Anhydrous Ammonia: Safety and the Farmer

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FERTILIZER CANADA

Anhydrous Ammonia: Safety and the Farmer

Version 2.0

Information booklet regarding the safe handling and transporting of anhydrous ammonia under the *Transportation of Dangerous Goods (TDG)* regulations.

Information provided by Fertilizer Canada (fertilizercanada.ca) and the Canadian Association of Agri-Retailers (caar.org)

This booklet provides a quick reference to topics discussed in the Anhydrous Ammonia: Safety and the Farmer training program, and enhances training in the safe-handling of anhydrous ammonia.

Please ensure that you have obtained the most recent version of this book before proceeding.

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Introduction

Anhydrous ammonia is considered a dangerous good under the *Transportation of Dangerous Goods* Regulations. Every person handling, transporting, or offering to transport ammonia must be adequately trained, and hold a valid training certificate. This legal requirement includes farmers handling the product.

To assist you in obtaining this training, we produced this training package to promote the safe handling of anhydrous ammonia at the farm level. By taking this course, and reading this booklet, you are contributing to your overall training requirements.

To complete the process, you must acquire a training certificate once you have a sound knowledge of all aspects relating to your duties as an ammonia handler. The certificate is valid for 3 years, from the date signed, after which re-certification is required. The card must be kept with you when handling anhydrous ammonia.

Further information is available at www.fertilizercanada.ca. Your local dealer or CAAR at www.caar.org can also assist you in obtaining your certification.

Transportation of Dangerous Goods Information

The *Transportation of Dangerous Goods Act* is designed to protect the public and environment from hazards associated with shipping dangerous goods. According to the Regulations, anhydrous ammonia is classified as a 2.3(8). The numbers 2.3 represent a toxic gas. The 8 indicates a corrosive subclass. The product identification number for anhydrous ammonia is UN 1005.

Markings

All units carrying anhydrous ammonia must have proper safety markings and must be present on the unit before the tanks are filled. For anhydrous ammonia nurse tanks, this includes:

1. Class 2.3 placards and the 1005 UN number must be displayed on all 4 sides of the tank. Placards must be at least 100mm in length per side. If this size of placard or label is unable to be
clearly displayed due to the irregular shape of the tank (i.e. the domed shape of the front and rear of the tank), a smaller placard/label is acceptable but cannot be smaller than 30mm in length per side.

2. The words: “Anhydrous Ammonia, Inhalation hazard” or “Ammoniac Anhydre, dangereux par inhalation” on a contrasting background in letters at least 6 mm wide and at least 50 mm high on at least 2 sides of the tank (long sides)

3. First Aid Procedures displayed on the nurse tank;

4. A slow moving vehicle sign on the rear;

5. A Max 40 kph decal on the front;

6. Safe-handling instruction decals;

7. The Canadian Registration Number (CRN#), Transport Canada Registration Number (TCRN#) or recognized equivalent specifications is legible and [illegible] to the vessel; and,

8. Tank inspection marking from a registered testing facility.

It is the law that all ammonia nurse tanks must have valid certification in order to be filled. All anhydrous ammonia nurse wagons must meet Transport Canada regulations. These regulations apply to both company and producer owned ammonia vessels. Contact your dealer or CAAR for more information.

Nurse tanks with a water capacity of less than 10,000 liters that are used in transport solely on land and are on public roads for <100 km are exempt from TDG documentation, and an Emergency Response Assistance Plan only. These tanks still require the marking listed above.

Dangerous Goods Training

Anyone handling, offering for transport, or transporting anhydrous ammonia must be properly trained, and hold a valid training certificate (Figure 1). Training certificates are only valid if they are signed by both the employer, and employee, once the employee is deemed to be adequately trained. Certification is valid for 3 years, and must be carried with you at all times. Your agri-retailer is required by law, to ask to see your valid training certificate when you pick up a load of ammonia. The certificate must also be presented to a dangerous goods inspector, upon request, when you are transporting or working with ammonia.


CAAR

Farmer Certificate of Training
Transportation of Dangerous Goods
Clear Language Regulations

Certificate Number:
Employee's Name: _____
Employee's Signature: _____
Name of Employer: _____
Employer's Address: _____
_____
Employer's Signature: _____
Date Trained: ____/____/____ Expires on: ____/____/____

This certificate indicates that

_____

is adequately trained in all aspects of handling, offering for transport, and transporting, by road and rail, anhydrous ammonia.

Canadian Association of Agri-Retailers
628-70 Arthur Street
Winnipeg, MB R3B 1G7
Phone.204-989-9300 | Fax.204-989-9306

Figure 1: Sample Training Certificate

Characteristics of Ammonia

Anhydrous Ammonia:

1. Is highly alkaline and extremely corrosive to human flesh.

2. Has a high affinity for water and will seek it out. The human body is composed of 91% water.

3. Has a strong, pungent odor. Even low concentrations will irritate the eyes, skin, and mucous membranes of the nose and mouth.

4. Boils and turns to vapour at -33°C (at atmospheric pressure).

5. Is a gas at atmospheric pressure.

6. Is lighter than air and dissipates rapidly when released into the atmosphere under normal conditions. However, with high humidity, the vapor will take on moisture and linger in low-lying areas.

7. Vapours will move with the wind. In the event of an ammonia leak, move to an upwind position immediately.

8. Is extremely corrosive to copper, zinc, brass, and galvanized steel. Use only fittings approved for anhydrous ammonia on your tanks.

Remember: Always take precautions to ensure ammonia releases to the atmosphere are minimized.

Remember: As the temperature of an anhydrous ammonia tank rises, so does the pressure. Therefore, tanks must never be filled beyond the 85% level to allow for expansion.

