

Australian Standard™

AS 2205.7.2

Methods for destructive testing of welds in metal**Method 7.2: Dropweight fracture toughness test
for nil-ductility transition temperature**

PREFACE

This Standard was prepared by the Standards Australia Committee WD-006, Testing of Welds, to supersede AS 2205.7.2—1997.

The objective of this edition is to update the Standard and include editorial changes in accordance with current Standards Australia editorial policy.

METHOD

1 SCOPE

This Standard sets out a method for dropweight testing of a welded joint to determine the nil-ductility transition temperature of a selected area of metal in the weld zone.

NOTE: For the purposes of this Standard, welding consumables are taken to mean electrodes, filler metals, fluxes and gases.

2 REFERENCED DOCUMENT

The following document is referred to in this Standard:

AS

1663 Method for dropweight test for nil-ductility transition temperature of ferritic steels

3 PRINCIPLE

A test specimen is prepared and tested in a specified manner and the nil-ductility transition temperature of a selected area of metal in the weld zone is determined.

4 PREPARATION OF TEST SPECIMEN**4.1 Type and dimensions**

The shape, dimensions and method of preparation of the test specimen shall be in accordance with AS 1663.

4.2 Location of specimen

The location and orientation of the test specimen and the notch relative to the weld shall be one of the positions shown in Figure 1, or as specified in the application Standard. A transverse section of the specimen shall be etched to distinguish between the weld metal, heat-affected zones and the parent metal, to ensure that the notch will be located correctly.

For routine production testing, the notch shall be located in the zone or zones of the welded joint that was shown by the assessment of the welding procedure to have the highest (i.e. poorest) NDTT.

4.3 Test Piece

4.3.1 *Size of test piece*

The test piece shall permit the taking of eight test specimens of the same orientation from each part of the weld for which determination of NDTT is required.

For assessment of welding procedures, sufficient length of weld shall be supplied, to permit the NDTT to be established for each significantly different zone of the weld (e.g. for each weld run where necessary).

Alternatively, for routine production testing and where otherwise specified, assessment may be limited to demonstrating that the NDTT is below the lowest permitted NO-BREAK temperature (test performed 5°C above the specified NDTT). Run-on/run-off tabs welded as dropweight specimens for each routine are sufficient test material.

4.3.2 *Alignment*

Parent material shall be prepared, so that the edges to be welded are aligned within 2 mm and the test piece is flat within 5 mm per 300 mm both parallel and transverse to the weld axis.

4.3.3 *Welding procedure*

For assessment of welding procedures, whether for use in butt or fillet welds, the test weld shall be made as a butt weld using the welding procedure to be assessed. The welding procedure shall be followed closely. Where the heat-affected zone is to be assessed, the weld preparation shall be suitably varied so that specimens will have a structure as shown in Figure 1.

For assessment of welding consumables, whether for use in butt or fillet welds, the test weld shall be made by depositing the weld metal as a butt weld, using welding conditions standardized in accordance with the appropriate Australian Standard for the particular consumable being tested, unless otherwise specified in the application Standard.

NOTE: For convenience in testing welding consumables, the parent material should have a higher yield strength than that of the weld metal under test. If this is not possible because of the need to study the effect of admixture in heavy run welds, additional lengths of the test weld may be required.

5 PROCEDURE

The test specimen shall be tested in accordance with AS 1663, together with any specific requirements of the application Standard.

Any temperature relevant to the test, such as specimen temperature or ambient temperature, shall be as specified in AS 1663 and the relevant application Standard.

6 REPORT

The test result shall be reported as follows:

- (a) Identification of this and any relevant application Standards (i.e., 'AS 2205.7.2, Dropweight fracture toughness test for nil-ductility transition temperature and').
- (b) Identification of test specimens by any markings (e.g., 'Specimen A').
- (c) Type of test specimen (e.g. as illustrated in Figures 1(a) and 1(e)).