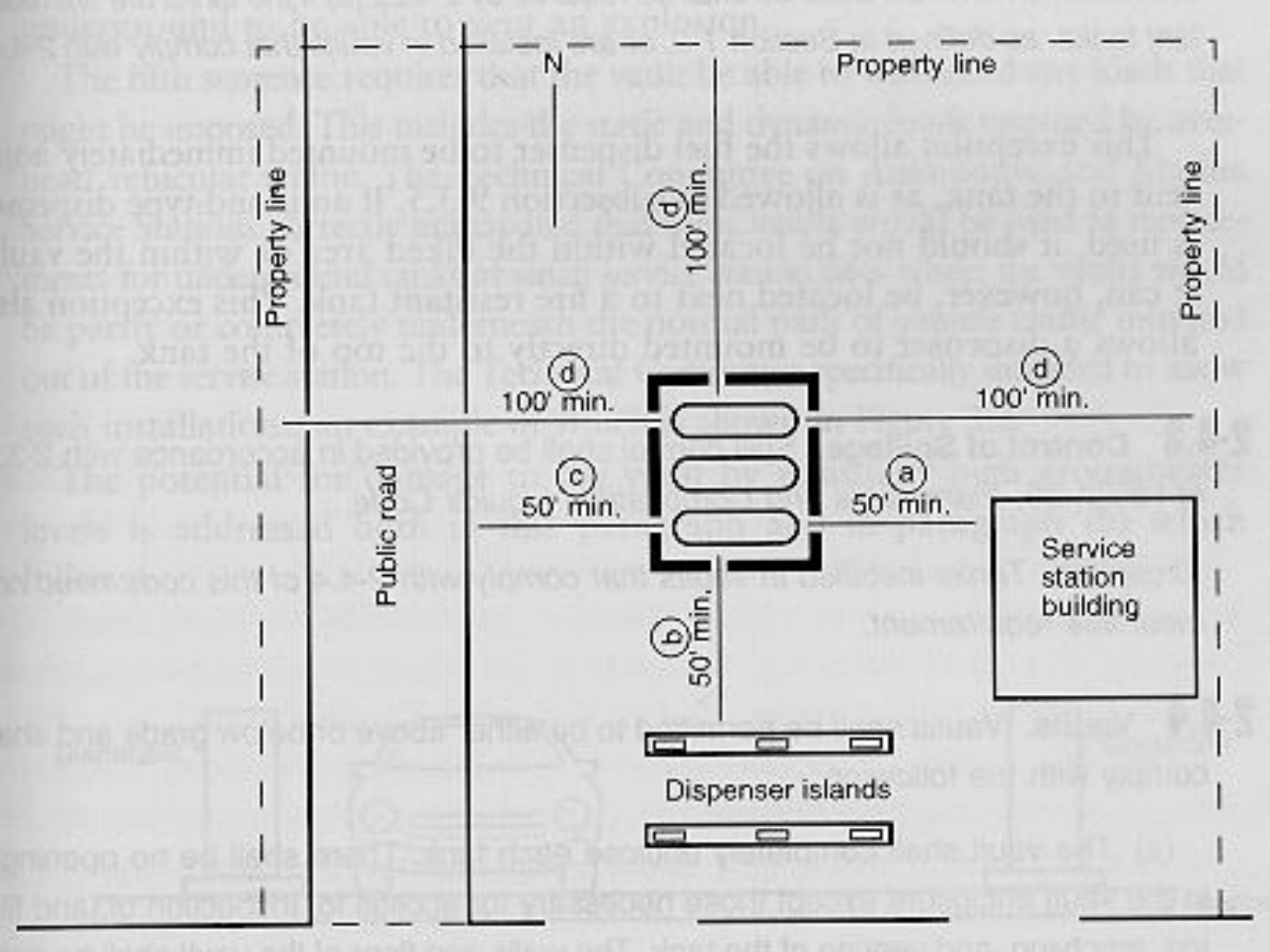
Shop Fabricated AST Inspection Regulations

Missouri Department of Agriculture
Weights, Measures & Consumer Protection
Petroleum/Propane/Nh3

Location of Storage Tanks

- Aboveground tank distance requirements
  - 50 ft. from the nearest important building on the same property.
  - 50 ft. from any fuel dispenser.
  - 50 ft. from the nearest side of a public way.
  - 100 ft. from any property line that is or might be built upon, including the opposite side of a public way.
  - * Exception: all distances shall be permitted to be reduced by 50% if the tanks are fire resistant which is a listed tank that provides fire resistive protection from exposures to a high intensity liquid pool fire. (ex: UL 2085)


N
Property line
Property line
Property line
d
100' min.
d
100' min.
d
100' min.
c
50' min.
a
50' min.
Public road
b
50' min.
Service station building
Dispenser islands

Distance from Power Lines

- 2 CSR 90-30.050 (19)
- Aboveground storage tanks shall not be installed under any electrical lines or transformers.
- All aboveground storage tanks shall maintain a minimum horizontal distance of 10 ft. from any overhead power line or transformer.


DIESEL
FUEL
NO 2


NFPA 30 2-3.3.6 The minimum horizontal separation between an LP-Gas container and a Class I, Class II, or Class IIIA liquid storage tank shall be 20 ft.

Areas subject to Flooding

- NFPA 30 2-6.6
- Where a tank is located in an area subject to flooding, provisions shall be taken to prevent tanks, either full or empty, from floating during a rise in water level up to the established maximum flood stage.
- Each vertical tank shall be located so that it's top extends above the maximum flood stage by at least 30 percent of it's allowable storage capacity.

- Horizontal tanks located so that more than 70% of the tanks storage capacity will be submerged at the established flood stage shall be anchored; shall be attached to a foundation of concrete or of steel and concrete of sufficient weight to provide adequate load for the tank when filled with flammable or combustible liquid and submerged by flood water to the established flood stage; or shall be adequately supported from floating by other means. Tank vents or other openings that are not liquid tight shall be extended above maximum flood stage water level.