Anhydrous Ammonia Temperature and Pressure Relationship

The following chart provides the temperature and pressure relationship of anhydrous ammonia. The higher the temperature, the higher the pressure, therefore it is a critical consideration when filling a tank. Optimally, the tank should not be filled more than 85 per cent to allow for expansion. Hotter days may require additional tank room for expansion.

Temperature (°C)	Pressure (PSI)
-6.72	33.5
-1.02	45
4.5	58.6
10	74.5
15.61	92.9
21	114.1
26.72	138.3
32	165.9
37	191.8
42	217.7
47.7	247.3

Chemical Properties of Anhydrous Ammonia

Category	Characteristic
Chemical Designation	NH^3
Guarantee	82-0-0
Density	Liquid = 0.63249 Kg/l at 15.6°C, Vapor = 0.597 Kg/L
Odor	Pungent
Colour	Colourless
Physical State	Atmosphere = Gas, Pressure = Liquid
Boiling Point	-33.3°C
Freezing Point	-77.7°C
Affinity for Water	Very High
Corrosiveness	Very corrosive to living tissue, copper, zinc, brass, galvanized steel
Auto Ignition Temperature	651°C
Expansion Ratio	500-1
Explosive Limit	16:25% by volume

Workplace Hazardous Materials Information System 2015

In July 2015, the Workplace Hazardous Materials Information System (WHMIS 2015) was updated to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS). WHMIS 2015 is a comprehensive system for providing health and safety information on the safe use of hazardous products used in Canadian workplaces. While it will take several years to fully transition to the new system (will be mandatory by December 1, 2018), you may see a change in the hazardous material information package provided by your agri-retailer. Both WHMIS 1988 and WHMIS 2015 are federal acts and are administered provincially by the Occupational Health and Safety departments. They are separate from the TDG Act and Regulations, however, WHMIS addresses a number of agricultural products – including anhydrous ammonia.

WHMIS 1998/2015 regulations refer to anhydrous ammonia as a compressed gas, and a corrosive and toxic product.

WHMIS 1998/2015 provides information to workers about controlled products through supplier labels on the product packages, and by documents referred to as Material Safety Data Sheets (MSDS) or Safety Data Sheets (SDS). **They contain important information on first aid and product characteristics.**

If you require WHMIS 1998/2015 training, contact your local agri-retailer, CAAR, or your Provincial Safety Council. This training program does not qualify as WHMIS 1988 or 2015 training.

For more information on WHMIS 1988 or 2015, visit:
http://www.ccohs.ca/topics/legislation/WHMIS/.

Under WHMIS, any person handling a controlled product must obtain proper training that includes understanding the supplier label and M/SDS sheet, product characteristics, and first aid and emergency measures, storage procedures, etc.

See *Appendix A* for examples of:

- New GHS Sample Supplier Label
- Sample Existing WHMIS 1988 Label
- Sample SDS Sheet in the new GHS format
- Sample WHMIS 1988 Material Safety Data Sheet (MSDS)

  Note: To obtain a copy of an M/SDS sheet, contact your local agri-retailer. The M/SDS sheet must be reissued every three years, or when a change is made. Always verify the date of preparation or revision when using an M/SDS.

General Safe-Handling Procedures for Anhydrous Ammonia

It is safe to work with anhydrous ammonia as long as it is stored, transported, and handled properly. Before you begin working with ammonia, ask your dealer to explain the step-by-step procedures for anhydrous ammonia application.

1. Ensure you are always working from an upwind position.

2. Secure the tank using wheel chocks when product is being transferred to make sure it will not accidentally roll away.

3. Put on your personal protective equipment (i.e. full-face respirator, one/two piece chemical suit, neoprene gloves, and proper foot wear).

4. Make sure an ample supply of fresh water is available (minimum 20 litres).

5. Check that additional goggles, gloves, and a water bottle, are in the tank's safety kit.

6. Always handle all hoses by the valve body, not the valve wheel.

7. Prior to opening the main valves, ensure coupling are connected and bleed valves are closed.

8. Prior to disconecting couplings, be sure the main valves have been closed and the bleed valves have been opened.

9. Inspect all hoses before use for cuts, cracks or abrasions.

10. Inspect all fittings and gauges before each use.

11. Inspect nurse wagon running gear such as wheels and tires before each use.

12. Inspect nurse wagon hitch for cracks and presence of good safety chains.

13. Inspect nurse wagon for tank mounting bolts and for stress cracks in the frame.

14. Make sure all hitch pins are in good condition and have safety pins.

Warning: Before you connect or disconnect an ammonia hose put on all items of your personal protective equipment. Then make sure there is no pressure in the lines or the fittings!

Personal Protective Equipment

Safe handling of anhydrous ammonia begins with proper personal protective equipment. When working with this product, make sure you wear:

1. A full-face respirator approved with cartridges for ammonia use.

2. A one/two piece ammonia resistant chemical suit.

3. 14” gauntlet style neoprene gloves.

4. Leather/rubber CSA approved ammonia resistant boots.

Remember:

1. Make sure the cuffs on your gloves are rolled up to prevent ammonia from running onto your arms.

2. Water is the only first aid treatment for ammonia burns. Make sure all units have a minimum of 20 litres of clean fresh water mounted high enough to provide gravity flow. Handlers must keep a squeeze bottle of fresh water in their breast pocket.

3. Ensure the emergency water does not freeze when working with ammonia in the Spring or Fall. An additional 20 litre jug is recommended in the tractor cab.

4. Never wear contact lenses when working with anhydrous ammonia. If it gets trapped behind your lenses, it is impossible to remove the ammonia or the lenses.

Anhydrous Ammonia Farm Location Storage and Security

Due to increased incidents of vandalism and theft of anhydrous ammonia, take extra precautions when leaving your ammonia equipment unattended.

