

# HE SILOS

Storing The Nation's Grain



## HE SILOS GUNNEDAH SILO OPERATION MANUAL

## Congratulations on your purchase of a HE Silos Gunnedah product!

Thank you for supporting our third-generation family business that is Australian made and owned. HE Silos Gunnedah has been manufacturing grain storage products for over 50 years, so you can rest assured knowing we have the knowledge and experience to guide you through your new purchase.

This operation manual has been provided to assist you in knowledge and training of safe use for your new silo. Please ensure you and all silo operators read this manual. If there is anything you do not understand, please get in touch with HE Silos Gunnedah.

*Please note that all information, illustrations and specifications in the operation manual are based on the latest product information available at the time of printing.*

## INDEX

1. Safe use	4
2. Installation and site preparation	5
3. Operation	7
4. Emergency procedures	11
5. Maintenance	14
6. Safe grain storage practices	16
7. Spare parts	20
8. Responsibilities and duty of care	21
9. Warranty	22
Appendix 1 – Bulk densities	28
Appendix 2 – Superphosphate silos	29
Appendix 3 – Feed and pellet silos	30
Appendix 4 – Flat bottom silos	31
Appendix 5 – Portable field bins	33
Appendix 6 – Feeders	35

## 1 Safe Use of Your New Silo

HE Silos Gunnedah recognises the importance of safety in silo design and use. The design of silos by HE Silos Gunnedah is consistent with the relevant codes of practice and legislation.

Your new silo is fitted with these features for your safety:

- Ladders and cages that comply with Australian Standard AS1657.
- Slide ladders that lock into place above ground to prevent children and visitors from climbing the ladder.
- Sight glasses to indicate the level of grain inside the silo.
- Safety mesh guard in silo roof.
- Ground opening lid.
- Warning labels positioned on the silo.
- Serial number plate to identify the silo as manufactured by HE Silos Gunnedah.

You must inform us immediately of any suspected problems. Unreported problems may cause further damage and may void your warranty.

## 2 Installation and Site Preparation

If you choose, HE Silos Gunnedah delivers and installs your silo with their own experienced team.

The silo is fixed to the foundation with M10x100mm screw bolts. When selecting a site location for a silo, the following factors must be considered by you:

FACTORS TO CONSIDER	YES	NO	N/A
Have you sought advice from a qualified structural engineer regarding the silo location?			
Is the silo concrete foundation level?			
Is the ground hard compacted soil?			
Can the ground support the loads?			
Is drainage adequate to prevent flooding and subsidence of the foundation or land surface?			
Have foundations been installed in accordance with HE Silos Gunnedah's recommendations?			
Are distances from overhead powerlines sufficient for work procedures such as augers and tipper trailers or trucks?			
Are distances from other buildings and facilities sufficient to allow safe access and egress from work areas?			
Is there safe vehicle access to and from public and any private roads?			

## SUITABILITY OF SOIL

The silo must be screwed down onto a concrete foundation that sits evenly on hard-fill compacted ground. HE Silos Gunnedah recommends consulting a qualified structural engineer who will advise you on the best way to stabilise your soil for the silo foundation. HE Silos Gunnedah provides foundation recommendations only, as we are not qualified structural engineers.

- The ground must not be susceptible to subsidence.
- The foundations must be excavated to suitable compacted soil.
- The area must be drained so that surface water is diverted around the site and no water can lie within five metres of the foundations.
- Ensure that burrowing animals, such as rabbits or pigs, do not undermine the foundations.
- DO NOT place silo on an existing silo foundation unless the foundation suitability is verified by a qualified structural engineer.

## SILO FOUNDATION

The silo must be screwed down on a concrete foundation that sits evenly. If there are gaps between the silo and concrete these MUST be packed using steel packers as recommended by a qualified structural engineer.

No gap should be more than 3mm. Silos must not be placed on timber. HE Silos Gunnedah screws down the silo with M10x100mm screw bolts but accepts no responsibility if a silo blows over due to concrete slab strength and/or quality.

## ACCESSIBILITY

Please consider that the concrete foundation needs to be accessed by trucks and equipment used during the filling and emptying of silos.

## OVERHEAD POWERLINES

Avoid placing silos near powerlines. All machinery and equipment such as augers and trucks must have maximum clearance from powerlines to access the silos.

## 3

## Silo Operation

It is important to use the silo maintenance checklist referred to on page 14 before operating the silo to ensure safe and correct operating procedures.

### TO FILL A SILO

1. Before filling the silo, ensure that no one is in the silo.
2. Open the top centre lid/hatch of the silo by removing the lid tension springs before opening the top centre lid.
3. Close manhole lid.
4. If sealed silo - fit sealed slide clamp on the bottom hatch to the outlet.
5. Ensure the auger is empty.
6. Move auger into the centre fill hole.
7. Commence filling by using auger manufacturer's instructions. Please ensure that the auger is not resting on the silo.
8. Use sight glasses for filling indication.

### TO UNLOAD A SILO

1. Open the top centre lid/hatch of the silo by removing the lid tension springs before opening the top centre lid.
2. Start auger by using auger manufacturer's instructions. Please ensure that the auger is not resting on the silo.
3. Open outlet to the desired rate determined by the size and speed of auger.
4. Once the required amount of product is withdrawn from the silo, close the outlet allowing the auger to empty.
5. Close top centre fill lid after completion.

