Safety data sheet
CI-E Carbonaceous Chondrite Engineering Grade Simulant

Version 1.1
Effective date: 2023-11-09

SECTION 1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY / UNDERTAKING

1.1 Product identifier

Trade name: CI-E Carbonaceous Chondrite Engineering Grade Simulant

1.2 Relevant identified uses of the substance or mixture and uses advised against:

Product use: Regolith/planetary simulant

1.3 Details of the Supplier of the safety data sheet:

Company: Space Resource Technologies
532 S Econ Cir, Suite 100
Oviedo, FL 32765

Contact: info@spaceresourcetech.com

1.4 Emergency telephone number:
1-800-535-5053 Or contact your regional Poison Control
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SECTION 2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture according to CLP no. 1272/2008.

Physical	Health	
Not hazardous	Carcinogen Category 1A	Category 1A (H350i)
	Specific Target Organ Toxicity – Repeated exposure	Category 1 (H372)

2.2 Label elements CLP no. 1272/2008:

Hazard pictograms:

Signal word: Danger

Hazard statements:

H350i May cause cancer by inhalation
H372 Causes damage through prolonged or repeated exposure

Precautionary statements:
Prevention:
Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Use personal protective equipment as required
Do not breathe dust/fume/gas/mist/vapors/spray
Wash face, hands and any exposed skin thoroughly after handling
Do not eat, drink or smoke when using this product

Response:
If exposed or concerned: Get medical advice/attention

Storage:
Store locked up

Disposal:
Dispose of contents/container to an approved waste disposal plant

Additional labeling:

Carcinogenicity: Natural terrestrial minerals are commonly contaminated with crystalline silica (quartz). Independent laboratory analyses indicate that crystalline silica is present in one or more of the simulant components. The International Agency on Research for Cancer (IARC) has classified silica dust, crystalline as a Group 1, known human carcinogen.

2.3 Other Hazards.
None known.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

3.2 Mixture:

CAS/EC-no.	REACH-no.	Name	Content %	Classification CLP
1302-78-9	-	Smectite	51.3	-
1317-61-9	-	Magnetite	10.0	-
1318-00-9	-	Vermiculite	9.6	-

1317-71-1	-	Olivine	7.0	-
1309-36-0	-	Pyrite	7.0	-
129521-66-0	-	Coal, Sub-bituminous	5.0	-
12174-11-7	-	Attapulgite	5.3	-
39473-89-7	-	Ferrihydrite	4.8	-

3.3 Additional information:
See full text of H-phrases in section 16. Occupational limits are listed in section 8, if these are available.

SECTION 4. FIRST AID MEASURES

4.1 Description of first aid measures:

General information: If any doubt or if symptoms persist, seek medical attention.

Inhalation: Move affected person to fresh air. Get medical attention if any discomfort continues.

Skin contact: Wash exposed skin if irritation exists.

Eye contact: If irritation or discomfort exists, flush eyes lightly with water to remove dust.

Ingestion: Adverse effects not expected from this product.

4.2 Most important symptoms and effects, both acute and delayed:
Inhalation: Irritation may occur.
In case of eye contact: Irritating to eyes.

4.3 Indication of any immediate medical attention and special treatment needed:
Treat symptomatically. If in contact with doctor, bring this safety data sheet with you.

SECTION 5. FIRE FIGHTING MEASURES

5.1 Extinguishing media: Foam, carbon dioxide or dry powder.

Unsuitable extinguishing media:
None known.

5.2 Special hazards arising from the substance or mixture:
The product is not flammable. No special hazards expected.

5.3 Advice for firefighters: No special advice for firefighters.

SECTION 6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures:
Wear appropriate personal protective equipment – see section 8. Avoid contact with eyes. Provide adequate ventilation. Avoid breathing dust. Keep unauthorized and unprotected persons away.

6.2 Environmental precautions: Prevent entry to sewers and public waters. Notify authorities if liquid enters sewers or public waters.

6.3 Methods and material for containment and cleaning up: Spray lightly with water to avoid creating dust and sweep/shovel into suitable container.

6.4 Reference to other sections: See section 8 and 13 for further information.

SECTION 7. HANDLING AND STORAGE

7.1 Precautions for safe handling: Avoid creating dust. Wear appropriate personal protective equipment – see section 8. Avoid contact with eyes. Avoid breathing dust. Provide adequate ventilation. Keep this product away from food and out of reach of children and pets. Wash hands after handling the product. Remove contaminated clothing. Use only in well ventilated areas.

7.2 Conditions for safe storage, including any incompatibilities:
Do not store near heat or open flame. Keep container tightly closed. Keep out of the reach of children. Special containers or storage locations are not required. Incompatible with strong oxidizers.

7.3 Specific end use(s): This product should only be used for applications described in Section 1.2.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters
Occupational exposure limits EH40 (Great Britain):

CAS-no:	Name:	Limits:

1302-78-9	Smectite	No exposure limit.
1317-61-9	Magnetite	No exposure limit.
1318-00-9	Vermiculite	No exposure limit.
10034-00-9	Olivine	No exposure limit.
1309-36-0	Pyrite	No exposure limit.
10034-99-8	Epsomite	No exposure limit.
129521-66-0	Coal, Sub-bituminous	No exposure limit.
12174-11-7	Attapulgite	No exposure limit.
14808–60–7	Crystalline Silica	0.1 mg/m^3

8.2 Exposure controls

Appropriate technical measures: Airborne concentrations must be kept as low as possible. Provide sufficient ventilation

General information / Hygiene measures: Wash hands after use.

