Section 1: Identification

MANUFACTURER: PACE Technologies
3601 E. 34th St.
Tucson, AZ 85713

INFORMATION PHONE: 520-882-6598

EMERGENCY PHONE: CHEMTREC 800-424-9300 (US) Day or night

Customer No. 16568

TRADE NAME: PICRAL Etchant

CHEMICAL FAMILY: Flammable liquids, corrosive, n.o.s (ethanol, picric acid)

HMIS RATING: HEALTH: 3 FLAMMABILITY: 3 REACTIVITY: 2 CONTACT: 3

HAZARD RATING:

LEAST: 0 SLIGHT: 1 MODERATE: 2 HIGH: 3 EXTREME: 4

Section 2: Hazard(s) Identification

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)	Flammable liquids (Category 2), H225 Acute toxicity, Oral (Category 4), H302 Skin sensitization (Category 1), H317 Specific target organ toxicity - single exposure (Category 1), H370
PICTOGRAM(s):	
SIGNAL WORD:	Danger
HAZARD STATEMENTS:	**Hazard Statement(s):** H225 - Highly Flammable liquid and vapor H302- Harmful if swallowed H317- May cause an allergic skin reaction H370- Causes damage to organs
PRECAUTIONARY	**Precautionary Statement(s):**

STATEMENTS:	**Preventions:** P210-Keep away from heat/sparks/open flames/hot surfaces — No smoking. P233- Keep container tightly closed. P240- Ground/bond container and receiving equipment. P241- Use explosion-proof electrical/ventilating/lighting/equipment. P242- Use only non-sparking tools. P243- Take precautionary measures against static discharge. P260- Do not breathe dust/fume/gas/mist/vapors/spray. P261-Avoid breathing dust/fume/gas/mist/vapors/spray. P264- Wash skin thoroughly after handling. P270- Do not eat, drink or smoke when using this product. P272-Contaminated work clothing should not be allowed out of the workplace. P280-Wear protective gloves/protective clothing/eye protection/face protection. P272-Contaminated work clothing should not be allowed out of the workplace. P280-Wear protective gloves/protective clothing/eye protection/face protection. **Response:** P301+312- IF SWALLOWED: call a POISON CENTER or doctor/physician IF you feel unwell. **P302 + P352-** IF ON SKIN: wash with plenty of soap and water. P303+ P361+P353- IF ON SKIN (or hair): Remove/Take off Immediately all contaminated clothing. Rinse SKIN with water/shower. P307+P311- IF exposed: call a POISON CENTER or doctor/physician. P321- Specific treatment (see Section 4 SDS). P330- Rinse mouth. **P333+P313-**IF SKIN irritation or rash occurs: Get medical advice/attention. P363-Wash contaminated clothing before reuse. P370+P378- In case of fire: Use dry chemical, CO2 or appropriate foam for extinction. **Storage:** P403+P235- Store in a well-ventilated place. Keep cool. P405- Store locked up. **Disposal:** P501- Dispose of contents/container to Federal, State and Local Regulations.
Hazards not otherwise classified or not covered by GHS	Explosive when dry.

Emergency Overview

DANGER! KEEP WET. EXPLOSIVE IF DRY. FLAMMABLE SOLID. CAUSES SEVERE EYE IRRITATION. HARMFUL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. CAUSES IRRITATION TO SKIN AND RESPIRATORY TRACT. MAY CAUSE ALLERGIC SKIN REACTION. AFFECTS LIVER, KIDNEYS AND BLOOD.

POISON! DANGER! MAY BE FATAL IF SWALLOWED. HARMFUL IF INHALED OR

ABSORBED THROUGH SKIN. VAPOR HARMFUL. FLAMMABLE! AFFECTS CENTRAL NERVOUS SYSTEM. MAY CAUSE BLINDNESS. CANNOT BE MADE NONPOISONOUS. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. MAY AFFECT LIVER, BLOOD, REPRODUCTIVE SYSTEM.