Remember:

1. Park ammonia nurse wagons at farm locations in a manner that will discourage tampering.

2. Secure main access valves when the tank is left unattended.

3. Always watch for signs of tampering on hoses, withdrawal valves, and bungs. Remember to approach the tank from an upwind position.

4. Arrange with your retailer to pick up empty retail-owned nurse tanks in a timely manner. Don't leave equipment unattended for extended periods.

5. In the ammonia off-season, park nurse wagons at a dealer-secured facility or park out of the general public's view; the use of valve locking devices are required. Never park or store ammonia tanks with product inside of a locked building.

Remember: If you suspect your equipment has been tampered with, call your local Police detachment, and your agri-retailer, immediately.

First Aid Guidelines

Should exposure to anhydrous ammonia occur, the following first aid procedures will help address the emergency:

1. When ammonia contacts the skin or the eye, immediately flush the areas with water for a minimum of 15 minutes to draw out the ammonia. Keep the area moist at all times.

2. If ammonia burns are extensive, submerge the individual in a water tank or place the individual in a shower, if available. Call 911 for medical attention and advise the operator of the ammonia related burn.

3. Due to the freezing action of ammonia, clothing may adhere to skin. Flush the area with water to thaw the clothing prior to removal. If burns are serious, do not remove clothing.

4. Do not use creams or salves of any kind to treat ammonia burns. Water is the only remedy. Make sure plenty of clean fresh water is available.

5. A person who has ingested ammonia should drink lots of water, or other potable liquids. Do not induce vomiting.

6. If breathing stops, begin artificial respiration, and call a health care professional to administer oxygen. Be careful not to ingest ammonia while performing mouth-to-mouth resuscitation.

7. Seek immediate medical attention for any injuries caused by exposure to ammonia. Make sure the doctor or physician is informed that this is an anhydrous ammonia related injury or burn and is provided with a M/SDS (see page 10 and Appendix A for details).

8. Keep the victim warm and at rest. Activity may aggravate respiratory problems. Watch for signs of shock.

9. People who have inhaled high concentrations of ammonia vapor should be observed by a doctor for delayed effects (e.g. edema).

10. Call 911 in an emergency and remember to keep your agri-retailer's number handy at all times. They can provide important emergency health care information (i.e. M/SDS sheets).

Additional First Aid procedures can be found on the MSDS provided by your retailer at the time of

Connecting the Nurse Tank to the Applicator Unit

purchase. Take the time to familiarizer yourself with this information before handling anhydrous ammonia.

Serious accidents can occur when connecting a nurse tank to the applicator. If you have any questions about this procedure, contact your dealer for assistance. Make sure you follow all safety guidelines listed to minimize the risks of accidents.

1. Put on your personal protective equipment (see page 12).

2. Make sure an adequate supply of water (i.e. minimum 20 litres) is available.

3. Always approach a nurse tank from the upwind position. This is extremely important when opening bleed valves and lines.

4. Make sure the liquid withdrawal valve on the nurse wagon and the hose end valve are closed. Position the applicator unit in front of the nurse tank.

5. Attach the nurse tank hitch to the applicator using a draw pin. Make sure you put the safety pin into the draw pin and secure it. Attach both safety chains.

6. Open the bleeder valve on the applicator's breakaway coupler to relieve any pressure.

7. Once pressure is relieved, shake the hose to ensure any pooled ammonia is discharged through the bleed valve.

8. Next, remove the protective cap from the breakaway coupler.

9. Before removing the liquid withdrawal hose from the nurse tank, open the bleed valve to relieve any pressure that has built up between the park plug.

10. Remove the liquid withdrawal hose from the nurse tank park plug. Handle by the valve body, not the wheel.

Warning: Never open any valve until all the pressure is released from the line via the bleeder valve.

11. Attach the hose to the breakaway coupler on the applicator, and hand-tighten securely. If the coupler does not thread easily, have the
fittings repaired by your dealer –
do not force the fittings.
12. Ensure the hose is not kinked or twisted, and will not drag on the ground during application.

13. Close the bleed valves on the breakaway coupler and the hose end valve.

14. From an upwind position, slowly open the hose end valve. Residual ammonia in the hose may fill the system - check for leaks. If a leak occurs, immediately close the valve and re-tighten the connection.

15. Slowly open the main withdrawal valve on the nurse tank. Residual ammonia in the hose may fill the system - check for leaks. If a leak occurs, immediately close the valve and re-tighten the connection. Re-open the valve and check for leaks. If you can't resolve the leak, close all valves and contact your dealer.

16. The system is now charged, and you are ready to apply ammonia. Ensure the tow vehicle is facing upwing with the applicator equipment down wind of the tow vehicle and open the flow control valve to discharge a small amount of ammonia from the applicator knives. Make sure the knives are in the ground. Ensure each knife is delivering product. A presence of frost on each line will indicate that ammonia is flowing properly. If there is an absence of frost, re-evaluate the connection.

Warning: The valves must be opened by following the proper sequence.

Open the valves slowly to prevent a pressure surge that could activate the excess flow valve, break a fitting, or rupture a hose.

Bleed Off Procedures

Always remember to close all valves when leaving the ammonia unit unattended.

Make sure you follow all safety guidelines listed to minimize the risks of accidents when bleeding-off an ammonia system. **If you have any questions about the procedure, contact your dealer for assistance.**

1. Put on your personal protective equipment (see page 12). Ensure adequate emergency water (i.e. minimum 20 litres) is available.

2. Approach the tank from the upwind direction.

3. Close the liquid withdrawal valve on nurse tank and hose end valve.

4. With the shanks in the ground (to minimize product release to the atmosphere), open the flow control valve. Pull the applicator down the field, in an upwind direction, for 2 – 3 minutes. This will drain product from the system.

