

N-BUTYRALDEHYDE

GHS Safety Data Sheet

Version No:2.0

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Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME

N-BUTYRALDEHYDE

OTHER NAMES

C4-H8-O, CH₃-CH₂-CH₂-CHO, butal, butaldehyde, butanal, n-butanal, n-butanal, butanaldehyde, "butyl aldehyde", "n-butyl aldehyde", "n-butyl aldehyde", butyral, n-butylaldehyde, n-butylaldehyde, "butyric aldehyde"

PROPER SHIPPING NAME

BUTYRALDEHYDE

PRODUCT USE

In the manufacture of rubber accelerators, synthetic resins and plasticisers.

SUPPLIER

Company: S D FINE- CHEM LIMITED

Address:

315- 317, T.V. INDUSTRIAL ESTATE,

248, WORLI,

MUMBAI- 400030.INDIA.

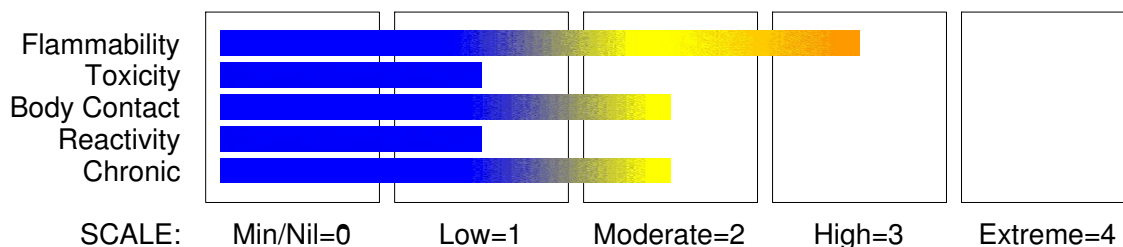
technical@sdfine.com

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HAZARD RATINGS



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Section 2 - HAZARDS IDENTIFICATION

GHS Classification

Acute Toxicity (Oral) Category 5
Eye Irritation Category 2A
Flammable Liquid Category 2
Respiratory Irritation Category 3
Skin Corrosion/Irritation Category 2
Skin Sensitizer Category 1



EMERGENCY OVERVIEW

HAZARD

DANGER
Determined by using GHS criteria:
H335 H225 H303 H315 H319 H317
May cause respiratory irritation
Highly flammable liquid and vapour
May be harmful if swallowed
Causes skin irritation
Causes serious eye irritation
May cause allergic skin reaction

PRECAUTIONARY STATEMENTS

Prevention

Use only non-sparking tools.
Take precautionary measures against static discharge
Avoid breathing dust/fume/gas/mist/vapours/spray.
Wash hands thoroughly after handling.
Ground/bond container and receiving equipment.
Use explosion-proof electrical/ventilating/lighting/equipment
Wash thoroughly after handling.
Keep away from heat/sparks/open flame - No smoking.
Contaminated clothing should not be allowed out of the workplace.
Wear protective gloves and eye/face protection.
Keep container tightly closed.

Response

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
Wash contaminated clothing before reuse.
IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.

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Section 2 - HAZARDS IDENTIFICATION

If eye irritation persists, get medical advice/attention.
If skin irritation or rash occurs, seek medical advice/attention.
If skin irritation occurs, seek medical advice/attention.
Wear eye/face protection.
IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.
Specific treatment: refer to Label or MSDS.
If on skin or hair: remove/take off immediately all contaminated clothing. Rinse with water/shower.
IF ON SKIN: Gently wash with plenty of soap and water.
Wash/Decontaminate removed clothing before reuse.
Remove/Take off immediately all contaminated clothing

Disposal

Dispose of contents and container in accordance with relevant legislation.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
butyraldehyde	123-72-8	>98

Section 4 - FIRST AID MEASURES

SWALLOWED

For advice, contact a Poisons Information Centre or a doctor.

- 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 casualty can comfortably drink.
- Seek medical advice.

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 Centre 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:

- Immediately flush body and clothes with large amounts of water, using safety shower if available.
- Quickly remove all contaminated clothing, including footwear.
- Wash skin and hair with running water. Continue flushing with water until advised to

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Section 4 - FIRST AID MEASURES

stop by the Poisons Information Centre.

