

TWISTER™

FOUR INCH CORRUGATED BINS OPERATOR'S MANUAL

STIFFENED, UNSTIFFENED, FOUNDATION FORM, & HOPPER BINS

Stiffened	18-05 – 18-16	Foundation Form	15-04 – 15-09
	21-05 – 21-18		18-04 – 18-09
	24-05 – 24-20		21-04 – 21-09
	27-05 – 27-22		24-04 – 24-09
	30-05 – 30-24		27-04 – 27-09
	33-05 – 33-24		30-04 – 30-09
	36-05 – 36-24		33-04 – 33-09
	42-05 – 42-24		36-04 – 36-09
	48-05 – 48-24		42-04 – 42-09
	60-05 – 60-24		48-04 – 48-09
Unstiffened	15-04 – 15-10	Hopper	15-04 – 15-09
	18-04 – 18-10		18-04 – 18-09
	21-04 – 21-10		21-04 – 21-09
	24-04 – 24-10		24-04 – 24-09
	27-04 – 27-10		27-04 – 27-09
	30-04 – 30-10		
	33-04 – 33-10		
	36-04 – 36-10		
	42-04 – 42-10		
	48-04 – 48-10		

ORIGINAL INSTRUCTIONS



Read this manual before using product. Failure to follow instructions and safety precautions can result in serious injury, death, or property damage. Keep manual for future reference.

Part Number: ENM-18887-TW R1

Revised: Nov/12

This product has been designed and constructed according to general engineering standards^a. Other local regulations may apply and must be followed by the operator. We strongly recommend that all personnel associated with this equipment be trained in the correct operational and safety procedures required for this product. Periodic reviews of this manual with all employees should be standard practice. For your convenience, we include this sign-off sheet so you can record your periodic reviews.

Date	Employee Signature	Employer Signature

a. Standards include organizations such as the American Society of Agricultural and Biological Engineers, American National Standards Institute, Canadian Standards Association, International Organization for Standardization, and/or others.

TABLE OF CONTENTS

1. Introduction	5
1.1. General Description and Intended Purpose	5
1.1.1. Site Selection	7
1.1.2. Bin Upgrade	8
1.1.3. Bin Site Expansion	8
1.1.4. Future/Additional Sidewall and Roof Loading	8
2. Safety	9
2.1. General Safety	10
2.1.1. Lockout and Tagout Procedures	10
2.2. Operational Safety	11
2.3. Maintenance Safety	14
2.4. Safety Decals	15
2.4.1. Decal Installation	15
2.4.2. Safety Decal Locations	15
3. Operation	19
3.1. Pre-Filling Checklist	19
3.2. Filling Bin	20
3.3. Storage	22
3.3.1. Inspecting Stored Grain	22
3.3.2. Drying and Aerating Stored Grain (When Equipped)	23
3.3.3. Stirring Machines	24
3.4. Emptying Bin	24
3.4.1. Emptying From the Bin Door	24
3.4.2. Emptying Hopper Bins	24
3.4.3. Emptying Using a Bin Unload and Sweep (When Equipped)	24
3.4.4. Sidedraw Option	29
3.5. Cleanout	29
4. Maintenance	31
4.1. General Maintenance Procedures	31
4.1.1. Grain Bin	31
5. Troubleshooting	35
5.1. Grain Bin	35
5.2. Bin Unload	38
6. Appendix	41
6.1. Grain Drying and Aeration Tips	41
7. Specifications	45
Limited Warranty	55

1. Introduction

Thank you for purchasing a Twister bin. Before using, please read this manual and understand the various features of the equipment and precautions for efficient and safe operation.

Keep this manual handy for frequent reference and to review with new personnel. A sign-off form is supplied on the inside front cover to record your safety reviews. Call your local distributor or dealer if you need assistance or additional information.

This manual should be regarded as part of the equipment. Suppliers are advised to retain documentary evidence that this manual was provided with the product.

1.1. GENERAL DESCRIPTION AND INTENDED PURPOSE

Table 1.1 Bin Features

Number	Feature
1	Filler cap and roof peak support: may include filler cap adaptor (33' and 36' bins), or compression ring (42', 48', and 60' bins)
2	Roof rings
3	Roof ladder
4	Inspection hatch sheet
5	Vent sheet(s)
6	Roof sheet ribs (and roof rib stiffeners on applicable models)
7	Roof ring angle sections (under roof sheet)
8	Top sidewall ladder platform
9	Roof eave birdstops
10	Top sidewall ladder and safety cage
11	Sidewall wind ring(s) (Stiffened bins only)
12	Sidewall stiffeners and stiffener splice plates (Stiffened bins only)
13	Middle sidewall ladder platform
14	Standard sidewall sheets (different gauges, according to tier)
15	Bottom sidewall ladder and safety cage
16	Door short side sheet
17	Door
18	Door bottom cut-out sheet (with aeration and foundation punching options)
19	Bottom tier sheets (with aeration and foundation punching options)
20	Bin unload
21	Stiffener baseplates (stiffened bins only), base angle sections, anchor bolts
22	Foundation

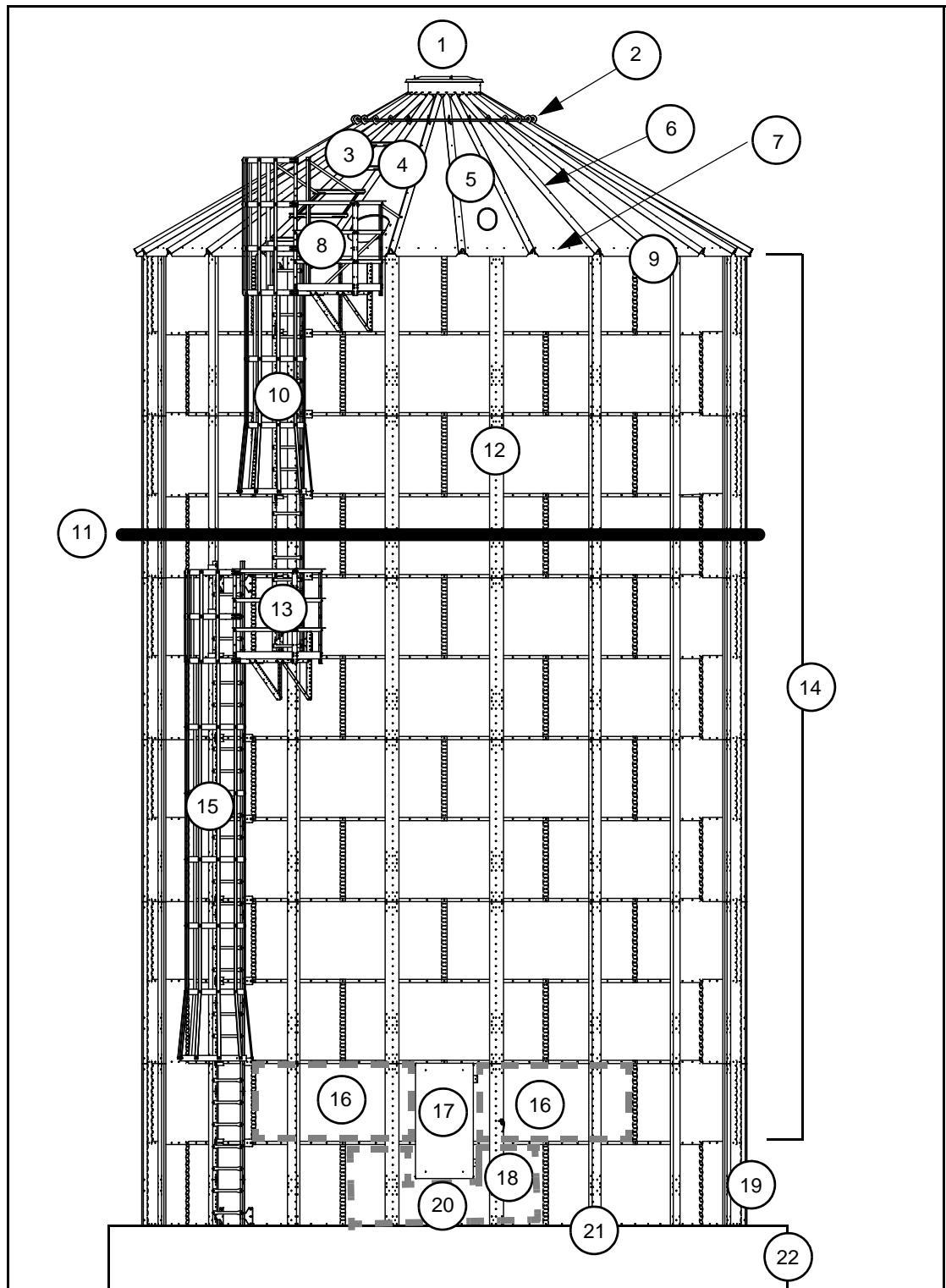


Figure 1.1 Typical Twister Bin (Stiffened Model Shown)

The following discusses intended uses for your bin:

- It is generally assumed that grain will be stored in the bin, however, other materials meeting criteria below are acceptable.
- Bins are designed for grain storage and allow loading and unloading of free flowing, non-corrosive granular material up to 55lb/ft³ (880kg/m³).

- Material is intended to be unloaded from the center with a bin unload auger, from the bin door with a portable auger placed as close as possible to the center of the bin, or under the hopper bottom, depending on your model. Refer to Operation Section.
- Bins can be loaded by a portable grain auger or conveyor, or other grain handling system (where design permits) through the filler cap, directed toward the center of the bin. Refer to “Specifications” on page 45
- Treated material/grain can be stored if it is not corrosive; check with your local supplier.
- Material can be stored in warm or cold environments, however stored grain may require special conditioning to prevent spoiling.
- See also Table 1.2 for specific intended uses for your bin.

Table 1.2 Grain Bin Usage

Type	Dry Storage	Stirring Machine	Natural Air Drying	Aeration	Side Draw
Stiffened	✓	✗	✓	✓	w/upgrade
Unstiffened	✓	✗	✓	✓	✗
Commercial	✓	✗	✓	✓	w/upgrade
Hopper	✓	✗	✓	✓	w/upgrade
Foundation Form	✓	✗	✓	✓	✗

The following are unacceptable misuses of the bin. Damage caused by such misuses is not covered by warranty. Edwards does not accept any liability arising out of these or any other misuses:

- Storing material other than free flowing, noncorrosive, granular material.
- Storing fertilizer inside the bin; fertilizer is corrosive and will damage the galvanized coating.
- Entering the bin while loading or unloading its contents, or to break up crusted material. Refer to “Operational Safety” on page 11.
- If equipped with a bin unload, unloading material from any location other than the center of the bin, except as described in “Emptying Using a Bin Unload and Sweep (When Equipped)” on page 24.
- Filling bin through the inspection hatch or directing material away from bin center.
- Overfilling the bin such that there is outward pressure on the roof sheets.
- Unauthorized modifications of the equipment.
- Unloading material in any way not described in this manual.
- If equipped with a sidedraw, using in a manner other than described in “Side-draw Option” on page 29.

1.1.1. SITE SELECTION

Selection of an appropriate site is a very important step prior to assembling a Twister grain bin. The following must be adhered to when choosing a bin site:

- Choose a firm, level, well-drained site, preferably at the top of a small hill or incline so that snow/water cannot collect near the grain bin.

- The soil needs a bearing capacity of at least 3,000 lb/ft² (143 kPa) when using a Twister foundation. Check bearing capacity if there is *any* doubt about its adequacy. If building a hopper bottom bin, refer to that manual for further information on concrete foundation requirements.
- Top soil is **not** adequate for the support of a grain bin and must be removed prior to assembly and replaced with packed gravel fill.
- The foundation may be subject to frost movement. If in doubt about the site, hire a professional engineer who is familiar with local conditions.
- Some materials that seem adequate at one time of year may become unstable later. Dry clay, for example, may lose practically all its strength if it becomes saturated with water.
- Grain bins should never be located near high buildings that may cause uneven snow build up on the bin roof or uneven wind pressure on the structure; both may result in bin damage.
- Bins should be positioned a safe distance from power lines or electrical transmission equipment. Contact your local power company to obtain recommended equipment clearance information.
- Electrical control equipment in contact with the bin must be grounded and installed in accordance with local codes.
- Determine your electrical needs for assembly and ensure that there is the correct type and a sufficient amount of power to operate tools, air compressors, lighting, etc.
- Ensure that there is sufficient power to operate any aeration or unload equipment that is to be installed.
- Orientation: Consider door (if equipped) and vent placement, loading auger direction, and unloading auger direction when choosing a site.

1.1.2. BIN UPGRADE

Some bins manufactured by Twister can be increased in size by adding tiers to make the bin taller. Contact your dealer for correct information and to ensure your bin is equipped to handle extra loading.

1.1.3. BIN SITE EXPANSION

Future potential bin site expansion should be considered and planned for prior to siting and construction.

1.1.4. FUTURE/ADDITIONAL SIDEWALL AND ROOF LOADING

Some bins manufactured by Twister are designed to allow additional loads to be added to the bin to support other equipment, or extra sidewall stiffeners can be added to some bins to support additional loading. If you are considering adding any equipment to your bin, contact your dealer for correct upgrade information and to ensure your bin is equipped to handle extra loading.

2. Safety



The Safety Alert symbol to the left identifies important safety messages on the product and in the manual. When you see this symbol, be alert to the possibility of personal injury or death. Follow the instructions in the safety messages. Why is SAFETY important to you?

- Accidents disable and kill.
- Accidents cost.
- Accidents can be avoided.

SIGNAL WORDS

Note the use of the signal words **DANGER**, **WARNING**, **CAUTION**, and **NOTICE** with the safety messages. The appropriate signal word for each message has been selected using the definitions below as a guideline.

DANGER



Indicates an imminently hazardous situation that, if not avoided, will result in serious injury or death.

WARNING



Indicates a hazardous situation that, if not avoided, could result in serious injury or death.

CAUTION



Indicates a hazardous situation that, if not avoided, may result in minor or moderate injury.

NOTICE

Indicates a potentially hazardous situation that, if not avoided, may result in property damage.

2.1. GENERAL SAFETY

Important: *This general safety section includes instructions that apply to all safety practices. Any instructions specific to a certain safety practice (e.g., Operational Safety), can be found in the appropriate section. Always read the complete instructional sections and not just these safety summaries before doing anything with the equipment.*

YOU are responsible for the **SAFE** use and maintenance of your equipment. **YOU** must ensure that you and anyone else who is going to work around the equipment understands all procedures and related **SAFETY** information contained in this manual.

Remember, **YOU** are the key to safety. Good safety practices not only protect you, but also the people around you. Make these practices a working part of your safety program.

- It is the equipment owner, operator, and maintenance personnel's responsibility to read and understand **ALL** safety instructions, safety decals, and manuals and follow them when assembling, operating, or maintaining the equipment. All accidents can be avoided.
- Equipment owners must give instructions and review the information initially and annually with all personnel before allowing them to operate this product. Untrained users/operators expose themselves and bystanders to possible serious injury or death.
- Use this equipment for its intended purposes only.
- Do not modify the equipment in any way without written permission from the manufacturer. Unauthorized modification may impair the function and/or safety, and could affect the life of the equipment. Any unauthorized modification of the equipment voids the warranty.
- Do not allow any unauthorized person in the work area.



2.1.1. LOCKOUT AND TAGOUT PROCEDURES

To minimize possibility of serious injury or death to workers from hazardous energy release (for example, when restarting the equipment) and prevent worker deaths from all forms of hazardous energy release, follow all lockout and tagout procedures when installing and servicing equipment. Ensure that lockout and tagout procedures are adhered to. For example:

- De-energize, block, and dissipate all sources of hazardous energy.
- Lock out and/or tag out all forms of hazardous energy.
- Ensure that only 1 key exists for each assigned lock, and that you are the only one that holds that key.
- After verifying all energy sources are de-energized, service or installation may be performed.
- Ensure that all personnel are clear before turning on power to equipment.

For more information on occupational safety practices, contact your local health and safety organization.

2.2. OPERATIONAL SAFETY

Operational and Maintenance Safety means using common sense and knowing and observing the proper precautions.

- Have another person nearby who can shut down equipment in case of accident. It is good practice to always work with at least one other person.
- Do not operate equipment with any guard removed.
- Keep body, hair, and clothing away from all moving parts.
- Do not climb ladder if damaged, wet, icy, greasy, or slippery. Remove slippery materials on platforms, rungs and gripping surfaces.
- Do not use the ladder until all bolts are fastened and secured.
- Consult a qualified electrician to ensure the bin is properly grounded.
- When ascending/descending a ladder, maintain good balance by having at least two feet and one hand or two hands and one foot on ladder at all times.
- Use required safety harnesses and climbing equipment. Consult local safety authorities.
- Perform maintenance during normal daylight hours or with equivalent ambient lighting.
- Use bin for free-flowing grains only.
- Never overfill bin. Grain should never come into contact with or place pressure on roof sheets.
- When filling, use top filler cap and direct grain to center of bin. Do not fill from inspection hatch; this will cause uneven loading and could cause the bin to collapse.
- Unload grain only as described in the operation section of this manual.
- Lock bin door (where equipped) and close/lock all other access doors when not in use.
- Never enter a bin when loading or unloading grain.
- Never enter a bin if you don't know its unloading history. Grain may form a bridge above a void space below, causing potential for entrapment.
- Always try to solve problems without entering a bin from the inspection hatch or filler cap. It takes more than 1000 lb (4.5kN) of force to remove someone buried below the surface of grain. Entering the bin while unloading grain will cause serious injury or death. Refer to Figure 2.3.
- Although entering the bin from the roof or inspection hatch is never recommended, **if you must enter the bin in an emergency:**
 - Stop the unloading process if the bin is being unloaded and lock out / tag out power before entering the bin, refer to "Lockout and Tagout Procedures" on page 10.
 - Always wear a dust-filtering respirator when entering the bin. Grain dust, spores, and inadequate oxygen can cause death in grain bins. Persistent exposure may cause "farmer's lung," which can eventually be fatal.
 - Have body harness tethered to a lifeline controlled by two others outside the bin. One worker should be able to see inside worker through the inspection hatch. If there is an accident, one worker can focus on the victim while the other goes/calls for help.

