

Safety Data Sheet

acc. to OSHA HCS (29 CFR 1910.1200)

Printing date: March 13, 2017

Revision: March 13, 2017

1 Identification

- · Product identifier
- · Trade name: Engineered Power Hybrid PIG Cell
- · Product code: No other identifiers
- · Recommended use and restriction on use
- Recommended use: Lithium-based battery product.
- Restrictions on use: Contact manufacturer/supplier
- · Details of the supplier of the Safety Data Sheet

Manufacturer/Supplier: Engineered Power 20, 3103 - 14th Avenue N.E. Calgary, Alberta, Canada T2A 7N6 Telephone (403) 235-2584

• Emergency telephone number: ChemTel Inc.

(800)255-3924 (North America) +1 (813)248-0585 (International)

2 Hazard(s) identification

· Classification of the substance or mixture

Acute Tox. 4 H302 Harmful if swallowed.

- Acute Tox. 3 H311 Toxic in contact with skin.
- Acute Tox. 4 H332 Harmful if inhaled.
- Skin Corr. 1B H314 Causes severe skin burns and eye damage.
- Eye Dam. 1 H318 Causes serious eye damage.
- Repr. 1 H360 May damage fertility or the unborn child.

STOT RE 2 H373 May cause damage to organs through prolonged or repeated exposure.

· Additional information:

Note: Leaking cells pose health hazards: see Sections 4 and 11. Intentional abuse of cells or batteries increases the risk of harm or damage to the product, to the user, and to surrounding materials and personnel. Do not attempt to open sealed cells or batteries. Do not intentionally short-circuit cells or batteries. Do not expose these products to temperatures exceeding the maximum manufacturers rating. Do not dispose of cells/batteries in landfills. Please follow all manufacturer guidelines in the use, storage, and disposal of these products. Consult manufacturer in cases of questions involving specific product usage.

There are no other hazards not otherwise classified that have been identified.

Exposure to product contents is highly unlikely during normal usage.

Adverse health effects are not reasonably expected from normal use of product.

· Label elements

· GHS label elements

The product is classified and labeled according to the Globally Harmonized System (GHS).

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(Cont'd. of page 1) · Hazard pictograms: GHS05 GHS06 GHS08 · Signal word: Danger · Hazard statements: H302+H332 Harmful if swallowed or if inhaled. H311 Toxic in contact with skin. H314 Causes severe skin burns and eye damage. H360 May damage fertility or the unborn child. H373 May cause damage to organs through prolonged or repeated exposure. · Precautionary statements: P201 Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. P202 P260 Do not breathe dusts or mists. P264 Wash thoroughly after handling. Wear protective gloves/protective clothing/eye protection/face protection. P280 Do not eat, drink or smoke when using this product. P270 Use only outdoors or in a well-ventilated area. P271 P303+P361+P353 If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P310 Immediately call a POISON CENTER/doctor. P321 Specific treatment (see on this label). P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing. P301+P312 IF SWALLOWED: Call a POISON CENTER/doctor if you feel unwell. P301+P330+P331 If swallowed: Rinse mouth. Do NOT induce vomiting. P308+P313 IF exposed or concerned: Get medical advice/attention. P314 Get medical advice/attention if you feel unwell. P361+P364 Take off immediately all contaminated clothing and wash it before reuse. P405 Store locked up. P501 Dispose of contents/container in accordance with local/regional/national/international regulations. · Additional information: Information references exposures to battery contents, and not exposures to whole units. Exposures to whole units are unlikely to produce health hazards. · NFPA ratings (scale 0 - 4) Health = 3Fire = 1Reactivity = 0The substance demonstrates unusual reactivity with water. (Cont'd. on page 3)

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· HMIS-ratings (scale 0 - 4)

*3 Health = *3 HEALTH FIRE 1 Fire = 1 **REACTIVITY** Reactivity = 0

* - Indicates a long term health hazard from repeated or prolonged exposures.

· Other hazards There are no other hazards not otherwise classified that have been identified.

