

1. Identification

Product identifier **EV Battery Array Thermal Interface Material**

Other means of identification
FIR No. 202309

Recommended use Thermal Interface Material

Recommended restrictions None known.

Manufacturer/Importer/Supplier/Distributor information

Company Name Ford Motor Company

Address Attention: SDS Information, P.O. Box 1899
 Dearborn, Michigan 48121
 USA

Telephone 1-800-392-3673

SDS Information 1-800-448-2063 (USA and Canada)
 fordsds.com

Emergency telephone numbers

Poison Control Center: USA and Canada: 1-800-959-3673
 INFOTRAC (Transportation): USA and Canada 1-800-535-5053

2. Hazard(s) identification

Physical hazards Not classified.

Health hazards Not classified.

Environmental hazards Hazardous to the aquatic environment, acute hazard Category 1
 Hazardous to the aquatic environment, long-term hazard Category 1

OSHA defined hazards Not classified.

Label elements



Signal word Warning

Hazard statement Very toxic to aquatic life. Very toxic to aquatic life with long lasting effects.

Precautionary statement

Prevention Avoid release to the environment.

Response Collect spillage.

Storage Store away from incompatible materials.

Disposal Dispose of contents/container in accordance with local/regional/national/international regulations.

Hazard(s) not otherwise classified (HNOC) None known.

Supplemental information None.

3. Composition/information on ingredients

Mixtures

Chemical name	Common name and synonyms	CAS number	%
ALUMINIUM OXIDE		1344-28-1	56 - 66
ZINC OXIDE		1314-13-2	19 - 29

Specific chemical identity and/or exact percentage (concentration) of composition has been withheld as a trade secret.

4. First-aid measures

Inhalation	Move to fresh air. Call a physician if symptoms develop or persist.
Skin contact	Wash off with soap and water. Get medical attention if irritation develops and persists.
Eye contact	Rinse with water. Get medical attention if irritation develops and persists.
Ingestion	Rinse mouth. Get medical attention if symptoms occur.
Most important symptoms/effects, acute and delayed	Headache. Nausea, vomiting. Coughing.
Indication of immediate medical attention and special treatment needed	Treat symptomatically.
General information	Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

5. Fire-fighting measures

Suitable extinguishing media	Water fog. Foam. Dry chemical powder. Carbon dioxide (CO ₂).
Unsuitable extinguishing media	Do not use water jet as an extinguisher, as this will spread the fire.
Specific hazards arising from the chemical	During fire, gases hazardous to health may be formed. Upon decomposition, this product emits carbon monoxide, carbon dioxide and/or low molecular weight hydrocarbons.
Special protective equipment and precautions for firefighters	Self-contained breathing apparatus and full protective clothing must be worn in case of fire.
Fire fighting equipment/instructions	Move containers from fire area if you can do so without risk.
Specific methods	Use standard firefighting procedures and consider the hazards of other involved materials.
General fire hazards	No unusual fire or explosion hazards noted.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	Avoid contact with eyes, skin, and clothing. Avoid breathing mist or vapor. Keep people away from and upwind of spill/leak. Keep unnecessary personnel away. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. Wear appropriate protective equipment and clothing during clean-up. For personal protection, see section 8 of the SDS.
Methods and materials for containment and cleaning up	<p>The product is immiscible with water and will sediment in water systems. This material is classified as a water pollutant under the Clean Water Act and should be prevented from contaminating soil or from entering sewage and drainage systems which lead to waterways.</p> <p>Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Absorb in vermiculite, dry sand or earth and place into containers. Following product recovery, flush area with water.</p> <p>Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination.</p> <p>Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS.</p>
Environmental precautions	Avoid release to the environment. Inform appropriate managerial or supervisory personnel of all environmental releases. Prevent further leakage or spillage if safe to do so. Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage

Precautions for safe handling	Avoid contact with eyes, skin, and clothing. Avoid breathing mist or vapor. Avoid prolonged exposure. Provide adequate ventilation. Avoid release to the environment. Observe good industrial hygiene practices. Wear appropriate personal protective equipment. For personal protection, see Section 8 of the SDS.
Conditions for safe storage, including any incompatibilities	Store in tightly closed container. Store away from incompatible materials (see Section 10 of the SDS).

8. Exposure controls/personal protection

Occupational exposure limits

The following constituents are the only constituents of the product which have a PEL, TLV or other recommended exposure limit. At this time, the other constituents have no known exposure limits.

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Components	Type	Value	Form
ALUMINIUM OXIDE (CAS 1344-28-1)	PEL	5 mg/m ³	Respirable fraction.
		15 mg/m ³	Total dust.
ZINC OXIDE (CAS 1314-13-2)	PEL	5 mg/m ³	Respirable fraction.
		5 mg/m ³	Fume.
		15 mg/m ³	Total dust.

