

# MATERIAL SAFETY DATA SHEET

## C-2199 Experimental Heat Stabilizer

Morton Thiokol, Inc.  
Carstab Division  
2000 West Street  
Cincinnati, Ohio 45215

Emergency Phone No. 513-733-2218  
General Information 513-733-2100  
MSDS Reference No. 2199  
Rev. Date 01/14/86 Rev. No. 1

### I. PRODUCT IDENTIFICATION

Product name: C-2199 Experimental Heat Stabilizer  
Chemical name: Mixture  
Chemical family: Proprietary alkyltin heat stabilizer

### II. HAZARDOUS CONSTITUENTS

| CAS No. | Chemical                                                   | Hazard Data                            |
|---------|------------------------------------------------------------|----------------------------------------|
|         | Experimental product of proprietary composition            | TLV tin-skin.<br>0.1 mg/m <sup>3</sup> |
|         | For R & D use only under appropriate technical supervision | Combustible                            |

### III. PHYSICAL DATA

|                              |                                                                  |                        |                |
|------------------------------|------------------------------------------------------------------|------------------------|----------------|
| Boiling point:               | 220°C                                                            | Melting point:         | Not applicable |
| Vapor pressure:              | <1.0 mm @ 25°C                                                   | Vapor density (air=1): | 4.5            |
| H <sub>2</sub> O solubility: | Insoluble                                                        | % volatiles by wt.:    | 6 @ 110°C      |
| Viscosity:                   | 36 cs @ 25°C                                                     | Specific gravity:      | 1.00 @ 25°C    |
| Appear. & odor:              | Clear colorless to pale yellow liquid with slight mercaptan odor |                        |                |

### IV. FIRE AND EXPLOSION HAZARD DATA

Flash point (method used): 190°F (Setaflash - ASTM D3273-78)  
Flammable limits in air: Unknown  
Extinguishing media: Carbon dioxide, water fog or foam  
Fire fighting procedures: Self-contained breathing apparatus with full facepiece in positive pressure mode and impervious suit  
Fire & explosion hazards: On burning, may produce irritating or toxic vapors including hydrocarbons, organotin and oxides of carbon and sulfur.

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V. HEALTH HAZARD INFORMATION

Health Hazard Data      Based on animal studies of similar products. No human exposure data.

TLV: 0.1 mg tin/m<sup>3</sup>, tin-skin  
PEL: 0.1 mg tin/m<sup>3</sup>, tin-skin

LD50: Not determined

LC50: Not determined

Skin Irritation Index (rabbit): Not determined  
Eye Irritation Index (rabbit): Not determined

Effects of Overexposure

Inhalation: May cause headache, nausea and/or irritation of throat (coughing).  
Skin contact: May cause reddening of the skin (erythema), swelling (edema) and irritation (dermatitis).  
Skin absorption: May cause shaking, loss of coordination, ataxia and hypersensitivity.  
Eye contact: No data available but good hygiene dictates avoiding any eye contact.  
Ingestion: May cause depression, excessive salivation, diarrhea, eye and nasal discharge.  
Chronic: No data available. Targeted organs in acute toxicity test of similar products include kidneys.

Emergency First Aid Procedures

Eyes: Flush with water for 15 minutes. Obtain medical attention.  
Skin: Wash immediately with soap and water. Remove contaminated clothing. Obtain medical attention if contact was prolonged or extensive.  
Inhalation: Remove to fresh air. Obtain medical attention if any irritation develops.  
Ingestion: Obtain medical attention immediately.

## VI. REACTIVITY DATA

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Stability of compound: Stable  
Chemical incompatibility: Compatible with other stable compounds.  
Decomposition products: Hydrocarbons, organotins and oxides of carbon and sulfur may be produced when burned.  
Hazardous polymerization: Will not occur.

## VII. SPILL OR LEAK PROCEDURES

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If material is spilled: Spills may be removed with any absorbent: sand, sponge, cloth, paper, etc. Use detergent with water for final cleanup. Wear prescribed protective equipment (see section VIII) to prevent vapor inhalation or skin contact.

Waste disposal method: Place absorbed material in an appropriate, closed container for disposal of in accordance with local, state and federal regulations.

Reportable quantities: Not applicable

## VIII. SPECIAL PROTECTION INFORMATION

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Ventilation requirements: Adequate to prevent vapor accumulation & keep below TLV/PEL.

### Equipment

Respiratory: If vapors are irritating, wear NIOSH-approved cartridge respirator with organic vapor cartridges. Where large vapor concentrations are suspected, wear NIOSH-approved air-supplied breathing equipment.

Eyes: Safety goggles and/or safety glasses and face shield

Gloves: Rubberized gloves

Other: Impermeable suit or rubber apron

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Morton Thiokol, Inc.  
Carstab Division  
513-733-2100

#### IX. SPECIAL PRECAUTIONS

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Do not take internally.

Store in cool, dry location.

For industry use only.

Keep away from children.

Remove contaminated clothing immediately and launder before reuse.

Contaminated shoes and gloves should be destroyed.

For MSDS information contact John L. Hanley, 513-733-2127.

