XCELTHERM® LV-1

Safety Data Sheet

Issue date: 11/14/2023 Revision date: 3/14/2025 Supersedes: 11/14/2023 Version: 2.0

according to 29 CFR § 1910.1200, Hazard Communication Standard (HCS)

SECTION 1: Identification

1.1. Identification

Trade name XCELTHERM® LV-1

1.2. Recommended use and restrictions on use

Use of the substance/mixture: Liquid or vapor phase to 700ºF (370ºC). Recommended for Concentrated Solar Power Systems, PET production, Synthetic Fiber plants, Chemical Processing and many other applications that require a high temperature heat transfer fluid.

Use of the substance/mixture: Heat Transfer Fluids

Restrictions on use: Heat transfer fluids

1.3. Supplier

Manufacturer

Radco Industries Inc.
CAGE Code 6ZS16
700 Kingsland Drive
Batavia, Illinois 60510
United States
T (630) 232-7966
www.radcoind.com

1.4. Emergency telephone number

Emergency number: For Chemical Emergency Call CHEMTREC 24hr/day 7days/week
Within USA and Canada: 1-800-424-9300
Outside USA and Canada: +1 703-741-5970
(collect calls accepted)

SECTION 2: Hazard(s) identification

2.1. Classification of the substance or mixture

GHS US classification

Acute toxicity (inhalation:dust,mist), Category 4	H332	Harmful if inhaled.
Specific target organ toxicity — Repeated exposure, Category 1	H372	Causes damage to organs (liver, kidneys, haematopoietic system) through prolonged or repeated exposure (oral).
Aspiration hazard, Category 1	H304	May be fatal if swallowed and enters airways.

Full text of H statements : see section 16

2.2. GHS Label elements, including precautionary statements

GHS US labeling

Hazard pictograms (GHS US):

Signal word (GHS US): Danger

Hazard statements (GHS US):
H304 - May be fatal if swallowed and enters airways
H332 - Harmful if inhaled
H372 - Causes damage to organs (liver, kidneys, haematopoietic system) through prolonged or repeated exposure (oral)

Precautionary statements (GHS US):
P260 - Do not breathe fume, dust, mist, spray, vapors.
P264 - Wash hands, forearms and face thoroughly after handling.
P270 - Do not eat, drink or smoke when using this product.
P271 - Use only outdoors or in a well-ventilated area.
P301+P310 - If swallowed: Immediately call a doctor, a POISON CENTER.
P304+P340 - If inhaled: Remove person to fresh air and keep comfortable for breathing.
P312 - Call a doctor, a POISON CENTER if you feel unwell.
P314 - Get medical attention.
P331 - Do NOT induce vomiting.
P405 - Store locked up.
P501 - Dispose of contents and container to an approved waste disposal plant.

2.3. Other hazards which do not result in classification

No additional information available

2.4. Unknown acute toxicity (GHS US)

Not applicable

SECTION 3: Composition/Information on ingredients

3.1. Substances

Not applicable

3.2. Mixtures

Name	Product identifier	%	GHS US classification
Diphenylethane	CAS-No.: 38888-98-1 / 612-00-0	≥ 75	Acute Tox. 4 (Inhalation:dust,mist), H332 STOT RE 1, H372 Asp. Tox. 1, H304 Aquatic Chronic 1, H410
Diphenyl oxide	CAS-No.: 101-84-8	10 – 50	STOT RE 2, H373 Aquatic Chronic 1, H410

Full text of hazard classes and H-statements : see section 16

SECTION 4: First-aid measures

4.1. Description of first aid measures

First-aid measures general: Call a POISON CENTER or doctor/physician. If medical advice is needed, have product container or label at hand. Vomiting: prevent asphyxia/aspiration pneumonia. Unconscious: maintain adequate airway and respiration. Call a physician immediately.

