WILEY GUIDE TO CHEMICAL INCOMPATIBILITIES

SECOND EDITION

This Page Intentionally Left Blank

WILEY GUIDE TO CHEMICAL INCOMPATIBILITIES

SECOND EDITION

This Page Intentionally Left Blank

WILEY GUIDE TO CHEMICAL INCOMPATIBILITIES

SECOND EDITION

Richard P. Pohanish
Stanley A. Greene

A JOHN WILEY & SONS PUBLICATION

This book is printed on acid-free paper. ♾

Published simultaneously in Canada.

For ordering and customer service, call 1-800-CALL-WILEY.

Library of Congress Cataloging-in-Publication Data:

Pohanish, Richard P.
Wiley guide to chemical incompatibilities. – 2nd ed. / Richard P. Pohanish.
p. cm.
Rev. ed. of: Rapid guide to chemical incompatibilities. ©1997.
Includes bibliographical references and index.
ISBN 0-471-23859-7
1. Hazardous substances–Safety measures–Handbooks, manuals, etc. 2. Chemicals–Safety measures–Handbooks, manuals, etc. I. Pohanish, Richard P. Rapid guide to chemical incompatibilities. II. Title.

T55.3.H3 P647 2003
660'.2804–dc21

2002032959

Printed in the United States of America.

10 9 8 7 6 5 4 3 2 1

To
Dina, Barbara, and Jennifer

This Page Intentionally Left Blank

NOTICE

This book is intended to provide data about chemical incompatibilities and other hazards. It is not intended as a primary source of research information. It cannot be assumed that all necessary warnings and precautionary measures are contained in this work, and that other, or additional, information or assessments may not be required. Extreme care has been taken in the preparation of this work and, to the best knowledge of the publisher and the editors, the information presented is accurate. No warranty, express or implied, is made. Information may not be available for some chemicals; consequently, an absence of data does not necessarily mean that a substance is not hazardous. Neither the publisher nor the editors assume any liability or responsibility for completeness or accuracy of the information presented or any damages of any kind alleged to result in connection with, or arising from, the use of this book. The publisher and the editors strongly encourage all readers, and users of chemicals, to follow the manufacturers' or suppliers' current instructions, technical bulletins, and material safety data sheets (MSDSs) for specific use, handling, and storage of all chemical materials.

The chemical profiles presented in this guide book are representative of known and potential incompatible materials and neither purports to be complete, nor is it intended as a primary source of research information. In fact, although there are other fine works that report on chemical accidents, it is nearly impossible to cover all of the potential combinations resulting from the 3,000 high-production volume chemicals used in the United States and elsewhere, let alone the hundreds of thousands of chemicals registered with the Chemical Abstract Service of the American Chemical Society (ACS).

ACKNOWLEDGMENT

Thanks are due to those individuals who reviewed and constructively commented on publication of the first edition and during the development of this second edition. We also want to thank the many scientists, contract employees, and other individuals who developed the various documents and databases that provided so much of the data that were compiled for this book. Thanks are also due to Bob Esposito of John Wiley & Sons for his encouragement and suggestions for this edition.

CONTENTS

Introduction	xi
How to Use This Book	xiii
Key to Abbreviations, Symbols, and Acronyms	xv
Chemicals and Their Incompatibilities in Alphabetical Order	1
Glossary	1257
Appendix 1: Reducing Agents (Name/CAS)	1267
Appendix 2: Oxidizing Materials (Name/CAS)	1269
Bibliography	1277

This Page Intentionally Left Blank

INTRODUCTION

More than five years ago, *Rapid Guide to Chemical Incompatibilities* was published. This second edition has outgrown Wiley's smaller "Rapid Guide" series and has been enlarged and renamed *Guide to Chemical Incompatibilities*. Designed to fill the need for a portable and easy-to-use reference on reactive substances commonly found in commerce, the objective of this book is to aid those having all levels of knowledge and especially those who may not be chemists by profession, but who are trusted with the protection of human health and the environment. More specifically, this is a guide for personnel in the fields of safety, first-response, and transportation, as well as workers, supervisors, and plant management responsible for the handling, storage, and conveyance of chemical materials. To this end, the summary information covers flammability, violent and explosive binary reactions, incompatibilities, and reactions that may result from physical change.

This edition contains nearly 9,500 chemical incompatibility profiles using more than 12,000 chemical and trade names. Nearly all the chemical profiles from the first edition have been revised, expanded, and rewritten. To save space, many similar and contiguous chemical synonyms (with the same CAS number) have been combined into a single entry. At the suggestion of reviewers of the first edition, Spanish language names and many additional flash points have been added and generally rounded down (i.e., 98.5 is rounded down to 98.0). More information has been added on the effects of chemicals that come into contact with construction materials, rubbers, plastics, and coatings. To help users with general chemical terms, a glossary has been included. Temperatures appear in both Fahrenheit and Celsius using the format (xxx°F/xxx°C). A more detailed description of profile contents appears in the next section. All CAS numbers have been checked.

It is hoped that this new edition will save the reader time by providing information that would otherwise be difficult to obtain from multiple other sources. Any comments, suggestions, or advice from users are both welcomed and appreciated. All correspondence should be submitted in writing to the publisher.

This Page Intentionally Left Blank

HOW TO USE THIS BOOK

The term incompatibility is used to describe a wide range of chemical reactions that might include self-ignition from contact with air, the generation of heat resulting from contact of a chemical with moisture; decomposition; the generation of toxic gases; the heating, overflow, and rupture of containers; polymerization; the formation of new and possibly more dangerous compounds; fire, detonation, and explosion; or any combination of these or other actions.

Using chemical names and Chemical Abstracts Service (CAS) numbers, readers can locate concise incompatibility profiles for thousands of commercial chemicals that may be found in the industrial workplace, frequently stored, and transported in bulk. Chemical names, regulatory names, alternate names, commonly used "trivial" names, and in many cases, product and trade names can be looked up directly without the reader's having first to consult interim indices or charts. To avoid confusion with like-sounding names or multiple names with exact spellings, CAS registry numbers (in the format xxx-xx-x) have been provided. These numbers are assigned to all chemicals registered with the Chemical Abstracts Service of the American Chemical Society, and should always be used in conjunction with a substance name for positive identification.

A substance's incompatibility profile is based on the following information (as available): Incompatibility or reactions with common materials or conditions, including air and moisture. Incompatibility or binary reactions with another chemical substances. Incompatibility or reactions with structural materials such as metals, glass, concrete, etc. Incompatibility or reactions with protective materials such as plastics, rubber, and coatings. Information, as known, related to the ability of chemical substances to accumulate dangerous static electrical charges. The ability, when known, of a chemical (e.g., ethers) to form unstable and potentially explosive peroxides, or to cause polymerization. When polymerization inhibitors are known or recommended, they have been included. According to National Safety Council Data Sheet 1-655/rev. 1982, peroxides can be rendered harmless with iron(II) sulfate (1:1) or by passing the liquid material over a bed of activated aluminum oxide [α-alumina (OSHA)].

