

# HARVESTORE<sup>®</sup> STRUCTURE EMERGENCY PROCEDURES

## Fire Fighting Procedures



### DANGER:

Failure to heed all of these instructions will result in serious personal injury or death.

Spontaneous combustion can occur in a Harvestore structure that contains material in the recommended moisture range only if sufficient oxygen is present. This should not happen unless there has been improper system management, installation or maintenance. Three basic rules for proper structure use are:

- Maintain proper forage and/or grain moisture content.
- Keep all access openings closed except when they must be opened for either filling or operating the unloader.
- Follow structure maintenance procedures as outlined in the structure maintenance section of the Harvestore Structure Operator's Manual.

The atmosphere normally present in a filled or partially filled Harvestore structure contains too little oxygen to support life or combustion. Fires have occurred in Harvestore structures when the roof openings and/or unloader access doors have been left open for a period of several days, or if the structure is in serious disrepair; i.e., leaking breather bags, little or no structure seam seals or foundation seals. If spontaneous combustion occurs, carbon monoxide (a toxic and potentially explosive gas) can be produced.

## Operator Instructions

If you suspect that you have a fire in your Harvestore structure follow all of these instructions.

1. Do not climb the structure.
2. Close any of the following that might have been inadvertently left open: the unloader discharge door, hood slide gate adjustment caps on top of the unloader housing, structure access door and any other openings which may be reached from the ground, including the drain cap below the door frame. When all openings to the structure are closed, which are accessible from the ground, the fire may burn itself out from the lack of oxygen.
3. Inspect for mechanical or wear through damage to the door frame or bottom of chain unloader housing.
4. Call the local fire department and advise them of your suspicion of a fire in your Harvestore structure. Fire department instructions must be provided to the fire department upon their arrival.

5. Call your authorized independent Harvestore systems dealer and report the structure condition. If continued monitoring of the structure is required it can probably be accomplished by your authorized independent Harvestore systems dealer.
6. When the fire is completely out call your authorized independent Harvestore systems dealer again and arrange for a complete maintenance check of the structure. It is recommended that the feed remaining in the structure be analyzed for nutritional content prior to feeding.

## Fire Department Instructions



### DANGER:

Do not fight fire by adding water or foam to the structure. Failure to heed all of these instructions will result in serious personal injury or death.

1. Stay off the structure as long as smoke or steam is seen coming out of the roof openings such as breather bag vents or pressure relief valves and/or rumbling and vibration of the structure is evident.
2. Do not spray water into the structure through any access opening. Water introduced through a roof opening will follow paths of least resistance through the forage, not necessarily reaching and cooling the hottest material. The water jet could also draw or force air into the structure which may already contain carbon monoxide; thus, creating a potentially explosive mixture.
3. Do not spray water onto the structure. Water sprayed on the hot sheets may damage them and will not effectively cool the material in the structure. It may however, cool the gases in the head space and may cause air to be brought in through roof openings. This additional oxygen could create an explosive mixture of gases in the head space of the structure.
4. Do not use air blown foam. The foam may introduce oxygen into a structure which may already contain carbon monoxide, thus, creating a potentially explosive mixture.
5. Check that the unloader door, structure access door, door frame drain, or any other openings that may be reached from the ground are closed. If the unloader is not installed, make sure that the lower door cover is in place and secured.

## Dealer Personnel Instructions

1. Stay off the structure as long as smoke or steam is seen coming out of the roof openings such as breather bag vents or pressure relief valves and/or rumbling and vibration of the structure is evident.
2. If there is smoke or steam coming from structure, wait 24 hours. If at that time there is still smoke or steam coming from any roof opening or the pressure relief valve, nitrogen or carbon dioxide should be introduced as follows:

- Remove the drain cap from the drain pipe at the bottom of the door frame.
- Connect a reducer bushing, pipe nipple and 90° elbow to the drain pipe. The drain pipe size is 1-1/2" NPT.
- Connect a pipe nipple and a 3/4" gas shut off valve to the elbow.
- Connect the appropriate regulator to a cylinder of nitrogen or carbon dioxide.

