AZIDE COMPOUNDS

Azide compounds (RN3) are derivatives of hydrogen azide (HN3). There are both inorganic and organic derivatives. They vary widely in their stability and some members of both classes are unstable and potentially explosive. Azide compounds also display significant human toxicity, primarily due to the evolution of hydrogen azide.

Ammonium azide
Azido guanidine picrate (dry)
5-Azido-1-hydroxy tetrazole
Azido hydroxy tetrazole (mercury & silver salts)
3-Azido-1,2-propylene glycol dinitrate
Azidotrimethyltin
Cupric azide
Diphenyl Phosphoryl Azide
1,3-Diazopropene
Azidotrimethyltin
Azotetrazole (dry)
Benzoyl Azide
Benzyl Azide
Bromine azide
Chlorine azide
Copper amine azide
Cupric azide
Cuprous azide
1,2-Diazidoethane
1,1’,Diazidobenzene
Diazonium nitrates (dry)
Diazonium perchlorates (dry)
Diphenyl Phosphoryl Azide
N,N’-Dichlorazodicarbonamidine
Hydrazine azide
Hydrogen azide
Iodine azide (dry)
Lead Azide (dry)
Mercuric azide
Mercurous azide
Nitrobenzoyl Azide
Silver azide (dry)
Sodium Azide
Tert-butoxy Carbonyl Azide
Tetraazido benzene quinone
Tetrazoyl azide (dry)
Triethylsilylazide
Tri-n-butyl ammonium azide
p-Xylyl diazide

The above list is not a complete listing of all unstable azides. In addition, even stable azides can become unstable under certain conditions.

MONO AND DINITRO COMPOUNDS

The main issues associated with mono and dinitro compounds are that some are considered potentially explosive or shock sensitive when dry and/or need to be wetted

dinitroglycerol or dingu
dinitronaphthalene
dinitrophenol
dinitrophenolates, alkali metals
dinitrophenyl hydrazine
dinitroresorcinol
dinitroaminophenol or picramic acid
dinitrosobenzene
N,N-dinitroso-N,N-dimethylephedrineamine
N,N-dinitrosopentamethylenetetramine

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nitrocellulose
nitroguanidine or picrite
nitrosoguanidine
nitrostarch
nitrourea
sodium dinitro-o-cresolate
sodium picramate
urea nitrate

**TRI AND MULTINITRATED COMPOUNDS**

The main issue with these compounds is that all are considered potentially explosive or shock sensitive under various conditions (e.g., dry, contaminated, etc.)

ammonium picrate
hexanitrodiphenylamine or dipicrylamine or hexyl
hexanitrostilbene
trinitro-m-cresol
trinitroaniline or picramide
trinitroanisole
trinitrobenzene
trinitrobenzenesulfonic acid or picrylsulfonic acid
trinitrobenzoic acid
trinitrofluorenone
trinitronaphthalene
trinitrophenetole
trinitrophenol or picric acid
trinitrophenylmethylnitramine or tetryl
trinitroresorcinol or styphnic acid
trinitrotoluene or TNT
various picrates

**PEROXIDE FORMING MATERIALS**

**GROUP I MATERIALS**

These materials form peroxides that may explode even without being concentrated.

<table>
<thead>
<tr>
<th>CHEMICAL</th>
<th>SYNONYMS</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Isopropyl ether</td>
<td>Diisopropyl Ether, Diisopropyl Oxide</td>
<td>Colorless Liquid</td>
</tr>
<tr>
<td>Diethyl Ketene</td>
<td>2 ethyl 1 butene 1 one</td>
<td>Liquid</td>
</tr>
<tr>
<td>Divinyl Ether</td>
<td>Vinyl Ether, Divinyl Oxide</td>
<td>Liquid</td>
</tr>
<tr>
<td>Potassium Metal</td>
<td>Potassium</td>
<td>Silver White Metal</td>
</tr>
<tr>
<td>Potassium Amide</td>
<td></td>
<td>Solid</td>
</tr>
<tr>
<td>Sodium Amide</td>
<td>Sodaamide</td>
<td>White crystalline powder</td>
</tr>
<tr>
<td>Sodium Ethoxyacetilide</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vinylidene Chloride</td>
<td>1,1-dichloroethylene 1,1-dichloroethane</td>
<td>Colorless Liquid</td>
</tr>
</tbody>
</table>
GROUP II MATERIAL

Peroxide hazard on concentration. Distillation or most likely evaporation.

