Phenacetin

sc-257998

Material Safety Data Sheet

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

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME
Phenacetin

STATEMENT OF HAZARDOUS NATURE

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
Phenacetin has analgesic (pain-relief) and antipyretic (fever reduction) effects similar to aspirin. Usually given with aspirin, codeine or caffeine in tablets. Intermediate

SYNONYMS
C10-H13-N-O2, C10-H13-N-O2, CH3-CONCH-C6H4-OC2H5, "NSAID analgesic (pain-killer)", antipyretic, acetophenetidin, acetophenetidin, acetophenetidin, acetophenetidin, acetophenetidin, acetophenetidin, acetophenetidin, N-acetyl-p-phenetidin, N-acetyl-p-phenetidin, ace

Section 2 - HAZARDS IDENTIFICATION

FLAMMABILITY 1
HEALTH HAZARD 2
INSTABILITY 0

1 of 11
and kidney inflammation. Occasionally, the liver may be affected, causing inflammation (hepatitis) an the urine, changes in urine chemistry, change in the frequency of urination, insufficiency of kidney
diarrhea or constipation, perforations causing serious infection, and blood in the vomit or stools. K
been causally related to hepatotoxicity.
Bioactivation of phenacetin to yield NABQI may further result in th reduction of molecular oxygen to
"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.
Non-steroidal anti-inflammatory drug (NSAID) overdose may produce nausea, vomiting, indigestion and
headache, ataxia, rapid shallow respiration, drowsiness, decreased urination frequency or absence of urine, increased heart rate, low or high blood pressure and kidney damage.
EYE
Although the material is not thought to be an irritant, direct contact with the eye may cause transient discomfort characterized by tearing or
conjunctival redness (as with windburn). Slight abrasive damage may also result. The material may produce foreign body irritation in certain
individuals.
SKIN
The material is not thought to produce adverse health effects or skin irritation following contact (as classified using animal models).
Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable gloves be used in an occupational
setting.
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
The material is not thought to produce either adverse health effects or irritation of the respiratory tract following inhalation (as classified
using animal models). Nevertheless, adverse effects have been produced following exposure of animals by at least one other route and good
hygiene practice requires that exposure be kept to a minimum and that suitable control measures be used in an occupational setting.
Persons with impaired respiratory function, airway diseases and conditions such as emphysema or chronic bronchitis, may incur further
disability if excessive concentrations of particulate are inhaled.
CHRONIC HEALTH EFFECTS
Skin contact with the material is more likely to cause a sensitization reaction in some persons compared to the general population.
There is sufficient evidence to suggest that this material directly causes cancer in humans.
Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or
biochemical systems.
Phenacetin use leads to interstitial nephritis (a kidney disorder in which the tubules become inflamed) with papillary necrosis (destruction of
kidney tissues) after the chronic ingestion of a cumulative dose of more than 3 kg. Ultimately infectious destructive pyelonephritis develops
and possibly, renal pelvis carcinoma. In the majority of cases "phenacetin kidney", papillary necrosis, and interstitial nephritis were connected
with analgesic abuse."
Bioactivation of phenacetin to yield NABQI may further result in the reduction of molecular oxygen to superoxide. Oxidation products have
been causally related to hepatotoxicity.
Prolonged use of non-steroidal analgesics damages the lining of the gastrointestinal tract, causing ulcers and bleeding. There may be
diarrhea or constipation, perforations causing serious infection, and blood in the vomit or stools. Kidney damage can result in blood or pus in
the urine, changes in urine chemistry, change in the frequency of urination, insufficiency of kidney function, destruction of the kidney lining
and kidney inflammation. Occasionally, the liver may be affected, causing inflammation (hepatitis) and jaundice. There may be changes in
blood cell distribution, and disturbance in platelet function. Sensitivity to light may occur. Anaphylactic-like syndrome is characterized by rash with redness, spots and blisters, itching, and fainting. The eyes, ears and urinary tract can all be affected. Asthma and anemia may be exacerbated. These drugs can cause circulatory defects in the fetus and newborn. Once the kidney has been damaged, there is an increased likelihood that cancers could develop there.