When a chemical mixes with air to form an explosive mixture, the flash point has been provided in both degrees Fahrenheit and Celsius. Flash point is defined as "the minimum temperature (@ 760 mm Hg/1 atm.) at which the liquid gives off sufficient vapor to form an ignitable mixture with air near the surface of the liquid or within the test vessel used. Data are apparatus- and procedure-dependent." However, in practice (e.g., outside the laboratory), ignition may occur at lower temperatures than those provided; it should also be noted that flash points found in the literature may differ for various reasons, including the presence of impurities. When a precise flash point is required, it should be established or verified by testing a technical-grade sample of the chemical substance.

It should be noted that the U.S. OSHA and U.S. DOT have differing definitions for the terms "flammable" and "combustible." DOT defines a flammable liquid as one that, under specified procedures, has a flash point of not more than 141°F/60.5°C. A combustible liquid is defined as one having a flash point above 141°F/60.5°C and below 200°F/93°C. This definition is used in this book. Many experts use 100°F/37.8°C as the point to differentiate these

terms. Therefore, for reference only, the following listing from 29 CFR 1910.106 is used by OSHA to classify flammable or combustible liquids:

Class IA flammable liquid: Flash point below 73°F and boiling point below 100°F
Class IB flammable liquid: Flash point below 73°F and boiling point at or above 100°F
Class IC flammable liquid: Flash point at or above 73°F and below 100°F
Class II combustible liquid: Flash point at or above 100°F and below 140°F
Class IIIA combustible liquid: Flash point at or above 140°F and below 200°F
Class IIIB combustible liquid: Flash point at or above 200°F

Extremely flammable liquids should be transported by gravity, pumping, or inert gas propellent. The use of compressed air will cause the spreading of fumes and air-vapor mixtures. In confined spaces combustion can lead to violent explosion.

Some materials are sensitive to heat and can deflagrate without any addition of air. When heated to decomposition, many substances emit toxic, flammable, and explosive vapors; some will ignite or explode.

Although intended to be helpful in preventing, or at least minimizing, the harmful effects of chemical accidents, this guide will not address all possible contingencies that may be associated with storage or chemical mixtures, and should not be considered a substitute for the user's own knowledge or judgment. In compiling this manual the editors used various sources of information; occasionally, contradictory data were found in the literature. Consequently, the editors and the publisher strongly urge users to consult chemical manufacturers' and suppliers' technical bulletins, material safety data sheets, labels, and shipping and other documents related to protection from, and the safe handling and storage of, all chemical substances. Furthermore, users are cautioned that the absence of specific reaction information in no way implies that different materials, or combinations of materials, under any set of conditions, may be safely mixed or otherwise used. In like manner, users must weigh comments about the "violence" of particular reactions, which may be affected by factors such as the amount of material, physical properties, temperature, use of closed or restricted systems, and so on. In some cases, very small quantities of contamination, or the presence of other materials in the working environment, may act as a catalyst and produce violent reactions such as polymerization, disassociation, and condensation.

It should be noted that foreign names do not contain distinctive or diacritical marks used to aid in a particular country's pronunciation; therefore, a name such as ACIDO FOSFORICO (phosphoric acid) or ACIDO NITRICO (nitric acid) are the same in both Italian and Spanish.

The term "incompatible" generally means that there may be a reaction (possibly violent) with another material which may be other than binary. The reaction with another material may occur when subjected to "outside forces" such as warming, change in vapor pressure, or other physical change.

KEY TO ABBREVIATIONS, SYMBOLS, AND ACRONYMS

α-	the Greek letter alpha; used as a prefix to denote the carbon atom in a straight-chain compound to which the principal group is attached
as-	prefix for asymmetric
ACGIH	American Conference of Governmental Industrial Hygienists
approx.	approximately
asym-	prefix for asymmetric
@	at
atm.	atmosphere
β-	the Greek letter beta
C	Centigrade
CAS	Chemical Abstract Service
cc	closed cup
CFCs	chlorofluorocarbons
CFR	*Code of Federal Regulations*
cis-	(Latin, meaning "on this side") indicating one of two geometrical isomers in which certain atoms or groups are on the same side of a plane
comp.	compound
cyclo-	(Greek, meaning "circle") cyclic, ring structure; as cyclohexane
Δ- or δ-	the Greek letter delta
deriv.	derivative
DOT	U.S. Department of Transportation
ε-	the Greek letter epsilon
EEC	European Economic Community
F	Fahrenheit
FR	*Federal Register*
γ-	the Greek letter gamma
iso-	(Greek, meaning "equal, alike") usually denoting an isomer of a compound
LEL	lower explosive (flammable) limit in air, % by volume at room temperature or other temperature as noted
m-	an abbreviation for "meta-," a prefix used to distinguish between isomers or nearly related compounds
m^3	cubic meter
MSDS	Material Safety Data Sheets
n-	abbreviation for "normal," referring to the arrangement of carbon atoms in a chemical molecule prefix for normal
N-	symbol used in some chemical names, indicating that the next section of the name refers to a chemical group attached to a nitrogen atom; the bond to the nitrogen atom

o-	ortho-, a prefix used to distinguish between isomers or nearly related compounds
ω-	the Greek letter omega
oc	open cup
OSHA	Occupational Safety and Health Administration
p-	abbreviation for "para-," a prefix used to distinguish between isomers or nearly related compounds
PCB	polychlorinated biphenyl
PE	polyethylene
PP	polypropylene
prim-	prefix for primary
PVC	polyvinyl chloride
®	symbol for a registered trademark or proprietary product
sec-	prefix for secondary
soln.	solution
sym-	abbreviation for "symmetrical," referring to a particular arrangement of elements within a chemical molecule
t-	prefix for tertiary
temp.	temperature
tert-	abbreviation for "tertiary," referring to a particular arrangement of elements within a chemical molecule
trans-	(Latin, meaning "across") indicating that one of two geometrical isomers in which certain atoms or groups are on opposite sides of a plane
UEL	upper explosive (flammable) limit in air, % by volume at room temperature or other temperature as noted
unsym-	prefix for asymmetric
>	symbol for "greater than"
<	symbol for "less than"
<=	symbol for "less than or equal to"
>=	symbol for "greater than or equal to"
%	percent

A

ABICEL® (9004-34-6) Reacts with bromine pentafluoride, hydrogen peroxide, sodium hypochlorite, sodium nitrate, fluorine, strong oxidizers.