"To the best of our knowledge the information contained herein is correct. All chemicals may present unknown health hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards which exist. Final determination of suitability of the chemical is the sole responsibility of the user. Users of any chemical should satisfy themselves that the conditions and methods of use assure that the chemical is used safely. NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR ANY OTHER NATURE ARE MADE HEREUNDER WITH RESPECT TO THE INFORMATION CONTAINED HEREIN OR THE CHEMICAL TO WHICH THE INFORMATION PERTAINS."

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# MATERIAL SAFETY DATA SHEET

## C-2227 Experimental Weatherable Lubricant

Morton Thiokol, Inc.  
Carstab Division  
2000 West Street  
Cincinnati, Ohio 45215

Emergency Phone No. 513-733-2218  
General Information 513-733-2100  
MSDS Reference No. 2227  
Rev. Date 12/16/85 Rev. No. 1

### I. PRODUCT IDENTIFICATION

Product name: Experimental weatherable lubricant  
Chemical name: Confidential  
Chemical family: Confidential

### II. HAZARDOUS CONSTITUENTS

| CAS No. | Chemical                                                   | Hazard Data |
|---------|------------------------------------------------------------|-------------|
|         | None currently known as defined by 29 CFR 1910.1200.       |             |
|         | Review this MSDS for precautionary and emergency measures. |             |
|         | For research and developmental use only.                   |             |

### III. PHYSICAL DATA

|                              |                |                        |                |
|------------------------------|----------------|------------------------|----------------|
| Boiling point:               | Not determined | Melting point:         | 40-45°C        |
| Vapor pressure:              | Not determined | Vapor density (air=1): | Not applicable |
| H <sub>2</sub> O solubility: | Insoluble      | % volatiles by wt.:    | Not determined |
| Viscosity:                   | Not applicable | Specific gravity:      | 0.98 at 25°C   |

Appear. & odor: White flake with mild odor

### IV. FIRE AND EXPLOSION HAZARD DATA

Flash point (method used): Not determined - ASTM D3278-78)  
Flammable limits in air: Not applicable  
Extinguishing media: Carbon dioxide, water fog or foam  
Fire fighting procedures: Self-contained breathing apparatus with full facepiece in positive pressure mode and impervious suit  
Fire & explosion hazards: On burning, may produce irritating or toxic vapors including: hydrocarbons and oxides of carbon.

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V. HEALTH HAZARD INFORMATION

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Health Hazard Data

TLV: None established  
PEL: None established

LD50: Not determined

LC50: Not determined

Skin Irritation Index (rabbit): Not determined  
Eye Irritation Index (rabbit): Not determined

Effects of Overexposure

Inhalation: None currently known.  
Skin contact: None currently known.  
Skin absorption: None currently known.  
Eye contact: None currently known.  
Ingestion: None currently known.  
Chronic: None currently known.

Emergency First Aid Procedures

Eyes: Flush with water for 15 minutes. Obtain medical attention.  
Skin: Wash immediately with soap and water. Remove contaminated clothing. Obtain medical attention if any irritation results.  
Inhalation: Remove to fresh air. Obtain medical attention if any irritation develops.  
Ingestion: Obtain medical attention.

#### VI. REACTIVITY DATA

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Stability of compound: Stable  
Chemical incompatibility: Compatible with other stable compounds.  
Decomposition products: Hydrocarbons and their decomposition products including oxides of carbon may be produced during fire.  
Hazardous polymerization: Will not occur.

#### VII. SPILL OR LEAK PROCEDURES

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If material is spilled: Spills may be removed mechanically. Avoid dusting. Detergent and water may be used for final cleanup.  
Waste disposal method: Place material in an appropriate container for disposal of in accordance with local, state and federal regulations.  
Reportable quantities: Not applicable

#### VIII. SPECIAL PROTECTION INFORMATION

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Ventilation requirements: Use adequate ventilation to control dusting.

##### Equipment

Respiratory: If dust becomes irritating, wear a NIOSH-approved dust respirator with dust cartridge, or a NIOSH-approved air-supplied breathing apparatus may be used if necessary.

Eye: Safety goggles (and/or safety glasses) and face shield

Gloves: Use gloves to avoid skin contact.

Other: Protective dust-proof clothing

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12/16/85

Morton Thiokol, Inc.  
Carstab Division  
513-733-2100

#### IX. SPECIAL PRECAUTIONS

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Do not take internally.

Store in cool, dry location.

For industry use only.

Keep away from children.

For MSDS information contact John L. Hanley, 513-733-2127.

"To the best of our knowledge the information contained herein is correct. All chemicals may present unknown health hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards which exist. Final determination of suitability of the chemical is the sole responsibility of the user. Users of any chemical should satisfy themselves that the conditions and methods of use assure that the chemical is used safely. NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR ANY OTHER NATURE ARE MADE HEREUNDER WITH RESPECT TO THE INFORMATION CONTAINED HEREIN OR THE CHEMICAL TO WHICH THE INFORMATION REFERS."

