



Green Plains

GHS SAFETY DATA SHEET

GRAIN DUST

SDS DATE: 09/28/2017

SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME (GHS Product Identifier): Grain Dust
(Other means of Identification): Grain dust corn, Corn dust

PRODUCT INTENDED USE AND RESTRICTION: Byproduct of grain handling, storage, and processing

MANUFACTURER: Green Plains, Inc.
DIVISION:

Green Plains Atkinson LLC. 87590 Hill Crest Rd. Atkinson, NE 68713 P.O. Box 391, Atkinson, NE 68713 Phone: 402-925-5570 Fax: 402-925-2988 <input checked="" type="checkbox"/>	Green Plains Bluffton LLC. 1441 S. Adams St., Bluffton, IN 46714 Phone: 260-353-1212 Fax: 260-353-1100 <input checked="" type="checkbox"/>	Green Plains Central City LLC. 214 20 th St., Central City, NE 68826 Phone: 308-946-9700 Fax: 308-946-2623 <input checked="" type="checkbox"/>	Green Plains Fairmont LLC. 1125 N Bixby Road, Fairmont, MN 56031 Phone: 507-238-3600 Fax: 507-238-3624 <input checked="" type="checkbox"/>	Green Plains Hereford LLC 4300 County Road 8 Hereford, TX 79045 Phone: 806-258-7800 Fax: 806-258-7801 <input checked="" type="checkbox"/>
Green Plains Holdings II LLC.-Lakota 1660 428 th St., Lakota, IA 50451 Phone: 515-886-2222 Fax: 515-886-2127 <input checked="" type="checkbox"/>	Green Plains Holdings II LLC.-Riga 7025 Siberhorn Hwy, Blissfield, MI 49228 P.O. Box 12, Riga, MI 49276 Phone: 517-486-6190 Fax: 517-486-6192 <input checked="" type="checkbox"/>	Green Plains Hopewell LLC 701 South 6th Avenue Hopewell, VA 23860 Phone: 804-668-0010 Fax: 804-668-0020 <input checked="" type="checkbox"/>	Green Plains Madison LLC 395 Bissell St Madison, IL 63060 Phone: 618-451-4420 Fax: 618-452-8946 <input checked="" type="checkbox"/>	Green Plains Mt Vernon LLC 8999 W Franklin Rd Mt Vernon, IN 47620 Phone: 812-985-4023 Fax: 812-985-9983 <input checked="" type="checkbox"/>
Green Plains Obion LLC. 2098 McDonald Rd., Rives, TN 38253/P.O. Box 95, Obion, TN 38240 Phone: 731-536-1286 Fax: 731-536-1434 <input checked="" type="checkbox"/>	Green Plains Ord LLC. 48267 Val-E Road, Ord, NE 68862 Phone: 308-496-4823 Fax: 308-496-4890 <input checked="" type="checkbox"/>	Green Plains Otter Tail LLC. 24096 170th Ave., Fergus Falls, MN 56537 Phone: 218-998-4301 Fax: 218-998-4302 <input checked="" type="checkbox"/>	Green Plains Shenandoah LLC. 4124 Airport Rd., Shenandoah, IA 51601 Phone: 712-246-2932 Fax: 712-246-3988 <input checked="" type="checkbox"/>	Green Plains Superior LLC. 1495 320th Ave, Superior, IA 51363 Phone: 712-858-4666 Fax: 712-858-4684 <input checked="" type="checkbox"/>
Green Plains Wood River LLC. 7874 South 140th Road, Wood River, NE 68883 Phone: 308-385-1200 Fax: 308-385-9990 <input checked="" type="checkbox"/>	Green Plains York LLC 1414 County Rd O York, NE 68467 Phone: 402-362-2285 Fax: 402-362-7041 <input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Green Plains Grain Company LLC. Archer 2132 Archer Road Archer, NE 68816 Phone: 308-795-2211 <input checked="" type="checkbox"/>	Green Plains Grain Company LLC. Cimarron 19016 Road I Kismet, KS 67859 Phone: 620-624-6296 Fax: 620-624-4411 <input checked="" type="checkbox"/>	Green Plains Grain Company LLC. Essex 411 North Street, Essex, IA 51638 Phone: 712-379-3155 Fax: 712-379-3175 <input checked="" type="checkbox"/>	Green Plains Grain Company LLC. Hopkins 200 N. Railroad Hopkins, MO 64461 Phone: 660-778-3331 Fax: 660-778-3676 <input checked="" type="checkbox"/>	<input type="checkbox"/>

