Technical Note 60

Materials Test Certificates Acceptance

November 2015
1 Introduction

The purpose of this technical note is to help explain the requirements for the supply of material test certificates to the requirements of MRTS78 Fabrication of Structural Steelwork.

2 Specification requirements

Clause 7 of MRTS78 states the following:

*Steel Plate and Sections*

Steel shall comply with the requirements of the following standards:

- rolled plate AS 1594
- hollow sections AS/NZS 1163 Grade L0
- hot-rolled steel plates AS 3678 and
- hot-rolled steel sections AS 3679.1.

For each shipment of steel to be used in the fabrication of:

- a) bridge girders, bridge traffic barrier, safety barrier and pedestrian balustrade
- b) other load bearing structures with a design life of 100 years or more, and
- c) other steelwork structures.

The Contractor shall supply to the Administrator prior to the commencement of fabrication copies of the steel manufacturer's test sheets, showing the chemical properties and results of tensile and elongation tests and Charpy V-notch impact tests. The Charpy V-notch impact tests results are to be supplied for material where "L0" is specified.

If test sheets are not available, then the Administrator shall select samples, for testing of tensile strength and elongation, cold and temper bend tests, chemical analysis and Charpy V-notch impact test in accordance with the appropriate Australian Standard at no expense to the Principal.

**Witness Point** Minimum testing requirements are two percent of each size and grade of product with a minimum sample size of one for each size and grade of the steel.

Steel fabrication shall not commence until the Administrator has reviewed and approved the material test certificates. **Hold Point 2**

Material supplied in accordance with AS/NZS 1163, where the Silicon content is greater than 0.24% will not be accepted when steelwork is to be hot dip galvanised in accordance with AS/NZS 4680.

3 Explanation of material test certificates

As outlined in the Transport and Main Roads (TMR) specification there is a requirement for the materials used for steel fabrication to conform to the requirements of the relevant Australian Standard. This section will detail the information that shall be contained on the material test certificate. We have attached a number of conforming material test certificates.

3.1 Traceability

The material test certificate shall supply a unique number which can be used to trace back to the material provided. Generally this will be the material heat number, production number or the coil number.
3.2 Chemical composition

The material test certificate shall specify chemical elements as outlined in the Australian Standard. The chemical composition values are used to determine the Carbon Equivalence (CE), there must be sufficient information to calculate the CE value. The CE is required from a weldability view point.

3.3 Mechanical properties

The material test certificate shall outline the yield strength, tensile strength and elongation. When pipe section material is supplied, generally the material is supplied to both the API 5L and AS/NZS 1163 standards. For a material test certificate to comply with the AS/NZS 1163 requirements the material yield, tensile and elongation test results shall be tested in the longitudinal direction. Material tested to the API standard is tested in the circumferential, which is not equivalent to testing the material in the longitudinal direction. TMR requires the material test certificate to specify that the materials yield, tensile and elongation was tested in the longitudinal direction.

3.4 Charpy V Notch impact testing

When a material is specified with “L0”, then the material test certificate shall contain a Charpy V Notch impact test value for the particular heat number being supplied. This requirement mainly applies to steel hollow sections manufactured to AS/NZS 1163. This process involves testing the impact properties of the steel supplied at 0oC.

In AS/NZS 1163 there is a requirement for the material with an overall thickness greater than 6 mm thick to be impact tested. All material with overall thickness less than 6mm thick does not need to be supplied with an impact test result. However the test certificate must comply with the requirements of Clause 13.2.2 of AS/NZS 1163.

3.5 Silicon content for galvanising

In AS/NZS 1163, there is a statement where product is to be hot dip galvanised, the Principal shall approve the use of the product for galvanising.

As the majority of structural steelwork supplied for Transport and Main Roads projects are hot dip galvanised, TMR will not accept hollow section material which has a silicon content greater than 0.24%.

3.6 Compliance of mechanical properties based on statistical sampling

AS/NZS 1163 permits the compliance of mechanical properties by statistical sampling. However the TMR specification requires the mechanical testing to be supplied for each heat number (batch testing). Therefore, if a manufacturer wishes to adopt a reduced level of testing then the supplier will need to comply with the following requirements.

- submit all testing data for each testing thickness from the previous 12 months. A minimum of 50 test result shall be supplied for each testing thickness
- Transport and Main Roads will use the test data to carry out a statistical analysis to determine the confidence level that the material is unlikely to be less than the minimum Charpy V Notch impact test result outlined in AS/NZS 1163
- the statistical analysis will be used to determine if a reduced level of testing can be adopted.
If the statistical data is satisfactory, the Deputy Chief Engineer (Structures) will issue a letter advising that a reduced level of testing can be adopted. The following testing will need to be undertaken to maintain a reduced level of testing.

As products are usually manufactured on a particular machine using different feedstock. Therefore, one sample from each machine will need to be selected at random every two months.

The material test certificate shall state the Charpy V Notch Impact test result as an “Indicative Test Result TMR Approved”. The test report shall state the heat number, material section used for testing and the date tested which apply to the particular Charpy V Notch impact test result.

If a sample is below the minimum requirements, then the approval for reduced level of testing will be withdrawn and the supplier will need to supply Charpy V Notch impact test results for every heat number (batch testing).

