Picric acid

sc-250721

Material Safety Data Sheet

Hazard Alert Code Key: EXTREME | HIGH | MODERATE | LOW

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

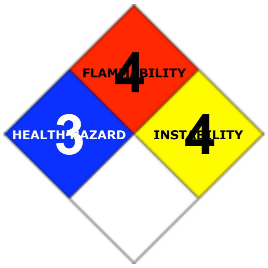
PRODUCT NAME

Picric acid

STATEMENT OF HAZARDOUS NATURE

CONSIDERED A HAZARDOUS SUBSTANCE ACCORDING TO OSHA 29 CFR 1910.1200.

NFPA



SUPPLIER

Company: Santa Cruz Biotechnology, Inc.
Address:
2145 Delaware Ave
Santa Cruz, CA 95060
Telephone: 800.457.3801 or 831.457.3800
Emergency Tel: CHEMWATCH: From within the US and Canada: 877-715-9305
Emergency Tel: From outside the US and Canada: +800 2436 2255 (1-800-CHEMCALL) or call +613 9573 3112

PRODUCT USE

Used as a laboratory reagent. Other uses include explosives, matches; in the leather industry; electric batteries; etching copper; manufacture of coloured glass; textile mordant.

SYNONYMS

C6-H3-N3-O7, HOC6H2(NO2)3, "carbazotic acid", "C.I. 10305", "2-hydroxy-1, 3, 5-trinitrobenzene", "2-hydroxy-1, 3, 5-trinitrobenzene", melinite, "nitroxanthic acid", "phenol trinitrate", "picronitric acid", "bitter acid", "2, 4, 6-trinitrophenol", "2, 4, 6-trinitrophenol", "phenol-2, 4, 6-trinitro-", "phenol-2, 4, 6-trinitro-", "1, 3, 5-trinitrophenol", "1, 3, 5-trinitrophenol"

Section 2 - HAZARDS IDENTIFICATION

CANADIAN WHMIS SYMBOLS

EMERGENCY OVERVIEW

RISK

Risk of explosion by shock, friction, fire or other sources of ignition.
Extreme risk of explosion by shock, fire, friction or other sources of ignition.
Forms very sensitive explosive metallic compounds.

Toxic by inhalation, in contact with skin and if swallowed.
Highly flammable.
Harmful to aquatic organisms.

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED

■ Toxic effects may result from the accidental ingestion of the material; animal experiments indicate that ingestion of less than 40 gram may be fatal or may produce serious damage to the health of the individual.

■ Picric acid has an intense bitter taste. Several human poisonings have occurred after the ingestion of 1-2 grams picric acid. Symptoms include gastroenteritis, toxic hepatitis, inflammation of the kidney (nephritis), blood in the urine (haematuria) and other urinary symptoms. Skin and conjunctiva become yellow due to acidosis and jaundice.

Death may follow renal lesions and anuria (both major kidney dysfunctions). Rarely, jaundice and coma with convulsions proceed death.

■ The substance and/or its metabolites may bind to hemoglobin inhibiting normal uptake of oxygen. This condition, known as "methemoglobinemia", is a form of oxygen starvation (anoxia).

Symptoms include cyanosis (a bluish discoloration skin and mucous membranes) and breathing difficulties. Symptoms may not be evident until several hours after exposure.

At about 15% concentration of blood methemoglobin there is observable cyanosis of the lips, nose and earlobes. Symptoms may be absent although euphoria, flushed face and headache are commonly experienced. At 25-40%, cyanosis is marked but little disability occurs other than that produced on physical exertion. At 40-60%, symptoms include weakness, dizziness, lightheadedness, increasingly severe headache, ataxia, rapid shallow respiration, drowsiness, nausea, vomiting, confusion, lethargy and stupor. Above 60% symptoms include dyspnea, respiratory depression, tachycardia or bradycardia, and convulsions. Levels exceeding 70% may be fatal.

EYE

■ Although the material is not thought to be an irritant, direct contact with the eye may produce transient discomfort characterized by tearing or conjunctival redness (as with windburn).

■ Strange yellow vision is symptomatic of over-exposure, to picric acid, by this or other routes. Buffered solutions of picric acid produce lesions of significant severity in the range pH 1.5 to pH 9 with little significant difference.

SKIN

■ Skin contact with the material may produce toxic effects; systemic effectsmay result following absorption.

■ The material is not thought to be a skin irritant (as classified using animal models). Temporary discomfort, however, may result from prolonged dermal exposures. Good hygiene practice requires that exposure be kept to a minimum and that suitable gloves be used in an occupational setting.

■ Skin absorption of picric acid may cause headache, vertigo with nausea, vomiting and rashes. Hair may be discoloured yellow. Topical application may result in local or generalised allergic reaction.

■ Open cuts, abraded or irritated skin should not be exposed to this material.

■ Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.

INHALED

■ Inhalation of vapors or aerosols (mists, fumes), generated by the material during the course of normal handling, may produce toxic effects.

■ The material is not thought to produce respiratory irritation (as classified using animal models). Nevertheless inhalation of the material, especially for prolonged periods, may produce respiratory discomfort and occasionally, distress.

■ Inhalation of high dust concentrations of picric acid may result in temporary unconsciousness followed by weakness, muscle pain, failure to produce urine (anuria) and later, excess urine production (polyuria).