Potential Health Effects

Inhalation:
Causes irritation mucous membranes of the upper respiratory tract. Symptoms may include coughing, shortness of breath. Systemic poisoning can cause headache, dizziness, nausea, vomiting, abdominal pain and diarrhea. Heavy exposures can cause red blood cell destruction resulting in bloody urine, liver and kidney damage, convulsions, weakness, muscle pain, coma and death.

Ingestion:
Causes irritation to the gastrointestinal tract, headaches, gastritis, intoxication, blindness and, in acute cases, death. Symptoms may include nausea, vomiting and diarrhea. Other symptoms may parallel those from inhalation. Ingestion of 1 to 2 grams has caused severe poisoning.

Skin Contact:
Causes irritation to skin. Symptoms include redness, itching, and pain. May cause allergic skin reactions. May be absorbed through the skin with possible systemic effects.

Eye Contact:
Can cause eye irritation. Splashes may cause temporary pain and blurred vision.

Chronic Exposure:
Prolonged or repeated exposures can cause liver, kidney and blood effects. Hair and skin may become yellow (not jaundice). Conjunctiva of the eye may also become yellow with corresponding yellow vision.
Prolonged skin contact causes drying and cracking of skin. Continued ingestion of small amounts could result in blindness.

Aggravation of Pre-existing Conditions:
Persons with pre-existing skin, blood, liver and kidney disorders may be more susceptible to the effects of this substance.

Section 3: Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Picric Acid	88-89-1	8 - 12%	Yes
Water	7732-18-5	0.5 - 1.5%	No
Ethyl Alcohol	64-17-5	80 - 90%	Yes
Methyl Alcohol	67-56-1	0.5 - 5%	Yes
Isopropyl Alcohol	67-63-0	0.5 - 5%	Yes

PACE Technologies · 3601 E. 34th St · Tucson, AZ 85713 USA
Telephone +1 520-882-6598 · FAX +1 520-882-6599 · pace@metallographic.com
Emergency phone number (CHEMTREC 800-424-9300)

Section 4: First-Aid Measures

Inhalation:
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.
Ingestion:
If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. Get medical attention.
Skin Contact:
Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse. Keep contaminated clothing wet after removing.
Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

Section 5: Fire-Fighting Measures

Fire:
PICRIC ACID
Flash point: 150C (302F) CC
Autoignition temperature: 300C (572F)
Flammable Solid!
Dangerous fire hazard when exposed to heat or flame.
Explosion:
Dangerous explosion hazard when dry. Becomes increasingly shock, heat and friction sensitive as it loses its moisture. Explosive decomposition is likely if material is involved in a fire. Sealed containers may rupture when heated. Sensitive to mechanical impact. Sensitive to static discharge.

ETHANOL
Fire:
Flash point: 13C (55F) CC
Autoignition temperature: 422C (792F)
Flammable limits in air % by volume:
lel: 3.3; uel: 19
Flammable liquid and vapor!
Dangerous fire hazard when exposed to heat or flame.
Explosion:
Above flash point, vapor-air mixtures are explosive within flammable limits noted above. Vapors

can flow along surfaces to distant ignition source and flash back. Sealed containers may rupture when heated. Sensitive to static discharge.

Fire Extinguishing Media:
Fight fire from protected location or maximum possible distance. Use flooding quantities of water as spray. DO NOT use carbon dioxide or halogenated extinguishing agents.
Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Water spray can be used to extinguish fires and cool fire-exposed containers. Water may be used to flush spills away from exposures and to dilute spills to non-flammable mixtures.

Section 6: Accidental Release Measures

Remove all sources of ignition. Ventilate area of leak or spill. Keep unnecessary and unprotected people away from area of spill. Wear appropriate personal protective equipment as specified in Section 8. Spills: Clean-up personnel should be aware of material's explosive capabilities. Wet down spill and absorb with sodium bicarbonate or sand-soda ash mixture (90:10 mix). Carefully scoop into glass containers (make sure material has at least 10% water). Use non-metallic tools and non-sparking equipment. Do not flush to sewer. Large spills may need the attention of explosives experts.