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# MATERIAL SAFETY DATA SHEET

## C-2327 Lubricating Stabilizer

Morton Thiokol, Inc.  
Carstab Products  
2000 West Street  
Cincinnati, Ohio 45215

Emergency Phone No. 513-733-2218  
General Information 513-733-2100  
MSDS Reference No. 2327  
Rev. Date 06/29/87 Rev. No. 1

### I. PRODUCT IDENTIFICATION

Product name: C-2327 Experimental Lubricating Stabilizer  
Chemical name: Mixture  
Chemical family: PVC lubricant & alkyltin mercaptide stabilizer

### II. HAZARDOUS CONSTITUENTS

| CAS No.    | Chemical                               |      | Hazard Data                         |
|------------|----------------------------------------|------|-------------------------------------|
| 57583-35-4 | Mixed methyltin mercaptoester sulfides | <21% | TLV tin-skin, 0.1 mg/m <sup>3</sup> |

### III. PHYSICAL DATA

|                              |                 |                        |                |
|------------------------------|-----------------|------------------------|----------------|
| Boiling point:               | >290°C (decom.) | Melting point:         | 110°C (d.p)    |
| Vapor pressure:              | <0.1 mm @ 25°C  | Vapor density (air=1): | Not applicable |
| H <sub>2</sub> O solubility: | Insoluble       | % volatiles by wt.:    | <1.0 @ 110°F   |
| Viscosity:                   | Not applicable  | Specific gravity:      | 0.95           |

Appear. & odor: Off-white to light yellow powder with slight mercaptan odor

### IV. FIRE AND EXPLOSION HAZARD DATA

Flash point (method used): 370°F (Setaflash - ASTM D3278-78)  
Flammable limits in air: Not applicable  
Extinguishing media: Dry chemical; carbon dioxide; water spray; foam  
Fire fighting procedures: Self-contained breathing apparatus with full facepiece in positive pressure mode and impervious suit  
Fire & explosion hazards: On burning, may produce irritating or toxic vapors including hydrocarbons, organotins and oxides of carbon and sulfur.

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## V. HEALTH HAZARD INFORMATION

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Health Hazard Data      Based on animal studies of a similar organotin stabilizer @ 100% active.

TLV: 0.1 mg tin/m<sup>3</sup>, tin-skin  
PEL: 0.1 mg tin/m<sup>3</sup>, tin-skin

LD50: oral, 4700 mg/kg (rat)

LC50: not determined

Skin Irritation Index (rabbit): 1.04 (not primary irritant)

Eye Irritation Index (rabbit): Not an eye irritant

### Effects of Overexposure

Inhalation: May cause headache, nausea and/or irritation of throat (coughing) or skin (itching).  
Skin contact: May cause reddening of the skin (erythema), swelling (edema) and irritation (dermatitis). May cause shaking, loss of coordination, ataxia and hypersensitivity.  
Eye contact: Not an irritant (see above) but good hygiene dictates avoiding any eye contact.  
Ingestion: May cause depression, excessive salivation, diarrhea, eye and nasal discharge.  
Chronic: No known human exposure data. The no-toxic effect level in the diet of rats was >5,000 ppm in a sub-chronic (90 day) toxicity study of a similar lubricating stabilizer product.

### Emergency First Aid Procedures

Eyes: Flush with water for 15 minutes. Obtain medical attention.  
Skin: Wash immediately with soap and water. Remove contaminated clothing. Obtain medical attention if contact was prolonged or extensive.  
Inhalation: Remove to fresh air. Obtain medical attention if any irritation develops.  
Ingestion: Obtain medical attention immediately.

#### VI. REACTIVITY DATA

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Stability of compound: Stable  
Chemical incompatibility: Can liberate hydrogen sulfide on contact with acids  
Decomposition products: Hydrocarbons, organotins and oxides of carbon and sulfur may be produced when burned.  
Hazardous polymerization: Will not occur.

#### VII. SPILL OR LEAK PROCEDURES

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If material is spilled: Spills may be removed mechanically. Avoid dusting. Use prescribed safety equipment. Detergent and water may be used for final cleanup.  
Waste disposal method: Place material in an appropriate, closed container for disposal of in accordance with local, state and federal regulations.

#### VIII. SPECIAL PROTECTION INFORMATION

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Ventilation requirements: Use adequate ventilation to prevent dust & comply with TLV.

##### Equipment

Respiratory: If dusting conditions exist or vapors become irritating, wear a NIOSH-approved, air-supplied breathing apparatus.

Eye: Safety goggles (and/or safety glasses) and face shield

Gloves: Impervious gloves

Other: Impervious suit

IX. SPECIAL PRECAUTIONS

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Do not take internally.

Store in cool, dry location.

For industrial use only

Wash thoroughly after handling.

"To the best of our knowledge the information contained herein is correct. All chemicals may present unknown health hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards which exist. Final determination of suitability of the chemical is the sole responsibility of the user. Users of any chemical should satisfy themselves that the conditions and methods of use assure that the chemical is used safely. NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR ANY OTHER NATURE ARE MADE HEREUNDER WITH RESPECT TO THE INFORMATION CONTAINED HEREIN OR THE CHEMICAL TO WHICH THE INFORMATION REFERS."