CHRONIC HEALTH EFFECTS

■ Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems.

There is limited evidence that, skin contact with this product is more likely to cause a sensitization reaction in some persons compared to the general population.

Sensitization may result in allergic dermatitis responses includingrash, itching, hives or swelling of extremities.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

HAZARD RATINGS

		Min	Max
Flammability:	3		

Hazard Alert Code Key: EXTREME | HIGH | MODERATE | LOW

Toxicity:	3
Body Contact:	3
Reactivity:	4
Chronic:	2

NAME	CAS RN	%
picric acid	88-89-1	>98
(containing not less than 30% water: for safety)		

Section 4 - FIRST AID MEASURES

SWALLOWED

■

- IF SWALLOWED, REFER FOR MEDICAL ATTENTION, WHERE POSSIBLE, WITHOUT DELAY.
- Where Medical attention is not immediately available or where the patient is more than 15 minutes from a hospital or unless instructed otherwise:
- For advice, contact a Poisons Information Center or a doctor.
- Urgent hospital treatment is likely to be needed.
- If conscious, give water to drink.
- INDUCE vomiting with fingers down the back of the throat, ONLY IF CONSCIOUS. Lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.

NOTE: Wear a protective glove when inducing vomiting by mechanical means.

- In the mean time, qualified first-aid personnel should treat the patient following observation and employing supportive measures as indicated by the patient's condition.
- If the services of a medical officer or medical doctor are readily available, the patient should be placed in his/her care and a copy of the MSDS should be provided. Further action will be the responsibility of the medical specialist.
- If medical attention is not available on the worksite or surroundings send the patient to a hospital together with a copy of the MSDS.

EYE

■ If this product comes in contact with the eyes:

- Immediately hold eyelids apart and flush the eye continuously with running water.
- Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.
- Continue flushing until advised to stop by the Poisons Information Center or a doctor, or for at least 15 minutes.
- Transport to hospital or doctor without delay.
- Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

SKIN

■ If skin or hair contact occurs:

- Quickly but gently, wipe material off skin with a dry, clean cloth.
- Immediately remove all contaminated clothing, including footwear.
- Wash skin and hair with running water. Continue flushing with water until advised to stop by the Poisons Information Center.
- Transport to hospital, or doctor.

INHALED

■

- If fumes or combustion products are inhaled remove from contaminated area.
- Lay patient down. Keep warm and rested.
- Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.
- Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary.
- Transport to hospital, or doctor, without delay.

NOTES TO PHYSICIAN

■ Symptoms of vasodilation and reflex tachycardia may present following organic nitrate overdose; most organic nitrates are extensively metabolized by hydrolysis to inorganic nitrites. Organic nitrates and nitrites are readily absorbed through the skin, lungs, mucosa and gastro-intestinal tract.

The toxicity of nitrates and nitrites result from their vasodilating properties and their propensity to form methemoglobin.

- Most produce a peak effect within 30 minutes.
- Clinical signs of cyanosis appear before other symptoms because of the dark pigmentation of methemoglobin.
- Initial attention should be directed towards improving oxygen delivery, with assisted ventilation, if necessary. Hyperbaric oxygen has not demonstrated conclusive benefits.
- Institute cardiac monitoring, especially in patients with coronary artery or pulmonary disease.
- Hypotension should respond to Trendelenburg's position and intravenous fluids; otherwise dopamine may be needed.
- Naloxone, glucose and thiamine should be given if a multiple ingestion is suspected.
- Decontaminate using Ipecac Syrup for alert patients or lavage for obtunded patients who present within 2-4 hours of ingestion.
- Symptomatic patients with methemoglobin levels over 30% should receive methylene blue.(Cyanosis alone, is not an indication for treatment). The usual dose is 1-2 mg/kg of a 1% solution (10 mg/ml) IV over 5 minutes; repeat, using the same dose if symptoms of hypoxia fail to subside within 1 hour.

[Ellenhorn and Barceloux: Medical Toxicology]BIOLOGICAL EXPOSURE INDEX - BEI

These represent the determinants observed in specimens collected from a healthy worker who has been exposed at the Exposure Standard (ES or TLV):

Determinant	Index	Sampling Time	Comments
1. Methemoglobin in blood	1.5% of hemoglobin	During or end of shift	B,NS,SQ

B: Background levels occur in specimens collected from subjects NOT exposed
NS: Non-specific determinant;also observed after exposure to other materials
SQ: Semi-quantitative determinant - Interpretation may be ambiguous; should be used as a screening test or confirmatory test.

Section 5 - FIRE FIGHTING MEASURES

Vapour Pressure (mmHG):	< 0.26 @ 195C
Upper Explosive Limit (%):	Not available
Specific Gravity (water=1):	1.76 (anh.)
Lower Explosive Limit (%):	Not available

EXTINGUISHING MEDIA

■ For SMALL FIRES:
Dry chemical, CO2, water spray or foam.
For LARGE FIRES:
Water-spray, fog or foam.

FIRE FIGHTING

■

- Alert Emergency Responders and tell them location and nature of hazard.
- Wear breathing apparatus plus protective gloves.
- Prevent, by any means available, spillage from entering drains or water course.
- Fight fire from a safe distance, with adequate cover.
- If safe, switch off electrical equipment until vapor fire hazard removed.
- Use water delivered as a fine spray to control fire and cool adjacent area.
- Avoid spraying water onto liquid pools.
- DO NOT approach containers suspected to be hot.
- Cool fire exposed containers with water spray from a protected location.
- If safe to do so, remove containers from path of fire.

