3-Pentanone

sc-238612

Material Safety Data Sheet

Hazard Alert Code Key:	EXTREME	HIGH	MODERATE	LOW

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME
3-Pentanone

STATEMENT OF HAZARDOUS NATURE

CONSIDERED A HAZARDOUS SUBSTANCE ACCORDING TO OSHA 29 CFR 1910.1200.

NFPA

SUPPLIER
Santa Cruz Biotechnology, Inc.
2145 Delaware Avenue
Santa Cruz, California 95060
800.457.3801 or 831.457.3800

EMERGENCY
ChemWatch
Within the US & Canada: 877–715–9305
Outside the US & Canada: +800 2436 2255
(1–800-CHEMCALL) or call +613 9573 3112

SYNONYMS
C5-H10-O, CH3CH2COCH2CH3, DEK, dimethylacetone, "dimethyl cetone", propione, metacetone, methacetone, pentanone-3, pentan-3-one, 3

Section 2 - HAZARDS IDENTIFICATION

CHEMWATCH HAZARD RATINGS

	Min	Max
Flammability:	3	
Toxicity:	2	
Body Contact:	2	
Reactivity:	2	
Chronic:	2	

Min/Nil=0
Low=1
Moderate=2
High=3
Extreme=4

CANADIAN WHMIS SYMBOLS

EMERGENCY OVERVIEW

RISK

Irritating to respiratory system.
HARMFUL - May cause lung damage if swallowed.
Highly flammable.
Repeated exposure may cause skin dryness and cracking.
Vapours may cause drowsiness and dizziness.

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED

■ Swallowing of the liquid may cause aspiration into the lungs with the risk of chemical pneumonitis; serious consequences may result. (ICSC13733).
■ Accidental ingestion of the material may be damaging to the health of the individual.
■ Considered an unlikely route of entry in commercial/industrial environments.
The liquid may produce gastrointestinal discomfort and may be harmful if swallowed.

EYE

■ There is some evidence that material may produce eye irritation in some persons and produce eye damage 24 hours or more after instillation.
Moderate inflammation may be expected with redness; conjunctivitis may occur with prolonged exposure.
■ The liquid may produce eye discomfort and is capable of causing temporary impairment of vision and/or transient eye inflammation, ulceration.

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.
■ Repeated exposure may cause skin cracking, flaking or drying following normal handling and use.
■ 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 can cause respiratory irritation in some persons.
The body's response to such irritation can cause further lung damage.
■ Inhalation of vapours may cause drowsiness and dizziness.
This may be accompanied by narcosis, reduced alertness, loss of reflexes, lack of coordination and vertigo.
■ Inhalation of vapors or aerosols (mists, fumes), generated by the material during the course of normal handling, may be damaging to the health of the individual.
■ Inhalation hazard is increased at higher temperatures.
■ Inhalation of high concentrations of gas/vapor causes lung irritation with coughing and nausea, central nervous depression with headache and dizziness, slowing of reflexes, fatigue and inco-ordination.
■ Ketone vapors irritate the nose, throat and mucous membrane.
High concentrations depress the central nervous system, causing headache, vertigo, poor concentration, sleep and failure of the heart and breathing.

CHRONIC HEALTH EFFECTS

■ Long-term exposure to respiratory irritants may result in disease of the airways involving difficult breathing and related systemic problems.
Prolonged or repeated skin contact may cause drying with cracking,irritation and possible dermatitis following.
Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems.
Chronic solvent inhalation exposures may result in nervous system impairment and liver and blood changes. [PATTYS].

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
diethyl ketone	96-22-0	>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. · If spontaneous vomiting appears imminent or occurs, hold patient's head down, lower than their hips to help avoid possible aspiration of vomitus.

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.

SKIN

■ If skin or hair contact occurs: · Flush skin and hair with running water (and soap if available). · Seek medical attention in event of irritation.

INHALED

· If fumes or combustion products are inhaled remove from contaminated area. · Lay patient down. Keep warm and rested.

