



# XCELTHERM® MK1 SOLAR GRADE HEAT TRANSFER FLUID

## SAFETY DATA SHEET

Issue Date: 8 August 1993

Revision Date: 16 January 2019

Revision Number: 7.0

### SECTION 1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

#### 1.1 Product Identifier

Product Name: XCELTHERM® MK1 Solar Grade Heat Transfer Fluid

ISO 9001:2015 Certification Number: C2018-00035

#### 1.2 Relevant identified uses of the substance or mixture and uses advised against

Heat transfer fluid for liquid or vapor phase to 400°C (750°F)

#### 1.3 Details of the supplier of the safety data sheet

Headquarters and Manufacturing Facility  
Radco Industries, Inc.  
700 Kingsland Drive  
Batavia, IL 60510  
CAGE Code 6ZS16

Customer information number: 1-630-232-7966

#### 1.4 Emergency Telephone Number

Advisory Office in case of poisoning: Chemtrec  
Chemtrec (North America): 1-800-424-9300

### SECTION 2. HAZARDS IDENTIFICATION

#### Classification of the substance or mixture:

Aquatic toxicity, acute hazards	Category 1
Aquatic toxicity, chronic hazards	Category 1
Serious eye irritation	Category 2B
Skin irritation	Category 2
Specific target organ toxicity – single exposure	Category 3

Classifications of mixture is in accordance with United Nations (UN) Globally Harmonized System of Classification and Labelling of Chemicals (GHS), sixth revised edition (2015), and United States Standard 29 CFR 1910 Occupational Safety and Health Standards.

See SECTION 16 for toxicity category definitions.

#### 2.1 Label elements



Exclamation



Environmental Hazard

Hazard pictograms:

Signal word:

Warning

#### Hazard statements

H315:	Causes skin irritation.
H319:	Causes serious eye irritation.



H335:	May cause respiratory irritation.
H410:	Very toxic to aquatic life with long-lasting effects.

**Precaution statements**

P101:	If medical advice is needed, have product container or label at hand.
P202:	Do not handle until all safety precautions have been read and understood.
P270:	Do not eat, drink or smoke when using this product.
P273:	Avoid release to the environment.
P280:	Wear protective gloves/protective clothing/eye protection/face protection.
P301 + P331 + P315:	IF SWALLOWED: Do NOT induce vomiting. Rinse mouth. Get immediate medical advice/attention.
P303 + P353:	IF ON SKIN (or hair): Rinse skin with water/shower.
P304 + P340 + P342 + P315:	IF INHALED: Remove person to fresh air and keep comfortable for breathing. If experiencing respiratory symptoms, get immediate medical advice/attention.
P305 + P351 + P338 + P310:	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor.
P306 + P363:	IF ON CLOTHING: Wash contaminated clothing before reuse.
P404:	Store in a closed container.
P501:	Dispose of contents/container to in accordance with local/regional/national/international regulation.

**2.2 Other hazards**

**PBT and vPvB**

PBT and vPvB assessment is not available as chemical safety assessment has not been conducted.

<b>NFPA Hazard ID</b>		<b>HMIS Hazard ID</b>	
Health:	1	Health:	1
Flammability:	1	Flammability:	1
Reactivity:	0	Reactivity:	0

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**SECTION 3. Composition/information on ingredients**

**3.1 Substances**

Biphenyl

Index number: 601-042-00-8  
CAS number: 92-52-4  
EC number: 202-163-5  
REACH number: Not available  
Synonyms: Phenylbenzene, 1,1'-Biphenyl; Diphenyl

Diphenyl oxide

Index number: Not available  
CAS number: 101-84-8  
EC number: 202-981-2  
REACH number: 01-2119472545-33  
Synonyms: Biphenyl oxide; Diphenyl ether

**3.2 Mixtures**



Component	CAS Number	EC Number	%Content	Classification of Labeling	M-Factor
Diphenyl oxide	101-84-8	202-981-2	73.0% ± 0.5%	Aquatic Acute 1 – H400 Eye Irrit. 2A – H319	1 --
Biphenyl	92-52-4	202-163-5	27.0% ± 0.5%	Aquatic Acute 1 – H400 Aquatic Chronic 1 – 410 Eye Irrit. 2 – H319 Skin Irrit. 2 – H315 STOT SE 3 – H335	1 1 -- -- --

M-Factor determinations are in accordance with UN GHS, sixth revised edition (2015).