5. Park upwind, lift the shanks, and turn on the flow control valve. If product remains, close the flow control valve and repeat step 4.

6. Ensure your Personal Protective Equipment is on, stand upwind and open the bleed valve on the breakaway coupler and the hose end valve, relieving any remaining pressure. If the pressure is not relieved in a reasonable amount of time (i.e. 30 seconds), ensure all valves are properly closed.

7. Drain any remaining ammonia through the bleed valve by lifting the withdrawal and applicator hoses.

The system should be drained of all product.

Disconnecting the Nurse Tank from the Applicator Unit

Serious accidents (i.e. ammonia burns) may occur when disconnecting a nurse tank from the applicator unit. **If you have any questions about the procedure, contact your dealer for assistance.** Make sure you follow all safety guidelines listed to minimize the risks of accidents.

1. Put on your personal protective equipment (see page 12).

2. Always approach a nurse tank from the upwind direction. **This is extremely important when opening bleed valves and lines.**

3. Make sure an adequate supply of water (i.e. minimum 20 litres) is available.

4. Turn off the main liquid withdrawal valve on the nurse tank, then close the hose end valve.
Bleed off all ammonia from the quick coupling and hose end valve prior to unscrewing the coupling.

5. Slowly remove the hose-end valve from the breakaway coupler

Follow the complete instructions for bleed off procedures.

Warning: Never disconnect any valve until all pressure is released from the line via the bleeder valve.

Never leave a charged applicator system unattended.

Always close the liquid withdrawal valve before leaving the machinery unattended.

Re-Coupling the Breakaway Coupler

returning it to the park plug on the nurse tank. Make sure to close the bleed valve.

6. Replace the protective cap on the breakaway coupler and close the bleed valve.

7. Remove the safety pin from the draw pin, then remove the draw pin from the applicator hitch. Make sure you support the tank's hitch to prevent it from falling on your feet.

8. Disconnect the safety chains.

If the nurse wagon and applicator are accidentally uncoupled, the excess flow valve on the nurse tank will automatically close preventing the release of ammonia. You should immediately contact your dealer for assistance. If this happens, the nurse tank hose will be pressurized. The applicator unit is usually depressurized due to the flow control valve being open when the disconnection occurs. However, make sure the entire system is bled down before attempting to reconnect the hose.
To safely reattach the tank:

1. Make sure you are working from an upwind position, you are wearing your personal protective equipment (refer to page 12), and ample fresh water is available.

2. Close the main withdrawal valve or nurse tank and hose end valve.

3. You MUST bleed off all ammonia in the system. Refer to page 17 for safe bleed-off procedures.

4. When the pressure is relieved, remove the male end of the break-away coupler from the hose end valve. Inspect all components for damage.

5. Make sure all pressure has been

Warning: Never open any valve unity until all pressure is released from the line via the bleeder valve.

relieved from the system. **If an attempt to reconnect the breakaway coupler is made with pressure in the system, an immediate release of ammonia will occur.**

6. Inspect all components for damage. If no damage is present, stand in an upwind position and reconnect the breakaway coupler.

It is very important that you follow the breakaway reconnect procedure for your specific brand of breakaway. Your dealer can help supply you with your breakaway instructions. Close the bleeder valves on the breakaway coupler and hose end value.

7. Re-attach the liquid withdrawal hose to the breakaway coupler.

8. The Excess Flow Valve on the nurse tank will reset after a few minutes. You will hear a "click". Once it opens, slowly open the hose end valve. Pay attention for leaks.

9. Slowly open the nurse tank withdrawal valve–check for leaks.

Emergency Shut Off System

The Nurse tank may also be equipped with an emergency shut off system that can be manually or automatically engaged in the event of a release.

There are a number of systems that can be used to shut down the flow of product in an emergency. Typically, an internal self-closing valve is partnered with the following mechanisms:

- Cable-pull
- Air-actuation control
- Electronic/remote-actuated control

Cable Pull

In the event of a hose separation, a cable running along the length of the hose, connecting the valve handle to the towing unit, will pull the emergency shut off valve closed as the hose stretches and breaks.

Air-Actuated Control

With this technology, a ¼" airline is attached to the valve and compressed air is used to keep the valve open. A small air compressor is kept inside the cab of the towing vehicle and is turned on during product application. In the event of an emergency, the operator can release the air pressure holding the emergency shut off valve open from inside the tractor cab, in turn closing the valve without leaving the vehicle. If the airline is pinched or gets pulled, the valve will automatically shut as the air pressure holding the valve open is released.

Remote-actuated Control

With this technology, an electronic remote can activate the valve closing. The operator can close the valve from the cab or, in the event of an incident where the operator must evacuate, the electronic

Equipment Maintenance

remote will automatically close the valve once it becomes out of communication range. The remote is to remain on the operator at all times.

Talk to your agri-retailer about the safety features available on your tank.

Regular maintenance is crucial to ensure your system is operating properly. **Maintenance should only be conducted by a trained individual. Always contact your dealer for assistance.** Have your dealer do a pre-season inspection of your equipment. You will also be required to perform daily inspections throughout the season.

You must ensure the following procedures are performed:

Breakaway Couplers

Inspect your breakaway coupler regularly to ensure that it is functioning properly. Before you connect your nurse tank to the applicator unit:

1. Inspect hoses and breakaway couplers frequently. Pay attention for worn O-rings and hoses on the nurse tank and applicator unit.

2. Ensure the coupling bracket swivels freely to allow easy turning of equipment.

3. Make sure poppet valves inside the hose valve and on the tip of the male coupler, depress and release freely. If not, have your dealer replace them immediately.

