



Standard Guide for the Preparation of a Binary Chemical Compatibility Chart¹

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INTRODUCTION

The purpose of this standard is to provide expert guidance to those interested in the task of compiling chemical compatibility (inter-reactivity) charts for the purposes of process safety and reactive chemicals hazard evaluation. This standard does not provide specific answers regarding the inter-reactivity of specific materials. However, it does provide a detailed framework for developing charts based on the current best practices of the chemical industry and it directs the user to sources of reactivity information. It is the E27 Committee's belief that inter-reactivity charts will be increasingly used in industry for day-to-day operations, process hazard reviews, employee education, and emergency response. It is our hope that this standard guide can be useful in that effort.

1. Scope

1.1 A binary chemical compatibility chart also called inter-reactivity chart, documents the hazards associated with the mixing of pairs of materials. This guide provides an aid for the preparation these charts. It reviews a number of issues that are critical in the preparation of such charts: accurate assessment of chemical compatibility, suitable experimental techniques for gathering compatibility information, incorporation of user-friendliness, and provision for revisions.

1.2 The uses of chemical compatibility charts are summarized in this standard.

1.3 This guide also reviews existing public domain compatibility charts, the differences therein, and their advantages and disadvantages.

1.4 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

2. Referenced Documents

2.1 *ASTM Standards*:²

E537 Test Method for The Thermal Stability of Chemicals by Differential Scanning Calorimetry

¹ This guide is under the jurisdiction of ASTM Committee E27 on Hazard Potential of Chemicals, and is the direct responsibility of Subcommittee E27.02 on Thermal Stability and Condensed Phases.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

E698 Test Method for Arrhenius Kinetic Constants for Thermally Unstable Materials Using Differential Scanning Calorimetry and the Flynn/Wall/Ozawa Method

E1231 Practice for Calculation of Hazard Potential Figures-of-Merit for Thermally Unstable Materials

PS168 Proposed Guide for Estimating the Incompatibility of Selected Hazardous Wastes Based on Binary Chemical Reactions³

2.2 *NFPA Standard*:⁴

NFPA 491 Guide to Hazardous Chemical Reactions

3. Terminology

3.1 *Definitions*:

3.1.1 *compatibility, adj*—the ability of materials to exist in contact without specified (usually hazardous) consequences under a defined scenario.

3.1.2 *scenario, n*—a detailed physical description of the process whereby a potential inadvertent combination of materials may occur.

4. Summary of Guide

4.1 A binary chemical compatibility chart indicates whether, under a given set of conditions (the scenario) the combination of two materials does or does not yield a specified undesired consequence.

4.2 A summary of the guide follows. Determine the scenario for the determination of compatibility and the degree of

³ Withdrawn. This chart was subsequently adopted by the U.S. EPA and is widely available by way of the Internet.

⁴ Available from National Fire Protection Association (NFPA), 1 Batterymarch Park, Quincy, MA 02169-7471, <http://www.nfpa.org>.