

How Safe is Your Built Design?

***Modifications to AS 1163 to improve
Compliance and reduce your Risk***

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Presentation Summary

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- Key messages
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- Reasons for caution with non-compliant product
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What is AS 1163?

- An Australian (and now NZ) Standard entitled:
Cold-formed Structural Steel Hollow Sections (SSHs)
- The Standard specifies:
the requirements for cold-formed, electric resistance-welded, carbon steel hollow sections used for structural purposes. It considers three strength grades, with or without impact properties, that are suitable for welding
- The Standard fundamentally covers structural:
 - ***Circular Hollow Sections (CHS)***
 - ***Rectangular Hollow Sections (RHS)***
 - ***Square Hollow Sections (SHS)***
- What it does not cover:
 - ***linepipe, pressure/fluid reticulation pipe, tube for mechanical purposes, precision tube, general purpose tube***



What is AS 1163?

- It is specifically referenced by the following Australian Standards and regulations:
 - ✓ AS 4100 Steel structures
 - ✓ AS/NZS 1554 Welding of steel structures
 - ✓ Building Code of Australia (BCA)
 - ✓ Specific contract documents and specifications in resources, defence, transport, defence and other government projects
- It is also referred to in other Standards such as:
 - ✓ AS 1396 Steel Water Bore Casing
 - ✓ AS 2159 Piling Design and Installation
 - ✓ AS 3845 Road safety barrier systems
 - ✓ AS 4677 Steel utility services poles
 - ✓ AS 4687 Temporary fencing and hoardings



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Key messages

The basis of the revision to AS/NZS 1163:2009:

- Address recent industry concerns on improved product quality, identification, certification and traceability for SSHS
- To avoid product “non-compliance” issues that are currently being seen in some other areas
- To engender further confidence in supplied tubular product quality for its end-use application
- To reduce the situation of “who is going to be responsible” when failure occurs
- To incorporate significantly improved documentation and demonstration requirements to support claims of product compliance
- From requests (if not demands) by your clients (e.g. end-users, asset owners, engineering houses, etc) to embrace the above



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Recent history of AS 1163

- AS 1163 was published in these years:
 - 1973
 - 1981
 - 1991
 - 2009
- The new edition of AS/NZS 1163 was published on:
9 Dec 2009
- Apart from technical and conformance updates, the Standard has also been adopted by Standards New Zealand and is now a joint Australian and New Zealand Standard
- Timings of AS 1163 and AS/NZS 1163:2009



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Overview of changes to AS/NZS 1163:2009

- General – compliance issues
 - In Australia, mandatory individual length marking will be required on all tubular products compliant with the Standard
 - Mandatory minimum information required on test certificates – e.g. must be in English, all chemical elements listed, etc
 - Mandatory requirement for test results which appear on certificates/reports to be performed by third-party (ILAC – ie NATA) accredited laboratories
 - Mandatory ‘Product Conformity’ provisions to demonstrate compliance with the Standard
- General – format & informative
 - Further assistance in the ‘informative’ appendix on ‘Purchasing Guidelines’
 - Where possible, the alignment of contents with the other structural steel material Standards



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Overview of changes to AS/NZS 1163:2009

- Steelmaking and steel feed
 - Minor tightening up of steelmaking and coil manufacturing requirements for quality steels to be used from hot strip mills
- Chemistry
 - Minor adjustment in some chemistry limits to reflect current quality steelmaking practices
 - Minor guidance note on steels for after-fabrication hot-dip galvanizing
- Mechanical properties
 - Revised method for impact test requirements for hollow sections with nominal thickness less than 6 mm
 - Some minor change in elongation results from tensile tests
- Tolerances
 - Closer alignment of dimensional tolerances & symbols to Euronorms and ISO Standards – i.e. some new tolerances introduced



Technical changes to AS/NZS 1163:2009

- Scope – Better defined
- Table of notations – Addition
- Steel making process – Improved and prescriptive
- Chemical composition – Minor changes to reflect modern practice
- Suitability for zinc coating – Informative text provided
- Manufacturing tolerances – Single table improved readability
- Description of measuring methods – Improved figures
- Introduction of minimum information on test certificate
- Test reports, certificates and QAS accredited by signatories to ILAC-MRA (*International Laboratory Accreditation Corporation Mutual Recognition Agreement*)



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Technical changes to AS/NZS 1163:2009

- Individual length marking – products not marked considered non-compliant
- Impact testing required only on $t \geq 6\text{mm}$
- For $t < 6\text{mm}$;
 - Same steel supplier as $\geq 6\text{mm}$
 - Ferrite grain size ≥ 6 (AS 1733)
 - Total aluminium $> 0.02\%$
 - Note steel must be: fully killed continuously cast, fine grain hot rolled coil.
- - 4% mass tolerance on individual lengths
- Weld seam within $3t$ of corner radius excluded from scope of standard
- Weld seam wall thickness not less than 90% of nominal wall thickness



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Technical changes to AS/NZS 1163:2009

- Manipulation & bending requirements for galvanized CHS
- Appendix B: Product Conformity (*Normative*)
 - Minimum batch sampling and testing, statistical sampling, maintain records of product conformity
 - Once per 50t batch (*Per mill, heat, grade, size, thickness*)
 - Type testing – Impact testing or microstructural examination (*Per steel supplier, mill, heat, grade, size, thickness*)
 - NOT ALLOWED: Product certification or quality system assurance
- Non-destructive testing of the weld carried out at manufacturers discretion, i.e. eddy current, ultrasonic, magnetic flux