GENERAL FIRE HAZARDS/HAZARDOUS COMBUSTIBLE PRODUCTS

■ WARNING: EXPLOSION HAZARD!

- Combustible.
- Detonation may occur from heavy impact or excessive heating.
- Mixing with incompatible chemicals may cause expansion, decomposition or detonation.
- Heat affected containers remain hazardous.
- Explosives can supply own oxygen for combustion and smothering action of foam or dry chemical may be ineffective.
- Combustion or decomposition produces oxides of nitrogen (NOx), carbon monoxide (CO) and carbon dioxide (CO2).

FIRE INCOMPATIBILITY

■ Avoid contamination with oxidizing agents i.e. nitrates, oxidizing acids,chlorine bleaches, pool chlorine etc. as ignition may result.

PERSONAL PROTECTION

Glasses:
Chemical goggles.
Gloves:
1.NEOPRENE 2.NITRILE 3.PVC
Respirator:
Type AB-P Filter of sufficient capacity

Section 6 - ACCIDENTAL RELEASE MEASURES

MINOR SPILLS

■

- Remove all ignition sources.
- DO NOT touch or walk through spilled material.
- Clean up all spills immediately.
- Avoid contact with skin and eyes.
- Prevent dust cloud.
- With clean shovel (preferably non-sparking) place material into clean, dry container and cover loosely.
- Move containers from spill area.
- Control personal contact by using protective equipment.

MAJOR SPILLS

■

- Clear area of personnel and move upwind.
- Alert Emergency Responders and tell them location and nature of hazard.
- DO NOT touch or walk through spilled material.
- Control personal contact by using protective equipment.
- Prevent, by any means available, spillage from entering drains or water course.
- No smoking, naked lights or ignition sources.
- Increase ventilation.
- Stop leak if safe to do so.
- Contain or cover with sand, earth or vermiculite.
- Use only spark-free shovels and explosion proof equipment.
- Collect recoverable product into labeled containers for recycling.
- Collect solid residues and seal in labeled drums for disposal.
- Wash area with water and dike for later disposal; prevent runoff into drains.
- After clean up operations, decontaminate and launder all protective clothing and equipment before storing and re-using.
- If contamination of drains or waterways occurs, advise emergency services.

ACUTE EXPOSURE GUIDELINE LEVELS (AEGL) (in ppm)

AEGL 1: The airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience notable discomfort, irritation, or certain asymptomatic nonsensory effects. However, the effects are not disabling and are transient and reversible upon cessation of exposure.
AEGL 2: The airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape.
AEGL 3: The airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience life-threatening health effects or death.

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING

■ For picric acid:

- Outside or detached storage is preferred
- Containers should be bonded and grounded for transfers to avoid sparks
- Use non-sparking tools and equipment including explosion proof ventilation
- Store in glass NOT metals containers and wet screw tops before sealing
- Do not store on concrete floors or wooden pallets
- Enclose all processes and employ automatic mechanical handling techniques and wet methods where possible
- If handling picric acid contained in a jar, gently tilt bottle to see if crystals roll over each other - if they do the acid is dry and capable of explosion - contact personnel trained in the handling of explosives immediately
- Dry crystals may be present in the threads of screw top containers and present a detonation hazard when opening the container
- Containers of this material remain hazardous when empty since the y retain product residues - observe all warnings for the product
- Avoid all personal contact, including inhalation.
- Wear protective clothing when risk of overexposure occurs.
- Use in a well-ventilated area.
- Prevent concentration in hollows and sumps.
- DO NOT enter confined spaces until atmosphere has been checked.
- DO NOT allow material to contact humans, exposed food or food utensils.
- Avoid smoking, naked lights or ignition sources.
- When handling, DO NOT eat, drink or smoke.
- Avoid contact with incompatible materials.
- Keep containers securely sealed when not in used.
- Avoid physical damage to containers.
- Always wash hands with soap and water after handling.
- Working clothes should be laundered separately. Launder contaminated clothing before re-use.
- Use good occupational work practice.
- Observe manufacturer's storing/handling recommendations.
- Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained.

RECOMMENDED STORAGE METHODS

■

- DO NOT use unlined steel containers

Store in a dark glass or other suitable light resistant container.

For low viscosity materials and solids: Drums and jerricans must be of the non-removable head type. Where a can is to be used as an inner package, the can must have a screwed enclosure. For materials with a viscosity of at least 2680 cSt. (23 deg. C):

- Removable head packaging and
- cans with friction closures may be used.

Where combination packages are used, there must be sufficient inert absorbent material to absorb completely any leakage that may occur, unless the outer packaging is a close fitting molded plastic box and the substances are not incompatible with the plastic. All combination packages for Packing group I and II must contain cushioning material.

STORAGE REQUIREMENTS

■ FOR MINOR QUANTITIES:

- Store in an indoor fireproof cabinet or in a room of noncombustible construction
- Provide adequate portable fire-extinguishers in or near the storage area.

