AUSTRALIAN STANDARD
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DETERMINATION OF TITANIUM DIOXIDE IN PAPER, PAPERBOARD, PIGMENTS AND FILLERS

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.

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 5 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 a 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 mm.

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.

2.4 Reagents.

2.4.1 Sulphuric acid, Analytical Grade concentrated H_2SO_4.

2.4.2 Ammonium sulphate, Analytical Grade, $(NH_4)_2SO_4$.

2.4.3 Hydrogen peroxide, Analytical Grade 3% H_2O_2; prepare as described in Section 1.

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