HALLIBURTON

SAFETY DATA SHEET

Product Trade Name: **CARTRIDGE, 1 11/16 MULTI-STAGE - PC16992021**

Revision Date: 04-Jan-2011 **Revision Number:** 5

1. Identification

1.1. Product Identifier

Product Trade Name: CARTRIDGE, 1 11/16 MULTI-STAGE - PC16992021
Synonyms: None
Chemical Family: Explosive
Internal ID Code HM000173

1.2 Recommended use and restrictions on use

Application: Explosive Charge
Uses Advised Against No information available

1.3 Manufacturer's Name and Contact Details

Manufacturer/Supplier Halliburton Energy Services Inc.
P.O. Box 1431
Duncan, Oklahoma 73536-0431
Emergency Telephone: (281) 575-5000

Prepared By Chemical Stewardship
Telephone: 1-580-251-4335
e-mail: fdunexchem@halliburton.com

1.4. Emergency telephone number

Emergency Telephone Number (281) 575-5000

2. Hazard(s) Identification

2.1 Classification in accordance with paragraph (d) of §1910.1200

Acute Oral Toxicity	Category 4 - H302
Serious Eye Damage / Eye Irritation	Category 2 - H319
Specific Target Organ Toxicity - (Repeated Exposure)	Category 2 - H373
Explosives.	Division 1.4 - H204

2.2. Label Elements

Hazard Pictograms

Signal Word Danger

Hazard Statements
H204 - Fire or projection hazard
H302 - Harmful if swallowed
H319 - Causes serious eye irritation
H373 - May cause damage to organs through prolonged or repeated exposure

Precautionary Statements

Prevention
P210 - Keep away from heat/sparks/open flames/hot surfaces. - No smoking
P240 - Ground/Bond container and receiving equipment
P250 - Do not subject to grinding/shock/friction
P260 - Do not breathe dust/fume/gas/mist/vapors/spray
P264 - Wash face, hands and any exposed skin thoroughly after handling
P270 - Do not eat, drink or smoke when using this product
P280 - Wear eye protection/face protection

Response
P301+ P312 - IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell
P330 - Rinse mouth
P370 + P380 - In case of fire: Evacuate area
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/attention
P314 - Get medical attention/advice if you feel unwell
P372 - Explosion risk in case of fire
P373 - DO NOT fight fire when fire reaches explosives

Storage
P401 - Store in accordance with local/regional/national/international regulations.

Disposal
P501 - Dispose of contents/container in accordance with local/regional/national/international regulations

Contains Substances	**CAS Number**
Titanium (II) hydride	7704-98-5
Potassium perchlorate	7778-74-7

2.3 Hazards not otherwise classified
None known

3. Composition/information on Ingredients

Substances	CAS Number	PERCENT (w/w)	GHS Classification - US
Titanium (II) hydride	7704-98-5	30 - 60%	Flam. Sol. 1 (H228)
Potassium perchlorate	7778-74-7	30 - 60%	Acute Tox. 4 (H302) Eye Irrit. 2 (H319) STOT RE 2 (H373) Ox. Sol. 1 (H271)

The exact percentage (concentration) of the composition has been withheld as proprietary.

4. First-Aid Measures

4.1. Description of first aid measures

Inhalation If inhaled, move victim to fresh air and seek medical attention.

Eyes In case of contact, or suspected contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention immediately after flushing.

Skin In case of contact, immediately flush skin with plenty of soap and water for at least 15 minutes. Get medical attention. Remove contaminated clothing and launder before reuse. Destroy or properly dispose of contaminated shoes.

Ingestion Do NOT induce vomiting. Give nothing by mouth. Obtain immediate medical attention.

4.2 Most important symptoms/effects, acute and delayed

Causes eye irritation Harmful if swallowed. Prolonged or repeated exposure may cause damage to organs.

4.3. Indication of any immediate medical attention and special treatment needed

Notes to Physician Treat symptomatically.

5. Fire-fighting measures

5.1. Extinguishing media

Suitable Extinguishing Media

Water fog, carbon dioxide, foam, dry chemical.

Extinguishing media which must not be used for safety reasons

None known.

5.2 Specific hazards arising from the substance or mixture

Special Exposure Hazards

Flammable solid, may detonate under adverse conditions. Oxidizer. May ignite combustibles. Sprinkler and/or deluge systems recommended for bulk storage areas.

