LandEnergy

Safety Data Sheet

Wood Pellets HS-SDS001

Contents:

Document Control Information				
Issue	**Purpose**	**Compiled by**	**Authorised by**	**Date**
V1.0	First Issue	GJD	RMcL	01/02/13

1. Identification of the substance/mixture and of the company/undertaking

1.1. Product:

Wood Pellets supplied as bulk, tote or small bags.
Product may be branded **Land**Energy or Woodlets.

1.2. Relevant Uses:

Fuel for domestic, municipal or commercial biomass boilers
Animal bedding

1.3. Supplier Details:

Land Energy Girvan Ltd.
19 Ladywell Avenue
Grangestone Industrial Estate
Girvan KA26 9PF

Tel: 01465 715754
Fax: 01465 713119
email: MSDS@land-energy.com

1.4. Emergency Telephone Number:

It is not anticipated that specific emergency support is required for this product however for further information call: 01465 715754 between 8am and 5pm.

2. Hazards identification

2.1. Classification

Wood pellets have no hazardous classification under Regulation (EC) No 1272/2008

2.2. Label Elements

Wood pellets have no hazardous labelling requirements under Regulation (EC) No 1272/2008

2.3. Other Hazards

Wood pellets are stable and dust free when manufactured.

2.3.1. Ingestion

Wood pellets will increase in volume by 3 to 4 times when wetted or ingested. Accidental ingestion of small quantities of wood pellets (<5 pellets) may cause discomfort.
Ingestion of larger quantities may cause damage to the digestive system and medical advice should be sought.

The following secondary hazards may arise due to **wood dust** generated due to their processing, handling and storage:

2.3.2. Health Effects

Skin irritation, nasal irritation, eye irritation. Long term exposure can cause asthma. Short term exposure may trigger pre-existing asthma.

2.3.3. Explosion

All wood dust should be considered potentially explosive and is a high explosion risk if an ignition source is present and the dust is in a confined space.

If you handle, re-process or store wood pellets you should carry out your own risk assessments in relation to the quantity of dust you create, the exposure levels of personnel and the risks to or from equipment.

Other hazards are:

2.3.4. Products of Combustion

Heating of wood pellets with insufficient oxygen in a confined space such as a combustion appliance will produce CO (Carbon monoxide), CO2 (Carbon Dioxide) and hydrocarbons. If oxygen is then introduced, an explosion may occur.

Inadequate air flow to and ventilation of domestic combustion appliances, when in use, may result in the release of life-threatening levels of CO. Combustion appliances must always be installed by a competent person in compliance with current regulations.

2.3.5. Self-Combustion

Should wood pellets become damp or wet there is a risk that, when stored, self-heating may occur resulting in smouldering fires. These may present further fire or explosion risk depending upon the quantity concerned and the storage environment.

2.3.6. Release of Carbon monoxide during storage

Small quantities of wood pellets can produce life-threatening quantities of CO in a confined space. Unless you can be sure that a wood pellet storage space has been freely ventilated to atmosphere for some time and that there are no unventilated areas DO NOT ENTER THE STORAGE SPACE. DO NOT OPEN AND PLACE YOUR HEAD INSIDE ACCESS PANELS OR HATCHES. If in doubt, consult a specialist who can check CO levels in the space before entry.

3. Composition/information on ingredients

Wood pellets comprise 100% softwood with no additives or binders.

Wood pellets are manufactured from wood chips that are processed by reducing to sawdust, drying and compressing.

Detailed composition of wood pellets will vary with tree species and tree growing environment. Nominal composition by mass is shown in the table on the right:

40%	Cellulose
30%	Hemi-Cellulose
28%	Lignin
2%	other

4. First-aid measures

4.1. Ingestion

Small quantities (<5 wood pellets): Do not take fluids. If discomfort is experienced, seek medical advice.

Larger quantities: Do not take fluids. Seek medical advice immediately.