FOR PACKAGE STORAGE:

- Store in original containers in approved flame-proof area.
- No smoking, naked lights, heat or ignition sources.
- DO NOT store in pits, depressions, basements or areas where vapors may be trapped.
- Keep containers securely sealed.
- Store away from incompatible materials in a cool, dry well ventilated area.
- Protect containers against physical damage and check regularly for leaks.
- Protect containers from exposure to weather and from direct sunlight unless: (a) the packages are of metal or plastic construction; (b) the packages are securely closed are not opened for any purpose while in the area where they are stored and (c) adequate precautions are taken to ensure that rain water, which might become contaminated by the dangerous goods, is collected and disposed of safely.
- Ensure proper stock-control measures are maintained to prevent prolonged storage of dangerous goods.
- Observe manufacturer's storing and handling recommendations.

SAFE STORAGE WITH OTHER CLASSIFIED CHEMICALS

Picric acid

sc-250721

Material Safety Data Sheet

Hazard Alert Code Key: EXTREME HIGH MODERATE LOW

X X X X X +

X: Must not be stored together
O: May be stored together with specific preventions
+: May be stored together

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

Source	Material	TWA ppm	TWA mg/m^3	STEL ppm	STEL mg/m^3	Peak ppm	Peak mg/m^3	TWA F/CC	Notes
Canada - Alberta Occupational Exposure Limits	picric acid (Picric acid (2,4,6-Trinitrophenol))		0.1						
Canada - British Columbia Occupational Exposure Limits	picric acid (Picric acid)		0.1						S
Canada - Ontario Occupational Exposure Limits	picric acid (2,4,6-Trinitrophenol)		0.1		0.3				Skin
US OSHA Permissible Exposure Levels (PELs) - Table Z1	picric acid (Picric acid)		0.1						
US ACGIH Threshold Limit Values (TLV)	picric acid (Picric acid)		0.1						TLV Basis: skin sensitization; dermatitis, eye irritation
US NIOSH Recommended Exposure Limits (RELs)	picric acid (Picric acid)		0.1		0.3				
US - Minnesota Permissible Exposure Limits (PELs)	picric acid (Picric acid)		0.1						
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants	picric acid (Picric acid)		0.1						
US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants	picric acid (Picric acid.)		0.1						
US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants	picric acid (Picric acid)		0.1						
US - California Permissible Exposure Limits for Chemical Contaminants	picric acid (Picric acid; 2,4,6-trinitrophenol)		0.1						
US - Idaho - Limits for Air Contaminants	picric acid (Picric acid)		0.1						
Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)	picric acid (Picric acid)		0.1						

Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits	picric acid (Picric acid)		0.1		0.3	
US - Hawaii Air Contaminant Limits	picric acid (Picric acid)		0.1		0.3	
US - Alaska Limits for Air Contaminants	picric acid (Picric acid)		0.1			
Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances	picric acid (Picric acid - Skin)	-	0.1	-	0.3	
Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances	picric acid (2,4,6-Trinitrophenol, see Picric acid - Skin)	-	0.1	-	0.3	
US - Washington Permissible exposure limits of air contaminants	picric acid (Picric acid (2, 4, 6-Trinitrophenol))		0.1		0.3	
US - Michigan Exposure Limits for Air Contaminants	picric acid (Picric acid)		0.1			
Canada - Nova Scotia Occupational Exposure Limits	picric acid (Picric acid)		0.1			TLV Basis: skin sensitization; dermatitis, eye irritation
Canada - Prince Edward Island Occupational Exposure Limits	picric acid (Picric acid)		0.1			TLV Basis: skin sensitization; dermatitis, eye irritation
US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants	picric acid (Picric acid)		0.1			
US - Oregon Permissible Exposure Limits (Z1)	picric acid (Picric acid)		0.1			
Canada - Northwest Territories Occupational Exposure Limits (English)	picric acid (Picric acid - Skin)		0.1		0.3	
Canada - Northwest Territories Occupational Exposure Limits (English)	picric acid (2,4,6-Trinitrophenol (Picric acid) - Skin)		0.1		0.3	

EMERGENCY EXPOSURE LIMITS

Material	Revised IDLH Value (mg/m3)	Revised IDLH Value (ppm)
picric acid	75	

MATERIAL DATA

PICRIC ACID:

■ For picric acid:

The TLV-TWA is thought to be protective against the development of systemic toxicity but may not, however, prevent the development of dermatitis or sensitisation in some workers exposed at the 8-hour TWA.

An earlier skin notation has been deleted since available data does not substantiate the ability of picric acid to penetrate intact skin.

PERSONAL PROTECTION

Picric acid

sc-250721

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Hazard Alert Code Key:	EXTREME	HIGH	MODERATE	LOW

Consult your EHS staff for recommendations

EYE

■

- Safety glasses with side shields.
- Chemical goggles.
- Contact lenses pose a special hazard; soft lenses may absorb irritants and all lenses concentrate them. DO NOT wear contact lenses.

HANDS/FEET

■ NOTE: The material may produce skin sensitization in predisposed individuals. Care must be taken, when removing gloves and other protective equipment, to avoid all possible skin contact.

- Neoprene gloves

Wear physical protective gloves, eg. leather.
Wear safety footwear.

OTHER

■

- Overalls.
- Eyewash unit.
- Barrier cream.
- Skin cleansing cream.
- Some plastic personal protective equipment (PPE) (e.g. gloves, aprons, overshoes) are not recommended as they may produce static electricity.
- For large scale or continuous use wear tight-weave non-static clothing (no metallic fasteners, cuffs or pockets), non sparking safety footwear.

