

# NICKEL CARBONYL

NKC

CAUTIONARY RESPONSE INFORMATION				4. FIRE HAZARDS	7. SHIPPING INFORMATION								
Common Synonyms Nickel tetracarbonyl	Liquid  Sinks in water. Poisonous, flammable vapor is produced.	Colorless to yellow  Musty, stale odor		<p><b>4.1 Flash Point:</b> &lt;4°F C.C.</p> <p><b>4.2 Flammable Limits in Air:</b> 2% (LFL)</p> <p><b>4.3 Fire Extinguishing Agents:</b> Water</p> <p><b>4.4 Fire Extinguishing Agents Not to Be Used:</b> Currently not available</p> <p><b>4.5 Special Hazards of Combustion Products:</b> Unusually toxic gases formed by incomplete combustion.</p> <p><b>4.6 Behavior in Fire:</b> Containers may explode when heated.</p> <p><b>4.7 Auto Ignition Temperature:</b> &lt;200°F (vapor)</p> <p><b>4.8 Electrical Hazards:</b> Currently not available</p> <p><b>4.9 Burning Rate:</b> 2.7 mm/min.</p> <p><b>4.10 Adiabatic Flame Temperature:</b> Currently not available</p> <p><b>4.11 Stoichiometric Air to Fuel Ratio:</b> 11.9 (calc.)</p> <p><b>4.12 Flame Temperature:</b> Currently not available</p> <p><b>4.13 Combustion Molar Ratio (Reactant to Product):</b> 5.0 (calc.)</p> <p><b>4.14 Minimum Oxygen Concentration for Combustion (MOCC):</b> Not listed</p>	<p><b>7.1 Grades of Purity:</b> 99.9+%</p> <p><b>7.2 Storage Temperature:</b> Cool ambient</p> <p><b>7.3 Inert Atmosphere:</b> Carbon monoxide at 15 psi; carbon dioxide</p> <p><b>7.4 Venting:</b> Cylinders must be stored in a well-ventilated area.</p> <p><b>7.5 IMO Pollution Category:</b> Currently not available</p> <p><b>7.6 Ship Type:</b> Currently not available</p> <p><b>7.7 Barge Hull Type:</b> Currently not available</p>								
<b>Fire</b>	FLAMMABLE.  POISONOUS GASES MAY BE PRODUCED IN FIRE. Containers may explode in fire. Flashback along vapor trail may occur. Vapor may explode if ignited in an enclosed area. Wear goggles and self-contained breathing apparatus. Cool exposed containers with water. Flood discharge area with water.				<p><b>8. HAZARD CLASSIFICATIONS</b></p> <p><b>8.1 49 CFR Category:</b> Poison</p> <p><b>8.2 49 CFR Class:</b> 6.1</p> <p><b>8.3 49 CFR Package Group:</b> I</p> <p><b>8.4 Marine Pollutant:</b> Yes</p> <p><b>8.5 NFPA Hazard Classification:</b></p> <table> <thead> <tr> <th>Category</th> <th>Classification</th> </tr> </thead> <tbody> <tr> <td>Health Hazard (Blue)</td> <td>4</td> </tr> <tr> <td>Flammability (Red)</td> <td>3</td> </tr> <tr> <td>Instability (Yellow)</td> <td>3</td> </tr> </tbody> </table> <p><b>8.6 EPA Reportable Quantity:</b> 10 pounds</p> <p><b>8.7 EPA Pollution Category:</b> A</p> <p><b>8.8 RCRA Waste Number:</b> P073</p> <p><b>8.9 EPA FWPCA List:</b> Not listed</p>	Category	Classification	Health Hazard (Blue)	4	Flammability (Red)	3	Instability (Yellow)	3
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Health Hazard (Blue)	4												
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<b>Exposure</b>	CALL FOR MEDICAL AID.  VAPOR POISONOUS IF INHALED. Irritating to eyes, nose and throat. Move victim to fresh air. If breathing is difficult, give oxygen.  LIQUID POISONOUS IF SWALLOWED OR IF SKIN IS EXPOSED. Will burn skin and eyes. Remove contaminated clothing and shoes. Flush affected areas with plenty of water. IF IN EYES, hold eyelids open and flush with plenty of water. IF SWALLOWED and victim is CONSCIOUS, have victim drink water or milk. DO NOT INDUCE VOMITING.			