required for sections with lower strengths and higher impact property requirements. The testing program shall include the thickest section in each of the thickness ranges specified in Table 11 and 12, AS/NZS 3679.1.

Initial type testing shall be performed on first application of the specification. Tests previously performed in accordance with the provisions of the specification (same product, same characteristic(s) test method, sampling procedure, system of attestation of conformity, etc) may be taken into account. In addition the initial type testing shall be performed at the beginning of a new method of production, using a new facility or equipment.

### **C.4.2 Minimum type test sampling and testing**

The initial type testing program comprises of routine testing at a higher frequency to establish the capabilities of the manufacturing process to produce the steel product. Table C.1 provides the minimum sampling and testing frequency plan for type testing. The results of all type tests shall conform to the requirements of AS/NZS 3679.1.

**Table C.2 - Production Testing to AS/NZS 3679.1**

<b>Characteristic</b>	<b>Clause</b>	<b>Requirement</b>	<b>Test Method</b>	<b>Frequency *</b>
<b>Minimum Sampling &amp; Testing Frequency Plan</b>				
Manufacturing process	5	Determine steel making process	Records inspection	Each heat
Chemical composition	6.2	Cast analysis	AS/NZS 1050	Each cast
	6.4	Residual elements analysis		
Manufacturing tolerances	7.1 & 7.2	Nominal dimensions	Gauging equipment	Once each 30 mins
	7.1 & 7.2	Straightness	Straight edge, string line & gauges	Constant visual, and one string line or gauging measurement once each hour
	7.2	Mass (for sections only)	Weighing equipment OR	Once every 30 mins
			By calculation from measurement & weighing	Calculate weight of one bar every 30 mins of rolling time and weighting every 6 hours
Freedom from defects	8.1	Free from pipe, segregation surface flaws and other defects	Visual	Inspect all surfaces of at least one length equivalent to one final roll revolution per hour
Mechanical properties	9 & 10.1	Tensile strength, yield stress & elongation	To Clauses 9 & 10	To Clause B2.2
	9 & 10.2	Impact strength for impact grades		
Identification	11.1	Manufacturers mark	Visual	Once per hour
	11.1.2	Bundle pack markings		Each bundle
Test reports & certificates	11.2	Test reports & certificates	Visual & records inspection	Each certificate

\* Time is operating hours

## **C.5 Production testing**

### **C.5.1 Minimum batch sampling and testing**

The manufacturer shall ensure that all products conform to the minimum frequency requirements of production testing as defined in Table C.2.

## **C.6 Factory production control**

### **C.6.1 General**

The manufacturer shall establish, document and maintain a factory production control (FPC) system to ensure that the products placed on the market conform with the stated performance characteristics. The FPC system shall consist of procedures, regular inspections and tests and/or assessments and the use of the results to control raw and other incoming material or components, equipment, the production process and the product.

FPC, in compliance with the requirements of this document, including the provisions of Appendix C, shall be included in the ISO 9001 quality management system.

### **C.6.2 Equipment**

**Testing** - All weighing, measuring and testing equipment shall be calibrated and regularly inspected according to documented procedures, frequencies and criteria.

**Manufacturing** - All equipment used in the manufacturing process shall be regularly inspected and maintained to ensure use; wear or failure does not cause inconsistency in the manufacturing process. Inspections and maintenance shall be carried out and recorded in accordance with the manufacturer's written procedures.

### **C.6.3 Raw materials**

The specification of all incoming raw materials shall be documented, as shall the inspection scheme for ensuring their conformity. All manufacturing process and steel feed shall comply with the requirements of AS/NZS 3679.1, Clause 6.

### **C.6.4 Product testing and evaluation**

The manufacturer shall establish procedures to ensure that the stated values of all the characteristics are maintained. The characteristics and the means of control shall be in accordance with the minimum requirements listed in Table C.2.

## **C.7 Non-conforming products**

### **C.7.1 General**

The manufacturer shall have written procedures, specifying the processing of non-conforming product.

### **C.7.2 Retests**

The requirements of AS/NZS 3679.1, Clause B2.2.3 shall apply.

### **C.7.3 Repair**

All repaired product shall be inspected for compliance to AS/NZS 3679.1.

## **C.8 Documentation**

### **C.8.1 General**

The results of all testing programs shall be recorded and such records shall be maintained and be made available for inspection for a period of at least 5 years after the date when that last product to which the test program refers to was delivered. Documentation shall include information to be supplied to the purchaser, plus manufacturing process, physical and mechanical properties, inspection and testing, and test procedures.

## Appendix D - Product conformity evaluation for AS/NZS 3679.2 structural steel, Part 2: Welded I sections

### D.1 Introduction

This appendix sets out the means by which Product Conformity Evaluation with this Technical Specification can be demonstrated by the manufacturer or supplier by:

- Initial type testing; and
- Factory production control including a minimum sampling and testing frequency plan.

### D.2 Additional normative references

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### D.3 Additional terms and definitions

The terms and definitions from ISO 404 and the following, apply.

#### Cast (heat) analysis

A chemical analysis representative of the cast (heat) determined by the steel maker in accordance with his own procedures. [Ref: ISO 404]

#### Factory production control (FPC)

Factory production control comprises operational techniques and all measures necessary to regulate and maintain the conformity of the product to the requirements of the relevant product standard. [Ref: ISO 9229]

### D.4 Initial Type Testing

#### D.4.1 General

An initial type testing program shall be carried out in accordance with Clause D.4.2 under the sole responsibility of the manufacturer of the products before they are first placed onto the market. A design and development system conforming to the requirements of ISO 9001, Clause 7.3, shall be used to satisfy the requirements.

