

VALERALDEHYDE

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CAUTIONARY RESPONSE INFORMATION

Common Synonyms Amyl aldehyde n-Butyl formal Pentanal Valeral n-Valeraldehyde Valeric aldehyde	Watery liquid Colorless Fruity odor Floats on water. Flammable, irritating vapor is produced.
Keep people away. Shut off ignition sources and call fire department. Avoid contact with liquid and vapor. Stay upwind and use water spray to "knock down" vapor. Notify local health and pollution control agencies. Protect water intakes.	
Fire	FLAMMABLE. Flashback along vapor trail may occur. Vapor may explode if ignited in an enclosed area. Extinguish with foam, dry chemical, or carbon dioxide. Water may be ineffective on fires. Cool exposed containers with water.
Exposure	VAPOR Irritating to eyes, nose, and throat. Move to fresh air. LIQUID Irritating to skin and eyes. Flush affected areas with plenty of water.
Water Pollution	Effect of low concentrations on aquatic life is unknown. Fouling to shoreline. May be dangerous if it enters water intakes. Notify local health and wildlife officials. Notify operators of nearby water intakes.

1. CORRECTIVE RESPONSE ACTIONS

Dilute and disperse
Stop discharge
Contain
Collection Systems: Skim
Clean shore line
Salvage waterfowl

2. CHEMICAL DESIGNATIONS

2.1 CG Compatibility Group: 19; Aldehyde
2.2 Formula: $\text{CH}_3(\text{CH}_2)_4\text{CHO}$
2.3 IMO/UN Designation: 3.2/2058
2.4 DOT ID No.: 2058
2.5 CAS Registry No.: 110-62-3
2.6 NAERG Guide No.: 129
2.7 Standard Industrial Trade Classification: 51621

3. HEALTH HAZARDS

3.1 **Personal Protective Equipment:** Goggles or face shield; rubber gloves and boots.
3.2 **Symptoms Following Exposure:** Vapor may irritate eyes. Liquid irritates eyes and skin.
3.3 **Treatment of Exposure:** EYES: flush with water for at least 15 min. SKIN: wipe off, wash with soap and water.
3.4 **TLV-TWA:** 50 ppm
3.5 **TLV-STEL:** Not listed.
3.6 **TLV-Ceiling:** Not listed.
3.7 **Toxicity by Ingestion:** Grade 1; LD_{50} = 5 to 15 g/kg (mouse)
3.8 **Toxicity by Inhalation:** Currently not available.
3.9 **Chronic Toxicity:** Currently not available
3.10 **Vapor (Gas) Irritant Characteristics:** Vapors cause a slight smarting of the eyes or respiratory system if present in high concentrations. The effect is temporary.
3.11 **Liquid or Solid Characteristics:** Minimum hazard. If spilled on clothing and allowed to remain, may cause smarting and reddening of the skin.
3.12 **Odor Threshold:** Currently not available
3.13 **IDLH Value:** Not listed.
3.14 **OSHA PEL-TWA:** Not listed.
3.15 **OSHA PEL-STEL:** Not listed.
3.16 **OSHA PEL-Ceiling:** Not listed.
3.17 **EPA AEGL:** Not listed

4. FIRE HAZARDS

4.1 **Flash Point:** 54°F O.C.
4.2 **Flammable Limits in Air:** 2.1 - 7.8%
4.3 **Fire Extinguishing Agents:** Foam, dry chemical, or carbon dioxide
4.4 **Fire Extinguishing Agents Not to Be Used:** Water may be ineffective.
4.5 **Special Hazards of Combustion Products:** Not pertinent
4.6 **Behavior in Fire:** Not pertinent
4.7 **Auto Ignition Temperature:** 432°F
4.8 **Electrical Hazards:** Not pertinent
4.9 **Burning Rate:** 1.9 mm/min
4.10 **Adiabatic Flame Temperature:** Currently not available
4.11 **Stoichiometric Air to Fuel Ratio:** 26.2 (calc.)
4.12 **Flame Temperature:** Currently not available
4.13 **Combustion Molar Ratio (Reactant to Product):** 8.0 (calc.)
4.14 **Minimum Oxygen Concentration for Combustion (MOCC):** Not listed

5. CHEMICAL REACTIVITY

5.1 **Reactivity with Water:** No reaction
5.2 **Reactivity with Common Materials:** No reaction
5.3 **Stability During Transport:** Stable
5.4 **Neutralizing Agents for Acids and Caustics:** Not pertinent
5.5 **Polymerization:** Not pertinent
5.6 **Inhibitor of Polymerization:** Not pertinent

6. WATER POLLUTION

6.1 **Aquatic Toxicity:** Currently not available
6.2 **Waterfowl Toxicity:** Currently not available
6.3 **Biological Oxygen Demand (BOD):** 26% (theor.), 5 days
6.4 **Food Chain Concentration Potential:** None
6.5 **GESAMP Hazard Profile:**
Bioaccumulation: T
Damage to living resources: 2
Human Oral hazard: 1
Human Contact hazard: I
Reduction of amenities: X

7. SHIPPING INFORMATION

7.1 **Grades of Purity:** 98.5+%
7.2 **Storage Temperature:** Ambient
7.3 **Inert Atmosphere:** No requirement
7.4 **Venting:** Open (flame arrester) or pressure-vacuum
7.5 **IMO Pollution Category:** C
7.6 **Ship Type:** 3
7.7 **Barge Hull Type:** 3

8. HAZARD CLASSIFICATIONS

8.1 **49 CFR Category:** Flammable liquid
8.2 **49 CFR Class:** 3
8.3 **49 CFR Package Group:** II
8.4 **Marine Pollutant:** No
8.5 **NFPA Hazard Classification:**