4. Check that locking balls move freely, and are free of dirt. Replace after three years or at the first sign of corrosion.

5. Lubricate the male and female breakaway coupler throughout the application season.

Flow Control Regulator

Occasionally, the screen on the flow control regulator will become clogged with dirt.
To unplug this part:

1. Make sure you work from an upwind position, you are wearing your personal protective equipment (refer to page 12), and ample fresh water is available.

2. You MUST close all valves and bleed off all ammonia in the system. Refer to page 17 for safe bleed-off procedures.

3. Remove the cap or fitting covering the flow control regulator screen. **The compartment housing the screen will contain ammonia.**

4. Remove the screen and clean any dirt. This can be done by tapping the screen, or cleaning it with a solvent (e.g. varsol), and/or air pressure. Once clean, inspect the screen to ensure it is not excessively damaged. Replace if necessary.

Warning: Never blow into the hose or the spout on the applicator shank with your mouth. Ammonia may be present and can cause sever burns.

5. Inspect the O-ring seals at the same time. They should be replaced regularly to prevent leaks. Ask you dealer for specific information on O-ring replacement.

6. Reinstall the screen, tighten the protective cap.

7. Close the bleeder valves on the hose end valve and the breakaway coupler.

8. Slowly reopen the hose end valve, then the liquid withdrawal valve, to charge the system. Pay attention for leaks.

Your agri-retailer may also provide assistance.

Shank Outlets
Shank outlets will plug under certain soil conditions. Plugged shanks are identified by a lack of frost on the hose.

Before attempting to clear a plugged shank:

1. Make sure you are working from an upwind position, you are wearing your personal protective equipment (refer to page 12), and ample fresh water is available.

2. You MUST shut off all valves and bleed off all ammonia that is in the system. Refer to page 17 for safe bleed-off procedures.

3. Position yourself upwind and slowly remove the ammonia hose from the plugged shank.

4. Use a piece of wire or tool to unplug the outlet. Pay particular attention for broken parts leading to the applicator knife. Reconnect the ammonia hose.

5. Close the bleeder valves on the hose end valve and the breakaway coupler.
6. Slowly reopen the hose end valve, then the liquid withdrawal valve, to charge the system. Pay attention for leaks.

7. Before allowing product to flow to the applicator knives, make sure the unit is positioned so that any ammonia released is carried away from the applicator and tractor, and risk of exposure to others is minimized.

8. Open the flow control valve. Ammonia should be flowing in the line that was plugged – watch for a presence of frost. If ammonia is not flowing, repeat Steps 1– 8, or replace the shank.

Nurse Wagons
On a daily schedule, always inspect the running gear of the nurse wagon: This includes the tires, lug nuts, wagon frame, hitches, breakaway coupler, frame bolts, and safety chains. Be sure to inspect the hoses and gauges, as well.

Remember: Chaining a tank to the wagon in unacceptable and dangerous.

- Make sure the hitch bolts are in good condition and tight. Inspect hitch welds for stress cracks.
- Ensure that the drawbar tongue is in good shape and that the hole is still round.
- Check for the presence and the condition of the chains.

- Check mounting bolts for securing tank to the wagon. They need to be tight and in good condition.
- Check springs to ensure there are no broken leaves in the spring pack. Some wagons will have Torflex axles with no visible components to inspect.
- Inspect welds holding spindles to the frame for cracking.
- Grease the fifth wheel. Check condition of fifth wheel pin.
- Inspect nurse wagon tires for wear and check wheels for studs being properly torqued.
- Inspect nurse wagon for stress cracks in the frame.

Yearly maintenance includes all of the aforementioned verifications plus other items such as:

- Paint, decal and markings maintenance or replacement
- Valve replacement
- Hose testing
- Tank inspection and periodic testing

It is best practice to conduct a complete tear down of the nurse wagon every 5 years in order to properly inspect all components that contribute to the safe operation of the application process.

Contact your dealer for assistance or information on this critically important maintenance.

Safe Transportation

Our commitment is to protect you, your family, your employees and the general public from the hazards of an accidental spill or leak. Dealers will ensure the equipment used to transport anhydrous ammonia is in good working condition. However, situations may still occur on roadways and in the fields when handling anhydrous ammonia.

A number of rollovers have been reported due to turning too sharp in the fields. To avoid this situation

Incident Prevention

we recommend additional headlands to eliminate sharp turns.

The second leading cause of incidents is the use of cellphones while operating farm equipment. Do not use a cellphone while operating equipment to ensure your attention is fully focused on safe operation.

Other Common Incidents where the operator:

- Accidentally knocked a hose end valve open.
- Moved a nurse tank without disconnecting the filling hose.
- Continued to use worn-out hoses, which eventually rupture without warning.
- Didn't bleed hose couplings before disconnecting resulting in product discharge.
- Was not upwind when bleeding off lines.
- Reconnected breakaway coupler without properly bleeding the system.
- Did not wear proper personal protective equipment (always wear the equipment when handling anhydrous ammonia product).
- Did not release pressure in the line before cleaning a plugged shank.
- Fails to properly maintain the nurse tank, fixtures and chassis.

Remember: Treat anhydrous ammonia with respect. Never rush or take shortcuts when working with this product.

Anhydrous ammonia can cause serious injury to humans and the environment. **Ensure all ammonia releases to the atmosphere are minimized.** Do your part to prevent ammonia accidents. Make sure you:

1. Are well-versed on the product and its characteristics.
2. Know your equipment and its limitations.
3. Seek proper training for yourself and your employees.
4. Ensure that your equipment is well-maintained.
5. Always wear your personal protective equipment.
6. See, think, and act your way to safety.