3 Composition/information on ingredients

· Chemical characterization: Mixtures

· Componen	ts:	
1313-13-9	manganese dioxide STOT RE 2, H373 Acute Tox. 4, H302; Acute Tox. 4, H332	< 50%
51311-17-2	carbon monofluoride Acute Tox. 3, H311 Skin Corr. 1B, H314; Eye Dam. 1, H318 Acute Tox. 4, H332	< 40%
	Trade Secret Acute Tox. 3, H301; Acute Tox. 3, H311 STOT RE 2, H373 Skin Corr. 1B, H314	< 20%
	Trade Secret Flam. Liq. 2, H225 Repr. 1B, H360 Acute Tox. 4, H332	< 10%
7439-93-2	lithium Water-react. 1, H260 Skin Corr. 1B, H314	< 10%
	Trade Secret	< 5%
	Trade Secret	< 5%
· Additional i	· ·	I]

For the listed ingredient(s), the identity and/or exact percentage(s) are being withheld as a trade secret. For the wording of the listed Hazard Statements refer to section 16.

4 First-aid measures

· Description of first aid measures

· General information:

Information references exposures to battery contents, and not exposures to whole units. Exposures to whole units are unlikely to produce health hazards.

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Immediat	ely remove any clothing soiled by the product.
Symptom	s of poisoning may even occur after several hours; therefore medical observation for at least 4
	er the accident.
Take affe	cted persons out into the fresh air.
· After inh	alation:
Unlikely r	pute of exposure.
Supply fre	sh air or oxygen; call for doctor.
	irregular breathing or respiratory arrest provide artificial respiration.
	unconsciousness place patient stably in side position for transportation.
· After ski	i contact:
	pute of exposure.
Immediat	ely wash with water and soap and rinse thoroughly.
Seek mee	lical treatment if any skin damage has occurred.
Immediat	e medical treatment necessary. Failure to treat burns can prevent wounds from healing.
· After eye	contact:
Unlikely r	pute of exposure.
	nharmed eye.
	contact lenses if worn, if possible.
Rinse ope	ened eye for several minutes under running water. Then consult a doctor.
· After swa	
	pute of exposure.
	mouth and then drink plenty of water.
	luce vomiting; immediately call for medical help.
	ortant symptoms and effects, both acute and delayed:
Adverse h	ealth effects are not reasonably expected from normal use of product.
	s, effects, and hazards reference leaking materials only. Normal handling and usage will n
	azardous exposures.
•	ustic effect on skin and mucous membranes.
Coughing	
Breathing	
	e respiratory irritation.
	intestinal disorders when ingested.
Eye dama	ige.
· Danger:	
	ontact with skin.
	age fertility or the unborn child.
	d of causing cancer.
	e damage to organs through prolonged or repeated exposure.
	evere skin burns and eye damage.
	swallowed or if inhaled.
	n of any immediate medical attention and special treatment needed:
	ninate patient thoroughly with sodium bicarbonate solution; assume that some skin contact h
	ce. Treat other symptoms symptomatically, with emphasis on maintaining electrolyte balance.
	upervision for at least 48 hours. ary oxygen respiration treatment.

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5 Fire-fighting measures

- · Extinguishing media
- Suitable extinguishing agents:
- Sand

Graphite powder such as Lith-X.

- Use only the agents indicated above.
- For safety reasons unsuitable extinguishing agents: Water or Halons.
- · Special hazards arising from the substance or mixture
- Information references exposures to battery contents, and not exposures to whole units. In contact with water releases flammable gases, which may ignite spontaneously. During heating or in case of fire poisonous gases are produced. Reacts violently with water.
- · Advice for firefighters

· Protective equipment:

Wear self-contained respiratory protective device. Do not inhale explosion gases or combustion gases.

- Wear fully protective suit.
- Additional information: Evacuate area and fight fire from from the upwind side.

6 Accidental release measures

Personal precautions, protective equipment and emergency procedures
 If containers are leaking, use respiratory protective device against the effects of fumes/dust/aerosol.
 Wear protective equipment. Keep unprotected persons away.
 Ensure adequate ventilation.

 Environmental precautions
 Do not allow to enter sewers/ surface or ground water.
 Avoid release to the environment.

 Methods and material for containment and cleaning up
 If a spill is small, a trained person may attempt to stop or contain the leak by carefully neutralizing spill with calcium carbonate or sodium bicarbonate. Seal leaking container and neutralized product in a plastic bag and transfer to a lidded container for disposal or recovery. Consult an accredited waste disposal contractor or the local authority for additional advice. Large spills should only be handled by specially trained hazardous materials personnel.