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Reasons for Caution with Non-Compliant Product

- Steel is “Unidentified” as per AS 4100 and limited to design yield stress of 170 MPa, and tensile strength of 300 MPa.
- Mill certification and test reports require translation and additional scrutiny
- Limited statistical evidence available to demonstrate steel compliance to AS/NZS 1163:2009
- Limited technical assistance available
- Steel making, refining, casting and rolling process are typically not specified
 - *NOTE: BOF, fully-killed, continuously cast hot-rolled steels ensures low contamination and homogenous structure*



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Reasons for Caution with Non-Compliant Product

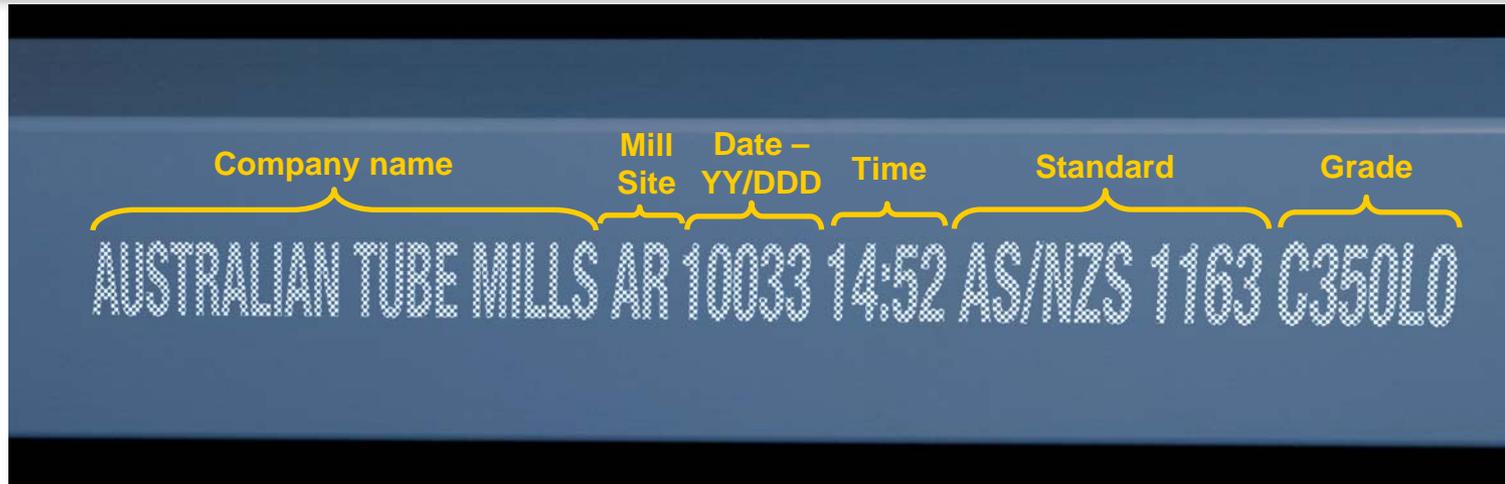


Product Labelling - details

- AS/NZS1163:2009 requires clear and legible tube mark:
 - The manufacturer's name or mark, or both
 - The manufacturer's site or mill identification, or both
 - Traceable text identification
 - Label applied at least once per length
 - NOTE: *Products not marked considered non-compliant*
- Additional benefits of tube marking are:
 - Clear distinction of compliant product in the market place
 - Improved product traceability to assist distributors, stockists and fabricators with compliance requirements, i.e. obtaining test certificates
 - A direct link to associated documentation, i.e. test certification and reports



Product Labelling - details



What do the changes mean?

- Improved traceability of product from mill through to fabrication
- Reduced risk of misrepresentation of tubular products
- Improved clarity & quality of test certificate & test reports
- Asset owners, end-users and specifiers:
 - Confidence in the tubular products they specify and purchase
 - Clear understanding of how tube manufacturers and products conform with the Standard's requirements, e.g. statistical sampling
- The Standard is brought up-to-date in some technical areas and better aligns with International Standards Organization (ISO) requirements
- ***All the above is substantially end-market driven (plus WTO, etc) with the intent of reducing risk for the end-user!***



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Future initiatives in this area

- The following material Standards are being revised to the format plus general requirements of AS/NZS 1163-2009 and will soon be released in the following sequence
 - AS/NZS 3679.1 *Structural steel—Hot-rolled bars and sections*
 - AS/NZS 3679.2 *Structural steel—Welded I sections*
 - AS/NZS 3678 *Structural steel—Hot-rolled plates, floorplates and slabs*
- Third-party certification
- Future ASI technical note



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Sources of further information

SAI Global

<http://infostore.saiglobal.com/store/>

for purchasing copies of
AS/NZS 1163:2009

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Conclusion – AS/NZS 1163:2009

- It is rare that any Standard can be read in isolation of the intended end-use application
- The release of AS/NZS 1163:2009 is reflective of world's best practice and engenders further confidence in quality tubular products being supplied for specific and critical end-use applications
- The requirements for AS/NZS 1163 tube mark provides improved traceability and identification
- *OneSteel Australian Tube Mills* and *Orrcon Steel* manufacture and supply structural products compliant with AS/NZS 1163:2009
- To ensure compliance, reduce risk and instil confidence in your built design – specify the new Standard AS/NZS 1163:2009 and ensure that your project's supply chain understand their responsibilities in complying with your Standard's requirements
- i.e. specify AS/NZS 1163:2009 for structural steel hollow sections – to make sure what you specify is what you get!



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Thank you

Questions & Discussion



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