

ISO

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

ISO RECOMMENDATION R 681

CHEMICAL ANALYSIS OF CEMENTS

MINOR CONSTITUENTS OF PORTLAND CEMENT

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BRIEF HISTORY

The ISO Recommendation R 681, *Chemical analysis of cements – Minor constituents of Portland cement*, was drawn up by Technical Committee ISO/TC 74, *Hydraulic binders*, the Secretariat of which is held by the Institut Belge de Normalisation (IBN).

Work on this question by the Technical Committee began in 1958 and led, in 1963, to the adoption of a Draft ISO Recommendation.

In February 1965, this Draft ISO Recommendation (No. 774) was circulated to all the ISO Member Bodies for enquiry. It was approved, subject to a few modifications of an editorial nature, by the following Member Bodies :

Argentina	Ireland	Romania
Australia	Israel	Sweden
Austria	Italy	Turkey
Belgium	Japan	U.A.R.
Czechoslovakia	Korea, Rep. of	United Kingdom
Denmark	Netherlands	U.S.A.
France	New Zealand	U.S.S.R.
Germany	Norway	Yugoslavia
Hungary	Poland	
India	Portugal	

No Member Body opposed the approval of the Draft.

The Draft ISO Recommendation was then submitted by correspondence to the ISO Council which decided, in March 1968, to accept it as an ISO RECOMMENDATION.

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1. GENERAL INSTRUCTIONS

1.1 Reagents

All the reagents should be of the analytical reagent grade.

Special reagents relating to a given determination are described in the section concerning the determination.

1.2 Filter-paper

Filter-papers should be *ash-free*. Filter-papers with a close texture are called *slow*, filter-papers with a medium texture are called *medium* and filter-papers with an open texture are called *fast*.

1.3 Blank determinations

A blank determination is recommended in every case. If possible, it is best carried out with a substance of nearly the same composition as the sample to be analysed, but without the constituent to be determined; otherwise carry out all the described operations without introducing the sample.

1.4 Colorimetry

An approximate determination can be made by visual comparison with a colorimetric scale corresponding with known quantities of the constituent to be determined.

A more precise determination can be made absorptiometrically. Two kinds of spectrophotometric apparatus are in common use: that employing a prism- or grating-monochromator capable of selecting a wave-length band of about one nanometer ($1 \text{ nm} = 10^{-9} \text{ m}$), and that using an optical filter of the ordinary or the interference type allowing the passage of a band of 5 to 20 nm. The narrower the wave band, the more accurately does the additivity law apply to the optical densities measured.

2. COLORIMETRIC DETERMINATION OF TITANIUM

2.1 Principle

Ti^{4+} forms a yellow complex with hydrogen peroxide in an acid medium. For concentrations under 50 mg of Ti^{4+} per litre, the resulting colour is proportional to the titanium present. The most suitable medium is sulphuric acid of 2 N to 3 N concentration.

Interfering ions : Fe^{+++} and V^{5+} .

The interference caused by the coloration due to the Fe^{+++} ions can be neglected in the case of Portland cement. V^{5+} gives a yellow colour similar to Ti^{4+} , and the specified procedure does not take account of this interference, but it is very seldom experienced.