■

- Respirators may be necessary when engineering and administrative controls do not adequately prevent exposures.
- The decision to use respiratory protection should be based on professional judgment that takes into account toxicity information, exposure measurement data, and frequency and likelihood of the worker's exposure - ensure users are not subject to high thermal loads which may result in heat stress or distress due to personal protective equipment (powered, positive flow, full face apparatus may be an option).
- Published occupational exposure limits, where they exist, will assist in determining the adequacy of the selected respiratory . These may be government mandated or vendor recommended.
- Certified respirators will be useful for protecting workers from inhalation of particulates when properly selected and fit tested as part of a complete respiratory protection program.
- Use approved positive flow mask if significant quantities of dust becomes airborne.
- Try to avoid creating dust conditions.

GLOVE SELECTION INDEX

■ Glove selection is based on a modified presentation of the:	
"Forsberg Clothing Performance Index".	
The effect(s) of the following substance(s) are taken into account in the computer-generated selection: picric acid	
■ Protective Material CPI *.	
NEOPRENE	B
NITRILE	B
PVC	C
NATURAL RUBBER	C
■ * CPI - Chemwatch Performance Index	
A: Best Selection	

B: Satisfactory; may degrade after 4 hours continuous immersion

C: Poor to Dangerous Choice for other than short term immersion

NOTE: As a series of factors will influence the actual performance of the glove, a final selection must be based on detailed observation. -

* Where the glove is to be used on a short term, casual or infrequent basis, factors such as "feel" or convenience (e.g. disposability), may dictate a choice of gloves which might otherwise be unsuitable following long-term or frequent use. A qualified practitioner should be consulted.

RESPIRATOR

■

Protection Factor	Half-Face Respirator	Full-Face Respirator	Powered Air Respirator
10 x PEL	AB P1	-	AB PAPR-P1
	Air-line*	-	-
50 x PEL	Air-line**	AB P2 AB	PAPR-P2
100 x PEL	-	AB P3	-
		Air-line*	-
100+ x PEL	-	Air-line**	AB PAPR-P3

* - Negative pressure demand ** - Continuous flow
Explanation of Respirator Codes:
Class 1 low to medium absorption capacity filters.
Class 2 medium absorption capacity filters.
Class 3 high absorption capacity filters.
PAPR Powered Air Purifying Respirator (positive pressure) cartridge.
Type A for use against certain organic gases and vapors.
Type AX for use against low boiling point organic compounds (less than 65ºC).
Type B for use against certain inorganic gases and other acid gases and vapors.
Type E for use against sulfur dioxide and other acid gases and vapors.
Type K for use against ammonia and organic ammonia derivatives
Class P1 intended for use against mechanically generated particulates of sizes most commonly encountered in industry, e.g. asbestos, silica.
Class P2 intended for use against both mechanically and thermally generated particulates, e.g. metal fume.
Class P3 intended for use against all particulates containing highly toxic materials, e.g. beryllium.
The local concentration of material, quantity and conditions of use determine the type of personal protective equipment required.
Use appropriate NIOSH-certified respirator based on informed professional judgement. In conditions where no reasonable estimate of exposure can be made, assume the exposure is in a concentration IDLH and use NIOSH-certified full face pressure demand SCBA with a minimum service life of 30 minutes, or a combination full facepiece pressure demand SAR with auxiliary self-contained air supply. Respirators provided only for escape from IDLH atmospheres shall be NIOSH-certified for escape from the atmosphere in which they will be used.

ENGINEERING CONTROLS

■ Local exhaust ventilation usually required. If risk of overexposure exists, wear an approved respirator. Correct fit is essential to obtain adequate protection an approved self contained breathing apparatus (SCBA) may be required in some situations. Provide adequate ventilation in warehouse or closed storage area.
Air contaminants generated in the workplace possess varying "escape" velocities which, in turn, determine the "capture velocities" of fresh circulating air required to effectively remove the contaminant.

Type of Contaminant:	Air Speed:
solvent, vapors, degreasing etc., evaporating from tank (in still air).	0.25-0.5 m/s (50-100 f/min.)
aerosols, fumes from pouring operations, intermittent container filling, low speed conveyer transfers, welding, spray drift, plating acid fumes, pickling (released at low velocity into zone of active generation)	0.5-1 m/s (100-200 f/min.)
direct spray, spray painting in shallow booths, drum filling, conveyer loading, crusher dusts, gas discharge (active generation into zone of rapid air motion)	1-2.5 m/s (200-500 f/min.)
grinding, abrasive blasting, tumbling, high speed wheel generated dusts (released at high initial velocity into zone of very high rapid air motion).	2.5-10 m/s (500-2000 f/min.)

Within each range the appropriate value depends on:

Lower end of the range	Upper end of the range

1: Room air currents minimal or favorable to capture	1: Disturbing room air currents
2: Contaminants of low toxicity or of nuisance value only.	2: Contaminants of high toxicity
3: Intermittent, low production.	3: High production, heavy use
4: Large hood or large air mass in motion	4: Small hood-local control only

Simple theory shows that air velocity falls rapidly with distance away from the opening of a simple extraction pipe. Velocity generally decreases with the square of distance from the extraction point (in simple cases). Therefore the air speed at the extraction point should be adjusted, accordingly, after reference to distance from the contaminating source. The air velocity at the extraction fan, for example, should be a minimum of 1-2 m/s (200-400 f/min) for extraction of solvents generated in a tank 2 meters distant from the extraction point. Other mechanical considerations, producing performance deficits within the extraction apparatus, make it essential that theoretical air velocities are multiplied by factors of 10 or more when extraction systems are installed or used.