### USE OF GROUND OPENING LID

You must ensure you have removed all four tension springs before opening the top centre lid. This will require someone to climb the silo; please refer to the ladder safety advice as listed on the following page.

Use the ground opening lid by pulling the lid handle down; the lid opens by pulling against a spring. To allow the lid to close, return the handle to the close position. CAUTION – the lid handle is under pressure.

## SAFE ENTRY AND ACCESS

### Ladders

Safely access the central hatch by use of safety ladders. Cages have been fitted to comply with Australian standard AS1657. When accessing the central hatch:

1. Remain on the ladder when accessing the centre fill lid.
2. Safety harness must be worn and attached at all times when climbing the ladder, then fasten safety harness to safety ring on top of silo. Refer to harness manufacturer for fitting and correct use instructions.
3. Lock ladder into closed position after use.
4. The maximum load on ladders is 150 kilograms.

### Safety grids

The top centre fill hatch is fitted with permanently mounted safety grids. DO NOT remove these safety items.

### Entry into silo

- DO NOT enter silo unless it is known to be safe.
- Follow confined spaces procedure.
- Open top and bottom hatches well before entering to allow ventilation.
- Wear appropriate breathing respirators with a dust filter or self-contained breathing apparatus.
- Check phosphine levels before entering.
- Have a support person on the outside whilst you are in the silo.
- DO NOT do any hot work inside silo.

## GENERAL POINTS OF OPERATION

Ensure all operators have read the manufacturer's operation manual to be fully competent in the safe use of a silo. Further information related to operators training:

- A harness must be worn when climbing a silo. Refer to harness manufacturer for fitting and correct use instructions.
- Lock ladder into closed position after use.

- Ensure the outlet is open only the amount the auger can handle to avoid spillage.
- DO NOT seal silo unless the silo is being fumigated or treating grain
- DO NOT overfill the silo.
- It is recommended that once the silo has been open at both outlets (roof lid and slide outlet) for a minimum of two weeks for gas to oxygen replacement, it will be safe to enter the silo for cleaning or maintenance.

## RISK OF FALL

When climbing a silo, a safety harness must be worn to operate the silo. Ensure you are wearing appropriate footwear and to take care at heights. After use, ensure all ladders are properly secured to restrict the possibility of children or other individuals accessing and falling from ladders.

Ladders and safety cages have been installed to reduce the risk of falling from silos. THESE SAFETY FEATURES SHOULD NOT BE REMOVED OR TAMPERED WITH IN ANY WAY.

If you remove the safety features against our advice, HE Silos Gunnedah will not be held responsible for any liability or responsibility arising out of your decision. You accept full responsibility and bear all risk from removing safety equipment and indemnify us if you do so against any loss, damage, injury or death resulting.

## PRESSURE TESTING SEALED SILOS

A silo is only truly sealed if it passes a five-minute half-life pressure test according to the Australian Standard AS2628. It is recommended, as a minimum, to pressurise your sealed silo:

1. When the gas-tight/sealed silo arrives on farm.
2. When you fill your silo.
3. When completing your annual silo maintenance.

A silo that does not meet the standard may allow gas to leak out. The concentration of fumigant will be reduced, and there is a chance of insect survival.

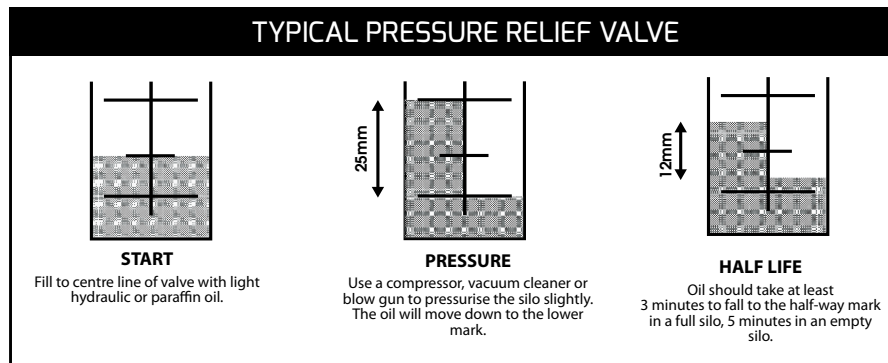
The optimum time to seal test a silo is within an hour of sunrise or on a cool, overcast day under stable weather conditions. Fluctuating temperatures will result in different pressure readings. The silo is tested by pressuring the silo and timing the pressure drop.

HE Silos Gunnedah provides these general recommendations (we do, however, encourage you to consult an appropriate expert):

1. Check silo seals – around the lid and manhole, ensure sealed slide clamp is fitted.
2. Ensure the oil levels on the oil bottle is filled to the correct level and are equal on both sides.
3. Pressurise the silo with a medium-size air compressor attached to the tubeless valve fitted to the silo wall.
4. As soon as the levels are more the 25mm apart of the oil is bubbling, stop the pressuring and commence timing.
5. The time taken for the oil to drop from 25mm to 12mm apart must be no less than five minutes on new silos. For older silos, three minutes is acceptable.

