

# Indicators and Warnings for Homemade Explosives



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## WARNING

- DO NOT handle any unknown chemicals or explosive materials
- Consider all unknown substances and materials dangerous
- Apply this guide with previous training and experience
- Contact your EOD or Bomb Squad immediately if a possible homemade explosives production area has been identified

***Enter your EOD / Bomb Squad Contact Information here:***

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## **Indicators and Warnings on Homemade Explosives**

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## Introduction

This booklet is a quick reference guide describing indicators and warnings related to homemade explosives. It is intended to aid military, federal, state, and local law enforcement personnel to visually recognize the materials, chemicals, and equipment associated with the manufacture of homemade explosives. The examples in this guide were selected based on historical incidents, intelligence on emerging threats, and the commercial availability of the components. Given the variety of substitute materials available for the manufacture of homemade explosives, this guide should not be considered all inclusive. Instead, it should be used to establish a basic understanding of typical materials, chemicals, and equipment associated with the manufacture of homemade explosives and to enable on-scene personnel to determine if they are dealing with a potentially dangerous situation.

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The majority of this quick reference guide is tab-divided into three sections.

- Homemade Explosives describes the key identifiers, hazards, commercial uses, chemical components, and the equipment used in the manufacture of homemade explosives.
- Chemical Components describes the key identifiers, hazards, commercial uses, commercial sources, and the homemade explosive it can be used to create.
- Manufacturing Equipment summarizes the laboratory and improvised equipment that can be utilized during the manufacturing process.

The Technical Support Working Group, Training Technology Development Subgroup, sponsored the development of this guide on Indicators and Warnings for Homemade Explosives with support from the Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF) and the Federal Bureau of Investigation (FBI).

# Homemade Explosives

## *In General...*

- Exercise Caution: If you think you have found a homemade explosive, DO NOT HANDLE, contact an expert immediately.
- All explosives are sensitive to heat, shock, friction, and electrostatic discharge; sensitivity will vary based on the type of explosive.
- Homemade explosives, also known as improvised explosives, can be made from commonly available commercial chemicals with relatively minimal effort.
- Many of the chemical components can be purchased from a chemical supply store in pure form.
- Homemade explosives can be made by physically mixing ingredients or by chemically reacting ingredients.
- For some homemade explosives, when the ingredients chemically react, small crystalline solids form. These solids that settle to the bottom of the container are homemade explosives.
- Some sensitive homemade explosives may be manufactured in a cold and/or frigid water bath to prevent explosion.
- Some homemade explosives may be kept in a refrigerator or freezer.
- Color is not a sole indicator to identify type or strength of explosive.

# Components

## EXAMPLES, NOT ALL INCLUSIVE

**One from "LIST A" mixed with one from "LIST B" could make an explosive**

<b>"List A" Oxidizers</b> .....	<i>Commercial Source</i>
Ammonium Nitrate .....	<i>Fertilizer</i>
Hydrogen Peroxide .....	<i>Disinfectant, Bleaching Agent, Hair Products</i>
Nitric Acid .....	<i>Industrial Chemical</i>
Potassium Chlorate .....	<i>Match Heads, Pyrotechnics</i>
Potassium Nitrate .....	<i>Black Powder, Saltpeter, Stump Remover</i>
Potassium Perchlorate .....	<i>Airbag Initiator Formulas, Pyrotechnics</i>
Potassium Permanganate .....	<i>Disinfectant, Algae Control</i>
Sodium Chlorate .....	<i>Herbicide, Pyrotechnics</i>
Sodium Nitrate .....	<i>Fertilizer, Food Preservative</i>

<b>"List B" Fuels</b> .....	<i>Commercial Source</i>
Alcohols .....	<i>Ethanol, Methanol, Isopropanol, etc.</i>
Cellulose .....	<i>Sawdust, Cotton, etc.</i>
Coal .....	<i>Charcoal</i>
Energetic Fuels .....	<i>Nitromethane, Nitrobenzene, etc.</i>
Flake / Powder Metals .....	<i>Aluminum, Magnesium, Iron</i>
Natural Gases .....	<i>Methane, Propane, Butane</i>
Fuel Oils .....	<i>Vehicle Fuel</i>
Petroleum .....	<i>Kerosene, Diesel, etc.</i>
Solvents .....	<i>Acetone, Methyl Ethyl Ketone, Naphtha</i>
Sugars .....	<i>Icing (Confectionery), Glucose</i>

**Two or more from "LIST C" could make an explosive**

<b>"List C" Precursors</b> .....	<i>Commercial Source</i>
Acetone .....	<i>Nail Polish Remover, Paint Remover</i>
Citric Acid .....	<i>Food Additive, Water Softener, Powdered Drinks</i>
Ethylene Glycol .....	<i>Antifreeze</i>
Hexamine .....	<i>Camp Stove Fuel Tablet</i>
Hydrochloric Acid .....	<i>Muriatic Acid</i>
Hydrogen Peroxide .....	<i>Disinfectant, Bleaching Agent</i>
Methyl Ethyl Ketone .....	<i>Paint Remover, Solvent</i>
Nitric Acid .....	<i>Industrial Chemical</i>
Potassium Nitrate .....	<i>Black Powder, Saltpeter, Stump Remover</i>
Sodium Nitrate .....	<i>Fertilizer, Food Preservative</i>
Sulfuric Acid .....	<i>Car Batteries, Drain Cleaners</i>
Urea .....	<i>Fertilizer</i>

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# Components

## EXAMPLES, NOT ALL INCLUSIVE

### Binders

Binders are materials used to hold certain explosive mixtures together. Binders can desensitize the explosive and can alter the appearance and consistency of the explosive.

Grease:

Lubricants,  
such as for ball  
bearings



Motor Oils:

10W-30, etc.



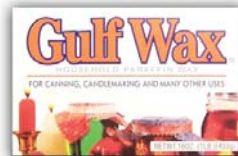
Petroleum Jelly:

Vaseline



Wax:

Paraffin,  
Candles,  
Car Wax  
(Carnauba Wax)



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## HOMEMADE EXPLOSIVES

*The following may help you determine whether or not you are in a homemade explosives lab. They are generalities, they are NOT rules. There are no rules.*



*If you notice.....*

- Predominantly dry chemical components
- More granular than powdery product
- Grinding equipment (but not necessary)
- Simplistic safety equipment (gloves, dust masks, etc.)

