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# INTERNATIONAL STANDARD



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## Aluminium and aluminium alloys — Determination of silicon — Gravimetric method

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## 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 now in the process of being transformed into International Standards. As part of this process, International Standard ISO 797 replaces ISO Recommendation R 797-1968 drawn up by Technical Committee ISO/TC 79, *Light metals and their alloys*.

The Member Bodies of the following countries approved the Recommendation :

Argentina	Germany	Poland
Austria	Hungary	South Africa, Rep. of
Belgium	Korea, Rep. of	Spain
Brazil	India	Sweden
Bulgaria	Ireland	Switzerland
Canada	Israel	Turkey
Chile	Italy	United Kingdom
Czechoslovakia	Japan	U.S.A.
Egypt, Arab Rep. of	Netherlands	U.S.S.R.
France	Norway	Yugoslavia

No Member Body expressed disapproval of the Recommendation.

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# Aluminium and aluminium alloys – Determination of silicon – Gravimetric method

## 1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies a gravimetric method for the determination of silicon in aluminium and aluminium alloys.

The method is applicable to the determination of silicon content greater than or equal to 0,30 %.

The method does not apply completely to the following special cases for which it should be modified as described in Annex A or Annex B :

- a) aluminium-silicon alloys (silicon content greater than 3 %) and aluminium-magnesium alloys (see Annex A);
- b) aluminium alloys containing tin or antimony (see Annex B).

## 2 PRINCIPLE

Attack with sodium hydroxide. Acidification with perchloric acid; dehydration of the silica. Filtration, drying, calcination and weighing of the silica.

Volatilization of the silica, by means of hydrofluoric acid, and weighing of the residue. Determination of the silica by difference in mass.

## 3 REAGENTS

**3.1 Sodium hydroxide pellets.** (Store in a plastics container.)

**3.2 Hydrobromic acid,**  $\rho$  approximately 1,49 g/ml, 48 % (V/V) solution.

**3.3 Hydrochloric acid,**  $\rho$  1,01 g/ml, approximately 0,62 N solution.

Take 5 ml of hydrochloric acid ( $\rho$  1,19 g/ml), approximately 12 N, and make the volume to 100 ml with water.

**3.4 Hydrofluoric acid,**  $\rho$  approximately 1,14 g/ml, 40 % (m/m) solution.

**3.5 Nitric acid,**  $\rho$  1,40 g/ml, approximately 15 N solution.

**3.6 Perchloric acid,**  $\rho$  1,67 g/ml, approximately 11,7 N solution.<sup>1)</sup>

**3.7 Perchloric acid,**  $\rho$  1,22 g/ml, approximately 4 N solution.

Take 35 ml of perchloric acid (3.6) and make up the volume to 100 ml with water.

**3.8 Sulphuric acid,**  $\rho$  1,48 g/ml, approximately 17,5 N solution.

Carefully add 50 ml of sulphuric acid ( $\rho$  1,84 g/ml), approximately 35,6 N, to water, cool and make up the volume to 100 ml.

**3.9 Bromine water,** saturated solution.

**3.10 Hydrogen peroxide,** 6 % (V/V) (about 20 volumes).

Take 17 ml of hydrogen peroxide, 36 % (V/V),  $\rho$  1,12 g/ml, and make up the volume to 100 ml with water.

**3.11 Sodium hydroxide,**  $\rho$  1,05 g/ml, approximately 1,25 N solution.

Dissolve 50 g of sodium hydroxide (NaOH) in a little water and, after cooling, make up the volume to 1 000 ml. (Store in a plastics container.)

1) Perchloric acid ( $\rho$  1,54 g/ml) approximately 9 N, may also be used. 1 000 ml of perchloric acid ( $\rho$  1,67 g/ml), is equivalent to 1 270 ml of perchloric acid ( $\rho$  1,54 g/ml).