



# MATERIAL SAFETY DATA SHEET

Prepared in accordance with ISO 11014-1/ ANSI standard  
Z400.1-2004

Revision Date: 04/September/2009

## 1. PRODUCT AND COMPANY IDENTIFICATION

**Product Name:** Formate Drilling Mud

**Synonyms:** cesium/potassium formate mud

**Use of the Substance/Preparation:** Drilling fluids, Industrial Products

**Supplier:**

Cabot Specialty Fluids  
Waterway Plaza Two  
10001 Woodloch Forest Drive  
Suite 275  
The Woodlands, TX 77380  
UNITED STATES  
Tel: 1-281-298-9955  
Fax: 1-281-298-6190

Tantalum Mining Corporation  
of Canada, Ltd.  
Bernic Lake  
Box 2000  
Lac du Bonnet, MB R0E 1A0  
CANADA  
Tel: 1-204-884-2400  
Fax: 1-204-884-2211

Cabot Specialty Fluids  
Ocean House  
Hareness Circle  
Altens Industrial Estate  
Aberdeen AB12 3LY  
SCOTLAND  
Tel: (+44) 1224-897229  
Fax: (+44) 1224-870089

**Emergency Telephone Number:** US: CHEMTREC 1-800-424-9300 or 1-703-527-3887  
US: Other 1-978-663-3455  
Canada: CANUTEC 1-613-996-6666

## 2. HAZARDS IDENTIFICATION

### EMERGENCY OVERVIEW - CAUTION:

Brown Liquid. Harmful if swallowed. Irritating to eyes and skin. Dried product may be a respiratory irritant.

**Principle Routes of Exposure:** Eye contact, Skin contact

### POTENTIAL HEALTH EFFECTS

**Eye Contact:** Irritating to eyes. Avoid contact with eyes.

**Skin Contact:** Irritating to skin. Avoid contact with skin.

**Inhalation:** Due to its liquid state, this material is not expected to be a significant inhalation hazard. Aerosols or dried product may be irritating to respiratory tract.

**Ingestion:** Harmful if swallowed.

**Carcinogenic Effects:** Does not contain any substances listed by IARC (International Agency for Research on Cancer), NTP (National Toxicology Program), OSHA (Occupational Safety and Health Administration), ACGIH (American Conference for Governmental Industrial Hygienists) or EU (European Union). See also Section 11.

**Target Organ Effects:** Eyes, Skin, Respiratory system

**Medical Conditions Aggravated by Exposure:** None under normal use

**Potential Environmental Effects:** No special environmental precautions required. See also Section 12.

### 3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS Number	EINECS/ELINCS Number	Weight %	EU Classification
Sodium Formate	141-53-7	205-488-0	1-53	None
Cesium Formate	3495-36-1	222-492-8	1-84	Xn;R48/22-36
Potassium formate	590-29-4	209-677-9	1-76	None
Water	7732-18-5	231-791-2	>13	None
Calcium carbonate	471-34-1	207-439-9	<9	None
Sodium carbonate	497-19-8	207-838-8	<3	Xi;R36
Potassium carbonate	584-08-7	209-529-3	<3	Xn;R:22-36/37/38
Sodium Bicarbonate	144-55-8	215-633-8	<3	None
Potassium bicarbonate	298-14-6	206-059-0	<3	None
Xanthan Gum	11138-66-2	234-394-2	<1	None
Potassium hydroxide	1310-58-3	215-181-3	<1	C;R35 Xn;R22
Polyanionic cellulose polymer	9004-32-4	Not assigned	<1	None
Starch	9005-25-8	232-679-6	<1	None
Cellulose, Colloidal Fiber	70851-17-1	Not assigned	<1	None

### 4. FIRST AID MEASURES

<b>Skin Contact:</b>	Wash thoroughly with soap and water. Seek medical attention if redness, swelling, itching, or burning occurs.
<b>Eye Contact:</b>	Flush eyes immediately with large amounts of water for 15 minutes. Seek medical attention if redness, swelling, itching, burning or visual disturbances occur.
<b>Inhalation:</b>	If cough, shortness of breath or other breathing problems occur, move to fresh air. Seek medical attention if symptoms persist. If necessary, restore normal breathing through standard first aid measures.
<b>Ingestion:</b>	Do not induce vomiting. If conscious, give several glasses of water. Never give anything by mouth to an unconscious person.
<b>Notes to Physician:</b>	Treat symptomatically.

