



# Certificate of Analysis

## Standard Reference Material 1075a

### Aluminum 2-Ethylhexanoate

(Standard for Determination of Aluminum in Petroleum Products)

This compound was prepared to insure material that is essentially free from other metals and has suitable solubility, compatibility, and uniformity, for use in the preparation of a standard of aluminum in lubricating oils. The compound is certified to one part per hundred of aluminum, and every effort should be made to maintain a uniform procedure by following the directions in this certificate.

#### CHEMICAL AND SPECTROGRAPHIC ANALYSES

##### Procedure and Results of Chemical Analysis

Aluminum, percent ..... 8.07±0.02

The uncertainty shown represents the 95 percent confidence limit of the mean based on 8 determinations and allowances for the effects of known sources of possible errors.

Aluminum was determined by wet-ashing a 1-g sample (dried for 48 hr over phosphorus pentoxide) with sulfuric and nitric acids, precipitating with ammonium hydroxide, and igniting the filtered precipitate to  $\text{Al}_2\text{O}_3$  at 1100 °C. Determinations were also made by direct ignition of a dried 1-g sample, wrapped in filter paper and covered with oxalic acid, to  $\text{Al}_2\text{O}_3$  at 1100 °C.

##### Procedure and Results of Spectrographic Analysis

The compound was examined spectrographically for metallic impurities. A 5-mg sample of the compound was excited in a direct-current arc and the photographed spectrum was examined for the characteristic lines of 51 elements. Several impurities were found, but none is considered to be present in sufficient concentration to interfere with the intended use. The impurities were each estimated to be less than 0.01 percent.

**STABILITY.**—Tests show that standard lubricating-oil solutions of this compound with concentrations of aluminum up to 500 ppm are stable for several weeks when prepared by the directions given on the reverse side of this certificate.

**COMPATIBILITY.**—Lubricating-oil solutions of this compound have been found to be compatible with lubricating-oil solutions of the other compounds in this series. Blends of several different compounds have been prepared by use of the procedures given in the certificates for the other compounds. (Tests have not been carried out to insure compatibility with the various additives that may be in the oils to be analyzed.)

The aluminum 2-ethylhexanoate was prepared by Distillation Products Industries of Rochester, N. Y. Chemical analyses were conducted by B. B. Bendigo, and spectrochemical analyses by Virginia C. Stewart.

WASHINGTON, D. C. 20234  
October 25, 1967

W. Wayne Meinke, Chief  
Office of Standard Reference Materials

(over)

## DIRECTIONS FOR PREPARING LUBRICATING-OIL SOLUTIONS OF ALUMINUM 2-ETHYLHEXANOATE

Transfer approximately 1.0 g of this compound from the bottle to a small beaker and dry over fresh phosphorus pentoxide in a desiccator for 48 hr. (Tightly close the bottle containing the remainder of the compound.) Quickly and accurately transfer 0.620 g of this dried salt to a weighed 200-ml flask. (This weight of salt is equivalent to 50 mg of aluminum.) Add 3 ml of xylene and 4 ml of 2-ethylhexanoic acid and heat the flask on a hot plate, with swirling and without charring, until a clear gel forms. Add 3 ml of 6-methyl-2, 4-heptanedione and continue heating and swirling until the gel disappears and a clear solution forms. Add to the hot solution 80 to 90 ml of lubricating oil and gently shake the flask to mix the contents. Allow the flask to cool to room temperature and add enough lubricating oil to bring the total weight of the contents of the flask to  $100 \pm 0.5$  g. Stopper the flask and shake gently to insure a homogeneous solution. The concentration of aluminum in this solution is 500 ppm.