If handling picric acid contained in a jar, gently tilt bottle to see if there are any crystals. If crystals roll over each other. If they do, the acid is dry and capable of explosion--contact personnel trained in explosives. Dried crystals may also be present within threads of screw top containers and present a detonation hazard when opening container.

Section 7: Handling and Storage

Protect against physical damage. Store in a cool, dry well-ventilated location, away from any area where the fire hazard may be acute. Outside or detached storage is preferred. Separate from incompatibles. Containers should be bonded and grounded for transfers to avoid static sparks. Storage and use areas should be No Smoking areas. Use non-sparking type tools and equipment, including explosion proof ventilation.

Store in glass or plastic (not metal) containers and wet screw tops before sealing. Store in as small a quantity as possible and keep moist. Do not store on concrete floors (can form explosive calcium picrate). 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 explosives. Dried crystals may also be present within threads of screw top containers and present a detonation hazard when opening container.

Containers of this material are hazardous when empty since they retain product residues; observe all warnings for the product.

Section 8: Exposure Controls/ Personal Protection

Airborne Exposure Limits:
PICRIC ACID
OSHA Permissible Exposure Limit (PEL):
0.1 mg/m3 (TWA), skin
ACGIH Threshold Limit Value (TLV):
0.1 mg/m3 (TWA)

ETHANOL
- OSHA Permissible Exposure Limit (PEL):
1000 ppm (TWA) for ethyl alcohol
400 ppm (TWA) for isopropyl alcohol
200 ppm (TWA) for methyl alcohol
- ACGIH Threshold Limit Value (TLV):
1000 ppm (STEL), A3 - confirmed animal carcinogen with unknown relevance to humans for ethyl alcohol
200 ppm (TWA), 400 ppm (STEL), A4 - not classifiable as a human carcinogen for isopropyl alcohol
200 ppm (TWA), 250 ppm (STEL) skin, for methyl alcohol

Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details. Use explosion-proof equipment.
Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded and engineering controls are not feasible, a half facepiece particulate respirator (NIOSH type N95 or better filters) may be worn for up to ten times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest.. A full-face piece particulate respirator (NIOSH type N100 filters) may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency, or respirator supplier, whichever is lowest. If oil particles (e.g. lubricants, cutting fluids, glycerine, etc.) are present, use a NIOSH type R or P filter. For emergencies or instances where the exposure levels are not known, use a full-facepiece

positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

Skin Protection:
Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

Eye Protection:
Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

Other Control Measures:
Clothing contaminated with this material should be kept soaked with water and disposed of in the same manner as the material itself.

Section 9: Physical and Chemical Properties

Appearance:
Yellow liquid.

Odor:
Mild pleasant whiskey-like odor.

Solubility:
Miscible in water.

Specific Gravity:
0.79-1.2

pH:
No information found.

% Volatiles by volume @ 21C (70F):
> 90%

Boiling Point:
PICRIC Acid Explodes above 300C (572F).
ETHANOL 78C (172F)

Melting Point:
PICRIC ACID 122C (252F)
ETHANOL -114C (-173F)

Vapor Density (Air=1):
1.6 (ethanol)

Vapor Pressure (mm Hg):
40 @ 19C (66F) (ethanol)

Evaporation Rate (BuAc=1):
ca. 1.4 (CCl4=1) (ethanol)

Section 10: Stability and Reactivity

Stability:
Dangerous explosion hazard when dry. Becomes increasingly shock, heat and friction sensitive as it loses its moisture. Explosive decomposition is likely if material is involved in a fire.
Hazardous Decomposition Products:
Explosive decomposition is likely if material is involved in a fire.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Metals including copper, lead, and zinc (corrodes the metal to form shock-sensitive metal salts); aluminum + water (ignites after a delay period), ammonia, concrete (forms explosive salts such as calcium picrate), plaster, salts, oxidizers, gelatin, alkaloids. Salts are more explosive-sensitive than picric acid itself. Strong oxidants, silver salts, acid chlorides, alkali metals, metal hydrides, hydrazine, and many other substances.
Conditions to Avoid:
Heat, flame, ignition sources, shock, dryness, and incompatibles.

