

**Section 1: Identification**

**MANUFACTURER:** PACE Technologies  
3601 E. 34<sup>th</sup> St.  
Tucson, AZ 85713

**INFORMATION PHONE:** 520-882-6598

**EMERGENCY PHONE:** CHEMTREC 800-424-9300 (US) Day or night  
Customer No. 16568

**TRADE NAME:** Kalling's Reagent No. 2


**CHEMICAL FAMILY:** Flammable liquids, Corrosive, n.o.s. (HCl, Denatured alcohol, copper chloride mixture)

**HMS RATING:** HEALTH: 3      FLAMMABILITY: 3      REACTIVITY: 1

**HAZARD RATING:**

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

**Section 2: Hazard(s) Identification**

<p><b>GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)</b></p>	<p>Flammable liquids (Category 2), H225 Acute toxicity, Oral (Category 4), H302 Acute toxicity, Dermal (Category 4), H312 Skin irritation (Category 2), H315 Serious eye damage (Category 1), H318 Specific target organ toxicity - single exposure (Category 1), H370 Acute aquatic toxicity (Category 1), H400 Acute aquatic toxicity (Category 2), H401 Chronic aquatic toxicity (Category 2), H411</p>
<p><b>PICTOGRAM(s):</b></p>	
<p><b>SIGNAL WORD:</b></p>	<p>Danger</p>
<p><b>HAZARD STATEMENTS:</b></p>	<p><b>Hazard Statement(s):</b> H225- Highly Flammable liquid and vapor H302- Harmful if swallowed H312- Harmful in contact with skin</p>

	H315- Causes skin irritation H318 - Causes serious eye damage H370- Causes damage to organs H401- Toxic to aquatic life H411- Toxic to aquatic life with long lasting effects
<b>PRECAUTIONARY STATEMENTS:</b>	<b>Precautionary Statement(s):</b>  <b>Preventions:</b> 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. P264- Wash skin thoroughly after handling. P270- Do not eat, drink or smoke when using this product. P273- Avoid release to the environment. P280- Wear protective gloves/protective clothing/eye protection/face protection.  <b>Response:</b> P301+312- IF SWALLOWED: call a POISON CENTER or doctor/physician IF you feel unwell. P302+352- 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. P305+P351+P338- IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P307+P311- IF exposed: call a POISON CENTER or doctor/physician. P310- Immediately call a POISON CENTER or doctor/physician. P312- Call a POISON CENTER or doctor/physician if you feel unwell. P321- Specific treatment (see Section 4 SDS). P322- Specific measures (see Section 4 SDS). P330- Rinse mouth. P363- Wash contaminated clothing before reuse. P370+P378- In case of fire: Use dry chemical, CO2 or appropriate foam for extinction. P391- Collect spillage. Hazardous to the aquatic environment  <b>Storage:</b> P403+P235- Store in a well-ventilated place. Keep cool. P405- Store locked up.  <b>Disposal:</b> P501- Dispose of contents/container to Federal, State and Local Regulations.

## Emergency Overview

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**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.**

**SAF-T-DATA<sup>(tm)</sup>** Ratings (Provided here for your convenience)

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Health Rating: 3 - Severe (Poison)

Flammability Rating: 3 - Severe (Flammable)

Reactivity Rating: 1 - Slight

Contact Rating: 3 - Severe (Life and Corrosive)

Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD;  
PROPER GLOVES; CLASS B EXTINGUISHER

Storage Color Code: Red (Flammable) , White (Corrosive)

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### **Potential Health Effects**

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#### **Inhalation:**

Copper Chloride - Causes irritation to respiratory tract, symptoms may include coughing, sore throat, and shortness of breath. May result in ulceration and perforation of respiratory tract.

When heated, this compound may give off copper fume, which can cause symptoms similar to the common cold, including chills and stuffiness of the head.

Denatured Alcohol - Exposure may cause irritation to the mucous membranes of the upper respiratory tract. Prolonged exposures to high concentrations may cause drowsiness, loss of appetite and inability to concentrate.

#### **Ingestion:**

Copper Chloride - May cause burning pain in the mouth, esophagus, and stomach. Hemorrhagic gastritis, nausea, vomiting, abdominal pain, metallic taste, and diarrhea may occur. If vomiting does not occur immediately systemic copper poisoning may occur. Symptoms may include capillary damage, headache, cold sweat, weak pulse, kidney and liver damage, central nervous excitation followed by depression, jaundice, convulsions, blood effects, paralysis and coma. Death may occur from shock or renal failure.