### 5. FIRE AND IGNITION INFORMATION

<b>Flash Point:</b>	Not applicable
<b>Explosion Limits in Air - Upper (g/m<sup>3</sup>):</b>	Not applicable
<b>Explosion Limits in Air - Lower (g/m<sup>3</sup>):</b>	Not applicable
<b>Extinguishing Media:</b>	Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
<b>Special Protective Equipment for Firefighters:</b>	Wear suitable protective equipment. In the event of fire, wear self-contained breathing apparatus.
<b>Specific Hazards:</b>	Burning produces irritant fumes.
<b>Hazardous Decomposition and/or Combustion Products:</b>	Carbon monoxide, Carbon dioxide, Hydrocarbons, Mixture of inorganic salts.
<b>Risk of Dust Explosion:</b>	None.

### 6. ACCIDENTAL RELEASE MEASURES

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<b>Personal Precautions:</b>	Avoid formation of dust and aerosols. Ensure adequate ventilation. Use personal protective equipment. See also Section 8.
<b>Methods for Cleaning Up:</b>	Soak up with inert absorbent material. Pick up and transfer to properly labelled containers. See Section 13.
<b>Environmental Precautions:</b>	Do not flush into surface water or sanitary sewer system. Do not allow material to contaminate ground water system. Local authorities should be advised if significant spillages cannot be contained. See also Section 13.

## 7. HANDLING AND STORAGE

<b>Handling:</b>	Avoid contact with skin and eyes. Avoid formation of dust, aerosol, or mist. Do not breathe aerosols or dust from dried material. Provide appropriate exhaust ventilation at machinery and at places where vapors from hot product or dust can be generated.
<b>Storage:</b>	Keep containers tightly closed in a dry, cool and well-ventilated place. Keep in properly labeled containers. Do not store together with strong oxidizing agents.

## 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

### EXPOSURE LIMITS

There are no exposure limits identified for this product.

**ENGINEERING CONTROLS**      Ensure adequate ventilation to minimize exposures.

### PERSONAL PROTECTIVE EQUIPMENT

<b>Respiratory Protection:</b>	Approved respirator may be necessary if local exhaust ventilation is not adequate.
<b>Hand Protection:</b>	Wear as appropriate. Impervious gloves. Neoprene gloves. Protective gloves. Nitrile rubber gloves. Rubber gloves. PVC or other plastic material gloves.
<b>Eye Protection:</b>	Wear eye/face protection. Safety glasses with side-shields. Goggles. Wear face-shield if splashes are likely to occur.
<b>Skin and Body Protection:</b>	Wear suitable protective clothing. No special protective equipment required.
<b>Other:</b>	Handle in accordance with good industrial hygiene and safety practice. Emergency eyewash and safety shower should be located nearby.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

<b>Appearance:</b>	Brown Liquid
<b>Odor:</b>	Slight
<b>pH:</b>	9-11
<b>Vapor Pressure:</b>	400-2250 Pa
<b>Vapor Density:</b>	Not determined
<b>Boiling Point/Range:</b>	102 to 145°C
<b>Melting Point/Range:</b>	Not applicable

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<b>Water Solubility:</b>	Not applicable
<b>Density:</b>	1.05-2.40 g/cm <sup>3</sup> @ 20°C
<b>Bulk Density:</b>	Not applicable
<b>Specific Gravity:</b>	Not determined
<b>Evaporation Rate:</b>	Not determined
<b>Viscosity:</b>	1-300 cPs
<b>Partition Coefficient (n-octanol/water):</b>	Not determined

## 10. STABILITY AND REACTIVITY

<b>Stability:</b>	Stable
<b>Hazardous Polymerization:</b>	Hazardous polymerization does not occur.
<b>Mechanical Sensitivity (shock):</b>	Not sensitive to mechanical impact.
<b>Conditions to Avoid:</b>	Avoid contact with: Strong oxidizing agents. During long exposures to high temperatures, and in contact with certain catalysts, some liberation of gasses (H <sub>2</sub> and CO) might occur. The greatest risk exists when dry formate powder is contacted by a platinum catalyst. Users are advised to obtain the Cabot Specialty Fluid's (CSF) Formate Technical Manual, Section A13 from a CSF representative for more detailed information on conditions to avoid. CSF does not recommend retorting formate solutions to determine solids content as temperatures may exceed 500 °C. The use of rupture disks is recommended as a precautionary measure when conducting heat aging of formate solutions at temperatures above 150 °C.
<b>Hazardous Decomposition and/or Combustion Products:</b>	Carbon dioxide, Carbon monoxide, Hydrogen, Mixture of inorganic salts.
<b>Static Discharge Effects:</b>	Avoid formation of dust and aerosols. Take precautionary measures against static discharges.