Areas subject to flooding

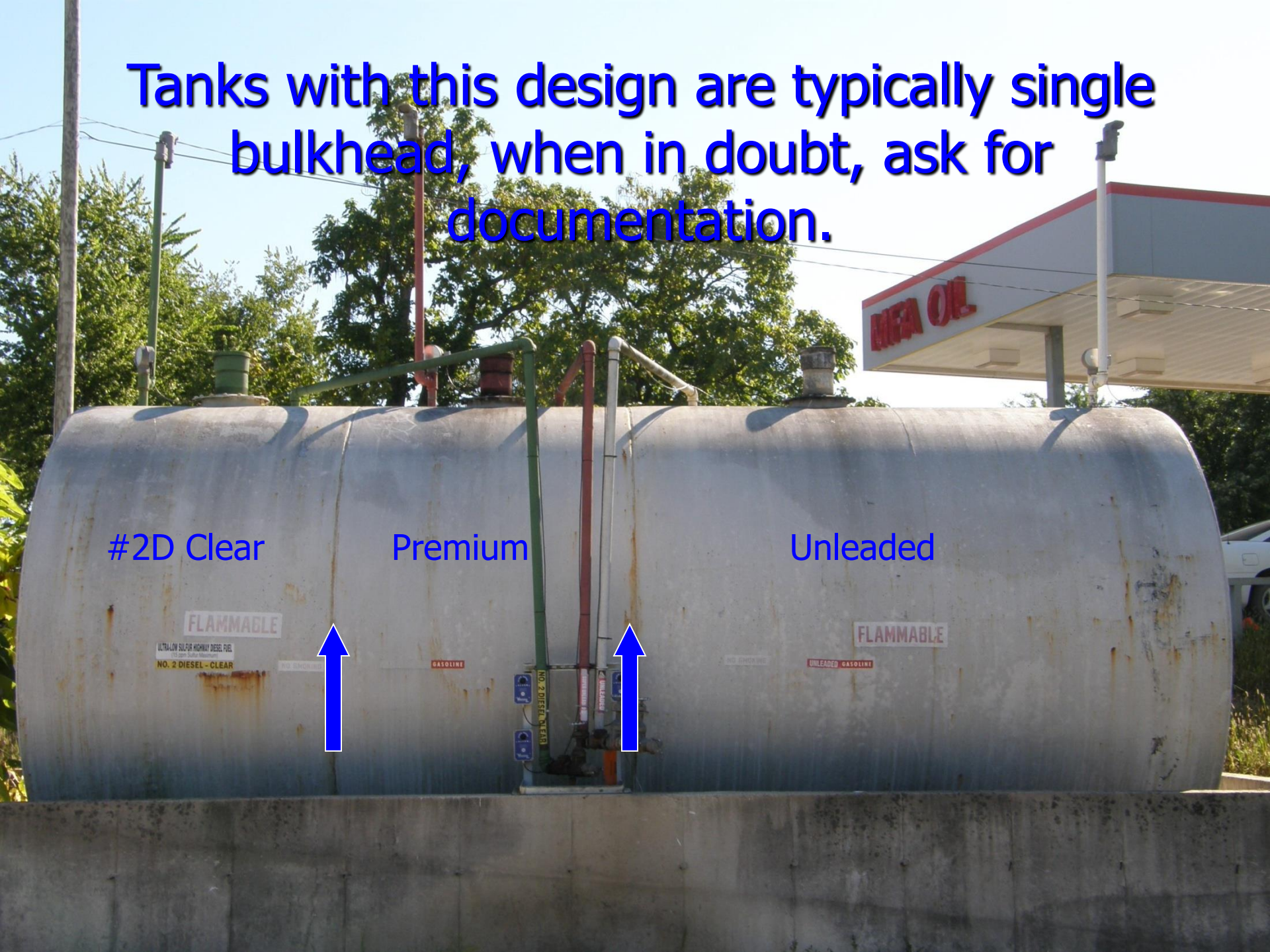
Double Compartment Tanks

- All aboveground storage tanks utilizing compartments and storing different classes of products shall be constructed with a double wall center bulkhead with means of interstitial monitoring. This may be accomplished using an interstitial drain which must be kept closed at all times, except for draining condensate or checking for leakage or failure of the bulkhead.


AV GAS
NO SMOKING
WE-MAC
800-444-3218
FLAMMABLE
JET A
AIRPORT OPERATIONS AREA
RESTRICTED AREA KEEP OUT
AVIATION FUEL STORAGE FACILITY
AV gas
Jet A

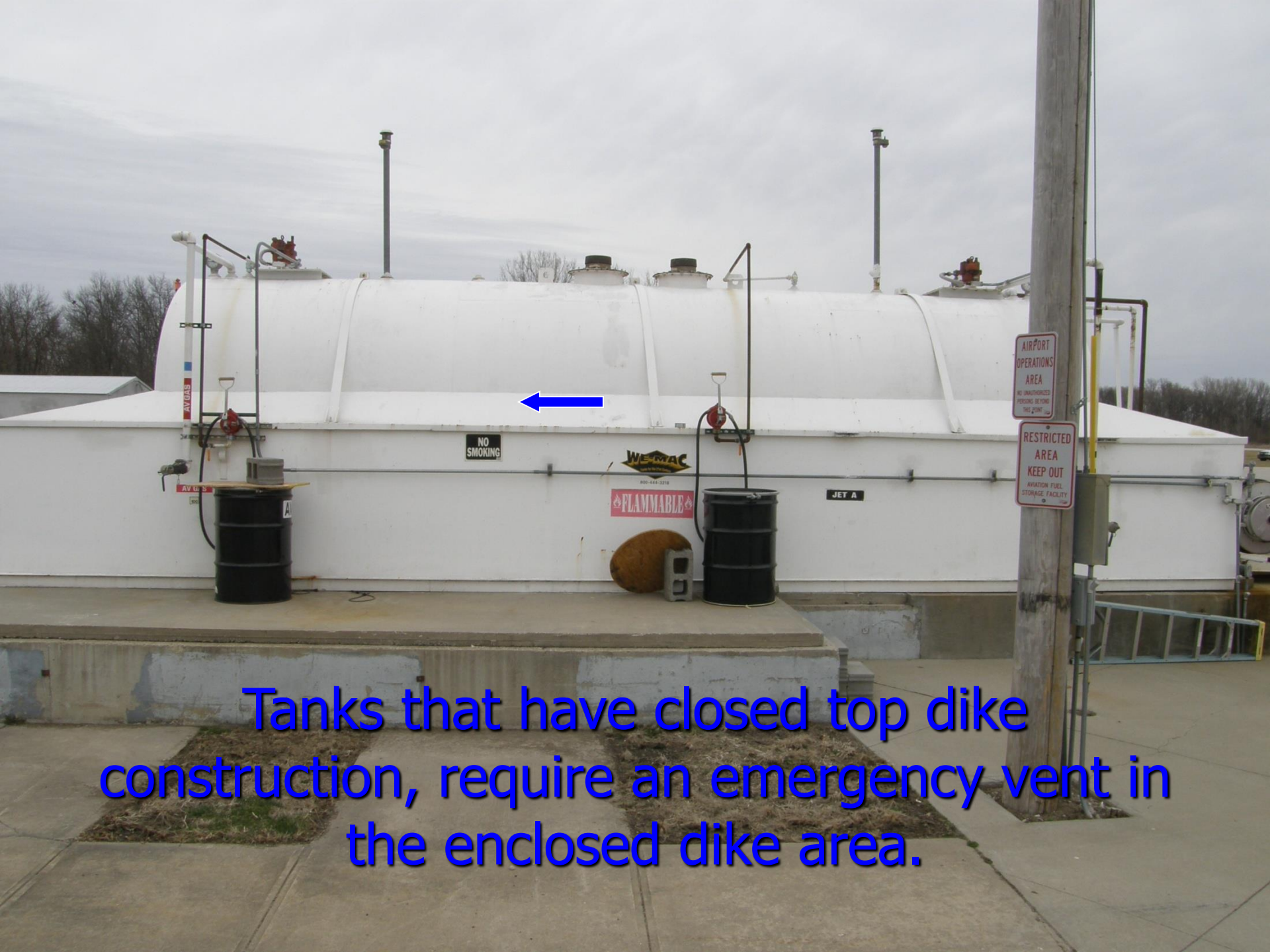

1993
UNLEADED
5,300 GAL
1300 GAL.

Tanks with this design are typically single bulkhead, when in doubt, ask for documentation.



Emergency Venting

- NFPA 30 2-3.6.1
- Except as provided in 2-3.6.2, every aboveground storage tank shall have some form of construction or device that will relieve excessive internal pressure caused by exposure fires. This requirement shall also apply to each compartment of a compartmented tank, the interstitial space (annulus) of a secondary containment type tank, and the enclosed space of tanks of closed top dike construction. Spaces or enclosed volumes, such as those intended for insulation, membranes, or weather shields, that can contain liquid because of a leak from the primary vessel and can inhibit venting during fire exposure shall also comply with this subsection.



Tanks that have closed top dike construction, require an emergency vent in the enclosed dike area.