Do not flush with water or aqueous cleansing agents

Send for recovery or disposal in suitable receptacles.

Reference to other sections
 See Section 7 for information on safe handling.
 See Section 8 for information on personal protection equipment.
 See Section 13 for disposal information.

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7 Handling and storage

Handling

· Precautions for safe handling:

Information is only applicable to product contents, and not to product as normally supplied. This information is applicable to damaged, leaking, or spilled product as contact with contents is possible under these conditions.

Keep away from open flames or temperatures exceeding manufacturer ratings. DO NOT ATTEMPT TO OPEN SEALED CELLS OR BATTERIES – BATTERY CONTENTS MAY PRESENT SERIOUS SAFETY AND HEALTH HAZARDS. SHORT-CIRCUITING THE TERMINALS OF A DEVICE MAY RESULT IN DAMAGE TO DEVICE AND ANY NEARBY OBJECTS OR PERSONNEL.

· Information about protection against explosions and fires:

Protect from heat.

Keep respiratory protective device available.

Conditions for safe storage, including any incompatibilities

- · Storage
- · Requirements to be met by storerooms and receptacles:

Store in a dry, well-ventilated place.

Do not use or store near open flame.

Avoid extreme temperatures; battery may rupture and release contents.

Do not store and transport with incompatible materials.

Store individual batteries or cells only in approved packaging in order to avoid inadvertent short circuits, as this may result in damage to device, nearby objects, personnel, or all of the above.

Provide ventilation for receptacles.

· Information about storage in one common storage facility: Store away from foodstuffs. Do not store together with oxidizing and acidic materials.

Do not store together with alkalis (caustic solutions). Store in accordance with local/regional/national/international regulations.

· Further information about storage conditions:

Store in a cool place. Heat will increase pressure and may lead to the receptacle bursting. Keep containers tightly sealed.

· Specific end use(s) No relevant information available.

8 Exposure controls/personal protection

Control parameters

· Components with limit values that require monitoring at the workplace:

The following constituents are the only constituents of the product which have a PEL, TLV or other recommended exposure limit.

At this time, the other constituents have no known exposure limits.

51311-17-2 carbon monofluoride

TLV (USA)	Short-term value: 2.5 mg/m ³ As fluorides	
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EV (Canada)	methoxyethane Long-term value: 18 mg/m³, 5 ppm Skin
646-06-0 1,3-die	pxolane
TLV (USA)	Long-term value: 61 mg/m ³ , 20 ppm
EL (Canada)	Long-term value: 20 ppm R
EV (Canada)	Long-term value: 20 ppm
· · ,	Long-term value: 20 ppm
General protect Information is an information is an these conditions Keep away from Immediately rem Do not inhale ga Avoid contact with Engineering co	ctive equipment: tive and hygienic measures: only applicable to product contents, and not to product as normally supplied. This oplicable to damaged, leaking, or spilled product as contact with contents is possible under a. nove all soiled and contaminated clothing. ases / fumes / aerosols. ith the eyes and skin. ontrols: Provide adequate ventilation. pment: For spills, respiratory protection may be advisable.
Not required und Wear protective The glove mater • Eye protection: Contact lenses	ive gloves der normal conditions of use. gloves to handle contents of damaged or leaking units. rial has to be impermeable and resistant to the product/ the substance/ the preparation. should not be worn. normal handling. Wear protective eyewear while handling damaged or leaking product.
Safety g	
Protection may l	n: der normal conditions of use. be required for spills. d supervision of exposure into the environment o the environment.

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9 Physical and chemical prope	erties
· Information on basic physical a	and chemical properties
· Appearance:	
Form:	Solid metal container containing liquid and solid contents.
Color:	Various colors
· Odor:	Normally odourless. Leaking devices may emit acrid, sulphurous or ethereal odours.
· Odor threshold:	Not determined.
· pH-value:	Not determined.
· Melting point/Melting range:	Not determined.
 Boiling point/Boiling range: 	Not determined.
· Flash point:	Not applicable.
· Flammability (solid, gaseous):	Not applicable.
· Auto-ignition temperature:	Not determined.
· Decomposition temperature:	Not determined.
 Danger of explosion: 	Product does not present an explosion hazard.
· Explosion limits	
Lower:	Not determined.
Upper:	Not determined.
· Oxidizing properties:	Non-oxidizing.
· Vapor pressure:	Not applicable.
· Density:	
Relative density:	Not determined.
Vapor density:	Not determined.
Evaporation rate:	Not determined.
 Solubility in / Miscibility with 	
Water:	Not determined.
· Partition coefficient (n-octanol/wat	ter): Not determined.
· Viscosity	
Dynamic:	Not determined.
Kinematic:	Not determined.
 Other information 	No relevant information available.