<p><b>5. CHEMICAL REACTIVITY</b></p> <p><b>5.1 Reactivity with Water:</b> No reaction</p> <p><b>5.2 Reactivity with Common Materials:</b> No reaction</p> <p><b>5.3 Stability During Transport:</b> Stable below 100°C</p> <p><b>5.4 Neutralizing Agents for Acids and Caustics:</b> Not pertinent</p> <p><b>5.5 Polymerization:</b> Not pertinent</p> <p><b>5.6 Inhibitor of Polymerization:</b> Not pertinent</p>	<p><b>9. PHYSICAL &amp; CHEMICAL PROPERTIES</b></p> <p><b>9.1 Physical State at 15° C and 1 atm:</b> Liquid</p> <p><b>9.2 Molecular Weight:</b> 170.7</p> <p><b>9.3 Boiling Point at 1 atm:</b> 109°F = 43°C = 316°K</p> <p><b>9.4 Freezing Point:</b> -13°F = 25°C = 248°K</p> <p><b>9.5 Critical Temperature:</b> Not pertinent</p> <p><b>9.6 Critical Pressure:</b> Not pertinent</p> <p><b>9.7 Specific Gravity:</b> 1.322 at 17°C (liquid)</p> <p><b>9.8 Liquid Surface Tension:</b> 15.9 dynes/cm = 0.0159 N/m at 20°C</p> <p><b>9.9 Liquid Water Interfacial Tension:</b> Currently not available</p> <p><b>9.10 Vapor (Gas) Specific Gravity:</b> 5.9</p> <p><b>9.11 Ratio of Specific Heats of Vapor (Gas):</b> Currently not available</p> <p><b>9.12 Latent Heat of Vaporization:</b> 72 Btu/lb = 40 cal/g = 1.7 X 10<sup>5</sup> J/kg</p> <p><b>9.13 Heat of Combustion:</b> -2,970 Btu/lb = -1,650 cal/g = -69.0 X 10<sup>5</sup> J/kg</p> <p><b>9.14 Heat of Decomposition:</b> Not pertinent</p> <p><b>9.15 Heat of Solution:</b> Not pertinent</p> <p><b>9.16 Heat of Polymerization:</b> Not pertinent</p> <p><b>9.17 Heat of Fusion:</b> Currently not available</p> <p><b>9.18 Limiting Value:</b> Currently not available</p> <p><b>9.19 Reid Vapor Pressure:</b> Currently not available</p>								
<b>Water Pollution</b>	Effect of low concentrations on aquatic life is unknown. May be dangerous if it enters water intakes. Notify local health and wildlife officials. Notify operators of nearby water intakes.				NOTES								
<b>1. CORRECTIVE RESPONSE ACTIONS</b> Stop discharge Collection Systems: Pump; Dredge Do not burn	<b>2. CHEMICAL DESIGNATIONS</b> 2.1 CG Compatibility Group: Not listed. 2.2 Formula: Ni(CO) <sub>4</sub> 2.3 IMO/UN Designation: 3.1/1259 2.4 DOT ID No.: 1259 2.5 CAS Registry No.: 13463-39-3 2.6 NAERG Guide No.: 131 2.7 Standard Industrial Trade Classification: 52499												
<b>3. HEALTH HAZARDS</b>													
<p><b>3.1 Personal Protective Equipment:</b> Self-contained breathing apparatus; complete protective clothing</p> <p><b>3.2 Symptoms Following Exposure:</b> Inhalation causes giddiness, headache, shortness of breath, vomiting; if victim is removed from exposure, symptoms may disappear but recur 12-36 hours later, along with blue pallor of skin, fever, and cough; death may occur. Ingestion or contact with skin may also produce these symptoms. Abnormal nickel content of urine and blood is a measure of the severity of exposure. Contact of liquid with eyes causes severe irritation.</p> <p><b>3.3 Treatment of Exposure:</b> Medical help must be obtained following all exposures to vapor or liquid INHALATION: oral administration of sodium diethylthiocarbamate trihydrate (Dithiocarb); complete bed rest and positive-pressure oxygen are indicated for pulmonary edema; treatment otherwise is symptomatic. EYES: flush with water for at least 15 min. SKIN: wipe off, wash with soap and water. INGESTION: do NOT induce vomiting.</p> <p><b>3.4 TLV-TWA:</b> 0.05 ppm</p> <p><b>3.5 TLV-STEL:</b> Not listed.</p> <p><b>3.6 TLV-Ceiling:</b> Not listed.</p> <p><b>3.7 Toxicity by Ingestion:</b> Currently not available</p> <p><b>3.8 Toxicity by Inhalation:</b> Currently not available.</p> <p><b>3.9 Chronic Toxicity:</b> May produce cancer</p> <p><b>3.10 Vapor (Gas) Irritant Characteristics:</b> Vapors cause severe irritation of eyes and throat and can cause eye and lung injury. They cannot be tolerated even at low concentrations.</p> <p><b>3.11 Liquid or Solid Characteristics:</b> Severe skin irritant. Causes second-and third-degree burns on short contact and is very injurious to the eyes.</p> <p><b>3.12 Odor Threshold:</b> 1-3 ppm</p> <p><b>3.13 IDLH Value:</b> 2 ppm</p> <p><b>3.14 OSHA PEL-TWA:</b> 0.001 ppm</p> <p><b>3.15 OSHA PEL-STEL:</b> Not listed.</p> <p><b>3.16 OSHA PEL-Ceiling:</b> Not listed.</p> <p><b>3.17 EPA AEGL:</b> Not listed</p>													