ABSOLUTE ALCOHOL or ABSOLUTE ETHANOL (64-17-5) Forms explosive mixture with air (flash point 55°F/13°C). Reacts, possibly violently, with strong oxidizers, bases, acetic anhydride, acetyl bromide, acetyl chloride, aliphatic amines, bromine pentafluoride, calcium oxide, cesium oxide, chloryl perchlorate, disulfuryl difluoride, ethylene glycol methyl ether, iodine heptafluoride, isocyanates, nitrosyl perchlorate, perchlorates, platinum, potassium-*tert*-butoxide, potassium, potassium oxide, potassium peroxide, phosphorus(III) oxide, silver nitrate, silver oxide, sulfuric acid, oleum, sodium, sodium hydrazide, sodium peroxide, sulfinyl cyanamide, tetrachlorosilane, *s*-triazine-2,4,6-triol, triethoxydialuminum tribromide, triethylaluminum, uranium fluoride, xenon tetrafluoride. Mixture with mercury nitrate(II) forms explosive mercury fulminate. Forms explosive complexes with perchlorates, magnesium perchlorate (forms ethyl perchlorate), silver perchlorate. Flow or agitation of substance may generate electrostatic charges due to low conductivity.

ACEDE CRESYLIQUE (French) (1319-77-3) Combustible solid or liquid (flash point >178°F/>81°C). Incompatible with strong acids, oxidizers, acetaldehyde, alkalis, aliphatic amines, amides, chlorosulfonic acid, fuming sulfuric acid (oleum). Liquid attacks most plastics and rubber, although butyl rubber and Teflon® have high resistance to permeation. Attacks many metals.

ACEITE de CITRONELA (Spanish) (8000-29-1) Combustible liquid (flash point 165°F/74°C). Contact with strong oxidizers can cause fire and explosion.

ACEITE de RICINO (Spanish) (8001-79-4) Combustible liquid (flash point 445°F/229°C). Incompatible with strong acids, oxidizers, nitrates.

ACETAL (105-57-7) Forms explosive mixture with air (flash point −5°F/−20°C cc). Reacts violently with oxidizers. Forms unstable and explosive peroxides on contact with heat and light. Flow or agitation of substance may generate electrostatic charges due to low conductivity.

ACETALDEHIDO (Spanish) (75-07-0) Forms explosive mixture with air (flash point −36°F/−38°C). Oxidizes freely in air, forming unstable peroxides that can explode spontaneously. Slowly polymerizes to acetic acid. Exposure to heat, dust, corrosives, or oxidizers can cause explosive polymerization. A strong reducing agent; reacts violently with combustibles, strong acids, acid anhydrides, alcohols, anhydrous ammonia, amines, bromine, caustic materials, chlorine, ketones, halogens, hydrogen sulfide, oxidizers, phenols, phosphorus. Explodes when mixed with iodine, oxygen. May dissolve rubber. Slightly corrosive to

mild steel. Flow or agitation of substance may generate electrostatic charges due to low conductivity. May explode without warning when exposed to heat, dust, corrosives, or oxidizers. Pure product attacks some plastics (PVC, nitrile, polyethylene, polyvinyl alcohol, Teflon®, polyurethane, Neoprene®, Viton®).

ACETALDEHYDE (75-07-0) Forms explosive mixture with air (flash point −36°F/−38°C). Oxidizes freely in air, forming unstable peroxides that can explode spontaneously. Slowly polymerizes to acetic acid. Exposure to heat, dust, corrosives, or oxidizers can cause explosive polymerization. A strong reducing agent; reacts violently with combustibles, strong acids, acid anhydrides, alcohols, anhydrous ammonia, amines, bromine, caustic materials, chlorine, ketones, halogens, hydrogen sulfide, oxidizers, phenols, phosphorus. Explodes when mixed with iodine, oxygen. May dissolve rubber. Slightly corrosive to mild steel. Flow or agitation of substance may generate electrostatic charges due to low conductivity. May explode without warning when exposed to heat, dust, corrosives, or oxidizers. Pure product attacks rubber, coatings, and some plastics (PVC, nitrile, polyethylene, polyvinyl alcohol, Teflon®, polyurethane, Neoprene®, Viton®).

***p*-ACETALDEHYDE (123-63-7)** Forms explosive mixture with air (flash point 62°F/17°C). Reacts with strong acids, caustics, ammonia, amines, oxidizers. Decomposes on contact with acids or acid fumes, forming acetaldehyde. Flow or agitation of substance may generate electrostatic charges due to low conductivity.

ACETALDEHYDE DIETHYLACETAL (105-57-7) Forms explosive mixture with air (flash point −5°F/−20°C cc). Reacts violently with oxidizers. Forms unstable and explosive peroxides on contact with heat and light. Flow or agitation of substance may generate electrostatic charges due to low conductivity.

ACETALDEHYDE DIMETHYL ACETAL (534-15-6) Forms explosive mixture with air (flash point 33°F/1°C). May be able to form unstable peroxides. Reacts violently with strong oxidizers. Incompatible with aliphatic amines, amides, sulfuric acid, nitric acid, caustics, isocyanates. Flow or agitation of substance may generate electrostatic charges due to low conductivity.

β-ACETALDEHYDE OXIME (107-29-9) Forms explosive mixture with air (flash point 72°F/22°C). Reacts violently with oxidizers. Decomposes on contact with acids, forming hydroxylamine and acetaldehyde. Forms explosive peroxides on contact with air, acids. Attacks various alkali metals (i.e., lithium, sodium, potassium, rubidium, cesium, francium).

ACETALDEHYDE TRIMER (123-63-7) Forms explosive mixture with air (flash point 62°F/17°C). Reacts with strong acids, caustics, ammonia, amines, oxidizers. Decomposes on contact with acids or acid fumes, forming acetaldehyde. Flow or agitation of substance may generate electrostatic charges due to low conductivity.

ACETAL DIETHYLIQUE (French) (105-57-7) Forms explosive mixture with air (flash point −5°F/−20°C cc). Reacts violently with oxidizers. Forms unstable and explosive peroxides on contact with heat and light. Flow or agitation of substance may generate electrostatic charges due to low conductivity.

ACETALDOL (107-89-1) Combustible liquid (flash point 150°F/66°C oc). Violent reaction with strong oxidizers.

ACETALDOXIME or β-ACETALDOXIME (107-29-9) Forms explosive mixture with air (flash point 72°F/22°C). Reacts violently with oxidizers. Decomposes on contact with acids, forming hydroxylamine and acetaldehyde. Forms explosive peroxides on contact with air, acids. Attacks various alkali metals (i.e., lithium, sodium, potassium, rubidium, cesium, francium).

ACETALE (Italian) (105-57-7) Forms explosive mixture with air (flash point −5°F/−20°C cc). Reacts violently with oxidizers. Forms unstable and explosive peroxides on contact with heat and light. Flow or agitation of substance may generate electrostatic charges due to low conductivity.

ACETALNILIDA (Spanish) (103-84-4) A combustible solid (flash point 345°F/174°C). Reacts with strong oxidizers and strong bases. UV light can cause chemical alteration (the acetyl group forms a new bond on ring in the *o*- or *p*-position).