- 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.

NOTES TO PHYSICIAN

Symptoms and treatment of intoxication may be similar to that prescribed for formaldehyde poisoning:

For acute or short-term repeated exposures to formaldehyde:

INGESTION:

- Patients present early with severe corrosion of the gastro-intestinal tract and systemic effects.
- Inflammation and ulceration may progress to strictures.
- Severe acidosis results from rapid conversion of formaldehyde to formic acid. Coma, hypotension, renal failure and apnoea complicate ingestion.
- Decontaminate by dilution with milk or water containing ammonium acetate; vomiting should be induced. Follow with gastric lavage using a weak ammonia solution (converts formaldehyde to relatively inert pentamethylenetetramine)
- Gastric lavage is warranted only in first 15 minutes following ingestion.

SKIN:

- Formaldehyde can combine with epidermal protein to produce a hapten-protein couple capable of sensitising T-lymphocytes. Subsequent exposures cause a type IV hypersensitivity reaction (i.e allergic contact dermatitis). [Ellenhorn & Barceloux: Medical Toxicology].

Section 5 - FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA

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

FIRE FIGHTING

- Alert Fire Brigade and tell them location and nature of hazard.
- Wear full body protective clothing with breathing apparatus.
- Prevent, by any means available, spillage from entering drains or water course.
- Use fire fighting procedures suitable for surrounding 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.

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Section 5 - FIRE FIGHTING MEASURES

FIRE/EXPLOSION HAZARD

- Liquid and vapour are highly flammable.
- Severe fire hazard when exposed to heat, flame and/or oxidisers.
- Vapour may travel a considerable distance to source of ignition.
- Heating may cause expansion or decomposition leading to violent rupture of containers.
- On combustion, may emit toxic fumes of carbon monoxide (CO).

FIRE INCOMPATIBILITY

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

Personal Protective Equipment

- Breathing apparatus.
- Gas tight chemical resistant suit.
- Limit exposure duration to 1 BA set 30 mins.

Section 6 - ACCIDENTAL RELEASE MEASURES

EMERGENCY PROCEDURES

MINOR SPILLS

- Remove all ignition sources.
- Clean up all spills immediately.
- Avoid breathing vapours and contact with skin and eyes.
- Control personal contact by using protective equipment.
- Contain and absorb small quantities with vermiculite or other absorbent material.
- Wipe up.
- Collect residues in a flammable waste container.

MAJOR SPILLS

- Clear area of personnel and move upwind.
- Alert Fire Brigade and tell them location and nature of hazard.
- May be violently or explosively reactive.
- Wear full body protective clothing with breathing apparatus.
- Prevent, by any means available, spillage from entering drains or water course.
- Consider evacuation (or protect in place).
- Stop leak if safe to do so.
- Contain spill with sand, earth or vermiculite.
- Collect recoverable product into labelled containers for recycling.
- Neutralise/decontaminate residue.
- 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.

EMERGENCY RESPONSE PLANNING GUIDELINES (ERPG)

The maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to one hour WITHOUT experiencing or developing

life-threatening health effects is:
butyraldehyde 2000 ppm

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Section 6 - ACCIDENTAL RELEASE MEASURES

irreversible or other serious effects or symptoms which could impair an individual's ability to take protective action is:

butyraldehyde 25 ppm

other than mild, transient adverse effects without perceiving a clearly defined odour is:

butyraldehyde 25 ppm

The threshold concentration below which most people will experience no appreciable risk of health effects:

butyraldehyde 25 ppm

American Industrial Hygiene Association (AIHA)

Ingredients considered according to the following cutoffs

Very Toxic (T+)	$\geq 0.1\%$	Toxic (T)	$\geq 3.0\%$
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R50	$\geq 0.25\%$	Corrosive (C)	$\geq 5.0\%$
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R51	$\geq 2.5\%$		
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else	$\geq 10\%$		
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where percentage is percentage of ingredient found in the mixture

SAFE STORAGE WITH OTHER CLASSIFIED CHEMICALS



+



X



X



X



X



+

+: May be stored together

O: May be stored together with specific precautions

X: Must not be stored together

Personal Protective Equipment advice is contained in Section 8 of the MSDS.

