INTERNATIONAL STANDARD 905

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

Hydrochloric acid for industrial use — Evaluation of hydrochloric acid concentration by measurement of density

Acide chlorhydrique à usage industriel — Évaluation de la concentration en acide chlorhydrique par mesurage de la masse volumique

First edition — 1976-11-01

UDC 661.419 : 542.3

Ref. No. ISO 905-1976 (E)

Descriptors : hydrochloric acid, chemical analysis, determination of content, concentration, density measurement.

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 905-1968 and found it technically suitable for transformation. International Standard ISO 905 therefore replaces ISO Recommendation R 905-1968, to which it is technically identical.

ISO Recommendation R 905 had been approved by the member bodies of the following countries :

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

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

United Kingdom

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

Printed in Switzerland

Hydrochloric acid for industrial use — Evaluation of hydrochloric acid concentration by measurement of density

1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies a method, by measurement of density, for the approximate evaluation of the hydrochloric acid (HCl) concentration of hydrochloric acid for industrial use.

2 PRINCIPLE

Determination of the density at 20 °C by means of a hydrometer. Evaluation of the corresponding hydrochloric acid (HCl) concentration.

3 APPARATUS

Ordinary laboratory apparatus and

3.1 Hydrometer, graduated in 0,005 g/ml, calibrated at 20 °C (see ISO/R 649).

3.2 Glass test tube, of capacity at least 500 ml, of diameter at least 25 mm greater than that of the hydrometer (3.1), and of height at least 25 mm greater than the immersion level of the hydrometer.

4 PROCEDURE

4.1 Determination of density

Place approximately 500 ml of the test sample in the glass test tube (3.2). Adjust the temperature of the contents of the test tube to 20 ± 0,5 °C.

Plunge in the hydrometer (3.1) and, as soon as static equilibrium has been reached, verify again that the temperature of the acid is 20 ± 0,5 °C. Read the density indicated on the hydrometer scale.

4.2 Evaluation of hydrochloric acid (HCl) content

Read from the table the concentration corresponding to the density indicated on the hydrometer.

TABLE — **Relationship between density and concentration of aqueous solutions of hydrochloric acid**

Density at 20 °C	HCl	Density at 20 °C	HCl
g/ml	% (*m*/*m*)	g/ml	% (*m*/*m*)
1,000	0,4	1,105	21,4
1,005	1,4	1,110	22,3
1,010	2,4	1,115	23,3
1,015	3,4	1,120	24,2
1,020	4,4	1,125	25,2
1,025	5,4	1,130	26,2
1,030	6,4	1,135	27,2
1,035	7,5	1,140	28,2
1,040	8,5	1,145	29,2
1,045	9,5	1,150	30,2
1,050	10,5	1,155	31,2
1,055	11,5	1,160	32,2
1,060	12,5	1,165	33,2
1,065	13,5	1,170	34,2
1,070	14,5	1,175	35,2
1,075	15,5	1,180	36,2
1,080	16,5	1,185	37,3
1,085	17,4	1,190	38,3
1,090	18,4	1,195	39,4
1,095	19,4	1,198	40,0*
1,100	20,4		

* Saturation value at 20 °C.

NOTE — The data shown in the table have been obtained by graphic interpolation of the data given in *International Critical Tables*, Vol. 3, p. 54, rounded to the first decimal.

5 EXPRESSION OF RESULTS

State the density read on the hydrometer, expressed in grams per millilitre, and the corresponding hydrochloric acid (HCl) concentration obtained from the table.

6 TEST REPORT

The test report shall include the following particulars :

a) the reference of the method used;

b) the results and the method of expression used;

c) any unusual features noted during the determination;

d) any operation not included in this International Standard or regarded as optional.

ANNEX

ISO PUBLICATIONS RELATING TO HYDROCHLORIC ACID FOR INDUSTRIAL USE

ISO 904 – Determination of total acidity – Titrimetric method.

ISO 905 – Evaluation of hydrochloric acid concentration by measurement of density.

ISO 906 – Determination of sulphate content – Barium sulphate gravimetric method.

ISO 907 – Determination of sulphated ash – Gravimetric method.

ISO 908 – Determination of oxidizing or reducing substances – Titrimetric method.

ISO/R 909 – Determination of iron content – 2,2′-Bipyridyl spectrophotometric method.

ISO 2762 – Determination of soluble sulphates – Turbidimetric method.

ISO 5785 – Determination of arsenic content – Silver diethyldithiocarbamate photometric method.