See SECTION 16 for full text of the toxicity categories and H-statements listed in this section.

**Indicative occupational exposure limit values**

Component	Specific Concentration limits
Biphenyl	See SECTION 8 for specific concentration limits.
Diphenyl oxide	See SECTION 8 for specific concentration limits.

**SECTION 4. FIRST AID MEASURES**

**4.1 Description of first aid measures**

**Eye contact**

Upon accidental eye exposure, wash the eyes promptly with water for at least 20 minutes. If wearing contact lenses, remove them if safe to do so, and continue washing. Get medical attention immediately.

**Ingestion**

If swallowed, do not induce vomiting. Rinse mouth out with water. Get medical attention immediately.

**Inhalation**

If respiratory irritation, dizziness, or nausea occurs, move to fresh air and keep at rest in a comfortable position for breathing. If symptoms persist or unconsciousness occurs, seek immediate medical assistance.

**Skin contact**

Wash skin thoroughly with mild soap and plenty of water for at least 20 minutes. If irritation develops, seek medical advice.

**Note to physicians**

Treat symptomatically.

**4.2 Most important symptoms and effects, both acute and delayed**

**Acute symptoms**

**Eye exposure symptoms**

Direct eye exposure may lead to redness and lacrimation (crying tears).

**Ingestion symptoms**

Small amounts may cause nausea. Large amounts may lead to abdominal obstruction (cramps), constipation or diarrhea.

**Inhalation symptoms**

May cause irritation of the nose, throat, and lungs.

**Skin exposure symptoms**

Short-term exposure is not expected to cause irritation.

**Delayed symptoms**

**Eye exposure symptoms**

None expected, however seek medical attention if irritation persists.

**Ingestion symptoms**

None expected, however seek medical attention if abdominal obstruction, constipation or diarrhea persists.



**Inhalation symptoms**

None expected, however seek medical attention if respiratory irritation persists.

**Skin exposure symptoms**

Repeated exposure may lead to irritation. If rash develops, seek medical attention.

**4.3 Indication of any immediate medical attention and special treatment needed**

Suggestions for clinical testing and medical monitoring for delayed effects are not known. Use first aid when applicable, and seek guidance from a medical physician for specific treatment.

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**SECTION 5. FIREFIGHTING MEASURES**

**5.1 Extinguishing media**

Suitable extinguishing media includes alcohol-resistant foam, carbon dioxide, dry chemical or water fog.

**5.2 Special hazards arising from the substance or mixture**

No data is available.

**5.3 Advice for firefighters**

**Fire-Fighting Equipment**

Firefighter should wear normal protective equipment (full bunker gear) and positive-pressure contained breathing apparatus. Water can be used to cool fire-exposed containers, to protect personnel and to disperse vapors and spills. Water runoff can cause environmental damage. Dike and collect water used to fight fires.

**Special Fire-Fighting Procedures**

Use water spray to cool fire-exposed containers and structures. If a rail or tank truck is involved in a fire, isolate for 800 meters (0.5 mile) in all directions. Shut off fuel to fire if it is possible to do so without hazard. If this is impossible, withdraw from the area and let the fire burn out under controlled conditions. Withdraw immediately in case of rising sound from venting safety device or any discoloration of tank due to fire.

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**SECTION 6. ACCIDENTAL RELEASE MEASURES**

**6.1 Personal precautions, protective equipment and emergency procedures**

**For non-emergency personnel**

Wear personal protective equipment (PPE). Eliminate sources of ignition, if safe to do so. Avoid breathing vapors or mist. Evacuate to designated safe areas.

**For emergency responders**

If possible, move individual to safe area, and treat symptomatically.

**6.2 Environmental precautions**

Contain spill, if safe to do so. Prevent from entering sewers or drains.

**6.3 Methods and material for containment and cleaning up**

Use oil absorbent material to soak up product on the ground. Should this product enter sewers or drains, it should be pumped out into an open vessel. The recovered material should be discarded as hazardous waste.