4.2. Exposure to dust

4.2.1. Skin irritation

Wash affected parts with water. Remove contaminated clothing.
If irritation or inflammation persists seek medical advice.

4.2.2. Nasal or Respiratory Irritation

Remove to fresh air. Carefully remove any contaminated clothing to avoid further irritation. If breathing difficulties are experienced, seek medical assistance immediately.

If the affected personnel have been heavily contaminated with dust or need assistance to be removed from the dusty environment then first responders should use respiratory protection.

4.3. Exposure to Carbon Monoxide (CO)

Symptoms of mild CO poisoning include:

- headache
- dizziness and nausea (feeling sick)
- vomiting (being sick)
- tiredness and confusion
- stomach pain
- shortness of breath and difficulty breathing

Symptoms of moderate to severe CO poisoning include:

- impaired mental state and personality changes (intoxication)
- vertigo – the feeling that you or the environment around you is spinning
- ataxia – loss of physical co-ordination due to underlying damage to the nervous system and brain

- breathlessness and tachycardia (a heart rate of more than 100 beats a minute)
- chest pain caused by angina or a heart attack
- seizures – (muscle spasms)
- loss of consciousness – in cases where there are very high levels of CO gas, death may occur within minutes

If CO exposure is suspected, a rapid response is vital. However, first responders MUST carefully assess the situation before approaching as the environment around the affected personnel may be hazardous. These guidelines are not intended to replace an assessment of the actual situation.

Suspected mild CO poisoning

If the affected person is in a relatively open space with some ventilation and is exhibiting mild symptoms it may be possible for first responders to quickly enter the area and remove the person to an area with fresh air then seek immediate medical assistance. IT IS ESSENTIAL that other personnel are prevented from entering the area where the incident occurred to avoid further CO exposure.

If in any doubt as to the risk or potential CO concentration treat the situation as severe, below:

Suspected moderate to severe CO poisoning

If the person is adjacent to, or has access to an enclosed space and/or is showing symptoms of severe CO poisoning first responders MUST use self contained breathing apparatus to enter the area affected. UNDER NO CIRCUMSTANCES SHOULD PERSONNEL ENTER THE AFFECTED AREA OR OPEN OR LOOK IN TO ACCESS HATCHES/DOORWAYS WITHOUT SELF-CONTAINED BREATHING APPARATUS.
Remove the person from the affected area to fresh air and seek immediate medical assistance.

5. Fire-fighting measures

5.1. Extinguishing Media

5.1.1. Wood pellets that are loose or in small bags or containers

Fires may be responsively extinguished with sand, water (preferred), foam, and inert gases.

It is important to ensure that the extinguishing media can penetrate to all parts of the material. If possible, spread the material on a non-combustible surface while spraying with water. There is a risk that, even with small volumes of material, the extinguishing media cannot penetrate into the core of the material and so leave residual smouldering fires.

5.1.2. Wood Pellets in Silos or Large Storage Vessels

Fires require special methodology to extinguish effectively.

Determine whether the site affected by the fire has any special fire-fighting plan. If so, implement that plan. This will usually involve the injection of inert gases into the storage areas to reduce oxygen levels to a point where combustion is inhibited throughout the whole volume of material. This can take several days or weeks to stabilise and special methods may be needed to subsequently remove burnt material.

If no plan or method exists, use water or foam as extinguishing media having fully assessed the specific risks to life and structures.

5.2. Special Hazards

5.2.1. Residual long-term smouldering fires if extinguishing media have nor penetrated to all parts of the burning material. This can result in fires re-igniting after unexpectedly long intervals.

5.2.2. Unexpected and catastrophic collapse of silos or storage containers due to the load from extinguishing media exceeding the load capacity of the vessel.

5.2.3. Low oxygen environments in and around silos or vessels subject to inert gas fire suppression require mandatory use of self contained breathing apparatus.

