

Book Reviews

Industrial Colour Testing: Fundamentals and Techniques. By H. G. Völz. VCH, Weinheim, Germany, 1994. 377 pp. ISBN 3-527-28643-8. Price: DM198.

This book is the English version of the text 'Industrielle Farprüfung', published in 1989/1990. Some updating has been applied to take account of developments which have taken place since the publication of the German language edition. The new material includes the CIELAB 92 colour difference system and the RAL Design colour system. An index of standards is provided in this English language edition, and this short section should prove to be a very useful addition to the original text.

This reviewer enjoyed the book. The style is clear and the text lucid. The author states that his objective was to reach three audiences: (i) technical personnel, whether in manufacturing, converting or consuming; (ii) industry-based scientists engaged in research and development work on coloring matters; and (iii) university academics, lecturers and students. However, there is a fourth audience of people who would benefit from reading this book, namely the group which has a natural curiosity in life, science and nature. The author has amply achieved his objective, and has somehow managed successfully to bridge the gap between the classical text book and the more advanced research type of text.

The volume consists of eight chapters divided into two main sections, namely Principles and Test Methods. Each chapter carries an integral bibliography, some of which are rather dated. In the section to follow, each chapter is discussed and page length and number of references quoted is given. The range of time covered by the bibliography is also mentioned.

Chapter 1 Introduction, 13 pages, 9 references (1972–1993). This short chapter covers the classifications of coloring materials, white pigments and black pigments. However, the emphasis is placed clearly on the world of pigments. Colour properties, including the origins of colour, are then briefly considered.

Chapter 2 How Colours Depend on Spectra (Colorimetry), 50 pages, 33 references (1802–1993). This chapter begins with consideration of the role of colour measurement in the description of colour, in colour formulation, in colour appreciation and in colour identification codes. Topics such as

reflection and transmission, spectral distribution and stimulus, colour measurement theories and principles, sensation based systems, and colour-order systems are considered in depth, as are the mathematical statistics of colour coordinates. The section on colour measurement errors and their significance is very well presented.

Chapter 3 How Spectra Depend on the Scattering and Absorption of Light (Phenomenological Theory), 60 pages, 36 references (1860–1987). The topics covered include the ‘many-flux theory’, surface phenomena, the ‘four-flux theory’, the ‘Kubelka–Munk theory’, hiding power factors, transparency as a phenomenon, and the principles of spectral evaluation as applied to transparency and coloring power and to hiding power.

Chapter 4 How Light Scattering and Absorption Depend on the Content of Colouring Material (Beer’s Law, Scattering Interaction), 80 pages, 32 references (1854–1988). This chapter deals essentially with colour in continuous media from the standpoint of pigment properties such as particle size, particle shape, opacity, density and surface area. Features considered in detail include ease of dispersion and dispersion stability as viewed from the optical (scattering) properties. Factors relating to mixing strategies and pastes are given extensive, excellent treatment. The chapter concludes with treatment of colour matching and considerations of particular problems.

Chapter 5 How Light Scattering and Absorption Depend on the Physics of the Pigment Particle—(Corpuscular Theory), 24 pages, 23 references (1908–1988). A description of the corpuscular theory is provided in terms of a bridge between Kubelka–Munk concepts and the approaches which arise from consideration of the two physical-optical constants of a pigment particle, its refractive index and its absorption index. The chapter is somewhat dated in its treatment, but is still a useful introduction into this important area. Particle size distributions, optical constants, Mie theory, particle ensemble notation, scattering behaviour, and absorption behaviour are all given succinct treatment.

Chapter 6 Measurement and Evaluation of Object Colours, 45 pages, no references. This is the first of three chapters within a general ‘Test Methods’ section of the total volume. Topics covered include gloss measurement and assessment, practical evaluation of colour differences, errors in testing, statistical treatments and quality ensurance/acceptability.

Chapter 7 Determination of Hiding Power and Transparency, 45 pages, no references. This chapter considers four important points in considerable detail, from the standpoint of measurement and evaluation. These are the measurement of film thickness, of scattering and absorption coefficients, of transparency, and of hiding power. The detail afforded to the test procedures is impressive.

Chapter 8 Determination of Tinting Strength and Lightening Power, 33 pages, no references. Emphasis is placed on three aspects, quantitative chemical evaluation of the colorant content (dyes and pigments), of formulations, and separation criteria and spectrophotometric determinations of properties such as the relative tinting strength, lightness matching, lightening power and pigment volume concentration values.

The book is concluded by a useful listing of important international standards for testing drawn from ISO, ASTM, BS, NF, JIS and DIN sources. Chapters 1–5 are accompanied by an individual list of symbols used in formulae, a meaningful summary of the chapter and a short review of historical factors of relevance coupled with bibliographical notes.

The text will fulfil the objectives of the author. However, students will need guidance through some of the more mathematical and conceptual points. It is recommended that this text be read initially in sections and enjoyed, as good non-fiction. On second reading, fuller understanding develops. From this comes the wish to develop concepts, argue and think more deeply about what is written.

This book is recommended for all those who are interested in industrial colour testing. Never mind the price, enjoy the quality?

J. T. Guthrie

Encyclopedia of Spectroscopy. By H.-H. Perkampus. VCH, Weinheim, Germany, 1995. 669 pp. ISBN 3-527-29281-0. Price: DM148.

This text is designed to provide an introduction to spectroscopic techniques for a non-specialist audience, particularly scientists and students who may be considering the application of spectroscopy to problem-solving.

The concept of such an encyclopedia, which embraces spectroscopic techniques, apparatus, instrumentation, definitions and principles, is an interesting one; to maintain such a book to a reasonable size is also commendable. The individual entries are of a very different scope and standard; some examples of excellent descriptions are provided by Mössbauer spectroscopy, Mie scattering, Kerr effect, photoacoustic spectroscopy and polarized light. In contrast, other entries such as those for near-infrared spectroscopy, Raman spectroscopy and normal coordinate analysis are perhaps rather too brief.

The book succeeds in the ready provision of information about spectroscopic instrumentation, effects and definitions which otherwise might require considerable searching of literature; an advantage of such a