First-aid measures after inhalation:	Remove person to fresh air and keep comfortable for breathing. In case of respiratory problems, consult a doctor/medical service. Move the affected person away from the contaminated area and into the fresh air. Call a poison center/doctor/physician if you feel unwell.
First-aid measures after skin contact:	Remove affected clothing and wash all exposed skin area with mild soap and water, followed by warm water rinse. If eye irritation persists: Get medical advice/attention. Wash skin with plenty of water.
First-aid measures after eye contact:	Immediately rinse with water for a prolonged period while holding the eyelids wide open. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention. Rinse eyes with water as a precaution.
First-aid measures after ingestion:	Do NOT induce vomiting. Rinse mouth out with water. Get immediate medical advice/attention. Do not induce vomiting. Call a physician immediately.

4.2. Most important symptoms and effects (acute and delayed)

Potential Adverse human health effects and symptoms:	Practically non-toxic if swallowed (LD50 oral, rat > 2000 mg/kg). Not irritant to skin. Non-toxic in contact with skin (LD50 skin> 5000 mg/kg). Causes serious eye irritation.
Symptoms/effects:	Harmful if inhaled. Causes serious eye irritation. May be fatal if swallowed and enters airways.
Symptoms/effects after inhalation:	Irritation of the respiratory tract. Harmful if inhaled.
Symptoms/effects after skin contact:	Causes skin irritation.
Symptoms/effects after eye contact:	Causes serious eye irritation.
Symptoms/effects after ingestion:	Abdominal pain, nausea. Risk of lung edema.
Chronic symptoms:	Red skin. Itching.

4.3. Immediate medical attention and special treatment, if necessary

Treat symptomatically.

SECTION 5: Fire-fighting measures

5.1. Suitable (and unsuitable) extinguishing media

Suitable extinguishing media:	Dry chemical, CO2, or water spray or regular foam. Water spray. Dry powder. Foam. Carbon dioxide.
Unsuitable extinguishing media:	Water (quick-acting extinguisher, reel); risk of puddle expansion. Water; risk of puddle expansion.

5.2. Specific hazards arising from the chemical

Fire hazard:	DIRECT FIRE HAZARD: Combustible. INDIRECT FIRE HAZARD: Temperature above flashpoint: higher fire/explosion hazard.
Explosion hazard:	No direct explosion hazard.
Hazardous decomposition products in case of fire:	Upon combustion CO and CO2 are formed (carbon monoxide - carbon dioxide).

5.3. Special protective equipment and precautions for fire-fighters

Precautionary measures fire:	Exposure to fire/heat: keep upwind. Exposure to fire/heat: seal off low-lying areas. Exposure to fire/heat: have neighbourhood close doors and windows.
Firefighting instructions:	Exercise caution when fighting any chemical fire. Use water spray or fog for cooling exposed containers. Do not enter fire area without proper protective equipment, including respiratory protection.

Protection during firefighting:	Use self-contained breathing apparatus and chemically protective clothing. Do not attempt to take action without suitable protective equipment. Self-contained breathing apparatus. Complete protective clothing.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures:	Warning! Product may cause floors to be slippery. Clean up any spills as soon as possible, using an absorbent material to collect it. Avoid contact with skin and eyes. Stop leak if safe to do so. Notify authorities if product enters sewers or public waters. Absorb spillage to prevent material-damage.

6.1.1. For non-emergency personnel

Protective equipment:	Safety glasses (EN 166). Wear recommended personal protective equipment.
Emergency procedures:	Ventilate spillage area. Avoid contact with skin, eyes and clothing. Wash contaminated clothes. Do not breathe dust/fume/gas/mist/vapors/spray.

6.1.2. For emergency responders

Protective equipment:	Do not attempt to take action without suitable protective equipment. Wear recommended personal protective equipment. For further information refer to section 8: "Exposure controls/personal protection".
Emergency procedures:	Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous. Ventilate area. Evacuate unnecessary personnel. Stop leak if safe to do so.

