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Standard Guide for Determination of Anions in Cathodic Electrocoat Permeates by Ion Chromatography[1]

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1. Scope

1.1 This guide is used for the determination of nitrate anion in electrocoat bath permeate by use of chemically suppressed and non-suppressed ion chromatography (IC).

1.2 Other anions, with the exception of phosphate, may be determined in electrocoat bath permeates by use of this guide.

1.3 It is the responsibility of the user of this guide to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

2. Referenced Documents

2.1 *ASTM Standards:*[2]
D1193 Specification for Reagent Water

3. Significance and Use

3.1 It is important to monitor the anion concentrations and anion contaminants in electrocoat baths. Wet chemical methods are long, tedious, and of questionable accuracy in the ppm range. Ion chromatography offers a fast, convenient and accurate alternative. Since IC analysis of electrocoat bath samples is difficult, the permeates are often analyzed for contaminants. This guide addresses some important considerations for such analyses.

4. Apparatus

4.1 A wide variety of ion chromatography columns, eluents, and operating parameters are available from commercial sources. The round robin studies conducted in conjunction with this guide's preparation utilized both suppressed and non-suppressed IC systems, acid and base eluents, strong and weak base eluents, and varying gradients and flow rates. All laboratories utilized a conductivity detector for their analysis.

4.2 Any properly maintained commercial IC system capable of separating, detecting, and quantifying anions by conductivity is deemed satisfactory.

5. Guidelines for Analysts

5.1 Utilize commercially available ANION standards or prepare anion standards from reagent grade chemicals and reagent water Type I (see Specification D1193).

5.2 Sparge all eluent solutions with helium for at least 15 min prior to performing an IC analysis.

5.3 When necessary, remove residual traces of organic compounds such as resin with properly pretreated precolumns.

5.4 Utilize at least three standards for calibration. Standards should be in the same approximate concentration ranges as the anion's concentration in the sample. Calibration standards should bracket the anion's concentration in the sample.

5.5 Calibrate instrument only after chromatogram's baseline is stable.

5.6 Use the peak area for the specific anion of interest as determined by an electronic integrator.

5.7 Use a sample of sufficient size to completely fill the ion chromatograph's injection loop.

6. Keywords

6.1 cathodic electrocoat; ion chromatography; nitrate; permeate

[1] This guide is under the jurisdiction of ASTM Committee D01 on Paint and Related Coatings, Materials, and Applications and is the direct responsibility of Subcommittee D01.21 on Chemical Analysis of Paints and Paint Materials.

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[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.