*Then you might review the information on...*

- Ammonium Nitrate Mixtures
- Black Powder
- Chlorate / Perchlorate Mixtures



*If you notice .....*

- Liquid and some dry chemical components
- Finer, more powdery than granular product
- Pyrex, mason jars, or scientific glassware
- Filters (paper, cloth, etc.)
- Ice water baths
- Safety eye and respiratory protection
- Acid-resistant skin protection

*Then you might review the information on...*

- Hydrogen Peroxide Mixtures
- TATP
- HMTD
- Urea Nitrate



*If you notice .....*

- Predominantly liquid chemical components
- Liquid product
- Pyrex, mason jars, or scientific glassware
- Safety eye and respiratory protection
- Acid-resistant skin protection

*Then you might review the information on...*

- MEKP
- EGDN
- Hydrogen Peroxide Mixtures (some)

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*If you see...*

*See these pages...*

Acetone.....	xx
Algae Control.....	xx
Aluminum Powder.....	xx
Ammonium Nitrate.....	xx
Antibiotics.....	xx
Antifreeze.....	xx
Automotive Batteries.....	xx
Bleaches.....	xx
Camp Stove Fuel Tablets.....	xx
Citric Acid.....	xx
Cleaner, Laboratories.....	xx
Disinfectant.....	xx
Drain Pipe Cleaners.....	xx
Ethylene Glycol.....	xx
Fertilizer.....	xx
Fingernail Polish Remover....	xx
First Aid Cold Packs.....	xx
Fuel.....	xx
Fungicide.....	xx
Hair Products.....	xx
Herbicide.....	xx
Hexamine.....	xx
Hydrochloric Acid.....	xx
Hydrogen Peroxide.....	xx
Magnesium Powder.....	xx
Matches.....	xx
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Muriatic Acid.....	xx
Nitric Acid.....	xx
Paint Flakes.....	xx
Paint Remover.....	xx
Pickling Salt.....	xx
Pool Water Softeners.....	xx
Potassium Chlorate.....	xx
Potassium Nitrate.....	xx
Potassium Permanganate.....	xx
Pulp Bleaching.....	xx
Pyrotechnics.....	xx
Saltpeter.....	xx
Sodium Chlorate.....	xx
Soil Additive, Sulfur.....	xx
Solvent.....	xx
Sour Salt.....	xx
Stump Remover.....	xx
Sulfur.....	xx
Sulfuric Acid.....	xx
Therapeutic Health Baths.....	xx
Urea.....	xx

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# Ammonium Nitrate Mixtures

## Key Identifiers

- Ammonium nitrate and aluminum
  - Silvery, gray
  - Powder or granules
  - Odorless



*Ammonium Nitrate and Aluminum*

- Ammonium nitrate and racing car fuel
  - White
  - Powder or granules, moist
  - Mild, fruity, but disagreeable odor
- Ammonium nitrate and icing (confectionery)
  - White
  - Powder
  - Slightly sweet odor
  - Attracts sugar ants
- Ammonium nitrate and fuel oil (ANFO)
  - Off-white to pinkish
  - Granules or spherical pellets
  - Fuel oil odor



*Ammonium Nitrate and Fuel Oil (ANFO)*

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# Ammonium Nitrate Mixtures

## Hazards

- Sensitive to impact, friction, static spark, and heat
- Ammonium nitrate by itself can be explosive in hot, confined areas

## Commercial Uses

- Exploding targets (Tannerite)
- Blasting agent (also known as ANFO)
- Dynamites, emulsions, water gels, and certain other packaged high explosives

## Chemical Components

- Ammonium nitrate... *fertilizer*
- Aluminum... *metal paint flakes*
- Fuel... *fuel oils, diesel, nitromethane*
- Sugars... *sucrose, icing (confectionery)*



**Ammonium Nitrate**



**Aluminum**



**Fuel**



**Sugars**

## Equipment

### Manufacturing:

- Grinders
- Blenders

### Safety:

- Dust mask or respirator, if large quantities or high concentrations present
- Safety glasses
- Impermeable gloves
- Protective clothing
- Ventilated area, if large quantities present (open windows, doors, fans)

#

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# Black Powder

## Key Identifiers

- Powder or granules
- Gray, black
- Faint, non-distinct odor
- Sulfur odor (rotten eggs) when burned
- Other names: *Gun Powder*

## Hazards

- Sensitive to impact, friction, static spark, and heat

## Commercial Uses

- Antique firearms propellant / gunpowder
- Fuses
- Pyrotechnics
- Special blasting applications
- Military salute charges and other ordnance



*Black Powder*



*Pyrotechnics*



*Gray Black Powder*

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# Black Powder

## Chemical Components

- Potassium nitrate... *black powder, saltpeter, pickling salt*
- Charcoal... *briquettes*
- Sulfur... *chemical supply, garden supply*



**Potassium Nitrate**



**Charcoal**



**Sulfur**

## Equipment

### *Manufacturing:*

- Grinders
- Blenders

### *Safety:*

- Dust mask or respirator, if large quantities present
- Safety glasses
- Impermeable gloves
- Protective clothing
- Ventilated area, if large quantities present (open windows, doors, fans)



# Chlorate / Perchlorate Mixtures

## Key Identifiers

- All mixtures are odorless
- Flash Powders:
  - Powder or granules
  - Silvery, gray



*Flash Powder*

- Poor Man's C4:
  - Putty-like, solid or clumps
  - White



*Poor Man's C4*

- Armstrong's Mix:
  - Powder
  - Red



*Armstrong's Mix*

## Hazards

- Extremely sensitive to impact, friction, static spark, and heat

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# Chlorate / Perchlorate Mixtures

## Commercial Uses

- Flash Powders: Fireworks
- Armstrong's Mix: Toy gun caps

## Chemical Components

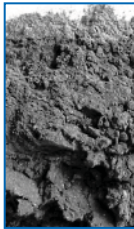
- Potassium chlorates... *match heads, pyrotechnics*
- Potassium perchlorates... *airbag initiator formulas, pyrotechnics*
- Metal powders... *aluminum, magnesium*
- Petroleum jelly... *Vaseline*
- Red phosphorus... *pyrotechnics*



**Potassium  
Chlorates**



**Potassium  
Perchlorates**



**Metal  
Powders**



**Petroleum  
Jelly**



**Red  
Phosphorus**

## Equipment

### Manufacturing:

- Grinders
- Blenders

### Safety:

- Dust mask or respirator, if large quantities present
- Safety glasses
- Impermeable gloves
- Protective clothing
- Ventilated area, if large quantities present (open windows, doors, fans)

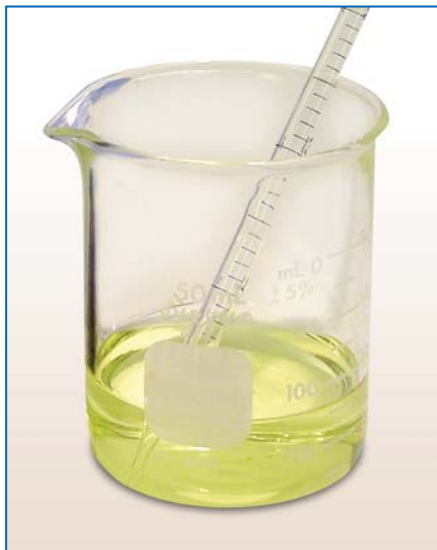


## Key Identifiers

- Oily, viscous liquid
- Colorless to dark yellow
- Odorless
- Other names: *Nitroglycol*, *Dinitroglycol*, *Glycol Dinitrate*, *Ethylene Dinitrate*

## Hazards

- Extremely sensitive to impact, friction, static spark, and heat
- Inhalation may cause headaches, dizziness, chest pain, and low blood pressure