NOTES TO PHYSICIAN

■ Any material aspirated during vomiting may produce lung injury. Therefore emesis should not be induced mechanically or pharmacologically.
Treat symptomatically.
for simple ketones:
----------BASIC TREATMENT

· Establish a patent airway with suction where necessary.
· Watch for signs of respiratory insufficiency and assist ventilation as necessary.

Section 5 - FIRE FIGHTING MEASURES

Vapor Pressure (mmHg):	28.052 @ 20 C
Upper Explosive Limit (%):	Not available
Specific Gravity (water=1):	0.853
Lower Explosive Limit (%):	Not available

EXTINGUISHING MEDIA

· Alcohol stable foam.
· Dry chemical powder.

FIRE FIGHTING

· Alert Emergency Responders and tell them location and nature of hazard.
· May be violently or explosively reactive.
When any large container (including road and rail tankers) is involved in a fire,
consider evacuation by 500 metres in all directions.

GENERAL FIRE HAZARDS/HAZARDOUS COMBUSTIBLE PRODUCTS

· Liquid and vapor are highly flammable.
· Severe fire hazard when exposed to heat, flame and/or oxidizers.
Combustion products include: carbon dioxide (CO_2), other pyrolysis products typical of burning organic material.

FIRE INCOMPATIBILITY

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

PERSONAL PROTECTION

Glasses:
Safety Glasses.
Chemical goggles.
Gloves:
Respirator:
Type A Filter of sufficient capacity

Section 6 - ACCIDENTAL RELEASE MEASURES

MINOR SPILLS
· Remove all ignition sources.
· Clean up all spills immediately.
MAJOR SPILLS
· Clear area of personnel and move upwind.
· Alert Emergency Responders and tell them location and nature of hazard.

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING

· Containers, even those that have been emptied, may contain explosive vapours.
· Do NOT cut, drill, grind, weld or perform similar operations on or near containers.
· Avoid all personal contact, including inhalation.
· Wear protective clothing when risk of exposure occurs.

RECOMMENDED STORAGE METHODS

■ Packing as supplied by manufacturer. Plastic containers may only be used if approved for flammable liquid.
· For low viscosity materials (i): Drums and jerricans must be of the non-removable head type. (ii): Where a can is to be used as an inner package, the can must have a screwed enclosure.
· For materials with a viscosity of at least 2680 cSt. (23 deg. C).

STORAGE REQUIREMENTS

· Store in original containers in approved flame-proof area.
· No smoking, naked lights, heat or ignition sources.

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

Source	Material	TWA ppm	TWA mg/m³	STEL ppm	STEL mg/m³	Peak ppm	Peak mg/m³	TWA F/CC	Notes
Canada - Alberta Occupational Exposure Limits	diethyl ketone (Diethyl ketone)	200	705	300	1060				
Canada - British Columbia Occupational Exposure Limits	diethyl ketone (Diethyl ketone)	200		300					
US ACGIH Threshold Limit Values (TLV)	diethyl ketone (Diethyl ketone)	200		300					TLV Basis: upper respiratory tract irritation; central nervous system impairment
US NIOSH Recommended Exposure Limits (RELs)	diethyl ketone (Diethyl ketone)	200	705						
US - Minnesota Permissible Exposure Limits (PELs)	diethyl ketone (Diethyl ketone)	200	705						
US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants	diethyl ketone (Diethyl ketone)	200	705						
US - California Permissible Exposure Limits for Chemical Contaminants	diethyl ketone (Diethyl ketone)	200	705	300	1057				
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants	diethyl ketone (Diethyl ketone)	200	705						
US - Hawaii Air Contaminant Limits	diethyl ketone (Diethyl ketone)	200	705						
US - Alaska Limits for Air Contaminants	diethyl ketone (Diethyl ketone)	200	705						
US - Washington Permissible exposure limits of air contaminants	diethyl ketone (Diethyl ketone)	200		250					
Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits	diethyl ketone (Diethyl ketone)	200		300					
US - Michigan Exposure Limits for Air Contaminants	diethyl ketone (Diethyl ketone)	200	705						

