# INTERNATIONAL STANDARD 1980

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

# Nitric acid for industrial use — Determination of total acidity — Titrimetric method

*Acide nitrique à usage industriel — Détermination de l'acidité totale — Méthode titrimétrique*

First edition — 1977-11-15



UDC 661.56 : 543.241.5

Ref. No. ISO 1980-1977 (E)

**Descriptors** : nitric acid, chemical analysis, acidity, determination of content, volumetric analysis.



Price based on 2 pages

## FOREWORD

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been set up has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

Prior to 1972, the results of the work of the technical committees were published as ISO Recommendations; these documents are in the process of being transformed into International Standards. As part of this process, Technical Committee ISO/TC 47, *Chemistry*, has reviewed ISO Recommendation R 1980-1971 and found it technically suitable for transformation. International Standard ISO 1980 therefore replaces ISO Recommendation R 1980-1971, to which it is technically identical.

ISO Recommendation R 1980 had been approved by the member bodies of the following countries :

| | | |
|---|---|---|
| Australia | India | Portugal |
| Austria | Iran | Romania |
| Belgium | Ireland | South Africa, Rep. of |
| Chile | Israel | Switzerland |
| Czechoslovakia | Italy | Thailand |
| Egypt, Arab Rep. of | Netherlands | Turkey |
| France | New Zealand | United Kingdom |
| Germany | Peru | U.S.A. |
| Greece | Poland | U.S.S.R. |

No member body had expresse disapproval of the Recommendation.

No member body disapproved the transformation of the Recommendation into an International Standard.





Printed in Switzerland

# Nitric acid for industrial use — Determination of total acidity — Titrimetric method



## 1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies a titrimetric method for the determination of the total acidity of nitric acid for industrial use, conventionally expressed as $HNO_3$.

## 2 PRINCIPLE

Addition to a test portion of an excess of a standard volumetric sodium hydroxide solution, and back-titration with a standard volumetric sulphuric acid solution in the presence of an indicator.

## 3 REAGENTS

During the analysis, use only reagents of recognized analytical grade, and only distilled water or water of equivalent purity, neutral to the indicator (3.3).

**3.1 Sodium hydroxide,** 1 N standard volumetric solution.

**3.2 Sulphuric acid,** 1 N standard volumetric solution.

**3.3 Indicator,** having an end point within the pH range between 3,2 and 4,4; for example :

**3.3.1 Methyl orange,** 0,5 g/l solution.

## 4 APPARATUS

Ordinary laboratory apparatus and

**4.1 Flask,** capacity approximately 500 ml, with neck of diameter about 30 mm, with ground glass stopper.

**4.2 Spherical glass ampoule,** of suitable shape and capacity, for example about 20 mm in diameter, having one capillary end of length about 50 mm (see the example shown in the figure).

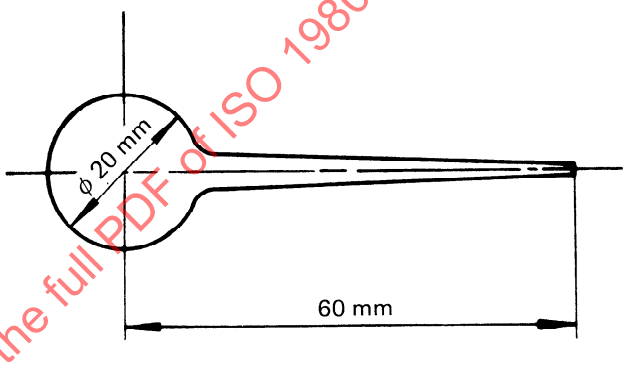


FIGURE — **Spherical glass ampoule**

**4.3 Conical flask,** capacity 500 ml, with ground glass stopper.

## 5 PROCEDURE

### 5.1 Test portion

Nearly fill the flask (4.1) with the test sample. Slightly heat in a flame the bulb of the glass ampoule (4.2), previously weighed to the nearest 0,000 1 g.

Immerse the capillary end of the ampoule into the flask containing the test sample and ensure that during cooling the bulb is almost completely filled (4 ml approximately) for diluted acid and half-filled (2 ml approximately) for concentrated acid.

Withdraw the ampoule and carefully wipe the capillary end with filter paper.

Seal the capillary end in an oxidizing flame, **without loss of glass.** Remove from the flame and allow to cool. Wash the capillary and wipe carefully with filter paper.

Weigh the ampoule to the nearest 0,000 1 g and calculate, by difference, the mass of the test portion.

### 5.2 Determination

Carefully place the ampoule containing the test portion (5.1) in the conical flask (4.3) containing 100 ml of cold water and 50,0 ml of the sodium hydroxide solution (3.1).