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.
- Avoid smoking, naked lights, heat or ignition sources.
- When handling, DO NOT eat, drink or smoke.
- Vapour may ignite on pumping or pouring due to static electricity.
- DO NOT use plastic buckets.
- Earth and secure metal containers when dispensing or pouring product.
- Use spark-free tools when handling.
- Avoid contact with incompatible materials.
- Keep containers securely sealed.
- Avoid physical damage to containers.
- Always wash hands with soap and water after handling.
- Work clothes should be laundered separately.

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Section 7 - HANDLING AND STORAGE

- 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.

SUITABLE CONTAINER

Plastic container.

- Lined metal can, lined metal pail/ can.
- Plastic pail.
- Polyliner drum.
- Packing as recommended by manufacturer.
- Check all containers are clearly labelled and free from leaks.

STORAGE INCOMPATIBILITY

Avoid reaction with oxidising agents, bases and strong reducing agents.

Avoid contact with strong acids.

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.

Store between 10 and 25 deg. C.

DO NOT use mild steel or galvanised containers.

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

The following materials had no OELs on our records

- butyraldehyde:

CAS:123- 72- 8

MATERIAL DATA

CEL TWA: 25 ppm, 73.5 mg/m³ (compare WEEL TWA)

Odour Threshold: low = 0.005 ppm, 0.0136 mg/m³; high = 9.0 ppm, 26.55 mg/m³

Saturated vapour concentration: 1.16 x 10(exp 5) to 1.21 x 10(exp 5) ppm at 20 C .

The Council of Europe has established an acceptable daily intake (ADI) of 1 mg/kg for butyraldehyde.

Butyraldehyde has a low odour threshold and, therefore, good warning properties at concentrations below 10 ppm. The acute lethality of butyraldehyde is considerably less than other saturated aldehydes (acetaldehyde and propionaldehyde) by subcutaneous, oral and inhalation routes of exposure in many species. The AIHA concluded that a workplace environmental exposure level (WEEL) should therefore be based on the ocular and upper respiratory tract irritancy. For humans 197 ppm is reportedly the lowest concentration that produces irritation. Animal data however suggests that a lower exposure level is warranted. In one subchronic study 117 ppm produced ocular and upper respiratory tract irritation in rats and dogs, with relatively minor changes in the nasal

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Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

cavity of both species; in another subchronic study 50 ppm was a no-observable-effect level. The WEEL TWA is thought to be protective against irritation and possible minor histopathologic changes in the upper respiratory tract.

PERSONAL PROTECTION



EYE

- Safety glasses with side shields.
- Chemical goggles.
- 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 lens 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

Wear chemical protective gloves, eg. PVC.
Wear safety footwear.

OTHER

- Overalls.
- Barrier cream
- Eyewash unit.

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: butyraldehyde

BUTYL	A
TEFLON	A
PVA	B
NEOPRENE	C
VITON	C

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Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

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

Where the concentration of gas/particulates in the breathing zone, approaches or exceeds the "Exposure Standard" (or ES), respiratory protection is required.

Degree of protection varies with both face-piece and Class of filter; the nature of protection varies with Type of filter.

Protection Factor	Half- Face Respirator	Full- Face Respirator	Powered Air Respirator
10 x ES	A- AUS	-	A- PAPR- AUS
20 x ES	-	A- AUS	-
100 x ES	-	A- 2	A- PAPR- 2 ^

^ - Full-face.

The local concentration of material, quantity and conditions of use determine the type of personal protective equipment required.

For further information consult your Occupational Health and Safety Advisor.

ENGINEERING CONTROLS

General exhaust is adequate under normal operating conditions. Local exhaust ventilation may be required in specific circumstances. If risk of overexposure exists, wear approved respirator. Correct fit is essential to obtain adequate protection. Provide adequate ventilation in warehouse or closed storage areas. 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, vapours, 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.)

