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**I** PRODUCT INFORMATION

**CHEMICAL NAME:** BENZALDEHYDE  
**SYNONYM:** Artificial Oil of Almond  
**CHEMICAL FAMILY:** Aromatic Aldehyde  
**MOLECULAR FORMULA:** C<sub>6</sub>H<sub>5</sub>CHO (C<sub>7</sub>H<sub>6</sub>O)  
**MOLECULAR WEIGHT:** 106.1  
**CAS REG #:** 100-52-7

**II** SUMMARY OF HAZARDS

**WARNING!** RAGS AND ACTIVATED CARBON CONTAMINATED WITH BENZALDEHYDE  
MAY IGNITE SPONTANEOUSLY.  
MAY CAUSE EYE IRRITATION  
MAY CAUSE SKIN IRRITATION

**III** PHYSICAL PROPERTIES

**APPEARANCE / ODOR:** Colorless to light yellow liquid with an odor of bitter almond.  
**BOILING POINT:** 354°F (179°C) **MELTING POINT:** -15°F (-26°C)  
**VAPOR PRESSURE:** < 1 mm Hg @ 68°F **SOLUBILITY IN WATER:** 6.55 g / l @ 25°C  
**SPECIFIC GRAVITY:** 1.046 @ 77°F (H<sub>2</sub>O = 1) **WEIGHT PER GALLON:** 8.7 #  
**VAPOR DENSITY:** 3.66 (Air = 1) **% VOLATILE:** 100  
**EVAPORATION RATE:** 0.04 (Butyl Acetate = 1)

**IV** FIRE AND EXPLOSION HAZARD INFORMATION

**FLASH POINT (TCC):** 148°F (64°C) **FLAMMABLE LIMITS:** See below  
**AUTOIGNITION TEMP:** 377°F (192°C) **DECOMPOSITION TEMP:** Not determined  
**LOWER EXPLOSION LIMIT:** 1.4 %, by volume @ atmospheric pressure  
**UPPER EXPLOSION LIMIT:** 12.3 %, by volume @ atmospheric pressure  
Explosion is possible above the upper explosion limit  
due to partial oxidation of benzaldehyde to benzoic acid

**FIRE and EXPLOSION HAZARDS:** Since benzaldehyde has a low autoignition temperature, avoid exposure to heated surfaces. Finely dispersed benzaldehyde may ignite spontaneously. Rags used to wipe up spills or activated carbon to absorb vapors of benzaldehyde have also been known to ignite spontaneously. Decomposition under fire conditions will generate carbon monoxide and may generate other toxic vapors.

**FIRE FIGHTING INFORMATION:** Use CO<sub>2</sub>, foam, or dry chemical to extinguish fire. Water can be used to cool a fire, but for extinguishment, foam or dry chemical are preferred. Avoid spreading liquid and fire by water flooding. Wear self-contained, positive pressure breathing apparatus and full fire fighting protective clothing. Use water to keep containers cool.

V HAZARD RATINGS FOR BENZALDEHYDE

<u>NFPA</u>	<u>HEALTH</u>	<u>2</u>	<u>H.M.I.S.</u>	<u>HEALTH</u>	<u>2</u>
<u>HAZARD</u>	<u>FLAMMABILITY</u>	<u>2</u>	<u>RATINGS</u>	<u>FLAMMABILITY</u>	<u>2</u>
<u>RATING</u>	<u>REACTIVITY</u>	<u>0</u>	<u>(NPCA &amp; NAPIM)</u>	<u>REACTIVITY</u>	<u>0</u>

VI HEALTH HAZARD INFORMATION

<u>LD<sub>50</sub> (Oral Rat):</u>	1300 mg / kg
<u>LD<sub>50</sub> (Dermal Rat):</u>	> 1250 mg / kg
<u>THRESHOLD LIMIT VALUE (TLV):</u>	TLV has <u>not</u> been established.
<u>CARCINOGEN ( IARC / NTP / 29CFR )?:</u>	No

**ACUTE HEALTH HAZARDS:**

- Inhalation: Inhalation of concentrated vapors may irritate the nose and throat and may produce central nervous system depression with possible respiratory failure.
- Eye Contact: May cause eye irritation.
- Skin Contact: May cause skin irritation. Sensitive individuals may develop a rash from contact with benzaldehyde.
- Ingestion: May be harmful if swallowed. See LD<sub>50</sub> information.

**CHRONIC HEALTH HAZARDS:** Prolonged or repeated contact with the skin may cause contact dermatitis. No other chronic health hazard information is available.

**MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE:** None

**EMERGENCY FIRST AID:**

- Inhalation: If overcome by exposure, remove to fresh air immediately. Give oxygen or artificial respiration as needed. Obtain emergency medical attention.
- Eye Contact: In case of eye contact, flush eyes with plenty of water for at least 15 minutes. Get immediate medical attention.
- Skin Contact: In case of skin contact, flush skin with plenty of water. While removing contaminated clothing. Call a physician if irritation develops. Wash clothing before reuse. Clothing soaked with benzaldehyde may be a fire hazard. Care must be taken when cleaning or disposing of these materials.
- Ingestion: If swallowed, call a physician immediately. Induce vomiting only on advice of medical personnel. Never give anything by mouth to an unconscious person.