CHEMTREC PHONE (24HR Emergency Telephone): 1-800-424-9300 (Within U.S.A)
INTERNATIONAL CHEMTREC CALL: 1-703-527-3887
OTHER CALLS: 1-402-884-8700 (M-F, 8 AM-5 PM, Central time (U.S.A & Canada); within U.S.A)

FAX PHONE: 1-402-884-8776 (M-F, 8 AM-5 PM, Central time (U.S.A & Canada); within U.S.A)

SECTION 1 NOTES: None Available

SECTION 2: HAZARDS IDENTIFICATION

GHS LABELING AND CLASSIFICATION: This product meets the definition of the following hazard classes as defined by the OSHA Hazard Communication Standard and Globally Harmonized System of Classification and Labelling of Chemicals (GHS).



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GHS CLASSIFICATION ACCORDING TO ANNEX II:

HEALTH		ENVIRONMENTAL	PHYSICAL
Not classified		Not classified	Combustible Dust
SIGNAL WORD:		WARNING	
SYMBOL:		No Symbol	
HAZARD STATEMENT:			
May form combustible dust concentrations in the air			
PRECAUTIONARY STATEMENTS (OSHA):	PREVENTIVE:	P210-Keep away from heat/sparks/open flames/hot surfaces.—No smoking. P241: Use explosion-proof electrical/ventilating/light/...equipment. P261:Avoid breathing dust	
	RESPONSE:	P346+P311: If experiencing respiratory symptoms: Call a poison center/doctor	
	STORAGE:	Prevent dust accumulations to minimize explosion hazard.	
	DISPOSAL:	Not Applicable	

Any Regional Considerations: N/A

SECTION 2 NOTES: Warning! May form combustible dust concentrations in air (during processing). The chemical manufacturer or importer shall label chemicals that are shipped in dust form, and present a combustible dust hazard in the form when used downstream.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

CHEMICAL NAME: Grain dust
COMMON NAME: Grain dust
CHEMICAL FAMILY: Dust (combustible dust)
CHEMICAL FORMULA: NA
SYNONYMS: Grain dust corn; corn dust

INGREDIENT:
Corn dust

NAME	CAS#	EC#	ICSC#	% WT
Grain dust	NA	NA	NA	60%
Particulates not otherwise classified or regulated (corn)	NA	NA	NA	40%

CARCINOGENICITY
OSHA: NO **ACGIH:** NO **NTP:** NO **IARC:** NO
OTHER: NA

IMPURITIES/STABILIZING ADDITIVES IDENTIFICATION: None

IMPURITIES/STABILIZING ADDITIVES CLASSIFICATION (if applicable): None

SECTION 3 NOTES: None Available

SECTION 4: FIRST AID MEASURES

Contaminated individuals of chemical exposure must be taken for medical attention if any adverse effect occurs. Rescuers should be taken for medical attention, if necessary. Take copy of label and MSDS/SDS to health professional with contaminated individual.

EMERGENCY OVERVIEW: Dust dispersin in air poses explosion hazard.

ROUTES OF ENTRY/FIRST AID: Eye contact, Inhalation, skin contact

EYES CONTACT: Contact may cause slight irritation due to mechanical action. Symptoms include redness and tearing. Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. Get medical attention.

SKIN CONTACT: Skin effects may include itchy skin and skin rashes. In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Cold water may be used. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention. In case of serious skin contact, wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

INHALATION: Grain dust is a respiratory sensitizer. It can trigger an allergic reaction in the respiratory system. Once this reaction has taken place, further exposure to the dust, even to very small amounts, may produce symptoms. The symptoms may delay for



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several hours. Possible illnesses are rhinitis, coughing and breathing difficulties, asthma, chronic bronchitis, chronic obstructive pulmonary disease, extrinsic allergic alveolitis, organic dust toxic syndrome such as grain fever (a sudden onset, short-lived, 'flu-like' illness with fever and often associated with cough and chest discomfort). Get medical attention if symptoms appear. In case of serious inhalation, evacuate the victim to fresh air. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

INGESTION: None expected.

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE: Allergies, pre existing lung conditions such as asthma.

NOTES TO PHYSICIANS OR FIRST AID PROVIDERS: Treat symptomatically.

SECTION 4 NOTES: You can't usually see the very fine dust that you can breathe into lungs, which will cause most harm.

