

# Standards of Practice

## Grain Bin, Silo, and Tank Entry

<b>Document Authority:</b>	OH&S Director	<b>Document Custodian:</b>	OH&S Director
<b>Effective Date:</b>	11/1/18	<b>Issuing Dept:</b>	College of Agriculture EH&S
<b>Next Review Date:</b>	11/1/21	<b>Control Tier:</b>	II
<b>Document Number:</b>	GB001		

### I. PURPOSE

It is the standard of practice of this organization to permit only trained and authorized personnel to enter into grain bins, silos, and tanks. This standard of practice is applicable to all employees entering into a grain storage structure.

### II. SCOPE

This procedure covers the standard operating entry procedures for grain bins, silos, and tanks that KSU College of Agriculture can control and over which it can be expected to have an influence. These activities include, but are not limited to entry procedures, training, inspections, and the safe operation of the equipment.

### III. CONSEQUENCES OF DEVIATION

This procedure serves as an essential element in identifying and managing risk to staff associated with grain bin, silo, or tank entry activities. Ignoring this procedure could result in serious injuries, fatalities, or property damage.

### IV. RESPONSIBILITIES

The Unit Manager/Supervisor is responsible to initiate all aspects of the grain bin, silo, or tank entry standard of practice. Employees are required to be trained and implement all safe work practices associated with bin, silo, or tank entry to include immediate notification of the manager/supervisor if a hazard is encountered that cannot be controlled prior to entry causing the employee not to be able to enter the structure. If there is an issue or question regarding this written bin, silo, or tank entry program, the employee must bring these questions or concerns to the attention of top management for proper review.

### V. PROCEDURES

The following **PROCEDURES** shall be implemented before employees can enter a grain bin, silo, or tank:

- The manager/supervisor shall issue a permit for entering a grain bin, silo, or tank. The permit shall certify that the precautions contained in this standard operating procedure have been implemented **prior** to employees entering a grain bin, silo, or tank. The permit shall be kept on file until completion of the entry operations. (See Appendix A)

- Employees shall receive training in this standard operating procedure before they are permitted to enter into a grain bin, silo, or tank to include all safe work practices that includes but is no limited to: cleaning/housekeeping procedures, hot work, engulfment hazards and how to avoid them, mechanical, electrical, and fall hazards, lockout and tagout, handling of flammable or toxic substances, and ignition sources. Training shall be documented. Refresher training shall be conducted on an annual basis, and when there is a change in the standard operating procedure or nature of work, job assignment or the employee demonstrates a lack of understanding of the standard operating procedure.
- Inspect the grain bin, silo, or tank before entry. Good housekeeping practices need to be implemented to reduce fugitive grain dust on exposed surfaces to 1/8 inch or less. Note: OSHA states the 1/8 inch rule is by no means “a safe level” for grain dust. Do not use compressed air to blow dust or use any type of equipment that is an ignition hazard. Use intrinsically safe and spark resistant tools.
- All mechanical, electrical, hydraulic, and pneumatic equipment which presents a danger to employees inside a bin, silo, or tank shall be disconnected, locked-out and tagged, blocked-off, or prevented from operating by other means or methods. Do not work on or near unguarded equipment.
- Employees working inside a grain structure with a sweep auger must comply with the Sweep Auger Standard of Practice.
- The atmosphere within a grain bin, silo, or tank shall be tested for the presence of combustible gases, vapors, and toxic agents when the employer has reason to believe they may be present. Additionally, the atmosphere within a bin, silo, or tank shall be tested for oxygen content unless there is continuous natural air movement or continuous forced-air ventilation before and during the period employees are inside. If the oxygen level is less than 19.5%, or if combustible gas or vapor is detected in excess of 10% of the lower flammable limit, or if toxic agents are present in excess of the ceiling values listed in subpart Z of 29 CFR part 1910, or if toxic agents are present in concentrations that will cause health effects which prevent employees from effecting self-rescue or communication to obtain assistance, the following provisions apply:
  1. **Ventilation shall be provided** until the unsafe condition or conditions are eliminated, and the ventilation shall be continued as long as there is a possibility of recurrence of the unsafe condition while employees occupy the bin, silo, or tank.
  2. If toxicity or oxygen deficiency cannot be eliminated by ventilation, employees shall not enter the bin, silo, or tank. Any respirator use shall be in accordance to the COA Respirator Program: [http://www.ksre.k-state.edu/agsafe/manuals\\_forms/Resp%20BBBBBBBBB.PDF](http://www.ksre.k-state.edu/agsafe/manuals_forms/Resp%20BBBBBBBBB.PDF).
  3. If testing the atmosphere indicates oxygen deficiency and/or the presence of toxic and flammable gases above the specified limits, **the employee shall not enter the structure.**
  4. Manager/Supervisor must verify the procedures used to ensure atmosphere-testing equipment (to determine hazardous atmospheres) is **properly calibrated and maintained prior**