EGDN

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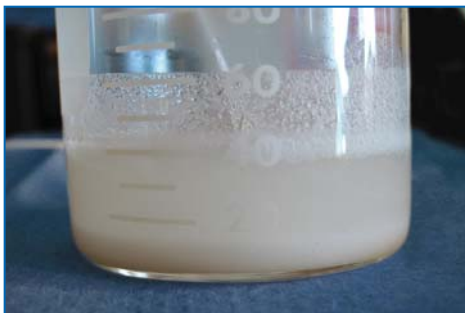
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## Key Identifiers



- Crystals or powder
- Colorless to white
- Dullness like flour
- Solids settled at bottom of container
- Finer than TATP
- Can smell like dead fish
- Fresh product may have little or no odor
- Additives can alter the physical appearance
- Precursor colors will affect HMTD color
- May be stored in refrigerator or freezer



*HMTD Settles to the Bottom*

## Hazards

- Should not be near metals
- Extremely sensitive to impact, friction, static spark, and heat



*Pure HMTD*

# HMTD

## Commercial Uses

- None known

## Chemical Components

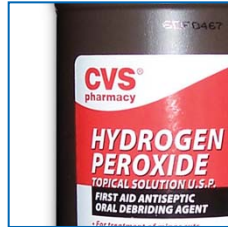
- Citric acid... *food additive, water softener, powdered drinks*
- Hexamine... *camp stove fuel tablets*
- Hydrogen peroxide... *disinfectant, bleaching agent, hair products*



*Citric Acid*



*Hexamine*



*Hydrogen Peroxide*

## Equipment

### *Manufacturing:*

- Glassware
- Distillers
- Mixers
- Ice Bath
- Filters

### *Safety:*

- Dust mask or respirator, if large quantities or high concentration present
- Safety glasses, chemical goggles, face shields
- Impermeable gloves
- Protective clothing
- Acid-resistant aprons
- Ventilated area, if large quantities present or concentrating chemicals (open windows, doors, fans, fume hood)

#

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# Hydrogen Peroxide Mixtures

## Key Identifiers

- Liquid or semi-liquid gel
- Mixture color varies with additives
- Slightly pungent, caustic odor (generally)
- Odor similar to chemical component

## Hazards

- Large quantities can self-heat and ignite if in sunlight or elevated room temperatures
- Extremely sensitive to impact, friction, static spark, and heat



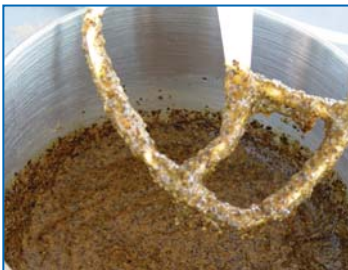
*HP and Nitromethane  
or Ethanol*



*HP and Flour*



*HP and Cumin*



*HP and Black Pepper*



*HP and Coffee*

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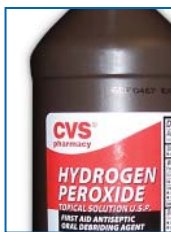
# Hydrogen Peroxide Mixtures

## Commercial Uses

- None known

## Chemical Components

- Hydrogen peroxide... *disinfectant, bleaching agent, hair products*
- Food products... *black pepper, coffee, cumin, flour*
- Nitromethane... *racing car fuel, remote control vehicle fuel*
- Ethanol (grain alcohol)... *liquor store, chemical supply*



**Hydrogen Peroxide**



**Food Products**



**Nitromethane**



**Ethanol (grain alcohol)**

## Equipment

### Manufacturing:

- Glassware
- Distillers
- Mixers
- Ice Bath
- Filter

### Safety:

- Protective clothing
- Dust mask or respirator, if large quantities or high concentrations present
- Safety glasses, chemical goggles, face shields
- Impermeable gloves and aprons
- Ventilated area, if large quantities present or concentrating chemicals (open windows, doors, fans, fume hood)

#

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## Key Identifiers



- Liquid
- Clear, colorless
- Agreeable odor
- Other names: *Luberisol DDM*

## Hazards

- Extremely sensitive to impact, friction, static spark, and heat
- Should not be near sulfuric acid

## Commercial Uses

- Plastic manufacture (Stored in plastic containers, drums, about 5 to 20 kg)



MEKP

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# MEKP

## Chemical Components

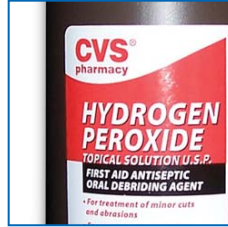
- Methyl ethyl ketone... *paint remover, solvents*
- Acid... *sulfuric, nitric, hydrochloric*
- Hydrogen peroxide... *disinfectant, bleaching agent, hair products*



**MEK**



**Acid**



**Hydrogen Peroxide**

## Equipment

### Manufacturing:

- Glassware
- Distillers
- Mixers
- Ice Bath

### Safety:

- Dust mask or respirator, if large quantities present
- Safety glasses, chemical goggles, face shield
- Impermeable gloves
- Impermeable, acid-resistant apron
- Protective clothing
- Ventilated area, if large quantities present or concentrating chemicals (open doors, windows, fans, fume hood)

## Key Identifiers



- Crystals or powder
- Sugar-like appearance
- Colorless or white
- Solids settled at bottom of container
- Additives can alter the physical appearance and color
- Fruity smell, like acetone but gentler
- Old TATP smells very acrid, like bad vinegar
- Evaporates in an open container
- If stored in a closed jar, glass may look frosted
- May be stored in a refrigerator or freezer
- Other names: *Acetone Peroxide*, *Mother of Satan*



*Crude TATP*



*Pure TATP*

## Hazards

- Extremely sensitive to impact, friction, static spark, and heat

## Commercial Uses

- None known

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#

# TATP



TATP



Jordanian TATP

## Chemical Components

- Acetone... *nail polish remover, paint remover*
- Acid... *sulfuric, nitric, hydrochloric*
- Hydrogen peroxide... *disinfectant, bleaching agent, hair products*



Acetone



Acid



Hydrogen Peroxide

## Equipment

### Manufacturing:

- Glassware
- Distillers
- Mixers
- Ice Bath
- Filters

### Safety:

- Dust mask or respirator, if large quantities are present
- Safety glasses, chemical goggles, face shields
- Impermeable gloves
- Impermeable, acid-resistant apron
- Protective clothing
- Ventilated area, if large quantities present or concentrating chemicals (open doors, windows, fans, fume hood) (open doors, windows, fans, fume hood)

#

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# Urea Nitrate

## Key Identifiers



- Crystals
- Colorless to off-white
- Solids settled at bottom of container
- Additives can alter the physical appearance
- Odorless
- Other names: *Acidogen Nitrate*



*Urea Nitrate*

## Hazards

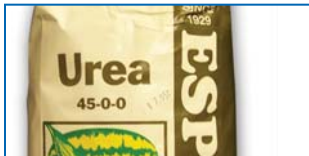
- Sensitive to impact, friction, static spark, and heat

## Commercial Uses

- None known

## Chemical Components

- Nitric acid... *industrial chemical*
- Urea... *fertilizer*



*Urea*



*Nitric Acid*

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# Urea Nitrate



*Mixing Urea Nitrate*

## Equipment

### *Manufacturing:*

- Glassware
- Mixers
- Ice Bath
- Filters

### *Safety:*

- Dust mask or respirator, if large quantities present
- Safety glasses, chemical goggles, face shields
- Impermeable gloves
- Impermeable, acid-resistant apron
- Protective clothing
- Ventilated area, if large quantities present (open doors, windows, fans, fume hood)

#

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# CHEMICAL COMPONENTS

EXAMPLES, NOT ALL INCLUSIVE

Chemicals may be found in cool dry areas; in tightly sealed containers.  
None of these chemicals require refrigeration, but may be stored there.  
All chemicals listed can be purchased from the Internet.