Emergency Response and Incident Reporting

Emergency Response
Should an accident or incident occur involving anhydrous ammonia such as a leak, spill, or rollover, the first priority is the safety for yourself, your employees and your neighbours.

All incidents MUST be reported to ensure compliance with environmental and other government regulations. Your agri-retailer can assist you in contacting the appropriate authorities, but it is ultimately your responsibility.

In the event of incident involving an uncontrolled leak, take the following steps:

1. Face the tractor upwind, proceed upwind and call for assistance.
2. Evacuate the area immediately – DO NOT WALK THROUGH THE VAPOUR CLOUD.
3. Neighbours should be notified immediately. Evacuation or Shelter in Place may be required.

4. Call 911 Police and Fire department. Inform them that anhydrous ammonia is involved. Ambulance must also be contacted if serious injuries are sustained.
5. Contact the Emergency response line listed on the side of the tank or documents provided from your local dealer.
6. CANUTEC is a service that Transport Canada offers to assist emergency response. They are knowledgeable of many dangerous goods and can provide information during an incident.
7. Some tanks carrying anhydrous ammonia may require a registered Emergency Response Assistance Plan (ERAP). Talk with your dealer about the resources available to you.

Incident Reporting

Everyone handling, transporting, or offering to transport ammonia must comply with the *Transportation of Dangerous Goods* Regulations. The *Transportation of Dangerous Goods Act and Regulations* is federal legislation which places legal responsibilities on handles, transports or offers to transport of anhydrous ammonia, including farm producers, the end user of anhydrous ammonia.

Emergency (Immediate) Report

An *Emergency Report* is required for any release or anticipated release submitted to the local authority that is responsible for responding to emergencies at the geographical location of the release or anticipated release. The TDG regulations requires the submission of an Emergency Report for the release of any quantity of ammonia, or any quantity that could be released. This is a change from the previous requirements where a report would be required only if the tank leaked for a period of 10 minutes or more.

Examples of releases or anticipated releases include but are not limited to:

- Damaged tank
- Pinhole leak
- Nurse tank roll over/accident
- Hose break
- Leaky valve
- Etc.

Information required in an *Emergency report* is as follows:

- the name and contact information of the person making the report;
- in the case of an anhydrous ammonia release, the date, time and geographic location of the release;

- in the case of an anticipated release of anhydrous ammonia, the date, time and geographic location of the incident that led to the anticipated release;
- the mode of transport used;
- the shipping name (anhydrous ammonia) or the 1005 UN number;
- the quantity of anhydrous ammonia that was in the means of containment before the release or anticipated release;
- in the case of a release of anhydrous ammonia, the quantity estimated to have been released; and
- if applicable, the type of incident leading to the release or anticipated release, including a collision, roll-over, derailment, overfill, fire, explosion or load-shift.

Release or Anticipated Release Report

- A report of the release or anticipated release for which an Emergency report was prepared and submitted, is required to be submitted as soon as possible to CANUTEC and the consignor of the anhydrous ammonia only if the release or anticipated release did not result in the following:
- the death of a person;
- a person sustaining injuries that required immediate medical treatment by a health care provider;
- an evacuation of people or their shelter in place; or
- the closure of:
    - a facility used in the loading and unloading of anhydrous ammonia; or
    - a road, main railway line or main waterway.

A Follow up report is also required if the tank has been damaged to the extent that the integrity is compromised.

The information required in the follow up report is as follows:

- the name and contact information of the person making the report;
- in the case of an anhydrous ammonia release, the date, time and geographic location of the release;
- in the case of an anticipated release of anhydrous ammonia, the date, time and geographic location of the incident that led to the anticipated release;
- the mode of transport used;
- the shipping name (anhydrous ammonia) or the 1005 UN number;
- the quantity of anhydrous ammonia that was in the means of containment before the release or

anticipated release;
- in the case of an anhydrous ammonia release, the quantity estimated to have been released;
- if applicable, the type of incident leading to the release or anticipated release, including a collision, rollover, derailment, overfill, fire, explosion or load-shift;
- if applicable, the name and geographic location of any road, main railway line or main waterway that was closed;
- a description of the means of containment containing anhydrous ammonia (nurse tank);
- if applicable, an estimate of the number of people evacuated or sheltered in place; and
- if applicable, the number of deaths and the number of persons who sustained injuries that required immediate medical treatment by a health care provider.

30-Day Follow Up Report

If you have made a *Release or Anticipated Release* report, a *Follow Up* report is required to be prepared and submitted to Transport Canada's Director General within 30 days of the after the day the release or anticipated release report was made. The report is required to include the following information:

a. the name and contact information of the person making the report;
b. the names and contact information of the consignor, consignee and carrier;
c. in the case of an anhydrous ammonia release, the date, time and geographic location of the release;
d. in the case of an anticipated release of anhydrous ammonia, the date, time and geographic location of the incident that led to the anticipated release;
e. the mode of transport used;
f. the classification of the anhydrous ammonia (Class 2.3);
g. the quantity of anhydrous ammonia that was in the means of containment (tank) before the release or anticipated release;
h. in the case of an anhydrous ammonia release, the quantity estimated to have been released;
i. a description of the means of containment containing anhydrous ammonia (nurse tank);
j. if applicable, a description of any failure of or damage to the means of containment;
k. information about the events leading to the release or anticipated release of anhydrous ammonia;
l. information as to whether there was an explosion or fire;
m. the name and geographic location of any facility used in the loading or unloading of anhydrous ammonia that was closed, and the duration of the closure;
n. the name and geographic location of any road, main railway line or main waterway that was closed, and the duration of the closure;

o. if applicable, an estimate of the number of people evacuated or sheltered in place and the duration of the evacuation or shelter in place;
p. if applicable, the number of deaths and the number of persons who sustained injuries that required immediate medical treatment by a health care provider;
q. if applicable, the ERAP reference number;
r. the date on which *the release or anticipated release* report was made; and
s. an estimate of any financial loss incurred as a result of the release or anticipated release, and any emergency response cost or remediation costs related to it.