Definition of Emergency Venting

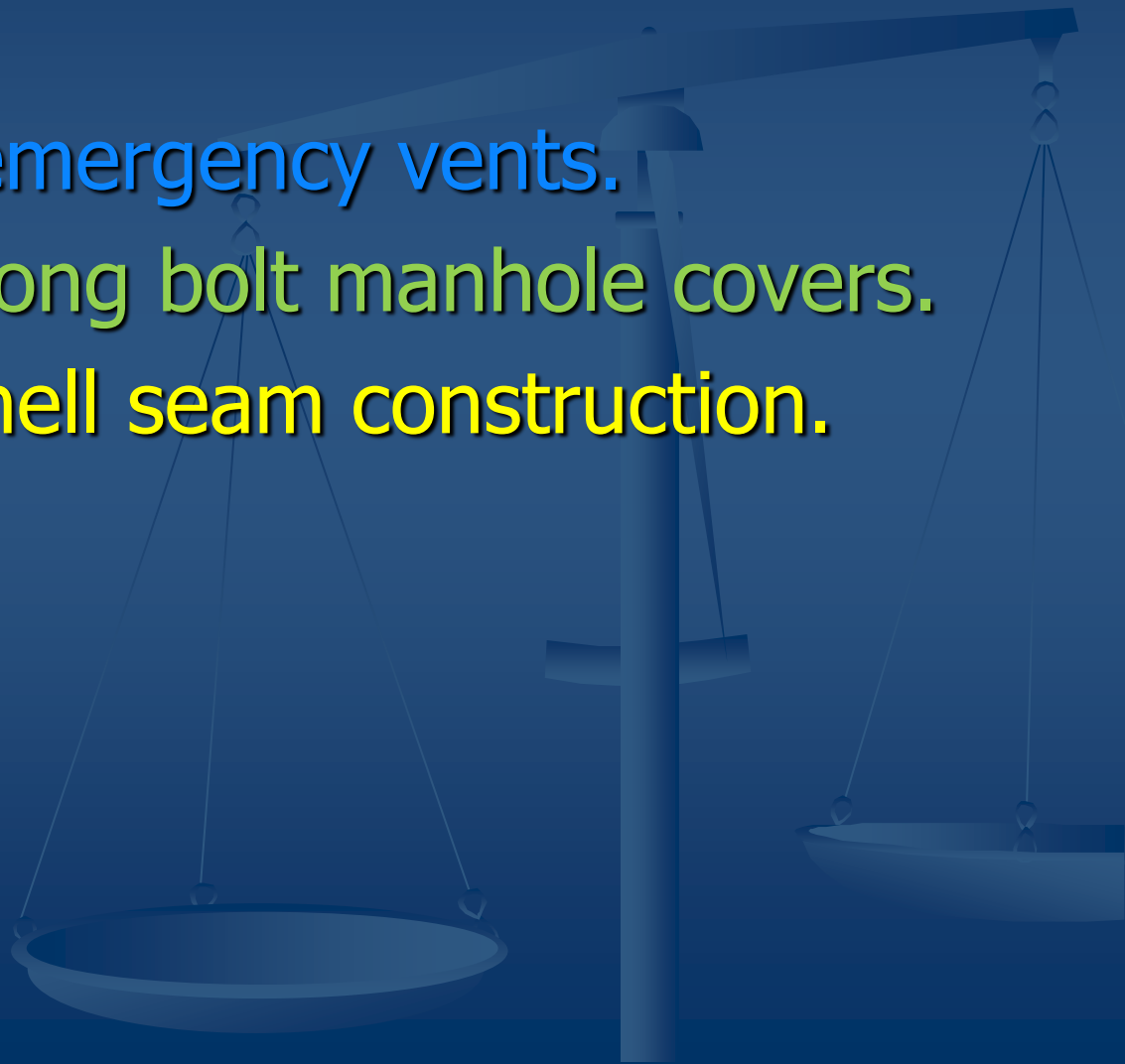
- NFPA 30 defines emergency relief venting as:
- An opening, construction method, or device that will automatically relieve excessive internal pressure due to an exposure fire.
- Adequate emergency relief venting on all AST's, is the most important lifeline to all emergency responders.

Emergency Venting Calculation

- Emergency venting calculations are based on the approximate wetted surface area of the storage tank.
- Example: A 10’ diameter 18’ tall vertical tank would have 565 ft^2 of wetted surface area.
- This tank would require 392,000 CFH (Cubic Feet per Hour) of emergency venting.

Three Common Forms of Emergency Venting.

- Manufactured emergency vents.
- Self closing or long bolt manhole covers.
- Weak roof to shell seam construction.



Manufactured Emergency Vents

- Must be adequately sized.
- Must have the rating stamped on it.
- Must be installed according to the manufacturers instructions.
- Must function properly.


MID-SOUTH STEEL PRODUCTS, INC.
THIS TANK REQUIRES EMERGENCY
RELIEF VENTING, CAPACITY NOT
CAPE GIRARDEAU, MO


The tank on the right is a larger diameter tank and clearly has a smaller vent.

Manufactured Vent Ratings

- NFPA 30 Requires that each commercial tank venting device have the following stamped on it :
- The opening pressure.
- The pressure at which the valve reaches the full open position.
- The flow capacity at the latter pressure shall be expressed in CFH.

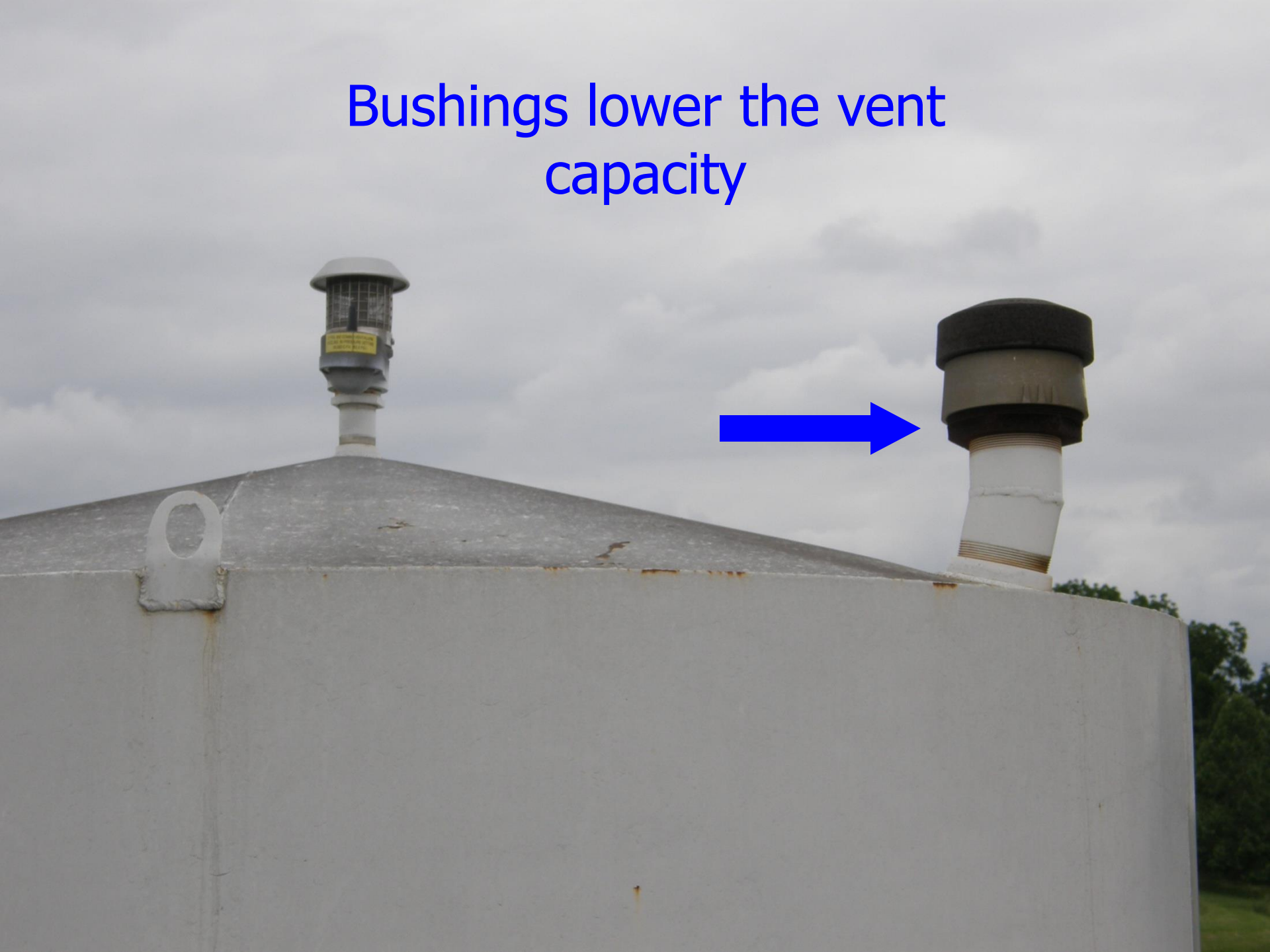
No Rating


MORRISON BROS
FIG
244
8 OZ
DUBUQUE IOWA

Installation

- Emergency vents must be installed according to the manufactures instructions.
- Vent openings must be sized properly for vents, and be unobstructed.