- In the event that you are trapped in the grain bin as it is unloading, move as quickly as possible toward the bin wall; keep yourself elevated above the grain mass by walking on the flowing mass while staying as close as possible to the bin wall.

Important: *If you ignore the safety precautions above and enter the bin, you could die from being submerged in grain.*

THERE ARE 3 COMMON WAYS A PERSON GETS SUBMERGED IN GRAIN:

1. Collapse of bridged grain:

- Grain can “bridge” across a bin, creating an empty air space below. A person can easily break through this bridge and become trapped, risking suffocation.
- To identify bridged grain, look for a funnel shape on the surface of the grain after having removed some of the grain. If surface is undisturbed, the grain has bridged and formed a crust.
- Never walk on the grain crust—the crust rarely becomes strong enough to support the weight of a person. See Figure 2.1.
- To remove bridge, try breaking the bridge from the inspection hatch or filler cap. Use a pole to hit the surface, securing it with a rope in case it is dropped. Be aware that chunks of crusted grain can move down to the auger and limit flow.

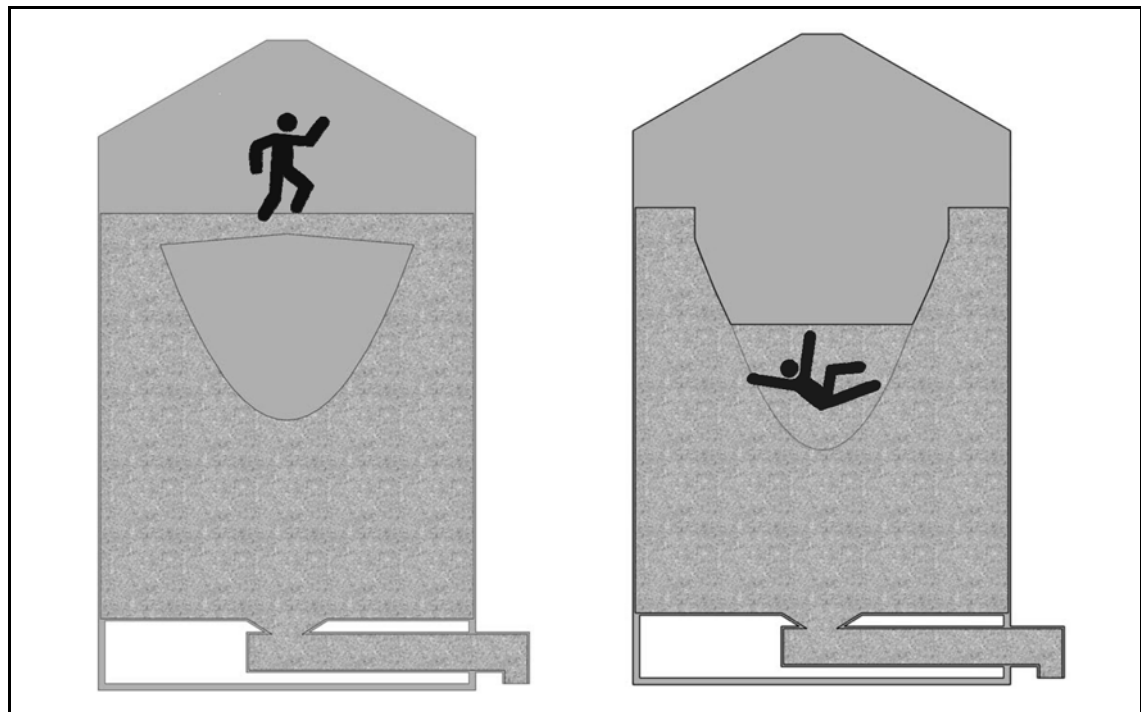


Figure 2.1 Bridged Grain Collapse

2. Collapse of a vertical wall of grain:

- Vertical walls of grain are created when the bin is partially empty. Poking at the wall can make the grain avalanche and submerge a person.
- Do not enter bin to break down grain that has set up. Break grain mass from top of bin outside. See Figure 2.2.

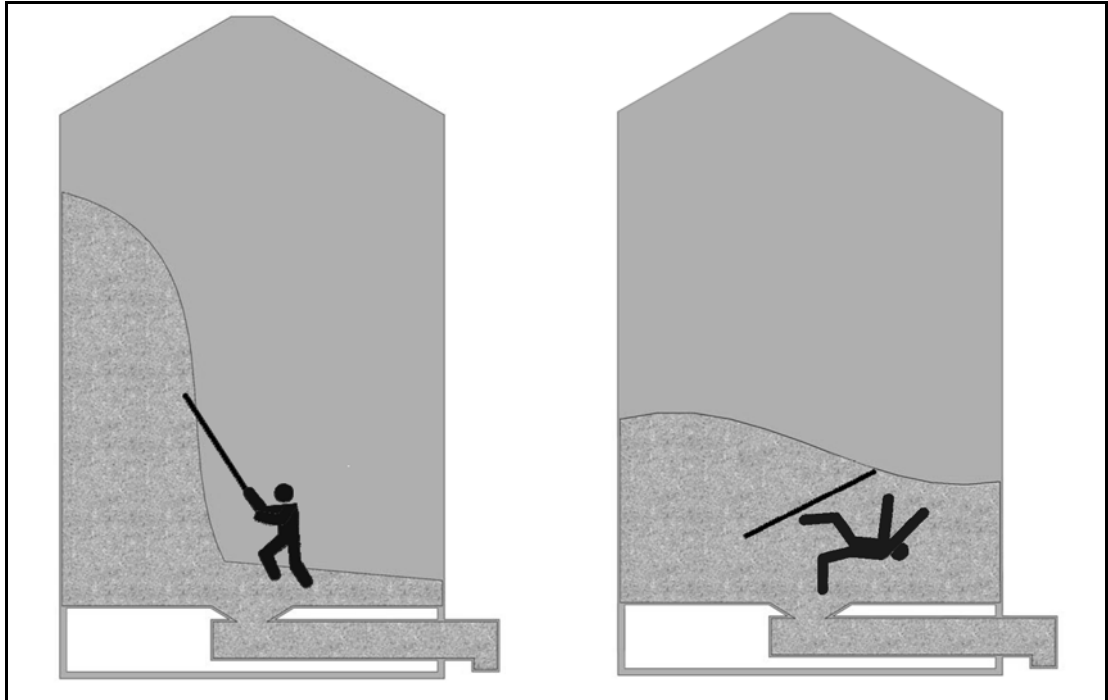


Figure 2.2 Vertical Wall Collapse

3. Entrapment in flowing grain:

- Grain flows in a funnel-shaped path to the unload auger, portable grain auger, hopper, or any other unloading system. This vortex of grain behaves very much like a water drain. Velocity increases as grain flows from the bin wall at the top of the grain mass into a small vertical column at the center of the bin. See Figure 2.3.
- Flowing grain will not support the weight of a person. Submersion happens within seconds.

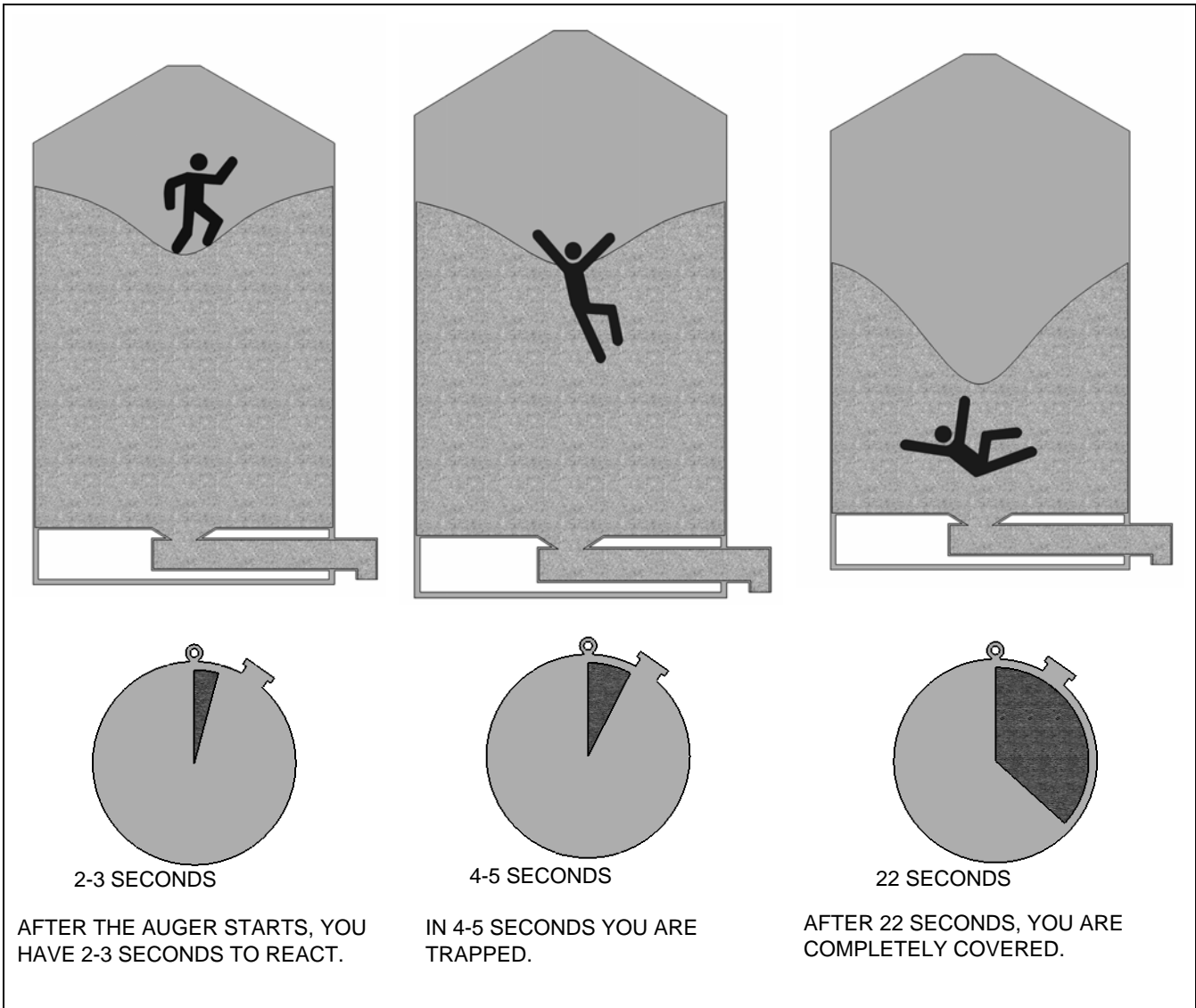


Figure 2.3 Bin Suffocation Hazards in Flowing Grain

2.3. MAINTENANCE SAFETY

When performing maintenance, understand and observe the following precautions:

- Do not replace or substitute bolts, nuts, or other hardware that is of lesser quality than the hardware supplied. Consult your dealer for proper replacements.
- After maintenance is completed, replace and secure all safety guards, safety devices, service doors, and cleanout covers.
- Keep records of the regular and annual inspection and maintenance.

2.4. SAFETY DECALS

- Keep safety decals clean and legible at all times.
- Replace safety decals that are missing or have become illegible. See decal location figures that follow.
- Replaced parts must display the same decal(s) as the original part.
- Safety decals are available from your distributor, dealer, or factory.

2.4.1. DECAL INSTALLATION

1. Decal area must be clean and dry, with a temperature above 50°F (10°C).
2. Decide on the exact position before you remove the backing paper.
3. Align the decal over the specified area and carefully press the small portion with the exposed sticky backing in place.
4. Slowly peel back the remaining paper and carefully smooth the remaining portion of the decal in place.
5. Small air pockets can be pierced with a pin and smoothed out using the sign backing paper.

2.4.2. SAFETY DECAL LOCATIONS

Replicas of the safety decals that are attached to the equipment are shown in the figure(s) that follow. Proper safety procedures require that you familiarize yourself with the various safety decals and the areas or particular functions that the decals apply to, as well as the safety precautions that must be taken to avoid serious injury, death, or damage.

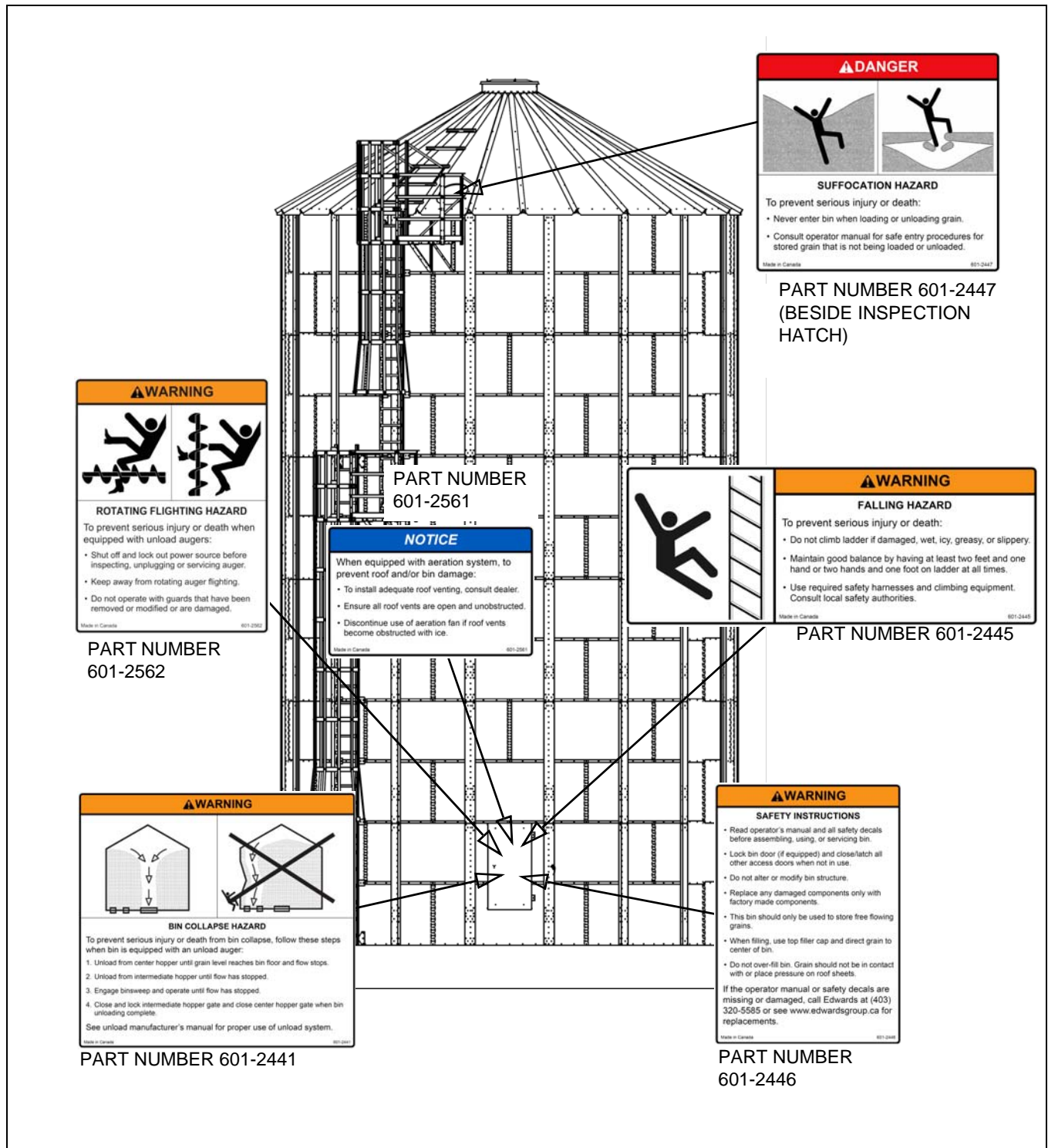


Figure 2.4 North American Safety Decal Locations (Flat Bottom Bins)