Denatured Alcohol - Cause headaches, gastritis, intoxication, blindness and, in acute cases, death.

Copper Chloride - Causes irritation, redness, and pain. Some individuals may develop copper allergies.

Denatured Alcohol - Causes skin irritation, cracking or flaking due to dehydration and defatting action.

#### **Eye Contact:**

Copper Chloride - Causes severe irritation with symptoms of redness, pain, blurred vision,

discoloration, and possible eye damage.

Denatured Alcohol - Can cause eye irritation. Splashes may cause temporary pain and blurred vision.

**Chronic Exposure:**

Copper Chloride - Prolonged or repeated skin exposure may cause dermatitis. Prolonged or repeated exposure to dusts of copper salts may cause discoloration of the skin or hair, blood and liver damage, ulceration and perforation of the nasal septum, runny nose, metallic taste, and atrophic changes and irritation of the mucous membranes.

Denatured Alcohol - Prolonged skin contact causes drying and cracking of skin. May affect the nervous system. May affect liver, blood, reproductive system. Continued ingestion of small amounts could result in blindness.

**Aggravation of Pre-existing Conditions:**

Copper Chloride - Persons with pre-existing skin disorders, impaired liver, kidney, or pulmonary function, glucose 6-phosphate-dehydrogenase deficiency, or pre-existing Wilson's disease may be more susceptible to the effects of this material.

Denatured Alcohol - Persons with pre-existing skin disorders or eye problems or impaired liver or kidney function may be more susceptible to the effects of the substance.

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**Section 3: Composition/Information on Ingredients**

**HAZARD INGREDIENTS**

CHEMICAL	CAS NUMBER	% PRESENT	Hazardous
Ethyl Alcohol	64-17-5	85 - 95%	Yes
Copper (II) chloride	7447-39-4	0.5-5%	Yes
Hydrogen Chloride	7647-01-0	2-7%	Yes
Methyl Alcohol	67-56-1	1 - 5%	Yes
Isopropyl Alcohol	67-63-0	1 - 5%	Yes

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**Section 4: First-Aid Measures**

**Inhalation:**

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

**Ingestion:**

Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to

an unconscious person.

**Skin Contact:**

In case of contact, wipe off excess material from skin then immediately flush skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. Call a physician.

**Eye Contact:**

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

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**Section 5: Fire-Fighting Measures**

**Fire:**

Flash point: 13C (55F) CC

Autoignition temperature: 422C (792F)

Flammable limits in air % by volume:

l<sub>el</sub>: 3.3; u<sub>el</sub>: 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:**

Water spray, dry chemical, alcohol foam, or carbon dioxide. Water may be ineffective.

**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.

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**Section 6: Accidental Release Measures**

Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

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## 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. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

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## Section 8: Exposure Controls/ Personal Protection

### Airborne Exposure Limits (Copper Chloride):

-OSHA Permissible Exposure Limit (PEL):

1 mg/m<sup>3</sup> (TWA) for copper dusts & mists as Cu

-ACGIH Threshold Limit Value (TLV):

1 mg/m<sup>3</sup> (TWA) for copper dusts & mists as Cu

### Airborne Exposure Limits (Denatured Alcohol):

- 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 (TWA), A4 - not classifiable as a human carcinogen 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.

### 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 full face shield where dusting or splashing of solutions is possible. Maintain eye wash fountain and quick-drench facilities in work area.

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**Section 9: Physical and Chemical Properties**

**Appearance:**

Light blue-green clear color.

**Odor:**

Mild pleasant whiskey-like odor with slight odor of hydrochloric acid.

**Solubility:**

Miscible in water.

**Specific Gravity:**

0.8-0.9

**pH:**

No information found.

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

>90%

**Boiling Point:**

78C (172F) (ethanol)

**Melting Point:**

-114C (-173F) (ethanol)

**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)

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**Section 10: Stability and Reactivity**

**Stability:**

Stable under ordinary conditions of use and storage.

**Hazardous Decomposition Products:**

Oxides of the contained metal and halogen, possibly also free, or ionic halogen.

**Hazardous Polymerization:**

Will not occur.

**Incompatibilities:**

Copper Chloride-Potassium, sodium, hydrazine, nitromethane, aluminum, strong oxidizers, acetylene, and sodium hypobromite. Corrosive to aluminum; on contact with acids it may release toxic chloride fumes.

