Australian/New Zealand Standard™

Structural steel welding

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

STANDARDS AUSTRALIA

STANDARDS NEW ZEALAND
Paerewa Aotearoa

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PREFACE

This Standard was prepared by the Joint Australian/New Zealand Committee WD-003, Welding of Structures, to supersede AS/NZS 1554.5:1995.

The objective of this Standard is to provide rules for the welding of steel structures subject to high levels of fatigue loading.

The objective of this edition is to update the Standard and bring it in line with the latest edition of AS/NZS 1554.1, *Structural steel welding,* Part 1: *Welding of steel structures*.

This Standard specifically applies to welds subject to fatigue loading in excess of the range covered by AS/NZS 1554.1, *Structural steel welding,* Part 1: *Welding of steel structures* and hence, it should not be specified where AS/NZS 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 preparations, 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.

Statements expressed in mandatory terms in notes to Tables and Figures are deemed to be requirements to this Standard.

The terms ‘normative’ and ‘informative’ have been used in this Standard to define the application of the appendix to which they apply. A ‘normative’ appendix is an integral part of a Standard, whereas an ‘informative’ appendix is only for information and guidance.

CONTENTS

Page

SECTION 1 SCOPE AND GENERAL
1.1 SCOPE 5
1.2 EXCLUSIONS 6
1.3 INNOVATION 6
1.4 REFERENCED DOCUMENTS 6
1.5 DEFINITIONS 6
1.6 BASIC WELDING REQUIREMENTS 7
1.7 SAFETY 7

SECTION 2 MATERIALS OF CONSTRUCTION
2.1 PARENT MATERIAL 8
2.2 BACKING MATERIAL 8
2.3 WELDING CONSUMABLES 8

SECTION 3 DETAILS OF WELDED CONNECTIONS
3.1 GENERAL 10
3.2 BUTT WELDS 10
3.3 FILLET WELDS 11
3.4 COMPOUND WELDS 15

SECTION 4 QUALIFICATION OF PROCEDURES AND PERSONNEL
4.1 QUALIFICATION OF WELDING PROCEDURE 16
4.2 METHODS FOR QUALIFYING A WELDING PROCEDURE 17
4.3 PREQUALIFIED WELDING PROCEDURES 18
4.4 PORTABILITY OF QUALIFIED WELDING PROCEDURES 18
4.5 PREQUALIFIED JOINT PREPARATIONS 18
4.6 QUALIFICATION OF WELDING CONSUMABLES 19
4.7 QUALIFICATION OF WELDING PROCEDURE BY TESTING 25
4.8 EXTENSION OF QUALIFICATION 28
4.9 COMBINATION OF PROCESSES 29
4.10 RECORDS OF TESTS 29
4.11 REQUALIFICATION OF WELDING PROCEDURES 29
4.12 QUALIFICATION OF WELDING PERSONNEL 32

SECTION 5 WORKMANSHIP
5.1 PREPARATION OF EDGES FOR WELDING 36
5.2 ASSEMBLY 36
5.3 PREHEATING AND INTER-RUN CONTROL 37
5.4 WELDING UNDER ADVERSE WEATHER CONDITIONS 39
5.5 TACK WELDS 39
5.6 WELD DEPTH-TO-WIDTH RATIO 39
5.7 CONTROL OF DISTORTION AND RESIDUAL STRESS 40
5.8 BACKGOUGING AND REPAIR OF DEFECTS IN WELDS 45
5.9 TEMPORARY ATTACHMENTS 46
5.10 ARC STRIKES 46
5.11 CLEANING OF FINISHED WELDS 46
5.12 DRESSING OF BUTT WELDS 46

Page

SECTION 6 QUALITY OF WELDS
6.1 METHODS OF INSPECTION AND PERMISSIBLE LEVELS OF IMPERFECTIONS 47
6.2 RADIOGRAPHY 47
6.3 ULTRASONIC EXAMINATION 48
6.4 MAGNETIC PARTICLE EXAMINATION 49
6.5 WELD DEFECTS 49
6.6 REPORTING 49

SECTION 7 INSPECTION
7.1 GENERAL 54
7.2 QUALIFICATIONS OF INSPECTORS 54
7.3 VISUAL INSPECTION OF WORK 54
7.4 NON-DESTRUCTIVE EXAMINATION OTHER THAN VISUAL 54

APPENDICES
A REFERENCED DOCUMENTS 56
B BRITTLE FRACTURE 59
C TYPICAL FORMS FOR WELDING PROCEDURES 64
D CHECK LIST OF MATTERS FOR DISCUSSION 67
E WELDED JOINT AND PROCESS IDENTIFICATION 68

STANDARDS AUSTRALIA/STANDARDS NEW ZEALAND

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SECTION 1 SCOPE AND GENERAL

1.1 SCOPE

This Standard specifies requirements for the welding of steel 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 or MIG), including pulsed mode.

(d) Gas tungsten-arc welding (GTAW or TIG).

(e) Flux-cored arc welding (FCAW).

(f) Electroslag (including consumable guide) welding (ESW).

(g) Electrogas welding (EGW).

The Standard is limited to the welding of steel parent material with a specified minimum yield strength not exceeding 500 MPa.

The Standard applies specifically to the welding of steelwork in structures complying with AS 3990, AS 4100 or NZS 3404.1. Where welded joints in these structures are governed by dynamic loading conditions, the Standard applies only to those welded joints that comply with the fatigue provisions of AS 3990, where the stress range in the welded joint is greater than 80% of the permissible stress range for Category B of AS 3990, or exceeds the stress range permitted for detail Category 112 of AS 4100 or NZS 3404.1, but does not exceed the maximum stress ranges permitted for these categories.

NOTE: Fillet welds and incomplete penetration butt welds may be used in AS 4100 or NZS 3404.1 detail Category 125, and in Category B fatigue applications of AS 3990 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 bridges, cranes, hoists, other dynamically loaded structures and steelwork in applications other than structural.

NOTES:

1 Further information on this Standard is given in WTIA Technical Note 11.

2 The Standard is basically in line with AS/NZS 1554.1; however, it specifically applies to welds subject to fatigue loading in excess of the range covered by AS/NZS 1554.1 and hence it should not be specified where AS/NZS 1554.1 is acceptable.

3 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.

4 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.

AS/NZS 1554.5:2004 Structural steel welding - Welding of steel structures subject to high levels of fatigue loading