If the half-life pressure test on a new silo is less than five minutes, there is a leak that needs fixing. If an existing silo does not meet a three-minute half-life pressure test, it has a leak that needs fixing.

To find leaks, pressurise the silo again and use soapy water in a spray bottle to check for air leaks around seals. Common places for leaks are: bottom outlet, aeration inlet seal, damaged lids (caused by the auger when lining it up to fill the silo), stretched springs on latches, between the bottom cone or base and the silo wall joint, the roof and wall joint and where the lid ring joins the roof.



## 4 Emergency Procedures

In any emergency, including fire or life-threatening injury, dial 000 immediately.

### Entrapment

If someone is trapped in a silo, immediately Dial 000 for help. Grain empties from a silo in a 'funnel flow' fashion. Any person standing on the grain is very quickly sucked into the grain and may not be able to escape, causing suffocation. If you become trapped in grain, to avoid suffocation:

1. Lean forward to allow for your chest to expand while breathing.
2. Cover your face with your shirt to filter the air you breathe.
3. Try not to panic, remain calm and maintain a slow breathing rate.

### Confined spaces

As the silo is a fully enclosed space, safety assessment and precautions must be taken before entering a silo. The hazard associated with confined space in a silo is the contaminated atmosphere from poisonous gases or dust, temperatures that can cause heat exhaustion, and oxygen depletion. HE Silos Gunnedah provides the following general recommendations (we do, however, encourage you to consult an appropriate expert).

Eliminate confined space risk by:

- Only enter a silo when necessary and safe.
- Place a standby person on the outside to implement emergency procedures if required.
- Wear appropriate protective equipment, including breathing equipment such as a dust mask or air supplied breathing mask.
- Use safety tag lines.
- Have an emergency and rescue plan.
- Provide rescue, first aid and fire suppression equipment.
- Do not enter a silo for extended periods in hot weather.

## GRAIN DUST

Grain dust is classified as a hazardous substance. Many tasks, such as shovelling grain or cleaning out structures, have the risk of exposing workers to airborne dust and to moulds from spoiled organic products (such as grain or fibres), especially when working in an enclosed area.

HE Silos Gunnedah provides the following general recommendations (we do, however, encourage you to consult an appropriate expert).

Control measures may include the following:

- Store only dry grain and dry well-cured forages and hay to prevent the development of moulds.
- Handle dusty substances mechanically if this creates less dust or reduces people's contact with the dust.
- Reduce the amount of dust by enclosing conveyor belts, installing dust collectors and making sure the ventilation system is maintained in good working order.
- Remove accumulated dust in a safe manner (e.g. with an industrial vacuum cleaner where practicable and where dust removal would generate dust hazards).
- Use an appropriate breathing apparatus.

## FIRES AND EXPLOSIONS

The nature of the stored substance in a silo needs to be assessed, including its likelihood of combustible dust and dangerous goods classification that may apply.

Grain dust and dangerous goods stored in a silo, such as oily substances that can be found in substances containing unsaturated oils, as well as beads used in plastic manufacture of ammonium nitrate fertilisers, can cause a hazardous explosion, especially if there is any potential ignition source.

HE Silos Gunnedah provides the following general recommendations (we do, however, encourage you to consult an appropriate expert).

When dealing with hazardous substances, it is important to:

- Research and comply with dangerous goods classifications.
- Remove any ignition source away from the silo, which can include but not

limited to cigarette, welder, power tools, electrical spark or heating due to mechanical failure (e.g. bearing in a conveyor). This includes smartphones.

- Ensure all electrical installation around the silo comply with relevant codes and standards.
- Ensure clean, tidy environments and safe housekeeping as an initial explosion may result in a subsequent explosion.

## EXTINGUISH FIRE

If a silo is on fire, dial 000 immediately. No attempt should be made to extinguish a fire in a container except only by trained firefighters by inert gas injection at ground level into the silo.

## EQUIPMENT ASSOCIATED WITH SILOS

Trucks, augers, elevators or any other equipment associated with grain storage have their own risks. Ensure you have read the manufacturer's safe operating manual. Safe practice is to keep children and visitors away, do not remove machinery guards and be aware of overhead powerlines.

## 5 Maintenance

Regular maintenance of your silo is recommended, and conducting a yearly and pre-season inspection when the silo is empty will ensure the silo is safe for use and is fit for purpose. If any problems become evident, contact HE Silos Gunnedah immediately.

HE Silos Gunnedah does not warrant repairs, alterations or modifications that have been made to the silo by any persons other than HE Silos Gunnedah authorised personnel.

### CLEANING

Grain should only be introduced to a clean silo. Removing any environment that pests could live and breed in is the basis of grain hygiene, which includes all grain handling equipment and storage.

Grain pests live in dark, sheltered areas and breed best in warm conditions. Straight after harvest is the best time to clean before there is any chance that the grain could become infested with pests. Clean your silo by sweeping and/ or water with a pressure washer or fire hose. Choose a warm, dry day to wash so that it dries out quickly.

### PRE-FILLING CHECKS BEFORE FILLING A SILO

It is important to check the silo and its surrounds. The checklist below will assist you in checking your silo before filling.