-Denatured Alcohol – Strong oxidants, silver salts, acid chlorides, alkali metals, metal hydrides, hydrazine, and many other substances.

**Conditions to Avoid:**

Product is used for etching metals, take precaution when using in conjunction with incompatibles.

Avoid heat, flames, ignition sources.

**Section 11: Toxicological Information**

Copper Chloride - Oral rat LD50: 584 mg/kg; investigated as a mutagen.  
(data for anhydrous material)

Ingredient	---NTP Carcinogen---		IARC Category
	Known	Anticipated	
Copper Chloride (7447-39-4)	No	No	None
Hydrogen Chloride (7647-01-0)	No	No	3
Water (7732-18-5)	No	No	None

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.

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**Section 12: Ecological Information**

**Environmental Fate:**

Following data for 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.

Following data for copper chloride: When released into the soil, this material is not expected to biodegrade. When released into the soil, this material may leach into groundwater. When released into water, this material is not expected to biodegrade. When released into water, this material is not expected to evaporate significantly. This material is expected to significantly bioaccumulate. This material has an experimentally-determined bioconcentration factor (BCF) of greater than 100. Bioaccumulation data for copper.

**Environmental Toxicity:**

Following data for ethanol: This material is expected to be very toxic to aquatic life. The LC50/96-hour values for fish are less than 1 mg/l. The IC50/72-hour values for algae are less than 1 mg/l. Toxicity data for copper.

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

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**Section 13: Disposal Considerations**

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved incinerator or disposed in 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.

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**Section 14: Transportation Information**

**Domestic (Land, D.O.T.)**  
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**Proper Shipping Name:** FLAMMABLE LIQUIDS, CORROSIVE, N.O.S. (Hydrochloric acid, Denatured alcohol, copper chloride mixture)

**Hazard Class:** 3,8

**UN/NA:** UN 2924

**Packing Group:** II

**Label Codes:** 3,8

**NMFC:** 45615-11

**Shipping Class:** CL125

**International (Air, I.C.A.O.)**  
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**Proper Shipping Name:** FLAMMABLE LIQUIDS, CORROSIVE, N.O.S. (Hydrochloric acid, Denatured alcohol, copper chloride mixture)

**Hazard Class:** 3,8

**UN/NA:** UN 2924

**Packing Group:** II

**Label Codes:** 3,8

**Section 15: Regulatory Information**

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

Ingredient	TSCA	EC	Japan	Australia
Copper Chloride (7447-39-4)	Yes	Yes	Yes	Yes
Hydrogen Chloride (7647-01-0)	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	--Canada--			
	Korea	DSL	NDSL	Phil.
Copper Chloride (7447-39-4)	Yes	Yes	No	Yes
Hydrogen Chloride (7647-01-0)	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-		-----SARA 313-----	
	RQ	TPQ	List	Chemical Catg.
Copper Chloride (7447-39-4)	No	No	No	Copper compo
Hydrogen Chloride (7647-01-0)	5000	500*	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-	-TSCA-
		261.33	8 (d)
Copper Chloride (7447-39-4)	10	No	No
Hydrogen Chloride (7647-01-0)	5000	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: Yes  
SARA 311/312: Acute: Yes      Chronic: Yes      Fire: Yes      Pressure: No  
Reactivity: No      (Mixture / Liquid)

**Australian Hazchem Code: 2[S]E ,. 2Z**

**Poison Schedule: S5**

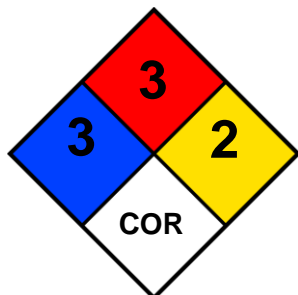
**WHMIS:**

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

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**Section 16: Other Information**

**16.1 NFPA 704**



**Top, Flammability: 3 – Severe Hazard**

**Left, Health Hazard: 3 – Severe Hazard**

**Right, Reactivity: 2 – Moderate Hazard**

**Bottom, Special Notice: COR – Corrosive**

**Label First Aid:**

If swallowed, induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. In all cases call a physician.

**Product Use:**

Laboratory Reagent.

**Disclaimer:**

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DATE PREPARED: 2/09/2015

DATE REVISED: 6/7/2018 AG