AS 4351.6—1996
ISO 10634:1995

Australian Standard®

Biodegradability—Organic compounds in an aqueous medium

Part 6: Guidance for the determination of biodegradability of poorly soluble organic compounds

[Water quality—Guidance for the preparation and treatment of poorly water-soluble organic compounds for the subsequent evaluation of their biodegradability in an aqueous medium]

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Australian Chemical Specialties Manufacturers Association

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PREFACE

This Standard was prepared by the Standards Australia Committee MS/56 on Biodegradability of Materials.

This is Part 6 in a series of Standards which give guidance and methods to determine the biodegradability of organic compounds in an aqueous medium. The objective of this Standard is to provide guidance for the determination of the 'ready' biodegradability of poorly soluble organic compounds. This includes techniques for dispersing organic compounds, which are not soluble enough to be analysed using the relevant tests in the normal manner. The techniques are applicable to the methods given in AS 4351.3 *Biodegradability—Organic Compounds in an aqueous medium* Part 3: *Determination by oxygen demand in a closed respirometer* and AS 4351.4 *Biodegradability—Organic compounds in an aqueous medium* Part 4: *Determination by analysis of released carbon dioxide.*

This Standard is identical with and has been reproduced from ISO 10634.1995, *Water quality—Guidance for the preparation and treatment of poorly water-soluble organic compounds for the subsequent evaluation of their biodegradability in an aqueous medium.*

The term 'informative' has been used in this Standard to define the application of the annex to which it applies. An 'informative' annex is only for information and guidance.

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		4351.3	Part 3: Determination by oxygen demand in a closed respirometer
9439	Water quality—Evaluation in an aqueous medium of the 'ultimate' aerobic biodegradability of organic compounds—Method by analysis of released carbon dioxide	4351	Biodegradability—Organic compounds in an aqueous medium
		4351.4	Part 4: Determination by analysis of released carbon dioxide

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Introduction

The standardizing work carried out by ISO/TC 147/SC 5 has shown that the development of a single method for evaluating the biodegradability of organic compounds with a low solubility in water may not be envisaged in the immediate future. In fact, the selection of the most suitable working method to obtain a satisfactory emulsion or dispersion of these compounds in the test media depends particularly on their physico-chemical properties. Consequently, the selection of the most suitable method has to be left to the judgement of laboratories responsible for the tests based on their experience and the product information supplied by the applicant. It is for this reason that this International Standard describes various techniques for treating poorly soluble organic compounds before they are investigated in biodegradability tests, with the aim of reaching a stage where, for any given technique, the same working method is used by all laboratories, thus making it easier to compare results.

The techniques described in this International Standard do not necessarily produce the same results if they are used in parallel. The use of solvents and dispersing or emulsifying techniques may be additional sources of errors and may lead to test results which differ from those obtained without using these techniques. Furthermore, dispersions or emulsions may be produced which would not exist as such in nature and where the rate and degree of biodegradability is enhanced because very fine particles are present. These facts have to be considered for the evaluation and interpretation of the results of biodegradation tests. It is recommended to perform biodegradability tests first, with the direct addition of a test compound, or to perform this test in parallel to tests using dispersion techniques.

Normally, only pure or virtually pure compounds should be tested. If mixtures or multi-componental substances are tested, the use of solvents and dispersion techniques may lead to unrepresentative heterogeneous distributions and to misleading test results in the subsequent biodegradability tests.

AUSTRALIAN STANDARD

Biodegradability — Organic compounds in an aqueous medium

Part 6:
Guidance for the determination of biodegradability of poorly soluble organic compounds

1 Scope

This International Standard describes four techniques for preparing poorly water-soluble organic compounds and introducing them into test vessels for a subsequent test on biodegradability in an aqueous medium using standard methods. The test compounds concerned are not sufficiently soluble in water to perform the biodegradability tests in the normal manner, as described in the respective test methods indicated in clause 2.

The preparation techniques are as follows:

— direct addition (clause 3): this technique is restricted to non-volatile test compounds if inert supports or solvents are used;

— ultrasonic dispersion (clause 4): this technique may be applied to non-volatile liquid and solid compounds;

— adsorption on an inert support (clause 5);

— dispersions or emulsions with an emulsifying agent (clause 6).

The subsequent tests on biodegradability are primarily methods using the analysis of the released carbon dioxide (see ISO 9439) and the determination of the oxygen consumption (see ISO 9408). This International Standard does not describe the test methods; it is restricted to describing the techniques for introducing the test substances into the test medium and to keep them in a dispersed state. These techniques are implemented while observing the experimental conditions described in the standardized methods for evaluating biodegradability. It should be noted that volatile chemicals may not be tested by the carbon dioxide method specified in ISO 9439.

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 9408:1991, *Water quality — Evaluation in an aqueous medium of the "ultimate" aerobic biodegradability of organic compounds — Method by determining the oxygen demand in a closed respirometer.*

ISO 9439:1990, *Water quality — Evaluation in an aqueous medium of the "ultimate" aerobic biodegradability of organic compounds — Method by analysis of released carbon dioxide.*

3 Direct addition

Any of the following techniques can be used

— The test compound is weighed and directly introduced into the test vessels which are subjected to continuous agitation.

NOTE 1 Some organic compounds which are sparingly soluble in water dissolve more readily when alkali or acid is added. They may be introduced as an acid or

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