SAFETY DATA SHEET

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

Revision Date: 05/August/2011
Product Code: CESFORMDRY

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

Product Name: **Cesium Formate**

Synonyms: CsCOOH-H2O, Cesium Formate Monohydrate

Use of the Substance/Preparation: Drilling & completion 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
Canada: CANUTEC 1-613-996-6666
UK: (+44) 144 673 6999

2. HAZARDS IDENTIFICATION

Pictogram:

Signal Word: WARNING!

Classification according to Regulation (EC) No 1272/2008:
Acute Tox. 4, H302
Eye Irrit. 2, H319
STOT SE 2, H371
STOT RE 2, H373

Hazard Statement(s):
H302 - Harmful if swallowed
H319 - Causes serious eye irritation
H371 - May cause damage to nervous system
H373 - May cause damage to multiple organs, nervous system, and blood through prolonged or repeated exposure

Precautionary Statement(s):
P260 - Do not breathe dust
P264 - Wash your hands thoroughly after handling
P280 - Wear eye protection
P305+P351+P338 - IF IN EYES: rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337+P313 - If eye irritation persists, get medical advice
P270 - Do not eat, drink or smoke when using this product
P301+P312 - IF SWALLOWED: call a poison center or a physician if you fell unwell
P330 - Rinse mouth
P405 - Store locked up
P501 - Dispose of contents/container in accordance with local, regional, national and international regulations

Classification according to Directive 67/548/EEC:
Xn; R48/22
Xi; R36

Other hazards: None known

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

POTENTIAL HEALTH EFFECTS

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

Skin Contact: May cause irritation. Avoid contact with skin.

Inhalation: Dust may be irritating to respiratory tract. Do not breathe dust.

Ingestion: Harmful if swallowed. Adverse effects on multiple organ systems were observed in animals following repeated oral exposure to cesium formate. However, these effects would not be expected under normal handling conditions. See Section 11.

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: Respiratory system, Eyes, Skin, Nervous system

Medical Conditions Aggravated by Exposure: None under normal use

Potential Environmental Effects: Avoid release into the environment. See also Section 12.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS Number	EINECS/ELINCS Number	Weight %	EU Classification
Cesium Formate	3495-36-1	222-492-8	>99	Xn;R48/22 Xi;R36
Water	7732-18-5	231-791-2	<1	None
Other alkali formates	Various	Not determined	<0.1	None

4. FIRST AID MEASURES

Skin Contact: Wash thoroughly with soap and water. Remove contaminated clothing and shoes. 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. Seek medical attention.

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, Oxides of Cesium.

Risk of Dust Explosion: Not determined.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions: Avoid dust formation. Ensure adequate ventilation. Use personal protective equipment. See also Section 8.

Methods for Cleaning Up: Do not create a dust cloud by using a brush or compressed air. Clean up promptly by vacuum. Use a suitable vacuum cleaner. 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 dust formation. Do not breathe dust. Provide appropriate exhaust ventilation at machinery and at places where dust can be generated.

Storage: Hygroscopic material. Will absorb water readily from atmosphere. Keep away from humid air and water. 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. Exposure limits for dust are stated below.

Dust, or Particulates Not Otherwise Specified:	Austria MAK:	10 mg/m³, STEL 2x30 min, Inhalable dust 5 mg/m³, TWA, Inhalable dust
	Belgium:	10 mg/m³, TWA, Inhalable 3 mg/m³, TWA, Respirable
	France:	10 mg/m³, TWA Inhalable dust 5 mg/m³, TWA Respirable dust
	Germany - TRGS 900:	10 mg/m³, TWA, Inhalable 3 mg/m³, Respirable fraction
	Ireland:	10 mg/m³, TWA, Total inhalable 4 mg/m³, TWA, Respirable
	Italy:	10 mg/m³, TWA, Inhalable 3 mg/m³, TWA, Respirable
	Spain:	10 mg/m³, VLA, Inhalable 3 mg/m³, VLA, Respirable
	Sweden:	10 mg/m³, NGV, Total inhalable 5 mg/m³, NGV, Respirable
	The Netherlands:	10 mg/m³, TGG, Inhalable 5 mg/m³, TGG, Respirable
	United Kingdom - WEL:	10 mg/m³, TWA, Total Inhalable dust 4 mg/m³, TWA, Respirable dust
	US ACGIH - TLV:	10 mg/m³, TWA, Inhalable 3 mg/m³, TWA, Respirable
	US OSHA - PEL:	15 mg/m³, TWA, Total inhalable 5 mg/m³, TWA, Respirable

DNEL: 0.05 mg/kg bw/day - dermal
0.025 mg/kg bw/day - inhalation

PNEC: See Exposure Scenarios

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. Nitrile rubber gloves. Rubber gloves. PVC or other plastic material gloves.

Eye Protection: Wear eye/face protection. Safety glasses with side-shields. Goggles.

Skin and Body Protection: Wear chemical impervious protective clothing if skin contact may occur.