Oxygen activation (generation of a superoxide) occurs during one of the reactions of this metabolic sequence. Superoxide is a strong base and can therefore attract protons from a variety of compounds; it is also a potent reducing agent which can reduce transition metal ions (such as Fe3+ and Cu+) to their reduced form. Superoxide may also act as a nucleophile and may readily react with a number of electrophilic agents. Finally, superoxide may initiate oxidation reactions, for example, of molecules such as ascorbic acid or epinephrine (adrenaline) following hydrogen abstraction due to its basicity.

Under certain conditions the rate of formation of reactive oxygen species may exceed the capacity of the bodies auto-oxidative defence mechanisms and, as a result, result in "oxidative stress". Oxidative stress appears to be involved in some biological processes such as aging and inflammation reactions and is thought to play a role in the pathogenesis of several diseases, including acute pancreatitis, post-ischaemic syndrome, tumour formation, atherosclerosis and diabetic angiopathy.

Free radicals can react with specific cellular molecules including low molecular weight biomolecules such as neurotransmitters and co-enzymes and, as a consequence, inactivate them. Macromolecules and cellular membranes are particularly vulnerable to free radical damage with the resultant loss of physiological function and cell death. Depolymerisation of polysaccharides (such as hyaluronic acid) may result in inflammation of the joints.

Free radicals have a high affinity for sulfur containing amino-acids and therefore many proteins. The may bind covalently to these proteins leading to loss of biological function such as catalysis exhibited by enzymes. Covalent binding may also result in allergic reactions when the modified protein is recognised, by the bodies immune system, as "foreign". Free radicals are also capable of causing proteins to cross-link to yield larger aggregates.

Free radicals are also able to react with the nucleic acids of DNA which may affect cell division or cell death. Oxidative modifications of DNA may result in tumour initiation.

Lipids containing several double bonds (such as polyunsaturated fatty acids and cholesterol) are also subject to damage. In the case of membrane phospholipids, such "peroxidation" results in impairment of cellular and/or subcellular membranes which may produce cell death. Transition metal ions may also play an important role in lipid peroxidation after free radical-induced change of valency. Fe3+/Fe2+, copper and mercury ions, as well as vanadate and chromate ions seem to initiate this process and may even exacerbate it by producing secondary radicals when the phospholipid is modified.

Chronic ingestion of excessive amounts of non-narcotic analgesics can lead to nephropathy (kidney damage) in humans. A substantial number of health deficits are associated with this condition. The include reduced GFR (glomerular filtration rate), salt wastage, hyperkalaemia, metabolic acidosis, and a vasopressin-resistant concentration defect. More severe forms of analgesic nephropathy may lead to papillary necrosis with sloughing of the papilla. Although renal function may return to normal after discontinuation of treatment or abuse, complete anuria (absence of urine formation) may result following continued abuse. Most patients who develop analgesic nephropathy consume analgesics for up to 3 years, consuming between 2 and 5 mg daily.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Hazard Ratings</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flammability:</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Toxicity:</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Body Contact:</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Reactivity:</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Chronic:</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

NAME | CAS RN | %
---|-------|---
phenacetin | 62-44-2 | >98

Section 4 - FIRST AID MEASURES

SWALLOWED
- If swallowed do NOT induce vomiting.
- If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.
- Observe the patient carefully.
- Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious.
- Give water to rinse out mouth, then provide liquid slowly and as much as casually can comfortably drink.
- Seek medical advice.

EYE
- If this product comes in contact with the eyes:
  - Wash out immediately with fresh 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.
  - If pain persists or recurs seek medical attention.
Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

**SKIN**
- If skin contact occurs:
  - Immediately remove all contaminated clothing, including footwear
  - Flush skin and hair with running water (and soap if available).
  - Seek medical attention in event of irritation.

**INHALED**
- If dust is inhaled, remove from contaminated area.
- Encourage patient to blow nose to ensure clear passage of breathing.
- If irritation or discomfort persists seek medical attention.

