AS/NZS 1301.424s:2006

Australian/New Zealand Standard™

Methods of test for pulp and paper

Method 424s: Determination of titanium dioxide in paper, paperboard, pigments and fillers

This Joint Australian/New Zealand Standard was prepared by Joint Technical Committee PK-019, Methods of Test for Pulp and Paper. It was approved on behalf of the Council of Standards Australia on 31 October 2006 and on behalf of the Council of Standards New Zealand on 10 November 2006.
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The following are represented on Committee PK-019:

Australian Plantation Products and Paper Industry Council (A3P)
Appita
CSIRO Forestry and Forest Products
Ensis Papro, SCION
National Association of Forest Industries

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Contents

Foreword

This standard was prepared by Joint Technical Committee PK-019, Methods of Test for Pulp and Paper, as part of AS/NZS 1301, *Methods of test for pulp and paper*.

This edition cancels and replaces AS 1301.424s—1989.

The following document is referred to in this Standard.

AS/NZS
1301.457s Determination of moisture content in paper, board and pulps

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.

Introduction

This Standard describes procedures for qualitative and quantitative determinations of titanium dioxide in paper, paperboard, pigments and fillers. The method is not suitable for determination of total titanium because the solution procedure does not dissolve all titanium compounds. The quantitative procedure consists of a colorimetric method suitable for test pieces containing quantities of titanium dioxide less than 0.05 g or for samples which have a high concentration of filler other than TiO_2. If the test piece contains more than 0.05 g of TiO_2, use a higher dilution in step 2.6.3 and modify the calculation appropriately.

Determination of titanium dioxide in paper, paperboard, pigments and fillers

1 QUALITATIVE TEST

1.1 Apparatus

1.1.1 *Ashing equipment*, silica or platinum crucible and a muffle furnace capable of maintaining a temperature of 900 ±50°C.

1.1.2 *Fine filter papers* such as Whatman No. 5 or better

1.2 Reagents

1.2.1 *Concentrated sulphuric acid*, analytical grade H_2SO_4.

1.2.2 *Ammonium sulphate*, analytical grade $(NH_4)_2SO_4$.

1.2.3 *Hydrogen peroxide*, analytical grade 3% H_2O_2—dilute 10 mL of 30% H_2O_2 to 100 mL with distilled water. This solution is stable for five days.

1.3 Preparation of test piece

Cut a test piece sufficient to provide about 0.5 g of ash.

1.4 Procedure

Ash the test piece at 900 ±50°C in a clean crucible. Transfer about 0.5 g of the ash to a 250 mL beaker, add 20 mL of concentrated H_2SO_4, 10 g of ammonium sulphate and boil for at least 5 min. Cool, add the solution to about 100 mL of water, and heat to boiling. Allow insoluble material to settle and filter through a fine filter paper. To the filtrate add 5 – 10 mL of 3% H_2O_2. A clear yellow or orange colour indicates the presence of titanium dioxide.

1.5 Report

Report the presence or absence of titanium dioxide.

2 QUANTITATIVE TEST — COLORIMETRIC PROCEDURE

2.1 Scope

This method describes the procedure for the colorimetric quantitative determination of titanium dioxide (TiO_2) in paper, paperboard, pigments and fillers.

This method is suitable when the amount of TiO_2 in the ash is less than 0.05 g or when the paper has a high filler content other than TIO_2. If more than 0.05 g of TiO_2 is present include a larger dilution in step 2.6.3 and modify the calculation accordingly.

2.2 Summary

The titanium in dilute H_2SO_4 solution is combined with H_2O_2 and the resulting yellow brownish orange complex is measured spectrophotometrically.

2.3 Apparatus

2.3.1 *Spectrophotometer* or other instrument for accurately measuring the light transmission of a solution at 410 nm.

2.3.2 *Ashing equipment*, silica or platinum crucible and a muffle furnace capable of maintaining a temperature of 900 ±50°C.

2.3.3 *Analytical balance*, capable of weighing to 0.1 mg.

2.3.4 *Hardened ashless filter paper*, such as Whatman No.541.