

PREFACE

Although the chemical industry can trace its roots into antiquity, it was during the industrial revolution that it started to become an actual industry and began to use the increased knowledge of chemistry as a science and technology to produce products that were needed by companion industries and consumers. These commercial efforts resulted in the synthesis of many new chemicals. Quite quickly, in these early days, previously unknown materials or materials that had been present only in low concentrations, were now in contact with people in highly concentrated forms and in large quantities. The people had little or no knowledge of the effects of these materials on their bodies and the natural biological and physical processes in the rivers and oceans, the atmosphere, and in the ground.

Until the end of the nineteenth century these problems were not addressed by the chemical industry and it is only recently that the industry began to respond to public criticism and political efforts. Legal restrictions aimed at preserving the quality of life have been directed at health, safety and longevity issues and the environment. Solvents have always been mainstays of the chemical industry and because of their widespread use and their high volume of production they have been specifically targeted by legislators throughout the world. The restrictions range from total prohibition of production and use, to limits placed on vapor concentrations in the air. As with any arbitrary measures some solvents have been damned unfairly. However, there is no question that it is best to err on the side of safety if the risks are not fully understood. It is also true that solvents should be differentiated based on their individual properties.

This book is intended to provide a better understanding of the principles involved in solvent selection and use. It strives to provide information that will help to identify the risks and benefits associated with specific solvents and classes of solvents. The book is intended to help the formulator select the ideal solvent, the safety coordinator to safeguard his or her coworkers, the legislator to impose appropriate and technically correct restrictions and the student to appreciate the amazing variety of properties, applications and risks associated with the more than one thousand solvents that are available today.

By their very nature, handbooks are intended to provide exhaustive information on the subject. While we agree that this is the goal here, we have attempted to temper the impact of information, which may be too narrow to make decision.

Many excellent books on solvents have been published in the past and most of these are referenced in this book. But of all these books none has given a comprehensive overview of all aspects of solvent use. Access to comprehensive data is an essential part of solvent evaluation and it has been a hallmark of such books to provide tables filled with data to the point at which 50 to 95% of the book is data. This approach seems to neglect a fundamental requirement of a handbook - to provide the background, explanations and clarifications that are needed to convert data to information and assist the reader in gaining the knowledge to make a decision on selecting a process or a solvent. Unfortunately, to meet the goal of providing both the data and the fundamental explanations that are needed, a book of 4,000 to 5,000 pages might be required. Even if this was possible, much of the data would fall out of date quite quickly. For example, a factor that defines solvent safety such as threshold limit

values (TLVs) for worker exposure or some single toxicity determinants may change frequently. This book would be huge and it would have to be updated frequently to continue to claim that it is current.

What we have attempted to do here is to give you a book with a comprehensive and extensive analysis of all current information on solvents then use other media to present the supporting data on individual solvents. These data are provided on a CD-ROM as a searchable database. Data are provided on more than 1140 solvents in 110 fields of data. The medium permits frequent updates. If the same data were presented in book form, more than 2,000 pages would be needed which exceeds the size of any data in handbook form offered to date.

The best approach in presenting an authoritative text for such a book is to have it written by experts in their fields. This book attracted well-known experts who have written jointly 47 books and authored or coauthored hundreds of papers on their areas of expertise. The authors have made their contributions to this book in late 1999 and early 2000 providing the most current picture of the technology. Their extreme familiarity with their subjects enables them to present information in depth and detail, which is essential to the reader's full understanding of the subject.

The authors were aware of the diversity of potential readers at the outset and one of their objectives was to provide information to various disciplines expressed in a way that all would understand and which would deal with all aspects of solvent applications. We expect professionals and students from a wide range of businesses, all levels of governments and academe to be interested readers. The list includes solvent manufacturers, formulators of solvent containing products, industrial engineers, analytical chemists, government legislators and their staffs, medical professionals involved in assessing the impact on health of solvents, biologists who are evaluating the interactions of solvents with soil and water, environmental engineers, industrial hygienists who are determining protective measures against solvent exposure, civil engineers who design waste disposal sites and remediation measures, people in industries where there are processes which use solvents and require their recovery and, perhaps most important, because understanding brings improvements, those who teach and learn in our universities, colleges and schools.

A growing spirit of cooperation is evident between these groups and this can be fostered by providing avenues of understanding based on sharing data and information on common problems. We hope to provide one such avenue with this book. We have tried to present a balanced picture of solvent performance by dealing not only with product performance and ease of processing but also by giving environmental and health issues full consideration.

Data and information on known products and processes should be cornerstones of the understanding of a technology but there is another aspect of technology, which can lead to advances and improvements in utility, safety and in safeguarding the environment. This must come from you, the reader. It is your ideas and creative thinking that will bring these improvements. The authors have crammed their ideas into the book and we hope these will stimulate responsible and effective applications of solvents. Francis Bacon wrote, "The end of our foundation is the knowledge of causes, and the secret motion of things, and the enlarging of the bound of human Empire, to the effecting of all things possible."

Today there are few technical activities that do not employ solvents. Almost all industries, almost all consumer products, almost everything we use can, if analyzed, be shown to

contain or to have used in its processing, a solvent. Solvent elimination need never be a technical objective. Rather, we need to use our increasing understanding and knowledge to find the safest and the most effective means of meeting our goals.

I would like to thank the authors for their relentless efforts to explain the difficult in an interesting way. In advance, I would like to thank the reader for choosing this book and encourage her or him to apply the knowledge to make our world a better, more livable place.

George Wypych
Toronto, August 3, 2000