Category	Classification
Health Hazard (Blue).....	1
Flammability (Red).....	2
Instability (Yellow).....	0

8.6 **EPA Reportable Quantity:** Not listed.
8.7 **EPA Pollution Category:** Not listed.
8.8 **RCRA Waste Number:** Not listed
8.9 **EPA FWPCA List:** Not listed

9. PHYSICAL & CHEMICAL PROPERTIES

9.1 **Physical State at 15° C and 1 atm:** Liquid
9.2 **Molecular Weight:** 86.13
9.3 **Boiling Point at 1 atm:** 217.4°F = 103.0°C = 376.2°K
9.4 **Freezing Point:** -132°F = -91°C = 182°K
9.5 **Critical Temperature:** 537.8°F = 281°C = 554.2°K
9.6 **Critical Pressure:** 514 psia = 35 atm = 3.5 MN/m²
9.7 **Specific Gravity:** 0.811 at 20°C (liquid)
9.8 **Liquid Surface Tension:** (est.) 30 dynes/cm = 0.03 N/m at 20°C
9.9 **Liquid Water Interfacial Tension:** (est.) 30 dynes/cm = 0.03 N/m at 20°C
9.10 **Vapor (Gas) Specific Gravity:** Not pertinent
9.11 **Ratio of Specific Heats of Vapor (Gas):** 1.072
9.12 **Latent Heat of Vaporization:** 170 Btu/lb = 93 cal/g = 3.9×10^5 J/kg
9.13 **Heat of Combustion:** -15,500 Btu/lb = -8,610 cal/g = -360.5×10^5 J/kg
9.14 **Heat of Decomposition:** Not pertinent
9.15 **Heat of Solution:** Not pertinent
9.16 **Heat of Polymerization:** Not pertinent
9.17 **Heat of Fusion:** Currently not available
9.18 **Limiting Value:** Currently not available
9.19 **Reid Vapor Pressure:** Currently not available

NOTES

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9.20 SATURATED LIQUID DENSITY		9.21 LIQUID HEAT CAPACITY		9.22 LIQUID THERMAL CONDUCTIVITY		9.23 LIQUID VISCOSITY	
Temperature (degrees F)	Pounds per cubic foot	Temperature (degrees F)	British thermal unit per pound-F	Temperature (degrees F)	British thermal unit inch per hour-square foot-F	Temperature (degrees F)	Centipoise
15	52.460	41	0.478	41	1.040	41	0.640
20	52.290	42	0.478	42	1.040	42	0.634
25	52.120	43	0.478	43	1.040	43	0.628
30	51.940	44	0.478	44	1.040	44	0.622
35	51.770	45	0.478	45	1.040	45	0.616
40	51.600	46	0.478	46	1.040	46	0.610
45	51.420	47	0.478	47	1.040	47	0.605
50	51.250	48	0.478	48	1.040	48	0.599
55	51.080	49	0.478	49	1.040	49	0.594
60	50.900	50	0.478	50	1.040	50	0.588
65	50.730	51	0.478	51	1.040	51	0.583
70	50.550	52	0.478	52	1.040	52	0.578
75	50.380	53	0.478	53	1.040	53	0.573
80	50.210	54	0.478	54	1.040	54	0.567
85	50.030	55	0.478	55	1.040	55	0.562
90	49.860	56	0.478	56	1.040	56	0.557
95	49.690	57	0.478	57	1.040	57	0.552
100	49.510	58	0.478	58	1.040	58	0.547
105	49.340	59	0.478	59	1.040	59	0.543
110	49.170	60	0.478	60	1.040	60	0.538
115	48.990	61	0.478	61	1.040	61	0.533
120	48.820	62	0.478	62	1.040	62	0.529
125	48.650	63	0.478	63	1.040	63	0.524
130	48.470	64	0.478	64	1.040	64	0.519
135	48.300	65	0.478	65	1.040	65	0.515
140	48.130	66	0.478	66	1.040	66	0.511

9.24 SOLUBILITY IN WATER		9.25 SATURATED VAPOR PRESSURE		9.26 SATURATED VAPOR DENSITY		9.27 IDEAL GAS HEAT CAPACITY	
Temperature (degrees F)	Pounds per 100 pounds of water	Temperature (degrees F)	Pounds per square inch	Temperature (degrees F)	Pounds per cubic foot	Temperature (degrees F)	British thermal unit per pound-F
68	1.350	40	0.203	40	0.00326	0	0.310
		50	0.286	50	0.00450	25	0.322
		60	0.395	60	0.00611	50	0.335
		70	0.539	70	0.00816	75	0.347
		80	0.724	80	0.01076	100	0.359
		90	0.959	90	0.01400	125	0.370
		100	1.256	100	0.01801	150	0.382
		110	1.625	110	0.02289	175	0.393
		120	2.081	120	0.02880	200	0.404
		130	2.636	130	0.03587	225	0.415
		140	3.309	140	0.04428	250	0.426
		150	4.116	150	0.05417	275	0.437
		160	5.076	160	0.06573	300	0.448
		170	6.211	170	0.07915	325	0.458
		180	7.543	180	0.09461	350	0.468
		190	9.094	190	0.11230	375	0.478
		200	10.890	200	0.13250	400	0.488
		210	12.960	210	0.15530	425	0.498
		220	15.330	220	0.18100	450	0.508
		230	18.030	230	0.20980	475	0.517
		240	21.090	240	0.24180	500	0.526
		250	24.540	250	0.27740	525	0.535
		260	28.410	260	0.31680	550	0.544
		270	32.750	270	0.36010	575	0.553
		280	37.570	280	0.40750	600	0.562