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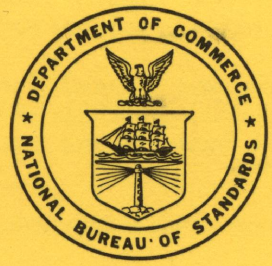
NBS MONOGRAPH 35—Supplement 1

Bibliography and Index on Vacuum and Low Pressure Measurement

January 1960 to December 1965



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Bibliography and Index on Vacuum and Low Pressure Measurement January 1960 to December 1965

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Foreword

This bibliography is a supplement to the Bibliography and Index on Vacuum and Low Pressure Measurement issued in 1961 as NBS Monograph 35. It lists technical publications issued during 1960-1965 inclusive, together with some issued earlier but omitted in Monograph 35. As in preparing the original Monograph, the aim has been to meet the needs of scientists, engineers, and others for a general source of information on vacuum measurement. For this purpose, the author and subject indices should be particularly helpful.

This publication was compiled as part of the work on vacuum standards which is now in progress under the supervision of E. C. Lloyd, Chief of the Mechanical Measurements Branch of the NBS Mechanics Division, and S. Ruthberg, Chief of the Vacuum Measurements Section.

A. V. Astin, Director

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BIBLIOGRAPHY AND INDEX ON VACUUM AND LOW PRESSURE MEASUREMENT
January 1960 to December 1965

W. G. Brombacher

The bibliography, a supplement to NBS Monograph 35, of the same title, covers the years 1960 to 1965, inclusive, and includes 109 references for prior years not listed in Monograph 35. It contains 1787 references, 38 of which are to books. The references, besides those directly concerned with pressure measurement, include those on vacuum technology which may bear on the technique of vacuum measurement, such as on adsorption and desorption, diffusion of gases into solids, gas conductance and hardware such as pumps, seals and traps. Author and subject indices are provided.

KEY WORDS: bibliography, low pressure measurement, techniques of vacuum measurement, vacuum index, vacuum measurement.

This bibliography is an extension to 1965 of the bibliography completed in 1960 and published as NBS Monograph 35 under the same title. For convenience, some of the Introduction of Monograph 35 will bear repetition, suitably modified.

Abstracts of current literature on vacuum technology are available in a) Vacuum (since 1951), Pergamon Press, London, and by title only in b) Le Vide (since 1946), Société Française des Ingénieurs des Techniciens du Vide, Paris, France. Other abstract journals or publications containing a significant number of pertinent abstracts include c) Physics Abstracts, Institution of Electrical Engineers, London, d) Chemical Abstracts, American Chemical Society, Columbus, Ohio, e) Engineering Index, Engineering Index, Inc., New York, f) Physikalische Berichte, Deutsche Gesellschaft für Technische Physik, Braunschweig, g) Vakuum-Technik, Deutsche Arbeitsgemeinschaft Vakuum, Rudolf A. Lang Verlag, Esch, Taunus, Germany. The above publications have been freely drawn upon in preparing this bibliography.

As in Monograph 35, this paper has three major parts: a) the bibliography, b) an author index and c) an index of the subject matter covered by the bibliography. The bibliography is divided into a list of books and a list of papers and reports, all listed chronologically, by years. Books are designated by the letter "B" followed by two digits indicating the year of publication and by a single digit identifying the order of listing. For example, B645 indicates a book published in 1964, listed fifth in the book list for 1964. Papers and reports are designated by four, or five digits where necessary, the first two indicating the year of publication or issue, and the last two or three the order of listing. Thus 65229 indicates the 229th in the list for 1965.

The bibliography contains 1787 references of which 38 are books. An effort was made to list all significant publications on vacuum and low pressure measurement. Vacuum technology and vacuum phenomena are covered, if of some interest in making valid vacuum measurements. References are therefore listed on such phenomena as adsorption, degassing, outgassing, surface reactions, leak detection, diffusion and permeation of gases into solids, and gas conductance. Hardware for vacuum systems, such as vacuum pumps, controlled gas leaks, seals, and valves, are covered with, it is hoped, few omissions. The literature on mass spectrometers, field emission microscopy and sorption phenomena is extensive, so that limited coverage was advisable. The selection of references for inclusion has been somewhat arbitrary, but it is hoped that none of the more pertinent papers have been omitted. References on evaporated film technology, which are also extensive, have been omitted as not germane.

Papers on the various designs of micromanometers both liquid and mechanical, are listed.

With minor exceptions, neither catalogs, nor announcements in trade journals of new instruments without technical data, nor patents, are listed. Reports on vacuum measurement issued as separates have, with some exceptions, not been listed. They appear rarely to justify the labor involved in locating them, in view of the fact that if important, their essence is ultimately published in a periodical.

It will be noticed that all of the references, over 140, for 1960 given in Monograph 35 are repeated in the present bibliography. This gives full coverage here for the years 1960 to 1965 inclusive.

Over 100 references are for years prior to 1960 and in effect are desirable additions to Monograph 35. To preserve continuity with Monograph 35, the identifying numbers start where those in Monograph 35 leave off.

In general the number of references cited is unlisted. Where such listing might aid in judging their adequacy of a review or indicate a significant source of published information, the number of references cited is given when easily available.

Low pressure measurement is here defined to apply to instrumentation used to measure absolute or differential pressures in the range from about 10^{-4} to 10 mm of mercury with the ability to detect pressure changes of less than about 0.01 mm of mercury. The instruments are generally known as micromanometers, which divide into liquid and mechanical types. The liquid types generally involve a U-tube, filled with either mercury, oil or water. The sensitivity used as a criterion to justify listing is about 0.01 mm of the column height of the filling liquid.

Standard terminology has been proposed by the American Vacuum Society (58148, Monograph 35, 6376) and others (see Subject Index). The American proposed standard terminology has been largely followed in the subject index, including the classification of degrees of vacuum. The latter is:

Condition	Pressure range, torr
High vacuum	10^{-3} to 10^{-6}
Very high vacuum	10^{-6} to 10^{-9}
Ultra-high vacuum	10^{-9} and below

The torr equals 1/760 of one atmosphere of pressure (1,013,250 dynes per cm^2) or at pressures in the vacuum range, one millimeter of mercury for all practical purposes.

The subject index is preceded by a discussion of the headings used.

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The headings require some discussion. Outgassing and degassing are indexed under "Degassing" for convenience. The phenomena are in many cases too closely related to be easily separated. For the same reason, papers on permeability and diffusion are indexed under "Diffusion into or through solids."

Gettering action has been covered under five headings: "Getters," under which gettering materials are covered; "Traps" which has some overlap with the former; "Ion pumps"; "Getter-ion pumps"; and "Gettering action, ionization gages" which seemed to warrant a separate heading.

Micromanometers cover the class of low pressure instrumentation of interest. Two main headings are used: "Micromanometers, liquid U-tube" and "Mechanical pressure and vacuum gages." In addition see also "Vapor pressure measurement" and "Pressure measurement."

Two primary indices are given in the index. Under the heading "Pressure measurement" all types of vacuum gages and micromanometers are listed under the various nomenclatures in use. It would serve to locate the heading in the index under which references will be found. The same has been done for pumps under the heading "Pumps."

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