

Australian Standard™

Methods of test for vitreous enamel coatings**Method 1.5: Chemical tests—Determination of resistance of vitreous enamel coatings to citric acid at room temperature**

PREFACE

This Standard was prepared by Standards Australia Committee CH-007, Vitreous Enamel Finishes to supersede AS 2219.1.5—1978.

This Standard is identical with and has been reproduced from ISO 2722:1997, *Vitreous and porcelain enamels—Determination of resistance to citric acid at room temperature*.

This series comprises the following Parts:

AS

2219	Methods of test for vitreous enamel coatings
2219.1.1	Method 1.1: Chemical tests—Determination of resistance of vitreous enamel coatings to hot sodium hydroxide
2219.1.2	Method 1.2: Chemical tests—Determination of resistance of vitreous enamel coatings to boiling water and water vapour
2219.1.3	Method 1.3: Chemical tests—Determination of resistance of vitreous enamel coatings to boiling hydrochloric acid
2219.1.5	Method 1.5: Chemical tests—Determination of resistance of vitreous enamel coatings to citric acid at room temperature

As this Standard is reproduced from an International Standard, the following applies:

- (a) Its number does not appear on each page of text and its identity is shown only on the cover and title page.
- (b) In the source text, 'this international Standard' should read 'this Australian Standard'.
- (c) A full point substitutes for a comma when referring to a decimal marker.

References to International Standards should be replaced by references to Australian Standards, as follows:

<i>Reference to International Standard</i>		<i>Australian Standard</i>	
ISO		AS	
648	Laboratory glassware—One-mark pipettes	2164	Laboratory glassware—One-mark volumetric flasks
6696	Water for analytical laboratory use—Specification and test methods	—	
4788	Laboratory glassware—Graduated measuring cylinders	2164	Laboratory glassware—One-mark volumetric flasks

NOTES

1 Scope

This International Standard specifies a method of test for the determination of resistance to citric acid, at room temperature, of vitreous and porcelain enamelled articles, and also specifies a method for classifying the results.

It is not applicable to vitreous and porcelain enamels that come into contact with hot and strong acids or to vitreous and porcelain enamelled articles for use in the chemical industry.

NOTES

- 1 For testing the resistance to boiling citric acid, see ISO 2742^[3].
- 2 For testing the resistance to sulfuric acid of vitreous and porcelain enamels at room temperature, see ISO 8290^[5].
- 3 For testing the resistance to condensing hydrochloric acid vapour of vitreous and porcelain enamelled surfaces of containers and equipment used in the chemical industry, see ISO 2743^[4].

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 648:1977, *Laboratory glassware — One-mark pipettes*.

ISO 3696:1987, *Water for analytical laboratory use — Specification and test methods*.

ISO 4788:1980, *Laboratory glassware — Graduated measuring cylinders*.

3 Principle

Exposure, under defined conditions, of a part of the surface of a test specimen to attack by citric acid solution.

Assessment of resistance by methods based on the appearance and cleanability of the enamelled surface.

4 Reagents and materials

During the determination, unless otherwise stated, use only reagents of recognized analytical grade and only distilled water, or water of equivalent purity (grade 3 water complying with the requirements of ISO 3696).

4.1 Citric acid solution, 100 g/l.

Dissolve 10 g of pure crystalline citric acid ($C_6H_8O_7 \cdot H_2O$) in water and then add water to the 100 ml mark.

A fresh solution, prepared the same day, is required for each test.

4.2 Degreasing medium, for example a detergent containing water or ethanol, C_2H_5OH , for cleaning and degreasing of the test specimens.

4.3 Titanium dioxide, pigment grade.

5 Apparatus

5.1 Graduated measuring cylinder, capacity 100 ml, complying with the requirements of ISO 4788.

5.2 Balance, accurate to 0,1 g.

5.3 Pipette, complying with the requirements of ISO 648.

5.4 Towel, of white cotton or flax.

5.5 Filter paper, free from fluoride, thickness less than 0,18 mm, approximately 30 mm in diameter (only to be used for testing of curved surfaces).

5.6 Filter paper, free from fluoride, thickness greater than 0,38 mm, approximately 25 mm in diameter (only to be used for testing of curved surfaces).

5.7 Filter paper, free from fluoride.

5.8 Pencil, HB hardness (or equivalent).

5.9 Caps (e.g. curved glasses), made of polyethylene or glass, external approximately 30 mm in diameter.

6 Test specimens

6.1 The test specimens may be commercial items, parts thereof, or test pieces especially prepared in accordance with the International Standard for the appropriate base metal.

NOTE — The production of test specimens for testing vitreous and porcelain enamels for sheet steel, cast iron and aluminium is specified in ISO 2723^[1], ISO 2724^[2] and ISO 13804^[6], respectively.

6.2 Each test specimen shall be cleaned with the degreasing medium (4.2), then rinsed with hot water until the water spreads evenly on the surface and then finally dried by dabbing (not rubbing) with the clean towel (5.4).

Alternatively, the test specimen may be rinsed with ethanol and allowed to air-dry after rinsing with hot water.