US. OSHA Table Z-3 (29 CFR 1910.1000)

Components	Type	Value	Form
ALUMINIUM OXIDE (CAS 1344-28-1)	TWA	5 mg/m ³	Respirable fraction.
		15 mg/m ³	Total dust.
		50 mppcf	Total dust.
		15 mppcf	Respirable fraction.

US. ACGIH Threshold Limit Values

Components	Type	Value	Form
ALUMINIUM OXIDE (CAS 1344-28-1)	TWA	1 mg/m ³	Respirable fraction.
ZINC OXIDE (CAS 1314-13-2)	STEL	10 mg/m ³	Respirable fraction.
	TWA	2 mg/m ³	Respirable fraction.

US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value	Form
ZINC OXIDE (CAS 1314-13-2)	Ceiling	15 mg/m ³	Dust.
	STEL	10 mg/m ³	Fume.
	TWA	5 mg/m ³	Dust.
		5 mg/m ³	Fume.

Biological limit values

No biological exposure limits noted for the ingredient(s).

Appropriate engineering controls

Use adequate ventilation to control airborne concentrations below the exposure limits/guidelines. If user operations generate a vapor, dust and/or mist, use process enclosure, appropriate local exhaust ventilation, or other engineering controls to control airborne levels below the recommended exposure limits/guidelines.

Individual protection measures, such as personal protective equipment

Eye/face protection

Wear safety glasses with side shields (or goggles).

Skin protection

Hand protection

Suitable chemical protective gloves should be worn when the potential exists for skin exposure. The choice of an appropriate glove does not only depend on its material but also on other quality features and is different from one producer to the other. Nitrile, butyl rubber or neoprene gloves are recommended.

Other

Wear appropriate chemical resistant clothing if applicable.

Respiratory protection

If engineering controls do not maintain airborne concentrations to a level which is adequate to protect worker health, an approved respirator must be worn. Respirator selection, use and maintenance should be in accordance with the requirements of OSHA Respiratory Protection Standard 29 CFR 1910.134 and/or Canadian Standard CSA Z94.4.

Thermal hazards

Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations

Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical and chemical properties**Appearance**

Physical state	Liquid.
Form	VISCOUS LIQUID
Color	Dark grey.
Odor	Mild.
Odor threshold	Not available.
pH	Not available.
Melting point/freezing point	Not available.
Initial boiling point and boiling range	Not available.
Flash point	> 201.0 °F (> 93.9 °C) Setaf flash
Evaporation rate	Not available.
Flammability (solid, gas)	Not applicable.

Upper/lower flammability or explosive limits

Flammability limit - lower (%)	Not available.
Flammability limit - upper (%)	Not available.
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.

Vapor pressure Not available.

Vapor density > 1 (AIR=1)

Relative density 2.9

Solubility(ies)

Solubility (water) Insoluble

Partition coefficient (n-octanol/water) Not available.

Auto-ignition temperature Not available.

Decomposition temperature Not available.

Viscosity > 10000 mm²/s

Viscosity temperature 104 °F (40 °C)

Other information

Density 2.93 g/cm³

VOC 0 lb/gal

10. Stability and reactivity

Reactivity The product is stable and non-reactive under normal conditions of use, storage and transport.

Chemical stability Material is stable under normal conditions.

Possibility of hazardous reactions Hazardous polymerization does not occur.

Conditions to avoid Avoid temperatures exceeding the flash point. Contact with incompatible materials.

Incompatible materials Acids. Chlorine.

Hazardous decomposition products Upon decomposition, this product emits carbon monoxide, carbon dioxide and/or low molecular weight hydrocarbons.

11. Toxicological information**Information on likely routes of exposure**

Inhalation May cause irritation to the respiratory system. Prolonged inhalation may be harmful.

Skin contact Prolonged skin contact may cause temporary irritation.

Eye contact Direct contact with eyes may cause temporary irritation.
Ingestion May cause discomfort if swallowed.

Symptoms related to the physical, chemical and toxicological characteristics Headache. Nausea, vomiting. Coughing.

Information on toxicological effects

Acute toxicity

Components	Species	Calculated/Test Results
ZINC OXIDE (CAS 1314-13-2)		
Acute		
Inhalation		
LC50	Mouse	> 5.7 mg/l, 4 Hours
Oral		
LD50	Mouse	7950 mg/kg
	Rat	> 5 g/kg
Other		
LD50	Rat	240 mg/kg

Skin corrosion/irritation Prolonged skin contact may cause temporary irritation.

Serious eye damage/eye irritation Direct contact with eyes may cause temporary irritation.

Respiratory or skin sensitization

Respiratory sensitization Based on available data, the classification criteria are not met.

Skin sensitization Based on available data, the classification criteria are not met.

