AS 1554.5—1989

Australian Standard®

SAA Structural Steel Welding Code

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

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The following interests are represented on Committee WD/3:

Association of Consulting Engineers, Australia

Australian Chamber of Commerce

Australian Institute of Steel Construction

Bureau of Steel Manufacturers of Australia

Confederation of Australian Industry

Department of Defence

Electricity Supply Association of Australia

Institution of Engineers, Australia

Metal Trades Industry Association of Australia

National Association of Australia State Road Authorities

Railways of Australia Committee

Steel Reinforcement Promotion Group

University of Sydney

Welding Technology Institute of Australia

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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)

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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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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) Electrogas 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 abovementioned 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) Thermit welding (TW).

It also 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 materials, 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 F.

1.4 DEFINITIONS. For the purpose of this Standard, the definitions given in AS 1101.3 and AS 2812 and those below apply.

1.4.1 Shall—indicates that a statement is mandatory.

1.4.2 Should—indicates a recommendation.

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

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

1.4.5 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.

1.4.6 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.