

⋮

Enhanced Vapor Recovery Workshop October 1, 1999

- ◆ Performance Standards and Performance Specifications.
 - ◆ Increased stringency of pressure integrity of components
 - ◆ “Dripless” nozzles
 - ◆ Negative pressure in UST for Vacuum Assist systems (except innovative designs).
 - ◆ Additional HAPS not to increase cancer risk by more than 1 in a million.

⋮

Performance Standards and Performance Specifications

- ◆ Evidence of compliance with the standards and specifications shall be provided in the application for certification, along with the results of tests demonstrating compliance.
- ◆ The system shall demonstrate ongoing compliance with all applicable standards and specifications throughout certification testing.

⋮

Performance Standards and Performance Specifications

- ◆ The following slides are excerpts from Tables 2 through 8, and are not intended to completely represent the information contained therein. These tables will be incorporated into the Certification Procedure. Please refer to the tables for complete information.
- ◆ More than one table may apply.

⋮

Standards and Specifications Tables

- ◆ Table 2 Phase I Systems
- ◆ Table 3 All Phase II Systems
- ◆ Table 4 Additional - Balance Systems
- ◆ Table 5 Additional - Vacuum Assist Systems
- ◆ Table 6 Additional - Common Collection Unit
- ◆ Table 7 Additional - Destructive Processor
- ◆ Table 8 Additional - Non-Destructive
Processor

•
•
•

All Phase I Systems

- ◆ Phase I Efficiency $\geq 98\%$
- ◆ Emission Factor $\text{HC} \leq 0.17 \text{ \#/1000 gals}$
- ◆ Product Adaptor Rotatable 360° or equiv
- ◆ Drop tube with Overfill Protection $\leq 0.17 \text{ CFH at } 2.0 \text{ " wc}$
- ◆ Vapor Adaptor Rotatable 360° or equiv
Poppeted
 $\leq 0.17 \text{ CFH at } 2.0 \text{ " wc}$

• • • • • • • •

•
•
•

All Phase I and II Systems

◆ UST Vent Pipe
Pressure/Vacuum
Relief Valves

+3.0 ± 0.5 " H₂O

-8.0 ± 2.0 " H₂O

Leakrate at +2.0 " H₂O ≤
0.17 CFH

Leakrate at -4.0 " H₂O ≤
0.21 CFH

Total Additive Leakrate
≤ 0.17 CFH at 2.0 " H₂O

• • • • • • • • •

•
•
•

All Phase II Systems

- | | |
|---------------------------------------|----------------------------|
| ◆ Emission Factor | HC \leq 0.42 #/1000 gals |
| ◆ ORVR Compat. | No excess emissions |
| ◆ Phase I Compat. | No excess emissions |
| ◆ Static Pressure | As specified in TP=201.3 |
| ◆ Spillage including drips from spout | \leq 0.42 #/1000 gals |
| ◆ Liquid Retention | 100ml/1000 gallons |

• • • • • • • •

•
•
•

Phase II Balance Systems

◆ UST Pressure ≤ 0.00 " H₂O for
Minimum of 16 hr/day

≤ 0.25 " H₂O Ave. of
Positive Pressures

Maximum of 1.5 " H₂O
for 1 hour/day

• • • • • • • •

•
•
•

Phase II Balance Systems

◆ Nozzle Criteria
Each Nozzle Shall:

Have an Insertion
Interlock

Be “Dripless”

≤ 1 Drop per Refueling

Be Equipped with a
Vapor Check Valve

• • • • • • • •

⋮

Phase II Balance Systems

- ◆ Vapor Check Valve Leakrate ≤ 0.017 CFH at 2.0 " H₂O
- ◆ Insertion Interlock No Liquid Flow Prior to Bellows Compression
- ◆ Bellows Insertion Force Pounds (force) to Retaining Device Specified During Certification Testing