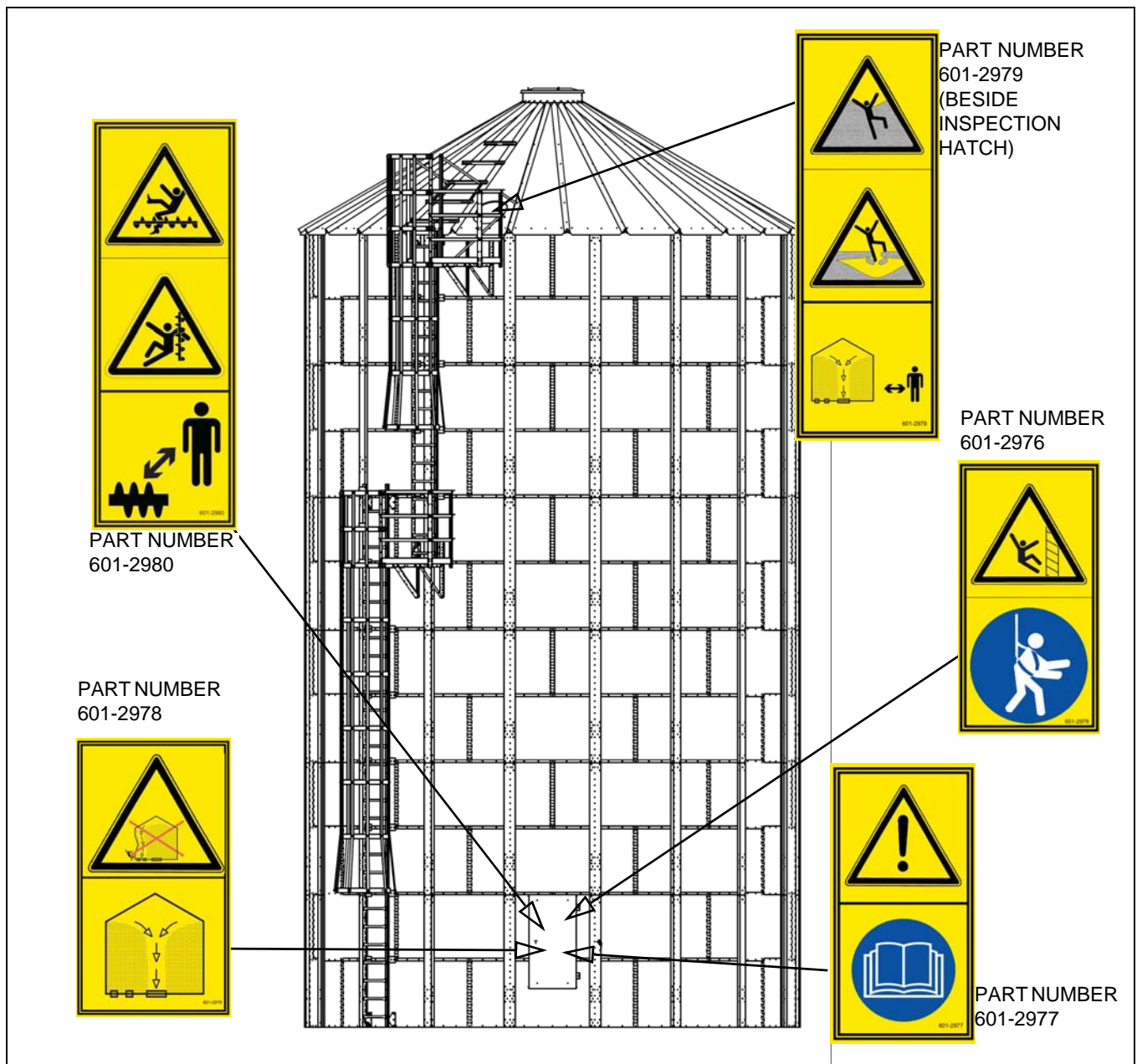


Figure 2.5 International Safety Decal Locations

Safety Decal

Definition

601-2976

Falling Hazard, use safety harnesses and climbing equipment.

601-2977

Read operation manual before using equipment.

601-2978

To prevent serious injury or death from bin collapse when equipped with an unloading system, center hopper must be opened first to empty bin (where equipped).

601-2979


To prevent serious injury or death from suffocation, keep out of bin when loading or unloading grain from bin.

601-2980

To prevent serious injury or death when equipped with unload augers, keep away from rotating auger flighting.

3. Operation

Warning: Before continuing, ensure you have read and understand the relevant information in the safety section. Safety information is provided to help prevent serious injury, death, or property damage.

WARNING	
	Do not enter the bin while filling, storing, or removing grain! You risk partial or complete submergence, and you may get trapped and suffocate in the bin.

➔ Bins are available in various combinations. In most cases, the following instructions will apply to all bins. Where information varies, additional instructions will be included and are indicated with an arrow.

3.1. PRE-FILLING CHECKLIST

Before filling each time, the operator must confirm the following:

GRAIN BIN

- Confirm that no one is in the work area or inside of the bin, refer to “Operational Safety” on page 11.
- Ensure working areas surrounding the bin are clean and clear of clutter.
- Check that bin is clean (see Section 3.5.) and free of moisture prior to filling.
- Ensure maintenance has been performed (see Section 4.)
- ➔ • **Hopper Bins:** Make sure slide gate and manhole are closed.
- ➔ • **Flat Bottom Bins:** If equipped with sweep, make sure sweep is over the bin unload intermediate hoppers and gates and is free to move around the bin.
- ➔ • **Flat Bottom Bins:** Make sure gates are closed on bin unload (if equipped). Close inner door and chute properly, and ensure panels are locked.
- Ensure grain bin is properly anchored to foundation. **Anchor nuts should be finger tight against surface plus half turn with a wrench.**
- Ladders, handrails, platforms, stairways, and steps are securely in place.
- All bolts are in place and securely tightened.
- Any temperature cables must be fastened to floor or anchored to concrete using breakable string (fishing line). Absolutely no weights or plates should be attached to the bottom of the temperature cables which could overload roof.

NOTICE
Attaching weights to temperature cables can damage the bin roof and is not covered by warranty.

➡ **BIN UNLOAD AND SWEEP (WHERE EQUIPPED)**

- All fasteners are secure.
- Drive belt(s) are not frayed or damaged.
- Drive belt(s) are properly adjusted and aligned.
- Intake area and discharge spout are free of obstructions.
- Inspect tube supports (where applicable) frequently.
- Proper maintenance has been performed. See Maintenance section.
- All safety guards are in place and secure.

3.2. FILLING BIN

1. Confirm bin is located a safe distance away from power lines. Do not use if there is a chance of any loading or unloading equipment contacting power lines.

Important: *Complete the step below unless otherwise advised of an alternative procedure by a soils engineer. For example, in cases where the soil may not have a load bearing capacity adequate for the grain bin as described in the concrete form assembly.*

2. For the initial fill:
 - a. If bin height is not greater than its diameter, initial fill can be completed as desired. Bins that are taller than their diameter should be filled in two stages.

The first stage should be filled to the height of the bin’s diameter, see Figure 3.1. Allow 10 days for settling to occur and then complete filling the bin. See Table 3.1 for applicable bins. For example, a 42-14 bin (42’ or 12.8 m diameter, 14 tiers in height) should be filled to a height of 42’ for the first stage, and the second stage should be completed 10 days later.

Table 3.1

Stiffened, Unstiffened, and Foundation Form Bin Models	Hopper Bin Models
15-05 – 15-09	15-03 – 15-09
18-05 – 18-16	18-04 – 18-09
21-06 – 21-18	21-05 – 21-09
24-07 – 24-20	24-06 – 24-09
27-08 – 27-22	27-06 – 27-09
30-09 – 30-24	
33-10 – 33-24	
36-11 – 36-24	
42-12 – 42-24	
48-14 – 48-24	
60-17 – 60-24	

- b. Confirm maximum uneven settlement is not more than 1.5" from level after initial fill. Contact your dealer for assistance if required.
- 3. For optimal storage, cleaning grain prior to filling bin will prolong storage life and improve airflow and uniform bin temperature from aeration and help prevent mold growth and hot spots from forming in the bin.

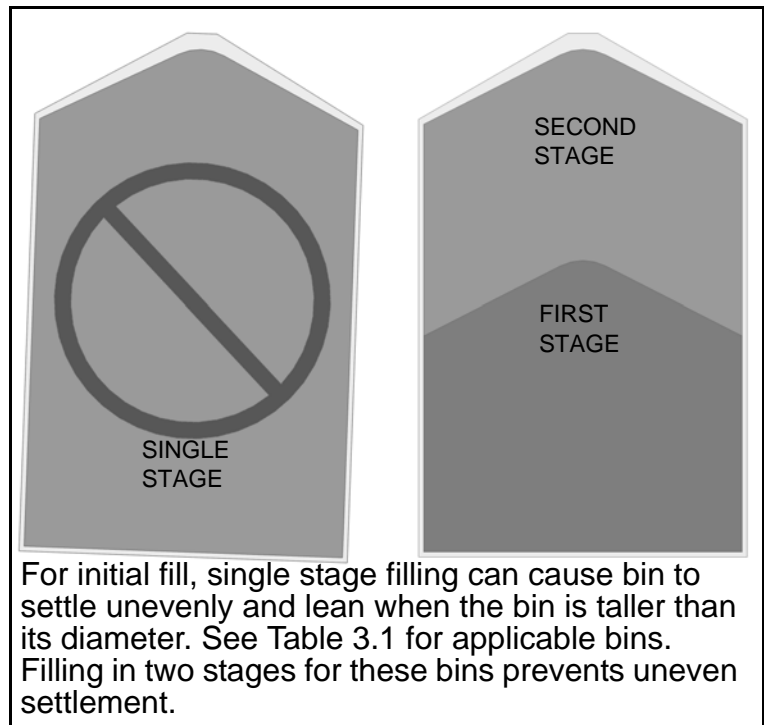


Figure 3.1

- 4. Open bin lid and fill bin from filler cap. Do not enter bin while filling.

NOTICE

Do not fill bin from the inspection hatch as this will result in uneven loading can cause the bin to collapse.

- 5. Use of a spout or chute will help prevent overfilling of the bin and obtain the most amount of storage from the bin, see Figure 3.2.

Important: *Bin is full when filled to no more than 1" below the eave, see Figure 3.2. Overfilling can cause roof failure and create hazardous situations if the inspection hatch opened.*

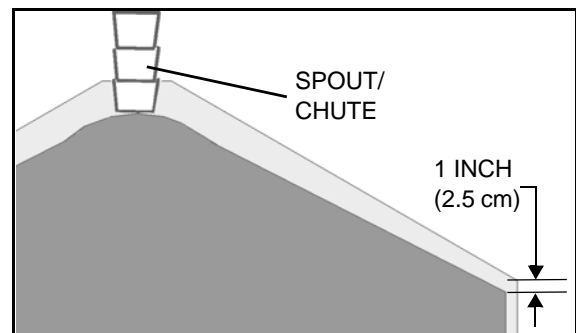



Figure 3.2

NOTICE

Do not allow grain to press against roof sheets; outward pressure can cause roof damage.

WARNING	
	Opening the inspection hatch on an overfilled bin can cause grain to spill out, creating a potential falling hazard resulting in serious injury or death.

6. Grain will store better when level than peaked, a grain spreader will do this automatically or can be done by unloading some grain from the center of the bin and refilling.

Why does grain store better when level?

- Grain mass is level allowing aeration to be more uniform.
- Fines are removed which tend to accumulate at the bin center, improving airflow.
- Fines are redistributed, which will help prevent spoilage and mold prob-

7. Close lid after filling.



8. **Flat Bottom Bins:** Attach a padlock to the bin door for security and to prevent unauthorized entry. Ensure that all other access points are inaccessible, especially to children.

NOTICE
Bins are designed to be filled with dry, free-flowing grain only. Use of other materials can cause damage to the bin.

9. Lock out the bin ladder to prevent unauthorized entry.

3.3. STORAGE

3.3.1. INSPECTING STORED GRAIN

Inspect grain quality regularly. Grain should be stored in the bin at a moisture content that will not cause the grain to heat and eventually spoil. This safe moisture content is different for each type of grain. It is also influenced by factors such as grain temperature, humidity and temperature conditions of the region, variety, and maturity of the grain. Information on these safe moisture contents is available from local agricultural offices.

Wet grain that exceeds its safe storage period should not be placed in a bin without a natural air drying system.

NOTICE
Storage of spoiled grain can damage galvanized coating. Check grain quality regularly.

When grain is placed in the bin under excessive moisture conditions, it is important to provide adequate amounts of air. The amount of air required to safely store the grain can vary drastically depending on whether aeration (cooling) or drying (heating) of the grain is desired.

Moisture testing should be used to determine when the grain is dry.

Grain temperature should be checked every two weeks of storage. Crusting can develop on the top of the grain mass when grain has not been aerated to a uniform temperature.

Re-lock door after inspecting to keep others from entering the bin. If you have to enter the bin while grain is being stored, refer to “Operational Safety” on page 11 for important safety instructions.

3.3.2. DRYING AND AERATING STORED GRAIN (WHEN EQUIPPED)

Note: *If your bin was not purchased with a fan and/or heater and you wish to add one to your bin, consult your dealer to help select a properly sized fan and/or heater and roof venting requirements.*

1. Bin must be filled as described in “Filling Bin” on page 20 with grain below the eave to allow proper aeration or drying.
2. Make sure that roof vents and fan are open and appropriately sized for your bin. Consult dealer if you are unsure.
3. If equipped with an aeration fan, start air flow through the grain as soon as the ducts are covered with grain when filling. If equipped with natural air drying, start air flow once the bin is filled to at least half of the bin's diameter above the floor. Once started, to prevent crusted grain, air flow through the grain bin must be maintained until the bin reaches the desired moisture content if drying or reaches the desired temperature if aerating the bin.
4. When using a supplemental heater, do not apply too much heat to the bin as this will over dry the grain. Refer to your supplemental heater manual.
5. Check grain mass has a uniform temperature throughout. If equipped with temperature sensors, these will assist in determining uniform temperature.
6. Consult your fan and/or heater operation manual for further details on proper drying/aerating procedures.
7. Do not use fan and/or heater or discontinue use if weather conditions cause icing of the roof vents.

NOTICE

When equipped with fan, to prevent roof and/or bin damage:

- Install adequate roof venting, consult dealer.
- Ensure all roof vents are open and unobstructed.
- Discontinue use of aeration fan if roof vents become obstructed with ice or bin is overfilled with grain placing outward pressure on the roof sheets.

8. See also “Grain Drying and Aeration Tips” on page 41 for further information.

3.3.3. STIRRING MACHINES

Check with your dealer for information on stirring machines. This equipment places excess loads on bin walls which may or may not be intended for your particular bin.

3.4. EMPTYING BIN

3.4.1. EMPTYING FROM THE BIN DOOR

Note: *The following section applies only to bins equipped with auger chute doors. Do not modify or attempt to unload from the door if bin was not originally supplied with a door equipped for unloading.*

1. Open outer door.
2. Place auger in chute and push as close to center of bin as possible. After starting the auger, adjust its position if possible to ensure it is centered in the bin.
3. Never enter bin while emptying; refer to “Operational Safety” on page 11.
4. Clean bin after emptying to remove all old material.

3.4.2. EMPTYING HOPPER BINS

1. Center unloading equipment under slide gate. Start the unloading equipment, then open the slide gate by turning the slide gate handle.
2. Never enter the bin while emptying, refer to “Operational Safety” on page 11.
3. Clean bin after emptying to remove all old material, see Section 3.5.


3.4.3. EMPTYING USING A BIN UNLOAD AND SWEEP (WHEN EQUIPPED)

BIN UNLOAD DRIVE & LOCKOUT PROCEDURE

Drive Type	Before Operation	Lockout
Electric Motor	Before starting motor, ensure <ul style="list-style-type: none"> • motor is properly grounded • pulley guards are in place and secure 	The electric motor should be equipped with a main power disconnect switch capable of being locked in the off-position only. The switch should be in the locked position during shutdown or whenever maintenance is performed on the auger. If reset is required, disconnect all power before resetting motor.

INITIAL START-UP AND BREAK-IN

1. Complete the pre-filling “Pre-Filling Checklist” on page 19 at the beginning of this section.

WARNING	
	To avoid the risk of a bin collapse, center hopper must be opened first to empty bin and should be the only hopper gate open.

2. Disengage sweep gearbox (push gearbox shift handle towards bin wall to disengage sweep).
3. Close all hopper gates (both center and intermediate hoppers).
4. Start system.
5. Never enter bin while emptying; refer to “Operational Safety” on page 11.
6. Open center hopper slightly. Ensure product flows out of discharge end at a constant rate.
7. **For the first 30 minutes**, check that the underfloor auger functions without excessive vibration.

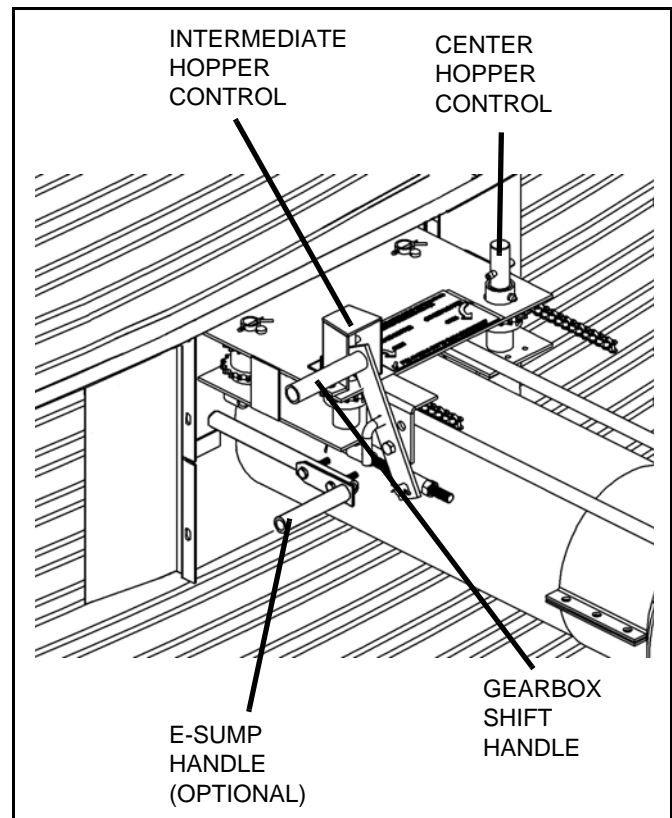


Figure 3.3

Important: *When starting underfloor auger for the first time, be prepared for an emergency shutdown in case of excessive vibration or noise. Note that the auger may run rough until tube is polished.*

8. Continue to open center hopper; keep in mind to look for constant product flow at discharge end. Do this until center hopper is fully open.
- ➔ 9. **Bin Unloads with emergency hoppers:** If product flow slows considerably or stops while unloading, the center hopper may be blocked with clumped grain. Pull the emergency hopper handle to allow product to continue unloading.