FACTORS TO CONSIDER	YES	NO	N/A
If a sealed silo, has the silo been pressure/ seal tested?			
<b>Silo structure - visual examination for any damage of silo</b>			
Is there any damage to silo welds?			
Bulging of the container barrel or sides?			
Is there any damage to the support struts (e.g. from vehicle collision)?			
Are any rivets / bolts loose or missing?			

FACTORS TO CONSIDER	YES	NO	N/A
Silo checked internally for any corrosion?			
Is there any corrosion to ladders, cages, platforms?			
Have the inlet and outlet seals been checked?			
Is the oil bottle intact?			
<b>Silo concrete foundation</b>			
Is there any crack or damage to concrete?			
Is the silo sitting evenly on the foundation?			
Anchorage points are fastened and in good condition?			
Is the silo ring free from water and rotting material?			
<b>Safety</b>			
Guarding of ladders and access maintained?			
Safety device attachments, safety line or harness checked for integrity?			
Visual check of electrical equipment, including leads and cables for obvious damage?			
No water present near electrical connections or lead?			
Are all warning labels clearly present?			
Has the silo been cleaned out all grain by sweeping or washing out?			
Is the area clean and free from grain spillage, rubbish or livestock?			
<b>Pneumatic loading and unloading</b>			
Air or dust filters and dust control system ready for operation?			
Checked for cleanliness and integrity (including dust tightness)?			
Pressure relief valves for correct operation?			
Are any warning devices and high-level detection systems operational?			



## 6

## Safe Grain Storage Practices

The type of substances or produce that can be stored in the silo are referred to in the appendix section. Each silo has a maximum allowable capacity in tonnes. This is the designed safe working load of the silo when correctly installed on the recommended foundations. This maximum tonnage **MUST NOT BE EXCEEDED**.

In general (unless a customised silo), grain storage silos are designed to carry their full volume in heavier grains such as wheat. Always check the maximum allowable weight before filling. The silo specifications, including tonnes and cubic metre capacity, are listed on the Silo Serial Plate, which is fitted above the manhole on the silo.

Store only dry and clean grain to ensure grain quality is maintained. Grain deterioration can be caused by insects, moisture migration and heat.

### GRAIN MOISTURE/MOISTURE MIGRATION

Moisture control in farm-stored grain is essential. The drier the grain, the better.

In a silo that will remain sealed, do not store cereal grain above 12% moisture content. If the silo is fitted with aeration fans, a higher moisture content product may be stored. To avoid problems, always test the grain before loading the silo with a calibrated moisture meter. Consult a storage specialist before putting a high-moisture product into long-term storage.

**Moisture Migration** – silo operators often blame leaks in the roof or wall for moisture problems. Moisture in a sealed silo is more likely to come from the stored grain, weed seeds, or respiration of insects or mites. Free moisture that is present in the grain in a silo will usually be carried upwards by the convection currents of air that circulate in the silo (see diagram for typical flow pattern on following page).

These air currents are created by the temperature difference between the warm grain in the centre of the silo and the cool walls, or vice versa.

GRAIN STAYS WARM  
FOR A LONG PERIOD  
AFTER HARVEST

COOL OUTSIDE

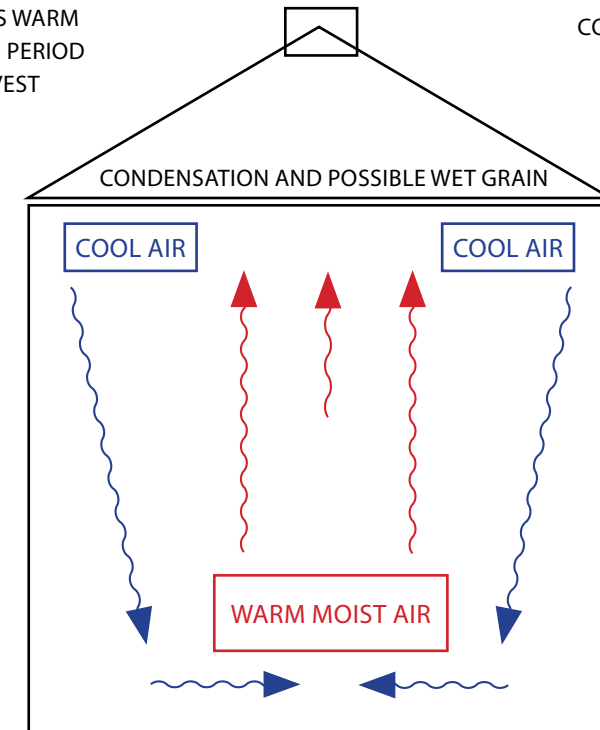


DIAGRAM OF TYPICAL AIR FLOW PATTERN

\* Refer to GRDC (Grain Research and Development Corporation) website for more information.

## AERATION

Aeration units are designed to ensure that silo stored grain remains low in temperature, low in moisture and low in insect and mould activity. Grain stored in silos isn't always below the recommended moisture level.

Aeration uses fans and ducting to blow outside (ambient) air through the grain to keep it cool.

Aeration assists grain quality and fumigation in a silo by:

- Reducing mould.
- Reducing insect development.
- Reducing grain temperature through aeration cooling.
- Increasing storage longevity.

