ISOPROPYL ALCOHOL

IPA

CAUTIONARY RESPONSE INFORMATION

Common Synonyms			
Dimethylcarbinol Isopropanol Petrohol 2-Propanol sec-Propyl alcohol Rubbing alcohol	Watery liquid	Colorless	Unpleasant alcohol odor like rubbing alcohol

Keep people away.
Shut off ignition sources and call fire department.
Stay upwind and use water spray to ``knock down'' vapor.
Avoid contact with liquid and vapor.
Notify local health and pollution control agencies.

Fire

FLAMMABLE.
Flashback along vapor trail may occur.
Vapor may explode if ignited in an enclosed area.
Extinguish with dry chemical, alcohol foam, or carbon dioxide.
Water may be ineffective on fire.
Cool exposed containers with water.

Exposure

CALL FOR MEDICAL AID.

VAPOR
Irritating to eyes, nose and throat.
Move to fresh air.
If breathing has stopped, give artificial respiration.
If breathing is difficult, give oxygen.

LIQUID
Irritating to eyes.
Harmful if swallowed.
IF IN EYES, hold eyelids open and flush with plenty of water.
IF SWALLOWED and victim is CONSCIOUS, have victim drink water or milk.

Water Pollution

Dangerous to aquatic life in high concentrations.
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

2. CHEMICAL DESIGNATIONS

2.1 CG Compatibility Group: 20; Alcohol, glycol
2.2 Formula: $CH_3CH(OH)CH_3$
2.3 IMO/UN Designation: 3.2/1219
2.4 DOT ID No.: 1219
2.5 CAS Registry No.: 67-63-0
2.6 NAERG Guide No.: 129
2.7 Standard Industrial Trade Classification: 51212

3. HEALTH HAZARDS

3.1 Personal Protective Equipment: Organic vapor canister or air-supplied mask; chemical goggles or face splash shield.
3.2 Symptoms Following Exposure: Vapors cause mild irritation of eyes and upper respiratory tract; high concentrations may be anesthetic. Liquid irritates eyes and may cause injury; harmless to skin; if ingested causes drunkenness and vomiting.
3.3 Treatment of Exposure: INHALATION: if victim is overcome by vapors, remove from exposure immediately; call a physician; if breathing is irregular or has stopped, start resuscitation and administer oxygen. EYES: flush with water for at least 15 min.
3.4 TLV-TWA: 400 ppm
3.5 TLV-STEL: Not listed.
3.6 TLV-Ceiling: 500 ppm.
3.7 Toxicity by Ingestion: Grade 1; LD_{50} = 5 to 15 g/kg (rat: LD_{50}: 5.84 g/kg)
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: No appreciable hazard. Practically harmless to the skin.
3.12 Odor Threshold: 90 mg/m^3
3.13 IDLH Value: 2,000 ppm
3.14 OSHA PEL-TWA: 400 ppm.
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: 65°F O.C. 53°F C.C.
4.2 Flammable Limits in Air: 2.3%-12.7%
4.3 Fire Extinguishing Agents: Alcohol 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: 750°F
4.8 Electrical Hazards: Class I, Group D
4.9 Burning Rate: 2.3 mm/min.
4.10 Adiabatic Flame Temperature: Currently not available
4.11 Stoichometric Air to Fuel Ratio: 21.4 (calc.)
4.12 Flame Temperature: Currently not available
4.13 Combustion Molar Ratio (Reactant to Product): 7.0 (calc.)
4.14 Minimum Oxygen Concentration for Combustion (MOCC): N_2 diluent: 12.0%

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: 900-1100 ppm/24 hr/chub/critical range/fresh water
6.2 Waterfowl Toxicity: Currently not available
6.3 Biological Oxygen Demand (BOD): 133%, 5 days
6.4 Food Chain Concentration Potential: None
6.5 GESAMP Hazard Profile:
Bioaccumulation: 0
Damage to living resources: 0
Human Oral hazard: 1
Human Contact hazard: 0
Reduction of amenities: 0

7. SHIPPING INFORMATION

7.1 Grades of Purity: 91%, 95% Anhydrous
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: Currently not available
7.6 Ship Type: Currently not available
7.7 Barge Hull Type: Currently not available