For large scale or continuous use:

- Spark-free, earthed ventilation system, venting directly to the outside and separate from usual ventilation systems
- Provide dust collectors with explosion vents

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL PROPERTIES

Liquid.
Toxic or noxious vapors/ gas.

State	Non slump paste	Molecular Weight	229.11 anhydrous
Melting Range (°F)	251.6- 37.4 C (anh.)	Viscosity	Not Available
Boiling Range (°F)	explodes >572F	Solubility in water (g/L)	Partly Miscible
Flash Point (°F)	302	pH (1% solution)	Not applicable
Decomposition Temp (°F)	Not Available	pH (as supplied)	Not applicable
Autoignition Temp (°F)	572 (explodes)	Vapour Pressure (mmHG)	< 0.26 @ 195C
Upper Explosive Limit (%)	Not available	Specific Gravity (water=1)	1.76 (anh.)
Lower Explosive Limit (%)	Not available	Relative Vapor Density (air=1)	7.91 (anh.)
Volatile Component (%vol)	Not available	Evaporation Rate	Not available

APPEARANCE

Yellow crystals with a very bitter taste supplied in water as paste. Becomes Explosive when dry. Soluble in alcohol, ether, acetone, benzene, acetic acid.

Section 10 - CHEMICAL STABILITY

CONDITIONS CONTRIBUTING TO INSTABILITY

■

- Presence of shock and friction
- Presence of heat source and ignition source
- Presence of incompatible materials.
- Product is considered stable.
- Hazardous polymerization will not occur.

STORAGE INCOMPATIBILITY

■ Picric acid:

- when dry is a highly unstable and heat, friction-, and impact- sensitive explosive (explodes at approximately 300 C)
- explosive sensitivity increases when trace metals are present
- reacts with nitric acid, alkalis, heavy metals, copper, lead, zinc, transition metals, and other metals and their salts, to form other salts known as picrates; these are initiators which are much more highly sensitive to heat, impact, or shock than the parent compound - shock sensitive salts include ammonium salts and calcium salts (the calcium salt may be produced when picric acid comes in contact with plaster or concrete - do NOT store on uncoated concrete)

- mixtures with perchlorates form extremely powerful, high velocity explosives
- reacts violently with strong oxidisers
- is incompatible with ammonia
- may accumulate static electric charge, when dry, producing explosion
- is a strong oxidiser in aqueous solution and a strong acid
- reacts violently with alkalis, reducing agents, combustible materials, organic materials and other easily oxidised materials, aluminium powders, and other metal powders
- attacks many materials, forming flammable hydrogen gas
- attacks natural rubber, polyvinyl alcohol, PVC
- Polynitro derivatives of mono- and poly- cyclic systems are often explosives liable to detonate on grinding or impact.
- The presence of two or more nitro groups (each with 2 oxygen atoms) on an aromatic nucleus often increase the reactivity of other substituents and the tendency towards explosive instability as oxygen balance is approached.
- Aromatic nitro compounds range from slight to strong oxidizing agents. If mixed with reducing agents, including hydrides, sulfides and nitrides, they may begin a vigorous reaction that culminates in a detonation. The explosive tendencies of aromatic nitro compounds are increased by the presence of multiple nitro groups.
- In view of the reports of previous violent or explosive reactions, heating of polynitroaryl (particularly di- and tri-nitroaryl) compounds with alkalies, ammonia, or O-ethylsulfuric acid salts, in autoclaves should be avoided.
- Nitroaromatic and in particular polynitroaromatic compounds may present a severe explosion risk if subjected to shock or heated rapidly and uncontrollably as in fire situations. In addition, when such compounds are heated more moderately with caustic alkalies, even when water or organic solvents are present, there is also a risk of violent decomposition or explosion. Several industrial accidents, which probably were due to such interactions, have occurred; this potential hazard often remains unacknowledged.
- A range of exothermic decomposition energies for nitro compounds is given as 220-410 kJ/mol. The relationship between energy of decomposition and processing hazards has been the subject of discussion; it is suggested that values of energy released per unit of mass, rather than on a molar basis (J/g) be used in the assessment. For example, in "open vessel processes" (with man-hole size openings, in an industrial setting), substances with exothermic decomposition energies below 500 J/g are unlikely to present a danger, whilst those in "closed vessel processes" (opening is a safety valve or bursting disk) present some danger where the decomposition energy exceeds 150 J/g.

BRETHERICK: Handbook of Reactive Chemical Hazards, 4th Edition.
Avoid reaction with oxidizing agents, bases and strong reducing agents.

For incompatible materials - refer to Section 7 - Handling and Storage.

Section 11 - TOXICOLOGICAL INFORMATION

picric acid

TOXICITY AND IRRITATION

■ unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.

