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REVISION REGISTER

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WELDING OF REINFORCING STEEL

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IC-QA-B203

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FOREWORD

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When this document forms part of a contract

This document should be read with all the documents forming the Contract.

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REVISIONS TO PREVIOUS VERSION

This is the first version.

PROJECT SPECIFIC CHANGES

Any project specific changes are indicated in the following manner:

(a) Text which is additional to the base document and which is included in the Specification is shown in bold italics e.g. Additional Text.

(b) Text which has been deleted from the base document and which is not included in the Specification is shown struck out e.g. Deleted Text.
RMS QA SPECIFICATION B203
WELDING OF REINFORCING STEEL

1 GENERAL

1.1 SCOPE
This Specification sets out the requirements for the welding of steel reinforcement for concrete.

1.2 STRUCTURE OF THE SPECIFICATION
This Specification includes a series of annexures that detail additional requirements.

1.2.1 (Not Used)
1.2.2 (Not Used)
1.2.3 Schedules of HOLD POINTS and Identified Records
The schedules in Annexure B203/C list the HOLD POINTS that must be observed. Refer to Specification RMS Q for definition of HOLD POINTS.

The records listed in Annexure B203/C are Identified Records for the purposes of RMS Q Annexure Q/E.

1.2.4 (Not Used)
1.2.5 (Not Used)
1.2.6 Referenced Documents
Unless otherwise specified, the applicable issue of a referenced document, other than an RMS Specification, is the issue current at the date one week before the closing date for tenders, or where no issue is current at that date, the most recent issue.

Standards, specifications and test methods are referred to in abbreviated form (e.g. AS 1234). For convenience, the full titles are given in Annexure B203/M.

1.3 DEFINITIONS
The terms “you” and “your” mean “the Contractor” and “the Contractor’s” respectively.

2 MATERIALS
Welding consumables must conform to Section 2.3 of AS/NZS 1554.3.

Weld metal deposited by the welding consumables must have minimum tensile strength of 550 MPa, minimum impact energy of 27 J at 0°C and maximum hydrogen content of 10 ml/100g.
3 PERSONNEL

3.1 WELDING SUPERVISOR

Assign a Welding Supervisor for the Works.

The roles and responsibilities of the Welding Supervisor are stated in Clause 4.12 of AS/NZS 1554.3.

The qualifications of the Welding Supervisor must conform to at least one of Items (a), (b), (c) or (d) of Clause 4.12.1 of AS/NZS 1554.3.

3.2 WELDING INSPECTOR

Assign a Welding Inspector for the Works.

The qualifications of the Welding Inspector must conform to at least one of items (a), (b), (c) or (d) of Clause 7.2 of AS/NZS 1554.3.

3.3 WELDERS

Welders must be approved by or qualified in the presence of the Welding Supervisor in conformity to Clause 4.12.2 of AS/NZS 1554.3.

3.4 REINFORCEMENT CAGE DESIGNER

Load bearing welds for lifting and transport of prefabricated reinforcement cages must be designed by a suitably qualified person with extensive experience in the design, welding and handling of prefabricated cages, taking into account static and dynamic loadings and any stress reversals that may occur during lifting, moving and transport.

4 WELDING OPERATIONS

4.1 SUBMISSIONS

Prior to the commencement of welding of steel reinforcement for the Works, submit the following:

(a) welding personnel names, roles, qualifications and experience;
(b) welding procedure specifications (WPS) for the required welding;
(c) welding procedure qualification records (PQR or WPQR) for the applicable WPS;
(d) proof of conformity of proposed welding consumables to this Specification.
4.2 **WELDING STANDARDS**

Carry out welding (including tack welding) of reinforcing steel in conformity to AS/NZS 1554.3 using only the welding processes specified in Items (a), (b) or (c) of Clause 1.1 of AS/NZS 1554.3.

Carry out welding of reinforcing steel onto steel plates in conformity to Clauses 1.8 and 3.2.3 of AS/NZS 1554.3 for the reinforcing steel, and the relevant parts of AS/NZS 1554 which are applicable to the steel plates.

