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Overview of Tank and Line Tightness Testing

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Outline

- What are tightness tests?
- Why are tightness tests performed?
- What some state regulatory requirements?
- Short summary of tightness testing methods.
- What are some changes and research with tightness testing?

Tightness Testing Defined

- **Tanks** [40 CFR 280.43 (c)]
  - Capable of detecting a 0.1 gallon per hour leak from any portion of the tank that routinely contains product;
  - Accounts for the effects of
    - Thermal expansion or contraction of product
    - Vapor pockets
    - Tank deformation
    - Evaporation or condensation
    - Location of the water table
  - Accurately detect leaks with probability of 95% and a false alarm rate of 5%

Tightness Testing defined--continued

- **Product Lines** [40 CFR 280.44 (b)]
  - Detect 0.1 gallon per hour leak
  - At one and one-half times the operating pressure
  - Accurately detect leaks with probability of 95% and a false alarm rate of 5%

Why are tightness tests performed?

- **Required by federal regulation**
  - Tanks [40 CFR 280.41 (a) (1)]
    - Monthly monitoring under 40 CFR 280.43 not used for release detection
    - 5-Year Tank Tightness Testing inventory control for a total of 10 years for USTs installed after 12/22/1998

Why are tightness tests performed? -- continued

- **Required by federal regulation – continued**
  - Product Lines [40 CFR 280.41 (b) (1) (ii), (b) (2)]
    - Annual tightness testing of pressurized product lines
    - 3-year tightness testing of conventional suction product lines

Why are tightness tests performed? -- continued

- Follow up to work done on tanks and lines
  - New installations
  - Upgrades
  - Repairs
- Property transfers (Hoffman, 2009)
- Investigation of observed or suspected releases
  - Monthly monitoring failures
  - Line leak detectors that “trip up” or produce slow flow
  - Occurrences of free product

State Regulatory Requirements

- Some states have no requirements
  - No licensing
  - No state issued certification for tightness testers

State Requirements continued. . .

- Some states require
  - State-specific licensing test
  - Experience documented on application forms
  - International Code Council (ICC) exam for tightness testing may or may not be required

State Requirements continued. . .

- Some states require that
  - Testers be certified on testing equipment
  - Testing methods be third-party certified
  - Testing methods be listed on the National Work Group on Leak Detection Evaluations Web Site (http://www.nwglde.org/)

Summary of Line Tightness Test Methods

- "Tracer"
- Hydrostatic (Hoffman, 2009)
  - Pressure decay
    - Hand pump provides pressure
    - Amount of liquid used to establish test pressure measured over set intervals
  - Constant pressure
    - Inert gas pressurizes space above column of liquid
    - Liquid loss measured over set intervals

Summary of Tank Tightness Test Methods -- Volumetric

- Volumetric (Hoffman, 2009)
  - Measurements
    - Product level change
    - Product temperature
  - Calculations
    - Overall volume change
    - Volume change based on thermal expansion
  - Result
    - Overall leak rate.

Types of Volumetric Tightness Tests

- Overfill
  - Tank filled to 100%
- Underfill
  - Existing level of fuel used in tank (Hoffman, 2009)
  - Ullage test maybe needed

Summary of Tank Tightness Test Methods – Non-Volumetric

- Non-Volumetric according to National Work Group on Leak Detection Evaluations (http://www.nwglde.org/)
  - Tracer
  - Ullage
    - Pressure (pressure decay measured)
    - Vacuum (acoustic signal and/or water ingress)
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