Acetone



Nail Polish Remover



First Aid Cold Packs



Citric Acid



Sour Salt



Antifreeze



Camp Stove Fuel



Hair Products



Disinfectant



Pool Chemicals



Flour



Coffee



Cumin



Pepper

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CHEMICAL COMPONENTS

## CHEMICAL COMPONENTS

EXAMPLES, NOT ALL INCLUSIVE



MEK



Strike Anywhere  
Matches



Stump  
Remover



Iron  
Remover



Sulfuric Acid Drain Cleaner



Sulfuric Acid Battery Fluid



Muriatic Acid



Ammonium Nitrate



Urea



Sulfur



Various Chemicals from Chemical Supply

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# Acetone



## Key Identifiers

- Liquid
- Colorless to yellow
- Sweet, flowery, perfume-like odor
- Smells like nail polish remover
- Evaporates quickly if opened
- Small quantities, up to a gallon: glass bottles, metal containers
- Large quantities: metal cans, drums (5 to 55 gallons)
- Other names: *Dimethyl Ketone, 2 Propanone*



## Equipment

### Safety:

- Respirator, if large quantities present
- Safety glasses, chemical goggles, face shields
- Impermeable gloves and aprons
- Ventilated area (open doors, windows, fans, fume hoods)

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# Acetone

## Hazards

- Extremely flammable
- Explosive vapors can travel
- Eye, skin, respiratory irritant
- Vapors can cause drowsiness, dizziness, and numbness in hands and feet
- Should not be near chemicals rich in oxygen

## Commercial Uses

- Fingernail polish remover
- Paint remover
- Glassware cleaner for college and high school labs
- Laboratory and industrial solvent



## Sources

- Beauty supply stores
- Chemical supply stores
- Drug stores
- Hardware supply stores
- Paint supply stores
- Household supply stores

## Possible HME Product

- TATP, pg XX



*Example Commercial Product Packaging*

*Also see NIOSH, CAS 67-64-1, ICSC 0087, RTECS AL3150000, and ERG 127 (v 2004)*

#

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# Aluminum Powder

## Key Identifiers

- Powder
- Silver, gray, black
- May look whitish
- Odorless
- Small quantities, up to a gallon: plastic and steel containers
- Large quantities, 5 gallons or more: steel containers
- Other names: *Aluminum*



*Aluminum Powder*

## Equipment

### *Safety:*

- Dust mask or respirator, if large quantities present
- Safety glasses, chemical goggles, face shields
- Protective clothing

## Hazards

- Extremely flammable
- Vapors can be explosive
- Vapors may be present in adjacent areas
- Contact with water can release flammable gases
- Should not be near water, moisture, acids, and chemicals rich in oxygen



*Typical Chemical Supply Packaging*

# Aluminum Powder

## Commercial Uses

- Paints
- Pyrotechnics
- Manufacture of engines, cars, structural members, etc.

## Sources

- Hardware supply stores
- Paint supply stores
- Chemical supply stores
- Pyrotechnic stores

## Possible HME Product

- Ammonium Nitrate Mixtures, pg xx
- Flash Powders, pg xx



*Example Commercial  
Product Packaging*

*Also see NIOSH, CAS 7429-90-5, ICSC 0988,  
RTECS BD0330000, and ERG 138, 169, 170 (v 2004)*

#

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# Ammonium Nitrate



## Key Identifiers

- Spherical pellets, granular, crystalline, or powder
- Colorless or white
- Odorless
- Small quantities, up to 5 gallons: plastic or glass containers
- Large quantities, more than 5 gallons: plastic or paper bags
- Other names: *Nitrate of Ammonium*

## Equipment

### Safety:

- Dust mask or respirator, if large quantities present
- Safety glasses
- Impermeable gloves
- Protective clothing



*Typical Chemical Supply Packaging*



*Fertilizer Grade Pellets*



*Explosive Grade Pellets*

- FOR OFFICIAL USE ONLY -

#

# Ammonium Nitrate

## Hazards

- Eye, skin, respiratory irritant
- Ammonium nitrate by itself can be explosive
- Addition of powdered metals or fuels can be explosive
- Should not be near combustibles, acids, flammables, and heat
- Should not be stored in direct sunlight

## Commercial Uses

- Fertilizers
- Explosives
- First aid cold packs



## Sources

- Farm and feed stores
- Agricultural supply stores
- Chemical supply stores
- First aid supplies

*Example Commercial Product Packaging*

## Possible HME Product

- Ammonium Nitrate Mixtures, pg XX

*Also see CAS 6484-52-2, ICSC 0216, RTECS BR9050000, and ERG 140 (v 2004)*

#

- FOR OFFICIAL USE ONLY -

# Citric Acid



## Key Identifiers

- Crystalline
- White or colorless
- Odorless
- Small quantities, up to 5 pounds: baggies, glass, or plastic containers
- Large quantities, more than 5 pounds: plastic containers, plastic / paper sacks
- May be available in tablet form
- Other names: *Hydrogen citrate, sour salt*



*Typical  
Chemical  
Supply  
Packaging*

## Equipment

### *Safety:*

- Dust mask or respirator, if large quantities present
- Safety glasses
- Impermeable gloves
- Protective clothing

- FOR OFFICIAL USE ONLY -

#

# Citric Acid

## Hazards

- Incompatible with chemicals rich in oxygen or bases
- Severe eye irritant
- Skin and respiratory irritant
- Prolonged or repeated exposure may cause allergic reaction in some individuals

## Commercial Uses

- Food additives
- Water softeners

## Sources

- Pharmacies
- Health food stores
- Chemical supply stores



*Example Commercial Product Packaging*

## Possible HME Product

- HMTD, pg xx

*Also see CAS 77-62-9, ICSC 0855,  
and RTECS GE7350000*

#

- FOR OFFICIAL USE ONLY -



# Ethylene Glycol

## Key Identifiers



- Liquid, syrupy, viscous
- Clear, colorless (pure chemical form)
- Odorless
- Small quantities, up to 5 gallons: glass or plastic containers
- Large quantities, more than 5 gallons: plastic or steel container
- Other names: *Glycol, Ethanediol, Monoethylene glycol*



*Ethylene Glycol*

## Equipment

### *Safety:*

- Respirator, if large quantities present
- Chemical goggles
- Impermeable gloves and aprons
- Protective clothing
- Ventilated area (open doors, windows, fans, fume hoods)