HE Silos Gunnedah uses aeration cooling fans unless otherwise specified by the client. Aeration cooling, as the name suggests, works by cooling the grain which protects seed viability

The aeration fan works by creating a current that circulates through the grain which in turn has the ability to cool the grain. Aeration cooling allows for longer-term storage of low moisture grain by creating desirable conditions for the grain.

## THE EFFECT OF GRAIN TEMPERATURE ON INSECTS AND MOULD

GRAIN TEMPERATURE (°C)	INSECT AND MOULD DEVELOPMENT
40–55°C	Seed damage occurs, reducing viability
30–40°C	Mould and insects are prolific
25–30°C	Mould and insects are active
20–25°C	Mould development is limited
18–20°C	Young insects stop developing
<15°C	Most insects stop reproducing and mould stops developing

## INSECTS AND FUMIGATION

A sealed silo is an excellent fumigation chamber. Its design enables it to hold a lethal concentration of gas long enough to control insects at all stages of their life cycle (egg, larvae, pupae and adult).

Grain should only be introduced to a clean silo; please refer to cleaning section on page 14. When filling a silo, there are a number of fumigation treatments available; it is advised you read and follow the manufacturer's instructions.

For effective fumigation, pressure test sealable silos at least once a year to identify any leaks and maintain rubber seals. Only sealed silos that meet the Australian Standards requirements under AS 2628 (2010) can be used for phosphine fumigation.

Phosphine fumigation typically requires 7 –10 days in a gas-tight sealed silo. When completed, open silo top with care, ventilate using aeration fan for one day; if not aerated, open silo top and ventilate for five days. The minimum withholding period is then two days after ventilation is completed. The total time needed for fumigation is therefore 10 –17 days.

Do not fumigate when grain temperatures are below 15°C or when grain moisture content is below 9%. If fumigation is essential, caution must be exercised when opening the silo after fumigating. The low atmosphere moisture content may be insufficient to liberate the gas fully from the tablets or sachets.

Clearly mark all areas under fumigation with "Danger - Under Fumigation" signs. Warn all personnel on the property (particularly children) of the dangers. For more details, refer to the material safety data sheet from the manufacturer of the product.

Inspect the grain regularly for insect population. In warmer months, this should be at least every 3 – 4 weeks.

### Phosphine – Dangerous poison

Phosphine is a highly toxic gas with potentially fatal consequences if handled incorrectly. Please ensure you have read and understood the Phosphine manufacturer's instructions on the correct and safe use of Phosphine. A dose rate will depend on Phosphine manufacture procedures.

## 7 Spare Parts

As stated, all silo seals must be kept in good condition to ensure optimum results in a sealed silo. HE Silos Gunnedah parts can be purchased directly by contacting the office details provided in this operation manual.

Please see a list below of spare parts, including renewing seals:

- Silo roof lid gasket seal – 2.4m long, 12mm thick, 32mm wide.
- Manhole lid gasket seal – 1.8m long, 12mm thick, 32mm wide.
- Outlet sealed slide plate – 3.5mm thick, 350x350 insertion rubber.
- Tubeless tyre valve.
- Pressure relief valve kit .
- Ground opening lid kit.
- Silo manhole kit.
- Safety silo warning stickers.

## 8 Responsibilities and Duty of Care for Safe Silo Operation

### SILO OWNER OR SITE OCCUPIER

It is the responsibility of the silo owner or site occupier to ensure that persons operate the silo safely in accordance with this operation manual.

### EMPLOYER

The employer's main responsibility is for the health and safety of everyone in their workplace, including visitors. The employer must provide the necessary training and a safe workplace to ensure that the silo and related equipment are operated safely.

### EMPLOYEES AND VISITORS

Employees and visitors carry the responsibility to take reasonable care for their own health and safety as well as others. Employees must follow reasonable health and safety instructions from their employer which includes the safe operation of a silo as per their training.

More information can be found at [www.safework.nsw.gov.au](http://www.safework.nsw.gov.au)

To ensure a safe working environment a risk assessment is vital for each business to complete.

The following documents are available via the SafeWork NSW website to help to conduct a risk assessment for silos:

[Safe Use of Bulk Solids Containers and Flatbed Storage including Silos, Field Bins and Chaser Bins: Code of Practice | SafeWork NSW](#)

[Silo safety self-assessment checklist | SafeWork NSW](#)

## Limited Warranty

### 1. Definitions

“**Acceptable quality**” means:

- (a) Fit for all purposes for which the Product is commonly supplied.
- (b) Acceptable in appearance and finish.
- (c) Free from defects.
- (d) Safe.
- (e) Durable.

“**Australian Consumer Law guarantee**” means the legally enforceable guarantee that applies regardless of the terms of this warranty where a Purchaser has paid a purchase price that was less than \$100,000.00.

“**Climatic or Environmental Conditions**” include weathering, discolouration, fading and staining of the Product.

“**Faulty material**” means material that does not comply with Australian Standards, or that is not of acceptable quality.

“**HE Silos Gunnedah**” means HE Silos Gunnedah, its successors, employees and agents.

“**Major Failure**” means a product or service failure whereby:

- (a) The product or service would not have been acquired by a reasonable consumer fully acquainted with the nature and extent of the failure; or
- (b) The product or service is substantially unfit for purpose; or
- (c) The product or service is not of acceptable quality because it is unsafe; or
- (d) The product or service does not match the description in significant respects.

