CARL HANSER VERLAG

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# Plastics Flammability Handbook

Principles - Regulations - Testing and Approval

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# Preface to the Third Edition

None of the many publications on the reaction of plastics to fire provides a comprehensive review of the fundamentals as well as of the relevant regulations and test methods. The "International Plastics Flammability Handbook" was first published in 1983 to fill this gap. In the 1980s, major changes occurred in the field of plastics fire behavior ratings on national and increasingly on international levels. These changes made it necessary to prepare a completely revised 2nd edition of the handbook, which was published in 1990. The last thirteen years saw a breakthrough in the internationalization of fire testing and classification, particularly in building, electrical engineering, and transportation. At the same time, the perception of how to assess the main parameters governing a fire and the role of combustible materials like plastics were redefined and led to new approaches particularly in the fields of smoke development and toxicity of fire effluents. All these developments required a comprehensive revision of the handbook.

To fulfill these demands, the various chapters were revised by experts in the relevant fields. I should like to express my gratitude to my responsible editors *M. Le Bras* and *S. Bourbigot* (I Fundamentals), *M. Mitzlaff* (II Fire protection regulations and test procedures), *H. U. Werther* (III Fire effluents) and to the more than 40 co-authors, whose expertise and commitment made the revision of this handbook feasible.

The handbook consists of four parts: After a historical review and a detailed synopsis of the market situation, Part I describes the basic principles of the burning process, covers the thermal properties and burning behavior of thermoplastics, foams, thermosets, and elastomers in depth. Chapters on flame retardants, their mode of action and flame retardant plastics, the burning behavior of textiles and flame retardant textiles, smoke development and suppression follow. It is hoped that this will facilitate the reader's introduction to this complex subject and also provide the background to a better understanding of the fire test procedures, regulations, and approval criteria covered in the second part.

Part II starts with an introduction to the methodology of fire testing and describes fire protection regulations, the fire test methods introduced to satisfy these regulations, and product approval procedures for combustible products and plastics components in various applications.

The most extensive section in the handbook is devoted to the building sector for which numerous regulations and test methods were developed in all industrialized countries and where a tremendous harmonization effort is under way or was already completed.

Further sections cover transportation and electrical engineering where international harmonization of regulations and test methods has made greater progress. Their number and variety is thus less extensive. The chapter on furnishings focuses on developments in the European Union and the US.

Part III deals with the smoke development, toxicity, and corrosivity of fire effluents. These topics are of increasing public interest and thus covered in some depth.

Part IV, the Appendix, contains listings intended to assist the reader in his daily work.

It is hoped that this book will be of interest to all those concerned with plastics, flame retardancy, fire testing as well as fire protection and will help to better understand this complex matter.

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