STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard

for

MATERIALS USED FOR THE PACKAGING OF FOOD AND BEVERAGES—METHODS FOR THE ASSESSMENT OF ODOUR AND TAINT

AS 2609.2
INSTRUMENTAL METHODS

PREFACE

This standard was prepared by the Association's Committee on Assessment of Odour from Food Packaging Material under the direction of the Packaging Standards Board to complement the sensory methods set out in Part 1 of AS 2609.

Principles of instrumental methods based on gas-liquid chromatography are described. These techniques should be used in quality control work for monitoring levels of volatile organic compounds, particularly residual solvents, but they cannot be used to assess the effect on food flavour of these components in the absence of supporting data from sensory tests.

NOTE: Additives bound chemically or physically to plastics packaging materials are discussed in AS 2070, Plastics Materials for Food Contact Use.

It cannot be emphasized too strongly that sensory tests must by definition form the basis of all odour assessment. The objective instrumental procedures for quantitative evaluation set out in this Part of the standard can be used for quality control purposes following the primary assessment established by subjective odour or taste methods.

This standard is intended to provide an authoritative source of important principles and practical guidelines to be used by responsible and competent persons or organizations. It is not to be regarded as being an instruction manual for untrained persons.

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CONTENTS

METHODS

1 SCOPE. This standard sets out an instrumental method based on gas-liquid chromatography for the determination of volatile compounds in packaging materials which could affect the flavour of packaged foods.

This standard specifies a syringe sampling technique but does not preclude the use of more advanced techniques such as a heated gas sampling valve or automatic sampling devices.

NOTE: The sampling techniques used and the concentration limits of volatile compounds (hereinafter referred to as volatiles) permissible in specific types of materials should be agreed between the user and the supplier.

2 APPLICATION. The method is applicable to plain and printed packaging materials comprised of plastics, paper, paperboard, aluminium foil, and combinations of these materials in coated or laminated forms. It may be used for the determination of residual solvents, and other organic volatiles, such as monomers that are liquids at ambient temperatures.

Compounds which, at ambient temperatures, are gases or solids require specialized analytical techniques which are not dealt with by this standard.

3 REFERENCED DOCUMENTS. The following standards are referred to in this standard:

AS 2030 SAA Gas Cylinders Code

AS 2070 Plastics Materials for Food Contact Use

AS 2400 SAA Packaging Code
Part 1—Glossary of Packaging Terms

AS 2609 Materials Used for the Packaging of Food and Beverages—Methods for the Assessment of Odour and Taint
Part 1—Sensory Methods

4 DEFINITIONS. For the purpose of this standard, the definitions given in AS 2400, Part 1 apply.

5 PRINCIPLE. A sample of the packaging material is heated in an airtight, heat-resistant container to release the retained volatiles into the headspace. After a sufficient heating time a sample of the headspace atmosphere is transferred to a gas-liquid chromatograph for quantitative analysis of the volatiles present.

Volatiles are identified by reference to a table of relative retention times and/or coinjection with known standards. Estimation of the levels of volatiles is made by the external standard method which is generally considered accurate to within ± 5 percent.

6 REAGENTS.

6.1 Analytical grade solvents.

6.2 Air, instrument grade.

6.3 Nitrogen, free of oxygen.

6.4 Hydrogen, high purity.

NOTE: See also AS 2030, SAA Gas Cylinders Code (Fittings).

7 APPARATUS.

7.1 A gas-liquid chromatograph (GLC) having a flame ionization detector (FID) and equipped with the following:

(a) An oven with forced circulation capable of maintaining the required temperature to within 0.5°C.

(b) Heated injection port.

(c) Gas flow control devices, either built in or external.

(d) Suitable chart recorder.

(e) A partitioning column that will separate the volatiles to be analysed.

NOTE: Details of suggested columns and some typical volatiles are given in Appendix A and Appendix B, respectively.

7.2 Syringes.

(a) Gas-tight syringe capable of withstanding temperatures up to 70°C, having a capacity of 0.5 mL or 1.0 mL and having a PTFE (polytetrafluoroethylene) plunger of the expanding type.

NOTE: As an alternative, other gas sampling systems may be used.

(b) Microlitre syringe (liquid syringe) having a capacity of 5 μL and graduated in 0.1 μL divisions.

7.3 Ovens.

(a) *Incubation oven.* Forced draught type capable of maintaining the temperature at 110 ± 2°C.

(b) *Syringe oven.* Forced draught type capable of maintaining the temperature at 60 ± 2°C.

NOTE: Alternatively temperature controlled heating blocks may be used, provided that they maintain the specified temperature range.