Such a program shall be carried out for the steel sections with the highest requirements for welded web-to-flange properties that a manufacturer places on the market. The testing program shall include the thickest web in each of the thickness ranges specified in Table 3, AS/NZS 3679.2.

Initial type testing shall be performed on first application of the specification. Tests previously performed in accordance with the provisions of the specification (same product, same characteristic(s) test method, sampling procedure, system of attestation of conformity, etc) may be taken into account. In addition the initial type testing shall be performed at the beginning of a new method of production, using a new facility or equipment.

#### D.4.2 Minimum type test sampling and testing

The initial type testing program comprises of routine testing at a higher frequency to establish the capabilities of the manufacturing process to produce the steel product. Table D.1 provides the minimum sampling and testing frequency plan for type testing. The results of all type tests shall conform to the requirements of AS/NZS 3679.2.

### D.5 Production testing

#### D.5.1 Minimum batch sampling and testing

The manufacturer shall ensure that all products conform to the minimum frequency requirements of production testing as defined in Table D.2.

**Table D.1 - Type Tests to AS/NZS 3679.2**

Characteristic	Clause	Requirement	Test Method	Frequency *
<b>Product Type Tests</b>				
Designation	4	Correct steel grade designation	Visual	Once
Materials	5	Structural plate	Records inspection to AS/NZS 3678	Each plate
		Welding consumables	Records inspection to AS/NZS 1554.1	Each batch
Manufacturing process	6.1	Plate material	Visual	All plates
	6.2	Plate cutting & preparation	Visual	Each length, minimum of first 5 after set-up
	6.3	Fillet welds	Visual, tensile, weld macro	
		Butt welds	Ultrasonic testing	Each butt weld produced
Manufacturing tolerances	7.1 & 7.2	Nominal dimensions	Gauging equipment	Each length, minimum of first 5 after set-up
		Straightness	Straight edge, string line & gauges	
		Mass	Weighing	
Mechanical properties	8	Tensile strength	To Clause 8	Each length, minimum of first 5 after set-up
Weld quality	9	Weld quality, testing & examination	Visual, tensile, weld macro	
Identification	10.1	Individual length markings	Visual	Each length

\* Set-up is achieved after the manufacturing process is stable

**Table D.2 - Production Testing to AS/NZS 3679.2**

Characteristic	Clause	Requirement	Test Method	Frequency *
<b>Minimum Sampling &amp; Testing Frequency Plan</b>				
Materials	5	Structural plate	Records inspection to AS/NZS 3678	Each plate
		Welding consumables	Records inspection to AS/NZS 1554.1	Each batch
Manufacturing process	6.1	Plate material	Visual	1 each hour
	6.2	Plate cutting & preparation	Visual	
	6.3	Fillet welds	Visual, tensile, weld macro	1 at commencement of each production shift, then 1 every 400 metres
		Butt welds	Ultrasonic testing	Each butt weld produced
Manufacturing tolerances	7.1 & 7.2	Nominal dimensions	Gauging equipment	1 every 8 hours or at section change
		Straightness	Straight edge, string line & gauges	1 every 8 hours
		Mass	Weighing	1 every 8 hours or at section change
Mechanical properties	8	Tensile strength	To Clause 8	1 at commencement of each production shift, then 1 every 400 metres
Weld quality	9	Weld quality, testing & examination	Visual, tensile, weld macro	
Identification & certification	10.1	Individual length markings	Visual	Each length
	10.2	Compliance certification	Records inspection	

\* Set-up is achieved after the manufacturing process is stable

## **D.6 Factory production control**

### **D.6.1 General**

The manufacturer shall establish, document and maintain a factory production control (FPC) system to ensure that the products placed on the market conform with the stated performance characteristics. The FPC system shall consist of procedures, regular inspections and tests and/or assessments and the use of the results to control raw and other incoming material or components, equipment, the production process and the product.

FPC, in compliance with the requirements of this document, including the provisions of Appendix D, shall be included in the ISO 9001 quality management system.

### **D.6.2 Equipment**

**Testing** - All weighing, measuring and testing equipment shall be calibrated and regularly inspected according to documented procedures, frequencies and criteria.

**Manufacturing** - All equipment used in the manufacturing process shall be regularly inspected and maintained to ensure use; wear or failure does not cause inconsistency in the manufacturing process. Inspections and maintenance shall be carried out and recorded in accordance with the manufacturer's written procedures.

### **D.6.3 Raw materials**

The specification of all incoming raw materials shall be documented, as shall the inspection scheme for ensuring their conformity. All manufacturing process and steel feed shall comply with the requirements of AS/NZS 3679.2, Clause 6.

### **D.6.4 Product testing and evaluation**

The manufacturer shall establish procedures to ensure that the stated values of all the characteristics are maintained. The characteristics and the means of control shall be in accordance with the minimum requirements listed in Table D.2.

## **D.7 Non-conforming products**

### **D.7.1 General**

The manufacturer shall have written procedures, specifying the processing of non-conforming product.

### **D.7.2 Retests**

The requirements of AS/NZS 3679.2, Clause B2.2.3 shall apply.

### **D.7.3 Repair**

All repaired product shall be inspected for compliance to AS/NZS 3679.2.

## **D.8 Documentation**

### **D.8.1 General**

The results of all testing programs shall be recorded and such records shall be maintained and be made available for inspection for a period of at least 5 years after the date when that last product to which the test program refers to was delivered. Documentation shall include information to be supplied to the purchaser, plus manufacturing process, physical and mechanical properties, inspection and testing, and test procedures.