SECTION 5: FIRE-FIGHTING MEASURES

EXTINGUISHING MEDIA: Foam, CO₂, dry chemical or water fog

PROTECTIVE EQUIPMENT AND PRECAUTIONS FOR FIRE FIGHTERS: DO NOT use direct hose stream if dust can be dispersed into air. Dust dispersed by water stream in the presence of an ignition source could cause an explosion.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

(Define specific hazards arising from the chemical e.g., nature of any hazardous combustion products)

If improperly handled, stored, and/or exposed to an ignition source, this material may burn. Airborne dust in sufficient concentrations when confined and to a sufficient ignition source can explode.

HAZARDOUS DECOMPOSITION PRODUCTS: NA

FLAMMABLE LIMITS IN AIR,

UPPER: Unknown

LOWER: 55 gm/m³

FLASH POINT: Not Applicable.

IGNITION TEMPERATURE:

Cloud (°C)³: 400 °C (752 °F)

Layer (°)⁴: 250 °C (482 °F)

NFPA HAZARD CLASSIFICATION: No information found

SECTION 5 NOTES: None available.

SECTION 6: ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS, PROTECTIVE EQUIPMENT AND EMERGENCY PROCEDURES: Avoid dust dispersion in confined space for explosion prevention.

ENVIRONMENTAL PRECAUTIONS: Dust deposits should not be allowed to accumulate on surfaces, as these may form an explosive mixture if they are released into the atmosphere in sufficient concentration. Avoid dispersal of dust in the air. Nonsparking tools should be used.

METHODS AND MATERIALS FOR CONTAINMENT AND CLEANING UP: Vacuum or sweep up material and place in disposal container; avoid dust dispersion in air

SECTION 6 NOTES: None available.

SECTION 7: HANDLING AND STORAGE

PRECAUTION FOR SAFE HANDLING: Minimize dust generation and accumulation, should never be allowed to exceed 1/8" accumulation.

The use of compressed air to blow dust from ledges, walls, and other areas shall only be permitted when all machinery that presents an ignition source in the area is shut-down, and all other known potential ignition sources in the area are removed or controlled. Routine housekeeping should be instituted to ensure that dusts do not accumulate on surfaces. Dry powders can build static



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electricity charges when subjected to the friction of transfer and mixing operations. Provide adequate precautions, such as electrical grounding and bonding, or inert atmospheres.

CONDITIONS FOR SAFE STORAGE (any incompatibilities): Store in a dry place.

SECTION 7 NOTES: None Available.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

EXPOSURE LIMITS/GUIDELINES:

INGREDIENTS	ACGIH	OSHA-FINAL PELs
Grain Dust	4 mg/m ³ TWA	10 mg/m ³ TWA; 1900 mg/m ³ TWA
Particulates not otherwise classified or regulated (corn)	10 mg/m ³ total dust-TWA; 3 mg/m ³ respirable dust-TWA	15 mg/m ³ total dust-TWA; 5 mg/m ³ respirable dust-TWA

ENGINEERING CONTROLS:

VENTILATION: It is recommended that all dust control equipment such as local exhaust ventilation and material transport systems involved in handling of this product contain explosion relief vents or an explosion suppression system or an oxygen-deficient environment. Ensure that dust-handling systems (such as exhaust ducts, dust collectors, vessels, and processing equipment) are designed in a manner to prevent the escape of dust into the work area. Use only appropriately classified electrical equipment and powered industrial trucks.

PERSONAL PROTECTIVE EQUIPMENT (PPE):

EYE PROTECTION: Safety glasses or goggles

SKIN PROTECTION: Non-spark-producing clothing such as natural fiber

RESPIRATORY PROTECTION: Follow the OSHA respirator regulations found in 29 CFR 1910.134. Use a NIOSH/MSHA approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

OTHER PROTECTIVE CLOTHING OR EQUIPMENT: Sleeved clothing

SECTION 8 NOTES: None Available.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: light grayish brown

PHYSICAL STATE: solid/powerder

COLOR: light grayish brown

ODOR: normally odorless

pH: Not Applicable

FREEZING POINT: Not Applicable

BOILING POINT: Not Applicable

MELTING POINT: Not Applicable

FLASH POINT: Not Applicable

EVAPORATION RATE (BASIS=1): Not Applicable

FLAMMABILITY (by %volume):

UPPER FLAMMABILITY LIMIT: unknown

LOWER FLAMMABILITY LIMIT: 55 gm/m³

VAPOR PRESSURE (mmHg): Not Applicable



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VAPOR DENSITY (AIR = 1): Not Applicable

SOLUBILITY IN WATER: Not Applicable

PARTITION COEFFICIENT n-octanol/water: Not Applicable

Deflagration Index (Kst): 89 bar m/sec (Explosion Testing)