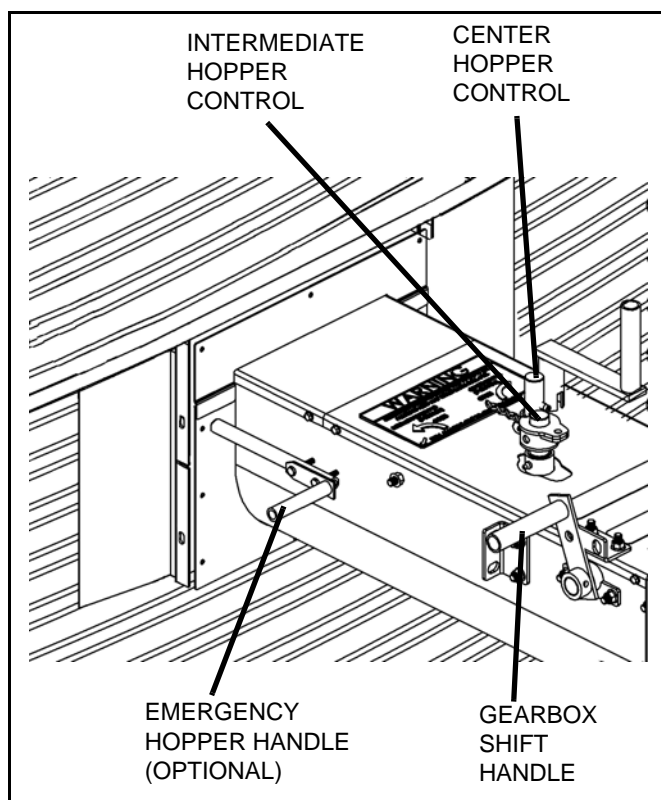



Figure 3.4

WARNING	
	To avoid serious injury or death from bin collapse, do not open the intermediate hoppers to allow product flow if the center hopper becomes blocked with clumped grain.

Important: *Clumped grain is caused by improper storage or wet grain. Consult your aeration fan manual on how to condition stored grain or refer to “Grain Drying and Aeration Tips” on page 41.*

10. When product flow (from discharge end) stops, unlock the padlock to open the intermediate hopper lockout cover. Open intermediate hopper(s) halfway. Monitor product flow for consistency before opening intermediate hopper(s) any further.
11. After grain has stopped flowing into intermediate hopper(s), shut down and lock out all power to the underfloor system. Close all intermediate hopper gates.
- ➔ 12. **Binsweep Option:** Release locking pin and engage binsweep (by shifting the lever away from bin wall). Lock shift lever into place.

a. Start system.

WARNING	
	To avoid serious injury or death, do not enter bin while equipment is running.

- b. Make sure center hopper is fully open, and maintain a constant product flow.
- c. When product flow stops and bin is clean, allow binsweep to travel around bin so that it lines up over top of the intermediate hoppers and underfloor auger.

NOTICE	
Failure to place the binsweep over the intermediate hoppers and underfloor auger could result in damage to the unload system the next time the binsweep is operated.	

- 13. Upon completion of initial run, shut down bin unload system. Refer to “Normal Shutdown” on page 28 for more information.
- 14. Lock out motor and conduct a complete inspection of bin unload system following the checklist at the beginning of this chapter.

After the initial start up and inspection, the bin unload system should be shut down and inspected at least three times during the first 10 hours of operation.

Keep operation of empty underfloor auger to a minimum, as this results in excessive wear.

Once bin unload system is broken in, the checklist should be a part of the daily routine before operating the system.

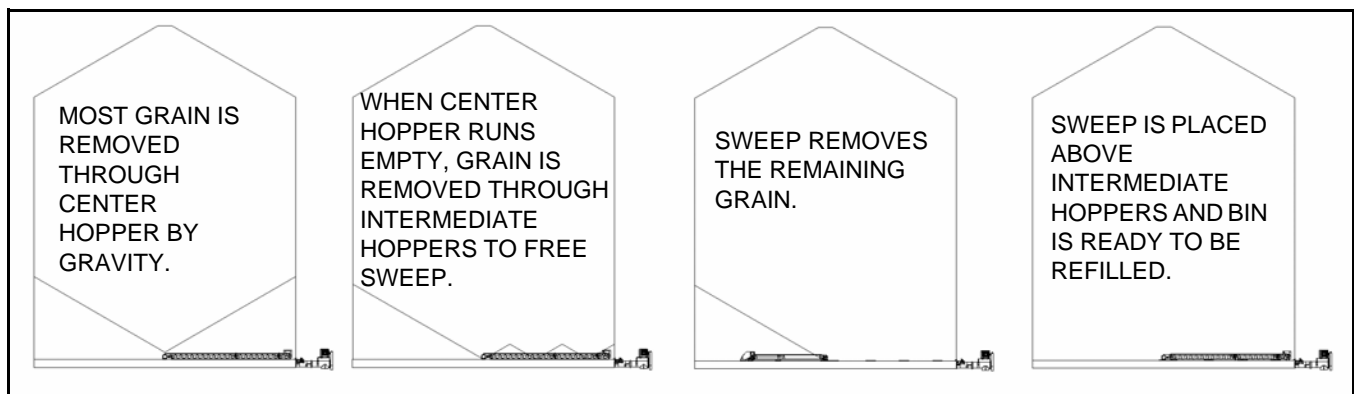



Figure 3.5

OPERATING WITH A FULL LOAD

1. Monitor the bin unload during operation for abnormal noises or vibrations.
2. Shut off all power before making adjustments, servicing, or clearing the machine.

DANGER	
	<p>Rotating Flighting Hazard!</p> <p>To prevent death or serious injury:</p> <ul style="list-style-type: none">• Keep away from rotating auger flighting.• Do not remove or modify auger flighting guards, doors, or covers. Keep in good working order. Have replaced if damaged.• Do not operate the auger without all guards, doors, and covers in place.• Never touch the auger flighting. Use a stick or other tool to remove an obstruction or clean out.• Shut off and lock out power to adjust, service, or clean.

EMERGENCY SHUTDOWN / FULL-TUBE RESTART:

1. If the bin unload is shut down for an emergency or during the unloading procedure, lock out motor before correcting the problem.
 - If the problem is plugging, clear as much of the grain as possible using a piece of wood, vacuum, or other tool before restarting auger. **Do not reach in and use your hands.** (See “Bin Unload Drive & Lockout Procedure” on page 24.)

NOTICE
Starting the auger under load may result in damage to unit. Be sure there is no blockage.

2. Once obstruction is clear, disengage sweep (if applicable). Remove locking pin, shift lever towards bin wall, and lock into place.
3. Close all intermediate hopper gates and close center hopper gate.
4. Restart bin unload system and follow steps to feed grain to finish unloading your bin.

NORMAL SHUTDOWN

1. Once auger is clear, stop motor and lock out power.

Note: *Remember that the flighting rpm on augers equipped with electric motors is not adjustable except with a change of pulley size.*

2. Clean entire work area.

3. Manually clean out grain from bin unload with a piece of wood, vacuum cleaner, or other tool. Do not use hands.
4. Clean bin (see Section 3.5.) after emptying to remove old material.
5. If unload system fails, do not cut holes in the bin sidewall to unload. Contact your local dealer for correct procedures.

3.4.4. SIDEDRAW OPTION

Note: *A sidedraw can be used to empty some bins (when equipped). If your bin was not purchased with a sidedraw, contact your local dealer if you are considering adding one. Depending on the bin, it may or may not have been designed or intended for sidedraw use.*

1. Use only one sidedraw at a time (when equipped with more than one).
2. The bin can be unloaded safely with the center hopper or other method at the same time as unloading with the sidedraw. Refer to Figure 3.6.
3. Never enter bin while emptying; refer to “Operational Safety” on page 11.
4. After unloading from the sidedraw(s), bin must be unloaded from center until an inverted cone is formed so that it can be reloaded safely.

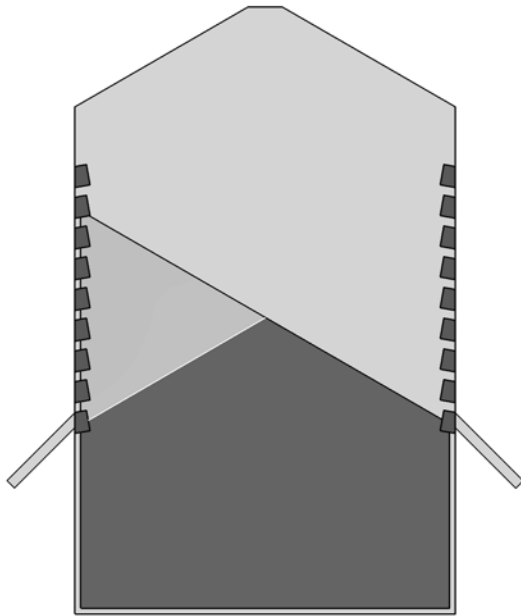
WARNING

Re-filling the bin without an inverted cone can result in bin damage or collapse.

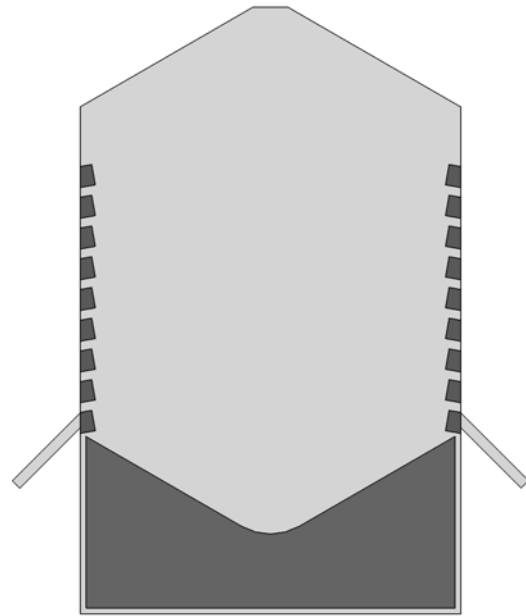
3.5. CLEANOUT

Important: *Bin must be cleaned thoroughly to lessen the risk of fire, insect infestation, and mold growth.*

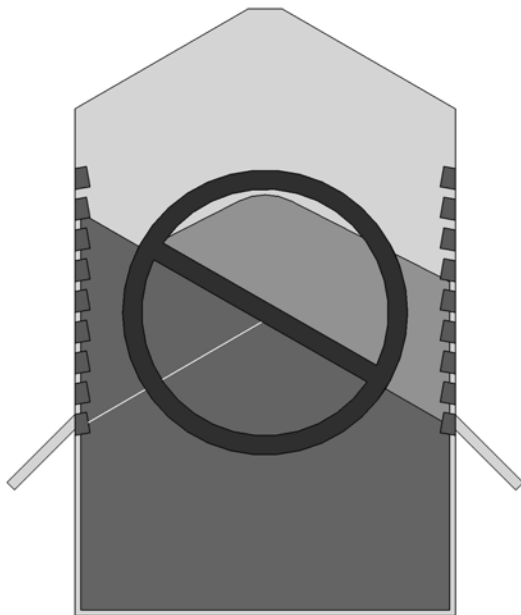
1. Use a wire or stiff brush to clean bin sidewalls of thin layers of crusted grain.
2. Remove all of the old grain and fines/dust.
3. Clean bin floor using a grain vac or shop vac.



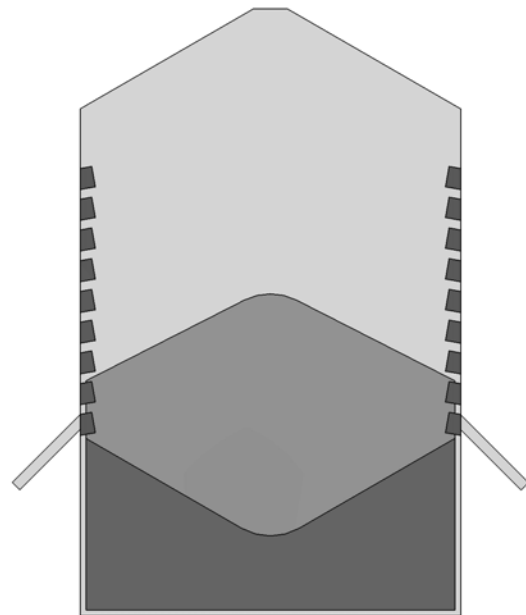
STEP 1: EMPTY USING ONE SIDEDRAW, FOLLOWED BY SECOND SIDEDRAW (IF EQUIPPED).



STEP 2: CORE GRAIN TO AN INVERTED CONE USING CENTER HOPPER.



NOTE: DO NOT REFILL BIN WITHOUT CORING THE GRAIN AS SHOWN IN STEP 2 OR DAMAGE TO THE BIN MAY RESULT.



STEP 3: REFILL BIN AS DESIRED.

Figure 3.6

4. Maintenance

Warning: Before continuing, ensure you have read and understand the relevant information in the safety section. Safety information is provided to help prevent serious injury, death, or property damage.

4.1. GENERAL MAINTENANCE PROCEDURES

Note: Use only genuine Twister replacement parts or equivalent. Replacement parts such as intake guards and pulley guards must meet ASABE standards or serious injury may result. Use of unauthorized parts will void warranty. If in doubt, contact Twister or your Twister dealer. Do not modify any bin unload system components.

4.1.1. GRAIN BIN

Your grain bin requires only minimal maintenance. The following maintenance is recommended to help keep your bin in peak condition over its service life.

Area	Maintenance	Frequency
Stiffeners and Sidewall	Check for gaps between stiffeners, buckling of stiffeners or sidewall, stiffener contact on supports/floor, concrete level, and missing, loose, or broken bolts/nuts. Repair as necessary. Do not replace or substitute bolts, nuts, or other hardware that is of lesser quality than the hardware supplied. Consult your dealer for proper replacements.	Annually or more often with frequent loading and unloading.
Inside grain bin	If grain becomes “caked,” the bin should be cleaned.	After unloading.
Inside and outside of grain bin	Check for signs of moisture leaks and reseal area.	Annually
	Check for Rust: It is normal for galvanized steel to fade or darken over time. However, any rust spots should be treated immediately to prevent spreading and further damage. <ul style="list-style-type: none"> White rust should be removed by applying a cleaning product such as white vinegar and washed away with water. Remove red rust with a wire brush, then clean the surface and paint with a rust-inhibiting or zinc rich paint. If rust develops on the bin ladder or a load bearing part of the bin, the part should be replaced. 	Annually
	If cracks start appearing in the bin floor, or foundation, contact your dealer for ways of repairing this before it becomes an issue.	Periodically, but not more than annually
	Inspect all major ladder components for rust, corrosion and deterioration. Consult your dealer for proper replacement of damaged components.	Annually

4.1.2. BIN UNLOAD

Proper maintenance habits on the bin unload mean a longer life, better efficiency, and safer operation. Please follow the guidelines below. See also Figure 4.1.

Area		Maintenance	Frequency
General		While auger is in use, observe the checklist in Section 3.1.	Daily
General		Check all operating, lifting, and transport components. Replace damaged or worn parts before using auger. For replacement instructions, see Assembly Section.	Prior to filling bin.
Transition Box (Optional on Tube Unloads) *Remember to support incline discharge before removing or replacing any parts inside the transition box.	Open access door. Check that u-joint is working properly (has free range of motion).		Prior to filling bin.
	Inspect flighting and bushing mount. Ensure set screws are tight.		Prior to filling bin.
	Lubricate u-joint and bushing mount.		Every 8 hours of operation
Rack and Pinion System	Ensure opening and closing of gate system.		Prior to filling bin.
	Inspect bushing, chain, and sprocket. Lubricate.		Every 8 hours of operation
E-Sump, Center and Intermediate Hoppers		Ensure safety mesh is installed.	Prior to filling bin.
		Ensure slide gates open and close properly without interference (replace gate rollers if necessary).	Prior to filling bin.
Binsweep Option	Gear-boxes	Check lower gearbox shift handle for proper engagement / disengagement.	Prior to filling bin.
		Maintain oil level at half full (center of cross shaft). Gearbox should be level when checking or refilling. Use EP90 Lube Oil when filling gearboxes.	Prior to filling bin.
	Universal Joint	Lubricate grease fitting in the u-joint. Check set screws and retighten if necessary.	Every 8 hours of operation
Drive Belt Replacement	Belt Tension	<ul style="list-style-type: none"> Move motor base to its loosest position. Remove old belt and replace with new one. Check pulley alignment and adjust if required by laying a straight edge across the pulley faces. Use pulley hub to move pulley to required position for alignment. Tighten the hub set screws to secure pulley to shaft. Move the motor base to set drive belt tension and check by pushing on center of belt span with a force of approximately 5 lb. The belts will deflect 1/4"–1/2" when properly tensioned. 	When belt is worn out.