**6.4 Reference to other sections**

If appropriate, refer to SECTION 8 and SECTION 13 for additional information.

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**SECTION 7. HANDLING AND STORAGE**

**7.1 Precautions for safe handling**

Use personal protective equipment (PPE) when handling this product. Smoking, eating and drinking should be prohibited in the application area.



**7.2 Conditions for safe storage, including any incompatibilities**

Do not store in open or unlabeled containers. Keep container tightly closed in a dry and well-ventilated place.

**7.3 Specific end use(s)**

Recommended for parabolic solar arrays, PET production, synthetic fiber plants and many other applications that require a high temperature heat transfer fluid.

**SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION**

**8.1 Control parameters**

**Occupational exposure limits**

Component	Form	Exposure Limits
Biphenyl	Vapor	ACGIH (United States, 2001) TWA = 0.2 ppm
	Vapor	OSHA Z-1 (United States, 6/2010) TWA = 1 mg/m <sup>3</sup> , 0.2 ppm
	Vapor	CAL PEL (California, 2/2017) PEL = 1.5 mg/m <sup>3</sup> , 0.2 ppm
Diphenyl oxide	Vapor	ACGIH (United States, 2001) TWA = 1 ppm, 7 mg/m <sup>3</sup>
	Vapor	ACGIH (United States, 2001) STEL = 2 ppm, 14 mg/m <sup>3</sup>
	Vapor	NIOSH (United States, 4/2016) TWA = 1 ppm, 7 mg/m <sup>3</sup>
	Vapor	OSHA Z-1 (United States, 6/2010) TWA = 1 ppm, 7 mg/m <sup>3</sup>

**Biological exposure limits**

None established for any of the disclosed components.

**8.2 Exposure controls**

**Appropriate engineering controls**

Practice general industrial hygiene. Do not eat, drink or smoke near product. Wash hands after handling. Remove clothing and wash separate from other laundry.

**Personal protective equipment (PPE)**

**Eye/face protection**

Safety glasses, chemical safety goggles and/or face shields are recommended when handling this product.

**Skin protection**

For extended handling, wear oil resistant gloves such as neoprene. Nitrile gloves may be appropriate for short handling periods use. Contact a government approved or accredited manufacturer for specific recommendations.

**Other protections**

Wear protective clothing ensuring minimal skin exposure. Protective clothing should be chemically impervious to oils and other solvents.

**Respiratory protection**

Use with adequate ventilation. Avoid breathing vapor. If heated and ventilation is inadequate, use NIOSH certified respirator, which will protect against organic vapor.

**Environmental exposure controls**

Do not allow product to reach ground water, water course, or sewage systems. Stop leaks, if safe to do so. Contain spills with absorbent or adsorbent materials.

**SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES**

**9.1 Information on basic physical and chemical properties**

Appearance:	Colorless to straw-colored liquid, or solid below 12°C (54°F)
Odor:	Aromatic
Odor threshold:	1 part per million (ppm)



Auto-ignition temperature:	621°C (1,150°F)
Decomposition temperature:	0.2% mass at 400°C (752°F)
Evaporation Rate:	Not determined
Explosive properties:	Not determined
Flammability (solid, gas):	Non-flammable
Lower flammability limit:	0.8%
Upper flammability limit:	7.0%
Flash point Cleveland Open Cup (ASTM D92):	124°C (255°F)
Flash point Pensky-Martens (ASTM D93):	110°C (230°F)
Normal boiling point:	257°C (495°F)
Melting point/freezing point:	12°C (54°F)
Oxidizing properties:	Not determined
Partition coefficient (n-octanol/water), Log P <sub>ow</sub> :	Not determined
pH:	Not applicable
Relative density (ASTM D1298) 15.6°C/15.6°C (60°F/60°F):	1.06
Solubility in water:	Insoluble
Vapor density:	Not determined
Vapor pressure:	0.08 mmHg at 20°C (68°F)
Viscosity (ASTM D445):	2.48 mm <sup>2</sup> /s (cSt) at 40°C (104°F) 0.99 mm <sup>2</sup> /s (cSt) at 100°C (212°F)

## 9.2 Other information

No further information is available.