Canada - Prince Edward Island Occupational Exposure Limits	diethyl ketone (Diethyl ketone)	200		300		TLV Basis: upper respiratory tract irritation; central nervous system impairment
Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)	diethyl ketone (Diethyl ketone)	200	705			
Canada - Northwest Territories Occupational Exposure Limits (English)	diethyl ketone (Diethyl ketone)	200	705	250	881	
Canada - Nova Scotia Occupational Exposure Limits	diethyl ketone (Diethyl ketone)	200		300		TLV Basis: upper respiratory tract irritation; central nervous system impairment

ENDOELTABLE

PERSONAL PROTECTION




RESPIRATOR

Type A Filter of sufficient capacity
Consult your EHS staff for recommendations

EYE

· Safety glasses with side shields.
· Chemical goggles.

HANDS/FEET

■ 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.
Wear chemical protective gloves, eg. PVC.

OTHER

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

ENGINEERING CONTROLS

■ For flammable liquids and flammable gases, local exhaust ventilation or a process enclosure ventilation system may be required. Ventilation equipment should be explosion-resistant.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL PROPERTIES

Liquid.
Mixes with water.

State	Liquid	Molecular Weight	86.15
Melting Range (°F)	-40	Viscosity	Not Available
Boiling Range (°F)	215.6	Solubility in water (g/L)	Miscible
Flash Point (°F)	42.998	pH (1% solution)	Not applicable
Decomposition Temp (°F)	Not Available	pH (as supplied)	Not applicable
Autoignition Temp (°F)	845.6	Vapor Pressure (mmHg)	28.052 @ 20 C
Upper Explosive Limit (%)	Not available	Specific Gravity (water=1)	0.853
Lower Explosive Limit (%)	Not available	Relative Vapor Density (air=1)	3.0
Volatile Component (%vol)	100	Evaporation Rate	Fast

diethyl ketone

log Kow (Sangster 1997): 0.82

APPEARANCE

Colourless liquid with acetone-like odour; mixes with water (1:25), alcohol, ether.

log Kow;;0.82-0.99>

Material	Value

Section 10 - CHEMICAL STABILITY

CONDITIONS CONTRIBUTING TO INSTABILITY

· Presence of incompatible materials.
· Product is considered stable.

STORAGE INCOMPATIBILITY

■ Ketones in this group:
· are reactive with many acids and bases liberating heat and flammable gases (e.g., H2).
· react with reducing agents such as hydrides, alkali metals, and nitrides to produce flammable gas (H2) and heat.
· are incompatible with isocyanates, aldehydes, cyanides, peroxides, and anhydrides.
· react violently with aldehydes, HNO3 (nitric acid), HNO3 + H2O2 (mixture of nitric acid and hydrogen peroxide), and HClO4 (perchloric acid).
· may react with hydrogen peroxide to form unstable peroxides; many are heat- and shock-sensitive explosives.
A significant property of most ketones is that the hydrogen atoms on the carbons next to the carbonyl group are relatively acidic when compared to hydrogen atoms in typical hydrocarbons. Under strongly basic conditions these hydrogen atoms may be abstracted to form an enolate anion. This property allows ketones, especially methyl ketones, to participate in condensation reactions with other ketones and aldehydes. This type of condensation reaction is favoured by high substrate concentrations and high pH (greater than 1 wt% NaOH).
Avoid reaction with oxidizing agents, bases and strong reducing agents.
Diethyl ketone
· reacts violently with strong oxidisers
· may form unstable peroxides on prolonged storage
· is incompatible with aliphatic amines, amides, sulfuric acid, nitric acid, caustics, isocyanates
· attacks some plastics , rubber and coatings
· may generate electrostic charge due to low conductivity.

