

*Under Revision See DR93284
Superseded by AS/NZS 1554.5:1995*

Australian Standard®

SAA Structural Steel Welding Code

**Part 5: Welding of steel structures
subject to high levels of fatigue
loading**

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This Australian Standard was prepared by Committee WD/3, Welding of Structures. It was approved on behalf of the Council of Standards Australia on 25 July 1989 and published on 15 December 1989.

The following interests are represented on Committee WD/3:

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Australian Chamber of Commerce
Australian Institute of Steel Construction
Bureau of Steel Manufacturers of Australia
Confederation of Australian Industry
Department of Defence
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Australian Standard®

Structural steel welding

**Part 5: Welding of steel structures
subject to high levels of fatigue
loading
(known as the SAA Structural Steel
Welding Code)**

✓ First published as AS 1554.5—1989.

PREFACE

This Standard was prepared by the Standards Australia Committee on Welding of Structures.

The Standard is basically in line with AS 1554.1, *SAA Structural Steel Welding Code, Part 1: Welding of steel structures*; however, it specifically applies to welds subject to fatigue loading in excess of the range covered by AS 1554.1 and hence it should not be specified where AS 1554.1 is acceptable.

It is expected that welds covered by this Standard will not normally occur with structures such as buildings, tanks, or silos, but only in certain classes of machinery and transport equipment.

The Standard requires that weld preparation, welding consumables, and welding procedures be qualified before commencement of welding. Prequalified joint preparations, welding consumables, and welding procedures are also given in the Standard.

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CONTENTS

	<i>Page</i>
SECTION 1. SCOPE AND GENERAL	
1.1 SCOPE	5
1.2 INNOVATION	5
1.3 REFERENCED DOCUMENTS	5
1.4 DEFINITIONS	5
1.5 BASIC WELDING REQUIREMENTS	5
SECTION 2. MATERIALS OF CONSTRUCTION	
2.1 PARENT MATERIAL	6
2.2 BACKING MATERIAL	6
2.3 WELDING CONSUMABLES	6
SECTION 3. DETAILS OF WELDED CONNECTIONS	
3.1 GENERAL	7
3.2 BUTT WELDS	7
3.3 FILLET WELDS	7
3.4 COMPOUND WELDS	11
SECTION 4. QUALIFICATION OF PROCEDURES AND PERSONNEL	
4.1 QUALIFICATION OF WELDING PROCEDURE	12
4.2 METHOD OF QUALIFICATION OF WELDING PROCEDURE	12
4.3 PREQUALIFIED WELDING PROCEDURES	12
4.4 PREQUALIFIED JOINT PREPARATION	12
4.5 QUALIFICATION OF WELDING CONSUMABLES	12
4.6 QUALIFICATION OF WELDING PROCEDURE BY TESTING	13
4.7 EXTENSION OF QUALIFICATION	14
4.8 COMBINATION OF PROCEDURES	14
4.9 RECORDS OF TESTS	14
4.10 REQUALIFICATION OF WELDING PROCEDURES	14
4.11 QUALIFICATION OF WELDING PERSONNEL	14
SECTION 5. WORKMANSHIP	
5.1 PREPARATION OF EDGES FOR WELDING	29
5.2 ASSEMBLY	29
5.3 PREHEATING AND INTERRUPT CONTROL	29
5.4 WELDING UNDER ADVERSE WEATHER CONDITIONS	30
5.5 TACK WELDS	33
5.6 WELD DEPTH-TO-WIDTH RATIO	33
5.7 CONTROL OF DISTORTION AND RESIDUAL STRESS	33
5.8 REPAIR OF DEFECTS IN WELDS	33
5.9 TEMPORARY ATTACHMENTS	34
5.10 ARC STRIKES	34
5.11 CLEANING OF FINISHED WELDS	34
5.12 DRESSING OF BUTT WELDS	34
SECTION 6. QUALITY OF WELDS	
6.1 METHODS OF INSPECTION AND PERMISSIBLE LEVELS OF IMPERFECTIONS	35
6.2 RADIOGRAPHY	38
6.3 ULTRASONIC EXAMINATION	38
6.4 MAGNETIC PARTICLE EXAMINATION	38
6.5 WELD DEFECTS	38
6.6 REPORTING	38