## SECTION 10. STABILITY AND REACTIVITY

### 10.1 Reactivity

Non-reactive in its original state.

### 10.2 Chemical stability

Stable in its original state.

### 10.3 Possibility of hazardous reactions

Does not occur.

### 10.4 Conditions to avoid

Oxidizing materials

### 10.5 Incompatible materials

Keep away from strong oxidizing or reducing agents.

### 10.6 Hazardous decomposition products

Decomposition of this product under fire conditions may produce carbon oxides, phenols, and other decomposition products.

## SECTION 11. TOXICOLOGICAL INFORMATION

### 11.1 Information on toxicological effects

Acute toxicity	Method	Species	Result
Biphenyl	Dermal	Rabbit	LD <sub>50</sub> > 5000 mg/kg
	Inhalation	--	No data available
	Oral	Rat	LD <sub>50</sub> > 2000 mg/kg body-weight



Diphenyl oxide	Dermal Inhalation Oral	Rabbit -- Rat	LD <sub>50</sub> > 7940 mg/kg No data available LD <sub>50</sub> = 2830 mg/kg body-weight
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**Aspiration hazard**

No data available

Carcinogenicity	Result
Biphenyl	Not a known carcinogen by IARC, NTP or OSHA
Diphenyl oxide	Not a known carcinogen by IARC, NTP or OSHA

Eye damage / irritation	Test Method	Species	Results
Biphenyl	--	--	No data available
Diphenyl oxide	<i>Read across</i>	Rabbit	Moderately irritating

Germ cell mutagenicity	Test Method	Species	Results
Biphenyl	Ames Assay	<i>S. typhimurium</i>	Not mutagenic
Diphenyl oxide	Ames Assay	<i>S. typhimurium</i>	Not mutagenic

Reproductive toxicity	Test Method	Species	Results
Biphenyl	OECD 414	Rat	Not toxic to reproduction
Diphenyl oxide	OECD 414	Rat	Not toxic to reproduction

Respiratory sensitization	Results
Biphenyl	No data available
Diphenyl oxide	No data available

Skin sensitization	Test Method	Species	Results
Biphenyl	OECD 406	Guinea pig	Not sensitizing
Diphenyl oxide	<i>Read across</i>	Human	Not sensitizing

Skin corrosion/irritation	Test Method	Species	Results
Biphenyl	Draize Test	Rabbit	Irritating
Diphenyl oxide	<i>Read across</i>	Rabbit	Not irritating

Specific target organ toxicity – repeated exposure (STOT-RE)	Route	Results
Biphenyl	<i>Read across</i>	Eyes, respiratory system, liver, central nervous system
Diphenyl oxide	Dermal Inhalation Oral	NOEL = 100 mg/kg/day NOEL = 4.9 ppm after 7 hours NOEL = 318 mg/kg/day

**Specific target organ toxicity – single exposure (STOT-SE)**

No data available

**11.2 Other information**

See SECTION 16 for toxicity references.

**SECTION 12. ECOLOGICAL INFORMATION**

**12.1 Toxicity**



Aquatic Toxicity	Test Method	Species	Results
Biphenyl	OECD 203	<i>P. promelas</i>	LC <sub>50</sub> = 3 mg/L after 96 hours
	Read Across	<i>D. magna</i>	EC50 = 0.36 mg/L after 48 hours
Diphenyl oxide	OECD 201	<i>P. subcapitata</i>	NOEC = 0.32 mg/L after 72 hours
	OECD 202	<i>D. magna</i>	LC <sub>50</sub> = 1.7 mg/L after 48 hours
	Read across	<i>O. mykiss</i>	LC <sub>50</sub> = 4.2 mg/L after 96 hours

**Terrestrial Toxicity**

No data available

**12.2 Persistence and degradability**

Biodegradation	Test Method	Results
Biphenyl	OECD 301C	84% after 14 days, readily biodegradable
Diphenyl oxide	OECD 301D	64% BOD after 5 days, readily biodegradable

**12.3 Bioaccumulative potential**

Bioconcentration Factor (BCF)	Results
Biphenyl	BCF = 281
Diphenyl oxide	BCF = 450

**Partition Coefficient n-octanol / water (Log K<sub>ow</sub>)**

No data available

**12.4 Mobility in soil**

Soil Mobility	Results
Biphenyl	No data available
Diphenyl oxide	LogKoc = 3.3

**12.5 Results of PBT and vPvB assessment**

Chemical	Results
Biphenyl	PBT and vPvB assessment not available
Diphenyl oxide	This substance is not PBT / vPvB.