4 References

<table>
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<th>MRTS78</th>
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## Appendix A – Conforming Material Test Certificates

### Figure 1 – Conforming Square Hollow Section material test certificate to AS/NZS 1163

#### Technical Note, Transport and Main Roads, November 2015

**Certificate No:** 1110061  
Page of 2  
Date Printed: 19/10/2011

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**SUPPLIER:**  
OneSteel Australian Tube Mills Pty Ltd  
145 Thom Road  
Ad alta Ridge, QLD 4119  
ABN 21 123 686 679

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**PRODUCT DESCRIPTION**

**PRODUCT:**  
150X150X6.0 LITECORE 12.0M  
AS/NZS 1163-C350/0.15G30LO

**SPECIFICATION:**  
AS/NZS 1163-C350/0.15G30LO

**MATERIAL:**  
ERW Steel Tube  
STEELMAKING: Basic Oxygen, Fully Killed, Continuous Cast, Fine Gained

**STELLMED:**  
Cot from Hot Strip Mill

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**CHEMICAL ANALYSIS**

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**NOTES:**

1. The Test No. represents the test report reference for this analysis.
2. For details in Test Lab., see General Notes below.
3. TL: Location of Chemical Analysis in Plant.
4. EC: ZCR: U3: Number minimum values for TL, TL, TL, TL, and TL, respectively.
5. (A1) All Analysis results are from standard Test Certificate and are not rounded.
6. (A2) Analysis results are from standard Test Certificate and are not rounded.

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**MECHANICAL PROPERTIES**

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**NOTES:**

1. The Test No. represents the test report reference for this analysis.
2. For details in Test Lab., see General Notes below.
3. **TEST CATEGORY:** (C1): Batch 3: Statistical Sampling, NA = Type Testing.
4. **BASE CATEGORY 3:** Demonstration of process validation for product conformity. C155 or AS/NZS 1163 can be supplied upon request for the relevant product tested.
5. **BASE CATEGORY 2:** Demonstration of process validation for process conformity. Suitable for production personnel and training in accordance with Australian Standard AS 1001 using OneSteel ATM method ASTM A370. (C165 or AS/NZS 1163 can be supplied upon request for the relevant product tested).

### Impact Test

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**NOTES:**

1. The Test No. represents the test report reference for this analysis.
2. For details in Test Lab., see General Notes below.
3. **TEST CATEGORY:** (C1): Batch 3: Statistical Sampling, NA = Type Testing.
4. **BASE CATEGORY 4:** Demonstration of process validation for product conformity. C155 or AS/NZS 1163 can be supplied upon request for the relevant product tested.

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Technical Note, Transport and Main Roads, November 2015  
4
Figure 2 – Conforming Square Hollow Section material test certificate to AS/NZS 1163

OVERRALL NOTES:
(1) TEST LAB: Analyses may be performed by the following laboratories:
632 = BlueScope Steel, Port Kembla Works (NATA accreditation no: 632)
17051 = Australian Tube Mills, Acacia Ridge (NATA accreditation no: 17051)
218 = Australian Laboratory Services (ALS), North Melbourne, VIC (NATA accreditation no: 218 site no: 14308)
$999 = Analysis supplied by steel supplier.
(2) For analyses not performed by OneSteel Australian Tube Mills the Test No. and Report No. represents the test report reference number for this analysis.
(3) Unless noted otherwise, the above Test Laboratories have been third-party certified by signatories to ILAC-MRA (www.ilac.org).

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NOTE:
The results fall within the distribution of properties for this product, and are not actual values of the product.

I certify that the above information is in accordance with the records of the company and conforms to the specification(s) stated.

Name: Chris Riggs
Signatory for Australian Tube Mills
Figure 3 – Conforming Plate material test certificate to AS/NZS 3678

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**COMMENTS**

This test certificate is issued subject to the Uncertainty of Results statement set out on BlueScope Steel’s Website at www.bluescopesteelconnect.com. In order to rely upon this certificate, you must read the Uncertainty of Results statement.

**MECHANICAL TESTING**

This mechanical testing has been performed on samples supplied by the relevant production departments. HEAT TREATMENT - PRODUCT AS ROLLED.

**ITEMS COVERED BY THIS CERTIFICATE**

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Figure 4 – Conforming Rolled Section material test certificate to AS/NZS 3679.1

TEST CERTIFICATE

Customer: SOUTHERN QUEENSLAND STEEL PTY LTD
77-97 COULSON STREET
WACOL
Q L D 4076

Supplier: OneSteel Manufacturing Pty Limited
Wynyard, SA - 6600, Australia
A.B.N. 42 004 651 325

Ship To:

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Sampling undertaken by OneSteel Wyllie 13352
Approved Signatory - M. Bukovich
Chemical results as identified are from Amcol Ltd, Wyllie 0934
Approved Signatory - K. Jordon
Mechanical results as identified are from Amcol Ltd, Wyllie 0794
Approved Signatory - L. Hermon

STEELMAKING: Basic Oxygen - Slab Cast

SPECIFICATION: AS/NZS3679.1-300

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Yield Strength - determined in accordance with requirements of accredited test standard

COMMENTS

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M. Bukovich - Certified Wyllie