5.2.4. Be aware of primary and secondary explosion risk due to presence of dust in adjacent process areas or storage vessels initiated by heat or debris from initial fire.

5.2.5. Be aware of secondary explosion risk due to presence of dust in adjacent process areas or storage vessels that may be damaged by unexpected collapse of structures..

5.2.6. Storage silos, containers & vessels may have high and potentially life-threatening levels of CO. Always check CO levels before entering wood pellet storage spaces or looking into access hatches in storage spaces.

5.3. Advice for Fire-Fighters

Use standard equipment but note special hazards in 5.2.

6. Accidental release measures

Wood pellets are an inert organic material and will naturally degrade in an external environment.

Where spillage of wood pellets presents a practical hazard or nuisance then sweep or preferably vacuum spills for recovery or disposal; avoiding creating dust.

Wood pellets and wood dust present a slip and fall hazard on floors and walkways.

7. Handling and storage

7.1. Precautions for Safe Handling

7.1.1. Dust Emissions

When handling loose wood pellets from bulk or from bags, assess the operations involved and adopt measures to remove airborne dust. These will generally be:

- for low volume periodic material movements: ensure good natural ventilation
- for high volume continuous or regular material process movement: implement mechanical dust extraction systems and associated filtration plant to current regulations.

7.1.2. Personal Protective Equipment

Assess the levels of personnel exposure to dust and adopt eye, respiratory and skin protection as determined by the specific risk assessment.

7.1.3. Incompatible substances

Avoid introducing contaminants from process equipment or external sources. In particular:

Water	Water and other liquids cause disintegration & swelling of pellets
Fuels	Fuels & Oils will adversely affect the flow characteristics and thermal performance of the material
Oils	
Metals	Metals and plastics will damage combustion and handling equipment and may create sources of ignition.
Plastics	

7.1.4. Occupational Hygiene

Do not eat, drink or smoke in handling areas.
Wash hands before eating and when finishing work.

7.2. Safe Storage

7.2.1. Explosive Atmospheres

Storage facilities for wood pellets, including silos, containers, bins and on-floor storage should be assessed in accordance with The Dangerous Substances and Explosive Atmospheres Regulations 2002 (DSEAR). These require employers to control the risks to safety from fire and explosions. Depending upon the results of the assessment, risk elimination, protection and safety measures may be required.

Equipment and protective systems used in areas where potentially explosive atmospheres exist must also comply with the ATEX Equipment Directive and the definition of ATEX requirements will form part of the DSEAR assessment.

Information on these requirements is available from the Health & Safety Executive:
http://www.hse.gov.uk/fireandexplosion/

7.2.2. Flammability Hazards

Wood pellets, in bulk or bags, should be stored in cool locations with no direct exposure to sunlight and good natural, or if necessary, forced ventilation.

7.2.3. Potential Ignition sources & mitigation measures

Wood pellets are stable at normal ambient temperatures and in palletised small bag or tote bag form. Critical ignition temperature can vary with environmental conditions and the mass of material stored in a single unit. Bulk storage facilities should be subject to specific fire risk assessment to ensure correct storage and handling design.

Potential Ignition sources and suggested mitigation measures include:

Potential Ignition source	Suggested Mitigation
Wet or damp material stored for prolonged periods can decompose, heat and self-ignite.	Operate a First-in, first-out (FIFO) policy for stock. Keep material dry. Check stock for wetting and dispose of wet material.
Direct sunlight on small quantities of loose or waste material can cause local heating and ignition.	Clean up dust & spills as soon as they occur. Adopt good housekeeping practices. Review direct sunlight risks.
Mechanical process or handling equipment that generates local heat (e.g. a failed bearing).	Ensure equipment has the correct ATEX rating for the application. Maintain equipment to prevent failure. Check equipment to assess risks.
Electrical equipment either by normal operation or through failure.	
Sparks generated by handling equipment or processes.	Eliminate risk through improved process design. Implement spark arresting measures
Discharges of static electricity	Ensure correct earth bonding of plant, equipment and tools
Human action: Smoking , hot works or maintenance activities	Enforce smoking ban. Carefully manage hot works and maintenance activities to eliminate risk.