5.3 Special protective equipment and precautions for fire-fighters

Special Protective Equipment for Fire-Fighters

Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

6. Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Use appropriate protective equipment. Use only competent persons for cleanup.
See Section 8 for additional information

6.2. Environmental precautions

Prevent from entering sewers, waterways, or low areas.

6.3. Methods and material for containment and cleaning up

Isolate area and remove sources of friction, impact, heat, low level electrical current, and RF energy. Scoop up and

remove.

7. Handling and storage

7.1. Precautions for Safe Handling

Handling Precautions

Do NOT consume food, drink, or tobacco in contaminated areas. Avoid contact with eyes, skin, or clothing. Avoid creating or inhaling dust. Wash hands after use. Launder contaminated clothing before reuse.

Hygiene Measures

Handle in accordance with good industrial hygiene and safety practice.

7.2. Conditions for safe storage, including any incompatibilities

Storage Information

Keep away from friction, impact, and heat. Store away from combustibles.

8. Exposure Controls/Personal Protection

8.1 Occupational Exposure Limits

Substances	CAS Number	OSHA PEL-TWA	ACGIH TLV-TWA
Titanium (II) hydride	7704-98-5	Not applicable	Not applicable
Potassium perchlorate	7778-74-7	Not applicable	Not applicable

8.2 Appropriate engineering controls

Engineering Controls Use in a well ventilated area.

8.3 Individual protection measures, such as personal protective equipment

Personal Protective Equipment If engineering controls and work practices cannot prevent excessive exposures, the selection and proper use of personal protective equipment should be determined by an industrial hygienist or other qualified professional based on the specific application of this product.

Respiratory Protection Dust/mist respirator. (N95, P2/P3)

Hand Protection Cloth gloves.

Skin Protection Cotton coveralls, undergarments, and socks. Conductive soled shoes. Anti-static clothing.

Eye Protection Chemical goggles; also wear a face shield if splashing hazard exists.

Other Precautions Eyewash fountains and safety showers must be easily accessible.

9. Physical and Chemical Properties

9.1. Information on basic physical and chemical properties

Physical State: Solid

Color: Gray to black

Odor: Odorless

Odor Threshold: No information available

Property Remarks/ - Method	Values
pH:	No data available
Freezing Point/Range	No data available
Melting Point/Range	No data available
Boiling Point/Range	No data available
Flash Point	No data available
Flammability (solid, gas)	No data available
upper flammability limit	No data available
lower flammability limit	No data available
Evaporation rate	No data available

Vapor Pressure	No data available
Vapor Density	No data available
Specific Gravity	1.04
Water Solubility	Insoluble in water
Solubility in other solvents	No data available
Partition coefficient: n-octanol/water	No data available
Autoignition Temperature	204 °C / 400 °F
Decomposition Temperature	No data available
Viscosity	No data available
Explosive Properties	No information available
Oxidizing Properties	No information available

9.2. Other information

VOC Content (%) No data available

10. Stability and Reactivity

10.1. Reactivity

Not expected to be reactive.

10.2. Chemical Stability

Stable

10.3. Possibility of Hazardous Reactions

Will Not Occur

10.4. Conditions to Avoid

May detonate with friction, impact, heat, and low level electrical current.

10.5. Incompatible Materials

Strong alkalis. Strong acids. Combustible materials. Organic matter. Reducing agents.

10.6. Hazardous Decomposition Products

Oxides of nitrogen. Chlorine. Carbon monoxide and carbon dioxide.

11. Toxicological Information

11.1 Information on likely routes of exposure

Principle Route of Exposure Eye or skin contact, inhalation.

11.2 Symptoms related to the physical, chemical and toxicological characteristics

Acute Toxicity

Inhalation	May cause respiratory irritation. May cause blood disorders including prolonged weakness and fatigue.
Eye Contact	Causes eye irritation.
Skin Contact	May cause skin irritation.
Ingestion	Harmful if swallowed. May reduce the blood's ability to transport oxygen (methemalobinemia).

Chronic Effects/Carcinogenicity Prolonged or repeated exposure may cause damage to the thyroid gland.

