

# **PAINT TESTING MANUAL**

**Physical and Chemical Examination of  
Paints, Varnishes, Lacquers, and Colors**

**Gardner/Sward**

**THIRTEENTH EDITION • 1972**

**STP 500**



**AMERICAN SOCIETY FOR TESTING AND MATERIALS**

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Physical and Chemical Examination of  
Paints, Varnishes, Lacquers, and Colors

G. G. Sward, editor

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*To*

**Dr. Henry A. Gardner**

*whose vision and interest in developing  
and sharing knowledge of paint materials  
has endured for more than a half century*

# Preface to the Thirteenth Edition

When the twelfth edition of this book came off the press in 1962, its authors believed that their work was done. Others would henceforth take over—new faces, a new generation, new approaches.

But Dr. John C. Weaver had the idea that the work started by Dr. Henry A. Gardner should live on and grow. All it needed was a permanent sponsor. And this sponsor, he thought, should be the American Society for Testing and Materials, in which Dr. Gardner had been very active. The Society agreed, and in a brief but historic ceremony at the January 1967 meeting of Committee D-1 in Washington, D.C., ownership of the Gardner-Sward Handbook was transferred from the Gardner Laboratory to the American Society for Testing and Materials.

In accepting the gift, the Society assumed responsibility for revising, editing, and publishing future editions of this time-honored work. The project was assigned to Committee D-1 on Paint, Varnish, Lacquer, and Related Materials, who created a permanent subcommittee (Subcommittee 19 on the Gardner-Sward Handbook) to guide the policy and preparation of future editions. A. Gene Roberts was appointed chairman of this working committee which included Harold M. Werner and Mark W. Westgate, with the three officers of Committee D-1, J. C. Moore, J. C. Weaver, and W. A. Gloger, as ex-officio members. George G. Sward who had coauthored most of the previous editions, was selected to be the editor. The thirteenth edition attests to the dedication with which this subcommittee and the contributing authors accomplished their task.

The scope of this book is in keeping with the stated scope of Subcommittee 19: "To provide technical, editorial, and general policy guidance for preparation of the 13th and subsequent editions of the Gardner-Sward Handbook. The Handbook is intended to review for both new and experienced paint technologists the past, present, and foreseeable trends in all kinds of testing within the scope of Committee D01. It supplements, but does not replace, the pertinent parts (currently parts 20 and 21) of the ASTM Book of Standards. It describes briefly and critically all test methods believed to have significance in the world of paint technology, whether or not these tests have been adopted officially by the Society."

As a general policy, in accordance with the above scope, standard methods that are described in detail in the ASTM Book of Standards are reviewed here only in sufficient detail to indicate the principle of operation, basic techniques and apparatus, area of usefulness, and a critique where appropriate. Test methods of particular merit and importance other than ASTM standard methods are described in greater detail.

Methods of limited usefulness or of largely historical interest are described only briefly. References to original or detailed sources of information are given wherever possible. The overall treatment, while not exhaustive, is sufficiently comprehensive to provide the paint technologist with a broad and critical guide to the selection of appropriate test methods.

A special debt of gratitude is due the authors who, without remuneration and often at a great sacrifice of personal time, contributed the material that made this work possible. Thanks are due also to those organizations that allowed authors to use company time for some of the writing, to contributors of photographs or drawings, and to the reviewers. The editor and the chairman appreciate the helpful interest of the ASTM publications staff.

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Paint undergoing outdoor exposure testing in Arizona. Q-Lab is the world leader in weathering test equipment and test services for the paint and coatings industry. Q-Lab's accelerated weathering testers simulate the primary weathering conditions that degrade paints and coatings outdoors, allowing our customers to accurately reproduce dozens of potential failure modes, including: Color change and fading. Yellowing. Manufacturer & distributor of paint testing instruments including paint test meters & paint adhesion test kits. Paint test meters are used for measuring electrical resistance of paint formulations for all electrostatic applications. Manual controlled abrasion wear testers & count controlled abrasion wear testers are available in 110 V, 220 V & 240 V voltage ratings. RCA abrasion wear testers are used in testing abrasion & wear resistance on flat, convex & concave shaped surfaces.