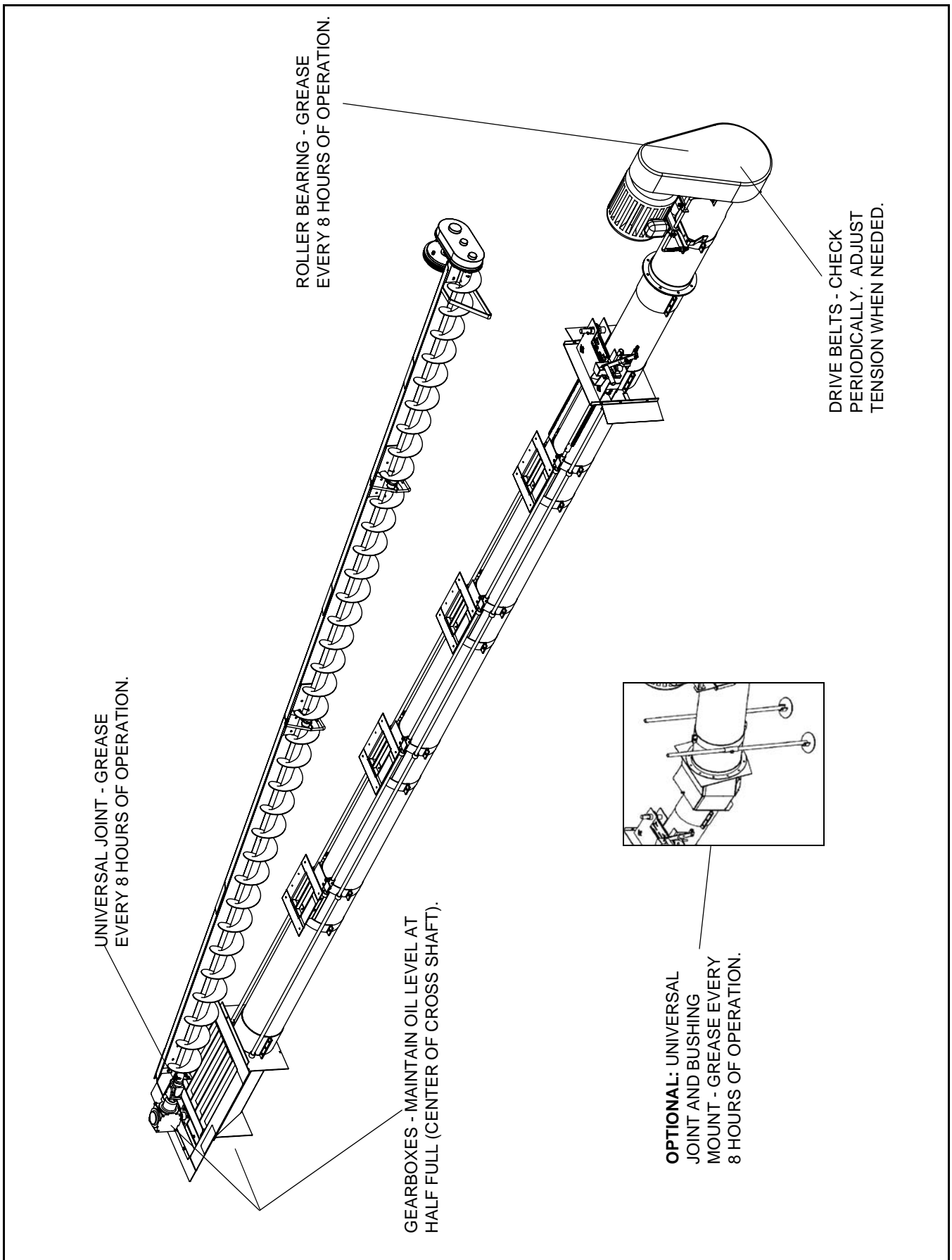


Figure 4.1 Maintenance of a typical Bin Unload System

5. Troubleshooting

If you encounter a problem that is difficult to solve, even after having read through this troubleshooting section, please contact your local Twister dealer or distributor. Before you contact them, please have this operation manual and the serial number from your machine.


5.1. GRAIN BIN

Problem	Cause	Solution
<i>Safety Concerns</i>		
Entrapment or partial entrapment in flowing grain	Emergency entry procedures not adhered to.	Shut down unloading system immediately, call local emergency services for help, and refer to Safety Section.
<i>Storage Problems</i>		
Spoiled Grain, odor from grain	Improper or no operation of aeration or drying fan or supplemental heater.	Remove grain from bin and separate spoiled grain, reload into bin and condition grain, refer to Operation and Appendix Sections.
	Bin not cleaned prior to filling.	Dry grain (if equipped with natural air drying system). See Operation and Appendix Sections.
Poor airflow through grain mass	Too much dust or fine material in stored grain.	Run aeration or drying fan for longer or remove center portion of grain from bin (fine material and dust tend to accumulate at the bin center) and use a grain cleaner to remove dust and fine material. Repeat if necessary.
	Moldy or caked grain mass above floor or in bin. Aeration or drying fan under-powered.	Remove moldy or caked grain, only reload grain in good condition. Refer to Appendix Section, Grain Drying and Aeration Tips and consult dealer.
Crusting or sticking grain at top of grain mass	Grain not continuously aerated or dried to uniform temperature or moisture content.	Aerate or dry grain, refer to Operation and Appendix Sections.

Problem	Cause	Solution
Uneven temperature throughout grain mass	Moisture content possibly too high.	Aerate grain, refer to Operation and Appendix Sections.
Grain not drying or aeration fan not getting grain to a uniform temperature	Bin filled past eave height or putting outward pressure on roof sheets.	Remove grain until optimal grain height is reached. Refer to Operation Section.
	Aeration or drying fan/heater undersized or outdoor temperature and humidity not adequate.	Refer to Appendix Section, and consult dealer.
Grain over-dried at bottom of bin or throughout bin	Supplemental heater operated for too long (where equipped).	See Operation and Appendix Sections.
Unknown grain conditions at bin center	Unable to check grain condition, no temperature cables and too far to sample.	Remove some grain from center of bin and check quality.
<i>Unloading Problems</i>		
Grain not flowing well when unloading	Clumped grain blocking center hopper.	Open emergency hopper if equipped or break up grain mass. Do not open intermediate hoppers. See Operation Section.
Steep wall of grain along bin sidewall	Improper storage or poor conditioning.	DO NOT enter bin. Break up grain mass from above with a pole or other tool, see Safety Section. See Operation Section for prevention.
Grain is not forming a funnel shape when unloading when viewed from inspection hatch or filler cap	Storage of high moisture grain has formed crusted grain which has bridged across the bin creating an empty air space below.	DO NOT enter bin. Break up crusted grain from above with a pole or other tool, see Safety Section.
<i>Roof Problems</i>		
Roof vents icing	Air temperature too cold to aerate or dry grain.	Discontinue use of fan.
Roof sheets bowed outward	Bin is overfull, grain pushing outward.	Remove grain to achieve correct height, refer to Operation Section.
	Inadequate number of roof vents.	Consult dealer.
Condensation on underside of roof	Grain temperature much warmer than outdoor temperature.	Aerate or dry until temperature of exhaust air is equal to outdoor air temperature or increase number of roof vents.

Problem	Cause	Solution
Grain is wet or spoiled below filler cap or at a point on the top of the grain mass	Leak from filler cap or roof.	Run aeration or drying fan to condition wet grain or remove spoiled or wet grain. Check bin roof for gaps and apply caulking as needed.
<i>Structural Problems</i>		
White Rust or Red rust forming on bin wall	Moisture in bin.	See Maintenance section for procedures.
Buckling of stiffeners or sidewall sheets	<p>Gaps between stiffeners or between stiffener and base.</p> <p>Bin filled from inspection hatch has caused uneven load distribution.</p> <p>Bin improperly unloaded from side draw has caused uneven load distribution.</p> <p>More than one side draw used at a time.</p> <p>Bin unloaded from intermediate hoppers before center hopper (if equipped).</p> <p>Hardware or parts replaced with part of lesser quality.</p> <p>Unauthorized modification to bin structure.</p>	Consult dealer to repair. To prevent recurrence, refer to operation section for applicable correct procedure.
Bin leaning	<p>For first fill, bin not filled in stages.</p> <p>Foundation not adequate.</p> <p>Ground not prepared properly prior to assembly.</p>	Contact dealer for assistance.

5.2. BIN UNLOAD

WARNING	
	<p>Fully disengage and lock out sweep before attempting any modifications or repairs.</p>

Problem	Cause	Solution
Gearbox won't engage	Gearbox shift adjust bolt is not adjusted correctly.	Adjust bolt. Flighting needs to be turned so that the gears can mesh appropriately.
Gearbox won't stay engaged	Lock pin not in place. Gearbox shift adjust bolt is not adjusted correctly. Obstruction in sweep.	Secure lock pin into place. Adjust bolt. Remove obstruction.
Hopper slide gates are difficult to open	Hopper rollers are damaged. Obstruction in hopper. Slide gate interference with aeration floor planking. Control rods are binding (hoppers not level to each other).	Repair rollers. Remove obstruction. Level intermediate hoppers to each other. Level intermediate hoppers to each other.
Sweep will not function	Underfloor auger not engaging lower gearbox stub. Shift gearbox is not engaged. Obstruction in sweep.	Ensure underfloor auger flighting is fully meshing with quick attach couple on lower gearbox. Engage it. Remove obstruction.
Underfloor auger plugs when initially starting the sweep	Intermediate hoppers aren't closed. Obstruction in underfloor auger.	Close intermediate hoppers. Remove obstruction.
Sweep drive wheel doesn't function when sweep is activated	Key or pin sheared or missing in drive wheel housing. Chain isn't adjusted correctly inside drive wheel housing.	Replace damaged part. Adjust chain correctly.

Problem	Cause	Solution
Sweep stops travelling around the bin	Sweep isn't adjusted correctly and is hitting a high spot in the aeration floor. Sweep drive wheel isn't fully functioning correctly (chain slipping, key missing etc...) Obstruction in sweep.	Adjust sweep in 2 places: Drive wheel and upper gearbox plate. Check to ensure chain is functional and that all keys / roll pins are in place Remove obstruction.
Sweep drive wheel contacts bin wall	Center hopper not centered during installation.	Shorten sweep section to allow it to travel all the way around bin.
Poor product flow from sweep	Sweep flighting is not timed correctly. Obstruction in sweep. Damaged or bent flighting.	Remove bolts, rotate flighting to next set of holes and replace bolts. Remove obstruction. Bend flighting back to original shape. If this doesn't work, replace flighting.
Underfloor auger is not able to move the grain that the sweep is dumping into the center hopper	Obstruction in center hopper. Intermediate hoppers are open, flooding the underfloor auger. Flighting not timed correctly on the underfloor auger.	Remove obstruction. Close intermediate hoppers. Pull out underfloor flighting, ensure that it is timed correctly. (Flighting must make a continuous spiral).
Grain is flowing over backboard of sweep	This is normal, and grain will be swept up on the second pass of the sweep	No solution needed. Part of normal operation.
Underfloor system stops when moving product	Electric motor belts not tight enough. Electric motor is not large enough to power entire system. Obstruction in underfloor auger.	Tighten belts. Replace electric motor with a larger model. Remove obstruction.
Sweep will not turn or is noisy	Check flights to ensure they're not catching.	Cut the flights back so that there is a 1/4" clearance from hanger.
Sweep is knocking	Gearbox adjustment incorrect.	Check to ensure adjustment is correct and is fully engaged.
Belt is moving, motor is running, but sweep and underfloor auger not moving	Set screws and key ways on pulleys not installed or too loose.	Disengage system and check set screws and key ways to ensure they're installed and tight.

Problem	Cause	Solution
Sweep engaged, under-floor auger and motor running, but sweep flight and/or upper gearbox not turning	<p>Under floor gearbox shift linkage is out of adjustment.</p> <p>Sheared bolt and key way in gearbox coupler.</p> <p>Roll pin and key way in center well sheared on the lower gearbox drive stub shaft.</p> <p>Sheared roll pin in gearbox shaft where it is attached to u-joint at the beginning of the sweep flight (key way may be missing).</p>	<p>Adjust shift linkages to fully engage sweep (see Sweep Owner's Manual).</p> <p>Replace key way and bolts and check coupler for cracks.</p> <p>Replace key way and roll pin.</p> <p>Replace key way and roll pin and install set screw tighten.</p>
Sweep is making a loud, distinct "squeak" noise	Center flighting tube rubbing on nylon carrier bushing.	Loosen all 4 bolts on center gearbox and tap hanger bracket with a hammer to adjust and provide adequate clearance between bushing and center tube.
Sweep engaged and running, but not advancing	<p>Sweep catching on Tek screws (backboard or gearbox).</p> <p>Backboard catching on the floor.</p> <p>Rubber on wheel worn down.</p> <p>Grain condition wet, hard-packed, moldy.</p> <p>End wheel gearbox contacting bin wall and/or bolts in bin wall.</p>	<p>Ensure Tek screws are fully screwed down.</p> <p>Ensure backboard clearance is 1/4" - 1/2". Tighten set screws.</p> <p>Replace with new rubber drive wheels.</p> <p>Sweep will perform poorly if grain is out of condition.</p> <p>Cut obstructive bolt ends off. Use sweep adjustments.</p>

6. Appendix

6.1. GRAIN DRYING AND AERATION TIPS

- **WHAT IS THE DIFFERENCE BETWEEN AERATION, NATURAL AIR DRYING, AND GRAIN DRYING WITH A SUPPLEMENTAL HEATER?** Aeration is used to control and provide uniform temperature for a grain mass. Natural air drying is generally used for farm bins and is a method of drying grain without using supplemental heat and is recommended at 1cfm per bushel of grain. Grain drying refers to adding supplemental heat to lower the moisture content of a grain mass at a flow rate of greater than 1cfm per bushel of grain. All three methods will help extend storage life for grain and prevent spoilage.
- **HOW MUCH POWER DO I NEED TO DRY GRAIN?** When natural air drying or when grain drying with a supplemental heater you need roughly 1HP for every 1000BU of grain. When aerating, you need roughly 1HP for every 10,000BU of grain. These are approximations only as the height of grain influences the required power as well. Consult your local dealer to accurately size a fan.
- **WHEN CAN I BEGIN TO HARVEST?** With a complete natural air drying system in place, crops can be taken off above normal moisture content (example: wheat 18%–20%). Under warm, low, relative humidity conditions you should see 3/4–1% of drying taking place per day. This allows a 7–10 day advance on harvest time as well as more harvesting hours per day.

Note: *Natural air drying should be used as a management tool and not as a late harvest emergency drying system. If late harvest conditions are cool and damp (conditions less than 10°C (50°F)) natural air drying will be slow and adding supplemental heat is much more effective.*

- **AT WHAT TEMPERATURE DOES NATURAL AIR DRYING BEGIN?** Grain drying begins at 10°C (50°F). Anything less than 10°C means the air is too cold and can only hold a small amount of moisture; therefore, moisture removal from grain will be very slow.
- **WHEN SHOULD I START MY FAN FOR NATURAL AIR DRYING?** In order to create a uniform drying front, the bin must be filled to the height of at least half of the bin's diameter above the system. (Example: A 14' diameter bin needs to have a minimum of 7' of grain above the system). The best uniform drying front can be produced by filling your bin and then turning on the fan. Turning your fan on too soon can cause uneven drying and negative results.
- **WHEN SHOULD I START MY FAN FOR AERATION?** The aeration fan should be started as soon as the aeration ducts are covered with grain when filling. Once started, to prevent crusted grain, air flow through the grain bin must be maintained until the bin reaches the desired temperature.

Table 6.1

Relative Humidity of Air %	Wheat Equilibrium Moisture Content %		Canola Equilibrium Moisture Content %		Corn Equilibrium Moisture Content %	
	at 25°C (77°F)	at 10°C (50°F)	at 25°C (77°F)	at 10°C (50°F)	at 25°C (77°F)	at 10°C (50°F)
58	12	13	7.5	8.6	12.2	13.5
64	13	14	8.2	9.4	13.0	14.4
70	14	15	9.0	10.3	14.0	15.4
75	15	16	9.8	11.1	15.0	16.4
79	16	17	10.8	12.0	15.8	17.1
83	17	18	12.0	13.2	16.9	18.2
86	18	19	13.4	14.5	17.8	19.0

- **SHOULD I SHUT MY FAN OFF AT NIGHT OR WHEN IT RAINS? NO!** High moisture grain drying (16% - 20%) requires continuous air flow to prevent the drying front from crusting over and restricting airflow.
- **DOES FAN OPERATION AT NIGHT OR IN HIGH HUMIDITY CONDITIONS REVERSE THE DRYING PROCESS?** We tend to think that a fan will force moisture back into a bin in high humidity conditions. However, it is much more difficult to put moisture back into the grain than it is to take it out. In fact, grain in the bottom of the bin that may be a little over-dried would benefit from taking on a little moisture. At 19% moisture and 10°C, corn that hasn't been dried will remain constant as the 86% relative humidity moisture level in the air equals the moisture in the grain, refer to Table 6.1.
- **IF I ADD SUPPLEMENTAL HEAT, CAN I DRY IN HIGH HUMIDITY CONDITIONS?** Adding supplemental heat (when available) to the natural air drying process will reduce relative humidity and increase the rate of moisture movement. Therefore, a low temperature supplemental heater will increase the drying rate and reduce the drying time.
- **CAN LOW TEMPERATURE SUPPLEMENTAL HEAT CUT MY DRYING TIME WITHOUT INCREASING COSTS?** A rule of thumb relating temperature increase to relative humidity decrease is: a temperature increase of 10°C (18°F) above outside air temperature will reduce the relative humidity by half.

Example:

10°C and 70% relative humidity
+ 10°C (increased by supplemental heat)
= 20°C and 35% relative humidity

- When low-temperature heat is added in high-humidity conditions, drying times can be reduced up to 8 days. By reducing operating time, overall costs are less than operating only the fan under these conditions.
With the average harvest period generally 30–40 days, it's comforting to know you can depend on supplemental heat—not the weather—to get the job done.