Germ cell mutagenicity Based on available data, the classification criteria are not met.

Carcinogenicity This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.

IARC Monographs. Overall Evaluation of Carcinogenicity

Not listed.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053)

Not listed.

Reproductive toxicity Based on available data, the classification criteria are not met.

Specific target organ toxicity - single exposure Based on available data, the classification criteria are not met.

Specific target organ toxicity - repeated exposure Based on available data, the classification criteria are not met.

Aspiration hazard Based on available data, the classification criteria are not met.

Chronic effects Prolonged inhalation may be harmful.

12. Ecological information

Ecotoxicity Very toxic to aquatic life with long lasting effects.

Ecotoxicity

Components	Species	Calculated/Test Results
ZINC OXIDE (CAS 1314-13-2)		
Aquatic		
Fish	LC50 Fathead minnow (<i>Pimephales promelas</i>)	2246 mg/l, 96 hours

Persistence and degradability No data is available on the degradability of any ingredients in the mixture.

Bioaccumulative potential No data available.

Mobility in soil No data available.

Other adverse effects No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.

13. Disposal considerations

Disposal instructions	Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Do not allow this material to drain into sewers/water supplies. Do not contaminate ponds, waterways or ditches with chemical or used container. Dispose of contents/container in accordance with local/regional/national/international regulations.
Local disposal regulations	Dispose in accordance with all applicable regulations.
Hazardous waste code	The waste code should be assigned in discussion between the user, the producer and the waste disposal company.
Waste from residues / unused products	Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).
Contaminated packaging	Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.

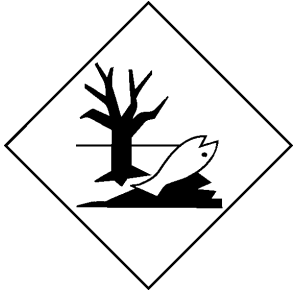
14. Transport information

DOT	
UN number	UN3077
UN proper shipping name	Environmentally hazardous substances, liquid, n.o.s. (ZINC OXIDE), MARINE POLLUTANT
Transport hazard class(es)	
Class	9
Subsidiary risk	-
Label(s)	9
Packing group	III
Environmental hazards	
Marine pollutant	Yes
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
IATA	
UN number	UN3077
UN proper shipping name	Environmentally hazardous substance, liquid, n.o.s. (ZINC OXIDE)
Transport hazard class(es)	
Class	9
Subsidiary risk	-
Packing group	III
Environmental hazards	Yes
ERG Code	9L
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
IMDG	
UN number	UN3077
UN proper shipping name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (ZINC OXIDE), MARINE POLLUTANT
Transport hazard class(es)	
Class	9
Subsidiary risk	-
Packing group	III
Environmental hazards	
Marine pollutant	Yes
EmS	F-A
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code	Not established.

DOT; IATA; IMDG



Marine pollutant



General information

IMDG Regulated Marine Pollutant. DOT Regulated Marine Pollutant.

15. Regulatory information

US federal regulations

This product is not known to be a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

Toxic Substances Control Act (TSCA)

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

CERCLA Hazardous Substance List (40 CFR 302.4)

ZINC OXIDE (CAS 1314-13-2)

Listed.

SARA 304 Emergency release notification

Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053)

Not listed.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous chemical No

SARA 313 (TRI reporting)

Chemical name	CAS number	% by wt.
ALUMINIUM OXIDE	1344-28-1	56 - 66
ZINC OXIDE	1314-13-2	19 - 29

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Not regulated.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Safe Drinking Water Act (SDWA) Not regulated.

US state regulations

California Proposition 65

California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins. For more information go to www.P65Warnings.ca.gov.

International Inventories

All components are listed or are exempt from listing on the Toxic Substances Control Act Inventory.

16. Other information, including date of preparation or last revision

Issue date	10-08-2020
Revision date	10-08-2020
Version	02
HMIS® ratings	Health: 1 Flammability: 1 Physical hazard: 0
NFPA ratings	Health: 1 Flammability: 1 Instability: 0
Preparation Information and Disclaimer	This document was prepared by FCSD-Toxicology, Ford Motor Company, Fairlane Business Park IV, 17225 Federal Drive, Allen Park, MI 48101, USA, based in part on information provided by the manufacturer. The information on this data sheet represents our current data and is accurate to the best of our knowledge as to the proper handling of this product under normal conditions and in accordance with the application specified on the packaging and/or technical guidance literature. Any other use of the product which involves using the product in combination with any other product or any other process is the responsibility of the user. To the extent that there are any differences between this product's Safety Data Sheet (SDS) and the consumer packaged product labels, the SDS should be followed.
Revision information	Hazard(s) identification: Hazard(s) not otherwise classified (HNOC) Physical & Chemical Properties: Multiple Properties
Part number(s)	TA-38