## Hazards

- Ingestion can cause blindness and death
- Mild eye, skin, respiratory irritant
- Should not be near chemicals rich in oxygen, strong acids, heat, and salts

- FOR OFFICIAL USE ONLY -

#

# Ethylene Glycol

## Commercial Uses

- Plastic manufacture
- Antifreeze
- Commercial explosives

## Sources

- Automotive stores
- Chemical supply stores

## Possible HME Product

- EGDN, pg xx



Example Commercial Product Packaging



Antifreeze

Also see NIOSH, CAS 107-21-1, ICSC 0179, and RTECS KW2975000

#

- FOR OFFICIAL USE ONLY -

# Hexamine



## Key Identifiers

- Crystalline or solid
- White
- Slight ammonia-like odor
- Small quantities: Up to 5 pounds, plastic bags or containers
- Large quantities: More than 5 pounds, containers or woven bags
- Other names:  
*Hexamethylenetetramine,*  
*Methenamine*

## Equipment

### *Safety:*

- Dust mask or respirator, if in dust form
- Impermeable gloves
- Protective clothing
- Ventilated area, if in dust form (open windows, doors, fans, fume hoods)

## Hazards

- Flammable
- Eye, skin, respiratory irritant
- Should not be near metals, peroxides, and chemicals rich in oxygen
- Should not be near heat, humidity, and acids



*Hexamine Tablets*



*Hexamine Tablet Burning*

- FOR OFFICIAL USE ONLY -

#

# Hexamine

## Commercial Uses

- Camp stove fuel tablets
- Antibiotics
- Military explosives
- Pyrotechnics

## Sources

- Hardware supply stores
- Camping / army surplus stores
- Chemical supply stores
- Pyrotechnic supply stores



*Camp Stove Fuel Tablets*



*Camp Stove Kit*

## Possible HME Product

- HMTD, pg xx
- R-Salt

*Also see CAS 100-97-0, ICSC 1228, RTECS MN4725000, and ERG 133 (v 2004)*

#

- FOR OFFICIAL USE ONLY -

# Hydrochloric Acid

## Key Identifiers

HCl

- Liquid
- Colorless to light yellow to greenish-yellow
- Pungent, acrid, sour odor
- Corrosive, leaves burn marks
- Will burn nose
- Makes eyes water
- Can liberate chlorine gas
- Various concentrations available
- Small quantities, up to a gallon: glass or plastic containers (varies by concentration)
- Large quantities, up to 55 gallons: lined steel drums, plastic containers
- Other names: *Muriatic Acid*

## Equipment

### *Safety:*

- Respirator, if large quantities present
- Safety glasses, chemical goggles, face shields
- Impermeable gloves
- Acid-resistant aprons
- Ventilated area (open doors, windows, fans, fume hoods)

## Hazards

- Severe eye, skin, respiratory irritant (severity depends on concentration)
- Ingestion may cause death
- Corrosive
- Should not be near anything except other acids



*Typical Chemical Supply Packaging*

- FOR OFFICIAL USE ONLY -

#

# Hydrochloric Acid

## Commercial Uses

- Manufacture of plastics and some chemicals
- Cleaning products

## Sources

- Industrial supply stores
- Chemical supply stores
- Building supply stores

## Possible HME Product

- TATP, pg xx
- MEKP, pg XX



*Example Commercial Product Packaging*

*Also see NIOSH, CAS 7647-01-0, ICSC 0163, RTECS MW4025000, and ERG 157 (v 2004)*

#

- FOR OFFICIAL USE ONLY -

# Hydrogen Peroxide

## Key Identifiers

- Liquid
- Clear, colorless
- Slightly pungent, caustic odor
- Corrosive, leaves burn marks
- Whitens skin on contact
- Skin blisters
- Peels paint, whitens materials
- Various concentrations available
- Easily concentrates to higher levels
- Beautician grade may require state license to purchase
- Small quantities, up to a half gallon:  
glass or plastic containers (varies by concentration)
- Large quantities, 30 to 55 gallons: plastic, aluminum, or  
stainless steel drums (varies by concentration)
- Other names: *Dihydrogen Dioxide*, *Hydroperoxide*



*35% Concentration  
from Chemical Supply*

## Equipment

### *Safety:*

- Dust mask or respirator, if large quantities or high  
concentrations present
- Safety glasses, chemical goggles, face shields
- Impermeable gloves and acid-resistant aprons
- Ventilated area, if large quantities present or  
concentrating (open windows, doors, fans, fume hoods)

## Hazards

- Eye, skin, respiratory irritant (severity depends on  
concentration)
- Inhaled vapors can cause breathing difficulties
- Concentrated vapors accumulate at ground level
- Corrosive
- Should not be near heat, light
- Should not be near metals, metal salts, rust, dust
- Should not be near flammable and combustible materials

- FOR OFFICIAL USE ONLY -

#

# Hydrogen Peroxide (HP)



50% Concentrations from Chemical Supply in Various Quantities

## Commercial Uses

- Bleaching pulp and textiles
- Bleaching hair
- Disinfectants
- Environmental clean-up
- Pool water softeners
- Therapeutic health baths



Beautician Grade HP

## Sources

- Drug stores (under 8% concentrations)
- Beauty supply stores (to about 35% concentrations)
- Internet (up to 35% concentrations)
- Chemical supply stores (up to 98% concentrations)

## Possible HME Product

- HMTD, pg XX
- TATP, pg XX
- Hydrogen Peroxide Mixtures, pg XX

Example  
Commercial  
Product  
Packaging



Also see NIOSH, CAS 7722-84-1, ICSC 0164, RTECS MX900000, MX0887000, and ERG 140, 143 (v 2004)

#

- FOR OFFICIAL USE ONLY -



# Magnesium Powder

## Key Identifiers

Mg

- Powder or solid
- Gray, black
- Odorless
- Small quantities, up to about a gallon: plastic and steel containers
- Large quantities, more than 5 gallons: steel containers

## Equipment

### *Safety:*

- Dust mask or respirator, if large quantities present
- Safety glasses
- Impermeable gloves
- Protective clothing
- Ventilated area, if large quantities present (open windows, doors, fans, fume hoods)



*Magnesium Powder*

- FOR OFFICIAL USE ONLY -

#

# Magnesium Powder



*Solid Magnesium*

## Hazards

- Eye, skin, respiratory irritant
- Extremely flammable
- Contact with water releases flammable gases

## Commercial Uses

- Manufacture of engines, cars, structural members
- Pyrotechnics

## Sources

- Hardware supply stores
- Chemical supply stores
- Pyrotechnic stores

## Possible HME Product

- Flash Powders, pg xx

*Also see CAS 7439-95-4, ICSC 0289, RTECS OM2100000, and ERG 138 (v 2004)*

#

- FOR OFFICIAL USE ONLY -

# Methyl Ethyl Ketone



## Key Identifiers

- Liquid
- Colorless
- Sweet, minty, acetone-like, agreeable odor
- Small quantities, up to about a gallon: glass and metal containers
- Large quantities, More than 5 gallons: metal containers
- Dry or cracked skin
- Evaporates quickly
- Other names: *2-Butanone, MEK*