6.2. Environmental precautions

Avoid release to the environment. Do not allow to enter drains or water courses. Notify authorities if product enters sewers or public waters. Prevent liquid from entering sewers, watercourses, underground or low areas. Very toxic to aquatic life with long lasting effects.

6.3. Methods and material for containment and cleaning up

For containment:	Absorb spilled material with sand or earth. Collect spillage. Contain any spills with dikes or absorbents to prevent migration and entry into sewers or streams. Stop leak, if possible without risk.
Methods for cleaning up:	Take up liquid spill into absorbent material. Absorb remaining liquid with sand or inert absorbent and remove to safe place. This material and its container must be disposed of in a safe way, and as per local legislation.
Other information:	Dispose of materials or solid residues at an authorized site.

6.4. Reference to other sections

For further information refer to section 8: "Exposure controls/personal protection". For further information refer to section 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Additional hazards when processed:	Not expected to present a significant hazard under anticipated conditions of normal use.

Precautions for safe handling:	Wear personal protective equipment. Avoid contact with skin and eyes. Do not breathe vapors. Do not eat, drink or smoke when using this product. Keep container tightly closed. Do not breathe dust/fume/gas/mist/vapors/spray. Use only outdoors or in a well-ventilated area.
Hygiene measures:	Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Wash contaminated clothing before reuse. Separate working clothes from town clothes. Launder separately. Do not eat, drink or smoke when using this product. Always wash hands after handling the product.

7.2. Conditions for safe storage, including any incompatibilities

Technical measures:	Store in a well-ventilated place. Keep container tightly closed.
Storage conditions:	Store locked up.
Incompatible products:	Oxidizing agent.
Heat-ignition:	KEEP SUBSTANCE AWAY FROM: Heat sources.
Information on mixed storage:	oxidizing agents. water/moisture.
Storage area:	Keep container in a well-ventilated place.
Special rules on packaging:	Store in a closed container.
Packaging materials:	Store always product in container of same material as original container.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Diphenyl oxide (101-84-8)	
No additional information available	
USA - ACGIH - Occupational Exposure Limits	
Local name	Phenyl ether
ACGIH OEL TWA	1 ppm Gas or vapor
ACGIH OEL STEL	2 ppm Gas or vapor
Remark (ACGIH)	TLV® Basis: URT & eye irr; nausea
Regulatory reference	ACGIH 2024
USA - OSHA - Occupational Exposure Limits	
Local name	Phenyl ether, vapor
OSHA PEL TWA	7 mg/m³
	1 ppm
Regulatory reference (US-OSHA)	OSHA Annotated Table Z-1

Diphenylethane (38888-98-1 / 612-00-0)
No additional information available

Monitoring methods	
Monitoring methods	A specific exposure sampling method is not available.

8.2. Appropriate engineering controls

Appropriate engineering controls: Provide local exhaust or general room ventilation. Ensure good ventilation of the work station.

Environmental exposure controls: Do not exceed the occupational exposure limits (OEL). Avoid release to the environment.

8.3. Individual protection measures/Personal protective equipment

Personal protective equipment:

ISO 16321-1. EN 14605. EN 13034.

Materials for protective clothing:
Good resistance: butyl rubber. Polyvinylalcohol (PVA). Tetrafluoroethylene

Hand protection:
Protective gloves

Eye protection:
Safety glasses

Skin and body protection:
Protective clothing (EN 14605 or EN 13034)

Respiratory protection:
[In case of inadequate ventilation] wear respiratory protection.