	<i>Page</i>
SECTION 7. INSPECTION	
7.1 GENERAL	39
7.2 QUALIFICATIONS OF INSPECTORS	39
7.3 VISUAL INSPECTION OF WORK	39
7.4 NON-DESTRUCTIVE EXAMINATION OTHER THAN VISUAL EXAMINATION	39
APPENDICES	
A CHECK LIST OF MATTERS FOR DISCUSSION	40
B METHOD FOR JOINT AND PROCESS IDENTIFICATION	41
C BRITTLE FRACTURE	42
D A SUITABLE FORM OF WELDING PROCEDURE SHEET	45
E SUGGESTED EXTENT OF NON-DESTRUCTIVE EXAMINATION	46
F LIST OF REFERENCED DOCUMENTS	7

STANDARDS AUSTRALIA

Australian Standard Structural steel welding

Part 5: Welding of steel structures subject to high levels of fatigue loading

SECTION 1. SCOPE AND GENERAL

1.1 SCOPE. This Standard specifies materials of construction, weld preparations and weld qualities, qualification of welding procedures and welding personnel, and fabrication and inspection requirements for welds related to the fusion welding of steelwork in structures made up of combinations of steel plate, sheet, or sections, including hollow sections and built-up sections, or castings and forgings, by the following processes:

- (a) Manual metal-arc welding (MMAW).
- (b) Submerged-arc welding (SAW).
- (c) Gas metal-arc welding (GMAW).
- (d) Flux cored arc welding (FCAW).
- (e) Electroslag (including consumable guide) welding (ESW).
- (f) Electro gas welding (EGW).

The Standard is limited to the welding of steel parent material with a specified minimum yield strength not exceeding 450 MPa.

The Standard applies specifically to the welding of steelwork in structures complying with AS 1250. Where the proportions of welded joints in these structures are governed by dynamic loading conditions, the Standard applies only to those welded joints which comply with the fatigue provisions of AS 1250 where the stress range in the welded joint is greater than 80 percent of the permissible stress range for Category B of AS 1250.

NOTE: Fillet welds and incomplete penetration butt welds can only be used in Category B fatigue applications of AS 1250 when the direction of the weld is parallel to the direction of the applied stress.

In addition to the above mentioned structures, the Standard applies to the welding of cranes, hoists, and other dynamically loaded structures; the welding of road and pedestrian bridges, and the welding of steelwork in applications other than structural.

The Standard does not apply to the welding of structures by the following processes:

- (i) Gas welding (GW).
- (ii) Gas tungsten arc welding (GTAW).
- (iii) Resistance welding (RW).
- (iv) Friction welding (FW).
- (v) TIG permit welding (TW).

The Standard does not apply to the welding of pressure vessels and pressure piping.

The Standard does not cover the design of welded connections or permissible stresses in welds, nor the production, rectification, or repair of castings.

1.2 INNOVATION. Any novel material, welding processes or consumables, or methods of construction which do not comply with a specific requirement of this Standard, or are not mentioned in it, but which give equivalent results to those specified, are not necessarily prohibited. The Standards Australia Committee on Welding of Structures can act in an advisory capacity concerning equivalent suitability, but specific approval remains the prerogative of the Inspecting Authority.

1.3 REFERENCED DOCUMENTS. A list with titles of documents referred to in this Standard is given in Appendix A.

1.4 DEFINITIONS. For the purpose of this Standard the definitions given in AS 1101.3 and AS 2002 and those below apply.

1.1.1 Shall—indicates that a statement is mandatory.

1.1.2 Should—indicates a recommendation.

1.1.3 Fabricator—the person or organization responsible for the welding of the structure during fabrication or erection.

1.1.4 Principal—the purchaser or owner of the structure being fabricated or erected, or his nominated representative.

1.1.5 Inspecting Authority—the Building Authority having statutory powers to control the design and erection of buildings or structures.

NOTE: Where the structure is not subject to statutory jurisdiction, the Principal is deemed to be the Inspecting Authority.

1.1.6 Inspector—a person employed by or acceptable to the Inspecting Authority or Principal for the purpose of inspecting welding in accordance with this Standard.

1.5 BASIC WELDING REQUIREMENTS. The basis of this Standard is that a weld shall—

- (a) be deposited in accordance with a qualified welding procedure;
- (b) be deposited by a welder suitably qualified to carry out such a procedure; and
- (c) comply with all the appropriate requirements of the Standard.