**NOTES TO PHYSICIAN**
- Treat symptomatically.
  - The material may induce methemoglobinemia following exposure.
  - Initial attention should be directed at oxygen delivery and assisted ventilation if necessary. Hyperbaric oxygen has not demonstrated substantial benefits.
  - Hypotension should respond to Trendelenburg's position and intravenous fluids; otherwise dopamine may be needed.
  - 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 50 minutes; repeat, using the same dose, if symptoms of hypoxia fail to subside within 1 hour.

**BIOLOGICAL EXPOSURE INDEX - BEI** These represent the determinants observed in specimens collected from a healthy worker exposed at the Exposure Standard (ES or TLV):

<table>
<thead>
<tr>
<th>Determinant</th>
<th>Index</th>
<th>Sampling Time</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Methemoglobin in blood</td>
<td>1.5% of hemoglobin</td>
<td>During or end of shift</td>
<td>B, NS, SQ</td>
</tr>
</tbody>
</table>

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.

For phenacetin intoxications:
- In case of overdose intravenous acetylcysteine, methionine or cysteamine may be antidotal.
- Haemoperfusion may be useful if some time has elapsed since the poisoning to make antidotes unhelpful.
- Basic measures that may be required include dextrose and blood transfusions.
- Removal of stomach contents by aspiration and lavage forms an early part of treatment; charcoal administration should be considered Martindale.

**Section 5 - FIRE FIGHTING MEASURES**

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vapour Pressure (mmHG)</td>
<td>Negligible</td>
</tr>
<tr>
<td>Upper Explosive Limit (%)</td>
<td>Not available</td>
</tr>
<tr>
<td>Specific Gravity (water=1)</td>
<td>Not available</td>
</tr>
<tr>
<td>Lower Explosive Limit (%)</td>
<td>Not available</td>
</tr>
</tbody>
</table>

**EXTINGUISHING MEDIA**
- Foam.
- Dry chemical powder.
- BCF (where regulations permit).
- Carbon dioxide.
- Water spray or fog - Large fires only.

**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.
- Use water delivered as a fine spray to control fire and cool adjacent area.
- 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.
- Equipment should be thoroughly decontaminated after use.

**GENERAL FIRE HAZARDS/HAZARDOUS COMBUSTIBLE PRODUCTS**
- Combustible solid which burns but propagates flame with difficulty.
- Avoid generating dust, particularly clouds of dust in a confined or unventilated space as dusts may form an explosive mixture with air, and any source of ignition, i.e. flame or spark, will cause fire or explosion. Dust clouds generated by the fine grinding of the solid are a particular hazard; accumulations of fine dust may burn rapidly and fiercely if ignited.
- Dry dust can be charged electrostatically by turbulence, pneumatic transport, pouring, in exhaust ducts and during transport.
- Build-up of electrostatic charge may be prevented by bonding and grounding.
Powder handling equipment such as dust collectors, dryers and mills may require additional protection measures such as explosion venting.

Combustion products include: carbon monoxide (CO), carbon dioxide (CO2), nitrogen oxides (NOx), other pyrolysis products typical of burning organic material.

May emit poisonous fumes.
May emit corrosive fumes.

**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:**

**Respirator:** Particulate

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**Section 6 - ACCIDENTAL RELEASE MEASURES**

**MINOR SPILLS**
- Clean up waste regularly and abnormal spills immediately.
- Avoid breathing dust and contact with skin and eyes.
- Wear protective clothing, gloves, safety glasses and dust respirator.
- Use dry clean up procedures and avoid generating dust.
- Vacuum up or sweep up. NOTE: Vacuum cleaner must be fitted with an exhaust micro filter (HEPA type) (consider explosion-proof machines designed to be grounded during storage and use).
- Dampen with water to prevent dusting before sweeping.
- Place in suitable containers for disposal.