**IMPORTANT:**

To connect multiple cylinders of nitrogen or carbon dioxide, use a two cylinder manifold with a center mounting for a regulator.

- Connect the hose to the other end of the regulator.
- Connect the cylinder of nitrogen or carbon dioxide to the gas shutoff valve with the hose. See Fig. 1.

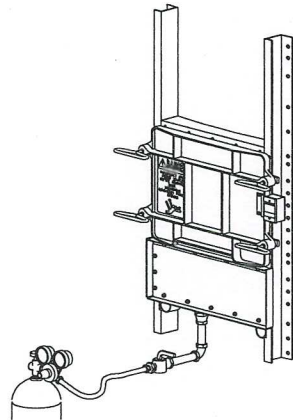


Fig. 1

- Set the pressure regulator to approximately 40 psi (276 kPa) gas pressure. Open the gas shutoff valve and inject gas into the structure. The amount of nitrogen or carbon dioxide needed will depend upon the size of the structure and fill level. Monitor the gas purging equipment to insure a uniform flow of gas.

**IMPORTANT:**

Compressed carbon dioxide or nitrogen, if introduced too quickly, may cause freezing of the valves and lines.

The following chart shows the approximate volume (in cubic feet and cubic meters) of one ring of each diameter Harvestore structure and also the weight of carbon dioxide or nitrogen which corresponds to this volume when it is released into the structure. Inject enough carbon dioxide or nitrogen gas into the structure to equal the empty volume of the structure. After purging, close the gas valve.

Nominal Structure Dia.	Volume Per Ring Ft <sup>3</sup> (m <sup>3</sup> )	CO <sub>2</sub> Gas Lb <sup>1</sup> (kg) Per Ring	Nitrogen Gas Lb <sup>2</sup> (kg) Per Ring
14'	705(20)	80 (36)	51 (23)
17'	1,015(29)	115 (52)	74 (36)
20'	1,380(39)	157 (71)	100 (45)
25'	2,280 (65)	259(117)	165 (75)
31'	3,438 (97)	390(177)	249(113)

- Wait at least 48 hours after the structure has been purged. If visible signs of the fire are still present, repurge the structure as described above.
- If the structure itself is calm (no vibrations or rumbling) and no smoke or steam is visible, climb the structure, inspect and close the roof hatches if they were open. The hatch(s) should NOT be secured down. If gas pressure subsequently builds up beyond the capacity of the relief valve(s), these covers can lift to relieve the pressure.

**Emergency Rescue Procedures**



**DANGER:**

Do not enter. Lack of oxygen and presence of toxic gases will cause immediate unconsciousness and death due to respiratory paralysis.

Harvestore structures carry signs warning persons not to enter because the structure in use does not normally contain enough oxygen to support human life.

**Rescue Squad Instructions**

Fire and rescue squads may be called upon to rescue a person who has entered a Harvestore structure. If it becomes imperative for rescue squad personnel to enter a structure, they MUST follow these steps:

- Use a NIOSH/MSHA<sup>3</sup> approved air supplying respirator.

**IMPORTANT:**

Special training is needed to use and maintain air supplying respirators. No one should use this type of equipment without this training.

- Be roped to an outside fixture.
- Be constantly attended and observed by a person outside the access opening.

- Carbon dioxide is normally sold as a liquefied gas by weight. One pound of CO<sub>2</sub> at 70°F (21°C) and standard atmospheric pressure occupies 8.8 ft<sup>3</sup> (0.25m<sup>3</sup>).
- Nitrogen is sold as a compressed gas, usually in cylinders, with a volume rating. One lb. of nitrogen at 70°F (21°C) and standard atmospheric pressure occupies 13.8 ft<sup>3</sup> (0.4 m<sup>3</sup>).
- National Institute for Occupational Safety and Health/Mine Safety and Health Administration.