



SAFETY DATA SHEET

According to EC Directive 1907/2006/EC, Article 31

Revision Date: 16/September/2009

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND THE COMPANY/UNDERTAKING

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

E-Mail Address: SDS@cabot-corp.com

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

Indication of danger: Xn - Harmful.

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
Xantham 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

Skin Contact:	Wash thoroughly with soap and water. Seek medical attention if redness, swelling, itching, or burning occurs.
Eye Contact:	Flush eyes immediately with large amounts of water for 15 minutes. Seek medical attention if redness, swelling, itching, burning or visual disturbances occur.
Inhalation:	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.
Ingestion:	Do not induce vomiting. If conscious, give several glasses of water. Never give anything by mouth to an unconscious person.
Notes to Physician:	Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Extinguishing Media:	Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
Special Protective Equipment for Firefighters:	Wear suitable protective equipment. In the event of fire, wear self-contained breathing apparatus.
Specific Hazards:	Burning produces irritant fumes.
Hazardous Decomposition and/or Combustion Products:	Carbon monoxide, Carbon dioxide, Hydrocarbons, Mixture of inorganic salts.
Risk of Dust Explosion:	None.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions:	Avoid formation of dust and aerosols. Ensure adequate ventilation. Use personal protective equipment. See also Section 8.
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Methods for Cleaning Up: Soak up with inert absorbent material. Pick up and transfer to properly labelled containers. See Section 13.

Environmental Precautions: 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

Handling: 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.

Storage: 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

Respiratory Protection: Approved respirator may be necessary if local exhaust ventilation is not adequate.

Hand Protection: Wear as appropriate. Impervious gloves. Neoprene gloves. Protective gloves. Nitrile rubber gloves. Rubber gloves. PVC or other plastic material gloves.

Eye Protection: Wear eye/face protection. Safety glasses with side-shields. Goggles. Wear face-shield if splashes are likely to occur.

Skin and Body Protection: Wear suitable protective clothing. No special protective equipment required.

Other: Handle in accordance with good industrial hygiene and safety practice. Emergency eyewash and safety shower should be located nearby.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Brown Liquid
Odor:	Slight
pH:	9-11
Density:	1.05-2.40 g/cm ³ @ 20°C
Bulk Density:	Not applicable
Vapor Density:	Not determined
Boiling Point/Range:	102 to 145°C
Melting Point/Range:	Not applicable
Vapor Pressure:	400-2250 Pa

Water Solubility:	Not applicable
Evaporation Rate:	Not determined
Viscosity:	1-300 cPs
Partition Coefficient (n-octanol/water):	Not determined
Flash Point:	Not applicable
Method:	Not applicable
Explosion Limits in Air - Upper (g/m³):	Not applicable
Explosion Limits in Air - Lower (g/m³):	Not applicable

10. STABILITY AND REACTIVITY

Stability:	Stable
Hazardous Polymerization:	Hazardous polymerization does not occur.
Mechanical Sensitivity (shock):	Not sensitive to mechanical impact.
Conditions to Avoid:	Avoid contact with: Strong oxidizing agents. During long exposures to high temperatures, and in contact with certain catalysts, some liberation of gasses (H ₂ 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.
Hazardous Decomposition and/or Combustion Products:	Carbon dioxide, Carbon monoxide, Hydrogen, Mixture of inorganic salts.
Static Discharge Effects:	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.

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

Indication of danger:

Xn - Harmful.

Xn



Risk Phrases: R36 - Irritating to eyes.
Risk Combination Phrases: R48/22 - Harmful: danger of serious damage to health by prolonged exposure if swallowed.
Safety Phrases: S23 - Do not breathe vapor/spray.
Safety Combination Phrases: S24/25 - Avoid contact with skin and eyes.

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

Germany Water Endangering Class (WGK) Class

WGK ID Nr.: Not determined

Switzerland Giftklasse (Poison Class) Toxic Category

Chemical Name

Potassium formate -- (tested and found to be not toxic): G-7498

ID Nr.: Not determined

16. OTHER INFORMATION

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.

EU Local Contacts:

See Section 1.

Prepared by: Cabot Corporation - Safety, Health and Environmental Affairs
Revision Date: 16/September/2009
Previous Revision Date: 9/September/2009
Reason for Revision: Revisions to Section(s) 3

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