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).....	3
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: 60.10
9.3 Boiling Point at 1 atm: 180.1°F = 82.3°C = 355.5°K
9.4 Freezing Point: –127.3°F = –88.5°C = 184.7°K
9.5 Critical Temperature: 455.4°F = 235.2°C = 508.4°K
9.6 Critical Pressure: 691 psia = 47.0 atm = 4.76 MN/m^2
9.7 Specific Gravity: 0.785 at 20°C (liquid)
9.8 Liquid Surface Tension: Not pertinent
9.9 Liquid Water Interfacial Tension: Not pertinent
9.10 Vapor (Gas) Specific Gravity: 2.1
9.11 Ratio of Specific Heats of Vapor (Gas): 1.105
9.12 Latent Heat of Vaporization: 286 Btu/lb = 159 cal/g = 6.66 X 10^5 J/kg
9.13 Heat of Combustion: –12,960 Btu/lb = –7,201 cal/g = –301.5 X 10^5 J/kg
9.14 Heat of Decomposition: Not pertinent
9.15 Heat of Solution: (est.) –9 Btu/lb = –5 cal/g = –0.2 X 10^5 J/kg
9.16 Heat of Polymerization: Not pertinent
9.17 Heat of Fusion: 21.37 cal/g
9.18 Limiting Value: Currently not available
9.19 Reid Vapor Pressure: 1.4 psia

NOTES

ISOPROPYL ALCOHOL

IPA

9.20 SATURATED LIQUID DENSITY	
Temperature (degrees F)	Pounds per cubic foot
34	49.940
36	49.890
38	49.830
40	49.780
42	49.720
44	49.660
46	49.610
48	49.550
50	49.500
52	49.440
54	49.380
56	49.330
58	49.270
60	49.210
62	49.160
64	49.100
66	49.050
68	48.990
70	48.930
72	48.880
74	48.820
76	48.760
78	48.710
80	48.650
82	48.600
84	48.540

9.21 LIQUID HEAT CAPACITY	
Temperature (degrees F)	British thermal unit per pound-F
15	0.525
20	0.533
25	0.540
30	0.547
35	0.554
40	0.561
45	0.569
50	0.576
55	0.583
60	0.590
65	0.598
70	0.605
75	0.612
80	0.619
85	0.626

9.22 LIQUID THERMAL CONDUCTIVITY	
Temperature (degrees F)	British thermal unit inch per hour-square foot-F
45	0.956
50	0.952
55	0.949
60	0.945
65	0.941
70	0.937
75	0.933
80	0.929
85	0.925
90	0.921
95	0.917
100	0.914
105	0.910
110	0.906
115	0.902

9.23 LIQUID VISCOSITY	
Temperature (degrees F)	Centipoise
	NOT PERTINENT

9.24 SOLUBILITY IN WATER	
Temperature (degrees F)	Pounds per 100 pounds of water
	MISCIBLE

9.25 SATURATED VAPOR PRESSURE	
Temperature (degrees F)	Pounds per square inch
40	0.223
50	0.328
60	0.476
70	0.678
80	0.953
90	1.319
100	1.801
110	2.429
120	3.237
130	4.266
140	5.563
150	7.183
160	9.188
170	11.650
180	14.650
190	18.270
200	22.610
210	27.790

9.26 SATURATED VAPOR DENSITY	
Temperature (degrees F)	Pounds per cubic foot
40	0.00250
50	0.00361
60	0.00513
70	0.00717
80	0.00988
90	0.01343
100	0.01802
110	0.02387
120	0.03126
130	0.04050
140	0.05194
150	0.06596
160	0.08302
170	0.10360
180	0.12820
190	0.15740
200	0.19190
210	0.23240

9.27 IDEAL GAS HEAT CAPACITY	
Temperature (degrees F)	British thermal unit per pound-F
0	0.312
25	0.325
50	0.339
75	0.352
100	0.365
125	0.378
150	0.390
175	0.403
200	0.416
225	0.428
250	0.440
275	0.453
300	0.465
325	0.477
350	0.489
375	0.500
400	0.512
425	0.524
450	0.535
475	0.546
500	0.557
525	0.568
550	0.579
575	0.590
600	0.601