“**Poor workmanship**” means workmanship that does not comply with Australian Standards or was not undertaken with reasonable care and skill.

“**Purchase Date**” means the date upon which the Purchaser pays for the Product or the date on which the product is supplied to the Purchaser, whichever is earlier.

“**Purchaser**” means a person who purchases products or services from HE Silos Gunnedah.

“**Severe Environmental Conditions**” means use of the product within 50km of breaking surf, within 100 metres from salt water not subject to breaking surf, or heavy industrial areas.

### 2. Warranty

- (a) HE Silos Gunnedah warrants its entire product range against faulty material and poor workmanship.
- (b) If a Product is found to have faulty material, HE Silos Gunnedah will repair or replace the goods. HE Silos Gunnedah retains the discretion to choose whether to repair or replacement is appropriate.
- (c) If there is evidence of poor workmanship, HE Silos Gunnedah will resupply the services.
- (d) The costs directly associated with a valid claim will be covered by HE Silos Gunnedah. This representation does not extend to ancillary expenses. Ancillary expenses include, but are not limited to, earthworks, plumbing, electrical work, equipment hire and replacement of the contents of the damaged product.

### 3. Warranty period

HE Silos Gunnedah offers a limited warranty to the Purchaser for five (5) years from the Purchase Date.

The warranty period is transferrable to a successor in title to land on which the silo is a permanent fixture if a claim is brought within the five (5) year period.

### 4. Making a claim

- (a) The Purchaser must notify HE Silos Gunnedah of a warranty claim within seven (7) days of suspecting the faulty material or poor workmanship. A claim should be made to HE Silos Gunnedah. Our contact details are:

Name: HE Silos Gunnedah

Address: 30 Borthistle Rd, Gunnedah NSW 2380

Telephone: 1300 764 700

Email: [sales@hesilos.com.au](mailto:sales@hesilos.com.au)

- (b) Where a warranty claim is made, HE Silos Gunnedah reserves the right to conduct a site inspection or arrange for a suitably qualified third party to conduct a site inspection.

## 5. Conditions of Warranty

- (a) This warranty will only apply if the Purchaser uses the Product in accordance with HE Silos Gunnedah Operation Manual.
- (b) This Product is supplied with standard safety equipment that HE Silos Gunnedah deems reasonably practicable to ensure the safety of all users. Safety equipment should not be tampered with or removed. HE Silos Gunnedah does not accept liability where safety equipment has been altered or removed in breach of the Operation Manual.
- (c) This warranty covers the manufacture and installation of the Product only. HE Silos Gunnedah does not accept liability for inappropriate or unsafe use of the Product.
- (d) It is the Purchaser's responsibility to ensure that the Product is mounted on a sound concrete foundation prepared to the appropriate Australian Standard. HE Silos Gunnedah Operational Manual provides recommendations only and it is the Purchaser's responsibility to seek the advice of a structural engineer. If the Purchaser makes a warranty claim, HE Silos Gunnedah reserves the right to specify an independent and licensed structural engineer to inspect the foundation.
- (e) When a claim is communicated to HE Silos Gunnedah, continued use of the Product without written consent from HE Silos Gunnedah will void this warranty.
- (f) This warranty is void if the Purchaser places the Product in Severe Environmental Conditions.
- (g) The Purchaser must conduct annual, as well as pre-harvest maintenance check on the Product.

## 6. Warranty exclusions

- (a) HE Silos Gunnedah will not warrant structural issues caused by unsound foundations as assessed by an independent and licensed structural engineer. Our foundation specifications in the HE Silos Gunnedah Operation Manual are to be used as a guide only. HE Silos Gunnedah strongly advises that you consult a structural engineer. The Purchaser waives this consultation at their own risk. The Purchaser bears liability for any issue arising from or associated with foundations.
- (b) If the independent and licensed structural engineer conducting the site inspection finds that the claimed fault or poor workmanship is not a warranty issue, the Purchaser will bear the cost of the site inspection. This cost will not be covered under warranty.

- (c) HE Silos Gunnedah will not warrant against any damage caused by malfunction or failure resulting from misuse, neglect, abuse or for a purpose for which it was not designed.
- (d) HE Silos Gunnedah will not warrant for grain or other materials that are incorrectly stored in the Product. If a Purchaser claims that a silo is leaking, they may be referred to a Grain Research and Development Consultant (GRDC). Where increased moisture is found to be due to the 'sweating' of grain or other material because the moisture content is too high, HE Silos Gunnedah will not accept liability and the Purchaser will bear the cost of the GRDC or HE Silos Gunnedah site inspection. This cost will not be covered under warranty.
- (e) HE Silos Gunnedah will not warrant repairs, alterations or modifications that have been attempted by any persons other than HE Silos Gunnedah authorised personnel without prior written consent from HE Silos Gunnedah.
- (f) A warranty claim is not available for damage caused by actual or intentional misuse or carelessness. HE Silos Gunnedah does not provide everyday maintenance of equipment. This warranty does not extend to everyday wear and tear caused by vehicles or other machinery, or inadequate or improper maintenance of goods.
- (g) HE Silos Gunnedah does not warrant the installation or instalment by HE Silos Gunnedah personnel or other manufacturers or suppliers' products and equipment that are outside of HE Silos Gunnedah product range.
- (h) HE Silos Gunnedah does not warrant fittings and accessories supplied with the Product that are not manufactured by HE Silos Gunnedah.
- (i) HE Silos Gunnedah does not warrant the Product if the serial number has been altered or defaced.
- (j) HE Silos Gunnedah does not warrant the Product if it has been used for any other purpose than to store materials that the Product is designed to hold.
- (k) HE Silos Gunnedah warranty does not extend to cover the effects of climatic or environmental conditions including weathering, discolouration, fading and staining of the goods.