The *Follow Up report* must be kept by the person making the report for at least two (2) years after the day on which it was made. You will also have 15 days to provide the report to a Transport Canada inspector from the time you receive a written request from the inspector. Any changes to the report relating to items: (f), (i), (j), (k), (l), (p), or (s) within one year after the day on which the follow up report was made must be brought to the attention of the Director General as soon as possible.
Please refer to the TDG Regulations Part 8: **https://www.tc.gc.ca/eng/tdg/clear-part8-379.htm**

Contact your Agri-retailer, Fertilizer Canada, or CAAR for more information.

Environmental Reporting
Releases of ammonia into the environment may require to be reported to the provincial ministry of environment. Visit your provincial ministry of environment's website for reporting requirements and contact information.

***Emergency Response Assistance Program* (ERAP)**
Anhydrous Ammonia is one of the many dangerous goods that require an ERAP intended to provide resources in the event of an incident. There is an exemption for tanks that have a water capacity of 10,000L or less.

For more information on ERAPs, please visit Transport Canada's website:
https://www.tc.gc.ca/eng/tdg/erap-menu-72.htm

Your agri-retailer may also be able to answer any questions.

Keep a list of your important phone numbers near the tank:
Part 8.1 of the TDG Regulation list the authorities that must be contacted. Visit the website and fill in your local emergency contacts to ensure you are prepared in the event of an emergency.

Emergency Contacts	
911	
Emergency Response # or Agri-Retailer	
Ambulance	
Police	
Fire Department	
Other emergency contacts / personnel	

Notes

Notes

Appendix A

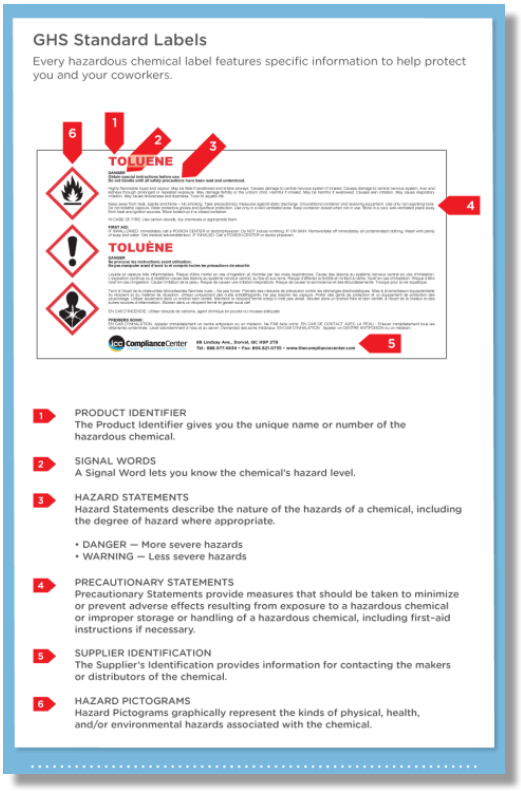


Fig 2. New GHS Sample SupplierLabel

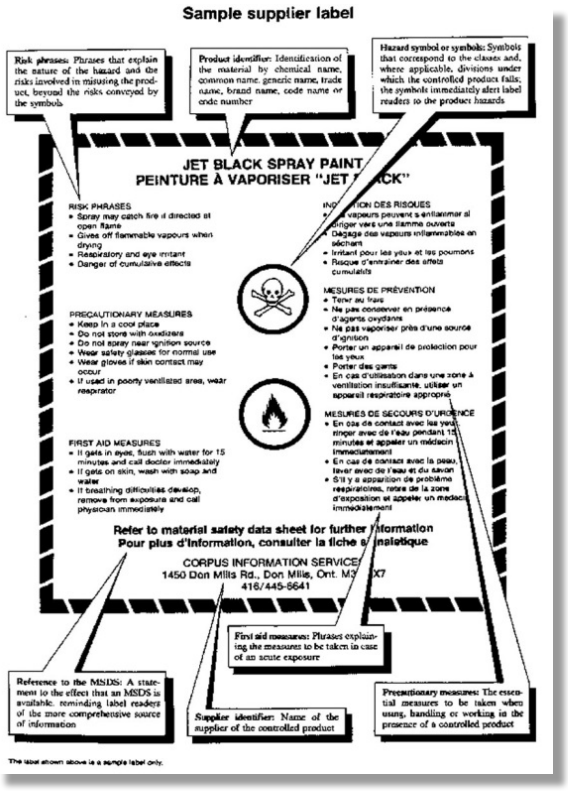
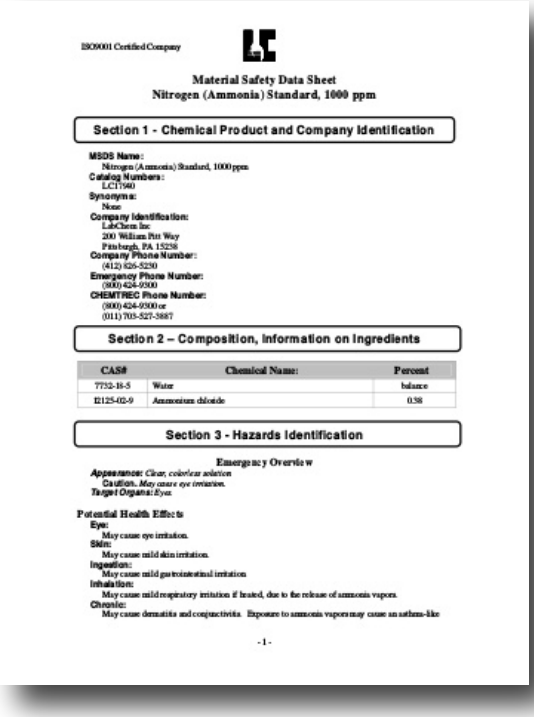