10 Stability and reactivity

· Reactivity: No relevant information available.

- Chemical stability: Stable under normal temperatures and pressures.
- Thermal decomposition / conditions to be avoided: Risk of explosion if heated under confinement.

• Possibility of hazardous reactions

Hazardous reactions generally occur with contents of leaking batteries only.

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Corrosive action on metals. Toxic fumes may be released if heated above the decomposition point.

- · Conditions to avoid Excessive heat.
- · Incompatible materials Oxidizers, strong bases, strong acids

· Hazardous decomposition products

Under fire conditions only: Toxic metal oxide smoke

11 Toxicological information

- · Information on toxicological effects
- · Acute toxicity:
- · LD/LC50 values that are relevant for classification: None.
- · Primary irritant effect:
- · On the skin: Caustic effect on skin and mucous membranes.
- · On the eye: Strong caustic effect.
- Sensitization: Based on available data, the classification criteria are not met.
- Subacute to chronic toxicity: None from normal handling. Symptoms only seen in exposure to leaking articles.
- · Carcinogenic categories
- · IARC (International Agency for Research on Cancer):

None of the ingredients are listed.

• NTP (National Toxicology Program):

None of the ingredients are listed.

· OSHA-Ca (Occupational Safety & Health Administration):

None of the ingredients are listed.

· Probable route(s) of exposure:

None

Information references exposures to battery contents, and not exposures to whole units. Exposures to whole units are unlikely to produce health hazards.

Ingestion.

Inhalation.

Eye contact.

Skin contact.

· Acute effects (acute toxicity, irritation and corrosivity):

None from normal handling. Symptoms only seen in exposure to leaking articles.

Toxic in contact with skin.

Harmful if swallowed or if inhaled.

Causes severe skin burns and eye damage.

- Repeated dose toxicity: Danger of very serious irreversible effects.
- \cdot CMR effects (carcinogenity, mutagenicity and toxicity for reproduction)
- Repr. 1
- Germ cell mutagenicity: Based on available data, the classification criteria are not met.
- · Carcinogenicity: Suspected of causing cancer.
- Reproductive toxicity: May damage fertility or the unborn child.

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- STOT-single exposure: Based on available data, the classification criteria are not met.
- **STOT-repeated exposure:** May cause damage to organs through prolonged or repeated exposure.
- Aspiration hazard: Based on available data, the classification criteria are not met.

12 Ecological information

· Toxicity

- · Aquatic toxicity Very toxic to aquatic life.
- · Persistence and degradability No relevant information available.
- · Bioaccumulative potential: No relevant information available.
- Mobility in soil: No relevant information available.
- · Ecotoxical effects:
- Remark: Very toxic for fish
- · Additional ecological information
- General notes:
- Avoid release to the environment.

Do not allow product to reach ground water, water course or sewage system, even in small quantities. Must not reach bodies of water or drainage ditch undiluted or unneutralized.

Danger to drinking water if even extremely small quantities leak into the ground.

Also poisonous for fish and plankton in water bodies.

Very toxic for aquatic organisms

· Other adverse effects No relevant information available.

13 Disposal considerations

· Waste treatment methods

· Recommendation:

Contact waste processors for recycling information.

Must not be disposed of together with household garbage. Do not allow product to reach sewage system. The user of this material has the responsibility to dispose of unused material, residues and containers in compliance with all relevant local, state and federal laws and regulations regarding treatment, storage and disposal for hazardous and nonhazardous wastes. Residual materials should be treated as hazardous.

· Uncleaned packagings

• Recommendation: Disposal must be made according to official regulations.