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Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

Within each range the appropriate value depends on:

Lower end of the range

1: Room air currents minimal or favourable to capture

2: Contaminants of low toxicity or of nuisance value only.

3: Intermittent, low production.

4: Large hood or large air mass in motion

Upper end of the range

1: Disturbing room air currents

2: Contaminants of high toxicity

3: High production, heavy use

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.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE

Water-white liquid with characteristic pungent odour; mixes with water (7.1%). Miscible in ethanol, ether, ethyl acetate, acetone, toluene and oils.

May undergo autopolymerisation to produce viscous liquids.

PHYSICAL PROPERTIES

Liquid.

Mixes with water.

Molecular Weight: 72.12

Melting Range (°C): - 96

Solubility in water (g/L): Miscible

pH (1% solution): Not available

Volatile Component (%vol): 100

Relative Vapour Density (air=1): 2.5

Lower Explosive Limit (%): 2

Autoignition Temp (°C): 198.89

State: Liquid

Boiling Range (°C): 75

Specific Gravity (water=1): 0.8

pH (as supplied): Not applicable

Vapour Pressure (kPa): 12 @ 20 deg C

Evaporation Rate: Not available

Flash Point (°C): - 11.11

Upper Explosive Limit (%): 11.8

Decomposition Temp (°C): Not available

log Kow (Prager 1995):

0.88

log Kow (Sangster 1997):

0.88

log Kow : 0.88-1.18

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Section 10 - CHEMICAL STABILITY AND REACTIVITY INFORMATION

CONDITIONS CONTRIBUTING TO INSTABILITY

- Presence of incompatible materials.
- Product is considered stable.
- Hazardous polymerisation will not occur.

Section 11 - TOXICOLOGICAL INFORMATION

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED

Although ingestion is not thought to produce harmful effects (as classified under EC Directives), the material may still be damaging to the health of the individual, following ingestion, especially where pre-existing organ (e.g liver, kidney) damage is evident. Present definitions of harmful or toxic substances are generally based on doses producing mortality rather than those producing morbidity (disease, ill-health). Gastrointestinal tract discomfort may produce nausea and vomiting. In an occupational setting however, ingestion of insignificant quantities is not thought to be cause for concern.

EYE

Evidence exists, or practical experience predicts, that the material may cause eye irritation in a substantial number of individuals and/or may produce significant ocular lesions which are present twenty-four hours or more after instillation into the eye(s) of experimental animals.

Repeated or prolonged eye contact may cause inflammation characterised by temporary redness (similar to windburn) of the conjunctiva (conjunctivitis); temporary impairment of vision and/or other transient eye damage/ulceration may occur.

The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.

SKIN

Evidence exists, or practical experience predicts, that the material either produces inflammation of the skin in a substantial number of individuals following direct contact, and/or produces significant inflammation when applied to the healthy intact skin of animals, for up to four hours, such inflammation being present twenty-four hours or more after the end of the exposure period. Skin irritation may also be present after prolonged or repeated exposure; this may result in a form of contact dermatitis (nonallergic). The dermatitis is often characterised by skin redness (erythema) and swelling (oedema) which may progress to blistering (vesiculation), scaling and thickening of the epidermis. At the microscopic level there may be intercellular oedema of the spongy layer of the skin (spongiosis) and intracellular oedema of the epidermis.

Skin contact is not thought to have harmful health effects (as classified under EC Directives); the material may still produce health damage following entry through wounds, lesions or abrasions.

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

Aliphatic aldehydes may be dermal sensitisers.

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Section 11 - TOXICOLOGICAL INFORMATION

The material may produce severe skin irritation after prolonged or repeated exposure, and may produce a contact dermatitis (nonallergic). This form of dermatitis is often characterised by skin redness (erythema) thickening of the epidermis.

Histologically there may be intercellular oedema of the spongy layer (spongiosis) and intracellular oedema of the epidermis. Prolonged contact is unlikely, given the severity of response, but repeated exposures may produce severe ulceration.

INHALED

Limited evidence exists, or practical experience predicts, that the material produces irritation of the respiratory system in a significant number of individuals following inhalation.