7.2.4. Other Advice

Packaging design:

- Packaging should be designed to permit air to escape from the bag or container.
- Packaging should protect wood pellets from water ingress where possible and movement/handling of bulk or packaged materials should always be carried out under cover.

8. Exposure controls/personal protection

8.1. Control Parameters

Wood pellets are stable in normal use and have no associated controls. Secondary respiratory effects from wood dust generated by processing and handling are subject to controls:

Softwood dusts from wood pellets have a Workplace Exposure Limit (WEL) of 5mg/m3 which must not be exceeded. These are limits placed on the amount of dust in the air, averaged over an eight-hour working day. However, exposure to wood dust must be reduced to a level as low as 'reasonably practicable'.

8.2. Exposure Controls

8.2.1. Skin

Skin sensitivity to dust must be assessed on an individual risk basis and appropriate controls adopted. These may include: Barrier creams, gloves, specialist clothing.

8.2.2. Respiratory & Eye Protection

Exposure to dust levels that cause eye irritation should be controlled using powered visors or hoods to provide full face protection.

A specific risk assessment should be made based on the type and density of dust. Respiratory protection should be used.

HSE information sheet: Woodworking Sheet No 14 (Revision 1): Selection of respiratory protective equipment suitable for use with wood dust. Provides guidance and can be found at:
http://www.hse.gov.uk/pubns/wis14.pdf

8.2.3. Environmental Exposure Controls

None applicable.

9. Physical and chemical properties

Typical Physical and Chemical properties of wood pellets and where specifically stated, secondary wood dust, are as follows:

9.1. Appearance	Cylinder of compressed wood, light to medium brown in colour. 6mm diameter. 4-40mm long. Pellets are dust free on loading or bagging but small quantities of wood dust may be generated by handling and shipping.
9.2. Odour	Slight wood odour.
9.3. Minimum Ignition temperature	Not applicable to wood pellets Secondary dust: Dust Cloud 480°C, Dust Layer 260°C
9.4. Auto-ignition temperature	+160°C in an oxygen environment
9.5. Density	≥600Kg/m^3 -typically 650Kg/m3
9.6. Moisture Content	≤10%
9.7. Energy Density	4.8MWh/tonne 17.3GJ/tonne
9.8. Ash Content	≤0.7%
9.9. Solubility	Insoluble in water. Will break down to constituent wood fibres.
9.10. Explosive Properties of secondary wood dust.	Wood dust is a very much stronger explosion risk than coal, flour, sugar and other common dusts. If explosive properties are critical to the design of containers, silos or systems, data should be obtained from specific tests carried out on the dust in question.

10. Stability and reactivity

10.1. Reactivity

Non-reactive

10.2. Chemical Stability

Stable in normal ambient conditions and use

10.3. Hazardous Reactions

Wetting will cause wood pellets to swell to 300-400% original volume. This increase in volume can cause damage to packaging and non-resilient containers. Retention of water will impose unexpected loads on structures and if not anticipated in design may exceed safe working loads.

10.4. Conditions to avoid

- Direct & prolonged exposure to sunlight
- Exposure to naked flames or temperatures approaching Auto-ignition temperature
- Storage for prolonged periods, particularly in combination with wet or humid environments and high ambient or spot temperatures.
- Poorly ventilated storage vessels/environments

10.5. Incompatible Materials

Wetting with any liquids
Exposure to drying oils & oxidising agents

10.6. Hazardous Decomposition Products

When stored in unventilated, or poorly ventilated areas wood pellets can release potentially life-threatening levels of CO. Such storage areas should not be fully or partially entered without self-contained breathing apparatus or until a gas concentration analysis has been carried out.

