



National Institute of Standards & Technology

Certificate of Analysis

Standard Reference Material 1083

Wear-Metals in Lubricating Oil

This Standard Reference Material (SRM) is intended for use as a diluent base oil for SRMs 1084a and 1085a. It has been analyzed for 20 elements, including sulfur, that are important to wear metal analyses. The information values given below in Table 1 are not certified values but are conservative upper limits of the elements detected, except for sulfur and chlorine. The sulfur and chlorine values are based on a single method or technique that employs a primary standard for comparison. They are not certified because the measurement process did not meet NIST requirements for certification, i.e., the employment of two or more independent methods or techniques.

The information values given below are based on a minimum sample size of 0.5 g, which is the minimum amount to be used for analysis. SRM 1083 consists of 150 mL of base oil number 245 that is contained in a polyethylene bottle.

Table 1

<u>Element</u>	<u>Information Value, $\mu\text{g/g}$</u>	<u>Method</u>	<u>Element</u>	<u>Information Value, $\mu\text{g/g}$</u>	<u>Method</u>
Ag	(<0.05)	a	Mn	(<0.005)	b
Al	(<0.5)	a	Mo	(<0.01)	b
Cd	(<0.04)	b	Na	(<0.06)	b
Cl	(1.7)	b	Ni	(<0.4)	a
Co	(<0.01)	b	S	(980.)	c
Cr	(<0.02)	a,b	Si	(<1.)	a
Cu	(<0.5)	a	Sn	(<0.4)	a
Fe	(<1.)	a,b	Ti	(<5.)	a
Pb	(<0.04)	a	V	(<0.3)	d
Mg	(<0.1)	a	Zn	(<0.08)	b

Methods

- Atomic Absorption and Flame Emission Spectrometry
- Instrumental Neutron Activation Analysis
- Ion Chromatography
- Direct Current Plasma Emission Spectroscopy

The original direction and coordination of measurements leading to the development of this material were performed in the NIST Inorganic Analytical Research Division by E.L. Garner.

The technical and support aspects involved in the update preparation, certification, and issuance of this SRM were coordinated through the Standard Reference Materials Program by T.E. Gills.

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William P. Reed, Chief
Standard Reference Materials Program

DIRECTIONS FOR PREPARING LUBRICATING-OIL SOLUTIONS OF DIBUTYL TIN
BIS(2-ETHYLHEXANOATE)

Transfer approximately 0.3 g of this compound from the bottle to a small beaker and dry over fresh phosphorus pentoxide in a desiccator for 2 hours. (Tightly close the bottle containing the remainder of the compound.) Quickly and accurately transfer 0.218 g of this dried compound to a weighed 200-ml flask. (This weight of compound is equivalent to 50 mg of tin.) Add 5 ml of xylene and heat the flask on a hot plate, with swirling and without charring, until 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 ± 0.5 g. Stopper the flask and shake gently to insure a homogeneous solution. The concentration of tin in this solution is 500 ppm.