## 7. Maximum Contribution

HE Silos Gunnedah will only be liable to pay up to the Purchase price paid for the product.

## 8. Disputes

HE Silos Gunnedah will endeavour to settle any dispute arising out of or relating to this agreement between HE Silos Gunnedah and the Purchaser. If an agreement is not reached within 30 days of being notified of a claim, HE Silos Gunnedah reserves the right to appoint an independent arbitrator to resolve disputes.

## 9. Application of the Sale of Goods Act

To avoid any doubt, the Sale of Goods Act NSW will apply to the Product. HE Silos Gunnedah stands behind their Product and holds their Product out as being of high quality.

## 10. Australian Consumer Law Guarantee

*Our goods and services come with guarantees that cannot be excluded under the Australian Consumer Law.*

*You are entitled to choose a refund or replacement for major failures with goods. If a failure with the goods or a service does not amount to a major failure, you are entitled to have the failure rectified in a reasonable time. If this is not done you are entitled to a refund for the goods and to cancel the contract for the service and obtain a refund of any unused portion. For major failures with service, you are entitled:*

- (a) To cancel your service contract with us; and*
- (b) To a refund for the unused portion, or to compensation for its reduced value.*

You are also entitled to be compensated for any other reasonably foreseeable loss or damage from a failure in the goods or service.

## ACKNOWLEDGEMENTS

- Grains Research & Development Corporation (GRDC)
- SafeWork New South Wales
- *Safe Use of Bulk Solids Containers and Flatbed Storage including Silos, Field Bins and Chaser Bins: Code of Practice* ([www.safework.nsw.gov.au](http://www.safework.nsw.gov.au))

## APPENDIXES

## Appendix 1 Produce Stored/Typical Bulk Densities

Due to grain shape, size or variety that will vary each season, bulk densities of products will differ widely. When a material is stored in a silo, compaction can be expected of roughly 5%.

Please note that superphosphate silos are designed for the storage of fertiliser. Feed and pellet silos are designed for the storage of pellets. Transportable grain silos are designed for the storage of grain and seeds.

Please see below bulk densities expressed as kg/m<sup>3</sup> to be used as a guide only.

PRODUCT	Kgs/m <sup>3</sup>		PRODUCT	Kgs/m <sup>3</sup>
Alfalfa seed	760		Navy Bean	760
Barley	630		Oats	580
Canary	700		Peanut in shell	300
Canola	690		Peanut shelled	640
Canola meal	630		Rice long paddy	620
Cement	1280		Rice med paddy	660
Chick laying mash	460		Rice long brown	790
Chickpea	740		Rice med brown	850
Cotton seed	400		Rye grain	700
Cowpea	750		Safflower	530
Flax seed	700		Sawdust	210
Horse pellets	650		Sesame	590
Linseed	720		Sorghum	730
Lucerne pellets	660		Soybean	750
Lupin	770		Sunflower	420
Maize	720		Triticale	700
Millet	630		Wheat	820
Mung	750			

## SUPERPHOSPHATE DENSITIES

PRODUCT	Kgs/m <sup>3</sup>		PRODUCT	Kgs/m <sup>3</sup>
Bulk Super	1200		DAP	928
Highplos	1000		Single Super	1050
Double Super	1040		Starter 12	840
Granulated Urea	767		Map 11 - 23- 0	950
Starterfos	995		Double Zine	1060
Pivot 15	930		Pivot DAP 18	1030
Triple Super TSP	970			

## Appendix 2 Superphosphate/Fertiliser Silos

Superphosphate silos are designed to store granulated fertilisers. HE Silos Gunnedah coats the silo internally with two-part epoxy resin to protect the silo from corrosion.

Many fertilisers pick up moisture from the air, causing them to set hard. As a result, fertiliser should only be stored for short periods and stored in silos that are sealed. It is important to ensure the silo is very dry when putting fertiliser into storage. It is recommended if you're storing fertiliser for a longer period to part fill a fertiliser silo to reduce the pressure at the bottom of the silo to set hard.

Fertiliser silos should be completely cleaned inside and out after each use. If using a fertiliser silo to store grain, it must be thoroughly cleaned to avoid contamination. Refer to silo maintenance on page 14 for further information.

## Appendix 3 Feed and Pellet Silos

### FILLING A FEED AND PELLETT SILO

When pneumatically filling silo, connect camlock fitting to blower pipe and commence filling, ensuring that product is not blowing out the breather pipe. If the product is blowing out of the breather pipe, this would indicate the silo is full or has too much pressure.

Contact HE Silos Gunnedah for further information.