Important: *Care should be taken when operating a supplemental heater under low humidity conditions. This can cause severe over-drying at the bottom of the bin.*

- **HOW DO I KNOW WHEN MY GRAIN IS DRY?** Approximate drying chart based on a complete Aeration System:

Approximate Condition	Approximate Drying %
Ideal warm days / dry conditions	1% per day
Warm days & cool nights	1/2% per day
Cool days & cool damp nights	1/4% per day
Cold days & cold nights	0% per day
Warm days & cool nights (supplemental heat added)	3/4% per day

Note: *If you add 1 or 2 loads of grain at 18% moisture into the bin, assume the bin to be at 18% average moisture—don't reduce the average if some loads are at a lower percentage.*

Note: *Do not count the first day in the drying process; it takes 14–16 hours for the bin to equalize its temperature.*

- **WHEN NATURAL AIR DRYING OR WHEN USING SUPPLEMENTAL HEAT, WHEN SHOULD I SHUT MY FAN OFF?** When bin samples show the grain is dry, turn off the fan.

WHEN NATURAL AIR DRYING, WHAT CAN I DO WHEN THE AIR TEMPERATURE DOES NOT REACH 10°C? There are a couple of options available at this point:

- a. You can dry the grain in a grain dryer and then cool it down with the bin fan to maximize the grain dryer daily output.
- b. You can wait until the outside air temperature falls to -5 to -10°C and then run the fan for 24–48 hours to cool the entire grain mass to a storage state (see charts that follow). Once spring conditions return, you can resume the natural air drying process.

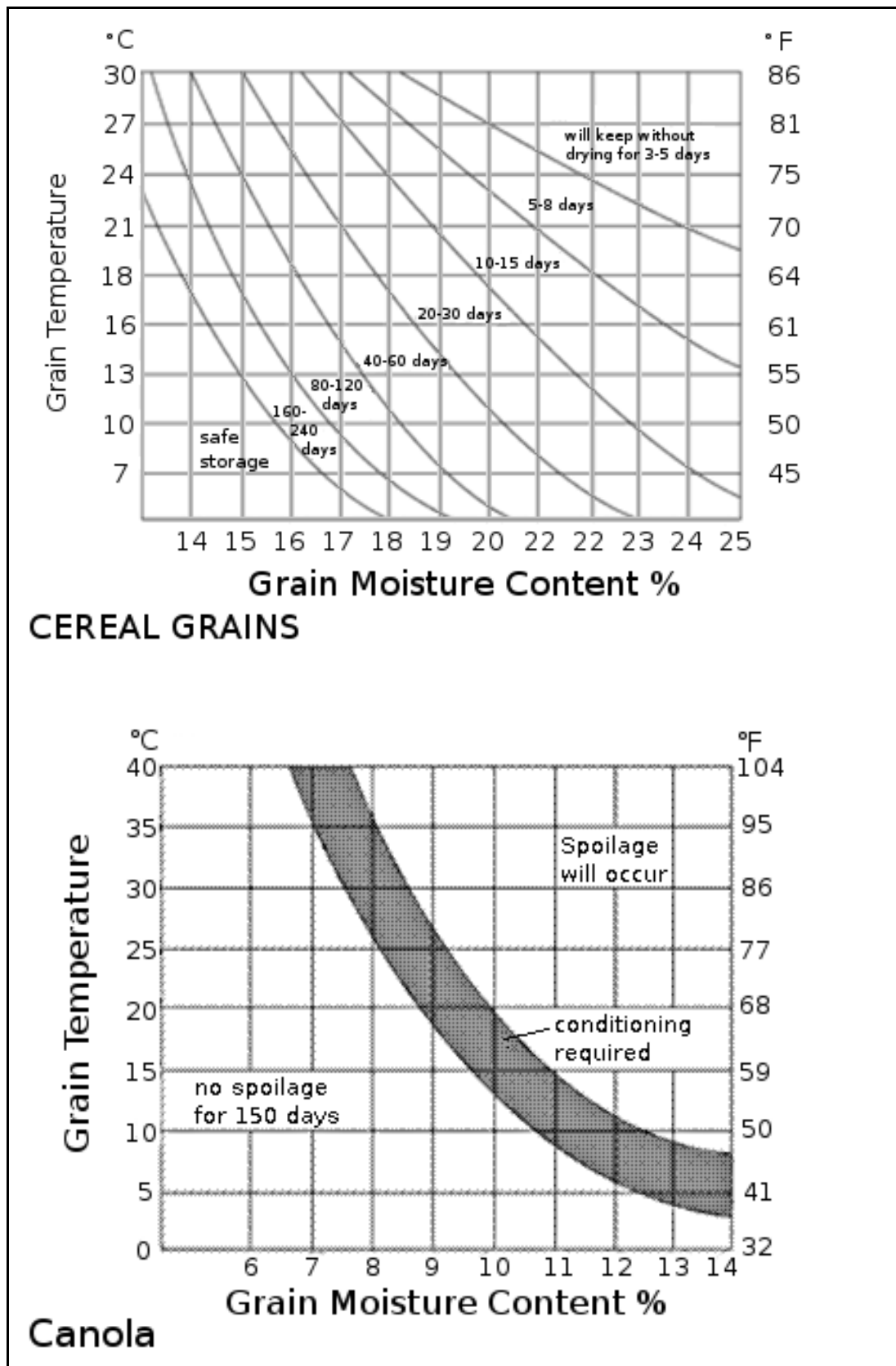


Figure 6.1 Grain Drying Charts

7. Specifications

WIDE-CORRUGATION, HOPPER-BOTTOM GRAIN BINS											
Diameter (feet) <small>Actual Diameter (feet) Actual Diameter (meters)</small>	Model No.	Tiers	Overall Height		Volume			Metric Tonnes (Compacted)			
			feet	meters	ft ³	m ³	Bushels (Compacted)	Wheat 770 kg/m ³	Corn 720 kg/m ³	Rice 580 kg/m ³	Sunflower ⁵¹⁰ kg/m ³
15 14' 11" 4.55 m	15-04H	4	28' 0"	8.53	3,187	90	2,690	73	68	55	48
	15-05H	5	31' 8"	9.65	3,828	108	3,231	88	82	66	58
	15-06H	6	35' 4"	10.77	4,469	127	3,772	102	96	77	68
	15-07H	7	39' 0"	11.89	5,110	145	4,313	117	109	88	77
	15-08H	8	42' 8"	13.01	5,751	163	4,854	132	123	99	87
	15-09H	9	46' 4"	14.12	6,392	181	5,395	146	137	110	97
18 17' 11" 5.46 m	18-04H	4	30' 2"	9.19	4,760	135	4,018	109	102	82	72
	18-05H	5	33' 10"	10.30	5,684	161	4,797	130	122	98	86
	18-06H	6	37' 6"	11.42	6,607	187	5,577	151	141	114	100
	18-07H	7	41' 2"	12.54	7,530	213	6,356	172	161	130	114
	18-08H	8	44' 10"	13.66	8,453	239	7,135	194	181	146	128
	18-09H	9	48' 6"	14.77	9,377	266	7,914	215	201	162	142
21 20' 11" 6.37 m	21-04H	4	32' 3"	9.83	6,713	190	5,666	154	144	116	102
	21-05H	5	35' 11"	10.94	7,970	226	6,727	183	171	137	121
	21-06H	6	39' 7"	12.06	9,226	261	7,788	211	197	159	140
	21-07H	7	43' 3"	13.18	10,483	297	8,848	240	224	181	159
	21-08H	8	46' 11"	14.30	11,740	332	9,909	269	251	202	178
	21-09H	9	50' 7"	15.42	12,996	368	10,970	298	278	224	197
24 23' 10" 7.28 m	24-0H	4	35' 0"	10.66	9,074	257	7,659	208	194	156	138
	24-05H	5	38' 8"	11.78	10,715	303	9,044	245	229	185	162
	24-06H	6	42' 4"	12.90	12,356	350	10,429	283	265	213	187
	24-07H	7	46' 0"	14.01	13,997	396	11,815	321	300	241	212
	24-08H	8	49' 8"	15.13	15,639	443	13,200	358	335	270	237
	24-09H	9	53' 4"	16.25	17,280	489	14,585	396	370	298	262
27 26' 10" 8.19 m	27-04H	4	37' 11"	11.55	11,870	336	10,019	272	254	205	180
	27-05H	5	41' 7"	12.67	13,947	395	11,772	319	299	241	211
	27-06H	6	45' 3"	13.78	16,024	454	13,525	367	343	276	243
	27-07H	7	48' 11"	14.90	18,102	513	15,279	414	387	312	274
	27-08H	8	52' 7"	16.02	20,179	571	17,032	462	432	348	306
	27-09H	9	56' 3"	17.14	22,256	630	18,785	510	476	384	337

NOTES:

1. Grain bin volumes and capacities based on ASAE S413.1 DEC97.
2. Volume based on 28° angle of repose in roof, filled to a height 25 mm (1") below the eave height.
3. Bushel and metric tonne capacity is compacted 6%.

WIDE-CORRUGATION, FLAT-BOTTOM UNSTIFFENED GRAIN BINS											
Diameter (feet) <small>Actual Diameter (feet) Actual Diameter (meters)</small>	Model No.	Tiers	Overall Height		Volume			Metric Tonnes (Compacted)			
			feet	meters	ft ³	m ³	Bushels <small>(Compacted)</small>	Wheat <small>770 kg/m³</small>	Corn <small>720 kg/m³</small>	Rice <small>580 kg/m³</small>	Sunflower ⁵¹⁰ <small>kg/m³</small>
15 14' 11" 4.55 m	15-04U	04	19' 4"	5.89	2,808	80	2,370	65	61	49	43
	15-05U	05	23' 0"	7.01	3,450	98	2,910	80	75	60	53
	15-06U	06	26' 8"	8.13	4,091	116	3,450	95	89	72	63
	15-07U	07	30' 4"	9.25	4,732	134	3,990	109	102	82	72
	15-08U	08	34' 0"	10.36	5,373	152	4,540	124	116	93	82
	15-09U	09	37' 8"	11.48	6,014	170	5,080	139	130	105	92
	15-10U	10	41' 4"	12.60	6,655	188	5,620	154	144	116	102
18 17' 11" 5.46 m	18-04U	04	20' 2"	6.16	4,111	116	3,470	95	89	72	63
	18-05U	05	23' 10"	7.27	5,034	143	4,250	116	109	87	77
	18-06U	06	27' 6"	8.39	5,957	169	5,030	138	129	104	91
	18-07U	07	31' 2"	9.51	6,880	195	5,810	159	149	120	105
	18-08U	08	34' 10"	10.63	7,804	221	6,590	180	169	136	119
	18-09U	09	38' 6"	11.74	8,727	247	7,370	202	189	152	134
	18-10U	10	42' 2"	12.86	9,650	273	8,150	223	209	168	148
21 20' 11" 6.37 m	21-04U	04	21' 1"	6.42	5,686	161	4,800	131	123	99	87
	21-05U	05	24' 9"	7.53	6,942	197	5,860	160	150	121	106
	21-06U	06	28' 5"	8.65	8,199	232	6,920	189	177	142	125
	21-07U	07	32' 1"	9.77	9,456	268	7,980	219	205	165	145
	21-08U	08	35' 9"	10.89	10,712	303	9,040	248	232	187	164
	21-09U	09	39' 5"	12.00	11,969	339	10,100	277	259	209	183
	21-10U	10	43' 1"	13.12	13,225	375	11,160	306	286	230	203
24 23' 10" 7.28 m	24-04U	04	21' 11"	6.68	7,545	214	6,370	174	163	131	115
	24-05U	05	25' 7"	7.79	9,186	260	7,750	212	199	160	140
	24-06U	06	29' 3"	8.91	10,827	307	9,140	250	234	188	166
	24-07U	07	32' 11"	10.03	12,469	353	10,520	288	270	217	191
	24-08U	08	36' 7"	11.15	14,110	400	11,910	326	305	246	216
	24-09U	09	40' 3"	12.27	15,751	446	13,290	364	341	274	241
	24-10U	10	43' 11"	13.38	17,392	493	14,680	402	376	303	266
27 26' 10" 8.19 m	27-04U	04	22' 9"	6.94	9,699	275	8,190	224	210	169	148
	27-05U	05	26' 5"	8.06	11,776	333	9,940	272	255	205	180
	27-06U	06	30' 1"	9.18	13,853	392	11,690	320	300	241	212
	27-07U	07	33' 9"	10.29	15,930	451	13,450	368	345	277	244
	27-08U	08	37' 5"	11.41	18,008	510	15,200	416	390	313	276
	27-09U	09	41' 1"	12.53	20,085	569	16,950	464	435	350	307
	27-10U	10	44' 9"	13.65	22,162	628	18,710	512	480	386	339
30 29' 10" 9.10 m	30-04U	04	23' 8"	7.20	12,159	344	10,260	281	263	212	186
	30-05U	05	27' 4"	8.32	14,723	417	12,430	340	319	256	225
	30-06U	06	30' 12"	9.44	17,288	490	14,590	400	374	301	265
	30-07U	07	34' 8"	10.56	19,852	562	16,760	459	430	346	304
	30-08U	08	38' 4"	11.67	22,417	635	18,920	518	485	390	343
	30-09U	09	41' 12"	12.79	24,981	707	21,090	577	541	435	382
	30-10U	10	45' 8"	13.91	27,546	780	23,250	637	596	480	422

NOTES:

1. Grain bin volumes and capacities based on ASAE S413.1 DEC97.
2. Volume based on 28° angle of repose in roof, filled to a height 25 mm (1") below the eave height.
3. Bushel and metric tonne capacity is compacted 6%.

WIDE-CORRUGATION, FLAT-BOTTOM UNSTIFFENED GRAIN BINS											
Diameter (feet) <small>Actual Diameter (feet) Actual Diameter (meters)</small>	Model No.	Tiers	Overall Height		Volume			Metric Tonnes (Compacted)			
			feet	meters	ft ³	m ³	Bushels (Compacted)	Wheat 770 kg/m ³	Corn 720 kg/m ³	Rice 580 kg/m ³	Sunflower ⁵¹⁰ kg/m ³
33 32' 10" 10.01 m	33-04U	04	24' 6"	7.47	14,936	423	12,610	345	323	260	229
	33-05U	05	28' 2"	8.59	18,039	511	15,230	417	390	314	276
	33-06U	06	31' 10"	9.71	21,142	599	17,840	489	458	368	324
	33-07U	07	35' 6"	10.83	24,245	687	20,460	560	525	422	371
	33-08U	08	39' 2"	11.94	27,348	774	23,080	632	592	476	419
	33-09U	09	42' 10"	13.06	30,451	862	25,700	704	659	530	466
	33-10U	10	46' 6"	14.18	33,554	950	28,320	776	726	585	514
36 35' 10" 10.91 m	36-04U	04	25' 5"	7.74	18,041	511	15,230	417	390	314	276
	36-05U	05	29' 1"	8.86	21,734	615	18,340	502	470	378	332
	36-06U	06	32' 9"	9.98	25,427	720	21,460	588	550	443	389
	36-07U	07	36' 5"	11.10	29,120	825	24,580	673	630	507	446
	36-08U	08	40' 1"	12.21	32,813	929	27,700	758	710	571	502
	36-09U	09	43' 9"	13.33	36,506	1,034	30,810	844	790	636	559
	36-10U	10	47' 5"	14.45	40,198	1,138	33,930	929	870	700	615
42 41' 9" 12.73 m	42-04U	04	26' 11"	8.19	25,281	716	21,340	584	547	440	387
	42-05U	05	30' 7"	9.31	30,307	858	25,580	700	656	527	464
	42-06U	06	34' 3"	10.43	35,334	1,001	29,820	817	765	615	541
	42-07U	07	37' 11"	11.55	40,360	1,143	34,070	933	873	703	618
	42-08U	08	41' 7"	12.67	45,387	1,285	38,310	1,049	982	790	695
	42-09U	09	45' 3"	13.78	50,413	1,428	42,550	1,165	1,091	878	772
	42-10U	10	48' 11"	14.90	55,440	1,570	46,790	1,281	1,200	965	848
48 47' 9" 14.55 m	48-04U	04	28' 8"	8.74	33,967	962	28,670	785	735	591	520
	48-05U	05	32' 4"	9.86	40,532	1,148	34,210	937	877	706	621
	48-06U	06	36' 0"	10.98	47,097	1,334	39,750	1,089	1,019	820	721
	48-07U	07	39' 8"	12.10	53,662	1,520	45,290	1,240	1,161	934	821
	48-08U	08	43' 4"	13.21	60,228	1,705	50,840	1,392	1,303	1,049	922
	48-09U	09	47' 0"	14.33	66,793	1,891	56,380	1,544	1,445	1,163	1,023
	48-10U	10	50' 8"	15.45	73,358	2,077	61,920	1,695	1,588	1,277	1,123

NOTES:

1. Grain bin volumes and capacities based on ASAE S413.1 DEC97.
2. Volume based on 28° angle of repose in roof, filled to a height 25 mm (1") below the eave height.
3. Bushel and metric tonne capacity is compacted 6%.