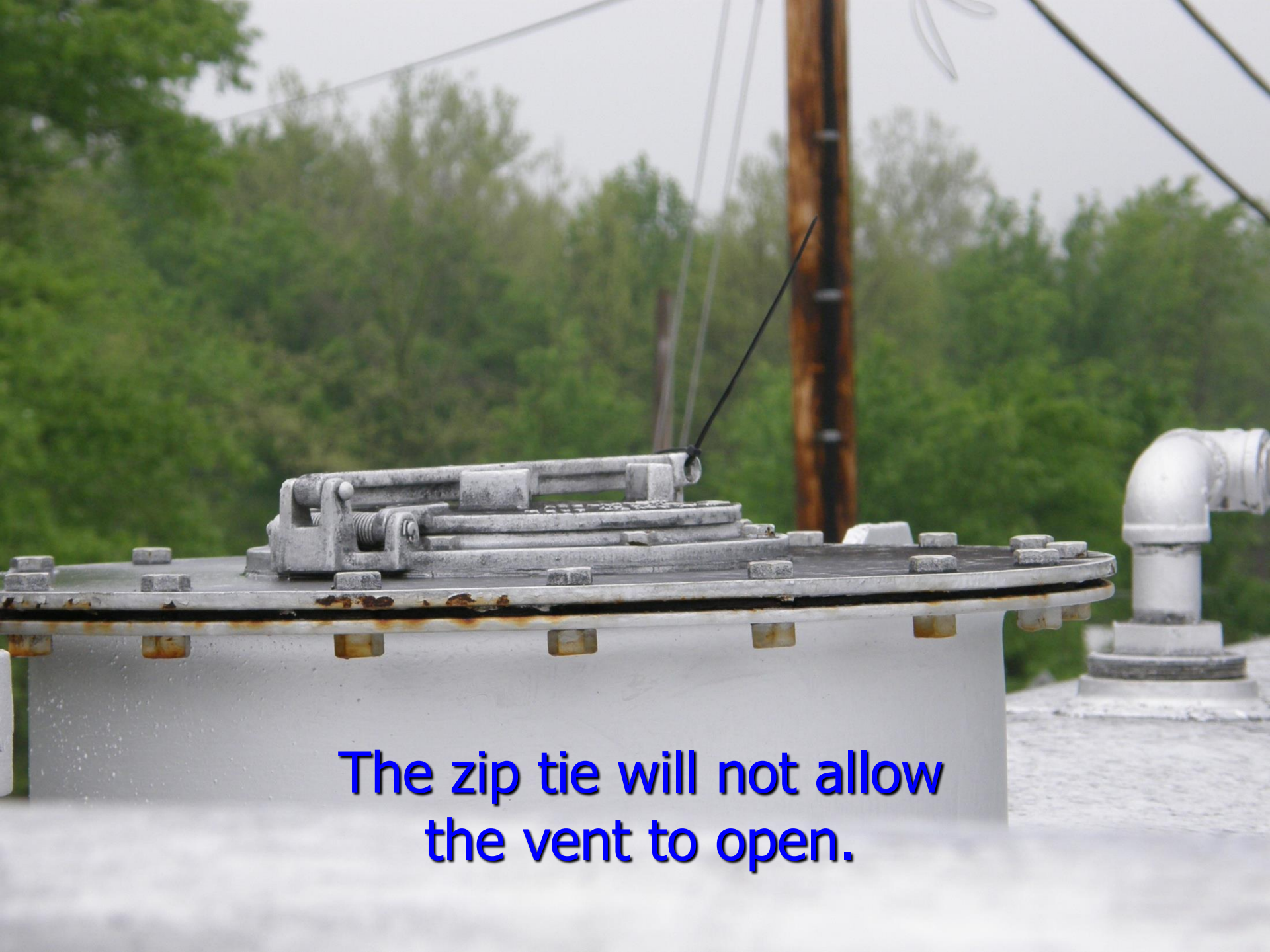
Bushings lower the vent capacity

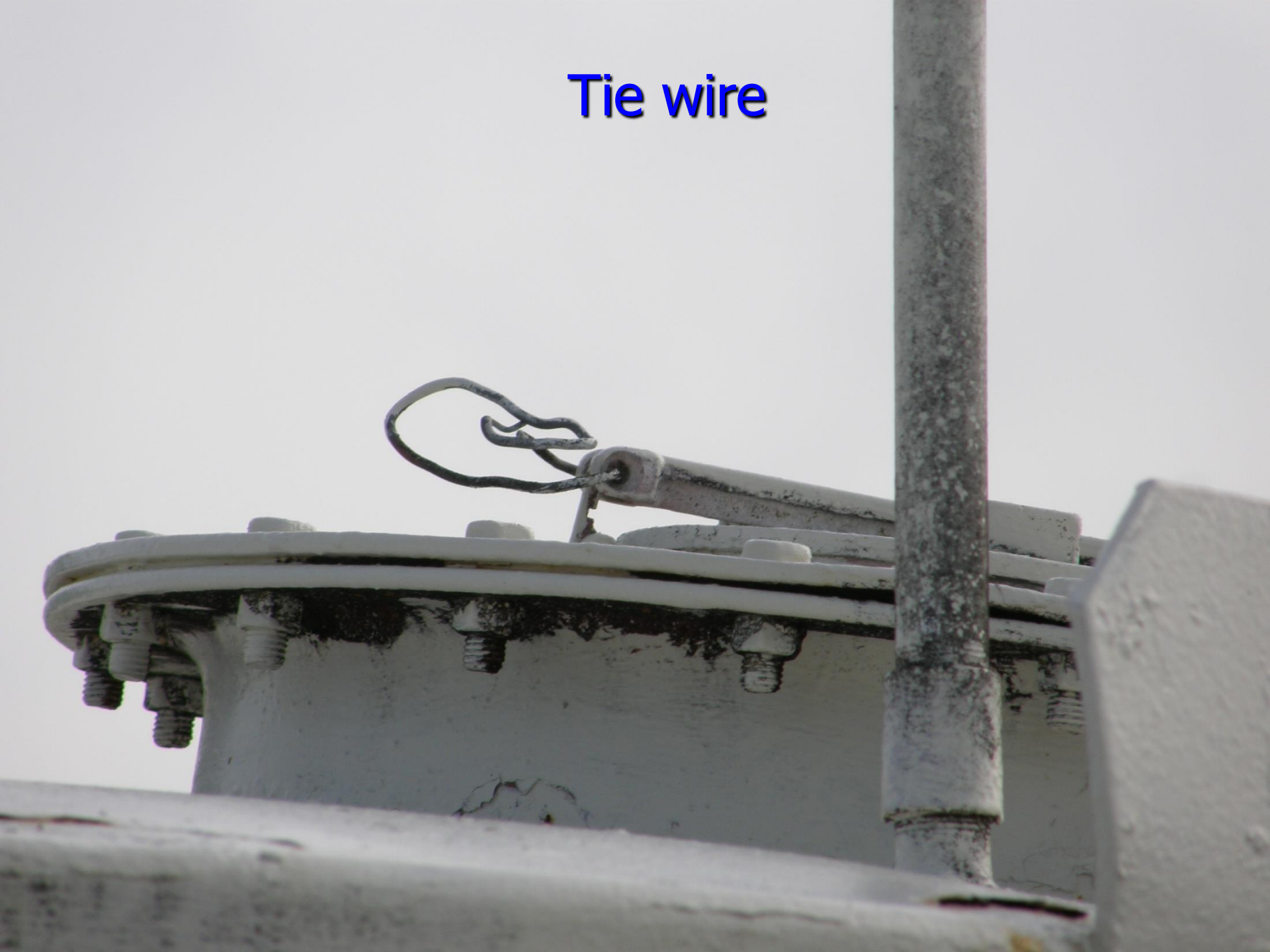



MISSOURI
581 XR5


STACK VALVE


Painted vents are a big problem.