ACETAMIDE, *N,N'*-DIMETHYL (127-19-5) Combustible liquid (flash point 158°F/70°C). Violent reaction with strong oxidizers, halogenated compounds. Incompatible with mineral acids, strong acids, ammonia, isocyanates, phenols, cresols. Attacks plastics, rubber, and coatings.

ACETAMIDOBENZENE (103-84-4) A combustible solid (flash point 345°F/174°C). Reacts with strong oxidizers and strong bases. UV light can cause chemical alteration (the acetyl group forms a new bond on ring in the *o*- or *p*-position).

ACETANIL (103-84-4) A combustible solid (flash point 345°F/174°C). Reacts with strong oxidizers and strong bases. UV light can cause chemical alteration (the acetyl group forms a new bond on ring in the *o*- or *p*-position).

ACETANILIDE (103-84-4) A combustible solid (flash point 345°F/174°C). Reacts with strong oxidizers and strong bases. UV light can cause chemical alteration (the acetyl group forms a new bond on ring in the *o*- or *p*-position).

ACETATE d'AMYLE (French) (628-63-7) Forms explosive mixture with air (flash point 60°F/16°C). High heat may lead to instability. Reacts with strong oxidizers. Incompatible with strong acids, nitrates, strong alkalis. Attacks some plastics, coatings, and rubber.

ACETATE de BUTYLE (French) (123-86-4) Forms explosive mixture with air (flash point 72°F/22°C). Reacts with water on standing to form acetic acid and *n*-butyl alcohol. Reacts violently with strong oxidizers and potassium *tert*-butoxide. Incompatible with caustics, strong acids, nitrates. Dissolves rubber, many plastics, resins, and some coatings. Flow or agitation of substance may generate electrostatic charges due to low conductivity.

ACETATE de BUTYLE SECONDAIRE (French) (105-46-4) Forms explosive mixture with air (flash point 64°F/18°C). Reacts violently with oxidizers. Incompatible with strong acids, nitrates, potassium *tert*-butoxide. Attacks some plastics, rubber, and coatings. Flow or agitation of substance may generate electrostatic charges due to low conductivity.

ACETATE de CUIVRE (French) (142-71-2) Incompatible with acetylides, hydrazine, nitrates, mercurous chloride, strong acids.

ACETATE d'ISOPROPYLE (French) (108-21-4) Forms explosive mixture with air (flash point 39°F/4°C). Violent reaction with strong oxidizers. Incompatible with strong alkalis, strong acids, nitrates. Dissolves rubber, and many plastic materials. Contact with iron or steel causes slow decomposition, forming isopropanol and acetic acid. Flow or agitation of substance may generate electrostatic charges due to low conductivity.

ACETATE de METHYLE (French) (79-20-9) Forms explosive mixture with air (flash point 14°F/−10°C). Violent reaction with oxidizers. Contact with acids or bases causes decomposition with formation of methanol. Incompatible with nitrates. Attacks some plastics. Flow or agitation of substance may generate electrostatic charges due to low conductivity.

ACETATE de METHYLE GLYCOL (French) (110-49-6) Forms explosive mixture with air (flash point 124°F/52°C). Able to form unstable peroxide in storage. Violent reaction with strong oxidizers. Incompatible with strong alkalis, permanganates, peroxides, ammonium persulfate, bromine dioxide, nitrates, strong acids: sulfuric acid, nitric acid.

ACETATE de PLOMB (French) (301-04-2) Contact with strong acids forms acetic acid. Reacts with strong oxidizers. Incompatible with alkalis, alkylene oxides, ammonia, amines, bromates, citrates, cresols, chloral hydrate, chlorides, carbonates, epichlorohydrin, hydrozoic acid, isocyanates, methyl isocyanoacetate, potassium bromate, phenols, phosphates, resorcinol, salicylic acid, sodium salicylate, sodium peroxyborate, sulfites, tartrates, trinitrobenzoic acid, urea nitrate.

ACETATE de PROPYLE NORMAL (French) (109-60-4) Forms explosive mixture with air (flash point 58°F/14°C). Violent reaction with strong oxidizers. Incompatible with strong acids, nitrates, strong acids. Attacks some plastics, rubber, and coatings. Flow or agitation of substance may generate electrostatic charges due to low conductivity.

ACETATE SALICYCLIC ACID (50-78-2) Combustible solid. An organic acid. Powder or dust forms explosive mixture with air. Reacts with strong oxidizers. Alkali hydroxides or carbonates may cause decomposition. Incompatible with sulfuric acid, caustics, ammonia, aliphatic amines, alkanolamines, isocyanates, alkylene oxides, epichlorohydrin.

ACETATE de VINYLE (French) (108-05-4) Forms explosive mixture with air (flash point 18°F/−7°C). Polymerizes readily if not inhibited; elevated temperatures, the influence of light, air, oxygen, water, or peroxides can initiate reaction. Must be stabilized (hydroquinone or diphenylamine are recommended) to prevent polymerization. Violent reaction with strong oxidizers. Reacts with nonoxidizing mineral acids, strong acids, ammonia, aliphatic amines, alkanolamines, bases, azo compounds, oleum, ozone (forms explosive: vinyl acetate ozonite), 2-aminoethanol, chlorosulfonic acid, ethylene diamine, ethyeneimine, ethyleneimine, toluene. The vapor may react vigorously with dessicants [e.g., silica gel or aluminum oxide (alumina)]. Flow or agitation of substance may generate electrostatic charges due to low conductivity. The uninhibited monomer vapor may block vents and confined spaces by forming a solid polymer material.

ACETATO de *p-ter*-AMILFENILO (Spanish) (80-46-6) Combustible solid (flash point 233°F/112°C). Reacts with strong oxidizers. Flow or agitation of substance may generate electrostatic charges due to low conductivity.

ACETATO de AMILO (Spanish) (628-63-7) Forms explosive mixture with air (flash point 60°F/16°C). High heat may lead to instability. Reacts with strong oxidizers. Incompatible with strong acids, nitrates, strong alkalis. Attacks some plastics, coatings, and rubber.

ACETATO de *sec*-AMILO (Spanish) (626-38-0) Forms explosive mixture with air (flash point 89°F/32°C). High heat may lead to instability. Reacts with strong oxidizers. Incompatible with strong acids, nitrates, strong alkalis. Attacks many plastics.

ACETATO de BENCILO (Spanish) (140-11-4) Forms explosive mixture with air (flash point 216°F/102°C). Reacts with strong acids, nitrates, oxidizers.