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

Section 11 - TOXICOLOGICAL INFORMATION

diethyl ketone

TOXICITY AND IRRITATION

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

TOXICITY	IRRITATION
Oral (rat) LD50: 2140 mg/kg	Skin (rabbit): 410 mg (open) Mild
Intravenous (rat) LD50: 513 mg/kg	Skin (rabbit): 500 mg/24h - Mild
Dermal (rabbit) LD50: 20000 mg/kg	Eye (rabbit): 50 mg - Moderate
	EYE (RABBIT): 100 MG/24H - Moderate

■ Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergenic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound. Key criteria for the diagnosis of RADS include the absence of preceding respiratory disease, in a non-atopic individual, with abrupt onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. A reversible airflow pattern, on spirometry, with the presence of moderate to severe bronchial hyperreactivity on methacholine challenge testing and the lack of minimal lymphocytic inflammation, without eosinophilia, have also been included in the criteria for diagnosis of RADS. RADS (or asthma) following an irritating inhalation is an infrequent disorder with rates related to the concentration of and duration of exposure to the irritating substance. Industrial bronchitis, on the other hand, is a disorder that occurs as result of exposure due to high concentrations of irritating substance (often particulate in nature) and is completely reversible after exposure ceases. The disorder is characterised by dyspnea, cough and mucus production.
The material may produce moderate eye irritation leading to inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.
The material may cause skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin.

CARCINOGEN

US - Rhode Island Hazardous Substance List	IARC

Section 12 - ECOLOGICAL INFORMATION

This material and its container must be disposed of as hazardous waste.

Ecotoxicity

Ingredient	Persistence: Water/Soil	Persistence: Air	Bioaccumulation	Mobility
diethyl ketone	LOW		LOW	HIGH

GESAMP/EHS COMPOSITE LIST - GESAMP Hazard Profiles

Name / EHS TRN A1a A1b A1 A2 B1 B2 C1 C2 C3 D1 D2 D3 E1 E2 E3 Cas No / RTECS No _____ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ [Heavy 226 282 5 2 (2) NR 1 NI 0 0 (1) 1 1 FE 2 Oxo 6 5 Fraction] / CAS:96- 22- 0 /

Legend: EHS=EHS Number (EHS=GESAMP Working Group on the Evaluation of the Hazards of Harmful Substances Carried by Ships) NRT=Net Register Tonnage, A1a=Bioaccumulation log Pow, A1b=Bioaccumulation BCF, A1=Bioaccumulation, A2=Biodegradation, B1=Acuteaquatic toxicity LC/ECIC50 (mg/l), B2=Chronic aquatic toxicity NOEC (mg/l), C1=Acute mammalian oral toxicity LD50 (mg/kg), C2=Acutemammalian dermal toxicity LD50 (mg/kg), C3=Acute mammalian inhalation toxicity LC50 (mg/kg), D1=Skin irritation & corrosion, D2=Eye irritation& corrosion, D3=Long-term health effects, E1=Tainting, E2=Physical effects on wildlife & benthic habitats, E3=Interference with coastal amenities, For column A2: R=Readily biodegradable, NR=Not readily biodegradable. For column D3: C=Carcinogen, M=Mutagenic, R=Reprotoxic, S=Sensitising, A=Aspiration hazard, T=Target organ systemic toxicity, L=Lunginjury, N=Neurotoxic, I=Immunotoxic. For column E1: NT=Not tainting (tested), T=Tainting test positive. For column E2: Fp=Persistent floater, F=Floater, S=Sinking substances. The numerical scales start from 0 (no hazard), while higher numbers reflect increasing hazard. (GESAMP/EHS Composite List of Hazard Profiles - Hazard evaluation of substances transported by ships)

Section 13 - DISPOSAL CONSIDERATIONS

US EPA Waste Number & Descriptions

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

Disposal Instructions

All waste must be handled in accordance with local, state and federal regulations.
¦ 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. If it has been contaminated, it may be possible to reclaim the product by filtration, distillation or some other means. 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.

