
International Standard



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Sodium tripolyphosphate and sodium pyrophosphate for industrial use — Separation by column chromatography and determination of the different phosphate forms

Tripolyphosphate et pyrophosphate de sodium à usage industriel — Séparation par chromatographie sur colonne et dosage des différentes formes de phosphates

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FOREWORD

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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.

International Standard ISO 3358 was developed by Technical Committee ISO/TC 47, *Chemistry*.

This second edition was submitted directly to the ISO Council, in accordance with clause 6.13.1 of the Directives for the technical work of ISO. It cancels and replaces the first edition (i.e. ISO 3358-1976), which had been approved by the member bodies of the following countries :

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|---------------------|-------------|-----------------------|
| Belgium | Hungary | South Africa, Rep. of |
| Bulgaria | India | Spain |
| Chile | Israel | Switzerland |
| Czechoslovakia | Italy | Thailand |
| Egypt, Arab Rep. of | Netherlands | Turkey |
| France | New Zealand | United Kingdom |
| Germany, F. R. | Poland | Yugoslavia |

No member body had expressed disapproval of the document.

Sodium tripolyphosphate and sodium pyrophosphate for industrial use — Separation by column chromatography and determination of the different phosphate forms

1 SCOPE

This International Standard specifies a method for the separation and the determination of the different phosphate forms in sodium tripolyphosphate (pentasodium triphosphate) and sodium pyrophosphate (tetrasodium diphosphate) for industrial use.

2 FIELD OF APPLICATION

The procedure specified allows the selective determinations of orthophosphate (Na_2HPO_4), of pyrophosphate ($\text{Na}_4\text{P}_2\text{O}_7$) and of tripolyphosphate ($\text{Na}_5\text{P}_3\text{O}_{10}$), and also the evaluation of the total content of more condensed forms of phosphates in the absence of tetrameta- and pentametaphosphates.

NOTES

1 In practice, tetrametaphosphates and pentametaphosphates are not usually present in commercial tripolyphosphates and pyrophosphates.

2 Although the procedure can separate orthophosphate, its determination is not possible if the content is lower than 0,1 % (m/m); in this case its determination shall be carried out by the method specified in ISO 2998.

3 REFERENCES

ISO 2998 — *Sodium tripolyphosphate and sodium pyrophosphate for industrial use — Determination of orthophosphate content — Photometric method using the reduced molybdophosphate.*

ISO 3357, *Sodium tripolyphosphate and sodium pyrophosphate for industrial use — Determination of total phosphorus(V) oxide content — Quinoline phosphomolybdate gravimetric method.*

4 PRINCIPLE

Absorption of the phosphate anions on an anionic ion-exchange resin. Elution with potassium chloride solutions of increasing concentrations. Determination of P_2O_5 in the different eluate volumes.

5 REAGENTS

During the analysis, use only reagents of recognized analytical grade and only distilled water or water of equivalent purity, free from silica.

5.1 Ion-exchange resin, strongly basic anionic type, in the chloride form, particle size between 0,07 and 0,16 mm.

NOTE — The resins commercially available as Biorad AG 1 X8 or Dowex 1 X8, purified and graded, meet these requirements and have given satisfactory results.

5.2 Hydrochloric acid, approximately 73 g/l solution.

5.3 Buffer solution, pH 4,3.

Dissolve 51 g of sodium acetate trihydrate ($\text{CH}_3\text{COONa}\cdot 3\text{H}_2\text{O}$) and 46 ml of glacial acetic acid, ρ approximately 1,05 g/ml, in water. Add several milligrams of phenylmercury(II) acetate ($\text{C}_6\text{H}_5\text{HgOOCCH}_3$) and dilute to 1 000 ml.

5.4 Potassium chloride, approximately 18,5 g/l solution.

5.5 Potassium chloride, approximately 37 g/l solution.

Prepare solutions 5.4 and 5.5 and then add to each solution 10 ml of the buffer solution (5.3) and several milligrams of phenylmercury(II) acetate per litre.

6 APPARATUS

Ordinary laboratory apparatus and

6.1 Ion-exchange column consisting of a glass tube 300 mm long and internal diameter 12 mm. The top of the tube is fitted with a ground glass socket enabling a 100 ml graduated cylindrical dropping funnel to be fitted (see figure 1). The bottom of the tube is extended by a narrower glass tube about 90 mm long and 8 mm diameter, fitted at its middle with a stopcock, the end of which is drawn out to a jet. The bottom of the ion-exchange column is fitted with a silica wool pad about 10 mm thick or, preferably, a fritted glass disk of porosity P 100 (pore diameter between 40 and 100 μm).

NOTE — The solutions can also be introduced into the column using either a syphon, as illustrated in figure 2, or a suction device, as illustrated in figure 3.