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Australian Standard 2122.2–1978

COMBUSTION PROPAGATION CHARACTERISTICS OF PLASTICS

Part 2–DETERMINATION OF MINIMUM OXYGEN CONCENTRATION FOR FLAME PROPAGATION

FOLLOWING TOP SURFACE IGNITION OF VERTICALLY ORIENTED SPECIMENS

STANDARDS ASSOCIATION OF AUSTRALIA
Incorporated by Royal Charter

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THE FOLLOWING SCIENTIFIC, INDUSTRIAL AND GOVERNMENTAL ORGANIZATIONS and departments were officially represented on the committee entrusted with the preparation of this standard:

CSIRO, Division of Building Research

Department of Defence

Experimental Building Station, Department of Construction

Insurance Council of Australia

Metropolitan Fire Brigades Board, Melbourne

Plastics Institute of Australia Inc.

Research and testing interests

State Electricity Commission of Victoria

Telecom Australia

This standard, prepared by Committee PL/10, Methods of Testing Plastics, was approved on behalf of the Council of the Standards Association of Australia on 8 September, 1977, and was published on 1 February, 1978.

To keep abreast of progress in industry, Australian standards are regularly reviewed. Suggestions for improvements to published standards, addressed to the head office of the Association, are welcomed.

This draft was issued in draft form for public review as DR 76092.

AUSTRALIAN STANDARD

METHODS OF TEST FOR COMBUSTION PROPAGATION CHARACTERISTICS OF PLASTICS

Part 2

DETERMINATION OF MINIMUM OXYGEN CONCENTRATION FOR FLAME PROPAGATION

FOLLOWING TOP SURFACE IGNITION OF VERTICALLY ORIENTED SPECIMENS

AS 2122, Part 2–1978

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PREFACE

This standard was prepared by the Association's Committee on Methods of Testing Plastics, under the authority of the Plastics Standards Board. It is one of a series of test methods that are being developed for determining the combustion propagation characteristics of plastics. Others in the series will cover the effect of such variables as top surface or bottom surface ignition, specimen orientation, and air temperature.

This test explores the minimum oxygen concentration necessary to just support flame propagation in test conditions of varying mixtures of oxygen and nitrogen. The test does not indicate the combustion propagation characteristics of the material at other oxygen concentrations or with the application of external heat energy.

The test has been found useful for quality control of materials, particularly in relation to the proof of the incorporation of flame retardents in the material under test. It has also been found useful in the research and development area. Guidance on the manner in which the results of this test method may be applied is given in Appendix B.

The combustion propagation characteristics of a material are complex and a series of tests would be required to specify all combustion characteristics of a material (e.g. ignitability, flame propagation, heat release, smoke release, toxicity and dripping behaviour). This test may be used to compare aspects of this particular combustion propagation characteristic of a series of plastics materials.

It must be stressed that this combustion propagation characteristics test will not indicate the fire hazard of a material in actual use. It is the manner in which the material is installed and the modification and/or fabrication which it undergoes in the production of the final product which determines the fire hazard of the material. This test may be used to specify a combustion propagation characteristic of a raw material in a product standard.

This standard may require reference to the following:

AS 1327 Standard Environments for Conditioning and Testing Plastics Materials

SAA MP32 SAA Guide for the Presentation, Preparation and Application of Fire Tests.

CONTENTS

STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard
METHODS OF TEST FOR COMBUSTION PROPAGATION CHARACTERISTICS OF PLASTICS

PART 2 — DETERMINATION OF MINIMUM OXYGEN CONCENTRATION FOR FLAME PROPAGATION FOLLOWING TOP SURFACE IGNITION OF VERTICALLY ORIENTED SPECIMENS

1 SCOPE. This standard describes the method of test for determining the minimum oxygen concentration for flame propagation for small specimens of plastics materials in a vertical configuration at the ambient temperature of the testing laboratory, when ignited at the top by surface ignition.

The method has been found suitable for testing various forms of plastics including film, fabric and cellular plastics. It has also been found suitable for testing certain non-plastics materials, e.g. fabrics made from natural fibres. Guidance on the manner in which the results of this method may be applied is given in Appendix B.

2 PRINCIPLE. The minimum concentration of oxygen in an upward flowing mixture of oxygen and nitrogen that will just support flame propagation is measured under equilibrium conditions. The balance between the heat from combustion of the specimen and the heat lost to the surroundings establishes the equilibrium. This point is approached from both sides of the critical oxygen concentration and a statistical method is used in its determination.

3 REFERENCES. This method is based on ASTM D2863, Standard Method for Test of Flammability of Plastics using the Oxygen Index Method, but modifications have been incorporated as a result of work carried out by CSIRO, Division of Building Research. Both methods yield, within experimental error, similar values.

Information on the development of this method may be found in CSIRO, Division of Building Research, *Special Report* 1977, by G. C. Ramsay and A. N. Souprounovich, The Oxygen Index Test — Part 1. See also SAA MP32, SAA Guide for the Presentation, Preparation and Application of Fire Tests, for background information on fire tests.