## 11. TOXICOLOGICAL INFORMATION

*Information given is based on data obtained from this substance or from similar substances.*

### ACUTE TOXICITY

**Oral LD50:** LD50/oral/rat = 1780 mg/kg.

**Inhalation LC50:** Not determined.

**Dermal LD50:** LD50/dermal/rabbit = > 2000 mg/kg.

**Eye Irritation:** Draize: 17.7/110 (1 hr); 11.7/110 (24 hrs); 5.7/110 (72 hrs). Moderate eye irritation.

**Skin Irritation:** Primary irritation index = 1.8. Slight irritation.

### SUBCHRONIC TOXICITY

Cesium formate. 28-day/oral/rat: Effects were observed in multiple organ systems at the high dose (500 mg/kg/d). Signs of neurotoxicity were also observed. Elevated reticulocyte count and effects on the heart, liver, spleen and serum biochemistry were observed at the middle dose (150 mg/kg/d). Elevated reticulocyte count was the only effect observed at the low dose (15 mg/kg/d).

## CHRONIC TOXICITY

**Carcinogenic Effects:** Does not contain any substances listed by IARC (International Agency for Research on Cancer), NTP (National Toxicology Program), OSHA (Occupational Safety and Health Administration), ACGIH (American Conference for Governmental Industrial Hygienists) or EU (European Union).

## OTHER

### **Mutagenic Effects:**

Not mutagenic in AMES Test, chromosomal aberration in human lymphocytes.

**Reproductive Toxicity:** Cesium formate data. Effects observed in ovaries and testes at 500 mg/kg/d in a 28-day oral repeated dose study in rats. No effects were observed on reproductive organs at the two lower doses (150 and 15 mg/kg/d).

**Sensitizing Effects:** Contains no known sensitizers.

**Synergistic Materials:** None reasonably foreseeable.

## **12. ECOLOGICAL INFORMATION**

*Information given is based on data on the components and the toxicology of similar products.*

### **Aquatic Toxicity:**

#### MARINE

Pacific oyster (*Crassostrea gigas*) EC50 (24 hr) = 1200 mg/l

Marine copepod (*Acartia tonsa*) EC50 (48 hr) = 340 mg/l

Marine algae (*Skeletonema costatum*) EC50 (72 hr) = 710 mg/l

Brown shrimp (*Crangon crangon*) LC50 (96 hr) = 91 mg/l

Juvenile turbot (*Scophthalmus maximus*) LC50 (96 hr) = 260 mg/l

Amphipod (*Corophium volutator*) LC50 (10 day) = 6653 mg/kg

Mysid shrimp (*Mysidopsis bahia*) LC50 (96 hr) < 30,000 ppm

#### FRESHWATER

Zebra fish (*Brachydanio rerio*) LC50 (96 hr) >100 mg/l

Rainbow trout (*Oncorhynchus mykiss*) LC50 (96 hr) = 2100 mg/l

Water flea (*Daphnia magna*) EC50 (48 hr) = 35 mg/l

Freshwater algae (*Scenedesmus subspicatus*) EC50 (72 hr) = 1.6 mg/l

Freshwater algae (*Selenastrum capricornutum*) EC50 (72 hr) = 3.5 mg/l

### **Other Information:**

In the majority of marine species, this material has not demonstrated toxicity and has received a Group E Rating (the highest approval rating) under the PARCOM Harmonized Offshore and Chemical Notification Format (HOCNF).

## ENVIRONMENTAL FATE

### **Bioaccumulation:**

Log Pow = <2.20 (no potential to bioconcentrate). See also Section 9.

### **Persistence / Degradability:**

Ready Biodegradability in Sea Water - Closed Bottle Test (OECD Method 306) = 79% degradation after 28 days

Ready Biodegradability in Freshwater - Closed Bottle Test (OECD Method 301D) = 83% degradation after 28 days

## **13. DISPOSAL CONSIDERATIONS**

**Disclaimer:** Information in this section pertains to the product as shipped in its intended composition as described in Section 3 of this MSDS. Contamination or processing may change waste characteristics and requirements. Regulations may also apply to empty containers, liners or rinsate. State/provincial and local regulations may be different from federal regulations.

**Unused and Uncontaminated Product:** Product, as supplied, should be disposed of in accordance with the regulations issued by the appropriate federal, state and local authorities. Same consideration should be given to containers and packaging.