The zip tie will not allow
the vent to open.


Tie wire


Shim can affect the operation of the
vent and allow fugitive emissions.

Manhole Covers

- NFPA 30, permits two types of manhole covers to be used as emergency vents.
  - Self closing manhole covers.
  - Manhole covers using long bolts with at least $1^1/_2$ in. of travel.
  - It is our policy, that we only allow long bolt manhole covers on class II liquids.

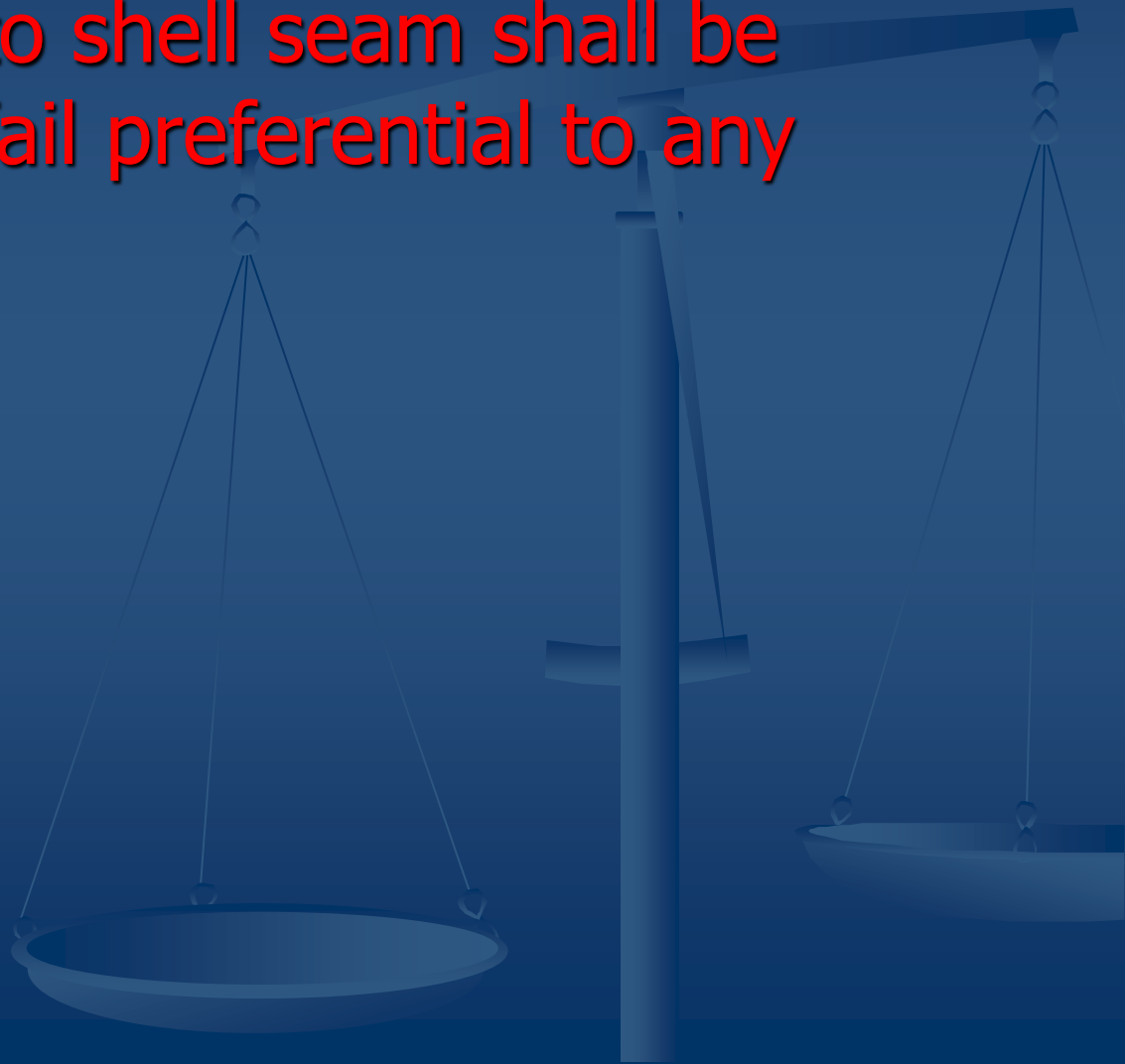
Self Closing Manhole Cover.

Long bolt manhole cover


Obstructed Long Bolt Manhole Cover

Weak Roof to Shell Seam

- The weak roof to shell seam shall be constructed to fail preferential to any other seam.




Weak roof to shell seam
tanks.

Normal Venting

- NFPA 30 2-3.5
- Atmospheric storage tanks shall be adequately vented to prevent the development of vacuum or pressure sufficient to distort the roof of a cone roof tank or exceeding the design pressure in the case of other atmospheric tanks, as a result of filling or emptying, and atmospheric temperature changes.
- Normal vents shall be at least as large as the filling or withdrawal connection, whichever is larger, but in no case less than $1^1/_4$ in. nominal inside diameter.
- Tanks storing class IA products shall be equipped with venting devices that will be normally closed, except when venting to pressure or vacuum conditions.

Some pressure/vacuum vents are not approved for aboveground use.


Normal vents shall be as large as fill or withdrawal


PRES. 3 IN
VAC. 8 IN


THIS COMPONENT WAS TESTED TO AND MET THE FOLLOWING
PRES. 2.5-6 IN. W.C.
VAC. 6-10 IN. W.C.
.05 CFH @ +2 IN. W.C.
.21 CFH @ -4 IN. W.C.


A simple trash bag.


Low
lfur No. 2 Diesel - Red
LOW SULFUR OFF-ROAD DIESEL FUEL
(500 ppm Sulfur Maximum)


Manifolded vents

Location of Normal Vent

- Normal vents shall terminate at least 12 ft. from ground level.
- To aid in their dispersion, vapors shall be discharged upward or horizontally.
- Depending on the tank size, shell thickness, and location, reasonable changes in height of vent pipes can be made.
- Wind load can sometimes fatigue the metal around the pipe opening.
- Careful consideration must be given when installing directional vents.


NO SMO NG
STOP EN NE
K-1
KEROS E


27 3:17PM


22 10:53AM

In order to aid in their dispersion, vapors shall be discharged upward or horizontally.


A way to avoid tank overfill from leaving the containment.

Manifolded Tanks

- 2 CSR 90-30.050 (16)
- All aboveground storage tanks installed and connected together, utilizing a common piping system of manifold, shall be installed with each tank top level with all other tank tops to prevent any overfilled tank condition. When tanks are manifolded or piped together, the total capacity of all tanks shall be considered as a single tank when calculating the capacity of the secondary containment.

- Regardless of the configuration, a manifold is a manifold. Check valves, Locking manual valves, or any other method, is a manifold, if the piping from more than 1 tank is connected by any means, fill or withdrawal, to another tank.

- Humans can and will forget to close valves.

Tanks manifolded by fill, and not filling at the same rate, are a major cause of overfills.


UNLEADED

All manifolds are not this easy to spot.


Plus
Regular
Premium


A transport drivers nightmare!
ETHANOL
WHITE CROWN

Overfill Requirements

- 2 CSR90-30.050 (27)
- All aboveground storage tanks except those of a 2000 gallons or less that are filled by a nozzle, shall be equipped with a 90% overfill alarm.

Overfill Protection

- The overfill alarm must be compatible with all appurtenances on the storage tank.
- It must function properly.
- It must be installed according to the manufacturers instructions.
- If it is battery powered, it must be accessible for testing.
- It must be installed where you can hear it.