Although inhalation is not thought to produce harmful effects (as classified under EC Directives), the material may still produce health damage, especially where pre-existing organ (e.g liver, kidney) damage is evident. Present definitions of harmful or toxic substances are generally confined to doses producing mortality rather than those producing morbidity (disease, ill-health).

Exposure to the simple aldehydes may result in central nervous system effects including headache, vertigo, seizures, depression and coma. Cardiovascular involvement may result in tachycardia, cardiovascular collapse and hypotension whilst respiratory tract involvement may result in irritation, upper airway oedema and laryngospasm, cough, dysphagia, pulmonary oedema, bronchial constriction, and asthma-like reactive airway disease. Gastrointestinal effects include nausea, vomiting (haematemesis), diarrhoea, severe mucosal necrosis and abdominal pain. Massive exposures may produce kidney and liver damage. Animals exposed to aldehyde vapours often show damage to the respiratory tract and pulmonary oedema. Multiple haemorrhages and alveolar exudate may also be present. In general, the aldehydes appear to be free of the actions that lead to cumulative organic damage to tissues. Intolerable irritant properties of these compounds preclude substantial worker exposure under normal conditions although these products may cause olfactory fatigue at lower concentrations and therefore may not provide adequate warning of overexposure based on smell alone. Rapid metabolic conversion to innocuous compounds probably limits those critical reactions necessary to initiate or promote tumourigenesis, although tissue irritation even at low exposure may promote tumour formation by other compounds. Caution is therefore mandatory. Development of short-term tolerance to aldehyde vapours has been reported. This may be related to reaction with catecholamines leading to depletion of the catecholamine stores in the smooth muscle of the respiratory tract. Such depletion may cause the sensory nerve endings of the upper respiratory tract to exhibit reduced activity thus lessening the initial respiratory distress. Although a number of aldehydes produce narcosis, this effect is rarely observed because the irritation that accompanies exposure generally serves as a sufficient warning property.

CHRONIC HEALTH EFFECTS

There exists limited evidence that shows that skin contact with the material is capable either of inducing a sensitisation reaction in a significant number of individuals, and/or of producing positive response in experimental animals.

Principal routes of exposure are by accidental skin and eye contact and by inhalation of vapours especially at higher temperatures.

Rats and dogs exposed to mean butyraldehyde concentrations of 117, 462 or 1852 ppm for 6 hours/day, 5 days/week, for 13-14 weeks showed clinical signs of ocular and upper respiratory tract irritation at both levels. No exposure related effects on body-weight, serum chemistry, haematology, urinalysis or liver or kidney weights were seen. No abnormal ophthalmic findings were recorded for rats, whilst all dogs showed slight conjunctivitis at 1852 ppm. Histopathologic findings in dogs exposed at

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Section 11 - TOXICOLOGICAL INFORMATION

1852 ppm included marked rhinitis with mucosal cell hyperplasia, inflammation and squamous metaplasia. Squamous metaplasia also occurred in the larynx and trachea of one dog. Dogs in the 117 and 462 ppm groups had goblet cell hyperplasia in the nasal mucosa. Histopathologic changes in rats included mild to severe rhinitis and mild to severe squamous metaplasia of the respiratory epithelium in all three exposure groups, with the incidence and severity generally decreasing with decreased concentration. Goblet cell hyperplasia of the nasal epithelium generally occurred in rats of the 117 and 462 ppm group; atrophy of goblet cells occurred at 1852 ppm. There were no exposure-related histopathologic lesions in the lungs or testes of dogs or rats in the study.

When rats and mice were dosed with butyraldehyde by gavage, (5 days/week/ for 90 days) histopathologic evaluation revealed that the stomach and nasal cavity were the principal target organs. Lesions in the stomach included inflammation, erosion, ulceration, necrosis, hyperplasia, and haemorrhage which probably resulted from direct toxicity to the mucosal epithelium. Inflammation of the nasal cavity is thought to have resulted from reflux.

The no-effect level was 300 mg/kg for mice of both sexes and female rats, and 150 mg/kg for male rats.

