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METHODS OF TEST FOR VITREOUS ENAMEL COATINGS

PART 1.4: CHEMICAL TESTS—

DETERMINATION OF RESISTANCE OF VITREOUS ENAMEL COATINGS TO BOILING CITRIC ACID

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

Australian Electrical Manufacturers Association

Australian Gas Association

Australian Vitreous Enamellers Institute

Bureau of Steel Manufacturers of Australia

Confederation of Australian Industry

Department of Science

Electricity Supply Association of Australia

Gas Appliance Manufacturers Association of Australia

Health Commission of N.S.W.

Metal Trades Industry Association of Australia

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PREFACE

These standard methods were prepared by the Association's Committee on Vitreous Enamel Finishes as the revision, metrication and extension of the methods in AS K95—1961 which they accordingly supersede.

During its work on these standard methods, the committee took particular note of ISO/TC 107/SC 7 published documents and standards, and accordingly has introduced test methods and equipment which have been adopted as international standards. These include:

ISO 2722	Vitreous and Porcelain Enamels— Determination of Resistance to Citric Acid at Room Temperature
ISO 2723	Vitreous and Porcelain Enamels for Sheet Steel— Production of Specimens for Testing
ISO 2724	Vitreous and Porcelain Enamels for Cast Iron— Production of Specimens for Testing
ISO 2733	Vitreous and Porcelain Enamels— Apparatus for Testing with Acid and Neutral Liquids and their Vapours
ISO 2734	Vitreous and Porcelain Enamels— Apparatus for Testing with Alkaline Liquids
ISO 2742	Vitreous and Porcelain Enamels— Determination of Resistance to Boiling Citric Acid
ISO 2743	Vitreous and Porcelain Enamels— Determination of Resistance to Boiling Hydrochloric Acid
ISO 2744	Vitreous and Porcelain Enamels— Determination of Resistance to Boiling Water and Water Vapour
ISO 2745	Vitreous and Porcelain Enamels— Determination of Resistance to Hot Sodium Hydroxide
ISO 2746	Vitreous and Porcelain Enamels— Enamelled Articles for Service under Highly Corrosive Conditions—High Voltage Test

International tests for the determination of abrasion resistance have not yet been finalized; accordingly, this standard relies on the test developed by the Porcelain Enamel Institute in America as specified in ASTM C448—1964.

The introduction of continuous cleaning enamels on the commercial market has necessitated the inclusion of a test method to test their efficacy.

These standard methods may require reference to the following standards:

AS 1580	Methods of Test for Paints, Varnishes, Lacquers and Related Materials (Metric Units)— Method 602.2, Specular Gloss
AS 1914	Glossary of Terms Relating to Vitreous Enamel Coatings
BS 1041	Code for Temperature Measurement

LIST OF METHODS

Number	Title
PART 1— CHEMICAL TESTS	
AS 2219.1.1—1978	Determination of resistance of vitreous enamel coatings to hot sodium hydroxide
AS 2219.1.2—1978	Determination of resistance of vitreous enamel coatings to boiling water and water vapour
AS 2219.1.3—1978	Determination of resistance of vitreous enamel coatings to boiling hydrochloric acid
AS 2219.1.4—1978	Determination of resistance of vitreous enamel coatings to boiling citric acid
AS 2219.1.5—1978	Determination of resistance of vitreous enamel coatings to citric acid at room temperature
PART 2— PHYSICAL TESTS	
AS 2219.2.1—1978	Determination of resistance of vitreous enamel coatings on steel to thermal shock
AS 2219.2.2—1978	Determination of the heat resistance of vitreous enamel coatings on cast iron
AS 2219.2.3—1978	Determination of abrasion resistance of vitreous enamel coatings
PART 3— MISCELLANEOUS TESTS	
AS 2219.3.1—1978	Determination of the performance of continuous cleaning vitreous enamel coatings

STANDARDS ASSOCIATION OF AUSTRALIA

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METHODS OF TEST FOR VITREOUS ENAMEL COATINGS

PART 1—CHEMICAL TESTS

AS 2219.1.4
DETERMINATION OF RESISTANCE OF VITREOUS ENAMEL COATINGS TO BOILING CITRIC ACID

1 SCOPE. This standard describes the procedure for determining the resistance of flat surfaces of vitreous and porcelain enamels to boiling citric acid vapour.

2 APPLICATION. This method is particularly suitable for the testing of enamels on utensils which are used with boiling, slightly dissociated acids.

NOTE: The method is not suitable for testing enamels used in the chemical industry, or enamels exposed to heavy attack by inorganic acids for a long period of time.

3 PRINCIPLE. Tared enamelled test pieces are exposed to attack by a boiling solution of citric acid or boiling citric acid vapour, as required. The rate of corrosion is then calculated from the loss in mass.

4 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 sample for the purpose of applying a particular test.

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

5 REAGENTS. Chemicals used for testing purposes shall be free from impurities which could influence the outcome of the test. The following reagents are required:

(a) *Citric acid,* 64 g/L solution of AR citric acid ($C_6 H_8 O_7 . H_2 O$) in distilled water.

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

(b) *Distilled or demineralized water.*

(c) *Solvent cleaner,* such as trichloroethylene or acetone.

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