**to use. Important Note: atmospheric testing is the safest means to identify the existence of a hazardous atmosphere.**

- Employees will not enter a grain bin, silo, or tank from the top or if a grain engulfment hazard exists. If top entry is required it must be done by a contracted service provider specialized in top entry and rescue procedures.
- An **Observer** trained to summons emergency assistance shall be stationed outside the bin, silo, or tank being entered by an employee. Must be trained in first aid and CPR. Maintain communications (visual, voice or signal line) with the employee entering the bin, silo, or tank. In large structures, a second attendant maybe added to assist with communication between the first Observer and the employee inside the grain bin, silo, or tank. Must have no other assigned tasks that interfere with monitoring safety. Can never leave their post until all employees have exited the grain structure.
- **Rescue services** will be summons by the Observer contacting 911. No entry rescue will be performed by any employee. If prompt rescue services are not available the employee cannot enter the bin, silo, or tank. **Note:** the Observer must be trained in first aid and CPR.
- **Employees shall not enter a bin, silo, or tank** underneath a bridging condition or where a buildup of grain products on the sides could fall and bury them or when there is flowing grain.
- A lifeline (body harness attached) shall be of such length that it would not allow the employee to sink any further than waist deep in the grain or be allowed to drag on the floor causing entanglement.
- Employees are **forbidden to walk or work on the surface of the grain until** the employer has verified that the depth will not result in an engulfment hazard. (**Below Waist Deep**). In addition, employees are prohibited from walking down grain to make it flow. Grain depth may be analyzed based on the use and documentation to show that there have been no recent draw-offs.
- **Hot work** is prohibited inside a bin, silo, or tank unless the area has been made fire safe by the removal of combustible materials and all ignition sources. Only employees specially trained can perform hot work. Refer to the KSU Hot Work policy: <https://www.k-state.edu/safety/fire/hot-work/>.
- **Contactors providing services must adhere to the contents within this standard of practice.**

Anytime there is enough grain in a bin, silo, or tank to bury an employee up to their waist, Employees will not enter the storage space unless the grain cannot flow and has reached its point of repose. If an employee would need to enter in such a situation, the employee must be attached to a lifeline, a non-entry rescue device and a body harness which will prevent the employee from sinking farther than waist deep.

Over 80% of all grain entrapments are caused when grain is out of condition. If grain is out of condition, the employee should be aware that many additional hazard exposures are present. If entry is made, all hazards should be eliminated before entering the grain storage structure.

**Bin, Silo and Tank Entry Permit and Checklist  
Appendix A**

Bin Identification: \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_

Work Required: \_\_\_\_\_

*This permit signifies all safety precautions for the described job have been complied with and is kept on file until all the work is complete.*

**Personnel shall not enter a bin from below bridged or hung-up material!  
Before entering the bin, silo or tank, complete the following checklist:**

	YES	N/A
1. Lock-out and tag of conveying equipment .....	_____	_____
2. Atmosphere of the bins, silo or tank:		
a. Oxygen content:		
(1) Oxygen level is 19.5 percent or more (determined through testing); or .....	_____	_____
(2) Ventilation (natural or forced air) provided before and during entry; or.. .....	_____	_____
(3) Self-contained breathing apparatus provided .....	_____	_____
b. Combustible gases, vapors and toxic agents - if believed to be present:		
(1) Atmosphere tested for suspected gases; or .....	_____	_____
(2) If testing indicates:		
(a) Ventilation (natural or forced air) provided before and during entry, and atmosphere monitored during entry .....	_____	_____
(b) Appropriate personal protection provided .....	_____	_____
3. Body harness and lifeline, or boatswain's chair and lifeline provided .....	_____	_____
4. Person performing entry:		
a. Instructed on bin entry hazards .....	_____	_____
b. Trained on safety equipment operation .....	_____	_____
c. Trained on use of respiratory protection (if provided) .....	_____	_____
5. Observer:		
a. Communications provided (voice, signal line, sight, walkie talkie, other) .....	_____	_____
b. Trained in rescue procedures .....	_____	_____
c. Knows how to obtain additional emergency help .....	_____	_____
6. Rescue equipment available .....	_____	_____

***Not to be signed unless all lines of the checklist have been marked.  
All equipment used for this job has been checked for performance and/or defects.***

Signature \_\_\_\_\_  
(Person entering bin)

Signature \_\_\_\_\_  
(Observer)

Signature \_\_\_\_\_  
(Manager or authorized rep.)

Completed \_\_\_\_\_  
(Date & Time)

## Revision Log

REVISION DATE	REVISION NO.	REVISION AUTHORITY	NATURE OF REVISION
		OH&S Director	Date of Original Document Issuance

**Controlled documents are maintained electronically.**  
**Printed documents are UNCONTROLLED.**  
**Prior to relying on a printed document, verify that it is current.**