## 14. TRANSPORT INFORMATION

Not covered by International Regulation on the transport of Dangerous Goods (IMDG, IATA, ADR/RID).

**UN Number:** Not Regulated  
**UN Proper Shipping Name:** Not classified  
**UN Shipping Class:** Not classified  
**UN Packing Group:** Not classified

### IMO IBC Code:

Cesium Formate - Provisionally assessed as: Pollution Category Z, Ship Type 3, with additional requirement 15.19.6.  
Potassium Formate - Pollution Category Z, Pollution Hazard Only, Not Requiring a Chemical Tanker.  
Calcium Carbonate - Pollution Category Z, Pollution Hazard Only, Ship Type 3.

### IMDG (International Maritime Organization's Dangerous Goods Code):

Not regulated.

### IATA (International Air Transport Association):

Not regulated.

## 15. REGULATORY INFORMATION

### Hazard Classification

**United States - OSHA (29 CFR 1910.1200):** Hazardous.

**Mexico - NOM-018-STPS-2000:** Refer to HMIS Rating in Section 16.

**Canada - WHMIS Classification (CPR, SOR/88-66):** Class D2B - Toxic Material.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

Chemical Name	WHMIS Ingredient Disclosure List:
Sodium carbonate	1 %
Potassium carbonate	1 %
Potassium hydroxide	1 %

### International Inventories

All components of this product are listed on or exempt from the following inventories:

- YES - Australian Inventory of Chemical Substances (AICS)
- YES - Canadian Domestic Substances List (DSL)
- NO - Chinese Inventory
- YES - European Inventory of Existing Commercial Chemical Substances (EINECS)
- NO - Japanese Inventory of Existing and New Chemical Substances (ENCS)
- NO - Korean Existing Chemicals List (KECL)
- NO - New Zealand Hazardous Substances and New Organisms Act (HSNO)
- NO - Philippines Inventory of Chemicals and Chemical Substances (PICCS)
- YES - United States Toxic Substances Control Act (TSCA) Inventory

### U.S. Federal Regulations

**TSCA 12(b) Export Notification:** This product does not contain any components that are subject to TSCA 12(b) Export Notification.

**Clean Air Act Amendments of 1990 (CAA, Section 112, 40 CFR 82):** This product does not contain any components listed as a Hazardous Air Pollutant, Flammable Substance, Toxic Substance, or Class 1 or 2 Ozone Depletor.

**Clean Water Act (CWA, 40 CFR 116) Priority Pollutants:** This product does not contain any listed Priority Pollutants.

**Comprehensive Environmental Response, Compensation and Liability Act (CERCLA, 40 CFR 302):** This product contains a listed Hazardous Substance(s).

**Superfund Amendments and Reauthorization Act, Title III (SARA):**

**SARA Section 302 (40 CFR 355) Extremely Hazardous Substances:** No components are listed as extremely hazardous chemicals under SARA Section 302.

**SARA Sections 311/312 (40 CFR 370) Hazard Category:** ACUTE/IMMEDIATE HEALTH HAZARD.

**SARA Section 313 (40 CFR 372) Toxics Release Inventory:** Does not contain any of the substances identified under Section 313 as toxic chemicals in excess of the de minimis concentrations necessary to be subject to the supplier notification requirements.

**Pharmaceutical Information:** Not permitted

## U.S. State Regulations

**California Proposition 65:** This product does not contain any components listed on California Proposition 65.

**US Coalition of NorthEastern Governors (CONEG) Metals List:** This product meets the CONEG Source Reduction Council limits for the sum of the levels of lead, cadmium, mercury and hexavalent chromium of less than 100 parts per million by weight.

## 16. OTHER INFORMATION

### HMIS Rating

**HMIS Index:** \* - chronic, 0 - minimal, 1 - slight, 2 - moderate, 3 - serious, 4 - severe

**Health:** 1

**Flammability:** 0

**Physical Hazard:** 0

### **References:**

MARPOL 73/78, Latest edition of Marine Environment Protection Committee (MEPC) Circulars MEPC.2/Circular, IBC Code, IMO Resolution A.673(16) Guidelines for the Transport and Handling of Limited Amounts of Hazardous and Noxious Liquid Substances in bulk on Offshore Support Vessels.

### **Additional Contacts:**

**Prepared by:** Cabot Corporation - Safety, Health and Environmental Affairs

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**Reason for Revision:** Revision to Section(s) 14, 16

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