***n*-ACETATO de BUTILO (Spanish) (123-86-4)** Forms explosive mixture with air (flash point 72°F/22°C). Reacts with water on standing to form acetic acid and *n*-butyl alcohol. Reacts violently with strong oxidizers and potassium *tert*-butoxide. Incompatible with caustics, strong acids, nitrates. Dissolves rubber, many plastics, resins, and some coatings. Flow or agitation of substance may generate electrostatic charges due to low conductivity.

ACETATO de BUTILO-*sec* (Spanish) (105-46-4) Forms explosive mixture with air (flash point 64°F/18°C). Reacts violently with oxidizers. Incompatible with strong acids, nitrates, potassium-*tert*-butoxide. Attacks some plastics, rubber, and coatings. Flow or agitation of substance may generate electrostatic charges due to low conductivity.

ACETATO CADMIO (Spanish) (543-90-8) Incompatible with strong oxidizers, elemental sulfur, selenium, sulfides, tellurium, strong acids, nitrates.

ACETATO de COBALTO (Spanish) (71-48-7) Cobalt compounds react with oxidizers, acetylene.

ACETATO de COBRE (Spanish) (142-71-2) Incompatible with acetylides, hydrazine, nitrates, mercurous chloride, strong acids.

ACETATO del ETILENGLICOL MONOMETIL ETER (Spanish) (110-49-6) Forms explosive mixture with air (flash point 124°F/52°C). Able to form unstable peroxide in storage. Violent reaction with strong oxidizers. Incompatible with strong alkalis, permanganates, peroxides, ammonium persulfate, bromine dioxide, nitrates, strong acids: sulfuric acid, nitric acid.

ACETATO de ETILO (Spanish) (141-78-6) Forms explosive mixture with air (flash point 135°F/57°C oc). Violent reaction with oxidizers, chlorosulfonic acid. Incompatible with strong acids, nitrates, lithium aluminum hydride, lithium tetrahydroaluminate, oleum. Will hydrolyze on standing, forming acetic acid and ethyl alcohol; this reaction is greatly accelerated by strong bases.

ACETATO de 2-ETOXIETILO (Spanish) (111-15-9) Forms explosive mixture with air (flash point 117°F/47°C). Reacts violently with oxidizers. Incompatible with strong acids, nitrates. Softens many plastics. Attacks some rubber and coatings.

ACETATO de HEXILO (Spanish) (142-92-7) Forms explosive mixture with air (flash point 113°F/45°C). Violent reaction with strong oxidizers. Incompatible with sulfuric acid,

nitric acid, caustics, aliphatic amines, isocyanates. Will swell rubber, and can dissolve certain coatings.

ACETATO de ISOAMILO (Spanish) (123-92-2) Forms explosive mixture with air (flash point 77°F/25°C). Reacts violently with strong oxidizers. Incompatible with strong alkalis, strong acids, nitrates. Attacks asbestos; softens and dissolves many plastics, rubber, and coatings.

ACETATO de ISOBUTILO (Spanish) (110-19-0) Forms explosive mixture with air (flash point 63°F/17°C). Reacts with water, slowly forming acetic acid and isobutyl alcohol. Reacts violently with strong oxidizers. Incompatible with sulfuric acid, nitric acid, caustics, aliphatic amines, nitrates, isocyanates. Dissolves rubber, many plastics, resins, and some coatings. Flow or agitation of substance may generate electrostatic charges due to low conductivity.

ACETATO de ISOPROPILO (Spanish) (108-21-4) Forms explosive mixture with air (flash point 39°F/4°C). Violent reaction with strong oxidizers. Incompatible with strong alkalis, strong acids, nitrates. Dissolves rubber, and many plastic materials. Contact with iron or steel causes slow decomposition, forming isopropanol and acetic acid. Flow or agitation of substance may generate electrostatic charges due to low conductivity.

ACETATO MERCURICO (Spanish) (1600-27-7) Light and heat can cause decomposition. May react violently or form sensitive explosive compounds with 2-butyne-1,4-diol, fluoroacetylene, α-nitroguanidine, 5-nitrotetrazol. Incompatible with ammonia, hydrozoic acid, methyl isocyanoacetate, sodium acetylide, sodium peroxyborate, trinitrobenzoic acid, urea nitrate.

ACETATO MERCURIOSO (Spanish) (21908-53-2) A strong oxidizer. Violent reaction with reducing agents, acetyl nitrate, diboron tetrafluoride, disulfur dichloride, combustible materials, fuels, hydrazine hydrate, hydrogen peroxide, hydrogen trisulfide, hypophosphorous acid, methanethiol, phospham. sodium-potassium alloy, sulfur, sulfur trioxide. Incompatible with alcohols, alkali metals, ammonium nitrate, diboron tetrafluoride, hydrazinium nitrate, hydrogen sulfide, nitroalkanes, rubidium acetylide, selenium oxychloride. Forms heat-, friction-, or shock-sensitive explosives with anilinium perchlorate, chlorine, phosphorus, sulfur, magnesium, potassium, sodium-potassium alloy. May increase the explosive or thermal sensitivity of nitromethane, nitroethane, 1-nitropropane and other lower nitroalkanes, silver azide, hydrazinium perchlorate. Slowly decomposes on exposure to air.

ACETATO di METIL CELLOSOLVE® (Union Carbide) (Italian) (110-49-6) Forms explosive mixture with air (flash point 124°F/52°C). Able to form unstable peroxide in storage. Violent reaction with strong oxidizers. Incompatible with strong alkalis, permanganates, peroxides, ammonium persulfate, bromine dioxide, nitrates, strong acids: sulfuric acid, nitric acid.

ACETATO de METILO (Spanish) (79-20-9) Forms explosive mixture with air (flash point 14°F/−10°C). Violent reaction with oxidizers. Contact with acids or bases causes decomposition with formation of methanol. Incompatible with nitrates. Attacks some plastics. Flow or agitation of substance may generate electrostatic charges due to low conductivity.

ACETATO de PLOMO (Spanish) (6080-56-4) Contact with acids forms acetic acid. Mixture with lead bromate forms explosive compound. Incompatible with bases, alkylene

oxides, ammonia, amines, bromates, cresols, epichlorohydrin, hydrozoic acid, isocyanates, methyl isocyanoacetate, phenols, salicylic acid, sodium salicylate, sodium peroxyborate, strong oxidizers, sulfites, trinitrobenzoic acid, urea nitrate.

ACETATO de *n*-PROPILO (Spanish) (109-60-4) Forms explosive mixture with air (flash point 58°F/14°C). Violent reaction with strong oxidizers. Incompatible with strong acids, nitrates, strong acids. Attacks some plastics, rubber, and coatings. Flow or agitation of substance may generate electrostatic charges due to low conductivity.

ACETDIMETHYLAMIDE (127-19-5) Combustible liquid (flash point 158°F/70°C). Violent reaction with strong oxidizers, halogenated compounds. Incompatible with mineral acids, strong acids, ammonia, isocyanates, phenols, cresols. Attacks plastics, rubber, and coatings.

