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BOOK REVIEWS

E. HAHNE and U. GRIGULL (Editors) **Heat Transfer in Boiling.** Hemisphere, Washington (1977). 486 pp. U.K. Price £28.05.

THE DEMAND for a deeper knowledge of the phenomena related to boiling is greater today than ever before. In order to make optimum use of our resources we have to understand the interrelations of the pertinent parameters governing the boiling process so that accurate predictions are possible.

Against this background, the Deutsche Forschungsgemeinschaft provided the financial background to a five-year research program on "Heat Transfer in Boiling" carried out at university institutes of the Federal Republic of Germany and Switzerland. This book is a handsome, well-written and informative account of the results of that program. In his preface one of the editors (E. Hahne) states that he is setting out to present the compilation of the above original experimental work in a form useful to the specialist in both experiment and theory, the researcher starting in the field of boiling, and the practicing engineer encountering a special problem; also to avoid the scatter of information on a special program among a variety of journals, and the shortcomings of publication in a journal due to limited space there.

The task thus defined by the editor has been adequately achieved. The book gives, in a text of 486 pages, easy access to information. It is divided into 19 chapters each presenting a separate paper. The above chapters are grouped into three parts.

Part One deals with Pool Boiling. Stephan (Stuttgart) covers bubble formation and heat transfer in natural convection boiling; Beer *et al.* (Darmstadt) deal with nucleate boiling, viewed with a laser interferometer; W. C. von Ceumern-Lindenstjerna (Braunschweig) presents a study on bubble departure diameter and release frequencies during nucleate pool boiling of water and aqueous sodium chloride solutions. Körner and Photiadis (Berlin) present a brief paper on pool boiling heat transfer and bubble growth on surfaces with artificial cavities for bubble generation; Bier *et al.* (Karlsruhe) present two papers (using the same experimental apparatus) on heat transfer at burnout and Leidenfrost points for pressures up to critical and pool boiling heat transfer at saturation pressures up to critical.

Diesselhorst and Grigull (München) and Hahne (Stuttgart) present a well documented paper on the hydrodynamic and surface effects on the peak heat flux in pool boiling and Hahne and Feurstein (Ravensburg) provide experimental data for the near-critical region in pool boiling as a function of pressure and of heater geometry. The last paper of this first part by Happel (Bochum) gives account of the author's tests for binary mixtures from the beginning of nucleate boiling, over the point of maximum heat flux density, to the beginning of film boiling.

Part Two of the book covers flow boiling. Lung *et al.* (München) deal with boiling heat transfer to subcooled water in turbulent annular flow, whilst the influence of flow velocity on surface boiling heat-transfer coefficient is studied by Lemmert and Chawla (Karlsruhe). The increase of nucleate boiling heat transfer with pressure is treated by Vaihinger (Zurich), and the heat transfer and pressure drop for boiling nitrogen flowing in a horizontal tube by Steiner and Schlünder (Karlsruhe). Forced convection boiling of neon flowing in horizontal tubes is the subject of the experiments by Mohr and Runge (Stuttgart), and systematic measurements of local heat-transfer coefficients for evaporation in horizontal tubes of an air–water system that of Ruppert *et al.* (Karlsruhe). The boiling of liquid mercury, a subject of great interest to nuclear reactor technology and in particular to the fast breeder reactor program, is investigated by Schmücker and Grigull (München).

The final series of papers deal with effects of properties, subject of particular interest to engineering applications, for example in boiling and condensation problems as well as in the theoretical treatment of phase transition and critical phenomena; they are presented in Part Three of the book. The effect of liquid viscosity on bubble formation and heat transfer in boiling is treated by Mayinger and Hollborn (Hannover) using various autoclaves, holographic interferometers and high-speed motion pictures. Rathjen and Straub (München) investigate the temperature dependence of surface tension, coexistence curve and vapor pressure, with special emphasis on the critical region; the substances used were CO_2, Freon 13, Freon 13B1 and SF_6. In the last paper of the book metastable states of special interest to boiling phenomena are investigated by Gerum *et al.* (München) for the liquid–vapor phase transition.

On the whole, the included papers are of high quality and all of them have adequate bibliographies to permit an overview of the field. Abstracts of the papers are collected at the end of the book. The publication is excellent as regards presentation, length and quality of all papers (there are only a couple of insignificant typographical errors).

This book has certainly provided us with a comprehensive and valuable compendium of high quality experimental information for practising engineers, research organizations, consulting engineering offices, and students at higher academic levels. The only slightly unhappy aspect of this volume is the price, a steep £28.05 in the UK. Whilst this may fall within organizational library budgets, I fear it may prove excessive for the individual.

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M. A. STYRIKOVICH, A. A. ZUKAUSKAS, J. P. HARTNETT and T. F. IRVINE, JR (Editors) **Heat and Mass Transfer Source Book.** Scripta/Wiley, New York (1977).

THIS book includes all the abstracts and a selection of papers from the Fifth All-Union Conference, held at Minsk in May 1976. The majority of the 580 papers presented at the Conference described Soviet research in the fields of heat transfer and fluid flow. Readers who therefore expect to find a predominance of translated Soviet papers will be disappointed, as the selection is entirely made from the small minority of non-Soviet papers presented. A result of this is that the apportionment of the 36 selected papers over the subject areas does not reflect the spread at the Conference or the range of Soviet research generally. For example, conduction analysis is represented by over 40 papers at the Conference but none in the book.

The selected papers are not listed under subject headings, but may be divided into three roughly equal parts; convection, two-phase heat transfer and other areas. Papers of particular interest in the first part include three involving roughness effects, a study of the effect of large temperature differences on air flow in a tube and the outline of a model