

Readers and others are invited to submit reviews of books of interest to the profession. Teachers are especially encouraged to write reviews of current textbooks they have tested in the classroom.

Non-Newtonian Flow and Heat Transfer

A.H.P. Skelland

John Wiley and Sons, New York (1967)

pp. vii + 469, 112 illustrations, \$17.95

Many fluids involved in today's processing are non-Newtonian. For this area of study, Professor Skelland has provided the student engineer and the practicing engineer a text that is both detailed and lucid. To accomplish this he has excluded much of the mathematically complex and often obscure developments of rheology, and has included a wealth of practical examples. For the teaching of engineering methods and to the practicing engineer, who because of his age and the newness of the field managed to escape a depth of treatment, this book can be recommended. It was not written with the intent of being a text for advanced graduate research orientated courses, for these there are several books available; e.g. Frederickson, Lodge, or Brodkey.

A breakdown of the coverage is of interest. After introductory sections on classification of fluid behavior and experimental determination of flow properties, the author deals with the mechanics of steady flow in tubes; of this, about one third is on turbulent flow. Steady flow in annuli, parallel plates, and rectangular ducts are all briefly treated. The remaining half of the book covers optimization of non-Newtonian pipe systems, boundary layers, mixing and agitation, and heat transfer. The balance appears to be satisfactory considering the engineering nature of the text and the state of the literature in the field.

There are areas of interest to researchers that Skelland has avoided. Some may criticize him for this, but I feel he has done well to avoid them. With a cutoff time of early 1966 he could

not include the very recent ideas on the second normal stress difference and drag reduction. Even today, such topics as these and the relations of viscoelasticity and thixotropic behavior are still far from completely understood. I fail to see how one could write a universally satisfactory discussion of these factors, let alone how to account for the observed effects in engineering design. Much more work will have to appear in the literature before these topics can be adequately treated in an engineering text.

Finally, I should mention that this review and the feeling expressed herein are based on the use of the text for a quarter course at the advanced undergraduate level and introductory graduate level. The book was used for the undergraduates and master candidates who planned to terminate at these levels. With these, I considered the use of the book totally successful.

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