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Committee E34 on Occupational Health and Safety
Subcommittee E34.50 on Health and Safety Standards for Metal Working Fluids

Research Report E34-1002

Interlaboratory Study to Establish Precision Statements for ASTM E2694-11, Measurement of Adenosine Triphosphate in Water-Miscible Metalworking Fluids

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1. Introduction:

Interlaboratory Study 466 was conducted to establish a precision statement for E2694, Measurement of Adenosine Triphosphate in Water-Miscible Metalworking Fluids (MWF).

2. Test Method:

The Test Method used for this ILS is E2694-11 To obtain a copy of E2694, go to ASTM's website, www.astm.org, or contact ASTM Customer Service by phone at 610-832-9585 (8:30 a.m. - 4:30 p.m. Eastern U.S. Standard Time, Monday through Friday) or by email at service@astm.org.

3. Participating Laboratories:

The following laboratories participated in this interlaboratory study

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4. Description of Samples:

There were 22 samples of varying targeted results used for this study. All MWF were provided by John Cutcher of Benz Oil, Milwaukee, WI. Don Satchell, Situ Biosciences, challenged 5% v/v dilutions of the neat MWF in tap water with an uncharacterized microbial inoculum from a contaminated MWF. The respective MWF formulae are provided in Annex A. The initial inoculations were performed approximately three-weeks before the ILS. Weekly, during the interim weeks between initial inoculation and the ILS, ILS, Satchell replaced 90% of the MWF with freshly prepared 5% v/v MWF. On the day preceding the ILS, Fred Passman (BCA, Inc), Don Satchell and Pat Whalen (LuminUltra Technologies, Ltd) 1 to 10 and 1 to 100 dilutions of each challenged MWF and dispensed 30 mL of MWF into 60 mL, wide-mouth, HDPE bottles (See Annex B for details).

5. Interlaboratory Study Instructions

Laboratory participants were emailed the test program instructions. For a copy of the instructions, including copies of the data reporting and chain of custody forms, please see Annex B.

6. Description of Equipment/Apparatus[1]:

For information on the equipment/apparatus used by each laboratory, please see Annex C.

7. Data Report Forms:

Each laboratory was provided with a data report form for the collection of data (See Annex B). A copy of the data obtained for this ILS is provided in Annex D

Please note: The laboratories have been randomly coded and cannot be identified herein.

8. Statistical Data Summary:

A summary of the statistics calculated from the data returned by the participating laboratories is provided in Annex E.

9. Precision and Bias Statement:

9.1 The precision of this test method is based on an interlaboratory study of ASTM E2694, Standard Test Method for Measurement of Adenosine Triphosphate in Water-Miscible Metalworking Fluids, conducted in 2011. Ten laboratories tested twenty-two different metalworking fluids for ATP content. Every "test result" represents an individual determination. All labs were asked to submit triplicate test results for each material tested (Table 1). Practice E691 was followed for the overall design and analysis of the data; the details are given in ASTM Research Report No. E34-1002. [i]

9.1.1 Repeatability limit (r) - Two test results obtained within one laboratory shall be judged not equivalent if they differ by more than the "r" value for that material; "r" is the interval representing the critical difference between two test results for the same material, obtained by the same operator using the same equipment on the same day in the same laboratory.

[1] The equipment listed was used to develop a precision statement for E 2694-09. This listing is not an endorsement or certification by ASTM International.