**MAJOR SPILLS**
- Clear area of personnel and move upwind.
- Alert Emergency Responders and tell them location and nature of hazard.
- Wear full body protective clothing with breathing apparatus.
- Prevent, by all means available, spillage from entering drains or water courses.
- Consider evacuation (or protect in place).
- No smoking, naked lights or ignition sources.
- Increase ventilation.
- Stop leak if safe to do so.
- Water spray or fog may be used to disperse / absorb vapour.
- Contain or absorb spill with sand, earth or vermiculite.
- Collect recoverable product into labelled containers for recycling.
- Collect solid residues and seal in labelled drums for disposal.
- Wash area and 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.

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**Section 7 - HANDLING AND STORAGE**

**PROCEDURE FOR HANDLING**
- Avoid all personal contact, including inhalation.
- Wear protective clothing when risk of exposure 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 contact with incompatible materials.
When handling, DO NOT eat, drink or smoke.
Keep containers securely sealed when not in use.
Avoid physical damage to containers.
Always wash hands with soap and water after handling.
Work clothes should be laundered separately.
Launder contaminated clothing before re-use.
Use good occupational work practice.
Observe manufacturer's storing and handling recommendations.
Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained.
Empty containers may contain residual dust which has the potential to accumulate following settling. Such dusts may explode in the presence of an appropriate ignition source.
Do NOT cut, drill, grind or weld such containers.
In addition ensure such activity is not performed near full, partially empty or empty containers without appropriate workplace safety authorisation or permit.

RECOMMENDED STORAGE METHODS
• Glass container.
• Polyethylene or polypropylene container.
• Check all containers are clearly labelled and free from leaks.

STORAGE REQUIREMENTS
• Store in original containers.
• Keep containers securely sealed.
• Store in a cool, dry, well-ventilated area.
• Store away from incompatible materials and foodstuff containers.
• Protect containers against physical damage and check regularly for leaks.
• Observe manufacturer's storing and handling recommendations.

SAFE STORAGE WITH OTHER CLASSIFIED CHEMICALS

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

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS
The following materials had no OELs on our records
• phenacetin: CAS:62-44-2

MATERIAL DATA
PHENACETIN:
• It is the goal of the ACGIH (and other Agencies) to recommend TLVs (or their equivalent) for all substances for which there is evidence of health effects at airborne concentrations encountered in the workplace.
At this time no TLV has been established, even though this material may produce adverse health effects (as evidenced in animal experiments or clinical experience). Airborne concentrations must be maintained as low as is practically possible and occupational exposure must be kept to a minimum.
NOTE: The ACGIH occupational exposure standard for Particles Not Otherwise Specified (P.N.O.S) does NOT apply.
Airborne particulate or vapor must be kept to levels as low as is practicably achievable given access to modern engineering controls and monitoring hardware. Biologically active compounds may produce idiosyncratic effects which are entirely unpredictable on the basis of literature searches and prior clinical experience (both recent and past).
OEL STEL (Russia): 0.5 mg/m3

PERSONAL PROTECTION
Consult your EHS staff for recommendations

**EYE**

- When handling very small quantities of the material eye protection may not be required.
- For laboratory, larger scale or bulk handling or where regular exposure in an occupational setting occurs:
  - Chemical goggles
  - Face shield. Full face shield may be required for supplementary but never for primary protection of eyes
  - Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lenses or restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience. Medical and first-aid personnel should be trained in their removal and suitable equipment should be readily available. In the event of chemical exposure, begin eye irrigation immediately and remove contact lens as soon as practicable. Lens should be removed at the first signs of eye redness or irritation - lens should be removed in a clean environment only after workers have washed hands thoroughly. [CDC NIOSH Current Intelligence Bulletin 59]

**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.
- Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include: such as:
  - frequency and duration of contact,
  - chemical resistance of glove material,
  - glove thickness and
  - dexterity
- Select gloves tested to a relevant standard (e.g. Europe EN 374, US F739).
  - When prolonged or frequently repeated contact may occur, a glove with a protection class of 5 or higher (breakthrough time greater than 240 minutes according to EN 374) is recommended.
  - When only brief contact is expected, a glove with a protection class of 3 or higher (breakthrough time greater than 60 minutes according to EN 374) is recommended.
- Contaminated gloves should be replaced.
- Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended.
- Rubber gloves (nitrile or low-protein, powder-free latex). Employees allergic to latex gloves should use nitrile gloves in preference.
- Double gloving should be considered.
- PVC gloves.
- Protective shoe covers.
- Head covering.