**12.6 Other adverse effects**

No further information is available

**SECTION 13. DISPOSAL CONSIDERATIONS**

**13.1 Waste treatment methods**

This is listed as a hazardous waste in Federal regulations.

**SECTION 14. TRANSPORTATION INFORMATION**

United States Department of Transportation (DOT)	
UN Number:	UN3082
UN Proper shipping name:	ENVIRONMENTALLY HAZARDOUS LIQUID, N.O.S. (BIPHENYL AND DIPHENYL OXIDE MIXTURE)
Transport hazard class:	9
Packing group:	III
Reportable spill quantity:	100 pounds of biphenyl or 370 pounds of XCEL THERM® MK-1





**Canada Transport - Transportation of Dangerous Goods (TDG)**

UN Number: UN3082  
UN Proper shipping name: ENVIRONMENTALLY HAZARDOUS LIQUID, N.O.S. (BIPHENYL AND DIPHENYL OXIDE MIXTURE)  
Transport hazard class: 9  
Packing group: III

**Not regulated (450-liter or less inner packaging):** **Special Provision 99 (2):** These Regulations, except for Part 1 (Coming into Force, Repeal, Interpretation, General Provisions and Special Cases) and Part 2 (Classification), do not apply to the handling, offering for transport or transporting of less than 450 kg of UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S., or less than 450 L of UN3082, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S., on a road vehicle or a railway vehicle. The dangerous goods must be contained in one or more small means of containment designed, constructed, filled, closed, secured and maintained so that under normal conditions of transport, including handling, there will be no accidental release of the dangerous goods that could endanger public safety.

**International Air Transport Association (IATA)**

UN Number: UN3082  
UN Proper shipping name: ENVIRONMENTALLY HAZARDOUS LIQUID, N.O.S. (BIPHENYL AND DIPHENYL OXIDE MIXTURE)  
Transport hazard class: 9  
Packing group: III

**International Carriage of Dangerous Goods by Inland Waterways (ADN)**

UN Number: UN3082  
UN Proper shipping name: ENVIRONMENTALLY HAZARDOUS LIQUID, N.O.S. (BIPHENYL AND DIPHENYL OXIDE MIXTURE)  
Transport hazard class: 9  
Packing group: III  
MARPOL73/78 and IBC Code: P  
Emergency schedules (EmS): F-A, S-F  
Special provisions: 274; 335; 375; 601

**Not regulated (5-liter or less inner packaging):** **Special Provision 375:** These substances when carried in single or combination packagings containing a net quantity per single or inner packaging of 5 l or less for liquids or 5 kg or less for solids, are not subject to any other provision of ADN provided the packagings meet the general provisions of 4.1.1.1, 4.1.1.2 and 4.1.1.4 to 4.1.1.8 of ADR.

**International Carriage of Dangerous Goods by Rail (RID)**

UN Number: UN3082  
UN Proper shipping name: ENVIRONMENTALLY HAZARDOUS LIQUID, N.O.S. (BIPHENYL AND DIPHENYL OXIDE MIXTURE)  
Transport hazard class: 9  
Packing group: III  
Special provisions: 274; 335; 375; 601

**Not regulated (5-liter or less inner packaging):** **Special Provision 375:** These substances when carried in single or combination packagings containing a net quantity per single or inner packaging of 5 l or less for liquids having a net mass per single or inner packaging of 5 kg or less for solids, are not subject to any other provisions of the RID provided the packagings meet the general provisions of 4.1.1.1, 4.1.1.2 and 4.1.1.4 to 4.1.1.8.