GREENLEAF GAUGE

SOLAR GAUGE™

MODEL EPG-7000

SERIAL# AAP00374

0905

GALLONS

PEI

HIGH LEVEL ALARM

LOW LEVEL ALARM

Gauge has been sealed by the manufacturer. There are no user serviceable parts inside. Any attempt to open voids warranty.

Patent Pending

1-888-88-GAUGE

Carlon

PVC

EADED PL

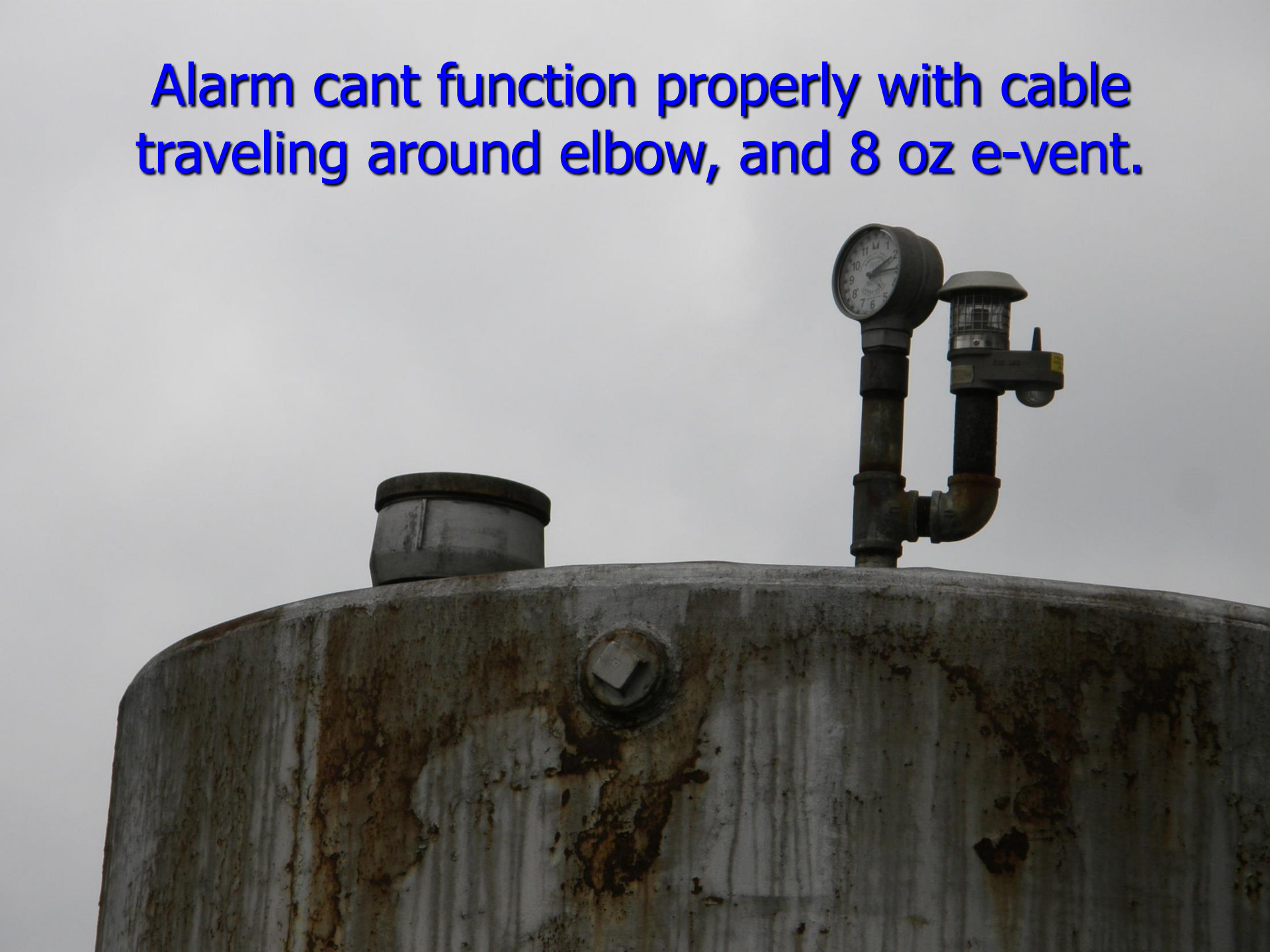
"POWERSCRUB" DETERGENT A


CLOCK GAUGE
ALARM
Press "Test/Cancel" to Test Alarm and Battery Before Filling.
If Overfill Alarm sounds, Press "Test/Cancel" to Silence the Alarm.
TEST/ CANCEL
MORRISON BROS. CO.
Dubuque, IA • 800-553-4840


TEST BATTERIES PRIOR TO EACH USE
BATT. A
BATT. B
ALARM
RED ON = OK
TEST - VERIFY
AUTO ARM
BATTERY TEST
ALARM SILENCE
• TEST ALARM PRIOR TO OPERATION.
• TO TEST, HOLD "TEST-VERIFY" UP FOR 2 SECONDS.
"ALARM MUST SOUND & ALARM LIGHT MUST BE RED (ON) WHILE "TEST-VERIFY" SWITCH IS UP.
• IF ALARM STAYS ON AFTER TEST, THE TANK IS FULL.
MODEL TA-2 TANK ALARM
THE TOKHEIM CO.
MARION, IA USA • PH: 800-747-3442
FOR USE AS A
MOTOR FUEL ONLY
UNLEADED
GASOLINE


AMOCO

Alarm cant function properly with cable traveling around elbow, and 8 oz e-vent.



