MINNESOTA DEPARTMENT OF AGRICULTURE
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FACT SHEET

ANHYDROUS AMMONIA

Storage Facility Physical/Traffic and Tampering Protection Requirements

Physical/Traffic Storage System Protection

Minnesota Rules (Parts 1513.0160 and 1513.0370) requires that storage systems (storage tanks, piping, and appurtenances) be located or protected by suitable barriers so as to avoid physical damage that might result from impact by moving machinery, automobiles, trucks, or any other equipment at the facility.

Protection Model Design Considerations

In developing adequate protection models, a "typical" situation was considered. Barriers utilized in providing protection must deflect/repel/withstand a vehicle impact equivalent to a standard size pickup truck towing a full 1000-1500 gallon NH3 nurse tank at a speed of 5-10 mph. Another consideration is the cost effectiveness associated with materials used to provide suitable protection models. For this reason, specified protection models (curb and post protection models) were developed.

However, higher levels of protection must be provided whenever larger equipment, vehicles, etc. routinely travels in a storage system area.

Curb Protection Model

1. Consist of a barrier sixteen (16) inches high and eight (8) inches wide;
2. Construct of a durable material (i.e. concrete, etc.) able to deflect/repel/withstand impact of a vehicle, etc.;
3. Anchor with metal stakes going to a depth of two (2) feet below ground level;
4. For curb structure less than three (3) feet in height: Install warning markers (i.e. light duty posts/rebar, etc. painted with a contrasting color), positioned every five (5) feet, and at a minimum height of three (3) feet from ground level. Warning markers serve to alert those operating vehicle or equipment in the area of the storage system where curbing/tank/appurtenances are located;
5. Allow adequate spacing [maximum spacing of three (3) feet] between each curb structure to ensure accessibility to and from storage system; and
6. Position curb structures three (3) feet from storage system. When space is limited, making it difficult to accommodate the three (3) foot setback distance, contact the MDA area Inspector or St. Paul office. Images, drawings, photos, or digital photos may prove helpful and may be requested.

Figures 1 and 2 *(see page 2)* illustrate the curb protection model.

Post Protection Model

1. Four (4) inch concrete filled steel piping;
2. Position three (3) feet above ground level;
3. Bury to a depth of four (4) feet below ground level with twelve (12) inch diameter concrete foundation;
4. Space at four (4) foot intervals or ten (10) foot intervals when posts are connected together by means of a highway rated barrier. If post/barrier protection is installed allow adequate spacing [maximum of three (3) feet] between each structure to ensure accessibility to and from storage system.
5. Position post or post/barrier proctection three (3) feet from storage system. When space is limited making it difficult to accommodate the three (3) foot setback distance, contact the MDA area Inspector or St. Paul office. Images, drawings, photos, or digital photos may prove helpful and may be requested.

Figures 3, 4, and 5 *(see page 2)* illustrate the post protection model.

Combination or Other Models of Physical/Traffic Protection

A combination of curb and post protection, as specified for each model, may be used to provide adequate storage system protection. Other equivalent protection may be used. Contact the MDA area Inspector or St. Paul office for more details. Images, drawings, photos, or digital photos may prove helpful and may be requested.

Figure 1. *Overhead view of curb protection model, where curbing and warning markers (solid circles) are used. Spacing between barriers for accessibility is not illustrated.*

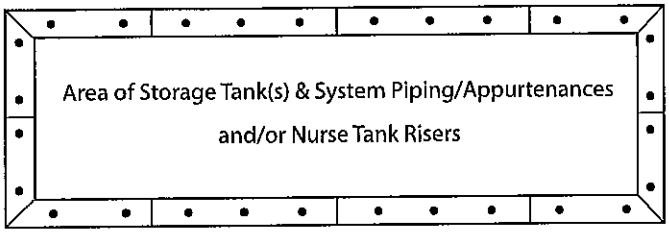
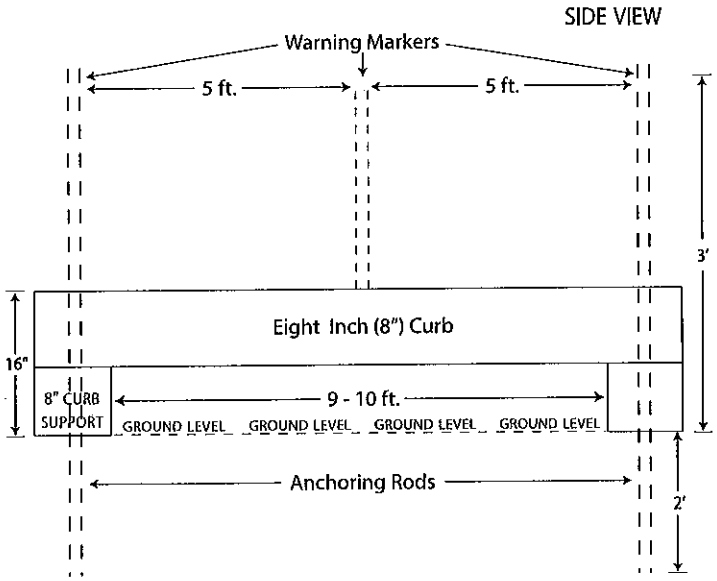
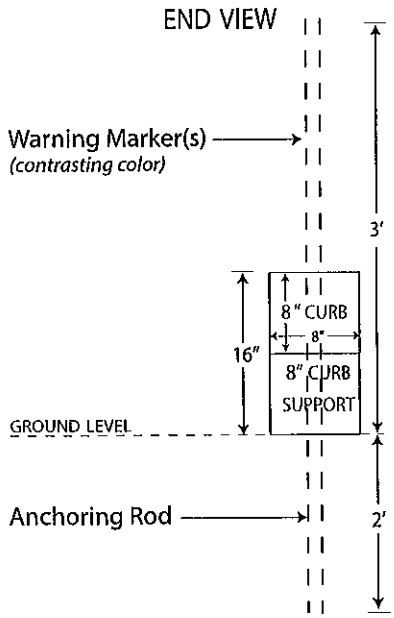