**International Carriage of Dangerous Goods by Road (ADR)**

UN Number: UN3082  
UN Proper shipping name: ENVIRONMENTALLY HAZARDOUS LIQUID, N.O.S. (BIPHENYL AND DIPHENYL OXIDE MIXTURE)  
Transport hazard class: 9  
Packing group: III  
Special provisions: 274; 335; 375; 601

**Not regulated (5-liter or less inner packaging):** **Special Provision 375:** These substances when carried in single or combination packagings containing a net quantity per single or inner packaging of 5 l or less for liquids or having a net mass per single or inner packaging of 5 kg or less for solids, are not subject to any other



provisions of ADR provided the packagings meet the general provisions of 4.1.1.1, 4.1.1.2 and 4.1.1.4 to 4.1.1.8.

**International Civil Aviation Organization (ICAO)**

UN Number: UN3082  
UN Proper shipping name: ENVIRONMENTALLY HAZARDOUS LIQUID, N.O.S. (BIPHENYL AND DIPHENYL OXIDE MIXTURE)  
Transport hazard class: 9  
Packing group: III

**International Maritime Dangerous Goods Code (IMDG Code)**

UN Number: UN3082  
UN Proper shipping name: ENVIRONMENTALLY HAZARDOUS LIQUID, N.O.S. (BIPHENYL AND DIPHENYL OXIDE MIXTURE)  
Transport hazard class: 9  
Packing group: III  
MARPOL73/78 and IBC Code: P  
Emergency schedules (EmS): F-A, S-F  
Special provisions: 274; 335; 969

**Not regulated (5-liter or less inner packing):** **2.10.2.7:** Marine pollutants packaged in single or combination packagings containing a net quantity per single or inner packaging of 5 L or less for liquids or having a net mass per single or inner packaging of 5 kg or less for solids are not subject to any other provision of this Code relevant to marine pollutants provided the packagings meet the general provisions of 4.1.1.1, 4.1.1.2 and 4.1.1.4 to 4.1.1.8. In the case of marine pollutants also meeting the criteria for inclusion in another hazard class, all provisions of this Code relevant to any additional hazards continue to apply.

## SECTION 15. REGULATORY INFORMATION

### 15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

**Australia Inventory (AICS)**

All the ingredients are listed.

**California Proposition 65**

This product does not contain any chemicals known to the State of California to cause cancer and/or to cause birth defects or other reproductive harm.

**Canadian Domestic Substances List/Non-Domestic Substances List (DSL/NDSL)**

All the ingredients are listed.

**China Inventory of Existing Chemical Substances (IECSC)**

All the ingredients are listed.

**Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Reportable Quantity**

The reportable spill quantity for biphenyl is 100 pounds (45.36 kg), or 370 pounds (167.83 kg) of XCEL THERM® MK-1 Solar Grade.

**International Agency for Research on Cancer (IARC)**

None of the ingredients are listed.

**Japan Existing and New Chemical Substances (ENCS)**

All the ingredients are listed.

**Korean Existing and Evaluated Chemical Substances (KECL)**

All the ingredients are listed.



**Pennsylvania (Worker and Community Right-To-Know Act): Pennsylvania Hazardous Substances List and/or Pennsylvania Environmental Hazardous Substance List**

This product contains 27.0% biphenyl, and it is cited in the Pennsylvania Hazardous Substance List and/or the Pennsylvania Environmental Substance List.

**Philippines Inventory of Chemicals and Chemical Substances (PICCS)**

All the ingredients are listed.

**SARA Title III Section 302 Extremely Hazardous Substances (40 CFR Part 355)**

This product is not regulated under Section 302 of SARA and 40 CFR Part 355.

**SARA Title III Section 313 (40 CFR Part 372)**

This product contains 27.0% biphenyl, and is subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 that is listed in 40 CFR 372.

**SARA Title III Sections 311/312 Hazardous Categorization (40 CFR Part 370)**

Hazardous categories for this product are:

Acute = No      Chronic = No      Fire = No      Pressure = No      Reactive = No

**United States Toxic Substances Control Act (TSCA)**

All the ingredients are listed.

**15.2 Chemical safety assessment**

A Chemical Safety Assessment has not been conducted.