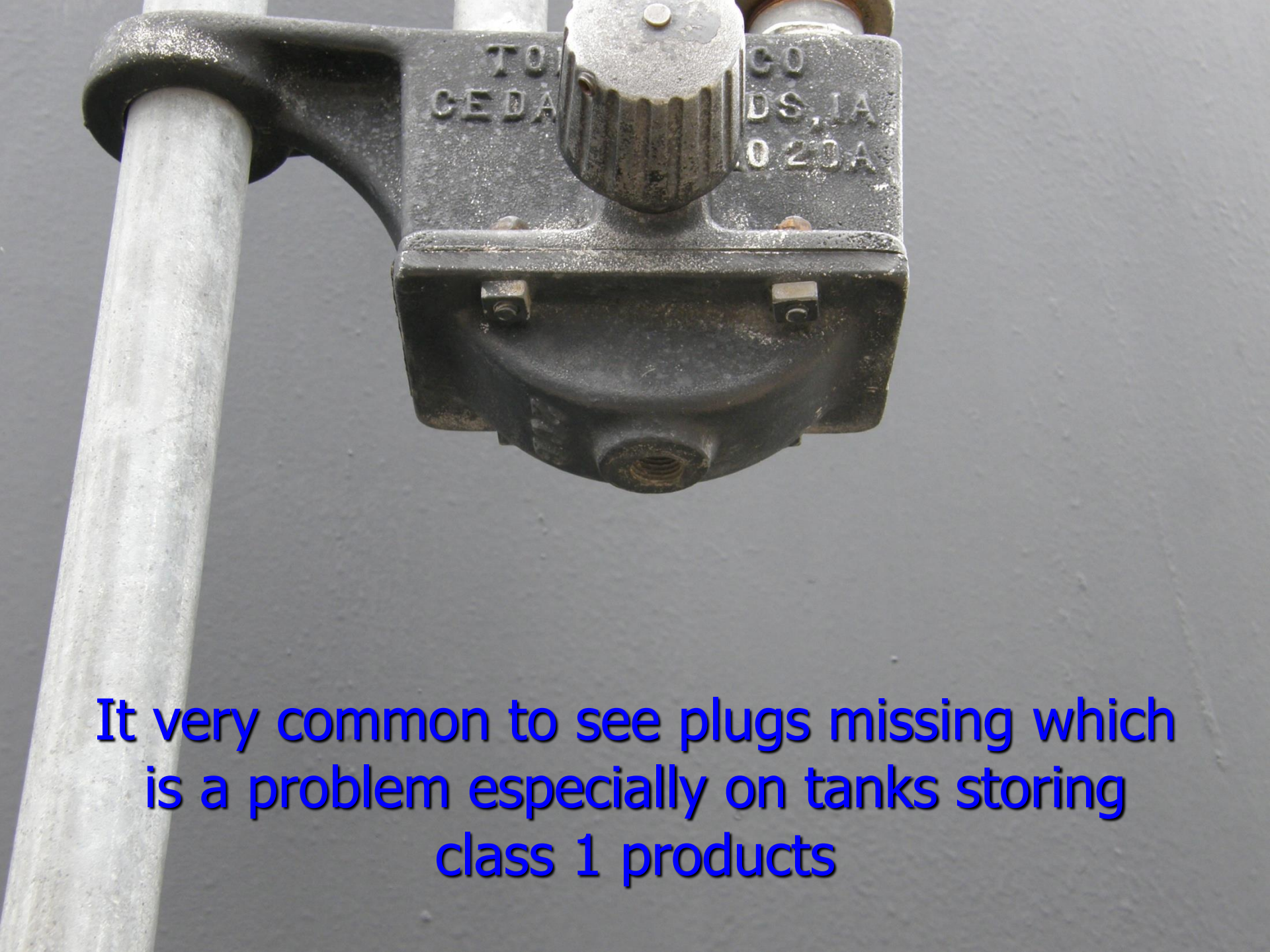
Tank Gauging

- Means shall be provided for determining the liquid level in each tank, and this means shall be accessible to the delivery operator at all times.
- Delivery personnel must gauge tank immediately before and immediately after all deliveries.
- It must be accessible/legible from the ground.
- It must be vapor tight.
- If it is a tape/float style gauge it must enter the tank vertically.
- It must be installed according to the manufactures instructions.

Tape/float gauges must enter tank vertically.


OFF ROAD
No2 Dyed Diesel
20,000 Gallon
70 gal per inch

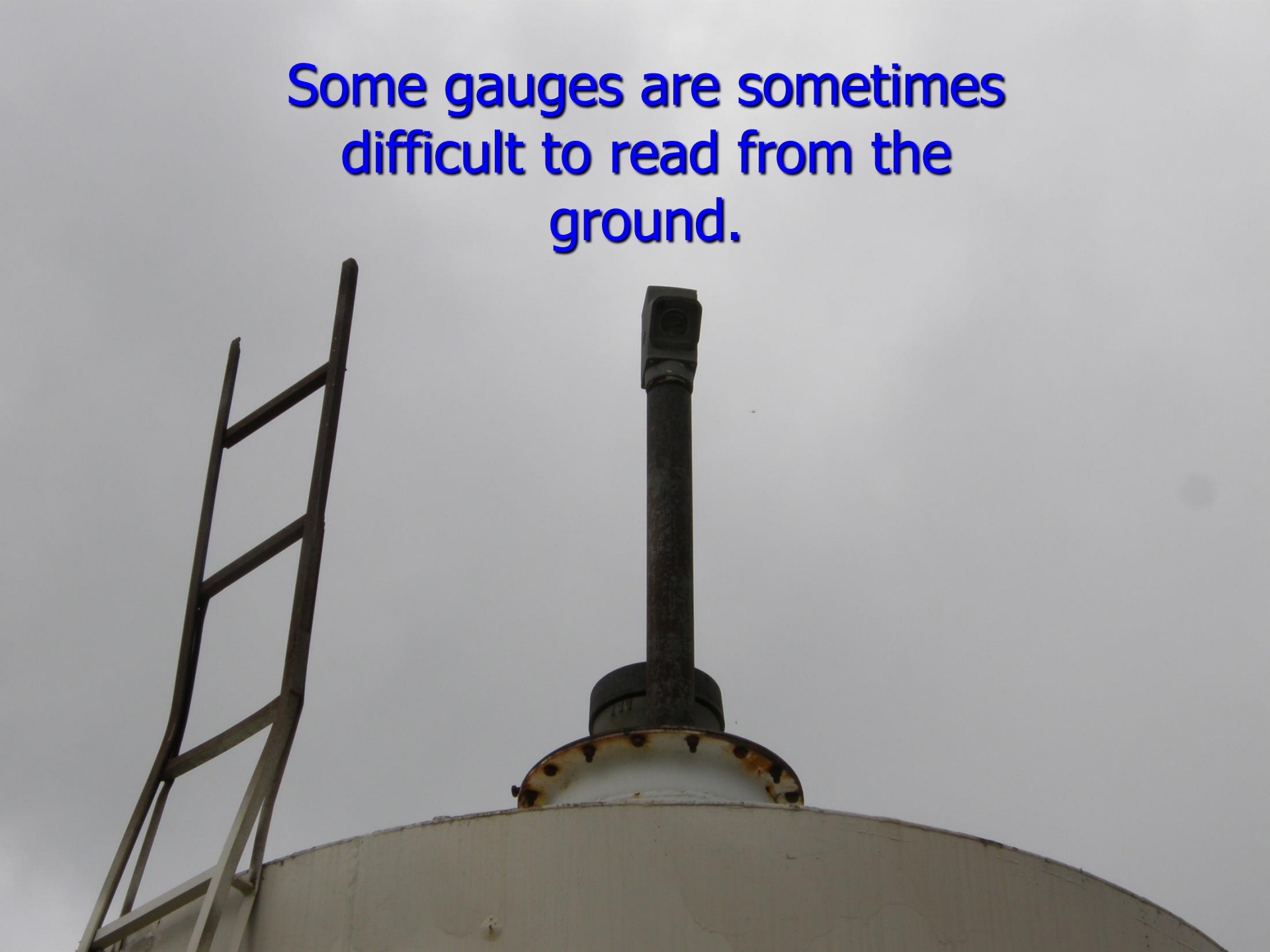
Tape gauge.



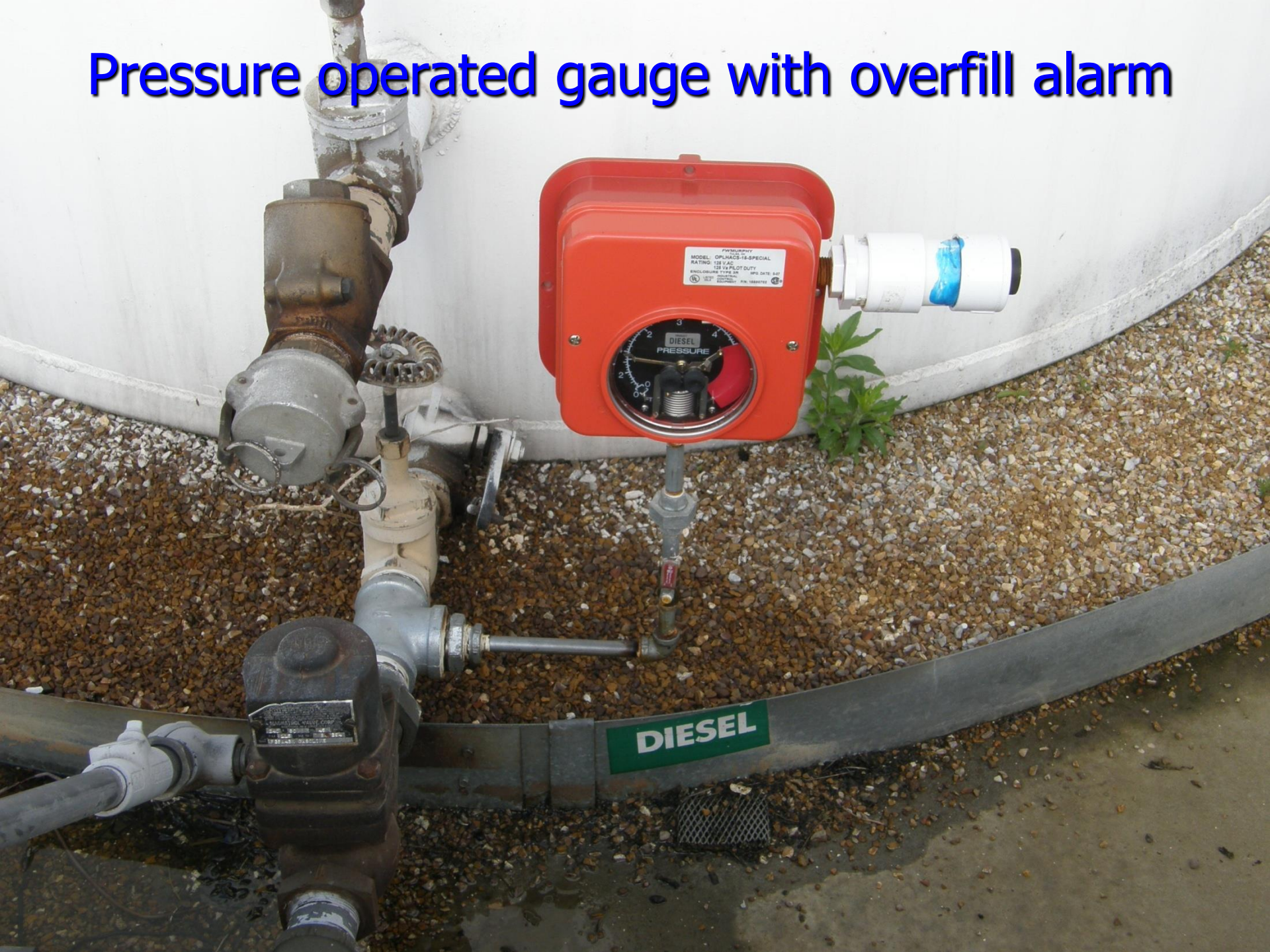
It very common to see plugs missing which is a problem especially on tanks storing class 1 products