***N,N'*-ACETDIMETHYLAMIDE (127-19-5)** Combustible liquid (flash point 158°F/70°C). Violent reaction with strong oxidizers, halogenated compounds. Incompatible with mineral acids, strong acids, ammonia, isocyanates, phenols, cresols. Attacks plastics, rubber, and coatings.

ACETEHYD (German) (75-07-0) Forms explosive mixture with air (flash point −36°F/−38°C). Oxidizes freely in air, forming unstable peroxides that can explode spontaneously. Slowly polymerizes to acetic acid. Exposure to heat, dust, corrosives, or oxidizers can cause explosive polymerization. A strong reducing agent; reacts violently with combustibles, strong acids, acid anhydrides, alcohols, anhydrous ammonia, amines, bromine, caustic materials, chlorine, ketones, halogens, hydrogen sulfide, oxidizers, phenols, phosphorus. Explodes when mixed with iodine, oxygen. May dissolve rubber. Slightly corrosive to mild steel. Flow or agitation of substance may generate electrostatic charges due to low conductivity. May explode without warning when exposed to heat, dust, corrosives, or oxidizers. Pure product attacks rubber, coatings, and some plastics (PVC, nitrile, polyethylene, polyvinyl alcohol, Teflon®, polyurethane, Neoprene®, Viton®).

ACETEHYDE (75-07-0) Forms explosive mixture with air (flash point −36°F/−38°C). Oxidizes freely in air, forming unstable peroxides that can explode spontaneously. Slowly polymerizes to acetic acid. Exposure to heat, dust, corrosives, or oxidizers can cause explosive polymerization. A strong reducing agent; reacts violently with combustibles, strong acids, acid anhydrides, alcohols, anhydrous ammonia, amines, bromine, caustic materials, chlorine, ketones, halogens, hydrogen sulfide, oxidizers, phenols, phosphorus. Explodes when mixed with iodine, oxygen. May dissolve rubber. Slightly corrosive to mild steel. Flow or agitation of substance may generate electrostatic charges due to low conductivity. May explode without warning when exposed to heat, dust, corrosives, or oxidizers. Pure product attacks rubber, coatings, and some plastics (PVC, nitrile, polyethylene, polyvinyl alcohol, Teflon®, polyurethane, Neoprene®, Viton®).

ACETENE (74-85-1) A flammable gas (−212°F/−136°C). Violent reaction with oxidizers, halogen acids. Chlorine compounds and sunlight or UV light can cause explosive polymerization. Incompatible with acids, halocarbons, lithium, nitrogen oxides, aluminum chloride, bromotrichloromethane, carbon tetrachloride, chlorine, chlorine dioxide, chlorotrifluoroethylene, copper, hydrogen bromide, nitrogen dioxide, ozone, polyethylene, tetrafluoroethylene, trifluoro hypofluorite. Attacks cast iron. Flow or agitation of substance may generate electrostatic charges due to low conductivity.

ACETIC ACID (64-19-7) Vapor forms explosive mixture with air (above 103°F/39°C). Reacts violently with bases such as carbonates and hydroxides, giving off large quantities of heat, oxidizers, organic amines, acetaldehyde, potassium *tert*-butoxide. Reacts, possibly violently, with strong acids, aliphatic amines, alkanolamines, alkylene oxides, epichlorohydrin, acetic anhydride, 2-aminoethanol, ammonia, ammonium nitrate, bromine pentafluoride, chlorosulfonic acid, chromic acid, chromium trioxide, ethylene diamine, ethylenediamine, ethyleneimine, hydrogen peroxide, isocyanates, oleum, perchloric acid, permanganates, phosphorus isocyanate, phosphorus trichloride, sodium peroxide, xylene. Attacks cast iron, stainless steel, and other metals, forming flammable hydrogen gas. Attacks many forms of rubber, plastic, and coatings.

ACETIC ACID, AMMONIUM SALT (631-61-8) Violent reaction with strong oxidizers, ammonium nitrate, chlorine trifluoride, magnesium, potassium nitrite, sodium chlorate, sodium hypochlorite. Incompatible with nitrates. Forms a heat-sensitive explosive with 5-azidotetrazole. Reacts with gold chloride, forming fulminating gold, a heat-, friction-, and impact-sensitive explosive. Incompatible with sodium dichloroisocyanurate.

ACETIC ACID, *n*-AMYL ESTER (628-63-7) Forms explosive mixture with air (flash point 60°F/16°C). High heat may lead to instability. Reacts with strong oxidizers. Incompatible with strong acids, nitrates, strong alkalis. Attacks some plastics, coatings, and rubber.

ACETIC ACID, ANHYDRIDE (108-24-7) Forms explosive mixture with air (flash point 126°F/52°C). Reacts with water, forming acetic acid and liberating a large amount of heat. Reacts with alcohol, forming ethyl acetate. Reacts violently with alkaline materials (e.g., potassium hydroxide or sodium hydroxide), barium peroxide, boric acid, chromic trioxide, 1,3-diphenyltriazine, peroxyacetic acid, tetrafluoroboric acid. Reacts with strong acids, ammonia, amines, 2-aminoethanol, aniline, chlorosulfonic acid, chromic acid, chromic anhydride, ethylene diamine, ethylenediamine, finely divided metals, glycerol, hydrogen peroxide, nitric acid, nitrogen tetroxide, oleum, oxidizers, perchloric acid, permanganates, sodium peroxide, sulfuric acid. Keep away from sunlight and heat. Attacks some plastics including PVC and Viton®, rubbers including natural, nitrile, and, to a lesser degree, neoprene. Corrodes iron, steel, and other metals. Flow or agitation of substance may generate electrostatic charges due to low conductivity.

ACETIC ACID, ANHYDRIDE WITH NITRIC ACID (591-09-3) Self-reactive; thermally unstable above 131−212°F/55−100°C, depending on solution strength. Violent reaction with strong oxidizers, mercuric oxide.

ACETIC ACID ANILIDE (103-84-4) A combustible solid (flash point 345°F/174°C). Reacts with strong oxidizers and strong bases. UV light can cause chemical alteration (the acetyl group forms a new bond on ring in the *o*- or *p*-position).

ACETIC ACID, BENZYL ESTER (140-11-4) Forms explosive mixture with air (flash point 216°F/102°C). Reacts with strong acids, nitrates, oxidizers.

ACETIC ACID, 2-BUTOXY ESTER (105-46-4) Forms explosive mixture with air (flash point 64°F/18°C). Reacts violently with oxidizers. Incompatible with strong acids, nitrates, potassium *tert*-butoxide. Attacks some plastics, rubber, and coatings. Flow or agitation of substance may generate electrostatic charges due to low conductivity.

