Australian/New Zealand Standard™

Methods of test for pulp and paper

Method 012s: Organic solvent extractives in wood, pulp and paper

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The following are represented on Committee PK-019:

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Australian Paper Industry Council
CSIRO Forestry and Forest Products
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National Association of Forest Industries
New Zealand Pulp and Paper Industry Association
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Australian/New Zealand Standard™

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Preface

This revision removes reference to benzene and chloroform as acceptable solvents: Benzene is a known human carcinogen, chloroform is classified as a suspected or probable carcinogen and, for most purposes, they are replaceable with safer substances. Dichloromethane is also a probable human carcinogen: It has been retained as it cannot be satisfactorily substituted by other solvents for some purposes. Also, tert-butyl methyl ether (TBME) has been added to the list of suitable solvents, particularly as a substitute for dichloromethane. TBME may not produce identical results for some components.

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Foreword

Certain materials in wood, pulp and paper are soluble in organic solvents. They consist primarily of resin and fatty acids and their esters, waxes and unsaponifiable substances. No single solvent is capable of removing all of these materials and different solvents remove different combinations of them. Therefore this Standard leaves the choice of solvent open, to be decided according to the purpose of the test. The following properties of various solvents need to be taken into consideration.

Petroleum ether has very low polarity and does not readily dissolve oxidized resin.

Diethyl ether, dichloromethane and *tert-butyl methyl ether* have low and about equal polarity and give approximately the same results. They remove resin and oxidized resin from softwoods and fats, waxes, etc., from hardwoods.

Acetone and *methanol* are polar solvents and dissolve some of the more polar compounds such as phenols, tannins, lignans and low molecular mass carbohydrates in addition to fats, waxes, fatty and resin acids. etc. They are particularly useful for hardwoods that have a high content of polar substances.

Organic solvent extractives in wood, pulp and paper

1 Scope

This Standard prescribes the procedure to be used in determining organic solvent extractives in wood, pulp and paper.

2 Referenced documents

The following documents are referred to in this Standard:

AS
1301 Methods of test for pulp and paper
1301.002 Preparation of wood samples for chemical analysis
1301.417 Sampling of paper, board and pulp for testing
1301.457 Determination of moisture content in paper, board and pulps

2508 Safe storage and handling information cards for hazardous materials

AS/NZS
1301 Methods of test for pulp and paper
1301.010 Determination of moisture in woodchips
1301.013 Sampling of woodchips for testing

2243 Safety in laboratories
2243.2 Part 2: Chemical aspects

3 Principle

The sample is extracted with the solvent in a Soxhlet extraction apparatus, the solvent is recovered by distillation and the extract is dried.

4 Reagents

> **WARNING:** *Always consult the most recent Material Safety Data Sheet for a solvent to determine if that solvent can be safely used in the extraction procedure.* Petroleum ether, diethyl ether, acetone and methanol are highly flammable in liquid or vapour form and form explosive mixtures with air. Prolonged exposure to the vapour may cause drowsiness or dizziness. Ethers are unstable materials, forming peroxides with air. It is unwise to store ethers in partly empty bottles, where the material is in contact with air. Dichloromethane is not classified as flammable, but it is toxic and a possible carcinogen and has been identified as harmful to the atmosphere in that it contributes to greenhouse gases and ozone depletion.
>
> All solvents must be recovered and all operations must be done in an efficient fume cupboard and in accordance with AS 2243.2. Any electrical equipment must be spark-free. For further details of hazardous materials see AS 2508.

4.1 Petroleum ether—analytical grade or better.

4.2 Diethyl ether—analytical reagent grade or better. Store in a dark glass bottle containing bright iron or copper. Check for peroxide by mixing with an equal volume of KI-starch solution. A blue colour indicates the presence of peroxide which can cause an explosion on evaporation.

4.3 Dichloromethane (CH_2Cl_2)—analytical reagent grade or better.

4.4 Acetone or methanol—analytical reagent grade or better.