Personal protective equipment symbol(s):

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state:	Liquid
Color:	Mixture contains one or more component(s) which have the following color(s): Colourless Colorless to light yellow
Odor:	There may be no odor warning properties, odor is subjective and inadequate to warn of overexposure. Mixture contains one or more component(s) which have the following odor: Floral odour Unpleasant odour Irritating/pungent odour
Odor threshold:	No data available
pH:	No data available
Melting point:	7.2 °C

Freezing point:	7.2 °C
Boiling point:	No data available
Critical temperature:	500 °C
Critical pressure:	30.6 bar
Flash point:	122 °C Cleveland Open Cup Method (ASTM D92)
Relative evaporation rate (butyl acetate=1):	No data available
Flammability:	Not applicable.
Vapor pressure:	No data available
Vapor pressure at 50°C:	0.16 – 0.26
Relative vapor density at 20°C:	No data available
Relative density:	1.06 at 15.6°C (Water = 1)
Density:	1062 kg/m³ at 25°C (77°F)
Solubility:	insoluble in water.
Partition coefficient n-octanol/water (Log Pow):	No data available
Auto-ignition temperature:	604 °C
Decomposition temperature:	No data available
Viscosity, kinematic:	4.9 mm²/s at 25°C (77°F)
Viscosity, dynamic:	3.5 cP at 40°C (104°F)
Explosion limits:	No data available
Explosive properties:	No data available.
Oxidizing properties:	No data available.

9.2. Other information

VOC content:	0 %
Other properties:	Gas/vapour heavier than air at 20°C. May generate electrostatic charges.

SECTION 10: Stability and reactivity

10.1. Reactivity

Reacts violently with (strong) oxidizers.

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

No dangerous reactions known under normal conditions of use.

10.4. Conditions to avoid

None under recommended storage and handling conditions (see section 7).

10.5. Incompatible materials

No additional information available

10.6. Hazardous decomposition products

Under normal conditions of storage and use, hazardous decomposition products should not be produced.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity (oral):	Not classified
Acute toxicity (dermal):	Not classified
Acute toxicity (inhalation):	Inhalation:dust,mist: Harmful if inhaled.
Skin corrosion/irritation:	Not classified
Carcinogenicity:	Not classified
Aspiration hazard:	May be fatal if swallowed and enters airways.
Viscosity, kinematic:	4.9 mm^2/s at 25°C (77°F)
Potential Adverse human health effects and symptoms:	Practically non-toxic if swallowed (LD50 oral, rat > 2000 mg/kg). Not irritant to skin. Non-toxic in contact with skin (LD50 skin> 5000 mg/kg). Causes serious eye irritation.
Symptoms/effects:	Harmful if inhaled. Causes serious eye irritation. May be fatal if swallowed and enters airways.
Symptoms/effects after inhalation:	Irritation of the respiratory tract. Harmful if inhaled.
Symptoms/effects after skin contact:	Causes skin irritation.
Symptoms/effects after eye contact:	Causes serious eye irritation.
Symptoms/effects after ingestion:	Abdominal pain, nausea. Risk of lung edema.
Chronic symptoms:	Red skin. Itching.
STOT-single exposure:	Not classified
STOT-repeated exposure:	Causes damage to organs (liver, kidneys, haematopoietic system) through prolonged or repeated exposure (oral).
Reproductive toxicity:	Not classified

Diphenyl oxide (101-84-8)	
LD50 oral rat:	2830 mg/kg body weight Animals: female rat, 95% CL: 2.49 - 3.21
LD50 dermal rabbit:	> 7940 mg/kg body weight (24 hour, male / female, 14 days)
ATE US (oral):	2830 mg/kg body weight

Diphenylethane (38888-98-1 / 612-00-0)	
ATE US (dust, mist):	1.5 mg/l/4h

Diphenyl oxide (101-84-8)	
Serious eye damage/irritation:	Not classified

Diphenylethane (38888-98-1 / 612-00-0)	
Serious eye damage/irritation:	Not classified

Diphenyl oxide (101-84-8)	
Respiratory or skin sensitization:	Not classified

Diphenylethane (38888-98-1 / 612-00-0)	
Respiratory or skin sensitization:	Not classified

Diphenyl oxide (101-84-8)	
Germ cell mutagenicity:	Not classified

Diphenylethane (38888-98-1 / 612-00-0)	
Germ cell mutagenicity:	Not classified

Diphenyl oxide (101-84-8)	
LOAEL (dermal,rat/rabbit,90 days):	100 mg/kg body weight Animals: rat
NOAEL (dermal,rat/rabbit,90 days):	1000 mg/kg body weight Animals: rat
STOT-repeated exposure:	May cause damage to organs through prolonged or repeated exposure.