Minimum Ignition Energy (MIE): 300-1000 mJ (Explosion Testing)

Minimum Explosible concentration (MEC): 50 to 150 grams per cubic meter

MINIMUM IGNITION TEMPERATURE:

Cloud (°C)³: 490 °C (Explosion Testing)

Layer (°)⁴: 300 °C (Explosion Testing)

DECOMPOSITION TEMPERATURE:No data available

SPECIFIC GRAVITY (H2O = 1): Not Applicable

BULK DENSITY: 0.150-0.308 g/cm³

PARTICLE DENSITY: 1.43-1.69 g/cm³

MASS MEAN DIAMETER: 10.7-14 µM

ASH CONTENT: 5.12-30.6%

PERCENT VOLATILE: Not Applicable

VOLATILE ORGANIC COMPOUNDS (VOC): Not Applicable

MOLECULAR WEIGHT: Not Applicable

VISCOSITY: Not Applicable

SECTION 9 NOTES: The MEC for grain dust varies according to the particle size (smaller particles are more powerful) and energy (caloric) nature of the product. Extracted flour from corn may have different explosive energy than corn dust. Corn starch is considered one of the more volatile and powerful grain products, but all grain dust should be considered as very dangerous.

SECTION 10: STABILITY AND REACTIVITY

REACTIVITY: NA

STABILITY: Stable

CONDITIONS TO AVOID (STABILITY): Dusty conditions exceeding the Lower Flammable Limit (LFL). Ignition sources.

POSSIBILITY OF HAZARDOUS REACTIONS: NA

INCOMPATIBILITY MATERIAL: NA

HAZARDOUS DECOMPOSITION PRODUCTS:NA

SECTION 10 NOTES: Follow procedures specified in the National Fire Protection Association Codes and Standards for handling combustible dusts. Maintain good house keeping to avoid dust buildup.

SECTION 11: TOXICOLOGICAL INFORMATION

TOXICOLOGICAL INFORMATION: The toxicity data of this product has not been determined by testing or research, but to our best knowledge, this product is minimally toxic. The toxicity data shown below is for reference only.

ROUTES OF EXPOSURE: Eye contact. Inhalation.

SYMPTOMS RELATED TO THE PHYSICAL, CHEMICAL AND TOXICOLOGICAL CHARACTERISTICS:

CONTACT WITH EYES: It can cause irritation to eyes and symptoms include redness and tearing.



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CONTACT WITH SKIN: Contact with dust may cause slight irritation.

INHALATION: Inhalation of grain dust may cause coughing, wheezing, chest tightness, and shortness of breath. Prolonged or repeated overexposure may cause lung damage.

INGESTION: NA

DELAYED AND IMMEDIATE EFFECTS AND ALSO CHRONIC EFFECTS FROM SHORT- AND LONG-TERM EXPOSURE:

SHORT-TERM EFFECTS: The substance irritates the eyes. Inhalation of grain dust may cause irritation of respiratory tract.

LONG-TERM EFFECTS: Long-term grain dust exposure may result in chronic obstructive lung disease. Studies have reported that grain dust inhalation may cause respiratory disease such as asthma, chronic bronchitis and grain fever.

NUMERICAL MEASURES OF TOXICITY:

LD50/LC50: No information found

IRRITATION DATA: No information available.

CARCINOGENICITY: No

EPIDEMIOLOGY: Exposure to grain dust causes grain fever, wheezing, chest tightness, productive cough, eye and nasal irritation, and symptoms of chronic respiratory disease. Grain dust may also induce asthmatic reactions via an allergic mechanism, particularly in individuals who are predisposed to developing allergies.

TERATOGENICITY: No information available.

REPRODUCTIVE EFFECTS: No information available.

NEUROTOXICITY: No information available.

MUTAGENICITY: No information available.

CHROMATID EXCHANGE: No information available.

SECTION 11 NOTES: None Available.

SECTION 12: ECOLOGICAL INFORMATION

ECOTOXICITY (AQUATIC AND TERRESTRIAL, WHERE AVAILABLE): Not Applicable

PERSISTENCE AND DEGRADABILITY: Not Applicable

BIOACCUMULATIVE POTENTIAL: Very unlikely to have bioaccumulation.

MOBILITY IN SOIL: Not Applicable

OTHER ADVERSE EFFECTS: No information available.

SECTION 12 NOTES: None Available.

SECTION 13: DISPOSAL CONSIDERATIONS

DISPOSAL METHOD: Vacuum or sweep up material and place in disposal container. Disposal of this material must be made in accordance with national, state, and local regulations. Avoid water contamination.