ACETIC ACID, 2-BUTOXYETHYL ESTER (112-07-2) Combustible liquid (flash point 160°F/71°C). May be able to form unstable peroxides in storage. Incompatible with oxidizers, permanganates, peroxides, ammonium persulfate, bromine dioxide, nitrates, strong acids: sulfuric acid, nitric acid, perchloric acid.

ACETIC ACID, BUTYL ESTER (123-86-4) Forms explosive mixture with air (flash point 72°F/22°C). Reacts with water on standing to form acetic acid and *n*-butyl alcohol. Reacts violently with strong oxidizers and potassium *tert*-butoxide. Incompatible with caustics, strong acids, nitrates. Dissolves rubber, many plastics, resins, and some coatings. Flow or agitation of substance may generate electrostatic charges due to low conductivity.

ACETIC ACID, *sec*-BUTYL ESTER (105-46-4) Forms explosive mixture with air (flash point 64°F/18°C). Reacts violently with oxidizers. Incompatible with strong acids, nitrates, potassium *tert*-butoxide. Attacks some plastics, rubber, and coatings. Flow or agitation of substance may generate electrostatic charges due to low conductivity.

ACETIC ACID, CADMIUM SALT (543-90-8) Incompatible with strong oxidizers, elemental sulfur, selenium, sulfides, tellurium, strong acids, nitrates.

ACETIC ACID CHLORIDE (75-36-5) Forms explosive mixture with air (flash point 40°F/4°C). Reacts violently with water, forming corrosive chlorides including acetic and hydrochloric acids. Violent reaction with strong oxidizers, strong bases, alcohols (especially ethanol; spontaneous reaction), dimethyl sulfoxide, phosphorus trichloride. Forms hydrogen chloride with air. Highly corrosive to most metals in the presence of moisture. Attacks most rubber and plastics, although Teflon® has high resistance to permeation. Flow or agitation of substance may generate electrostatic charges due to low conductivity.

ACETIC ACID, COBALT(II) SALT (71-48-7) Cobalt compounds react with oxidizers, acetylene.

ACETIC ACID, CUPRIC SALT (142-71-2) Incompatible with acetylides, hydrazine, nitrates, mercurous chloride, strong acids.

ACETIC ACID, DIMETHYLAMIDE (127-19-5) Combustible liquid (flash point 158°F/70°C). Violent reaction with strong oxidizers, halogenated compounds. Incompatible with mineral acids, strong acids, ammonia, isocyanates, phenols, cresols. Attacks plastics, rubber, and coatings.

ACETIC ACID, 1,3-DIMETHYLBUTYL ESTER (108-84-9) Forms explosive mixture with air (flash point 113°F/45°C). Violent reaction with strong oxidizers. Incompatible with sulfuric acid, nitric acid, caustics, aliphatic amines, isocyanates. Will swell rubber, and can dissolve certain coatings.

ACETIC ACID, ETHENYL ESTER (108-05-4) Forms explosive mixture with air (flash point 18°F/−7°C). Polymerizes readily if not inhibited; elevated temperatures, the influence of light, air, oxygen, water, or peroxides can initiate reaction. Must be stabilized (hydroquinone or diphenylamine is recommended) to prevent polymerization. Violent reaction with strong oxidizers. Reacts with nonoxidizing mineral acids, strong acids, ammonia, aliphatic amines, alkanolamines, bases, azo compounds, oleum, ozone (forms explosive: vinyl acetate

ozonite), 2-aminoethanol, chlorosulfonic acid, ethylene diamine, ethyeneimine, ethyleneimine, toluene. The vapor may react vigorously with dessicants [e.g., silica gel or aluminum oxide (alumina)]. Flow or agitation of substance may generate electrostatic charges due to low conductivity. The uninhibited monomer vapor may block vents and confined spaces by forming a solid polymer material.

ACETIC ACID, 2-ETHOXYETHYL ESTER (111-15-9) Forms explosive mixture with air (flash point 117°F/47°C). Reacts violently with oxidizers. Incompatible with strong acids, nitrates. Softens many plastics. Attacks some rubber and coatings.

ACETIC ACID, ETHYL ESTER (141-78-6) Forms explosive mixture with air (flash point 135°F/57°C oc). Violent reaction with oxidizers, chlorosulfonic acid. Incompatible with strong acids, nitrates, lithium aluminum hydride, lithium tetrahydroaluminate, oleum. Will hydrolyze on standing, forming acetic acid and ethyl alcohol; this reaction is greatly accelerated by strong bases.

ACETIC ACID, GLACIAL (64-19-7) Vapor forms explosive mixture with air (above 103°F/39°C). Reacts violently with bases such as carbonates and hydroxides, giving off large quantities of heat, oxidizers, organic amines, acetaldehyde, potassium *tert*-butoxide. Reacts, possibly violently, with strong acids, aliphatic amines, alkanolamines, alkylene oxides, epichlorohydrin, acetic anhydride, 2-aminoethanol, ammonia, ammonium nitrate, bromine pentafluoride, chlorosulfonic acid, chromic acid, chromium trioxide, ethylene diamine, ethylenediamine, ethyleneimine, hydrogen peroxide, isocyanates, oleum, perchloric acid, permanganates, phosphorus isocyanate, phosphorus trichloride, sodium peroxide, xylene. Attacks cast iron, stainless steel, and other metals, forming flammable hydrogen gas. Attacks many forms of rubber, plastic, and coatings.

ACETIC ACID, HEXYL ESTER (142-92-7) Forms explosive mixture with air (flash point 113°F/45°C). Violent reaction with strong oxidizers. Incompatible with sulfuric acid, nitric acid, caustics, aliphatic amines, isocyanates. Will swell rubber, and can dissolve certain coatings.

ACETIC ACID, ISOBUTYL ESTER (110-19-0) Forms explosive mixture with air (flash point 63°F/17°C). Reacts with water slowly, forming acetic acid and isobutyl alcohol. Reacts violently with strong oxidizers. Incompatible with sulfuric acid, nitric acid, caustics, aliphatic amines, nitrates, isocyanates. Dissolves rubber, many plastics, resins, and some coatings. Flow or agitation of substance may generate electrostatic charges due to low conductivity.

ACETIC ACID, ISOPENTLL ESTER (123-92-2) Forms explosive mixture with air (flash point 77°F/25°C). Reacts violently with strong oxidizers. Incompatible with strong alkalis, strong acids, nitrates. Attacks asbestos; softens and dissolves many plastics, rubber, and coatings.

ACETIC ACID, ISOPROPYL ESTER (108-21-4) Forms explosive mixture with air (flash point 39°F/4°C). Violent reaction with strong oxidizers. Incompatible with strong alkalis, strong acids, nitrates. Dissolves rubber, and many plastic materials. Contact with iron or steel causes slow decomposition, forming isopropanol and acetic acid. Flow or agitation of substance may generate electrostatic charges due to low conductivity.