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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
42	83.299	34	0.286		N	42	0.742
44	83.230	36	0.286		O	44	0.733
46	83.160	38	0.286		T	46	0.724
48	83.089	40	0.287		P	48	0.715
50	83.020	42	0.287		R	50	0.706
52	82.950	44	0.287		I	52	0.698
54	82.879	46	0.287		N	54	0.690
56	82.809	48	0.287		E	56	0.682
58	82.740	50	0.287		T	58	0.674
60	82.669	52	0.288		N	60	0.666
62	82.610	54	0.288		E	62	0.658
64	82.540	56	0.288		T	64	0.651
66	82.469	58	0.288		N	66	0.643
68	82.400	60	0.288		T	68	0.636
70	82.330	62	0.288		I	70	0.629
72	82.259	64	0.289		N	72	0.622
74	82.190	66	0.289		E	74	0.615
76	82.120	68	0.289		T	76	0.609
		70	0.289				
		72	0.289				
		74	0.289				
		76	0.290				
		78	0.290				
		80	0.290				
		82	0.290				
		84	0.290				

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
49	0.018	35	2.878	35	0.09251		N
		40	3.260	40	0.10380		O
		45	3.684	45	0.11610		T
		50	4.153	50	0.12960		P
		55	4.671	55	0.14430		E
		60	5.242	60	0.16040		R
		65	5.869	65	0.17790		I
		70	6.558	70	0.19690		N
		75	7.312	75	0.21750		E
		80	8.136	80	0.23970		T
		85	9.036	85	0.26380		P
		90	10.020	90	0.28980		R
		95	11.080	95	0.31770		I
		100	12.240	100	0.34770		N
		105	13.490	105	0.38000		O
		110	14.850	110	0.41450		T
		115	16.310	115	0.45150		P
		120	17.900	120	0.49090		E