*Typical Chemical Supply Packaging*

## Equipment

### *Safety:*

- Dust mask or respirator, if large quantities present
- Safety glasses, chemical goggles
- Impermeable gloves and apron
- Protective clothing
- Ventilated area (open doors, windows, fans, fume hoods)



*Methyl Ethyl Ketone*

- FOR OFFICIAL USE ONLY -

#

# Methyl Ethyl Ketone

## Hazards

- Extremely flammable
- Vapors can be explosive
- Vapors may be present in adjacent areas
- Eye, skin, respiratory irritant
- Vapors may cause drowsiness and dizziness
- Should not be near chemicals rich in oxygen
- Should not be near caustic solutions such as lye

## Commercial Uses

- Paint removers
- Laboratory and industrial solvents
- Plastics manufacture

## Sources

- Hardware stores
- Chemical supply stores

## Possible HME Product

- MEKP, pg xx



*Typical MEK Product Packaging*

Also see CAS 78-93-3, ICSC 0179, RTECS EL6475000, and ERG 127 (v 2004)

#

- FOR OFFICIAL USE ONLY -

## Key Identifiers



- Liquid
- Red-brown at 90% concentration
- Colorless to light yellow at 70% concentration
- Pungent, acrid odor
- Makes the eyes water
- Corrosive
- Turns skin yellow
- Various concentrations available
- Small quantities, up to a gallon: glass containers
- Large quantities, up to about 55 gallons: lined steel drums, plastic containers
- Other names: *Spirit of Nitre, Aqua Fortis, Hydrogen Nitrate, Azotic Acid*

## Equipment

### Safety:

- Respirator, if in high concentrations
- Safety glasses, chemical goggles, face shields
- Impermeable gloves
- Acid-resistant aprons
- Ventilated area, if large quantities present (open windows, doors, fans, fume hoods)

## Hazards

- Severe eye, skin, respiratory irritant
- Severe skin burns
- Inhalation can be fatal
- Effects may be delayed (can be hours)
- Should not be near fuels, powdered metals, and combustibles



*Typical Chemical Supply Packaging*

# Nitric Acid

## Commercial Uses

- Rocket propellants
- Explosives manufacture
- Fertilizer manufacture
- Laboratory and industrial processes

## Sources

- Chemical supply stores

## Possible HME Product

- Urea Nitrate, pg XX
- EGDN, pg XX
- TATP, pg XX
- MEKP, pg XX
- Hellhoffite and Nitrocellulose

**Nitric Acid**  
**Shipping Container**  
**for 100 ml**



Also see NIOSH, CAS 7697-37-2, ICSC 0183,  
RTECS QU5775000, and ERG 157 (v 2004)

#

- FOR OFFICIAL USE ONLY -

# Nitromethane



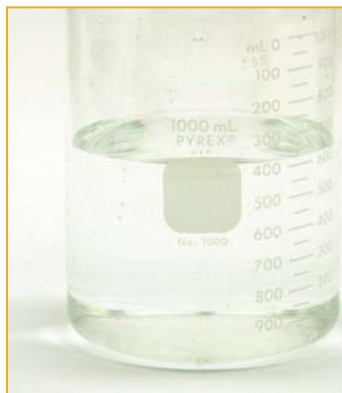
## Key Identifiers

- Liquid, oily
- Colorless
- Fruity, disagreeable odor
- Small quantities, up to a few gallons: glass, metal, and plastic containers
- Large quantities, more than a few gallons: stainless steel drums
- Other names: *nitrocarbol*

## Equipment

### *Safety:*

- Dust mask or respirator, if large quantities present
- Safety glasses
- Impermeable gloves
- Protective clothing



*Nitromethane*

## Hazards

- Extremely flammable
- Vapors flammable and susceptible to explosion
- Susceptible to shock, static spark, flame, and other ignition sources
- Eye, skin, respiratory irritant
- May cause headache, shallow respiration, dizziness, vomiting, weakness, and fall in blood pressure
- Nitromethane by itself can be explosive in hot, confined areas
- Should not be near strong acids, oxygen-rich chemicals, copper, some metals, combustible materials

# Nitromethane

## Commercial Uses

- Racing car fuel
- Remote control vehicle fuel
- Industrial solvent
- Propellants and explosives



*Example Commercial Product Packaging*

## Sources

- Chemical supply stores
- Racing fuel supply stores
- Remote control hobbyist stores

## Possible HME Product

- Ammonium nitrate mixtures, pg XX
- Hydrogen peroxide mixtures, pg XX

*Also see NIOSH, CAS 75-52-5, ICSC 0522  
RTECS PA9800000, and ERG 129 (v 2004)*

#

- FOR OFFICIAL USE ONLY -



# Potassium Chlorate



## Key Identifiers

- Crystalline or powder
- White
- Odorless
- Small quantities, up to a few pounds: glass or plastic containers, plastic baggies
- Large quantities, up to about 50 pounds: sealed plastic bag inside a metal drum
- Other names: *Chlorate of Potash*, *Potassium Oxymuriate*

## Equipment

### Safety:

- Dust mask or respirator, if large quantities present
- Safety glasses
- Impermeable gloves
- Protective clothing
- Ventilated area, if large quantities present (open windows, doors, fans)



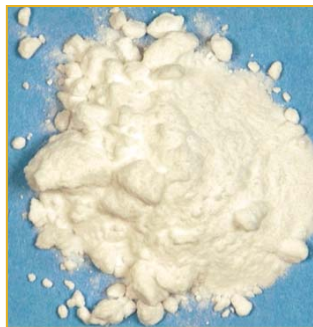
*Typical Chemical Supply Packaging*

## Hazards

- Eye, skin, respiratory irritant
- Should not be near metal powders, flammables, and combustibles

## Commercial Uses

- Pyrotechnics
- Strike anywhere matches
- Herbicides
- Oxygen candles



*Potassium Chlorate Powder Close-up*

- FOR OFFICIAL USE ONLY -

#

# Potassium Chlorate

## Sources

- Pyrotechnic stores
- Chemical supply stores
- Grocery stores
- Hardware supply stores

## Possible HME Product

- Chlorate / Perchlorate Mixtures, pg XX



*Strike Anywhere  
Matches*



*Close-up of Potassium Chlorate*

Also see CAS 3811-04-9, ICSC 0548,  
RTECS FO0350000, and ERG 140 (v 2004)

#

- FOR OFFICIAL USE ONLY -

# Potassium Nitrate



## Key Identifiers

- Crystalline, granular, or powder
- White
- Odorless
- Small quantities, up to a few pounds: glass or plastic containers
- Large quantities, up to about 50 pounds: sealed plastic bag inside a metal drum
- Other names: *Nitrate of Potash*, *Saltpeter*

## Equipment

### *Safety:*

- Dust mask or respirator, if large quantities present
- Safety glasses
- Impermeable gloves
- Protective clothing
- Ventilated area, if large quantities present (open windows, doors, fans)