<table>
<thead>
<tr>
<th>CHEMICAL</th>
<th>SYNONYMS</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>p- dioxane</td>
<td>1,4 dioxane, diethylene dioxide</td>
<td>Colorless liquid</td>
</tr>
<tr>
<td>Ethyl ether</td>
<td>Ether, diethyl ether, ethoxyethane</td>
<td></td>
</tr>
<tr>
<td>Tetrahydrofuran</td>
<td>Butylenes oxide, diethylene oxide</td>
<td></td>
</tr>
<tr>
<td>Acetal</td>
<td>1,1 diethoxymethane, diethyl acetal</td>
<td></td>
</tr>
<tr>
<td>Cumene</td>
<td>Isopropyl benzene</td>
<td></td>
</tr>
<tr>
<td>Cyclohexene</td>
<td>1,2,3,4 tetrahydrobenzene</td>
<td></td>
</tr>
<tr>
<td>Cyclopentene</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diacetylene</td>
<td>Beacetylene</td>
<td>Gas</td>
</tr>
<tr>
<td>Ethylene glycol dimethyl ether</td>
<td>1,2, dimethoxy ethane, glyme, monoglyme</td>
<td>Liquid</td>
</tr>
<tr>
<td>Furan</td>
<td>Divinylene oxide</td>
<td>Water white liquid</td>
</tr>
<tr>
<td>Methyl acetylene</td>
<td>Allyene, propyne</td>
<td>Colorless gas or liquid</td>
</tr>
<tr>
<td>Methyl cyclopentane</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tetrahydronapthalene</td>
<td>Tetraline</td>
<td></td>
</tr>
<tr>
<td>Vinyl ethers</td>
<td>Ethyl vinyl ether, methyl vinyl ether</td>
<td></td>
</tr>
<tr>
<td>Other unlisted ethers</td>
<td>Call in for evaluation</td>
<td></td>
</tr>
<tr>
<td>Diethylene glycol dimethyl ether</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acetaldehyde</td>
<td>Ethanal, ethyl aldehyde</td>
<td></td>
</tr>
</tbody>
</table>

GROUP III MATERIALS

Peroxide hazard due to peroxide initiation of polymerization. All materials in Group III with the exception of material stored as a liquid (the peroxide forming potential increase and certain of these monomers, especially butadiene, chloroprene, and tetrafluoroethylene). These materials should be considered a Group I material.

<table>
<thead>
<tr>
<th>CHEMICAL</th>
<th>SYNONYMS</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,3 butadiene</td>
<td>Vinylethylene, divinyl</td>
<td>Colorless gas</td>
</tr>
<tr>
<td>Chlorobutadiene</td>
<td>Chloroprene</td>
<td>Colorless liquid</td>
</tr>
<tr>
<td>Chlorotrifluorooethylene</td>
<td>Trifluorochloroethylene, genetone 1113</td>
<td>Gas</td>
</tr>
<tr>
<td>Tetrafluoroethylene</td>
<td>Perfluoroethylene</td>
<td>Colorless gas</td>
</tr>
<tr>
<td>Vinyl acetate</td>
<td></td>
<td>Colorless liquid</td>
</tr>
<tr>
<td>Vinyl acetylene</td>
<td>Buten-3-yne</td>
<td>Colorless gas or liquid</td>
</tr>
<tr>
<td>Vinyl chloride</td>
<td>Chloroethylene, ethylene monochloride</td>
<td>Colorless gas or liquid</td>
</tr>
<tr>
<td>Vinyl pyridine</td>
<td></td>
<td>Colorless liquid</td>
</tr>
</tbody>
</table>

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NFPA CLASS 4 OXIDIZER

Oxidizers that fall under the Class 4 NFPA (National Fire Prevention Association) oxidizer category require special evaluation consideration due to their potential for reactivity and shock sensitivity when contaminated or exposed to thermal or physical shock.

- Tetranitromethane
- Ammonium Perchlorate
- Guanidine Nitrate
- Hydrogen Peroxide >90%
- Ammonium Permanganate

ORGANIC PEROXIDES

Organic peroxides can be highly reactive and dangerous compounds if mistreated or mishandled. The main hazard associated with organic peroxides is decomposition. The main causes of peroxide decomposition are Heat, Fire, Friction, Shock and Contamination. Many organic peroxides require temperature controls (e.g., refrigerated vehicle) per DOT regulations when being transported or have been classified as subsidiary explosive compounds per DOT.