Diphenylethane (38888-98-1 / 612-00-0)	
STOT-repeated exposure:	Causes damage to organs through prolonged or repeated exposure.

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general: The product is not considered harmful to aquatic organisms or to cause long-term adverse effects in the environment.

Ecology - air: Not included in the list of substances which may contribute to the greenhouse effect (IPCC). Not included in the list of fluorinated greenhouse gases (Regulation (EU) No 517/2014). Not classified as dangerous for the ozone layer (Regulation (EC) No 1005/2009).

Ecology - water: Toxic to crustacea. Toxic to fishes. Groundwater pollutant. Fouling to shoreline. Very toxic to algae. Harmful to algae, with long-term consequences. Transformation due to hydrolysis not expected to be significant.

Diphenyl oxide (101-84-8)	
LC50 - Fish [1]:	4.2 mg/l Species: Oncorhynchus mykiss (Rainbow trout)
EC50 - Crustacea [1]:	1.96 mg/l Species: Daphnia magna (Water flea)
ErC50 algae:	0.58 mg/l (OECD 201 method)

12.2. Persistence and degradability

Diphenyl oxide (101-84-8)	
Persistence and degradability:	Readily biodegradable in water.
Biochemical oxygen demand (BOD):	1.68 – 2 g O_2/g substance
Chemical oxygen demand (COD):	2.19 – 2.5 g O_2/g substance
ThOD:	2.63 g O_2/g substance
BOD (% of ThOD):	0.72

Diphenylethane (38888-98-1 / 612-00-0)	
Persistence and degradability:	Not readily biodegradable in water.

12.3. Bioaccumulative potential

Diphenyl oxide (101-84-8)	
BCF - Fish [1]:	155 – 200 Species: Oncorhynchus mykiss (Rainbow trout), 4 days
Partition coefficient n-octanol/water (Log Pow):	4.21 (Experimental data, 25°C)
Bioaccumulative potential:	The substance has low potential for bioaccumulation.

Diphenylethane (38888-98-1 / 612-00-0)	
Partition coefficient n-octanol/water (Log Pow):	4.55
Bioaccumulative potential:	Potential for bioaccumulation (4 ≤ Log Kow ≤ 5).

12.4. Mobility in soil

Diphenyl oxide (101-84-8)	
Surface tension:	39 mN/m at 25°C (77°F)
Organic Carbon Normalized Adsorption Coefficient (Log Koc):	3.3 (Experimental data)
Ecology - soil:	Potential for mobility in soil is slight.

Diphenylethane (38888-98-1 / 612-00-0)	
Ecology - soil:	Potential for mobility in soil is slight.

12.5. Other adverse effects

No additional information available

SECTION 13: Disposal considerations

13.1. Disposal methods

Regional waste regulation:	Disposal must be done according to official regulations.
Waste treatment methods:	Dispose of contents/container in accordance with licensed collector's sorting instructions.
Sewage disposal recommendations:	Disposal must be done according to official regulations.
Product/Packaging disposal recommendations:	Disposal must be done according to official regulations.

Additional information: Do not re-use empty containers.