WIDE-CORRUGATION, FLAT-BOTTOM STIFFENED GRAIN BINS											
Diameter (feet) <small>Actual Diameter (feet) Actual Diameter (meters)</small>	Model No.	Tiers	Overall Height		Volume			Metric Tonnes (Compacted)			
			feet	meters	ft ³	m ³	Bushels <small>(Compacted)</small>	Wheat <small>770 kg/m³</small>	Corn <small>720 kg/m³</small>	Rice <small>580 kg/m³</small>	Sunflower ⁵¹⁰ <small>kg/m³</small>
18 17' 11" 5.46 m		5	23' 11"	7.29	5,050	143	4,300	117	109	88	77
	18-06S	6	27' 7"	8.41	5,973	169	5,090	138	129	104	91
	18-07S	7	31' 3"	9.53	6,896	195	5,880	159	149	120	105
	18-08S	8	34' 11"	10.65	7,819	221	6,660	181	169	136	120
	18-09S	9	38' 7"	11.76	8,743	248	7,450	202	189	152	134
	18-10S	10	42' 3"	12.88	9,666	274	8,240	223	209	168	148
	18-11S	11	45' 11"	14.00	10,589	300	9,020	245	229	185	162
	18-12S	12	49' 7"	15.12	11,512	326	9,810	266	249	200	176
	18-13S	13	53' 3"	16.23	12,436	352	10,600	287	269	216	190
	18-14S	14	56' 11"	17.35	13,359	378	11,380	309	289	233	205
	18-15S	15	60' 7"	18.47	14,282	404	12,170	330	309	249	219
18-16S	16	64' 3"	19.59	15,205	431	12,960	351	329	264	232	
21 20' 11" 6.37 m	21-05S	5	24' 9"	7.55	6,964	197	5,930	161	151	121	107
	21-06S	6	28' 5"	8.67	8,220	233	7,000	190	178	143	126
	21-07S	7	32' 1"	9.79	9,477	268	8,080	219	205	165	145
	21-08S	8	35' 9"	10.91	10,734	304	9,150	248	232	187	164
	21-09S	9	39' 5"	12.02	11,990	340	10,220	277	259	209	184
	21-10S	10	43' 1"	13.14	13,247	375	11,290	306	287	231	203
	21-11S	11	46' 9"	14.26	14,504	411	12,360	335	314	252	222
	21-12S	12	50' 5"	15.38	15,760	446	13,430	364	341	274	241
	21-13S	13	54' 1"	16.49	17,017	482	14,500	393	368	296	260
	21-14S	14	57' 9"	17.61	18,273	517	15,570	422	395	318	280
	21-15S	15	61' 5"	18.73	19,530	553	16,640	451	423	340	299
	21-16S	16	65' 1"	19.85	20,787	589	17,710	480	450	362	318
	21-17S	17	68' 9"	20.96	22,043	624	18,780	509	477	384	337
	21-18S	18	72' 5"	22.08	23,300	660	19,850	539	504	406	357
24 23' 10" 7.28 m	24-05S	5	25' 8"	7.81	9,214	261	7,850	213	199	160	141
	24-06S	6	29' 4"	8.93	10,855	307	9,250	251	235	189	166
	24-07S	7	32' 12"	10.05	12,497	354	10,650	289	270	218	191
	24-08S	8	36' 8"	11.17	14,138	400	12,050	327	306	246	216
	24-09S	9	40' 4"	12.28	15,779	447	13,450	365	341	275	242
	24-10S	10	43' 12"	13.40	17,420	493	14,840	403	377	303	267
	24-11S	11	47' 8"	14.52	19,062	540	16,240	441	413	332	292
	24-12S	12	51' 4"	15.64	20,703	586	17,640	478	448	360	317
	24-13S	13	54' 12"	16.75	22,344	633	19,040	516	484	389	342
	24-14S	14	58' 8"	17.87	23,986	679	20,440	554	519	418	367
	24-15S	15	62' 4"	18.99	25,627	726	21,840	592	555	446	392
	24-16S	16	65' 12"	20.11	27,268	772	23,230	630	590	475	417
	24-17S	17	69' 8"	21.22	28,909	819	24,630	668	626	503	443
	24-18S	18	73' 4"	22.34	30,551	865	26,030	706	661	532	468
24-19S	19	76' 12"	23.46	32,192	912	27,430	744	697	560	493	
24-20S	20	80' 8"	24.58	33,833	958	28,830	782	732	589	518	

NOTES:

1. Grain bin volumes and capacities based on ASAE S413.1 DEC97.
2. Volume based on 28° angle of repose in roof, filled to a height 25 mm (1") below the eave height.
3. Bushel and metric tonne capacity is compacted 6%.

WIDE-CORRUGATION, FLAT-BOTTOM STIFFENED GRAIN BINS											
Diameter (feet) <small>Actual Diameter (feet) Actual Diameter (meters)</small>	Model No.	Tiers	Overall Height		Volume			Metric Tonnes (Compacted)			
			feet	meters	ft ³	m ³	Bushels (Compacted)	Wheat 770 kg/m ³	Corn 720 kg/m ³	Rice 580 kg/m ³	Sunflower ⁵¹⁰ kg/m ³
27 26' 10" 8.19 m	27-05S	5	26' 6"	8.08	11,811	334	10,060	273	256	206	181
	27-06S	6	30' 2"	9.19	13,889	393	11,830	321	301	242	213
	27-07S	7	33' 10"	10.31	15,966	452	13,600	369	346	278	244
	27-08S	8	37' 6"	11.43	18,043	511	15,370	417	390	314	276
	27-09S	9	41' 2"	12.55	20,120	570	17,140	465	435	350	308
	27-10S	10	44' 10"	13.67	22,198	629	18,910	513	480	386	340
	27-11S	11	48' 6"	14.78	24,275	687	20,680	561	525	423	372
	27-12S	12	52' 2"	15.90	26,352	746	22,450	609	570	459	403
	27-13S	13	55' 10"	17.02	28,429	805	24,220	657	615	495	435
	27-14S	14	59' 6"	18.14	30,507	864	25,990	705	660	531	467
	27-15S	15	63' 2"	19.25	32,584	923	27,760	753	705	567	499
	27-16S	16	66' 10"	20.37	34,661	981	29,530	801	750	603	531
	27-17S	17	70' 6"	21.49	36,738	1,040	31,300	849	795	640	562
	27-18S	18	74' 2"	22.61	38,816	1,099	33,070	897	840	676	594
	27-19S	19	77' 10"	23.72	40,893	1,158	34,840	945	885	712	626
27-20S	20	81' 6"	24.84	42,970	1,217	36,610	993	930	748	658	
27-21S	21	85' 2"	25.96	45,047	1,276	38,380	1,041	975	784	690	
27-22S	22	88' 10"	27.08	47,125	1,334	40,150	1,089	1,020	820	721	
30 29' 10" 9.10 m	30-05S	5	27' 4"	8.34	14,767	418	12,580	341	320	257	226
	30-06S	6	31' 0"	9.46	17,331	491	14,770	401	375	302	265
	30-07S	7	34' 8"	10.58	19,896	563	16,950	460	431	346	305
	30-08S	8	38' 4"	11.69	22,460	636	19,140	519	486	391	344
	30-09S	9	42' 0"	12.81	25,025	709	21,320	578	542	436	383
	30-10S	10	45' 8"	13.93	27,589	781	23,510	638	597	480	422
	30-11S	11	49' 4"	15.05	30,154	854	25,690	697	653	525	462
	30-12S	12	53' 0"	16.16	32,718	926	27,880	756	708	570	501
	30-13S	13	56' 8"	17.28	35,283	999	30,060	815	764	614	540
	30-14S	14	60' 4"	18.40	37,847	1,072	32,250	875	819	659	579
	30-15S	15	64' 0"	19.52	40,412	1,144	34,430	934	875	704	619
	30-16S	16	67' 8"	20.63	42,976	1,217	36,620	993	930	748	658
	30-17S	17	71' 4"	21.75	45,541	1,290	38,800	1,053	986	793	697
	30-18S	18	75' 0"	22.87	48,105	1,362	40,990	1,112	1,041	837	736
	30-19S	19	78' 8"	23.99	50,670	1,435	43,180	1,171	1,097	882	776
30-20S	20	82' 4"	25.10	53,234	1,507	45,360	1,230	1,152	927	815	
30-21S	21	86' 0"	26.22	55,799	1,580	47,550	1,290	1,208	971	854	
30-22S	22	89' 8"	27.34	58,363	1,653	49,730	1,349	1,263	1,016	893	
30-23S	23	93' 4"	28.46	60,928	1,725	51,920	1,408	1,319	1,061	933	
30-24S	24	97' 0"	29.58	63,493	1,798	54,100	1,467	1,374	1,105	972	

NOTES:

1. Grain bin volumes and capacities based on ASAE S413.1 DEC97.
2. Volume based on 28° angle of repose in roof, filled to a height 25 mm (1") below the eave height.
3. Bushel and metric tonne capacity is compacted 6%.

WIDE-CORRUGATION, FLAT-BOTTOM STIFFENED GRAIN BINS											
Diameter (feet) <small>Actual Diameter (feet) Actual Diameter (meters)</small>	Model No.	Tiers	Overall Height		Volume			Metric Tonnes (Compacted)			
			feet	meters	ft ³	m ³	Bushels (Compacted)	Wheat 770 kg/m ³	Corn 720 kg/m ³	Rice 580 kg/m ³	Sunflower ⁵¹⁰ kg/m ³
33 32' 10" 10.01 m	33-05S	5	28' 3"	8.61	18,092	512	15,420	418	392	315	277
	33-06S	6	31' 11"	9.73	21,195	600	18,060	490	459	369	324
	33-07S	7	35' 7"	10.85	24,298	688	20,700	562	526	423	372
	33-08S	8	39' 3"	11.96	27,401	776	23,350	633	593	477	419
	33-09S	9	42' 11"	13.08	30,504	864	25,990	705	660	531	467
	33-10S	10	46' 7"	14.20	33,607	952	28,640	777	727	585	514
	33-11S	11	50' 3"	15.32	36,710	1,040	31,280	848	794	639	562
	33-12S	12	53' 11"	16.43	39,813	1,127	33,920	920	862	693	609
	33-13S	13	57' 7"	17.55	42,916	1,215	36,570	992	929	747	657
	33-14S	14	61' 3"	18.67	46,019	1,303	39,210	1,064	996	801	704
	33-15S	15	64' 11"	19.79	49,122	1,391	41,860	1,135	1,063	855	752
	33-16S	16	68' 7"	20.90	52,225	1,479	44,500	1,207	1,130	909	799
	33-17S	17	72' 3"	22.02	55,328	1,567	47,140	1,279	1,197	963	847
	33-18S	18	75' 11"	23.14	58,431	1,655	49,790	1,350	1,265	1,017	894
	33-19S	19	79' 7"	24.26	61,534	1,742	52,430	1,422	1,332	1,071	942
	33-20S	20	83' 3"	25.37	64,638	1,830	55,080	1,494	1,399	1,125	989
	33-21S	21	86' 11"	26.49	67,741	1,918	57,720	1,566	1,466	1,179	1,037
	33-22S	22	90' 7"	27.61	70,844	2,006	60,370	1,637	1,533	1,233	1,084
	33-23S	23	94' 3"	28.73	73,947	2,094	63,010	1,709	1,600	1,287	1,132
	33-24S	24	97' 11"	29.85	77,050	2,182	65,650	1,781	1,667	1,341	1,179
36 35' 10" 10.91 m	36-05S	5	29' 2"	8.88	21,797	617	18,570	504	472	379	334
	36-06S	6	32' 10"	10.00	25,490	722	21,720	589	552	444	390
	36-07S	7	36' 6"	11.12	29,183	826	24,870	674	632	508	447
	36-08S	8	40' 2"	12.23	32,876	931	28,010	760	711	572	503
	36-09S	9	43' 10"	13.35	36,569	1,036	31,160	845	791	637	560
	36-10S	10	47' 6"	14.47	40,261	1,140	34,310	931	871	701	616
	36-11S	11	51' 2"	15.59	43,954	1,245	37,450	1,016	951	765	673
	36-12S	12	54' 10"	16.70	47,647	1,349	40,600	1,101	1,031	829	729
	36-13S	13	58' 6"	17.82	51,340	1,454	43,750	1,187	1,111	894	786
	36-14S	14	62' 2"	18.94	55,033	1,558	46,890	1,272	1,191	958	842
	36-15S	15	65' 10"	20.06	58,726	1,663	50,040	1,357	1,271	1,022	899
	36-16S	16	69' 6"	21.17	62,419	1,768	53,190	1,443	1,351	1,087	956
	36-17S	17	73' 2"	22.29	66,112	1,872	56,330	1,528	1,431	1,151	1,012
	36-18S	18	76' 10"	23.41	69,805	1,977	59,480	1,613	1,511	1,215	1,069
	36-19S	19	80' 6"	24.53	73,497	2,081	62,630	1,699	1,591	1,280	1,125
	36-20S	20	84' 2"	25.64	77,190	2,186	65,770	1,784	1,671	1,344	1,182
	36-21S	21	87' 10"	26.76	80,883	2,290	68,920	1,869	1,750	1,408	1,238
	36-22S	22	91' 6"	27.88	84,576	2,395	72,070	1,955	1,830	1,472	1,295
	36-23S	23	95' 2"	29.00	88,269	2,499	75,210	2,040	1,910	1,537	1,351
	36-24S	24	98' 10"	30.11	91,962	2,604	78,360	2,125	1,990	1,601	1,408

NOTES:

1. Grain bin volumes and capacities based on ASAE S413.1 DEC97.
2. Volume based on 28° angle of repose in roof, filled to a height 25 mm (1") below the eave height.
3. Bushel and metric tonne capacity is compacted 6%.

WIDE-CORRUGATION, FLAT-BOTTOM STIFFENED GRAIN BINS											
Diameter (feet) <small>Actual Diameter (feet) Actual Diameter (meters)</small>	Model No.	Tiers	Overall Height		Volume			Metric Tonnes (Compacted)			
			feet	meters	ft ³	m ³	Bushels (Compacted)	Wheat 770 kg/m ³	Corn 720 kg/m ³	Rice 580 kg/m ³	Sunflower ⁵¹⁰ kg/m ³
42 41' 9" 12.73 m	42-05S	5	30' 7"	9.33	30,393	861	25,900	702	658	529	465
	42-06S	6	34' 3"	10.45	35,420	1,003	30,180	819	767	617	542
	42-07S	7	37' 11"	11.57	40,446	1,145	34,460	935	875	704	619
	42-08S	8	41' 7"	12.68	45,472	1,288	38,750	1,051	984	792	696
	42-09S	9	45' 3"	13.80	50,499	1,430	43,030	1,167	1,093	879	773
	42-10S	10	48' 11"	14.92	55,525	1,572	47,310	1,283	1,202	967	850
	42-11S	11	52' 7"	16.04	60,552	1,715	51,600	1,399	1,310	1,054	927
	42-12S	12	56' 3"	17.15	65,578	1,857	55,880	1,516	1,419	1,142	1,004
	42-13S	13	59' 11"	18.27	70,605	1,999	60,160	1,632	1,528	1,229	1,081
	42-14S	14	63' 7"	19.39	75,631	2,142	64,440	1,748	1,637	1,317	1,158
	42-15S	15	67' 3"	20.51	80,657	2,284	68,730	1,864	1,746	1,404	1,235
	42-16S	16	70' 11"	21.62	85,684	2,426	73,010	1,980	1,854	1,492	1,312
	42-17S	17	74' 7"	22.74	90,710	2,569	77,290	2,097	1,963	1,579	1,389
	42-18S	18	78' 3"	23.86	95,737	2,711	81,580	2,213	2,072	1,667	1,466
	42-19S	19	81' 11"	24.98	100,763	2,853	85,860	2,329	2,181	1,754	1,542
	42-20S	20	85' 7"	26.10	105,790	2,996	90,140	2,445	2,289	1,842	1,619
	42-21S	21	89' 3"	27.21	110,816	3,138	94,430	2,561	2,398	1,929	1,696
	42-22S	22	92' 11"	28.33	115,843	3,280	98,710	2,677	2,507	2,017	1,773
	42-23S	23	96' 7"	29.45	120,869	3,423	102,990	2,794	2,616	2,104	1,850
	42-24S	24	100' 3"	30.57	125,895	3,565	107,270	2,910	2,725	2,192	1,927
48 47' 9" 14.55 m	48-05S	5	32' 5"	9.88	40,644	1,151	34,630	939	880	708	622
	48-06S	6	36' 1"	11.00	47,209	1,337	40,230	1,091	1,022	822	723
	48-07S	7	39' 9"	12.12	53,774	1,523	45,820	1,243	1,164	936	823
	48-08S	8	43' 5"	13.23	60,340	1,709	51,410	1,395	1,306	1,050	924
	48-09S	9	47' 1"	14.35	66,905	1,895	57,010	1,546	1,448	1,165	1,024
	48-10S	10	50' 9"	15.47	73,470	2,080	62,600	1,698	1,590	1,279	1,125
	48-11S	11	54' 5"	16.59	80,035	2,266	68,200	1,850	1,732	1,393	1,225
	48-12S	12	58' 1"	17.70	86,600	2,452	73,790	2,002	1,874	1,508	1,326
	48-13S	13	61' 9"	18.82	93,165	2,638	79,390	2,153	2,016	1,622	1,426
	48-14S	14	65' 5"	19.94	99,730	2,824	84,980	2,305	2,158	1,736	1,527
	48-15S	15	69' 1"	21.06	106,296	3,010	90,570	2,457	2,300	1,851	1,627
	48-16S	16	72' 9"	22.17	112,861	3,196	96,170	2,608	2,442	1,965	1,728
	48-17S	17	76' 5"	23.29	119,426	3,382	101,760	2,760	2,585	2,079	1,828
	48-18S	18	80' 1"	24.41	125,991	3,568	107,360	2,912	2,727	2,193	1,929
	48-19S	19	83' 9"	25.53	132,556	3,754	112,950	3,064	2,869	2,308	2,029
	48-20S	20	87' 5"	26.64	139,121	3,939	118,540	3,215	3,011	2,422	2,130
	48-21S	21	91' 1"	27.76	145,686	4,125	124,140	3,367	3,153	2,536	2,230
	48-22S	22	94' 9"	28.88	152,252	4,311	129,730	3,519	3,295	2,651	2,331
	48-23S	23	98' 5"	30.00	158,817	4,497	135,330	3,671	3,437	2,765	2,431
	48-24S	24	102' 1"	31.12	165,382	4,683	140,920	3,822	3,579	2,879	2,532

NOTES:

1. Grain bin volumes and capacities based on ASAE S413.1 DEC97.
2. Volume based on 28° angle of repose in roof, filled to a height 25 mm (1") below the eave height.
3. Bushel and metric tonne capacity is compacted 6%.