*Typical Chemical Supply Packaging*

## Hazards

- Eye, skin, respiratory irritant
- Should not be near metal powders, flammables, and combustibles

## Commercial Uses

- Propellants
- Pyrotechnics
- Food preservatives (commercial)
- Fertilizers
- Stump remover (some)



*Potassium Nitrate Close-up*

- FOR OFFICIAL USE ONLY -

#

# Potassium Nitrate

## Sources

- Agricultural supply stores
- Pyrotechnic stores
- Chemical supply stores
- Hardware supply stores

## Possible HME Product

- Black Powder, pg XX



*Stump Remover*



*Not All Stump  
Remover Contains  
Potassium Nitrate*



*Close-up of Stump Remover Pellets*



*Close-up of Potassium Nitrate*

Also see CAS 7757-79-1, ICSC 0184,  
RTECS TT3700000, and ERG 140 (v 2004)

#

- FOR OFFICIAL USE ONLY -

# Potassium Permanganate



## Key Identifiers

- Solid or crystalline
- Dark purple, violet
- Odorless
- Stains skin brown
- Stains most anything purple
- Small quantities, up to a few pounds: glass and plastic containers, plastic baggies
- Large quantities, more than a few pounds: sealed plastic bag inside a metal drum



*Typical Chemical Supply Packaging*

## Equipment

### *Safety:*

- Dust mask or respirator, if large quantities present
- Safety glasses
- Protective clothing
- Impermeable gloves and aprons
- Ventilated area, if large quantities present (open windows, doors, fans)

## Hazards

- Severe eye, skin, respiratory irritant
- Should not be near metals, acids, fuels, peroxides, and combustibles

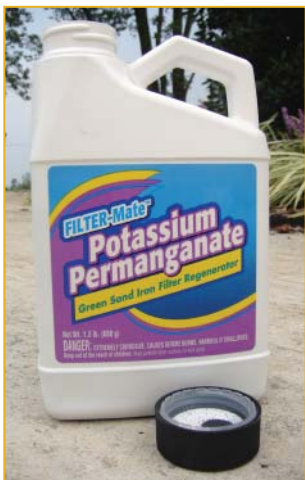


*Potassium Permanganate Close-up*

- FOR OFFICIAL USE ONLY -

#

# Potassium Permanganate



*Example Commercial Product Packaging*



*Iron Filter*



*Iron Filter Close-up*

## Commercial Uses

- Algae control
- Iron removal
- Disinfectants
- Water purification
- Manufacture of organics

## Sources

- Pool supply stores
- Aquarium supply stores
- Chemical supply stores

## Possible HME Product

- Chlorate / Perchlorate Mixtures, pg xx
- Permanganate / Glycerin Explosive Mixtures

*Also see CAS 7722-64-7, ICSC 0672, RTECS SD6475000, and ERG 140 (v 2004)*

#

- FOR OFFICIAL USE ONLY -

# Sodium Chlorate



## Key Identifiers

- Powder
- White, colorless, or light yellow
- Odorless
- Small quantities, up to a few pounds: glass or plastic containers
- Large quantities, more than a few pounds: plastic-lined woven bags, heavy plastic bags or cartons, iron drums, knitted bags

## Equipment

### *Safety:*

- Dust mask or respirator, if large quantities present
- Safety glasses
- Protective clothing
- Ventilated area, if large quantities present (open windows, doors, fans)



*Typical Chemical Supply Packaging*

## Hazards

- Eye, skin, respiratory irritant
- Should not be near combustibles, powdered metals, strong bases, and acids



*Sodium Chlorate Close-up*

- FOR OFFICIAL USE ONLY -

#

# Sodium Chlorate



*Example Commercial Product Packaging*

## Commercial Uses

- Herbicides
- Bleaching pulp
- Pyrotechnics

## Sources

- Pyrotechnic stores
- Chemical supply stores
- Agricultural supply stores

## Possible HME Product

- Chlorate / Perchlorate Mixtures, pg xx

*Also see CAS 7775-09-9, ICSC 1117,  
RTECS FO0525000, and ERG 140 (v 2004)*

#

- FOR OFFICIAL USE ONLY -



## Key Identifiers

- Powder, chalky
- Yellow
- Odorless
- When heated, smells like rotten eggs
- Small quantities, up to a few pounds: paper/plastic sacks, plastic containers
- Large quantities: cardboard and metal drums
- Other names: *Sulphur*

## Equipment

### *Safety:*

- Dust mask or respirator, if large quantities present
- Safety glasses
- Protective clothing
- Ventilated area, if large quantities present (open windows, doors, fans)



*Sulfur from Chemical Supply Close-up*

## Hazards

- Eye, skin, and respiratory irritant
- Should not be near chemicals rich in oxygen

## Commercial Uses

- Fertilizers
- Fungicides
- Matches
- Soil additive

# Sulfur

## Sources

- Agricultural supply stores
- Chemical supply stores
- Farm and feed stores
- Garden supply stores

## Possible HME Product

- Flash Powders, pg xx
- In combination with various chemicals rich in oxygen



*Example Commercial Product Packaging*

Also see CAS 7704-34-9, ICSC 1166, RTECS WS4250000, and ERG 133 (v 2004)

#

- FOR OFFICIAL USE ONLY -

# Sulfuric Acid



## Key Identifiers

- Liquid, may be viscous
- Colorless
- Pungent, acrid odor
- Various concentrations available
- Small quantities, up to about a gallon: glass or plastic containers
- Large quantities, more than a gallon: carbon steel, stainless steel, polyethylene containers
- Other names: *Vitriol*, *Oleum*, *Hydrogen sulfate*

## Equipment

### *Safety:*

- Respirator, if large quantities or high concentrations present
- Safety glasses, chemical goggles, face shields
- Impermeable gloves
- Acid-resistant apron

## Hazards

- Severe eye, skin respiratory irritant (severity depends on concentration)
- Severe skin burns
- Corrosive
- Do not add water
- Should not be near chemicals rich in oxygen
- Should not be near flammables, combustibles, and caustic solutions such as lye



**Typical Chemical Supply Packaging**

# Sulfuric Acid



Pipe Drain Cleaners

## Commercial Uses

- Drain pipe cleaners
- Automotive batteries
- Polymer manufacture
- Fertilizer manufacture
- Chemical manufacture
- Oil refining



Car Battery Acid

## Sources

- Automotive supply stores
- Chemical supply stores
- Industrial supply stores

## Possible HME Product

- EGDN, pg xx
- MEKP, pg xx
- TATP, pg xx

Also see NIOSH, CAS 7664-93-9, ICSC 0362, RTECS WS5600000, and ERG 137 (v 2004)

#

- FOR OFFICIAL USE ONLY -



## Key Identifiers

- Crystalline, granular, or powder
- White
- Ammonia-like odor
- Small quantities, up to a few pounds: glass or plastic containers
- Large quantities, up to about 50 pounds: sealed plastic containers or bags
- Other names: *Carbamide, Carbonyl Diamide*

