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**Committee G02 on Wear and Erosion
Subcommittee G02.40 on Non-Abrasive Wear**

Research Report: G02-1017

**Interlaboratory Study to Establish Precision Statements for ASTM
G98-17, Test Method for Galling Resistance of Materials**

Technical contact:

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1. Introduction:

Interlaboratory Study 1380 was conducted to establish a precision statement for G98, Test Method for Gallling Resistance of Materials.

2. Test Method:

The Test Method used for this ILS is G98-17. To obtain a copy of G98, 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:

Battelle Memorial Institute
505 King Ave
Columbus, OH
43201-2693 US
Steve Shaffer

Lafayette College 1
Dept of Mechanical Engineering
Materials Testing
Easton, PA 18042
US
Scott Hummel

Bud Labs
3145 Dewey Ave.
Rochester, NY 14616
US
Ken Budinski

Lafayette College 2
Department of Mechanical Engineering
Structures
Easton, PA 18042
US
Augustus Henninger

4. Description of Samples:

There were 1 samples of varying targeted results used for this study. Each sample was prepared and distributed by Scott Hummel of Lafayette College. Below is a list of the samples with the corresponding supplier:

1. Type 303 Stainless Steel
Provided by McMaster Carr Corporation

5. Interlaboratory Study Instructions

Laboratory participants were emailed the test program instructions. For a copy of the instructions, please see Annex A.

6. Description of Equipment/Apparatus¹:

6.1 Commonly available laboratory equipment has been used to conduct galling tests. Both Brinell hardness testers and servo-hydraulic testing machines have proven to be satisfactory as loading devices. Any apparatus that can apply and maintain a constant compressive load should be acceptable.

¹ The equipment listed was used to develop a precision statement for G98-17. This listing is not an endorsement or certification by ASTM International.
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7. Data Report Forms:

Each laboratory was provided with a data report form for the collection of data. A copy of the data is provided in Annex B.

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 C.

9. Precision and Bias Statement:

9.1 The precision of this test method is based on an interlaboratory study of G98, Standard Test Method for Galling Resistance of Materials, conducted in 2016. Four laboratories participated in this study. Each of the four labs reported duplicate test results for a single type of stainless steel. Every “test result” reported represents an individual determination. Except for the use of only four laboratories and a single material type, Practice E691 was followed for the design and analysis of the data; the details are given in ASTM Research Report No. G02-1017.ⁱ

9.1.1 Repeatability (r) - The difference between repetitive results obtained by the same operator in a given laboratory applying the same test method with the same apparatus under constant operating conditions on identical test material within short intervals of time would in the long run, in the normal and correct operation of the test method, exceed the following values only in one case in 20.

9.1.1.1 Repeatability can be interpreted as the maximum difference between two results, obtained under repeatability conditions, that is accepted as plausible due to random causes under normal and correct operation of the test method.

9.1.1.2 Repeatability limits are listed in Table 1 below.

9.1.2 Reproducibility (R) - The difference between two single and independent results obtained by different operators applying the same test method in different laboratories using different apparatus on identical test material would, in the long run, in the normal and correct operation of the test method, exceed the following values only in one case in 20.

9.1.2.1 Reproducibility can be interpreted as the maximum difference between two results, obtained under reproducibility conditions, that is accepted as plausible due to random causes under normal and correct operation of the test method.