11.3 Toxicity data

Toxicology data for the components

Substances	CAS Number	LD50 Oral	LD50 Dermal	LC50 Inhalation
Titanium (II) hydride	7704-98-5	> 5000 mg/kg (Rat) (Similar substance)	No data available	> 6.82 mg/L air (rat, dust, 4 h) (Similar substance)

Potassium perchlorate	7778-74-7	1900 mg/kg (Rabbit) > 2000 mg/kg (Rat) (Similar substance)	> 2,000 mg/kg (Rat) (Similar substance)	No data available

Substances	CAS Number	Skin corrosion/irritation
Titanium (II) hydride	7704-98-5	Not irritating to skin in rabbits. (similar substances)
Potassium perchlorate	7778-74-7	Not irritating to skin in rabbits. (similar substances)

Substances	CAS Number	Eye damage/irritation
Titanium (II) hydride	7704-98-5	Non-irritating to rabbit's eye (similar substances)
Potassium perchlorate	7778-74-7	(Rabbit) (similar substances)

Substances	CAS Number	Skin Sensitization
Titanium (II) hydride	7704-98-5	Did not cause sensitization on laboratory animals (guinea pig) (similar substances)
Potassium perchlorate	7778-74-7	Did not cause sensitization on laboratory animals (mouse) (similar substances)

Substances	CAS Number	Respiratory Sensitization
Titanium (II) hydride	7704-98-5	No data of sufficient quality are available.
Potassium perchlorate	7778-74-7	No information available

Substances	CAS Number	Mutagenic Effects
Titanium (II) hydride	7704-98-5	In vitro tests did not show mutagenic effects In vivo tests did not show mutagenic effects. (similar substances)
Potassium perchlorate	7778-74-7	In vitro tests did not show mutagenic effects In vivo tests did not show mutagenic effects. (similar substances)

Substances	CAS Number	Carcinogenic Effects
Titanium (II) hydride	7704-98-5	No data of sufficient quality are available.
Potassium perchlorate	7778-74-7	Did not show carcinogenic effects in animal experiments (similar substances)

Substances	CAS Number	Reproductive toxicity
Titanium (II) hydride	7704-98-5	Animal testing did not show any effects on fertility. Did not show teratogenic effects in animal experiments. (similar substances)
Potassium perchlorate	7778-74-7	Animal testing did not show any effects on fertility. Did not show teratogenic effects in animal experiments. (similar substances)

Substances	CAS Number	STOT - single exposure
Titanium (II) hydride	7704-98-5	No significant toxicity observed in animal studies at concentration requiring classification. (similar substances)
Potassium perchlorate	7778-74-7	No significant toxicity observed in animal studies at concentration requiring classification. (similar substances)

Substances	CAS Number	STOT - repeated exposure
Titanium (II) hydride	7704-98-5	No significant toxicity observed in animal studies at concentration requiring classification. (similar substances)
Potassium perchlorate	7778-74-7	Causes damage to organs through prolonged or repeated exposure: (Thyroid)

Substances	CAS Number	Aspiration hazard
Titanium (II) hydride	7704-98-5	Not applicable
Potassium perchlorate	7778-74-7	Not applicable

12. Ecological Information

12.1. Toxicity

Ecotoxicity Effects

Product Ecotoxicity Data

No data available

Substance Ecotoxicity Data

Substances	CAS Number	Toxicity to Algae	Toxicity to Fish	Toxicity to Microorganisms	Toxicity to Invertebrates

Titanium (II) hydride	7704-98-5	EC50(72h): > 100 mg/L (Pseudokirchneriella subcapitata) (similar substance)	LC50(96h): 294 mg/L (Japanese Medaka) (similar substance) NOEC(14d): > 0.87 mg/L (Oncorhynchus mykiss) (similar substance)	No information available	EC50(48h): > 500 mg/L (Daphnia magna) (similar substance) NOEC(21d): > 29.92 mg/L (Daphnia magna) (similar substance)
Potassium perchlorate	7778-74-7	No information available	LC50(96h): > 1000 mg/L (Danio rerio) NOEC(84d): 10 mg/L (Danio rerio)	No information available	EC50(48h): > 100 mg/L (Daphnia magna) NOEC(7d): 10 mg/L (Ceriodaphnia dubia)

12.2. Persistence and degradability

Substances	CAS Number	Persistence and Degradability
Titanium (II) hydride	7704-98-5	The methods for determining biodegradability are not applicable to inorganic substances.
Potassium perchlorate	7778-74-7	No information available

12.3. Bioaccumulative potential

Substances	CAS Number	Log Pow
Titanium (II) hydride	7704-98-5	No information available
Potassium perchlorate	7778-74-7	-7.18

12.4. Mobility in soil

Substances	CAS Number	Mobility
Titanium (II) hydride	7704-98-5	No information available
Potassium perchlorate	7778-74-7	No information available

12.5 Other adverse effects

No information available

13. Disposal Considerations

13.1. Waste treatment methods

Disposal Method Disposal should be made in accordance with federal, state, and local regulations.