11. Toxicological information

Toxicological information for the primary product: Wood Pellets and the secondary product: Wood Dust is summarised below:

Product	Route of Exposure	Effects
Wood Pellets	Skin contact through unprotected handling	Dermatitis, nettle rash, irritation (may cause photosensitisation)
	Accidental Ingestion	Discomfort due to disintegration & swelling of pellets. Damage to digestive system if large quantities ingested.
Secondary Wood Dust	Skin contact through unprotected handling or	Dermatitis, nettle rash, skin irritation (may cause photosensitisation),
	Eye contact through airborne dust	Irritation
	Respiratory system contact through inhalation of airborne dust	Rhinitis, bronchial effects, decrease in lung function, respiratory disorders

12. Ecological information

12.1. Toxicity

Wood Pellets have no environmental toxicity.

12.2. Persistence and degradability

Wood Pellets will naturally degrade in external environments with primary degradation varying from weeks to months according to environmental conditions. There is no environmental persistence of contaminants.

13. Disposal considerations

13.1. Uncontaminated waste wood pellets

Uncontaminated waste wood pellets may be re-used:

- as wood fuel in suitable combustion appliances
- in process environments may be returned to the wood pellet manufacturing cycle for re-processing
- as animal bedding or litter

If disposal is required ,the pellets should be dealt with according to local waste disposal regulations.

13.2. Contaminated waste wood pellets

Contaminated waste wood pellets should be disposed of according to local waste disposal regulations

14. Transport information

Wood Pellets are a non-hazardous material.

It should be noted when shipping that:

- The product should be kept dry.
- Wood Pellets are a free flowing material and bulk or bagged product should be carefully loaded and restrained to ensure load stability.
- Long term transport of wood pellets in closed spaces may give rise to hazardous levels of CO. See elsewhere in this sheet for further details.

15. Regulatory information

Relevant Risk and Safety phrases from Directive 2001/59/EC are as follows:

Risk Phrase:

R10, Flammable.
R22, Harmful if swallowed.
R37, Irritating to respiratory system.
R43, May cause sensitisation by skin contact
R44, Risk of explosion if heated under confinement

Safety Phrase:

S8, Keep container dry
S9, Keep container in a well-ventilated place
S16, Keep away from sources of ignition - No smoking
S22, Do not breathe dust.
S38, In case of insufficient ventilation, wear suitable respiratory equipment.

16. Other Information

16.1. Information Sources

- A significant amount of information is available from the Health & Safety Executive (www.hse.gov.uk) .
- Information on CO exposure can be found in:
- http://www.hse.gov.uk/safetybulletins/co-wood-pellets.htm
- Information on DSEAR & ATEX dust testing may be found at: http://www.nef.org.uk/logpile/pellets/documents/DSEAR_guidance_for_dust_explosions.pdf
- Document: http://www.see.ed.ac.uk/feh5/presentations/krause-biomass.pdf is instructive on self-ignition parameters.
- Physical properties of Sitka Spruce can be found in: http://www.forestry.gov.uk/pdf/FCRP015.pdf/$file/FCRP015.pdf
- information on wood toxicology can be found at: http://www.hse.gov.uk/pubns/wis30.pdf
- Information on health effects of wood dust are widely available. Specific information on CO exposure can be found at: http://www.nhs.uk/Conditions/Carbon-monoxide-poisoning/Pages/Symptoms.aspx
- Other data derives from public domain information and internal testing.

16.2. Training

General occupational health & safety training in accordance with the above sections.
All staff involved in the handling of wood pellets and dust will benefit from training in the reasons for, and implications of The Dangerous Substances and Explosive Atmospheres Regulations 2002 (DSEAR).

17. Legal Disclaimer:

This document describes general properties and safety related data for Wood Pellets. These can vary according to use, environment and circumstance. Customers and users of wood pellets should always review parameters and safety information and ensure that is correct, suitable and adequate for their own particular application.

Document End