Experience indicates that the following polymers are suitable as glove materials for protection against undissolved, dry solids, where abrasive particles are not present.
- polychloroprene
- nitrile rubber
- butyl rubber
- fluorocautchouc
- polyvinyl chloride

Gloves should be examined for wear and/ or degradation constantly.

**OTHER**

- Employees working with confirmed human carcinogens should be provided with, and be required to wear, clean, full body protective clothing (smocks, coveralls, or long-sleeved shirt and pants), shoe covers and gloves prior to entering the regulated area.
- Employees engaged in handling operations involving carcinogens should be provided with, and required to wear and use half-face filter-type respirators with filters for dusts, mists and fumes, or air purifying canisters or cartridges. A respirator affording higher levels of protection may be substituted.
- Emergency deluge showers and eyewash fountains, supplied with potable water, should be located near, within sight of, and on the same level with locations where direct exposure is likely.
- Prior to each exit from an area containing confirmed human carcinogens, employees should be required to remove and leave protective clothing and equipment at the point of exit and at the last exit of the day, to place used clothing and equipment in impervious containers at the point of exit for purposes of decontamination or disposal. The contents of such impervious containers must be identified with suitable labels. For maintenance and decontamination activities, authorized employees entering the area should be provided with and required to wear clean, impervious garments, including gloves, boots and continuous-air supplied hood.
- Prior to removing protective garments the employee should undergo decontamination and be required to shower upon removal of the garments and hood.
- For quantities up to 500 grams a laboratory coat may be suitable.
- For quantities up to 1 kilogram a disposable laboratory coat or coverall of low permeability is recommended. Coveralls should be buttoned at collar and cuffs.
PHYSICAL PROPERTIES

- For quantities over 1 kilogram and manufacturing operations, wear disposable coverall of low permeability and disposable shoe covers.
- For manufacturing operations, air-supplied full body suits may be required for the provision of advanced respiratory protection.
- Eye wash unit.
- Ensure there is ready access to an emergency shower.
- For Emergencies: Vinyl suit.

- 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.

RESPIRATOR

<table>
<thead>
<tr>
<th>Protection Factor</th>
<th>Half-Face Respirator</th>
<th>Full-Face Respirator</th>
<th>Powered Air Respirator</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 x PEL</td>
<td>P1</td>
<td>-</td>
<td>PAPR-P1</td>
</tr>
<tr>
<td>50 x PEL</td>
<td>Air-line*</td>
<td>P2</td>
<td>-</td>
</tr>
<tr>
<td>100 x PEL</td>
<td>-</td>
<td>P3</td>
<td>-</td>
</tr>
<tr>
<td>100+ x PEL</td>
<td>-</td>
<td>Air-line*</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>Air-line**</td>
<td>PAPR-P3</td>
</tr>
</tbody>
</table>

* - 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

- Employees exposed to confirmed human carcinogens should be authorized to do so by the employer, and work in a regulated area.
- Work should be undertaken in an isolated system such as a "glove-box" . Employees should wash their hands and arms upon completion of the assigned task and before engaging in other activities not associated with the isolated system.
- Within regulated areas, the carcinogen should be stored in sealed containers, or enclosed in a closed system, including piping systems, with any sample ports or openings closed while the carcinogens are contained within.
- Open-vessel systems are prohibited.
- Each operation should be provided with continuous local exhaust ventilation so that air movement is always from ordinary work areas to the operation.
- Exhaust air should not be discharged to regulated areas, non-regulated areas or the external environment unless decontaminated. Clean make-up air should be introduced in sufficient volume to maintain correct operation of the local exhaust system.
- For maintenance and decontamination activities, authorized employees entering the area should be provided with and required to wear clean, impervious garments, including gloves, boots and continuous-air supplied hood. Prior to removing protective garments the employee should undergo decontamination and be required to shower upon removal of the garments and hood.
- Except for outdoor systems, regulated areas should be maintained under negative pressure (with respect to non-regulated areas).
- Local exhaust ventilation requires make-up air be supplied in equal volumes to replaced air.
- Laboratory hoods must be designed and maintained so as to draw air inward at an average linear face velocity of 150 feet/ min. with a minimum of 125 feet/ min. Design and construction of the fume hood requires that insertion of any portion of the employees body, other than hands and arms, be disallowed.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES
APPEARANCE
Odourless white or off-white, glistening crystalline scales or fine white crystalline powder with a slightly bitter taste; does not mix with water (1:1300).