Section 11: Toxicological Information

Toxicological Data:
Ethyl alcohol: oral rat LD50: 7060 mg/kg; inhalation rat LC50: 20,000 ppm/10H; Irritation data, eye, rabbit: 500 mg/24H moderate; Investigated as a tumorigen, mutagen, reproductive effector. Methyl alcohol: oral rat LD50: 5628 mg/kg; inhalation rat LC50: 64000 ppm/4H; skin rabbit LD50: 15800 mg/kg; Irritation data,skin,rabbit: 20 mg/24H, Moderate; Investigated as a tumorigen, mutagen, reproductive effector. Isopropyl alcohol: oral rat LD50: 5045 mg/kg; skin rabbit LD50: 12.8 gm/kg; inhalation, rat: 16,000 ppm 8 hr. Investigated as a mutagen, tumorigen, reproductive effector.
Reproductive Toxicity:
Ethanol has been linked to birth defects in humans.
Carcinogenicity:
Ethanol has been linked to cancer in humans. Chronic ethanol ingestion is associated with liver cancer. Most industrial ethanol contains denaturants that render it undesirable to drink.

PICRIC ACID
Oral rat LD50: 200 mg/kg. Investigated as a mutagen.

--------\Cancer Lists\----------

Ingredient	---NTP Carcinogen--- Known	Anticipated	IARC Category
Picric Acid (88-89-1)	No	No	None
Water (7732-18-5)	No	No	None
Ethyl Alcohol (64-17-5)	No	No	None
Methyl Alcohol (67-56-1)	No	No	None
Isopropyl Alcohol (67-63-0)	No	No	3

PACE Technologies · 3601 E. 34th St · Tucson, AZ 85713 USA
Telephone +1 520-882-6598 · FAX +1 520-882-6599 · pace@metallographic.com
Emergency phone number (CHEMTREC 800-424-9300)

Section 12: Ecological Information

Environmental Fate:
PICRIC ACID
When released into the soil, this material is not expected to biodegrade. When released into the soil, this material is not expected to evaporate significantly. When released into water, this material is not expected to evaporate significantly. This material has an experimentally-determined bioconcentration factor (BCF) of less than 100. This material is not expected to significantly bioaccumulate.

ETHANOL
When released into the soil, this material is expected to readily biodegrade. When released into the soil, this material is expected to leach into groundwater. When released into the soil, this material is expected to quickly evaporate. When released into water, this material is expected to readily biodegrade. When released into water, this material may evaporate to a moderate extent. This material is not expected to significantly bioaccumulate. When released into the air, this material is expected to be readily degraded by reaction with photochemically produced hydroxyl radicals. When released into the air, this material is expected to be readily removed from the atmosphere by dry and wet deposition. When released into the air, this material is expected to have a half-life between 1 and 10 days.

Environmental Toxicity:
This material is not expected to be toxic to aquatic life. The LC50/96-hour values for fish are over 100 mg/l.

Section 13: Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

Section 14: Transportation Information

Domestic (Land, D.O.T.)