Section 14 - TRANSPORTATION INFORMATION

DOT:
Symbols: None Hazard class or Division: 3
Identification Numbers: UN1156 PG: II
Label Codes: 3 Special provisions: IB2, T4,
TP1

Packaging: Exceptions: 150 Packaging: Non- bulk: 202
Packaging: Exceptions: 150 Quantity limitations: 5 L
Passenger aircraft/rail:
Quantity Limitations: Cargo 60 L Vessel stowage: Location: B
aircraft only:
Vessel stowage: Other: None
Hazardous materials descriptions and proper shipping names:
Diethyl ketone

Air Transport IATA:

ICAO/IATA Class: 3 ICAO/IATA Subrisk: None
UN/ID Number: 1156 Packing Group: II
Special provisions: None
Cargo Only
Packing Instructions: 60 L Maximum Qty/Pack: 5 L
Passenger and Cargo Passenger and Cargo
Packing Instructions: 307 Maximum Qty/Pack: 305
Passenger and Cargo Limited Quantity Passenger and Cargo Limited Quantity
Packing Instructions: 1 L Maximum Qty/Pack: Y305
Shipping Name: DIETHYL KETONE

Maritime Transport IMDG:

IMDG Class: 3 IMDG Subrisk: None
UN Number: 1156 Packing Group: II
EMS Number: F-E , S-D Special provisions: None
Limited Quantities: 1 L
Shipping Name: DIETHYL KETONE

Section 15 - REGULATORY INFORMATION

diethyl ketone (CAS: 96-22-0) is found on the following regulatory lists;

"Canada - Alberta Occupational Exposure Limits","Canada - British Columbia Occupational Exposure Limits","Canada - Northwest Territories Occupational Exposure Limits (English)","Canada - Nova Scotia Occupational Exposure Limits","Canada - Prince Edward Island Occupational Exposure Limits","Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)","Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits","Canada Domestic Substances List (DSL)","Canada Ingredient Disclosure List (SOR/88-64)","Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS (English)","IMO MARPOL 73/78 (Annex II) - List of Other Liquid Substances","International Council of Chemical Associations (ICCA) - High Production Volume List","OECD Representative List of High Production Volume (HPV) Chemicals","US - Alaska Limits for Air Contaminants","US - California Occupational Safety and Health Regulations (CAL/OSHA) - Hazardous Substances List","US - California Permissible Exposure Limits for Chemical Contaminants","US - Connecticut Hazardous Air Pollutants","US - Hawaii Air Contaminant Limits","US - Massachusetts Oil & Hazardous Material List","US - Michigan Exposure Limits for Air Contaminants","US - Minnesota Hazardous Substance List","US - Minnesota Permissible Exposure Limits (PELs)","US - New Jersey Right to Know Hazardous Substances","US - Pennsylvania - Hazardous Substance List","US - Rhode Island Hazardous Substance List","US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants","US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants","US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants","US - Washington Permissible exposure limits of air contaminants","US ACGIH Threshold Limit Values (TLV)","US DOE Temporary Emergency Exposure Limits (TEELs)","US EPA High Production Volume Program Chemical List","US NIOSH Recommended Exposure Limits (RELs)","US -Texas Air Monitoring Comparison Values for Evaluating Carbonyls","US Toxic Substances Control Act (TSCA) - Inventory","US TSCA Section 4 (e) - ITC Priority Testing List","US TSCA Section 8 (a) - Preliminary Assessment Information Rules (PAIR) - Reporting List","US TSCA Section 8 (d) - Health and Safety Data Reporting"

Section 16 - OTHER INFORMATION

Reasonable care has been taken in the preparation of this information, but the author makes no warranty of merchantability or any other warranty, expressed or implied, with respect to this information. The author makes no representations and assumes no liability for any direct, incidental or consequential damages resulting from its use. For additional technical information please call our toxicology department on +800 CHEMCALL.

■ Classification of the preparation 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.