TOXICITY	IRRITATION
Oral (rat) LD50: 200 mg/kg	Nil Reported
Intraperitoneal (mouse) LD50: 56.3 mg/kg	
Oral (rabbit) LDLo: 120 mg/kg	
Oral (cat) LDLo: 250 mg/kg	

SKIN

picric acid	Canada - Ontario Occupational Exposure Limits - Skin	Notes	Skin
picric acid	US AIHA Workplace Environmental Exposure Levels (WEELs) - Skin	Notes	Skin
picric acid	US NIOSH Recommended Exposure Limits (RELs) - Skin	Skin	Yes
picric acid	Canada - Quebec Permissible Exposure Values for Airborne Contaminants - Skin (French)	Notes	Skin
picric acid	US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants - Skin	Skin Designation	X
picric acid	US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants - Skin	Skin Designation	X
picric acid	US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants - Skin	Skin Designation	X
picric acid	US - Washington Permissible exposure limits of air contaminants - Skin	Skin	X
picric acid	US - Minnesota Permissible Exposure Limits (PELs) - Skin	Skin Designation	X

picric acid	US - Hawaii Air Contaminant Limits - Skin Designation	Skin Designation	X
picric acid	ND	Skin Designation	X
picric acid	US OSHA Permissible Exposure Levels (PELs) - Skin	Skin Designation	X
picric acid	US - California Permissible Exposure Limits for Chemical Contaminants - Skin	Skin	X
picric acid	US - California Permissible Exposure Limits for Chemical Contaminants - Skin	Skin	S

Section 12 - ECOLOGICAL INFORMATION

Refer to data for ingredients, which follows:
PICRIC ACID:

■ Fish LC50 (96hr.) (mg/l):	30
■ Daphnia magna EC50 (48hr.) (mg/l):	88
■ log Pow (Verschueren 1983):	2.03
■ COD:	0.92
■ ThOD:	0.98
■ Half- life Soil - High (hours):	4320
■ Half- life Soil - Low (hours):	672
■ Half- life Air - High (hours):	4320
■ Half- life Air - Low (hours):	672
■ Half- life Surface water - High (hours):	4320
■ Half- life Surface water - Low (hours):	672
■ Half- life Ground water - High (hours):	8640
■ Half- life Ground water - Low (hours):	48
■ Aqueous biodegradation - Aerobic - High (hours):	4320
■ Aqueous biodegradation - Aerobic - Low (hours):	672
■ Aqueous biodegradation - Anaerobic - High (hours):	300
■ Aqueous biodegradation - Anaerobic - Low (hours):	48
■ Aqueous photolysis half- life - High (hours):	360
■ Photooxidation half- life air - High (hours):	4320
■ Photooxidation half- life air - Low (hours):	677

■ Harmful to aquatic organisms.

■ The nitrates are of environmental concern because of their high water solubility and consequent leaching, diffusion, and environmental mobility in soil and water. Nitrate can contaminate groundwater to unacceptable levels. Nitrite is formed from nitrate or ammonium ion by micro-organisms in soil, water, sewage and the alimentary tract. The concern with nitrate in the environment is related to its conversion to nitrite.

Methemoglobinemia is caused following exposure to high levels of nitrite and produces difficulties in oxygen transport in the blood. Thousands of cases involving poisoning of infants, particularly in rural areas, have been reported as a result of drinking nitrate rich well-water. Other concerns deriving from exposure to environmental nitrates relate to the production of nitrosamines following the reaction of food nitrites and secondary amines. Other nitroso-compounds may result following reaction with nitrites and amides, ureas, carbamates and other nitrogenous compounds. Nitrosamines produce liver damage, hemorrhagic lung lesions, convulsions and coma in rats, and teratogenic effects in experimental animals.

The N-nitroso class of compounds include potent carcinogens and mutagens: induction of tumors by single doses of N-nitroso compounds testify to this.

■ DO NOT discharge into sewer or waterways.

log Kow: 2.03
COD: 0.92
ThOD: 0.98

Ecotoxicity

Ingredient	Persistence: Water/Soil	Persistence: Air	Bioaccumulation	Mobility
picric acid	HIGH	HIGH	LOW	MED

Section 13 - DISPOSAL CONSIDERATIONS

US EPA Waste Number & Descriptions

A. General Product Information
Ignitability characteristic: use EPA hazardous waste number D001 (waste code I)

Disposal Instructions

All waste must be handled in accordance with local, state and federal regulations.
¦ Puncture containers to prevent re-use and bury at an authorized landfill.

- Explosives which are surplus, deteriorated or considered unsafe for transport, storage or use shall be destroyed and the statutory authorities shall be notified.
- Explosives must not be thrown away, buried, discarded or placed with garbage.
- This material may be disposed of by burning or detonation but the operation must be performed under the control of a person competent in the destruction of explosives.