**SECTION 16. OTHER INFORMATION**

Safety Data Sheet Creation Date: 8 August 1993  
 Safety Data Sheet Revision Date: 16 January 2019  
 Revision Number: 7.0

THIS INFORMATION RELATES TO THE SPECIFIC MATERIAL DESIGNATED AND MAY NOT BE VALID FOR SUCH MATERIAL USED IN COMBINATION WITH ANY OTHER MATERIALS OR IN ANY PARTICULAR PROCESS OR FOR ANY PARTICULAR PURPOSE. SUCH INFORMATION STATED IS TO THE BEST OF RADCO'S KNOWLEDGE AND BELIEF, ACCURATE AND RELIABLE AS OF THE DATE COMPILED. HOWEVER, NO REPRESENTATION, WARRANTY OR GUARANTEE IS MADE TO ITS ACCURACY, RELIABILITY, OR COMPLETENESS, PURCHASERS, USERS AND DISTRIBUTORS ARE NOT RELYING ON ANY PROMISE, REPRESENTATION, OR RECOMMENDATION MADE BY RADCO, AND RADCO DOES NOT ACCEPT LIABILITY FOR ANY LOSS OR DAMAGE THAT MAY OCCUR FROM THE USE OF THIS INFORMATION. FINAL DETERMINATION OF SUITABILITY OF ANY MATERIAL IS THE SOLE RESPONSIBILITY OF THE USER. ALL MATERIAL SHOULD BE USED WITH CAUTION TO GUARD AGAINST UNKNOWN HAZARDS. ALTHOUGH CERTAIN HAZARDS ARE DESCRIBED HEREIN, RADCO DOES NOT GUARANTEE THAT THESE ARE THE ONLY HAZARDS THAT EXIST.

XCELTHERM® is a registered trademark of Radco Industries, Inc.

**Toxicological References**

- "Biphenyl." *National Center for Biotechnology Information. PubChem Compound Database.* U.S. National Library of Medicine. Web. 22 May 2017.
- "Diphenyl." *The National Institute for Occupational Safety and Health (NIOSH).* Centers for Disease Control and Prevention, 11 Apr. 2016. Web. 22 May 2017.
- "Diphenyl Ether." *Registration Dossier.* European Chemicals Agency, 12 Apr. 2017. Web. 22 May 2017.

**Definitions**

ACGIH	American Conference of Governmental Industrial Hygienists
H315	Causes skin irritation
H319	Causes serious eye irritation
H400	Very toxic to aquatic life
H410	Very toxic to aquatic life with long-lasting effects
HMIS	Hazardous Materials Identification System



**SAFETY DATA SHEET**  
**XCEL THERM® MK1 SOLAR GRADE HEAT TRANSFER FLUID**

Issue Date: 8 August 1993  
Revision Date: 16 January 2019  
Revision: 7.0

LC <sub>50</sub>	Lethal concentration that causes 50% death in test population.
LD <sub>50</sub>	Lethal dose that causes 50% death in test population.
NFPA	National Fire Protection Association
NIOSH	National Institute for Occupational Safety and Health
OECD	Organisation for Economic Co-operation and Development
OECD 201	OECD Guideline 201: Freshwater Alga and Cyanobacteria, Growth Inhibition Test
OECD 202	OECD Guideline 202: Daphnia sp. Acute Immobilisation Test
OECD 203	OECD Guideline 203: Fish, Acute Toxicity Test
OECD 301B	OECD Guideline 301B: Ready Biodegradability CO <sub>2</sub> Evolution (Modified Sturm Test)
OECD 301C	OECD Guideline 301C: Ready Biodegradability MITI (Ministry of International Trade and Industry, Japan)
OECD 301D	OECD Guideline 301D: Ready Biodegradability Closed Bottle
OECD 406	OECD Guideline 406: Skin Sensitization Test
OECD 414	OECD Guideline 414: Prenatal Development Toxicity Study
OSHA	United States Department of Labor Occupational Safety and Health Administration
PBT	Persistence Bioaccumulation and Toxicity
PEL	Permissible exposure limit
ppm	Parts per million
TWA	Time-weighted average
vPvB	Very persistent and very bioaccumulative