TOXICITY AND IRRITATION

TOXICITY

Inhalation (rat) LC50: 174000 mg/m³/30m

Intraperitoneal (rat) LD50: 800 mg/kg

Subcutaneous (rat) LD50: 10000 mg/kg

Inhalation (mouse) LC50: 1140 mg/kg

Subcutaneous (mouse) LD50: 2700 mg/kg

Dermal (rabbit) LD50: 3560 mg/kg

Oral (rat) LD50: 5900 mg/kg * *[Sigma/Aldrich]

IRRITATION

Skin (rabbit): 410 mg(open)- Mild

Skin (rabbit): 2 mg/24h - SEVERE

Eye (rabbit):0.075 mg(open)SEVERE

Eye (rabbit): 20 mg/24h- Moderate

Skin (guinea pig): 100%- Moderate

Section 12 - ECOLOGICAL INFORMATION

Daphnia magna EC50 (48hr.) (mg/l):	19- 83
Algae IC50 (72hr.) (mg/l):	19
BCF<100:	1.13, 2.75
Water solubility (g/l):	71000
log Kow (Prager 1995):	0.88
log Kow (Sangster 1997):	0.88
BOD5:	28%
COD:	95% THOD
Half- life Soil - High (hours):	168
Half- life Soil - Low (hours):	24
Half- life Air - High (hours):	28
Half- life Air - Low (hours):	2.8
Half- life Surface water - High (hours):	168
Half- life Surface water - Low (hours):	24
Half- life Ground water - High (hours):	336
Half- life Ground water - Low (hours):	48
Aqueous biodegradation - Aerobic - High (hours):	168
Aqueous biodegradation - Aerobic - Low (hours):	24
Aqueous biodegradation - Anaerobic - High (hours):	672
Aqueous biodegradation - Anaerobic - Low (hours):	24
Aqueous biodegradation - Removal secondary treatment - High (hours):	672
Aqueous biodegradation - Removal secondary treatment - Low (hours):	96

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Section 12 - ECOLOGICAL INFORMATION

Photooxidation half- life water - High (hours):	167000
Photooxidation half- life water - Low (hours):	2750
Photooxidation half- life air - High (hours):	28
Photooxidation half- life air - Low (hours):	2.8

log Kow : 0.88-1.18
BOD 5 if unstated: 1.06-1.6,28-43.4%
COD: 99%
ThOD: 2.44
Toxicity Fish: LC50(96)25.8mg/L
Toxicity invertebrate: cell mult. inhib.4.2-100mg/L
Effects on algae and plankton: cell mult. inhib. algae 19-83mg/L
Degradation Biological: sig

Section 13 - DISPOSAL CONSIDERATIONS

- Recycle wherever possible or consult manufacturer for recycling options.
- Consult State Land Waste Authority for disposal.
- Bury or incinerate residue at an approved site.
- Recycle containers if possible, or dispose of in an authorised landfill.

Section 14 - TRANSPORTATION INFORMATION



Labels Required: FLAMMABLE LIQUID
HAZCHEM: 3WE

UNDG:

Dangerous Goods Class: 3
UN Number: 1129
Shipping Name: BUTYRALDEHYDE

Subrisk: None
Packing Group: II

Air Transport IATA:

ICAO/IATA Class: 3
UN/ID Number: 1129
ERG Code: 3L
Shipping name: BUTYRALDEHYDE

ICAO/IATA Subrisk: None
Packing Group: II

Maritime Transport IMDG:

IMDG Class: 3
UN Number: 1129
EMS Number: F- E, S- D
Shipping name: BUTYRALDEHYDE

IMDG Subrisk: None
Packing Group: II

continued...

N-BUTYRALDEHYDE

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Section 15 - REGULATORY INFORMATION

REGULATIONS

butyraldehyde (CAS: 123-72-8) is found on the following regulatory lists;
IMO MARPOL 73/78 (Annex II) - List of Noxious Liquid Substances Carried in Bulk
OECD Representative List of High Production Volume (HPV) Chemicals

Section 16 - OTHER INFORMATION

The above information is believed to be accurate and represent the best information currently available to us, but does not represent any warranty expressed or implied of the properties of the product. User should make their own investigation to determine the suitability of the information for their particular purpose.

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