4.3 **ADDITIONAL REQUIREMENTS**

The following requirements apply and override the provisions of AS/NZS 1554.3 when they are in conflict:

(a) Locational tack welding need not be supervised by the Welding Supervisor, provided that:
   
   (i) welds are carried out in conformity to Clause 3.3 of AS/NZS 1554.3 by qualified welders;
   
   (ii) audits of locational tack welding performed by qualified welders are carried out by the Welding Supervisor at least every 6 months, with appropriate records kept;
   
   (iii) the Principal is notified to witness the locational tack welding to verify conformity to AS/NZS 1554.3.

(b) Welders not qualified in conformity to AS/NZS 1554.3 must not perform any tack welding or other welding.

(c) Use butt welded splices only if acceptable to the Principal.

(d) Any welding procedure, regardless of the method used for its qualification, must be tested in conformity to Clause 4.7 of AS/NZS 1554.3 before it is used for the first time on RMS Works. Subsequent use of such a procedure is acceptable without these additional tests provided that records of these tests and their results are available and meet the requirements of Clause 4.8 of AS/NZS 1554.3.

(e) Provide a WPS for automated machine welds, and demonstrate that the strength of such welds is greater than the smaller of the bars being welded.

(f) Carry out the preparation or cutting of fusion faces, where appropriate, using a method complying with an appropriate approved technical procedure.

(g) The extent of inspection must be 100% visual scanning and 100% visual examination with permissible levels of imperfection equivalent to those of Table 6.2 of AS/NZS 1554.3.
4.4 **500L Steel, Prestressing Tendons and Bends**

Do not field weld 500L reinforcing steel. Where 500L steel is shop welded, demonstrate that the welding procedure does not result in loss of ductility of the bars at the welds, such as by carrying out comparative bend tests, i.e. bending the bar before and after welding.

Do not weld reinforcement for prestressed members after the prestressing tendons have been placed within the reinforcement assemblies or cages being assembled. Such welding includes any welding used to assemble reinforcing cages or for temporary attachments.

Carry out welding of any bent bars only after bending is completed, and such welding must not reduce the ultimate tensile strength of the bar at the welded bend.

5 **Surveillance and Testing**

Welding of steel reinforcement must be carried out in the presence of the Welding Supervisor, and be witnessed and inspected by the Welding Inspector.

Test welded splices to confirm that the parent metal strength has not been reduced. Such testing must be carried out by a laboratory with appropriate NATA registration.

Provide for perusal by the Welding Inspector, and the Principal as required, records of inspection and testing of the Works.
**ANNEXURE B203/A – (NOT USED)**

**ANNEXURE B203/B – (NOT USED)**

**ANNEXURE B203/C – SCHEDULES OF HOLD POINTS AND IDENTIFIED RECORDS**

Refer to Clause 1.2.3.

**C1 SCHEDULE OF HOLD POINTS**

<table>
<thead>
<tr>
<th>Clause</th>
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<th>Description</th>
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<tbody>
<tr>
<td>4.1</td>
<td>Hold</td>
<td>Submission of welding details.</td>
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</table>

**C2 SCHEDULE OF IDENTIFIED RECORDS**

The records listed below are Identified Records for the purposes of RMS Q Annexure Q/E.

<table>
<thead>
<tr>
<th>Clause</th>
<th>Description of Identified Record</th>
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<td>3.1</td>
<td>Qualifications of Welding Supervisor.</td>
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<td>Qualifications of Welding Inspector.</td>
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<td>Qualifications of welders.</td>
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<td>4.1</td>
<td>Welding procedure qualification records (PQR) and welding procedure specifications (WPS).</td>
</tr>
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<td>5</td>
<td>Weld inspection and test reports.</td>
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</table>

**ANNEXURES B203/D TO B203/L – (NOT USED)**

**ANNEXURE B203/M – REFERENCED DOCUMENTS**

Refer to Clause 1.2.6.

**RMS Specifications**

RMS Q

Quality Management System
Australian Standards

AS/NZS 1554.3  Structural steel welding - Welding of reinforcing steel