ACETIC ACID, LEAD(II) SALT TRIHYDRATE (6080-56-4) Contact with acids forms acetic acid. Incompatible with bases, alkylene oxides, ammonia, amines, bromates, cresols,

epichlorohydrin, hydrozoic acid, isocyanates, methyl isocyanoacetate, phenols, salicylic acid, sodium salicylate, sodium peroxyborate, strong oxidizers, sulfites, trinitrobenzoic acid, urea nitrate.

ACETIC ACID, MERCURY(II) SALT (1600-27-7) Light and heat can cause decomposition. May react violently or form sensitive explosive compounds with 2-butyne-1,4-diol, fluoroacetylene, α-nitroguanidine, 5-nitrotetrazol, and others. Incompatible with ammonia, hydrozoic acid, methyl isocyanoacetate, sodium acetylide, sodium peroxyborate, trinitrobenzoic acid, urea nitrate.

ACETIC ACID, 3-METHOXYBUTYL ESTER (4435-53-4) Combustible liquid (flash point 170°F/77°C). Incompatible with strong acids, nitrates, oxidizers.

ACETIC ACID, 2-METHOXY-1-METHYLETHYL ESTER (108-65-6) Forms explosive mixture with air (flash point 108°F/42°C cc). Unless inhibited, polymerization may occur; avoid exposure to high temperatures, UV light, free-radical initiators. Strong oxidizers may cause fire and explosions. Reacts violently with sodium peroxide, uranium fluoride. Incompatible with strong acids, nitrates, oxidizers. Incompatible with sulfuric acid, nitric acid, caustics, aliphatic amines, isocyanates, boranes.

ACETIC ACID, METHYL ESTER (79-20-9) Forms explosive mixture with air (flash point 14°F/−10°C). Violent reaction with oxidizers. Contact with acids or bases causes decomposition with formation of methanol. Incompatible with nitrates. Attacks some plastics. Flow or agitation of substance may generate electrostatic charges due to low conductivity.

ACETIC ACID, 1-METHYLETHYL ESTER (108-21-4) Forms explosive mixture with air (flash point 39°F/4°C). Violent reaction with strong oxidizers. Incompatible with strong alkalis, strong acids, nitrates. Dissolves rubber, and many plastic materials. Contact with iron or steel causes slow decomposition, forming isopropanol and acetic acid. Flow or agitation of substance may generate electrostatic charges due to low conductivity.

ACETIC ACID, 1-METHYLPROPYL ESTER (105-46-4) Forms explosive mixture with air (flash point 64°F/18°C). Reacts violently with oxidizers. Incompatible with strong acids, nitrates, potassium *tert*-butoxide. Attacks some plastics, rubber, and coatings. Flow or agitation of substance may generate electrostatic charges due to low conductivity.

ACETIC ACID, 2-METHYLPROPYL ESTER (110-19-0) Forms explosive mixture with air (flash point 63°F/17°C). Reacts with water slowly, forming acetic acid and isobutyl alcohol. Reacts violently with strong oxidizers. Incompatible with sulfuric acid, nitric acid, caustics, aliphatic amines, nitrates, isocyanates. Dissolves rubber, many plastics, resins, and some coatings. Flow or agitation of substance may generate electrostatic charges due to low conductivity.

ACETIC ACID, NICKEL(II) SALT (373-02-4) Incompatible with strong acids, strong oxidizers, sulfur, selenium.

ACETIC ACID, *n*-NONYL ESTER (143-13-5) Combustible liquid (flash point 153°F/67°C). Incompatible with strong acids, nitrates.

ACETIC ACID, 2-PENTYL ESTER (626-38-0) Forms explosive mixture with air (flash point 89°F/32°C). High heat may lead to instability. Reacts with strong oxidizers. Incompatible with strong acids, nitrates, strong alkalis. Attacks many plastics.

ACETIC ACID, PHENYLMETHYL ESTER (140-11-4) Contact with strong oxidizers may cause fire and explosions.

ACETIC ACID, PROPYL ESTER (109-60-4) Forms explosive mixture with air (flash point 58°F/14°C). Violent reaction with strong oxidizers. Incompatible with strong acids, nitrates, strong acids. Attacks some plastics, rubber, and coatings. Flow or agitation of substance may generate electrostatic charges due to low conductivity.

ACETIC ACID, *n*-PROPYL ESTER (109-60-4) Forms explosive mixture with air (flash point 58°F/14°C). Violent reaction with strong oxidizers. Incompatible with strong acids, nitrates, strong acids. Attacks some plastics, rubber, and coatings. Flow or agitation of substance may generate electrostatic charges due to low conductivity.

ACETIC ACID, THALLIUM(I) SALT (563-68-8) Moisture may cause decomposition. Incompatible with strong acids, nitrates.

ACETIC ACID, THALLOUS SALT (563-68-8) Moisture may cause decomposition. Incompatible with strong acids, nitrates.

ACETIC ACID, VINYL ESTER (108-05-4) Forms explosive mixture with air (flash point 18°F/−7°C). Polymerizes readily if not inhibited; elevated temperatures, the influence of light, air, oxygen, water, or peroxides can initiate reaction. Must be stabilized (hydroquinone or diphenylamine is recommended) to prevent polymerization. Violent reaction with strong oxidizers. Reacts with nonoxidizing mineral acids, strong acids, ammonia, aliphatic amines, alkanolamines, bases, azo compounds, oleum, ozone (forms explosive: vinyl acetate ozonite), 2-aminoethanol, chlorosulfonic acid, ethylene diamine, ethyeneimine, ethyleneimine, toluene. The vapor may react vigorously with dessicants [e.g., silica gel or aluminum oxide (alumina)]. Flow or agitation of substance may generate electrostatic charges due to low conductivity. The uninhibited monomer vapor may block vents and confined spaces by forming a solid polymer material.

ACETIC ACID, ZINC SALT (557-34-6) Incompatible with strong acids, strong bases. Moisture may cause hydrolysis/decomposition.

ACETIC ALDEHYDE (75-07-0) Forms explosive mixture with air (flash point −36°F/−38°C). Oxidizes freely in air, forming unstable peroxides that can explode spontaneously. Slowly polymerizes to acetic acid. Exposure to heat, dust, corrosives, or oxidizers can cause explosive polymerization. A strong reducing agent; reacts violently with combustibles, strong acids, acid anhydrides, alcohols, anhydrous ammonia, amines, bromine, caustic materials, chlorine, ketones, halogens, hydrogen sulfide, oxidizers, phenols, phosphorus. Explodes when mixed with iodine, oxygen. May dissolve rubber. Slightly corrosive to mild steel. Flow or agitation of substance may generate electrostatic charges due to low conductivity. May explode without warning when exposed to heat, dust, corrosives, or oxidizers. Pure product attacks rubber, coatings, and some plastics (PVC, nitrile, polyethylene, polyvinyl alcohol, Teflon®, polyurethane, Neoprene®, Viton®).