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:	White crystalline solid
Odor:	None
Odor Threshold:	None
pH:	9 - 11 when dissolved in water
Relative Density:	3.10 g/cm³

Bulk Density:	Not determined
Vapor Density:	Not applicable
Boiling Point/Range:	Not applicable
Melting Point/Range:	>633K
Vapor Pressure:	< 4.8 x 10-4 Pa at 25°C
Water Solubility:	84.6-86.6% soluble at 20+/-.5°C
Evaporation Rate:	Not applicable
Viscosity:	Not applicable
Partition Coefficient (n-octanol/water):	<-2.20 (no potential to bioconcentrate)
Surface Tension:	72.4 mN/m at 21.0 ± 0.5°C for a 1.04 g/l solution.
Method:	Not applicable
Explosion Limits in Air - Upper (g/m^3):	Not determined
Explosion Limits in Air - Lower (g/m^3):	Not determined
Autoignition Temperature:	None below the temperature at which it liquefies (approx. 42°C)
Method:	Method A16 of 440/2008/EC
Flammability Classification:	Not flammable
Decomposition Temperature:	Not determined
Oxidizing Properties:	Not determined

10. STABILITY AND REACTIVITY

Stability:	Stable
Hazardous Polymerization:	Hazardous polymerization does not occur.
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 (H2 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, Oxides of cesium.
Static Discharge Effects:	Avoid dust formation. Take precautionary measures against static discharges.

11. TOXICOLOGICAL INFORMATION

ACUTE TOXICITY

Oral LD50: LD50/oral/rat > 300 mg/kg and < 2000 mg/kg. See STOT - Single Exposure below.

Inhalation LC50: Not determined.

Dermal LD50: LD50/dermal/rat = >2000 mg/kg.

STOT - Single Exposure: Effects on the central nervous system were observed in rats following a single oral exposure to 1250 mg/kg and higher.

Eye Irritation: Irritating to eyes.

Skin Irritation: Primary irritation index = 1.8 Not classified as an irritant

SUBCHRONIC TOXICITY

28-day/oral/rat: NOAEL = 15 mg/kg/day. See STOT-Repeated Exposure below.

STOT - Repeated Exposure: In a 28-day oral study in rats, 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

Mutagenic Effects:
Not mutagenic in AMES Test, Negative in chromosome aberration test in human lymphocytes, Negative in mouse lymphoma assay.

Reproductive Toxicity: 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).

Sensitization: Contains no known sensitizers.

Synergistic Materials: None reasonably foreseeable.

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).

Aspiration Hazard: Not determined

12. ECOLOGICAL INFORMATION

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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) EbC50 (72 hr) = 710 mg/l; ErC50 (0-72hr) = 1600 mg/l; NOEC = 320mg/l
Brown shrimp (Crangon crangon) LC50 (96 hr) = 91 mg/l
Juvenile turbot (Scopthalmus maximus) LC50 (96 hr) = 260 mg/l
Ctenogobius gymnauchen LC50 (96 hr) = 861.5 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) > 100 mg/l
Freshwater algae (Desmodesmus subspicatus, formerly Scenedesmus subspicatus) ErC50 (0-72 hr) = 110 mg/l; NOEC = 56 mg/l
Freshwater algae (Pseudokirchneriella subcapitata, formerly Selenastrum capricornutum) ErC50 (0-72 hr) = 110 mg/l; NOEC = 18 mg/l

Other Information: In the majority of marine species, this material has not demonstrated toxicity and has received a rating of GOLD/SILVER/SILVER for drilling products and GOLD for Completion/Workover products under the PARCOM Harmonized Offshore and Chemical Notification Format (HOCNF).

ENVIRONMENTAL FATE

Mobility: No data are available.

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

Persistence / Degradability:
Readily biodegradable
Ready Biodegradability in Sea Water - Closed Bottle Test (OECD Method 306) = 79% degradation after 28 days
Ready Biodegradability in Sea Water - Closed Bottle Test (OECD Method 306) = 66% degradation after 28 days
Ready Biodegradability in Freshwater - Closed Bottle Test (OECD Method 301D) = 83% degradation after 28 days
Ready Biodegradability in Freshwater - Closed Bottle Test (OECD Method 301D) = 79% degradation after 28 days

PBT and vPvB Assessment: Cesium formate is not considered to be a PBT or a vPvB substance

Other adverse effects: No other data are available

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 regulated
UN Shipping Class:	Not regulated
UN Packing Group:	Not regulated

IMO IBC Code:
Cesium Formate - Provisionally assessed as: Pollution Category Z, Ship Type 3, with additional requirement 15.19.6.

IMDG (International Maritime Organization's Dangerous Goods Code):
Not regulated.

IATA:
Not Regulated.

15. REGULATORY INFORMATION

EU Chemical Safety Assessment:
Per Article 14.1 of the REACH Regulation a Chemical Safety Assessment has been carried out.

EU Exposure Scenarios
Exposure scenarios are available upon request.

Europe (EU) Hazard Classification:

According to 67/548/EEC: 

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:	S22 - Do not breathe dust.
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
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.
See Section 1.

Prepared by:	Cabot Corporation - Safety, Health and Environmental Affairs
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Reason for Revision:	Revisions to Section(s) 1, 2, 8, 9, 12

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