RCRA HAZARD CLASS: Not Applicable

DESCRIPTION OF WASTE RESIDUES AND INFORMATION ON THEIR SAFE HANDLING AND METHODS OF DISPOSAL, INCLUDING ANY CONTAMINATED PACKAGING: Not Applicable

SECTION 13 NOTES: None Available.

SECTION 14: TRANSPORT INFORMATION



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U.N. GHS TRANSPORT REQUIREMENT

UN NUMBER: Not Applicable
PROPER SHIPPING NAME: Not Applicable
TRANSPORT HAZARD CLASS: Not Applicable
PACKING GROUP: Not Applicable
LABEL STATEMENT: Not Applicable
MARINE POLLUTANT: Not Applicable

SPECIAL PRECAUTIONS FOR USER: Not Applicable

SECTION 14 NOTES: Shipment of grain does not present a combustible dust hazard in the shipped form. But when processed downstream in a plant, such hazards are a concern.

SECTION 15: REGULATORY INFORMATION

U.S. FEDERAL REGULATIONS

TOXIC SUBSTANCE CONTROL ACT (TSCA): Not Applicable

OCCUPATIONAL, SAFETY AND HEALTH ADMINISTRATION (OSHA): 29 CFR 1910.272

COMPREHENSIVE RESPONSE COMPENSATION AND LIABILITY ACT (CERCLA): Not Applicable

CLEAN WATER ACT (CWA): Not Applicable

CLEAN AIR ACT (CAA): Grain dust can contribute to particulate emission significantly.

SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) CODES: Not Applicable

SARA SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES: Not Applicable

SARA 313 REPORTABLE INGREDIENTS: Not Applicable

STATE REGULATIONS: Not Applicable

INTERNATIONAL REGULATIONS: Not Applicable

SECTION 15 NOTES: None Available.

SECTION 16: OTHER INFORMATION

DISCLAIMER: The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Green Plains Renewable Energy, Inc. be liable for any claims, losses or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Green Plains, Inc. has been advised of the possibility of such damages.

Refer to NPFA 654, *Standard for the prevention of fire and dust explosions from the manufacturing, processing, and handling of combustible particulate solids*, for safe handling.

REFERENCES:

GHS Annex II
GHS SDS Instruction

ACRONYMS/ABBREVIATIONS:

ACGIH-American Conference of Governmental Industrial Hygienists
CAA-Clean Air Act
CAS-Chemical Abstracts Service
CERCLA-Comprehensive Response Compensation and Liability Act
CHEMTREC-It serves as a round-the-clock resource for obtaining immediate response information for incidents involving hazardous material and dangerous goods.
CWA-Clean Water Act
EC-European Commission
GHS-Globally Harmonized System of Classification and Labelling of Chemicals



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IARC-International Agency for the Research on Cancer
ICSC-International Chemical Safety Cards
J-symbol for the minimum ignition energy of a combustible mixture
LC50-The concentration of a chemical in air or of a chemical in water which causes the death of 50% of a group of test animals.
LD50-The amount of a chemical, given all at once, which causes the death of 50% of a group of test animals.
MEC-Minimum explosive concentration; the minimum concentration of combustible dust suspended in air, measured in mass per unit volume that will support deflagration. The MEC can be determined using the test procedure in ASTM E 1515, Standard Test Method for Minimum Explosible Concentration of Combustible Duts.
MIE-Minimum ignition energy; measures the ease of ignition of a dust cloud by electrical and electrostatic discharges.
MIT-Minimum ignition temperature; the lowest temperature at which ignition occurs. The smaller the particle size, the lower the MIT; the lower the moisture content, the lower the MIT.
NIOSH-The National Institute for Occupational Safety and Health
NTP-National Toxicology Program
OSHA-Occupational Safety and Health Administration
RCRA-Resource Conservation and Recovery Act
SARA-Superfund Amendments and Reauthorization Act
STOST-SE-Specific Target Organ Toxicity Single Exposure
TSCA-Toxic Substance Control Act
U.N.-United Nation
UNCED-United Nations Conference on Environment and Development
VOL-Volume
WT-Weight
(°C)-a symbol for cloud where the auto-ignition in a combustible cloud is measured in Degrees Celsius
(°)-a symbol for layer where the layer ignition temperature is measured in degrees Celsius

ⁱ Calvin B. Parnell, Jr., David D. Jones, Ross D. Rutherford, and Kerry J. Goforth. Physical Properties of Five Grain Dust Types. Environ Health Perspect. 1986 Apr; 66:183-8.