AS 1330:2019

Australian STANDARD®

Metallic materials — Drop weight tear test for steels

STANDARDS Australia

AS 1330:2019

This Australian Standard® was prepared by MT-006, Mechanical Testing Of Metals. It was approved on behalf of the Council of Standards Australia on 25 September 2019.

This Standard was published on 29 October 2019.

The following are represented on Committee MT-006:

Australian Pipelines and Gas Association
Bureau of Steel Manufacturers of Australia
Materials Australia
National Association of Testing Authorities Australia
University of Technology Sydney
Weld Australia

This Standard was issued in draft form for comment as DR AS 1330:2019.

Keeping Standards up-to-date

Ensure you have the latest versions of our publications and keep up-to-date about Amendments, Rulings, Withdrawals, and new projects by visiting:
www.standards.org.au

ISBN 978 1 76072 600 3

Australian STANDARD®

Metallic materials — Drop weight tear test for steels

Originated as AS 1330—1974.
Second edition 2004.
Reconfirmed 2017.
Third edition 2019.

Preface

This Standard was prepared by Standards Australia Committee MT-006, Mechanical Testing of Metals, to supersede AS 1330—2004, *Metallic materials—Drop weight tear test for ferritic steels*.

The objective of this revision is to expand the range of applicable pipe sizes and to revise the test procedure used in this test method.

In the preparation of this Standard, reference was made to recent research and the following standards:

ASTM E436, *Standard test method for drop-weight tear tests of ferritic steels*

EN 10274, *Metal materials — Drop weight tear test*

API RP 5L3, *Recommended practice for conducting drop-weight tear tests on line pipe*

The terms "normative" and "informative" are used in Standards to define the application of the appendices 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

Preface ii

1 Scope 1

2 Normative references 1

3 Terms and definitions 1

4 Symbols and abbreviated terms 3

5 Apparatus 3
5.1 Testing machine 3
5.2 Anticipated fracture 3
5.3 Test machine setup 3
5.4 Tolerances 4
5.5 Temperature control 5

6 Test piece 5
6.1 Location of the test piece 5
6.2 Test piece geometry 5
6.3 Thickness of the test piece 6
6.4 Test piece preparation 6
6.5 Notching of the test piece 7

7 Test method 8
7.1 Test piece conditioning 8
7.2 Testing speed 8
7.3 Test piece alignment 8
7.4 Determination of FATT 8

8 Test evaluation 9
8.1 Results 9
8.2 Shear area of the fractured surface 9
8.3 Fracture assessment 9

9 Test report 10

10 Precision 11

Appendix A (informative) **Alternative procedure for testing thick materials** 12

Appendix B (normative) **Calculating the percentage shear area** 13

Appendix C (informative) **Full-wing test piece forming practice** 19

Australian Standard®

Metallic materials — Drop weight tear test for steels

1 Scope

This Standard specifies the method for conducting a drop weight tear test (DWTT) for carbon steel, low alloy steel, and similar materials. In particular, it applies to testing line-pipe, and strip or plate intended for line-pipe of 150 mm in diameter or greater but excludes the testing of weld metal. Where thickness is greater than 19 mm, an alternative method is permitted.

NOTE 1 Difficulty may be experienced in applying this test to material of thickness less than 5 mm.

This test may be used to determine the appearance of propagating fractures over the temperature range where the fracture mode changes from brittle (cleavage or flat) to ductile (shear or oblique).

NOTE 2 The test should be used for the following purposes:

(a) For research and development, to study the effect of metallurgical variables such as composition or heat treatment, or of fabricating operations on the mode of fracture propagation.

(b) For evaluation of materials for service, to indicate the suitability of materials for service applications by indicating fracture propagation behaviour at the service temperature(s).

(c) For information or specification purposes, to provide a manufacturing quality control technique when suitable correlations have been established with service behaviour.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
anvil
part of the testing machine used to support the test piece during impact

3.2
cleavage area
area of the fractured surface of the test piece that has broken in a brittle manner and is normally identified by a shiny crystalline appearance

3.3
fracture appearance transition temperature
FATT
temperature required to cause a specified percentage of the fracture to occur by shear

EXAMPLE For 40% shear fracture at –20 °C, this would be expressed as $\mathrm{FATT}\left(40\right) = -20\ ^{\circ}\mathrm{C}$.

3.4
gull-wing
specimen of pipe with the curvature undeformed in the test region and the remainder of the coupon bent such that the supported regions lie in the plane of the hammer

Note 1 to entry: A detailed description for forming a gull-wing test piece is given in Appendix C.