WIDE-CORRUGATION, FLAT-BOTTOM STIFFENED GRAIN BINS

Diameter (feet) <small>Actual Diameter (feet) Actual Diameter (meters)</small>	Model No.	Tiers	Overall Height		Volume			Metric Tonnes (Compacted)			
			feet	meters	ft ³	m ³	Bushels (Compacted)	Wheat 770 kg/m ³	Corn 720 kg/m ³	Rice 580 kg/m ³	Sunflower ⁵¹⁰ kg/m ³
60 59' 8" 18.19 m	60-05S	5	35' 11"	10.96	66,466	1,882	56,630	1,536	1,438	1,157	1,017
	60-06S	6	39' 7"	12.07	76,724	2,173	65,380	1,773	1,660	1,336	1,174
	60-07S	7	43' 3"	13.19	86,982	2,463	74,120	2,010	1,882	1,514	1,332
	60-08S	8	46' 11"	14.31	97,240	2,754	82,860	2,247	2,104	1,693	1,489
	60-09S	9	50' 7"	15.43	107,498	3,044	91,600	2,485	2,326	1,871	1,646
	60-10S	10	54' 3"	16.54	117,756	3,334	100,340	2,722	2,548	2,050	1,803
	60-11S	11	57' 11"	17.66	128,014	3,625	109,080	2,959	2,770	2,229	1,960
	60-12S	12	61' 7"	18.78	138,272	3,915	117,820	3,196	2,992	2,407	2,117
	60-13S	13	65' 3"	19.90	148,530	4,206	126,560	3,433	3,214	2,586	2,274
	60-14S	14	68' 11"	21.01	158,788	4,496	135,300	3,670	3,436	2,764	2,431
	60-15S	15	72' 7"	22.13	169,046	4,787	144,040	3,907	3,658	2,943	2,588
	60-16S	16	76' 3"	23.25	179,304	5,077	152,780	4,144	3,880	3,122	2,745
	60-17S	17	79' 11"	24.37	189,562	5,368	161,520	4,381	4,102	3,300	2,902
	60-18S	18	83' 7"	25.48	199,820	5,658	170,260	4,618	4,324	3,479	3,059
	60-19S	19	87' 3"	26.60	210,078	5,949	179,010	4,855	4,546	3,657	3,216
	60-20S	20	90' 11"	27.72	220,336	6,239	187,750	5,092	4,768	3,836	3,373
	60-21S	21	94' 7"	28.84	230,594	6,530	196,490	5,330	4,990	4,014	3,530
	60-22S	22	98' 3"	29.95	240,852	6,820	205,230	5,567	5,212	4,193	3,687
	60-23S	23	101' 11"	31.07	251,110	7,111	213,970	5,804	5,434	4,372	3,844
	60-24S	24	105' 7"	32.19	261,368	7,401	222,710	6,041	5,656	4,550	4,001

NOTES:

1. Grain bin volumes and capacities based on ASAE S413.1 DEC97.
2. Volume based on 28° angle of repose in roof, filled to a height 25 mm (1") below the eave height.
3. Bushel and metric tonne capacity is compacted 6%.

WIDE-CORRUGATION, FLAT-BOTTOM COMMERCIAL GRAIN BINS

Diameter (feet) <small>Actual Diameter (feet) Actual Diameter (meters)</small>	Model No.	Tiers	Overall Height		Volume			Metric Tonnes (Compacted)			
			feet	meters	ft ³	m ³	Bushels (Compacted)	Wheat 770 kg/m ³	Corn 720 kg/m ³	Rice 580 kg/m ³	Sunflower ⁵¹⁰ kg/m ³
48 47' 9" 14.55 m	48-09C	9	45' 4"	13.83	66,905	1,895	57,010	1,546	1,448	1,165	1,024
	48-10C	10	49' 0"	14.94	73,470	2,080	62,600	1,698	1,590	1,279	1,125
	48-11C	11	52' 8"	16.06	80,035	2,266	68,200	1,850	1,732	1,393	1,225
	48-12C	12	56' 4"	17.18	86,600	2,452	73,790	2,002	1,874	1,508	1,326
	48-13C	13	60' 0"	18.30	93,165	2,638	79,390	2,153	2,016	1,622	1,426
	48-14C	14	63' 8"	19.42	99,730	2,824	84,980	2,305	2,158	1,736	1,527
	48-15C	15	67' 4"	20.53	106,296	3,010	90,570	2,457	2,300	1,851	1,627
	48-16C	16	71' 0"	21.65	112,861	3,196	96,170	2,608	2,442	1,965	1,728
	48-17C	17	74' 8"	22.77	119,426	3,382	101,760	2,760	2,585	2,079	1,828
	48-18C	18	78' 4"	23.89	125,991	3,568	107,360	2,912	2,727	2,193	1,929
	48-19C	19	82' 0"	25.00	132,556	3,754	112,950	3,064	2,869	2,308	2,029
	48-20C	20	85' 8"	26.12	139,121	3,939	118,540	3,215	3,011	2,422	2,130
	48-21C	21	89' 4"	27.24	145,686	4,125	124,140	3,367	3,153	2,536	2,230
	48-22C	22	93' 0"	28.36	152,252	4,311	129,730	3,519	3,295	2,651	2,331
	48-23C	23	96' 8"	29.47	158,817	4,497	135,330	3,671	3,437	2,765	2,431
	48-24C	24	100' 4"	30.59	165,382	4,683	140,920	3,822	3,579	2,879	2,532
	48-25C	25	104' 0"	31.71	171,947	4,869	146,510	3,974	3,721	2,993	2,632
48-26C	26	107' 8"	32.83	178,512	5,055	152,110	4,126	3,863	3,108	2,733	
60 59' 8" 18.19 m	60-09C	9	48' 8"	14.84	107,498	3,044	91,600	2,485	2,326	1,871	1,646
	60-10C	10	52' 4"	15.96	117,756	3,334	100,340	2,722	2,548	2,050	1,803
	60-11C	11	56' 0"	17.08	128,014	3,625	109,080	2,959	2,770	2,229	1,960
	60-12C	12	59' 8"	18.20	138,272	3,915	117,820	3,196	2,992	2,407	2,117
	60-13C	13	63' 4"	19.31	148,530	4,206	126,560	3,433	3,214	2,586	2,274
	60-14C	14	67' 0"	20.43	158,788	4,496	135,300	3,670	3,436	2,764	2,431
	60-15C	15	70' 8"	21.55	169,046	4,787	144,040	3,907	3,658	2,943	2,588
	60-16C	16	74' 4"	22.67	179,304	5,077	152,780	4,144	3,880	3,122	2,745
	60-17C	17	78' 0"	23.78	189,562	5,368	161,520	4,381	4,102	3,300	2,902
	60-18C	18	81' 8"	24.90	199,820	5,658	170,260	4,618	4,324	3,479	3,059
	60-19C	19	85' 4"	26.02	210,078	5,949	179,010	4,855	4,546	3,657	3,216
	60-20C	20	89' 0"	27.14	220,336	6,239	187,750	5,092	4,768	3,836	3,373
	60-21C	21	92' 8"	28.25	230,594	6,530	196,490	5,330	4,990	4,014	3,530
	60-22C	22	96' 4"	29.37	240,852	6,820	205,230	5,567	5,212	4,193	3,687
	60-23C	23	100' 0"	30.49	251,110	7,111	213,970	5,804	5,434	4,372	3,844
	60-24C	24	103' 8"	31.61	261,368	7,401	222,710	6,041	5,656	4,550	4,001
	60-25C	25	107' 4"	32.72	271,626	7,692	231,450	6,278	5,878	4,729	4,158
60-26C	26	111' 0"	33.84	281,884	7,982	240,190	6,515	6,100	4,907	4,315	

NOTES:

1. Grain bin volumes and capacities based on ASAE S413.1 DEC97.
2. Volume based on 28° angle of repose in roof, filled to a height 25 mm (1") below the eave height.
3. Bushel and metric tonne capacity is compacted 6%.

WIDE-CORRUGATION, FLAT-BOTTOM COMMERCIAL GRAIN BINS											
Diameter (feet) <small>Actual Diameter (feet) Actual Diameter (meters)</small>	Model No.	Tiers	Overall Height		Volume			Metric Tonnes (Compacted)			
			feet	meters	ft ³	m ³	Bushels (Compacted)	Wheat 770 kg/m ³	Corn 720 kg/m ³	Rice 580 kg/m ³	Sunflower ⁵¹⁰ kg/m ³
72 71' 7" 21.83 m	72-09C	9	52' 3"	15.92	159,058	4,504	135,530	3,676	3,442	2,769	2,435
	72-10C	10	55' 11"	17.04	173,830	4,922	148,120	4,018	3,762	3,026	2,661
	72-11C	11	59' 7"	18.15	188,602	5,341	160,710	4,359	4,082	3,283	2,887
	72-12C	12	63' 3"	19.27	203,373	5,759	173,290	4,700	4,401	3,541	3,113
	72-13C	13	66' 11"	20.39	218,145	6,177	185,880	5,042	4,721	3,798	3,339
	72-14C	14	70' 7"	21.51	232,916	6,595	198,470	5,383	5,041	4,055	3,566
	72-15C	15	74' 3"	22.63	247,688	7,014	211,050	5,725	5,360	4,312	3,792
	72-16C	16	77' 11"	23.74	262,459	7,432	223,640	6,066	5,680	4,569	4,018
	72-17C	17	81' 7"	24.86	277,231	7,850	236,230	6,407	6,000	4,826	4,244
	72-18C	18	85' 3"	25.98	292,003	8,269	248,810	6,749	6,319	5,084	4,470
	72-19C	19	88' 11"	27.10	306,774	8,687	261,400	7,090	6,639	5,341	4,696
	72-20C	20	92' 7"	28.21	321,546	9,105	273,990	7,432	6,959	5,598	4,922
	72-21C	21	96' 3"	29.33	336,317	9,523	286,570	7,773	7,278	5,855	5,148
	72-22C	22	99' 11"	30.45	351,089	9,942	299,160	8,114	7,598	6,112	5,374
	72-23C	23	103' 7"	31.57	365,860	10,360	311,750	8,456	7,918	6,369	5,601
	72-24C	24	107' 3"	32.68	380,632	10,778	324,330	8,797	8,237	6,626	5,827
72-25C	25	110' 11"	33.80	395,404	11,197	336,920	9,139	8,557	6,884	6,053	
72-26C	26	114' 7"	34.92	410,175	11,615	349,510	9,480	8,877	7,141	6,279	
75 74' 7" 22.74 m	75-09C	9	53' 2"	16.20	173,746	4,920	148,050	4,016	3,760	3,025	2,660
	75-10C	10	56' 10"	17.31	189,774	5,374	161,700	4,386	4,107	3,304	2,905
	75-11C	11	60' 6"	18.43	205,802	5,828	175,360	4,757	4,454	3,583	3,150
	75-12C	12	64' 2"	19.55	221,830	6,282	189,020	5,127	4,801	3,862	3,396
	75-13C	13	67' 10"	20.67	237,858	6,735	202,680	5,497	5,148	4,141	3,641
	75-14C	14	71' 6"	21.78	253,886	7,189	216,330	5,868	5,494	4,420	3,887
	75-15C	15	75' 2"	22.90	269,915	7,643	229,990	6,238	5,841	4,699	4,132
	75-16C	16	78' 10"	24.02	285,943	8,097	243,650	6,609	6,188	4,978	4,377
	75-17C	17	82' 6"	25.14	301,971	8,551	257,310	6,979	6,535	5,257	4,623
	75-18C	18	86' 2"	26.25	317,999	9,005	270,960	7,350	6,882	5,536	4,868
	75-19C	19	89' 10"	27.37	334,027	9,459	284,620	7,720	7,229	5,815	5,113
	75-20C	20	93' 6"	28.49	350,055	9,912	298,280	8,091	7,576	6,094	5,359
	75-21C	21	97' 2"	29.61	366,084	10,366	311,940	8,461	7,923	6,373	5,604
	75-22C	22	100' 10"	30.72	382,112	10,820	325,590	8,831	8,269	6,652	5,849
	75-23C	23	104' 6"	31.84	398,140	11,274	339,250	9,202	8,616	6,931	6,095
	75-24C	24	108' 2"	32.96	414,168	11,728	352,910	9,572	8,963	7,210	6,340
75-25C	25	111' 10"	34.08	430,196	12,182	366,570	9,943	9,310	7,489	6,585	
75-26C	26	115' 6"	35.19	446,225	12,636	380,220	10,313	9,657	7,768	6,831	

NOTES:

1. Grain bin volumes and capacities based on ASAE S413.1 DEC97.
2. Volume based on 28° angle of repose in roof, filled to a height 25 mm (1") below the eave height.
3. Bushel and metric tonne capacity is compacted 6%.

LIMITED WARRANTY

This warranty relates to any new grain bin (the "Product") sold by Edwards Group (which is a trading name or division of Ag Growth Industries Partnership, referred to herein as the "Seller") and applies only to the first user of the Product (meaning a purchaser directly from the Seller or from an authorized dealer or distributor of the Product, referred to herein as the "Buyer").

This warranty shall only be effective if properly registered with the Seller in accordance with information provided to the Buyer at the time of sale.

1. The Seller warrants to the Buyer that the Product is free from defects in material and workmanship under normal and reasonable use.

2. This warranty applies only to defects in materials and workmanship and not to damage incurred in shipping or handling, or damage due to causes beyond the control of the Seller such as lightning, fire, flood, wind, earthquake, excessive voltage, mechanical shock, water damage, or damage arising out of abuse, alteration, improper assembly, improper installation, improper maintenance or improper repair of the Product.

3. **This warranty is void if:** a) the Product has not been installed and operated in accordance with the instructions provided by the Seller; b) all components of the grain bin system are not original equipment as supplied by the Seller; c) the installation was not done by an authorized dealer or certified representative of the Seller; d) damage to or malfunction or failure of the Product is due to misuse, abuse, negligence of the Buyer, alteration, accident or lack of proper maintenance; or e) the grain bin system is used for the storage of something other than grain or feed.

3. **The warranty period for the Product shall be FIVE (5) years from delivery of the Product to the Buyer and initial installation by or for the Buyer.** This five year warranty shall only apply to structural elements of the Product. All other parts are covered by a one (1) year warranty period. Painted parts are only warranted for one year against surface rust. In the event that any part of the Product is manufactured and sold to the Seller by a third party vendor, such part is only warranted to the extent of the warranty given by the third party vendor to the Seller.

4. The obligations set forth in this warranty are conditional upon the Buyer promptly notifying the Seller of any defect and, if required, promptly making the Product available for correction. The Seller shall be given reasonable opportunity to investigate all claims and no Product shall be returned to the Seller until after inspection and approval by the Seller and receipt by the Buyer of written shipping instructions from the Seller, with transportation charges prepaid.

5. If a defect is found by the Seller to exist within the applicable warranty period, the Seller will, at its sole option, (a) repair or replace the Product or such part free of charge, FOS the factory of manufacture, or (b) refund to the Buyer, the original purchase price, in lieu of such repair or replacement. Labour costs associated with the replacement or repair of the Product are not covered by the Seller. The Seller shall replace or attempt to repair and return the Product or such part within 4 weeks of receipt of notice of the defect from the Buyer.

6. The total liability of the Seller on any claim, whether in contract, tort or otherwise, arising out of, connected with, or resulting from the manufacture, sale, delivery, repair, replacement or use of the Product or any part thereof **shall not exceed the price paid for the Product** and the Seller shall not be liable for any special indirect, incidental or consequential damages caused by reason of the installation, modification, use, repair, maintenance or mechanical failure of the Product.

7. The Seller warrants that the use of the Product does not infringe upon the patents, copyrights, trade secrets or other intellectual property rights of others.

8. Notwithstanding anything contained herein to the contrary, the foregoing is the Buyer's sole and exclusive remedy for breach of warranty by the Seller in respect of the Product. The Seller, for itself, its agents, contractors, employees and for any parent or subsidiary of the Seller, expressly disclaims all warranties, either express or implied, written or oral, including implied warranties of merchantability or fitness for a particular purpose and undertakes no obligation with respect to the conformity of the Product except as set out in the purchase agreement, if any.

9. The foregoing warranty is the entire warranty of the Seller. The Seller neither assumes, nor authorizes any other person purporting to act on its behalf to modify or to change this warranty, nor to assume for it any other warranty or liability concerning the Product.

WARRANTY VOID IF NOT REGISTERED

TWISTER™

Twister is a Division of Ag Growth Industries Partnership

Part of Ag Growth International Inc. Group

215 Barons Street

Nobleford, Alberta, Canada T0L 1S0

Phone: (403) 320-5585

Fax: (888) 320-5669

Toll Free: (800) 565-2840 (Canada & USA)

website: www.twister.ca

email: sales@twister.ca

© Ag Growth Industries Partnership 2012

Printed in Canada