SECTION 14: Transport information

In accordance with DOT / TDG / IMDG / IATA / ICAO / ADN / RID / ADG

DOT	TDG	IMDG	IATA
14.1. UN number			
Not applicable	Not applicable	3082	3082
14.2. Proper Shipping Name			
Not applicable	Not applicable	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (1,1-Diphenylethane and Diphenyl Oxide Mixture)	Environmentally hazardous substance, liquid, n.o.s. (1,1-Diphenylethane and Diphenyl Oxide Mixture)
Transport document description			
Not applicable	Not applicable	UN 3082 ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (1,1-Diphenylethane and Diphenyl Oxide Mixture), 9, III (122°C c.c.)	UN 3082 Environmentally hazardous substance, liquid, n.o.s. (1,1-Diphenylethane and Diphenyl Oxide Mixture), 9, III
14.3. Transport hazard class(es)			
Not applicable	Not applicable	9	9
			
14.4. Packing group			
Not applicable	Not applicable	III	III
14.5. Environmental hazards			
Not applicable	Not applicable	Dangerous for the environment: No Marine pollutant: No	Dangerous for the environment: No
No supplementary information available			

14.6. Special precautions for user

DOT
No data available

TDG
No data available

IMDG

Transport regulations (IMDG):	Subject to the provisions
Special provision (IMDG):	274, 335, 969
Limited quantities (IMDG):	5 L
Excepted quantities (IMDG):	E1
Packing instructions (IMDG):	LP01, P001
Packing provisions (IMDG):	PP1
IBC packing instructions (IMDG):	IBC03
Tank instructions (IMDG):	T4
Tank special provisions (IMDG):	TP1, TP29
EmS-No. (Fire):	F-A - FIRE SCHEDULE Alfa - GENERAL FIRE SCHEDULE
EmS-No. (Spillage):	S-F - SPILLAGE SCHEDULE Foxtrot - WATER-SOLUBLE MARINE POLLUTANTS
Stowage category (IMDG):	A

IATA

Transport regulations (IATA):	Subject to the provisions
PCA Excepted quantities (IATA):	E1
PCA Limited quantities (IATA):	Y964
PCA limited quantity max net quantity (IATA)	30kgG
PCA packing instructions (IATA):	964
PCA max net quantity (IATA):	450L
CAO packing instructions (IATA):	964
CAO max net quantity (IATA):	450L
Special provision (IATA):	A97, A158, A197, A215
ERG code (IATA):	9L

14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable

SECTION 15: Regulatory information

15.1. US Federal regulations

All components of this product are present and listed as Active on the United States Environmental Protection Agency Toxic Substances Control Act (TSCA) inventory, except for:		
Diphenylethane	CAS-No. 38888-98-1 / 612-00-0	≥ 75%

This product or mixture is not known to contain a toxic chemical or chemicals in excess of the applicable de minimis concentration as specified in 40 CFR §372.38(a) subject to the reporting requirements of section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

15.2. International regulations

CANADA

Diphenyl oxide (101-84-8)
Listed on the Canadian DSL (Domestic Substances List)

EU-Regulations

No additional information available

National regulations

Diphenyl oxide (101-84-8)
Listed on INSQ (Mexican National Inventory of Chemical Substances)

15.3. US State regulations

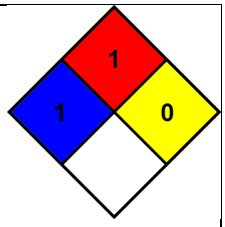
California Proposition 65 - This product does not contain any substances known to the state of California to cause cancer, developmental and/or reproductive harm

SECTION 16: Other information

according to 29 CFR § 1910.1200, Hazard Communication Standard (HCS)
Revision date: 03/14/2025

Full text of hazard classes and H-statements	
H304	May be fatal if swallowed and enters airways
H332	Harmful if inhaled
H372	Causes damage to organs through prolonged or repeated exposure
H373	May cause damage to organs through prolonged or repeated exposure
H410	Very toxic to aquatic life with long lasting effects

NFPA health hazard	1 - Materials that, under emergency conditions, can cause significant irritation.
NFPA fire hazard	1 - Materials that must be preheated before ignition can occur.
NFPA reactivity	0 - Material that in themselves are normally stable, even under fire conditions.



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