Personal protective equipment: Only CE-marked personal protection equipment should be used.

Respiratory protection: Not required if dust levels are maintained below occupational exposure limits (TLV-TWA of 10 mg/m3). For levels above the occupational exposure limits wear an appropriate NIOSH approved respirator.

Hand protection: None required. For hygiene purposes, chemically compatible gloves are appropriate.

Eye protection: Safety glasses should be worn.

Body protection: None required. Confine work clothing to workplace and wash daily.

Measures to avoid environmental exposure: Avoid discharge to lakes, streams, sewers, etc.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties:

Appearance: Dark gray powder.
Upper/lower flammability or explosive limits: N/D
Odor: None.
Vapor pressure: N/D
Odor threshold: N/D
Vapor density: N/D
pH: N/D
Relative density: N/D
Melting point/freezing point: N/D
Solubility: Insoluble in water.
Initial boiling point and boiling range: N/D
Flash point: N/D
Evaporation rate: N/D
Flammability: N/D
Partition coefficient (n-octanol/water): N/D
Auto-ignition temperature: N/D
Decomposition temperature: N/D
Viscosity: N/D

9.2 Other information:

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SECTION 10. STABILITY AND REACTIVITY

10.1 Reactivity: None under normal conditions.

10.2 Chemical stability: Stable under normal storage conditions and recommended use.

10.3 Possibility of hazardous reactions: None known.

10.4 Conditions to avoid: Heat, open flames, sparks.

10.5 Incompatible materials: Strong oxidizers.

10.6 Hazardous decomposition products:
Releases carbon monoxide, carbon dioxide, sulfur monoxide, sulfur dioxide and methane upon combustion.

SECTION 11. TOXICOLOGICAL INFORMATION

11.1 Information on Toxicological effects:

Acute toxicity:	Not classified.
Skin corrosion/irritation:	Not classified.
Serious eye damage/irritation:	Not classified.
Respiratory or skin sensitisation:	Not classified.
Germ cell mutagenicity:	Not classified.
Carcinogenicity:	The International Agency on Research for Cancer (IARC) has classified silica dust, crystalline as a Group 1, known human carcinogen.
Reproductive toxicity:	Not classified.
Specific target organ toxicity - single exposure:	May cause respiratory irritation.
Specific target organ toxicity – repeated exposure:	Adverse health effects including silicosis, lung cancer, autoimmune and chronic kidney diseases, tuberculosis, and non-malignant respiratory diseases are attributed to respirable crystalline silica.
Aspiration hazard:	Not classified.
Additional information:	Inhalation: Irritation may occur. In case of eye contact: Irritating to eyes.

SECTION 12. ECOLOGICAL INFORMATION

12.1 Toxicity: Not classified.

12.2 Persistence and degradability: The product is biodegradable.

12.3 Bioaccumulative potential: No data.

12.4 Mobility in soil: No data.

12.5 Result of PBT and vPvB assesment: No CPSR are created.

12.6 Other adverse effects: None known.

SECTION 13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods: Must be disposed of in accordance with local and national regulations. The coding of a waste stream is based on the application of the product by the consumer.

Contaminated packing: Packaging which contains leftovers from the product must be disposed of in the same way as the product.
Option: 15 01 10 packaging containing residues of or contaminated by dangerous substances. 15 01 02 plastic packaging.

SECTION 14. TRANSPORT INFORMATION

This product is not classified as dangerous to transport.

	ADR/RID	**IMDG/IMO**
14.1 UN number	-	-
14.2 UN proper shipping name	-	-
14.3 Transport hazard class(es)	-	-
14.4 Packing group	-	-
14.5 Environmental hazards - MP	No -	No -
Other informations	LQ: - TUNNEL: -	LQ: - TUNNEL: -

14.6 Special precautions for user:

14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code:

SECTION 15. REGULATORY INFORMATION

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture:

Sources: Pressure Equipment (Amendment) Regulations 2011. Chemicals (Hazard Information and Packaging for Supply) Regulations 2009. Control of Substances Hazardous to Health Regulations 2002 (as amended).

Merchant Shipping (Dangerous Goods and Marine Pollutants) Regulations 1997. Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995 (as amended). Personal Protective Equipment

Regulations 2002. Personal Protective Equipment at Work Regulations 1992. Hazardous Waste (England and Wales) Regulations 2005(as amended). EC regulation 1907/2006 (REACH) Directive 2000/532/EC. Seveso directive: 96/82/EC. EU 830/2015. CLP 1272/2008.

Additional information: -

15.2 Chemical safety assessment: Chemical safety assessments have not been performed for this product.

SECTION 16. OTHER INFORMATION

Full text of H-phrases as mentioned in section 3:
H350i May cause cancer by inhalation
H372 Causes damage through prolonged or repeated exposure

Additional information:
This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.

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