Clock gauges must enter vertically.

Some gauges are sometimes difficult to read from the ground.



Pressure operated gauge with overfill alarm

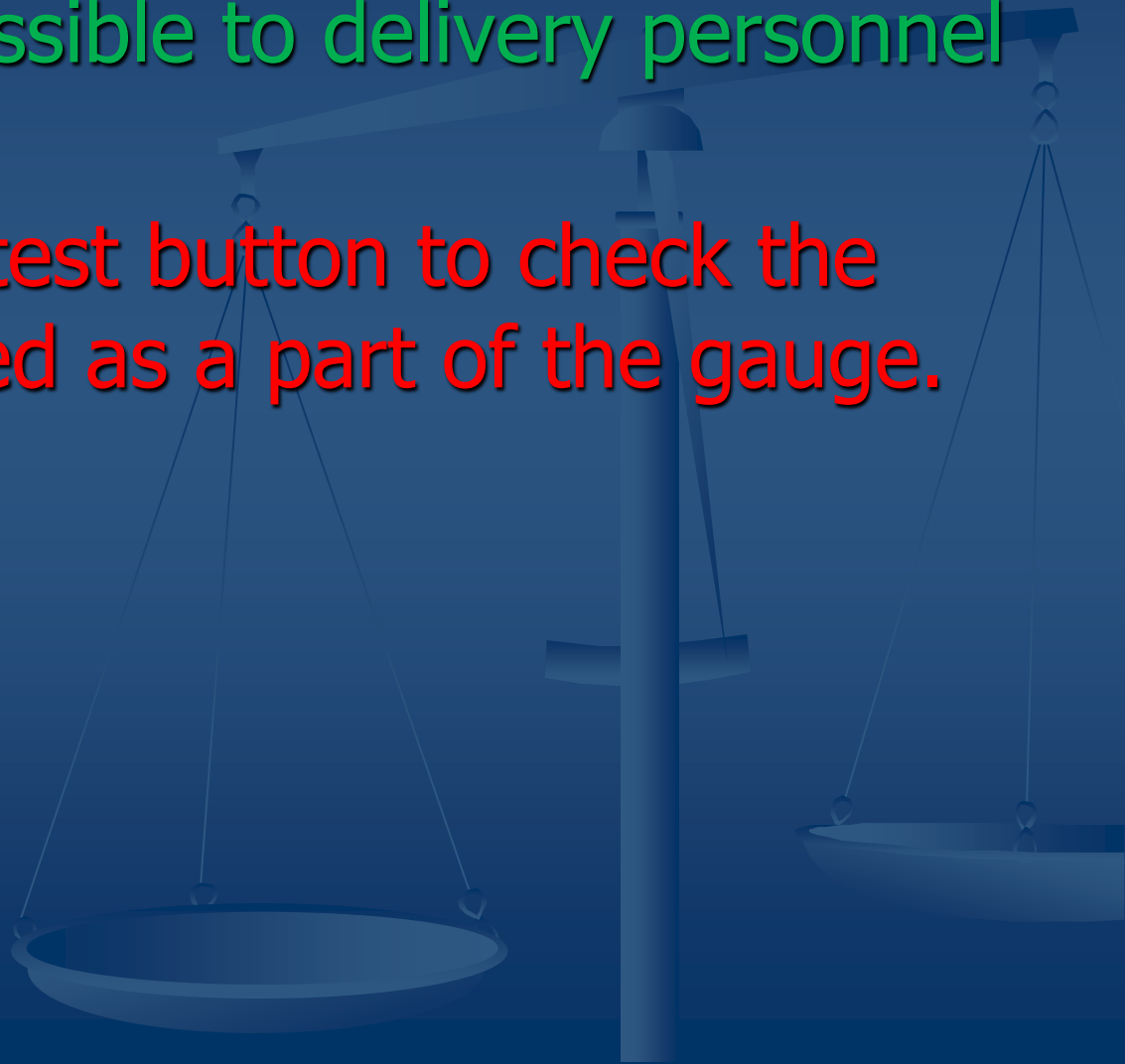



Piping to pressure operated gauges **MUST** be properly supported due to it's small diameter.


PREM UNL ADED
PEI
www.SOLAR GAUGE™.com
850
GALLONS
MODEL
EFG-8000
Patent #
6,125,697
© 2003 Greenleaf Gauge
SERIAL#
EFD144
HIGH LEVEL ALARM
LOW LEVEL ALARM
PUSH TO
TEST / RESET
ERROR MESSAGE
HELP= If displayed at any time
DO NOT FILL TANK
(Call Service Technician)
Please refer to operator's manual
For other display indicators.
GREENLEAF GAUGE, INC.
1-888-88-GAUGE
1-888-884-2843
USA 208-453-1714

Automatic Tank Gauging

- It must be accessible to delivery personnel 24 hrs.
- It must have a test button to check the alarm if equipped as a part of the gauge.



Manual Gauging

- This is the most accurate method, but it is seldom accessible on most aboveground tanks.
- On aboveground tanks that are accessible, there must be a **SAFE**, permanent provision to stick tank. No ladders!

Corrosion and Damage

- Aboveground tanks shall be painted or otherwise protected against corrosion.
- If serious corrosion, pitting or damage is evident an inspection by a certified tank inspector will be required by Missouri inspectors.
- The tank will be required to be repaired or replaced based on STI SP001 Inspection Standard and SP031 Repair Standard.

Tank Repairs

- All field repairs to aboveground storage tanks shall comply with STI SP031
- 2 CSR 90-30.085 (2)
  - Any person who manufactures an aboveground or underground fuel storage tank for use in Missouri, or piping for such tank; or any person who installs or repairs all or part of a fuel storage tank system in Missouri shall annually apply for a registration from the Department of Agriculture's Weights and Measures Division.

- At the time of application, such person shall provide evidence of financial responsibility for the costs of corrective action directly related to releases caused by improper manufacture, installation, or repair of such tank or piping.

Tank shall always be painted a light reflective color.

MDA Weights & Measures Petroleum Inspection Program

THANK YOU