
Proceedings of the

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PREFACE

A consortium of 29 companies formed the Design Institute for Emergency Relief Systems (DIERS) in 1976 under the auspices of the AIChE to evaluate existing methods to design emergency relief systems for runaway reactions and to develop additional technology as needed. Approximately \$1.6 million was spent to acquire test data and document applicable methods for the design of emergency relief systems suitable for the discharge of two-phase vapor-liquid flow. Of particular interest was the prediction of when two-phase flow would occur and the extent of vapor-liquid onset/disengagement.

The DIERS Users Group, established in 1986, works to reduce the frequency, severity, and consequences of pressure-producing incidents in the CPI and HPI and to promote the development of new techniques that will improve the design of emergency relief systems. There are presently 225 member companies of the DIERS Users Group with approximately one third international companies with their headquarters located in countries other than the United States. Member companies are located on every continent, except Antarctica. A European based DIERS Users Group meets at least annually. Interest has been expressed in forming an Asian based DIERS Users Group.

DIERS and the DIERS Users Group of the AIChE over the past 30 years have changed a chemical engineering paradigm – the approach to and techniques used for design of emergency relief systems. Generalized techniques to size emergency relief systems for runaway reaction and/or two-phase vapor-liquid flow were almost absent from the chemical engineering literature before DIERS. Standards, Guidelines and Recommended Practices, both domestic and international, now incorporate the research of DIERS and others. Today both industry practice and regulators expect consideration of these topics. Manufacturing companies seeking engineering design and construction services are contractually requiring that “DIERS methods” be considered for emergency relief system designs. Contractor and consultants offer “DIERS and DIERS-related” services. Industrial advertisements seeking safety professions mention “DIERS experience” as a prerequisite for employment.

The first public release of the DIERS design related research occurred at the AIChE 1985 Spring National Meeting in Houston. Publication of eight papers from that conference followed in the August 1985 issue of Chemical Engineering Progress and the October 1985 and January 1986 issues of Plant/Operations Progress. The AIChE made copies of the research reports of the DIERS contractors available to the CPI, HPI and general public in 1986. The DIERS Project Manual was published by the AIChE in 1992 and is available as an AIChE/DIERS publication. Many organizations and individual authors regularly publish the results of their research.

The First and Second International Symposia on Runaway Reactions, Pressure Relief Design, and Effluent Handling were held in August of 1995 and March of 1998. Copies of the proceedings of those conferences are available as AIChE/DIERS publications.

This book is the proceedings of the Third International Symposium of Runaway Reactions, Pressure Relief Design and Effluent Handling. A theme of the conference is “Managing Chemical Reactivity with Confidence”. The editors believe that the information in this book will prove useful to those who design or review emergency relief systems for both reactive and non-reactive scenarios.

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