Figure 2. *Side view of an 8 inch high by 6 inch wide protective curb. Note the use of anchoring rods as warning markers.*





Physical/Traffic Protection Is Not Required When:

1. Areas of a storage system are inaccessible to moving machinery, vehicles, etc.
2. Barriers are installed to prevent the entrance to areas of a storage system by moving machinery, vehicles, etc.; and
3. Other equivalent barriers (reinforced elevated walkway/ platform, dike, etc.) are present, preventing entrance by moving machinery, vehicles, etc.

Accessibility

Regardless of the 'model' of protection used it is important to allow access to and from a storage system for authorized personnel and emergency responders. For example, barrier structures used for protecting a storage system must accommodate adequate accessibility *(i.e. spacing between barrier structures, etc.)*.

Figure 3 & 4. *Overhead views of post protection model.*

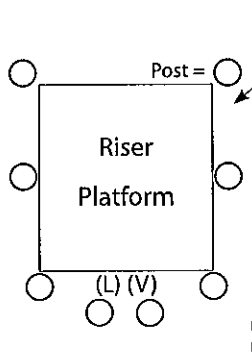


Figure 3

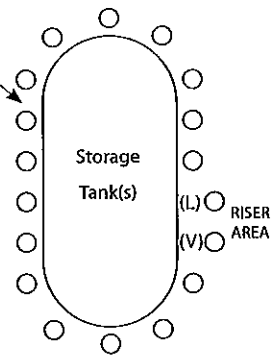
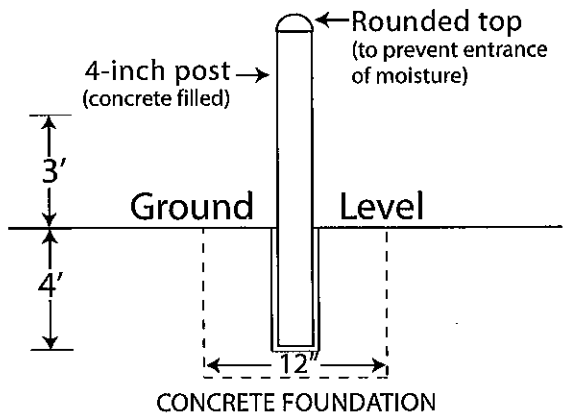


Figure 4

Figure 5. *Side view of post specifications:*



Tampering Protection for Storage Tank Main Shutoff and Riser Hoses End Valves

Minnesota Rules (Part 1513.0370) requires that storage tank main shut-off valves and riser hose end valves must be kept closed and locked when the installation is unattended. Valve locks are not required if area where main tank shut-off and riser hose end valves is fenced. See figures 6 and 7 illustrating valve lock outs.

Figure 6 & 7. Devices used to "lockout" storage tank main shut-off and riser hose end valves:

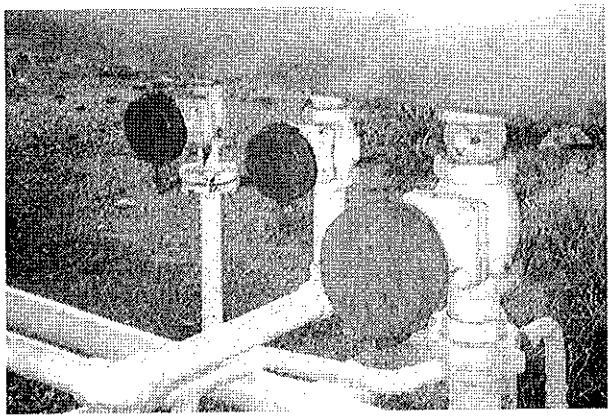


Figure 6: Individual main shutoff valve lockouts

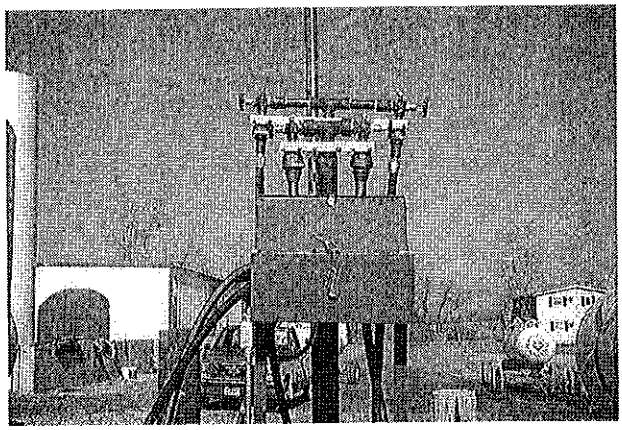


Figure 7: Standard riser hose end valve lockout box

Questions or Requesting Guidance

Contact/email the MDA area Inspector or St. Paul office at 651-201-6275, e-mail: Ed.Kaiser@state.mn.us