Section 10 - CHEMICAL STABILITY

CONDITIONS CONTRIBUTING TO INSTABILITY
• Presence of incompatible materials.
• Product is considered stable.
• Hazardous polymerization will not occur.

STORAGE INCOMPATIBILITY
• Avoid strong acids, bases.
Avoid reaction with oxidizing agents.
For incompatible materials - refer to Section 7 - Handling and Storage.

Section 11 - TOXICOLOGICAL INFORMATION

phenacetin

TOXICITY AND IRRITATION
• unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.

<table>
<thead>
<tr>
<th>TOXICITY</th>
<th>IRRITATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral (rat) LD50: 3600 mg/kg</td>
<td>Nil Reported</td>
</tr>
<tr>
<td>Intraperitoneal (rat) LD50: 634 mg/kg</td>
<td></td>
</tr>
</tbody>
</table>

Subcutaneous (mouse) LD50: 1625 mg/kg

• Contact allergies quickly manifest themselves as contact eczema, more rarely as urticaria or Quincke's edema. The pathogenesis of contact eczema involves a cell-mediated (T lymphocytes) immune reaction of the delayed type. Other allergic skin reactions, e.g. contact urticaria, involve antibody-mediated immune reactions. The significance of the contact allergen is not simply determined by its sensitization potential: the distribution of the substance and the opportunities for contact with it are equally important. A weakly sensitizing substance which is widely distributed can be a more important allergen than one with stronger sensitizing potential with which few individuals come into contact. From a clinical point of view, substances are noteworthy if they produce an allergic test reaction in more than 1% of the persons tested.

Analgesic mixtures containing phenacetin are carcinogenic to humans

There have been many case reports of renal pelvic and other urothelial tumours in patients who had used large amounts of phenacetin-containing analgesics. Case-control studies have been consistent in showing a positive association between cancer of the renal pelvis and cancer of the bladder and use of phenacetin-containing analgesics, with relative risks varying from 2.4 to over 6; these associations have not been explained by confounding with other causes of urothelial cancer and, where looked for, a positive dose-response relationship has been evident. In one study, use of non-phenacetin-containing analgesics appeared to increase the risk of cancer of the renal pelvis to the same extent as did phenacetin-containing analgesics. This result was not obtained in other studies.

Evidence for carcinogenicity to animals (sufficient for phenacetin; limited for analgesic mixtures containing phenacetin)

Phenacetin given orally induced benign and malignant tumours of the urinary tract in mice and rats and of the nasal cavity in rats. When given in combination with aspirin and caffeine to rats or mice, no significant association was found between the administration of the mixture and the incidence of tumours. In rats, phenacetin alone or in combination with phenazone slightly increased the incidences of renal-cell and renal-pelvic tumours; rats treated with phenacetin, phenazone and caffeine in combination developed hepatomas. In rats, phenacetin enhanced the incidence of urinary bladder tumours induced by N-nitrosobutyl-N-(4-hydroxybutyl)amine and prevented the induction of hepatocellular carcinomas by 2-acetylaminofluorene.

No data were available on the genetic and related effects of phenacetin in humans.

The results of studies on the induction of chromosomal aberrations, sister chromatid exchanges and micronuclei in rodents treated with phenacetin in vivo were equivocal. Phenacetin induced chromosomal aberrations in Chinese hamster cells in vitro but not DNA strand breaks in rat hepatocytes. It did not induce sex-linked recessive lethal mutations in Drosophila. Phenacetin was mutagenic to bacteria when tested in the presence of a metabolic system derived from hamster but not mouse or rat liver. The urine from phenacetin-treated Chinese hamsters,
but not that from rats, was mutagenic to bacteria.

