Phosphates | Fluorine Content in Phosphoric Acid

Summary

Millions of tons of phosphoric acid (H_3PO_4) are produced globally each year. Eighty percent of the acid is used in the production of agricultural fertilizers, with the remainder being used for detergent additives, cleaning agents, insecticides, and animal feed additives. Phosphoric acid used for animal feed additives and supplements must be de-fluorinated in order for the resultant manufactured feed to meet strict governmental regulations regarding the intake of fluorine. Too much fluorine in the animal diet can result in fluorosis, but trace amounts are required for good health.

Progression, Inc. has established a fast and easy method for the reliable determination of fluorine in phosphoric acid using the patented Magneflow® NMR products. Based on this method fluorine determinations can be made in the lab or on-line in the plant in only a few minutes allowing for better process control and higher throughput. Progression, Inc. is the world's leading supplier of industrial NMR technology to the phosphate industry. The company provides on-line process equipment as well as robust lab instrumentation used by the world's most efficient phosphate chemical plants.

Benefits

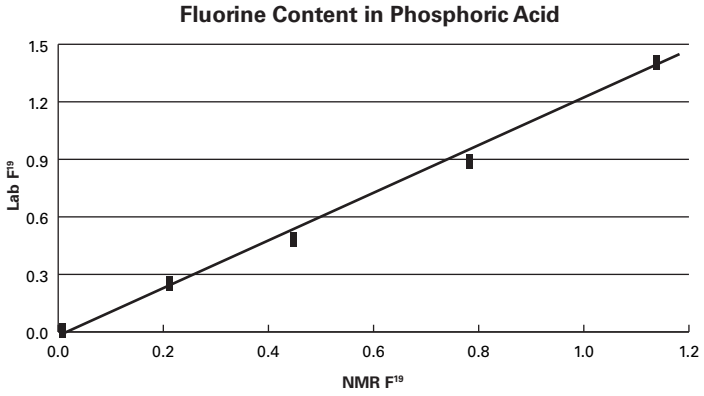
- Direct analysis of fluorine
- Fast results in less than 5 minutes
- Non-destructive analysis
- No sample preparation necessary
- Highly repeatable analysis
- Operator independent
- Chemical-free analysis
- Pre-loaded method and calculations

Sampling

Phosphoric acid samples can be manually or automatically taken from the chemical plant for Magneflow NMR analysis. The samples are then analyzed with the Magneflow NMR technology in less than 5 minutes to provide an accurate fluorine determination. No sample preparation is required. Since the Magneflow NMR technology measures 100% of the sample in the testing probe, the analysis is not affected by color, vibration or impurities.

Calibration and Results

The lab or on-line Magneflow NMR technology is calibrated versus traditional lab analysis. The Magneflow NMR technology is calibrated by Progression staff or by staff at the phosphate chemical plant. The linear calibrations are easy to generate with a limited number of reference samples. The calibration models once established are very robust and do not require adjustment.



This graph demonstrates a typical performance for the Magneflow NMR technology compared with lab reference data for the analysis fluorine content in phosphoric acid. In most cases, better quality reference data will result in better calibration results. The Magneflow NMR calibration performance is excellent in the short term, as well as long-term repeatability. A typical performance of 0.05% is expected.