



# SAFETY DATA SHEET

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

Revision Date: 29/July/2011  
Product Code: CESFORMSOL

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

**Product Name:** Cesium Formate Solution

**Synonyms:** CsCOOH, Cesium Formate Brine

**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
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**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 mist/spray  
 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 feel 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

**Other hazards:** None known

**Principle Routes of Exposure:** 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:** 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. Do not breathe dust, vapors or mist.

**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:** Eyes, Skin, Respiratory system, Nervous system

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

**Potential Environmental Effects:** Avoid release into the environment. See 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	60-84	Xn;R48/22 Xi;R36
Water	7732-18-5	231-791-2	16-40	None
Other alkali formates	Various	Not determined	1-5	None
Carbonate and bicarbonate salts of sodium and/or potassium	Various	Various	0-5	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.

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<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. Seek medical attention.
<b>Notes to Physician:</b>	Treat symptomatically.

## 5. FIRE-FIGHTING MEASURES

<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, Oxides of Cesium.
<b>Risk of Dust Explosion:</b>	None.

## 6. ACCIDENTAL RELEASE MEASURES

<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 dust, aerosol, or mist 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.

<b><u>DNEL:</u></b>	0.05 mg/kg bw/day - dermal 0.025 mg/kg bw/day - inhalation
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<b>PNEC:</b>	See Exposure Scenarios
<b>ENGINEERING CONTROLS</b>	Ensure adequate ventilation to minimize exposures.
<b>PERSONAL PROTECTIVE EQUIPMENT</b>	
<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. 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 chemical impervious protective clothing if skin contact may occur.
<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>	Colorless Liquid
<b>Odor:</b>	None
<b>Odor Threshold:</b>	None
<b>pH:</b>	9 - 11 (measured in 1:10 dilution with water)
<b>Relative Density:</b>	1.7-2.40 g/cm <sup>3</sup>
<b>Bulk Density:</b>	Not applicable
<b>Vapor Density:</b>	Not determined
<b>Boiling Point/Range:</b>	112-145°C
<b>Melting Point/Range:</b>	Not applicable
<b>Vapor Pressure:</b>	400-1700 Pa
<b>Water Solubility:</b>	84.6-86.6% soluble at 20 ±0.5°C
<b>Evaporation Rate:</b>	<0 @ 20°C
<b>Viscosity:</b>	1.7-10 cp @ 20°C
<b>Partition Coefficient (n-octanol/water):</b>	<-2.20 (no potential to bioconcentrate)
<b>Surface Tension:</b>	72.4 mN/m at 21.0 ± 0.5°C for a 1.04 g/l solution.
<b>Flash Point:</b>	Not applicable
<b>Explosion Limits in Air - Upper (g/m<sup>3</sup>):</b>	Not determined
<b>Explosion Limits in Air - Lower (g/m<sup>3</sup>):</b>	Not determined
<b>Autoignition Temperature:</b>	Not determined
<b>Flammability Classification:</b>	Not determined
<b>Decomposition Temperature:</b>	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 (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.

**Hazardous Decomposition and/or Combustion Products:** Carbon dioxide, Carbon monoxide, Oxides of cesium.

**Static Discharge Effects:** Not applicable.

## 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

**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 (*Scophthalmus 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.



**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**

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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