⋮

⋮

Phase II Balance Systems

Pressure Drop Criteria at 60 CFH

◆ Nozzle	≤ 0.06 inches H ₂ O
◆ Hose	≤ 0.07 inches H ₂ O
◆ Breakaway	≤ 0.06 inches H ₂ O
◆ dispenser	≤ 0.07 inches H ₂ O
◆ Swivel	≤ 0.04 inches H ₂ O
◆ From riser	≤ 0.05 inches H ₂ O
◆ From Nozzle to UST	≤ 0.35 inches H ₂ O

•
•
•

All Phase II Assist Systems

- ◆ UST Pressure $-0.25 \geq P \leq -4.50$
- ◆ Nozzle Criteria Possess a Vapor Guard
Each Assist Be “Dripless”
Nozzle Shall: ≤ 1 Drop per Refueling
- ◆ Have a Vapor Check Valve
- ◆ Nozzle Vapor Check Valve Leakrate ≤ 0.017 CFH at 2.0 " H₂O
 ≤ 0.005 CFH at -27.7 " H₂O

•
•
•

All Phase II Assist Systems

- | | |
|---|--|
| ◆ Nozzle Pressure Drop Specifications
ΔP at Specified Vacuum Level | Established During Certification Process |
| ◆ Maximum Air to Liquid Ratio | 1.00 (without processor) |
| ◆ Air to Liquid Ratio Range | Established During Certification Process |

• • • • • • • •

⋮

Phase II Assist Systems with a Common Collection Device

◆ Specification of Minimum and Maximum Vacuum Levels

Established During Certification Process

◆ Number of Refueling Points Per Vacuum Device

Established During Certification Process
Failure Mode Testing

⋯

⋮

Phase II Systems with a Destructive Processor

- ◆ Additional Processor Emission Factors
 $\text{CO} \leq 0.02 \text{ \#/1,000 gals}$
 $\text{NO}_x \leq 0.02 \text{ \#/1,000 gals}$
- ◆ Maximum HC Rate to Processor
 $\leq 2.1 \text{ lb/1,000 gallons}$
- ◆ Typical Load on Processor
Established during Certification

⋮

⋮

Phase II Systems with a Destructive Processor

◆ Hazardous
Air
Pollutants
(HAPS)

Emissions of Benzene

≤ 0.01 lb/1,000 gallons

Emissions of 1,3 Butadiene

Shall Not Increase the
Maximum Cancer Risk by
 > 1 in a Million or
Exceed 0.04 lb/yr

Emissions of Aldehydes Shall
Not increase the Maximum
Cancer Risk by > 1 in a Million

⋮

⋮

Phase II Systems with a Non-Destructive Processor

◆ Additional Processor Emission Factors	Benzene ≤ 0.01 lb/1,000 gallons
--	---

◆ Maximum HC Rate to Processor	≤ 2.1 lb/1,000 gallons
--------------------------------------	-----------------------------

⋯

•
•
•

Innovative Designs

- ◆ Any system that is capable of achieving the performance standards specified in Table 3 and can show performance equivalency for any other performance standards or specifications in tables 4, 5 or 6.
- ◆ The applicant must identify which performance standards or specifications are applicable to the “innovative design”, and provide documentation as to how equivalency will be determined.

⋮

Innovative Designs: One Example

Not required to maintain continuously negative UST pressure provided that the system can maintain the following pressure profile with monitoring and assurance that low pressures are not due to system leaks.

◆ ≤ 0.00 " H₂O for Minimum of 16 hr/day

◆ ≤ 0.25 " H₂O Ave. of Positive Pressures

◆ Maximum of 1.5 " H₂O for 1 hour/day

⋮

⋮

Standards and Specifications

- ◆ The performance specifications for the system and each component shall be determined by the applicant for certification, and shall be verified during certification testing.
- ◆ Systems and components shall meet the performance standards and specifications for at least the length of the warranty period.

•
•
•

Certification Testing

- ◆ Certification testing of systems shall include, but is not limited to, the following:
 - ◆ Operational test of at least 180 days
 - ◆ including continuous monitoring of UST pressure
 - ◆ Efficiency test
 - ◆ 200 cars
 - ◆ emissions include pressure-related fugitives
 - ◆ Demonstration of ORVR Compatibility
 - ◆ Failure Mode testing of System and ISD