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# INTERNATIONAL STANDARD



# 731/II

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

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## Formic acid for industrial use — Methods of test — Part II : Determination of total acidity — Titrimetric method

*Acide formique à usage industriel — Méthodes d'essai —  
Partie II : Détermination de l'acidité totale — Méthode titrimétrique*

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ISO 731-2:1977

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UDC 661.732.1 : 620.1 : 543.8

Ref. No. ISO 731/II-1977 (E)

**Descriptors** : formic acid, tests, chemical analysis, determination of content, acidity, chlorides, sulphates.

## 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 731-1968 and found it technically suitable for transformation. ISO/R 731 has, however, been subdivided into seven parts. International Standard ISO 731/II replaces clause 3 of ISO Recommendation R 731-1968 to which it is technically identical.

<https://standards.iso.org/standards/sist/7ec25ab5-911d-43b9-8623-4da47659cfb9/iso-731-2-1977>

ISO Recommendation R 731 had been approved by the member bodies of the following countries :

Austria	India	Romania
Belgium	Iran	South Africa, Rep. of
Bulgaria	Israel	Spain
Chile	Italy	Switzerland
Czechoslovakia	Japan	Turkey
Egypt, Arab Rep. of	Korea, Rep. of	United Kingdom
France	Netherlands	U.S.S.R.
Germany	New Zealand	Yugoslavia
Greece	Poland	
Hungary	Portugal	

The member body of the following country had expressed disapproval of the Recommendation on technical grounds :

U.S.A.

The member body of the following country disapproved the transformation of the recommendation into an International Standard :

Netherlands

# Formic acid for industrial use — Methods of test — Part II : Determination of total acidity — Titrimetric method

## 1 SCOPE AND FIELD OF APPLICATION

This part of ISO 731 specifies a titrimetric method for the determination of the total acidity of formic acid for industrial use.

This document should be read in conjunction with part I (see the annex).

## 2 PRINCIPLE

Titration of a test portion with a standard volumetric sodium hydroxide solution, using phenolphthalein as indicator.

## 3 REAGENTS

During the analysis, use only reagents of recognized analytical grade and only distilled water, or water of equivalent purity, freshly boiled and cooled.

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

**3.2 Phenolphthalein**, 5 g/l ethanolic solution.

Dissolve 0,5 g of phenolphthalein in 100 ml of 95 % (V/V) ethanol and make faintly pink by the addition of dilute sodium hydroxide solution.

## 4 APPARATUS

Ordinary laboratory apparatus and

**4.1 Spherical thin glass ampoule**, of diameter about 20 mm, having two capillary ends of length 60 to 70 mm at an angle of approximately  $150^\circ$  (see the figure).

This is only required for samples expected to contain more than 90 % (m/m) of total acidity.

## 5 PROCEDURE

**5.1 For acids expected to contain more than 90 % (m/m) of total acidity, expressed as formic acid.**

Weigh the glass ampoule (4.1) to the nearest 0,000 5 g and introduce a test portion of mass about 1,5 g by partially immersing the ampoule in the bottle containing the laboratory sample. Seal the capillary end that was not

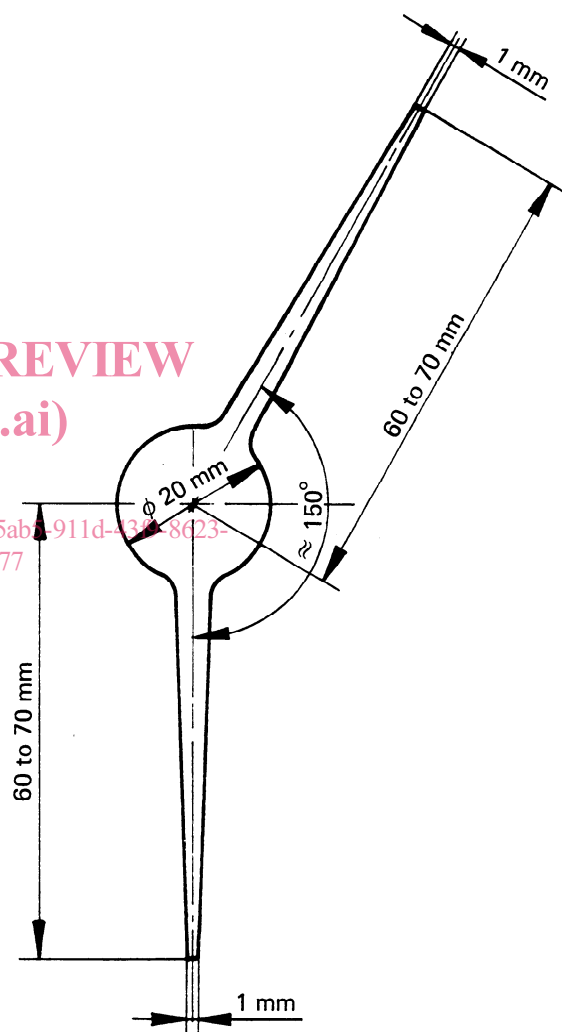


FIGURE — Spherical glass ampoule

immersed in the sample, without loss of glass, using the oxidizing flame of a burner; withdraw the ampoule and invert it. Carefully wipe the capillary end that was immersed in the sample with a filter paper and seal rapidly in the same way as described above. Weigh the ampoule again to the nearest 0,000 5 g and calculate to the nearest 0,001 g, by difference, the mass of the test portion.

Carefully place the sealed ampoule in a 250 ml conical flask containing about 50 ml of water. Break the ampoule with a glass rod, swirl, add 0,5 ml of the phenolphthalein solution (3.2) and titrate with the sodium hydroxide solution (3.1) until a faint pink colour appears.

**5.2 For acids expected to contain less than 90 % (m/m) of total acidity, expressed as formic acid**

Place a test portion of mass 1,5 to 2,0 g, weighed to the nearest 0,001 g, in a 250 ml conical flask containing about 50 ml of water. Add 0,5 ml of the phenolphthalein solution (3.2) and titrate with the sodium hydroxide solution (3.1) until a faint pink colour appears.

**6 EXPRESSION OF RESULTS**

The total acidity, expressed as a percentage by mass of formic acid (HCOOH), is given by the formula

$$\frac{V \times 0,046\ 03 \times 100}{m} = \frac{4,603 \times V}{m}$$

where

$V$  is the volume, in millilitres, of the sodium hydroxide solution (3.1) used for the titration;

$m$  is the mass, in grams, of the test portion;

0,046 03 is the mass, in grams, of formic acid corresponding to 1 ml of exactly 1 N sodium hydroxide solution.

NOTE — If the concentration of the standard volumetric solution used is not exactly as specified in the list of reagents, an appropriate correction should be made.

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ANNEX

[ISO 731-2:1977](https://standards.iteh.ai/catalog/standards/sist/7ec25ab5-911d-43b9-8623-4da47b59c23/iso-731-2-1977)

<https://standards.iteh.ai/catalog/standards/sist/7ec25ab5-911d-43b9-8623-4da47b59c23/iso-731-2-1977>  
**ISO PUBLICATIONS RELATING TO FORMIC ACID FOR INDUSTRIAL USE**

ISO 731/I — General.

ISO 731/II — Determination of total acidity — Titrimetric method.

ISO 731/III — Determination of content of other acids — Potentiometric method.

ISO 731/IV — Visual limit test for inorganic chlorides.

ISO 731/V — Visual limit test for inorganic sulphates.

ISO 731/VI — Determination of iron content — 2,2'-Bipyridyl photometric method.

ISO 731/VII — Determination of low contents of other volatile acids — Titrimetric method after distillation.