
ASTM Manual for

CONDUCTING AN INTER-
LABORATORY STUDY OF A
TEST METHOD



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Prepared by

COMMITTEE E-11 ON QUALITY CONTROL OF MATERIALS
AMERICAN SOCIETY FOR TESTING AND MATERIALS



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P R E F A C E

This ASTM Manual for Conducting an Interlaboratory Study of a Test Method was prepared by ASTM Committee E-11 on Quality Control of Materials to help other technical committees in the planning of interlaboratory studies of test methods and the interpretation of the results. The procedure is intended for the evaluation of well-defined physical or chemical testing processes which yield measurements of properties. Thus, the procedure covers interlaboratory evaluation of test methods, but not interlaboratory evaluations of materials. For example, if the objective of a study is the evaluation, on an interlaboratory scale, of a quantitative method for measuring the color intensity of paints, the methods of analysis discussed in this manual are applicable. On the other hand, a study of the color fading characteristics of different paints under various environmental conditions is not covered by the methods presented in this manual, despite the participation of a number of laboratories in the study. In the first case, a method of test is being studied; in the second, the objective of the investigation is an evaluation either of materials or of the effect of environment on the behavior of materials. Since studies of the latter type are often also referred to as "interlaboratory tests" or "round robins," the above distinction is essential.

Some of the general requirements for conducting interlaboratory studies that are discussed in this manual may appear to be trivial. However, experience has shown that results are often not valid simply because these requirements have not been met.

The process of making measurements is discussed briefly, and a model for the process is suggested which reduces the examination of a set of results of an interlaboratory study to the analysis of a group of regression lines. The general design of interlaboratory studies, based on this model, is outlined; and some specific suggestions are given about the allocation of materials to the laboratories.

No specific experimental designs for conducting interlaboratory studies are recommended; but examples of four studies are given to illustrate the relative amounts of information obtained when one material, two materials, three materials, and many materials are used. Complete detailed computations are given for these examples.

The statistical methodology used to examine a simple interlaboratory study on a single material is essentially that of control chart analysis. When a large number of materials are used, it becomes necessary to use the techniques of linear regression and analysis of variance.

This manual was prepared by a task group of ASTM Committee E-11 on Quality Control of Materials. The task group members at the time of publication were as follows: G. Wernimont, Chairman, S. Collier, H. F. Dodge, J. C. Hintermaier, J. Mandel, P. S. Olmstead, and F. D. Tuemmler. Many other members of Committee E-11 made important contributions by way of comments as the manual developed.

NOTE.—The Society is not responsible, as a body, for the statements and opinions
advanced in this publication.

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THIS PUBLICATION is one of many issued by the American Society for Testing and Materials in connection with its work of promoting knowledge of the properties of materials and developing standard specifications and tests for materials. Much of the data result from the voluntary contributions of many of the country's leading technical authorities from industry, scientific agencies, and government.

Over the years the Society has published many technical symposiums, reports, and special books. These may consist of a series of technical papers, reports by the ASTM technical committees, or compilations of data developed in special Society groups with many organizations cooperating. A list of ASTM publications and information on the work of the Society will be furnished on request.