### MAINTENANCE

Regular checks and cleaning of feed and pellet silo are recommended similarly to a silo. Feed and pellet silos should be checked once a year and pre-use. Please refer to the section outlining maintenance and cleaning on page 14.

## Appendix 4 Flat Bottom Silos

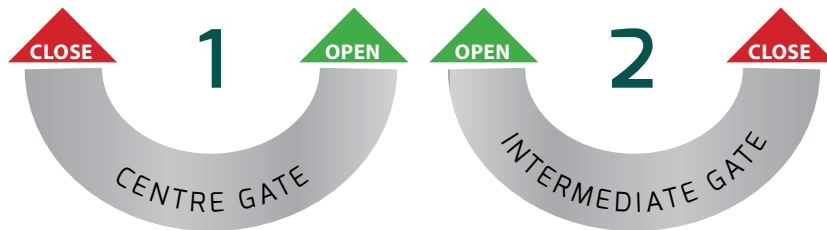
### UNLOADING FLAT BOTTOM SILO

1. Connect the hydraulic hose to the tractor in the correct order. Set RPM of the auger at the minimum 300 - 350RPM. This should be done by adjusting the flow taps on the tractor hydraulic.
2. Open handle marked "I", which means silo is emptying from centre outlets.
3. CAUTION - open centre outlet ONLY ENOUGH to load auger. If the centre hatch is opened too far, the auger will be overloaded and can jam causing damage to the auger because it is being force-fed.
4. After exhausting flow from the centre outlet, then open other handle to out load grain from around the entrance hatch.
5. With the entrance hatch open, connect hydraulic hoses from sweep to the tractor and start up sweep whilst operating the underground auger.
6. CAUTION - sweep may need to be freed from compacted grain to start turning. If this is the case, disconnect the hydraulics from the sweep auger, free compacted grain and restart the hydraulics.
7. Sweep speed will be much slower than an underfloor auger. Once again, adjust the speed with flow taps on the tractor.
8. DANGER - These silos are a CONFINED SPACE. Entry into them is subject to confined space procedures. There is a danger of a sweep auger rotating and moving into the body of the grain. The guards fitted to the sweep auger are for your protection. DO NOT REMOVE these guards and keep a safe distance from the moving sweeps. REFER to *Confined Space Procedures*.



## IMPORTANT

1. Always open centre gate first.
2. Only open gate enough to feed auger.
3. Auger speed and gate opening position are essential to the smooth and safe operation of out loading auger.



UNLOADING FROM INTERMEDIATE GATE FIRST MAY RESULT IN DAMAGE TO SILO.

## TO FILL A FLAT BOTTOM SILO

Filling a flat bottom silo, use the same procedure as outlined in how to fill a silo listed on page 7.

## MAINTENANCE

Regular checks and cleaning of flat bottom silos are recommended similarly to a silo. Flat bottom silos should be checked once a year and pre-use. Please refer to previous section on maintenance and cleaning, listed on page 14.

## Appendix 5 Portable Field Bins

HE Silos Gunnedah portable field bins are designed for short term storage that can be moved to your desired location.

### OPERATION

To fill a field bin, wheels need to be lowered to ensure field bin is sitting at ground level.

### RELOCATING A FIELD BIN

1. To lower field bin wheels, you must unlock the locking pins and lower the base with the lever arm provided.
2. To open side fill doors undo latches on the door and lift open the door with the ground opening lid handles.
3. CAUTION – be aware of strong winds when opening and closing side fill doors. Pushing direction against the wind may cause injury or damage to the field bin.
4. Ensure outlets gate and inspection hatch are closed before filling.

### UNLOADING A FIELD BIN

To unload a field bin, you must follow the instruction on how to unload a silo listed on page 7.

To tow a field bin:

1. Field bin must be empty before moving.
2. Ensure door handles are locked into place.
3. Ensure wheels are raised and locked into place with locking pins.
4. Follow standard towing procedure with a vehicle.
5. If using on a highway, you must follow oversize load rules and regulations such as using a pilot vehicle, oversize signs, lights and flags.

## MAINTENANCE

Regular maintenance of your field bin is recommended similarly to silos stated in the maintenance and cleaning section on page 14.

Ensure you check your field bin minimum once a year as well as pre-use. Further specific inspections include:

- Checking hinges.
- Checking welds.
- Check supports and rivets.
- Check tyres for damage or deterioration.
- Check tyres are correct tyre pressure.
- Check wheel bearings.
- Grease bearings.

## Appendix 6 Feeders

HE Silos Gunnedah cattle and sheep feeders are provided on steel skids for ease of moving around to the desired location. Feeders must be empty before moving. To move a feeder, it is suggested to use a forklift extension, or it can be towed behind a vehicle.

### OPERATION OF A FEEDER

Before filling feeder, you must ensure you have set your skirt height to desired feed out restriction. To adjust skirt:

1. Undo latches around the entire skirt.
2. Raise or lower to desire height.
3. Ensure all latches are locked in place.

To fill a HE Silos Gunnedah cattle or sheep feeder is the same procedure as outlined in previous section on how to fill a silo, listed on page 7.

### MAINTENANCE

Regular checks and cleaning of feeder is recommended similarly to a silo. Feeders should be checked once a year and pre-use. Please refer to section outlining maintenance and cleaning, listed on page 14.



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