Contaminated Packaging Follow all applicable national or local regulations.

14. Transport Information

US DOT

UN Number: UN0323
UN Proper Shipping Name: Cartridges, Power Device
Transport Hazard Class(es): 1.4S
Packing Group: II
EX Number: EX-8402313
Environmental Hazards: Not applicable
NAERG: NAERG 114

US DOT Bulk

DOT (Bulk) Not applicable

Canadian TDG

UN Number: UN0323
UN Proper Shipping Name: Cartridges, Power Device
Transport Hazard Class(es): 1.4S
Packing Group: II
EX Number: EX-8402313

Environmental Hazards: Not applicable

IMDG/IMO

UN Number: UN0323
UN Proper Shipping Name: Cartridges, Power Device
Transport Hazard Class(es): 1.4S
Packing Group: II
EX Number: EX-8402313
Environmental Hazards: Not applicable
EMS: EmS F-B, S-X

IATA/ICAO

UN Number: UN0323
UN Proper Shipping Name: Cartridges, Power Device
Transport Hazard Class(es): 1.4S
Packing Group: II
EX Number: EX-8402313
Environmental Hazards: Not applicable

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code: Not applicable
Special Precautions for User: None

15. Regulatory Information

US Regulations

US TSCA Inventory All components listed on inventory or are exempt.

EPA SARA Title III Extremely Hazardous Substances

Substances	CAS Number	EPA SARA Title III Extremely Hazardous Substances
Titanium (II) hydride	7704-98-5	Not applicable
Potassium perchlorate	7778-74-7	Not applicable

EPA SARA (311,312) Hazard Class

Acute Health Hazard
Chronic Health Hazard
Fire Hazard
Sudden Release of Pressure Hazard

EPA SARA (313) Chemicals

Substances	CAS Number	Toxic Release Inventory (TRI) - Group I	Toxic Release Inventory (TRI) - Group II
Titanium (II) hydride	7704-98-5	Not applicable	Not applicable
Potassium perchlorate	7778-74-7	Not applicable	Not applicable

EPA CERCLA/Superfund Reportable Spill Quantity

Substances	CAS Number	CERCLA RQ
Titanium (II) hydride	7704-98-5	Not applicable
Potassium perchlorate	7778-74-7	Not applicable

EPA RCRA Hazardous Waste Classification

If product becomes a waste, it does meet the criteria of a hazardous waste as defined by the US EPA, because of:

Reactivity D003

California Proposition 65	All components listed do not apply to the California Proposition 65 Regulation.
MA Right-to-Know Law	One or more components listed.
NJ Right-to-Know Law	One or more components listed.
PA Right-to-Know Law	One or more components listed.

Canadian Regulations

Canadian DSL Inventory	Product contains one or more components not listed on the inventory.

16. Other information

Preparation Information

Prepared By	Chemical Stewardship Telephone: 1-580-251-4335 e-mail: fdunexchem@halliburton.com
Revision Date:	04-Jan-2011
Reason for Revision	SDS sections updated: 2

Additional information
For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Safety Data Sheet for this or other Halliburton products, contact Chemical Stewardship at 1-580-251-4335.

Key or legend to abbreviations and acronyms
bw – body weight
CAS – Chemical Abstracts Service
EC50 – Effective Concentration 50%
ErC50 – Effective Concentration growth rate 50%
LC50 – Lethal Concentration 50%
LD50 – Lethal Dose 50%
LL50 – Lethal Loading 50%
mg/kg – milligram/kilogram
mg/L – milligram/liter
NIOSH – National Institute for Occupational Safety and Health
NTP – National Toxicology Program
OEL – Occupational Exposure Limit
PEL – Permissible Exposure Limit
ppm – parts per million
STEL – Short Term Exposure Limit
TWA – Time-Weighted Average
UN – United Nations
h - hour
mg/m^3 - milligram/cubic meter
mm - millimeter
mmHg - millimeter mercury
w/w - weight/weight
d - day

Key literature references and sources for data

www.ChemADVISOR.com/

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End of Safety Data Sheet