14 Transport information	
· UN-Number · DOT, ADR, IMDG, IATA	UN3090
· UN proper shipping name	
	Lithium metal batteries
ADR	3090 LITHIUM METAL BATTERIES
·IMDG	LITHIUM METAL BATTERIES, MARINE POLLUTANT
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Trade name: Engineered Power Hybrid PIG Cell (Cont'd. of page 10) Transport hazard class(es) · DOT, IATA · Class 9 Miscellaneous dangerous substances and articles · Label 9 · ADR Alb · Class 9 (M4) Miscellaneous dangerous substances and articles · Label 9 _____ · IMDG Alh · Class 9 Miscellaneous dangerous substances and articles · Label 9 Packing group · DOT, ADR, IMDG, IATA Ш · Environmental hazards · Marine pollutant: Symbol (fish and tree) · Special precautions for user Warning: Miscellaneous dangerous substances and articles · EMS Number: F-A,S-I · Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code Not applicable. · Transport/Additional information: Not regulated when carried in single or combination packaging containing a net quantity of 5 L or less for liquids or 5 kg or less for solids per the following: DOT: 171.4(c)(2) ADR: SP 375 IMDG: 2.10.2.7 IATA: special provision A197

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mixtu	y, health and environmental regulations/legislation specific for the substance o re States (USA)
	n 302 (extremely hazardous substances):
	f the ingredients are listed.
· Sectio	n 304 (emergency release notification):
None c	f the ingredients are listed.
· Sectio	n 355 (extremely hazardous substances):
None c	f the ingredients are listed.
· Sectio	n 313 (Specific toxic chemical listings):
	ngredients listed.
TSCA	(Toxic Substances Control Act)
All ingr	edients are listed.
· Propos	sition 65 (California)
· Chemi	cals known to cause cancer:
None c	f the ingredients are listed.
· Chemi	cals known to cause reproductive toxicity for females:
None c	f the ingredients are listed.
· Chemi	cals known to cause reproductive toxicity for males:
None c	f the ingredients are listed.
· Chemi	cals known to cause developmental toxicity:
None c	f the ingredients are listed.
	ogenic categories
•	Invironmental Protection Agency):
1313-1	3-9 manganese dioxide
•	International Agency for Research on Cancer):
None c	f the ingredients are listed.
	-Ca (National Institute for Occupational Safety and Health):
None c	f the ingredients are listed.

16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

· Date of preparation / last revision March 13, 2017 / -

· Abbreviations and acronyms:

LDLo: Lowest Lethal Dose Observed

ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road

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(Cont'd. of page 12) IMDG: International Maritime Code for Dangerous Goods DOT: US Department of Transportation IATA: International Air Transport Association CAS: Chemical Abstracts Service (division of the American Chemical Society) NFPA: National Fire Protection Association (USA) HMIS: Hazardous Materials Identification System (USA) LC50: Lethal concentration, 50 percent LD50: Lethal dose, 50 percent NIOSH: National Institute for Occupational Safety OSHA: Occupational Safety & Health TLV: Threshold Limit Value PEL: Permissible Exposure Limit **REL: Recommended Exposure Limit** Flam. Liq. 2: Flammable liquids - Category 2 Water-react. 1: Substances and mixtures which in contact with water emit flammable gases - Category 1 Acute Tox. 4: Acute toxicity – Category 4 Acute Tox. 3: Acute toxicity – Category 3 Skin Corr. 1B: Skin corrosion/irritation - Category 1B Eye Dam. 1: Serious eye damage/eye irritation – Category 1 Eye Irrit. 2A: Serious eye damage/eye irritation – Category 2A Repr. 1: Reproductive toxicity - Category 1 Repr. 1B: Reproductive toxicity - Category 1B STOT RE 2: Specific target organ toxicity (repeated exposure) - Category 2 Sources Website, European Chemicals Agency (echa.europa.eu) Website, US EPA Substance Registry Services (ofmpub.epa.gov/sor internet/registry/substreg/home/ overview/home.do) Website, Chemical Abstracts Registry, American Chemical Society (www.cas.org) Patty's Industrial Hygiene, 6th ed., Rose, Vernon, ed. ISBN: 978-0-470-07488-6 Casarett and Doull's Toxicology: The Basic Science of Poisons, 8th Ed., Klaasen, Curtis D., ed., ISBN: 978-0-07-176923-5. Safety Data Sheets, Individual Manufacturers SDS Prepared by: ChemTel Inc. 1305 North Florida Avenue Tampa, Florida USA 33602-2902 Toll Free North America 1-888-255-3924 Intl. +01 813-248-0573 Website: www.chemtelinc.com