Proper Shipping Name: FLAMMABLE LIQUIDS, CORROSIVE, N.O.S (ETHANOL, PICRIC ACID)
Hazard Class: 3 (8)
UN/NA: UN2924
Packing Group: II

PACE Technologies · 3601 E. 34th St · Tucson, AZ 85713 USA
Telephone +1 520-882-6598 · FAX +1 520-882-6599 · pace@metallographic.com
Emergency phone number (CHEMTREC 800-424-9300)

Section 15: Regulatory Information

--------\Chemical Inventory Status - Part 1\--------------------------------

Ingredient	TSCA	EC	Japan	Australia
Picric Acid (88-89-1)	Yes	Yes	Yes	Yes
Water (7732-18-5)	Yes	Yes	Yes	Yes
Ethyl Alcohol (64-17-5)	Yes	Yes	Yes	Yes
Methyl Alcohol (67-56-1)	Yes	Yes	Yes	Yes
Isopropyl Alcohol (67-63-0)	Yes	Yes	Yes	Yes

--------\Chemical Inventory Status - Part 2\--------------------------------

Ingredient	Korea	--Canada-- DSL	NDSL	Phil.
Picric Acid (88-89-1)	Yes	Yes	No	Yes
Water (7732-18-5)	Yes	Yes	No	Yes
Ethyl Alcohol (64-17-5)	Yes	Yes	No	Yes
Methyl Alcohol (67-56-1)	Yes	Yes	No	Yes
Isopropyl Alcohol (67-63-0)	Yes	Yes	No	Yes

--------\Federal, State & International Regulations - Part 1\--------------

Ingredient	-SARA 302- RQ	TPQ	------SARA 313------ List	Chemical Catg.
Picric Acid (88-89-1)	No	No	Yes	No
Water (7732-18-5)	No	No	No	No
Ethyl Alcohol (64-17-5)	No	No	No	No
Methyl Alcohol (67-56-1)	No	No	Yes	No
Isopropyl Alcohol (67-63-0)	No	No	Yes	No

--------\Federal, State & International Regulations - Part 2\--------------

Ingredient	CERCLA	-RCRA- 261.33	-TSCA- 8(d)
Picric Acid (88-89-1)	No	No	No
Water (7732-18-5)	No	No	No
Ethyl Alcohol (64-17-5)	No	No	No
Methyl Alcohol (67-56-1)	5000	U154	No
Isopropyl Alcohol (67-63-0)	No	No	No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No
SARA 311/312: Acute: Yes Chronic: Yes Fire: Yes Pressure: No
Reactivity: Yes (Mixture / Solid)

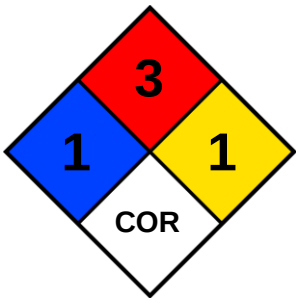
Australian Hazchem Code: 2WE
Poison Schedule: S5, S6
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products

PACE Technologies · 3601 E. 34th St · Tucson, AZ 85713 USA
Telephone +1 520-882-6598 · FAX +1 520-882-6599 · pace@metallographic.com
Emergency phone number (CHEMTREC 800-424-9300)

Regulations (CPR) and the MSDS contains all of the information required by the CPR.

Section 16: Other Information

16.1 NFPA 704



Top, Flammability: 3 – Severe Hazard

Left, Health Hazard: 1 – Slight Hazard

Right, Reactivity: 1 – Slight Hazard

Bottom, Special Notice: COR – Corrosive

Label First Aid:
If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Keep contaminated clothing wet after removing. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In all cases, get medical attention.
Product Use:
Laboratory Reagent.
Disclaimer:
PACE Technologies, Inc. provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product. Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose. PACE TECHNOLOGIES, INC. MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE INFORMATION SET FORTH HEREIN OR THE PRODUCT TO WHICH THE INFORMATION REFERS. ACCORDINGLY, PACE TECHNOLOGIES, INC. WILL NOT BE RESPONSIBLE FOR DAMAGES RESULTING FROM USE OF OR RELIANCE UPON THIS

INFORMATION.

DATE PREPARED: 2/09/2015

DATE REVISED: 6/7/2018 AG

PACE Technologies · 3601 E. 34th St · Tucson, AZ 85713 USA
Telephone +1 520-882-6598 · FAX +1 520-882-6599 · pace@metallographic.com
Emergency phone number (CHEMTREC 800-424-9300)