WARNING: This substance has been classified by the IARC as Group 1: CARCINOGENIC TO HUMANS.

Tenth Annual Report on Carcinogens: Substance anticipated to be Carcinogen [National Toxicology Program: U.S. Dep. of Health & Human Services 2002].

CARCINOGEN

Phenacetin (NB: Overall evaluation upgraded from 2A to 1 with supporting evidence from other relevant data)

International Agency for Research on Cancer (IARC) - Agents Reviewed by the IARC Monographs

Group 1

ANALGESIC MIXTURES CONTAINING PHENACETIN

US Environmental Defense Scorecard Recognized Carcinogens

Reference(s) P65

ANALGESIC MIXTURES CONTAINING PHENACETIN

US Environmental Defense Scorecard Suspected Carcinogens

Reference(s) P65

Section 12 - ECOLOGICAL INFORMATION

Refer to data for ingredients, which follows:

PHENACETIN:

- Half-life Soil - High (hours): 672
- Half-life Soil - Low (hours): 168
- Half-life Air - High (hours): 8.3
- Half-life Air - Low (hours): 0.83
- Half-life Surface water - High (hours): 672
- Half-life Surface water - Low (hours): 168
- Half-life Ground water - High (hours): 1344
- Half-life Ground water - Low (hours): 336
- Aqueous biodegradation - Aerobic - High (hours): 672
- Aqueous biodegradation - Aerobic - Low (hours): 168
- Aqueous biodegradation - Anaerobic - High (hours): 2688
- Aqueous biodegradation - Anaerobic - Low (hours): 672
- Photooxidation half-life air - High (hours): 8.3
- Photooxidation half-life air - Low (hours): 0.83

For phenacetin:

Environmental fate:

Phenacetin is expected to leach into groundwater. It is estimated to have a half-life exceeding 30 days.

The estimated bioconcentration factor is 100 and the log Kow is less than 3, therefore the material is not expected to significantly bioconcentrate.

When released to air reaction with photochemically produced hydroxyl radicals causes ready degradation (half-life less than 1 day).

- DO NOT discharge into sewer or waterways.

Ecotoxicity

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Persistence: Water/Soil</th>
<th>Persistence: Air</th>
<th>Bioaccumulation</th>
<th>Mobility</th>
</tr>
</thead>
<tbody>
<tr>
<td>phenacetin</td>
<td>LOW</td>
<td>LOW</td>
<td>LOW</td>
<td>HIGH</td>
</tr>
</tbody>
</table>

Section 13 - DISPOSAL CONSIDERATIONS

US EPA Waste Number & Descriptions

B. Component Waste Numbers

When phenacetin is present as a solid waste as a discarded commercial chemical product, off-specification species, as a container residue, or a spill residue, use EPA waste number U187 (waste code T).

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.

Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked.

A Hierarchy of Controls seems to be common - the user should investigate:

● Reduction
● Reuse
● Recycling
● Disposal (if all else fails)

This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use. Shelf life considerations should also be applied in making decisions of this type. Note that properties of a material may change in use, and recycling or reuse may not always be appropriate.

DO NOT allow wash water from cleaning equipment to enter drains. Collect all wash water for treatment before disposal.
Recycle wherever possible.
Consult manufacturer for recycling options or consult Waste Management Authority for disposal if no suitable treatment or disposal facility can be identified.
Dispose of by: Burial in a licensed landfill or Incineration in a licensed apparatus (after admixture with suitable combustible material)
Decontaminate empty containers. Observe all label safeguards until containers are cleaned and destroyed.

Section 14 - TRANSPORTATION INFORMATION

NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS: DOT, IATA, IMDG

Section 15 - REGULATORY INFORMATION

phenacetin (CAS: 62-44-2) is found on the following regulatory lists:

Section 16 - OTHER INFORMATION

LIMITED EVIDENCE
• Ingestion may produce health damage*.
• Cumulative effects may result following exposure*.
* (limited evidence).

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• 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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