VII PROTECTIVE EQUIPMENT AND EXPOSURE CONTROL METHODS

Use with adequate local exhaust ventilation. In confined or enclosed spaces, use NIOSH approved respiratory protection. Use chemical resistant apron, gloves, and other impervious clothing to avoid skin contact. Use splash goggles and face shield when eye contact may occur. Provide safety shower, equipped with an eye wash fountain in the immediate vicinity of any potential exposure. Use good personal hygiene practices. Wash hands before eating, drinking, or smoking, or using toilet facilities. Promptly remove contaminated clothing and wash thoroughly before reuse.

VIII SPILL OR LEAK PROCEDURES

Remove sources of ignition, stop release, and provide adequate ventilation. Prevent flow to sewer and public waters. Recover free product, if possible. Cover spill with inert, non-combustible absorbent material and remove to disposal container. Consider sealed metal containers for disposal. Report spill as per regulatory requirements. Leaking drum should be emptied or placed into an oversized (recovery) drum.

(please see page 3 for additional data)

IX

REACTIVITY DATA

**STABILITY:** Stable at normal temperatures and pressures. Before distillation, peroxides should be avoided. Benzaldehyde readily undergoes oxidation by air, particularly in the presence of minute traces of iron or on exposure to light.

**HAZARDOUS POLYMERIZATION:** Will not occur

**INCOMPATIBLE MATERIALS:** Strong oxidizing agents, bases, iron, phenol, aluminum, brass and related materials.

**HAZARDOUS DECOMPOSITION PRODUCTS:** Incomplete combustion will produce carbon monoxide and other potentially toxic and/or poisonous vapors.

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WASTE DISPOSAL

Disposal must be made in accordance with applicable governmental regulations. Do not contaminate any streams, lakes, or ponds. Benzaldehyde is readily biodegradable, so controlled biodegradation in waste-water treatment plants is possible.

XI

ADDITIONAL PRECAUTIONS

Benzaldehyde has a low autoignition temperature and can be ignited by, for example, exposed low pressure steam pipes. Rags used to wipe up spills of benzaldehyde, or activated carbon used to absorb vapors of benzaldehyde, have been known to ignite spontaneously (auto-oxidation). Care must be taken when disposing of these materials. Clean benzaldehyde soaked rags thoroughly to remove benzaldehyde before discarding. Consider the use of sealable metal containers.

Bulk storage of benzaldehyde should be made under a nitrogen blanket, since benzaldehyde is easily oxidized to benzoic acid on exposure to air. All storage tank openings should be easily accessible for cleaning, since they will have a tendency to plug with this benzoic acid. Pressure / vacuum relief devices should be steam traced or jacketed to maintain temperatures above the melting point of benzoic acid (122°C).

Since penetration of air during vacuum distillation of benzaldehyde may lead to auto-oxidation, it is important that nitrogen or other suitable inert gas (NOT AIR) be used to "break vacuum". Care should be taken to ensure that in emergency situations, air is not "sucked into" such columns when the vacuum generating device fails or otherwise becomes inoperable.

Store as a NFPA Class III A liquid. Keep fire and sparks away from drums. Since empty containers retain product residue, do not cut, drill, grind, or weld on or near the container until it is thoroughly cleaned.

Isolate, vent, drain, wash and purge systems or equipment before maintenance or repair. Remove all ignition sources. Check atmosphere for explosiveness and oxygen deficiencies. Use adequate personal protective equipment. Comply with regulations governing confined space entry.

(please see page 4 for additional data)

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II OSHA / SARA TITLE III / TSCA INFORMATION

We have evaluated Benzaldehyde using the criteria in OSHA's Hazard Communication Rule (29CFR 1910.1200). Benzaldehyde is considered hazardous under the OSHA standard.

Benzaldehyde is not listed as an Extremely Hazardous Substance under Section 302 of SARA Title III.

As an OSHA hazardous substance, Benzaldehyde is subject to the reporting requirements of Sections 311 or 312 of SARA Title III.

Benzaldehyde does not contain ingredients (at a level of 1% or more) on the List of Toxic Chemicals in Section 313 of SARA Title III.

Benzaldehyde is included in the current TSCA Inventory List.

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III DOT INFORMATION

Benzaldehyde is classified by DOT and IMDG regulations as a Class 9 Hazardous Material (Other Regulated Materials) and as a MARINE POLLUTANT (49 CFR § 172.101 - Appendix B).

PROPER SHIPPING NAME	Benzaldehyde
HAZARD CLASS	9
I.D. NUMBER	UN 1990
PACKING GROUP	III
PLACARDS REQUIRED	CLASS 9 (with 1990)
MARKS REQUIRED	MARINE POLLUTANT

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