## Equipment

### *Safety:*

- Dust mask or respirator, if large quantities present
- Safety glasses
- Impermeable gloves
- Protective clothing

## Hazards

- Eye, skin, respiratory irritant
- Should not be near chemicals rich in oxygen



*Typical Chemical Supply Packaging*



*Urea Close-up*

# Urea

## Commercial Uses

- Fertilizers
- Road de-icers
- Food supplement
- Manufacture of plastics

## Sources

- Agricultural supply stores
- Hardware supply stores

## Possible HME Product

- Urea Nitrate, pg xx



*Example Commercial  
Product Packaging*

*Also see CAS 57-13-6, ICSC 0595,  
RTECS YR6250000, and ERG 140 (v 2004)*

#

- FOR OFFICIAL USE ONLY -

## MANUFACTURING EQUIPMENT

*The manufacturing equipment will depend on the homemade explosive. The equipment may be scientific, simplistic, or improvised to provide grinding, mixing, stirring, distilling, filtering, and cooling capabilities.*



Bucket & Plastic Ware



Coffee Grinder



Slow Cooker



Coffee Pot



Filters / Funnels



Mortar / Pestle



Gloves & Goggles



Suspicious Venting



Hot Plate



Ice Baths



Glassware

MANUFACTURING EQUIPMENT

- FOR OFFICIAL USE ONLY -

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# Grinders

**Grinders reduce the granule size of solid components. Commonly used in the production of these homemade explosives:**

- Ammonium nitrate mixtures
- Black powder
- Chlorate / perchlorate mixtures



*Mortar/Pestle*



*Commercial Grade  
Coffee Grinder*



*Handheld Electric  
Coffee Grinder*



*Ball Mill*

- FOR OFFICIAL USE ONLY -

#

# Mixers and Stirrers

**Mixers physically blend components. Commonly used in the production of these homemade explosives:**

- Ammonium nitrate mixtures
- Black powder
- Chlorate / perchlorate mixtures

**Stirrers combine liquid components. Commonly used in the production of these homemade explosives:**

- EGDN
- HMTD
- Hydrogen peroxide mixtures
- MEKP
- TATP
- Urea Nitrate



*Blenders / Mixers*



*Magnetic Stirrers*

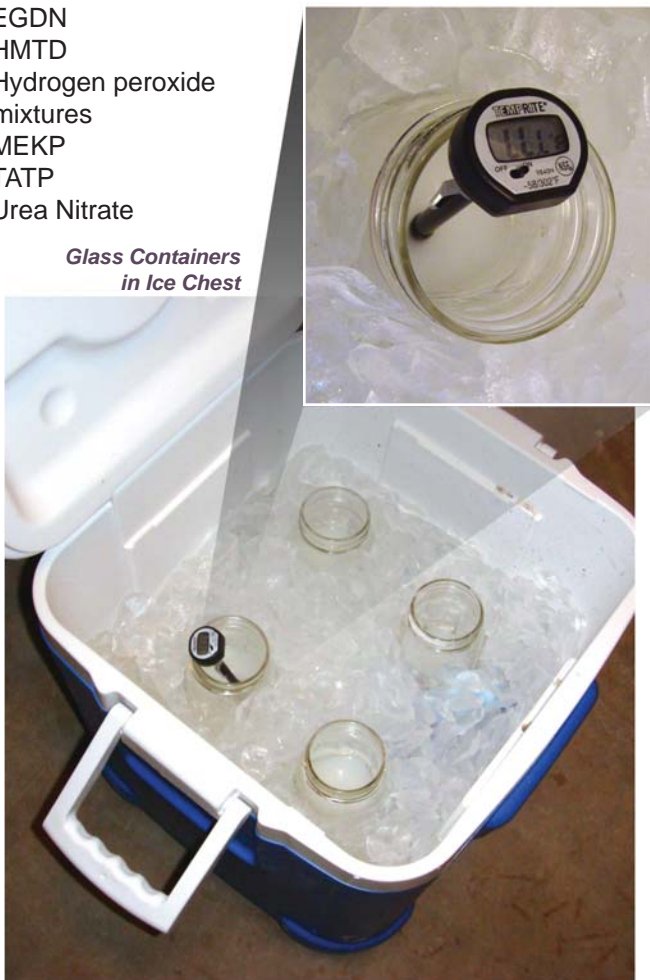


*Suspicious Buckets / Plastic Ware*

Ice baths cool mixtures that generate heat. Bath water could be ice with salted water or dry ice with acetone. Commonly used in the production of these homemade explosives:

- EGDN
- HMTD
- Hydrogen peroxide mixtures
- MEKP
- TATP
- Urea Nitrate

*Glass Containers  
in Ice Chest*



- FOR OFFICIAL USE ONLY -

#

# Distillers

Distillers concentrate chemical components with low-level heat.

Distillers may include complex scientific equipment or household items used in improvised methods.



*Rotovap*



*Coffee Pot*



*Hot Plate*



*Stovetop with Pot*



*Slow Cooker*

#

- FOR OFFICIAL USE ONLY -

**Filters separate the solids from the liquids. Commonly used in the production of these homemade explosives:**

- HMTD
- Hydrogen peroxide mixtures
- TATP
- Urea nitrate



*Filter Funnel*



*Coffee Filter*



*Coffee Filter Used with Funnel and Jar*

**- FOR OFFICIAL USE ONLY -**

#

# Safety Equipment

Safety equipment provides personal protection. It may prevent the formation of physical indicators such as whitening skin. Safety equipment may or may not be present, or could be improvised.



*Rubber  
Gloves*

*N95 Dust Mask  
and Vapor Mask*



*Safety Goggles*



*Face Shield*



*Flexible Dryer  
Vent Pipe*

#

- FOR OFFICIAL USE ONLY -

## Additional Resources

**Chemical Abstracts Service (CAS)** assigns a unique registry number for every chemical to facilitate information gathering. NIOSH, ERG, MSDS, and product labels include this number.

**Emergency Response Guidebook (ERG)** aids first responders to identify hazardous materials at an incident and recommends personal protection for the type of hazard.

**EOD Technical Manual 9 – 1300 Series** supports the Department of Defense EOD personnel.

**International Chemical Safety Card (ICSC)** facilitates the exchange of chemical information for the occupational safety and health of workers.

**Material Safety Data Sheets (MSDS)** are standardized government product forms completed and made available by the manufacturer to summarize the chemical constituents, hazards, handling, storage, and other recommendations for each product.

**National Institute for Occupational Safety and Health (NIOSH) Pocket Guide** is a source of general industrial hygiene information for workers, employers, and occupational health professionals, including exposure limits and recommended protective measures for chemicals.

**Registry of Toxic Effects of Chemical Substances (RTECS)** presents the toxicity of chemicals as taken from open literature sources.

**National Fire Protection Association (NFPA)** develops codes and standards, amongst other missions, to reduce the burden of fire and other hazards on the quality of life.

**NFPA codes relative to this booklet:**

- NFPA 490 Code for the Storage of Ammonium Nitrate
- NFPA 495 Explosives Materials Code
- NFPA 400 Hazardous Materials Code