- 2,5-Dimethyl-2,5-Di(2-ethylhexanoylperoxy) Hexane
- 2,5-Bis(tert-butylperoxy) 2,5-dimethyl-3-hexyne
- tert-butyl peroctoate w/ 1,1-di-(tert-butyl-peroxy)-3,3,5-trimethylcyclohexane
- Tert Amyl-Peroxy-2-ethylhexanoate
- Benzoyl peroxide
- tert-butyl peroxy-2-ethylhexanoate (50%)
- D-(4-tert-butylcyclohexyl) peroxydicarbonate
- Dicumyl Peroxide
- MEK Peroxide (45%)
- MEK Peroxide
- Di-tert-Butyl Peroxide
- tert-Butyl peroxybenzoate
- 1,1 Di(tert-butylperoxy)-3,3,5 trimethylcyclohexane in Dibutyl Phthalate
- Di-tert-butyl peroxide
- Di-Butylcyclohexyl peroxydicarbonate
- t-butyl peroxybutane
- Di-t-Amyl peroxy cyclohexane
- t-Amyl peroxyethylhexanoate
- t-Amyl peroxyoctanoate
- t-Amyl peroxypivalate
- t-Amyl peroxyneodecanoate
- t-Butyl Cumyl Peroxide
- t-Butyl peracetate
- Methyl Ethyl Ketone Peroxide
- t-Butyl peroctoate

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PERCHLORIC ACID

Perchloric acid (HClO4) is a highly corrosive and oxidizing material. It is also a highly reactive material if in contact with incompatibles. Perchloric acid can explode on contact with many organics and can form potentially explosive metal perchlorates if mixed with metals. It is also forbidden to transport in concentrations >72%.

- Perchloric Acid >72%
- Contaminated Perchloric Acid
- Decontamination Perchloric Acid fume hoods and spill type releases

AZO COMPOUNDS

Azo compounds have a wide variety of hazards. These hazards include:

- temperature sensitive
- flammable solids
- shock and friction sensitive
- poisonous solids.

The only way to determine the hazard associated with each type of compound is to review each on a case by case basis using MSDS's and/or chemical references.

- Azobisisobutyronitrile (VAZO 64)
- 2,2-azobis(2,4-dimethyl-4-methoxyvaleronitrile)
- 2,2-azobis(2-methylbutyronitrile)
- 2,2-azobis(2,4-dimethylvaleronitrile)

ADDITIONAL DOT FORBIDDEN MATERIAL

- Azotetrazole (dry)
- Benzene diazonium chloride (dry)
- Benzene diazonium nitrate (dry)
- Benzoazidizoles (dry)
- p-Diazoazobenzene
- 1,2-Diazoethane
- 1,1’-Diazaoaminonaphthalene
- Diazaoaminotetrazole (dry)

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Diazodinitrophenol (dry)
Diazidiphenylmethane
Diazonium nitrates (dry)
Diazonium perchlorates (dry)
1,3-Diazopropane
N,N’-Dichlorazodicarbonamidine (salts of) (dry)
Hexanitroaoxy benzene
Hexanitrodiphenylamine
Mercuric Oxy cyanide
Methazoic acid
Naphthalene diazonide
Nitrates of diazonium compounds
6-Nitro-4-diazotoluene-3-sulfonic acid (dry)
m-Nitrobenzene diazonium perchlorate
2,4,6-Trinitro-1,3-diazobenzene
p-Xylyl diazide

OTHER DOT EXPLOSIVES

Acetylides of heavy metals
Ammonium Nitrate explosive mixtures
Ammonium Perchlorate
Black Powder
Cyclonite
Cyclotetramethylenetetranitramine (HMX)
Cyclo trimethylenetrinitramine (RDX)
Dipicrylamine
Erythritol Tetryanitrate
Fulminates of heavy metals
Lead Styphnate
Mannitol Hexanitate
Nitroglycerine
Organic Nitramines
Perchlorate explosive mixtures
Pentaerythritol tetranitrate
Picrate explosives
Picryl chloride
Tetranitrocarbazole
Tetrazole explosives
Trinitrobenzoic acid
Unknown Explosives

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