

FOREWORD

I have been aware of and quite impressed by the work of Dr. M. Podhorsky and his co-author, H. Krips, for a number of years, in particular for their exceptional contribution to the development of the hydraulic expansion process for the manufacturing of tube-to-tubesheet joints. I was therefore delighted and honored to have been invited by Dr. Podhorsky to write a foreword for the English translation of his book on Heat Exchangers.

This book offers an interesting overview of procedures for designing heat exchanger pressure vessels; although the approach is based mainly on the German Code standards, it regularly refers to and provides comparisons with the ASME Code.

The authors draw extensively from their wide industrial experience combined with a thorough understanding of the theory underlying the code procedures. Their approach is systematic and easy to follow and they use numerous illustrations to make their point. They cover the field with just necessary details and leave it to the reader to complement his or her information from the available design codes.

Chapter 1 provides an excellent description of the many types of heat exchangers found in the field, their applications, and the many practical problems that could be encountered (in particular those related to corrosion and vibration damage). It is an excellent “*entrée en matière*” for the experienced and inexperienced designers alike.

Detailed design procedures are given in Chapters 2 and 3. While Chapter 2 provides details on the discontinuity analysis approach for computing the stresses in the various pressure vessel components, Chapter 3 looks particularly at the design of tubesheets.

I was particularly interested in the authors’ handling of the gasketed bolted flanged joint in Chapter 4. They are among the few who have tackled the problem in a complete manner, i.e., as a complex mechanical assembly whose purpose is to operate satisfactorily, not only in terms of pressure integrity but also in terms of leak tightness. It is, of course, beyond the scope of this book to cover in detail the extensive research work—more specifically that sponsored by the Pressure Vessel Research Council—that has recently been carried out of gasket evaluation alone. But it is interesting that their approach systematically takes into account the gasket as a full fledged mechanical element in the analysis. The fact that the ASME code is considering the introduction of new gasket factors and a new design procedure for gasketed flanged joints is an indication that the authors were pioneers in their approach.

Chapter 5 on Methods of Fastening Tubes to Tubesheets and Headers is, by itself, a justification to buy this book. It offers an excellent overview of the various methods available for securing a tight joint between the tube and the tubesheet. The authors cover all the methods in detail including, of course, the hydraulic expansion process which they pioneered. Having personally carried out research on the residual stresses generated in heat exchanger tubes by the various expansion processes discussed in the book, I can only but concur that the hydraulic process is the one that generates the least unwanted residual stresses while ensuring a systematic and uniform tube-tubesheet joint.