Fig. 3 Sample Existing WHMIS 1988 Label


ISO9001 Certified Company

Material Safety Data Sheet
Nitrogen (Ammonia) Standard, 1000 ppm

Section 1 - Chemical Product and Company Identification

MSDS Name:
Nitrogen (Ammonia) Standard, 1000 ppm
Catalog Numbers:
LC11960
Synonyms:
None
Company Identification:
LabChem Inc
200 William Pitt Way
Pittsburgh, PA 15238
Company Phone Number:
(412) 826-5230
Emergency Phone Number:
(800) 424-9300
CHEMTREC Phone Number:
(800) 424-9300 or
(011) 703-527-3887

Section 2 – Composition, Information on Ingredients

CAS#	Chemical Name:	Percent
7732-18-5	Water	balance
12125-02-9	Ammonium chloride	0.98

Section 3 - Hazards Identification

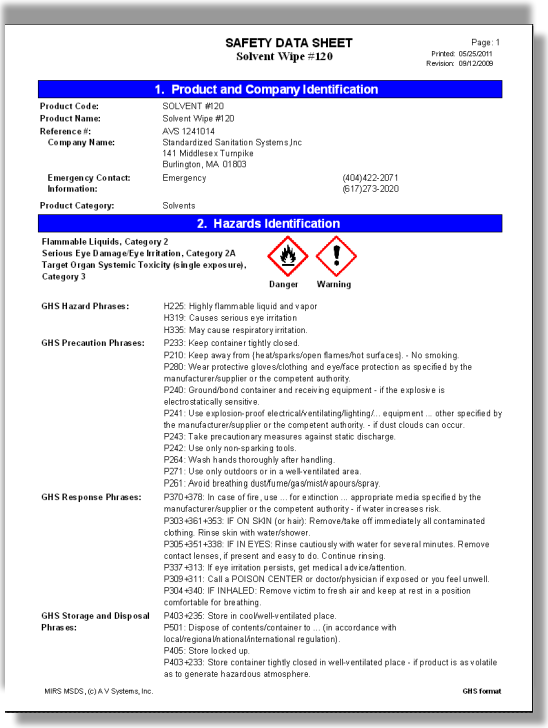
Emergency Overview

Appearance: *Clear, colorless solution*
Caution. *May cause eye irritation.*
Target Organs: *Eyes.*

Potential Health Effects
Eye:
May cause eye irritation.
Skin:
May cause mild skin irritation.
Ingestion:
May cause mild gastrointestinal irritation
Inhalation:
May cause mild respiratory irritation if heated, due to the release of ammonia vapors.
Chronic:
May cause dermatitis and conjunctivitis. Exposure to ammonia vapors may cause an asthma-like

- 1 -

Fig 4. Sample WHMIS 1988 Material Safety Data Sheet


SAFETY DATA SHEET
Solvent Wipe #120

Page: 1
Printed: 05/25/2011
Revision: 09/12/2009

1. Product and Company Identification

Product Code: SOLVENT #120
Product Name: Solvent Wipe #120
Reference #: AVS 1241014
Company Name: Standardized Sanitation Systems,Inc
141 Middlesex Turnpike
Burlington, MA 01803
Emergency Contact Information: Emergency (404)422-2071 (617)273-2020
Product Category: Solvents

2. Hazards Identification

Flammable Liquids, Category 2
Serious Eye Damage/Eye Irritation, Category 2A
Target Organ Systemic Toxicity (single exposure), Category 3

Danger Warning

GHS Hazard Phrases:
H225: Highly flammable liquid and vapor
H319: Causes serious eye irritation
H335: May cause respiratory irritation.

GHS Precaution Phrases:
P233: Keep container tightly closed.
P210: Keep away from (heat/sparks/open flames/hot surfaces). - No smoking.
P280: Wear protective gloves/clothing and eye/face protection as specified by the manufacturer/supplier or the competent authority.
P240: Ground/bond container and receiving equipment - if the explosive is electrostatically sensitive.
P241: Use explosion-proof electrical/ventilating/lighting/... equipment ... other specified by the manufacturer/supplier or the competent authority. - if dust clouds can occur.
P243: Take precautionary measures against static discharge.
P242: Use only non-sparking tools.
P264: Wash hands thoroughly after handling.
P271: Use only outdoors or in a well-ventilated area.
P261: Avoid breathing dust/fume/gas/mist/vapours/spray.

GHS Response Phrases:
P370+378: In case of fire, use ... for extinction ... appropriate media specified by the manufacturer/supplier or the competent authority - if water increases risk.
P303+361+353: IF ON SKIN (or hair): Remove/take off immediately all contaminated clothing. Rinse skin with water/shower.
P305+351+338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337+313: If eye irritation persists, get medical advice/attention.
P309+311: Call a POISON CENTER or doctor/physician if exposed or you feel unwell.
P304+340: IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.

GHS Storage and Disposal Phrases:
P403+235: Store in cool/well-ventilated place.
P501: Dispose of contents/container to ... (in accordance with local/regional/national/international regulation).
P405: Store locked up.
P403+233: Store container tightly closed in well-ventilated place - if product is as volatile as to generate hazardous atmosphere.

MIRS MSDS, (c) A.V Systems, Inc. GHS format

Fig 5. Sample SDS Sheet in the new GHS format