Disposal by detonation:

- The explosives to be destroyed must be placed in direct contact with fresh priming charge in a hole which is at least 0.6 meter deep and then adequately stemmed.
- No detonators shall be inserted into defective explosives.
- Personnel must be evacuated to a safe distance prior to initiation/firing of the charge. Disposal by burning:
- Make a sawdust bed or trail adequate for the quantity of explosives to be burned, approximately 400mm wide and 40 mm deep, upon which the explosive will be laid.
- If sawdust is not available, newspaper may be used.
- Normal precautions shall be taken to avoid the spread of fire.
- Individual trails should not be closer together than 600 mm and should contain not more than 12 Kg of explosive.
- Trails should be side by side, NOT in-line, and not more than four should be set up at one time.
- Remove any explosive that is not to be burnt to a distance of at least 300 meter.
- Sufficient diesel oil (never petrol or other highly inflammable liquid) should be used to thoroughly wet the sawdust (or paper) at least 4L per trail is recommended.
- Light the trail from a long, rolled paper wick which should be placed downwind and in contact with the end 1m of trail that is not covered with explosive. The wind should blow so that the flame from the wick (and later from the burning explosive) will blow away from the unburned explosive as detonation is more likely to occur if the explosive is preheated by the flame.
- If plastic igniter cord (slow) is available, its use for lighting is recommended instead of paper. One end should be coiled into the sawdust or under the paper and the other end lit from a minimum distance of 7m from the trail.
- Retire at least 300m or to a safe place.
- DO NOT return to the site for at least 30 minutes after the burning has apparently finished.
- If the fire goes out do not approach for at least 15 minutes after all trace of fire has gone.
- DO NOT add more diesel oil unless certain that the flame is completely extinguished. [DYNO]

Section 14 - TRANSPORTATION INFORMATION

DOT:

Symbols:	None	Hazard class or Division:	4.1
Identification Numbers:	UN1344	PG:	I
Label Codes:	4.1	Special provisions:	23, A8, A19, N41
Packaging: Exceptions:	None	Packaging: Non-bulk:	211

Packaging: Exceptions:	None	Quantity limitations: Passenger aircraft/rail:	1 kg
Quantity Limitations: Cargo aircraft only:	15 kg	Vessel stowage: Location:	E
Vessel stowage: Other:	28, 36		

Hazardous materials descriptions and proper shipping names:
Trinitrophenol, wetted or Picric acid, wetted, with not less than 30 percent water by mass

Air Transport IATA:

ICAO/IATA Class:	4.1	ICAO/IATA Subrisk:	麡ŋ
UN/ID Number:	1344	Packing Group:	I
Special provisions:	A40		

Shipping Name: PICRIC ACID, WETTED

Maritime Transport IMDG:

IMDG Class:	4.1	IMDG Subrisk:	None
UN Number:	1344	Packing Group:	I
EMS Number:	F-B,S-J	Special provisions:	28
Limited Quantities:	None		

Shipping Name: TRINITROPHENOL, WETTED with not less than 30% water, by mass

Section 15 - REGULATORY INFORMATION

picric acid (CAS: 88-89-1) is found on the following regulatory lists;

"Canada - Alberta Occupational Exposure Limits","Canada - British Columbia Occupational Exposure Limits","Canada - Northwest Territories Occupational Exposure Limits (English)","Canada - Nova Scotia Occupational Exposure Limits","Canada - Ontario Occupational Exposure Limits","Canada - Prince Edward Island Occupational Exposure Limits","Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)","Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits","Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances","Canada Domestic Substances List (DSL)","Canada Ingredient Disclosure List (SOR/88-64)","Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS (English)","Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS (French)","OECD Representative List of High Production Volume (HPV) Chemicals","US - Alaska Limits for Air Contaminants","US - California Air Toxics ""Hot Spots"" List (Assembly Bill 2588) Substances for which production, use or other presence must be reported","US - California Occupational Safety and Health Regulations (CAL/OSHA) - Hazardous Substances List","US - California Permissible Exposure Limits for Chemical Contaminants","US - Connecticut Hazardous Air Pollutants","US - Hawaii Air Contaminant Limits","US - Idaho - Limits for Air Contaminants","US - Massachusetts Oil & Hazardous Material List","US - Michigan Exposure Limits for Air Contaminants","US - Minnesota Hazardous Substance List","US - Minnesota Permissible Exposure Limits (PELs)","US - New Jersey Right to Know Hazardous Substances","US - Oregon Permissible Exposure Limits (Z1)","US - Pennsylvania - Hazardous Substance List","US - Rhode Island Hazardous Substance List","US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants","US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants","US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants","US - Washington Permissible exposure limits of air contaminants","US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants","US ACGIH Threshold Limit Values (TLV)","US Department of Homeland Security Chemical Facility Anti-Terrorism Standards - Chemicals of Interest","US DOE Temporary Emergency Exposure Limits (TEELs)","US EPCRA Section 313 Chemical List","US List of Lists - Consolidated List of Chemicals Subject to the Emergency Planning and Community Right-to-Know Act (EPCRA) and Section 112(r) of the Clean Air Act","US NIOSH Recommended Exposure Limits (RELs)","US OSHA Permissible Exposure Levels (PELs) - Table Z1","US Postal Service (USPS) Numerical Listing of Proper Shipping Names by Identification (ID) Number","US Toxic Substances Control Act (TSCA) - Inventory","USA: Chemical Facility Anti-Terrorism Standards - List Appendix A - 6CFR 27"

Section 16 - OTHER INFORMATION

LIMITED EVIDENCE

- Cumulative effects may result following exposure*.
- Possible skin sensitizer*.

* (limited evidence).

Picric acid

sc-250721

Material Safety Data Sheet

Hazard Alert Code Key: EXTREME HIGH MODERATE LOW

■ Classification of the mixture and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.
A list of reference resources used to assist the committee may be found at:
www.chemwatch.net/references.

■ The (M)SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

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