AS 2038—1977

Australian Standard®

METHODS FOR DETECTING THE SUSCEPTIBILITY OF AUSTENITIC STAINLESS STEELS TO INTERGRANULAR CORROSION

The following scientific, industrial and governmental organizations and departments were officialy represented on the committee entrusted with the preparation of this standard:

Associated Chambers of Manufactures of Australia
Bureau of Steel Manufactures of Australia
Commonwealth Aircraft Corporation
Department of Defence
Federated Chamber of Automotive Industries
Institute of Steel Service Centres of Australia
Metal Trades Industry Association of Australia
Railways of Australia Committee
Society of Automotive Engineers—Australasia
Telecom Australia
University of New South Wales (School of Metallurgy)

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METHODS FOR DETECTING THE SUSCEPTIBILITY OF AUSTENITIC STAINLESS STEELS TO INTERGRANULAR CORROSION

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PREFACE

This standard was prepared by the Association's Committee on Metallography to provide intergranular corrosion testing procedures for austenitic stainless steels.

During the preparation of the standard the committee considered the following documents:

ASTM A262	Recommended Practice for Detecting Susceptibility to Intergranular Attack in Stainless Steels
JIS-G-0573	Method for Nitric Acid Test for Stainless Steels
JIS-G-0575	Method of Copper Sulphate-Sulphuric Acid Test for Stainless Steels
ISO 3651	Austenitic Stainless Steels—Determination of Resistance to Intergranular Corrosion
	Part 1 Corrosion Test in Nitric Acid Medium by Measurement of Loss of Mass (Huey Test)
	Part 2 Corrosion Test in a Sulphuric Acid/Copper Sulphate Medium in the Presence of Copper Turnings (Monypenny-Strauss Test)
BS 970	Wrought Steels in the Form of Blooms, Billets, Bars and Forgings
	Part 4 Stainless, Heat-resisting and Valve Steels.

The committee points out that whilst the methods included are intended to detect the susceptibility of austenitic stainless steels to attack by intergranular corrosion, the results obtained are not to be taken as a measure of performance of such materials in other corrosive environments. The tests do not provide a basis for predicting resistance to other forms of corrosion.

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METHODS FOR DETECTING THE SUSCEPTIBILITY OF AUSTENITIC STAINLESS STEELS TO INTERGRANULAR CORROSION

1 SCOPE. This standard describes two procedures for detecting the susceptibility of austenitic stainless steel products to intergranular corrosion, namely—

(a) the Huey test involving treatment in boiling nitric acid, and

(b) the Monypenny-Strauss test involving contact with copper in the presence of boiling copper sulphate/sulphuric acid solution.

2 DEFINITIONS. For the purpose of this standard, the following definitions apply:

Test sample—a portion of material or a group of items selected from a batch or consignment by a sampling procedure.

Test specimen—a portion of material or a single item taken from the test sample for the purpose of applying a particular test.

Test piece—a prepared piece for testing made from a test specimen by some mechanical operation.

3 PREPARATION OF TEST PIECES.

3.1 Location and Size.

3.1.1 *General.* The location, size and number of test pieces shall be as specified in the relevant product specification or as agreed between the contracting parties.

Unless otherwise specified, the requirements of Clauses 3.1.2 to 3.1.6 apply.

3.1.2 *Location.* Test pieces should be selected so that they are representative of the surface of the product to be exposed in service.

Test pieces containing weld metal shall be cut so that not less than 10 mm of parent metal are included on either side of the weld.

The proportion of the total area represented by the exposed cross-section may influence the test results, as cross-sectional areas may be subject to end-grain attack in nitric acid.

The proportion of end-grain in a test piece should be kept low unless such surfaces are intended to be exposed to nitric acid in service. Test pieces should be proportioned so that the cross-sectional area does not exceed half of the exposed area.