California Environmental Protection Agency

Air Resources Board

Vapor Recovery Certification Procedure

INTERIM GUIDELINES FOR CERTIFYING VAPOR RECOVERY SYSTEMS USING ABOVE GROUND STORAGE TANKS

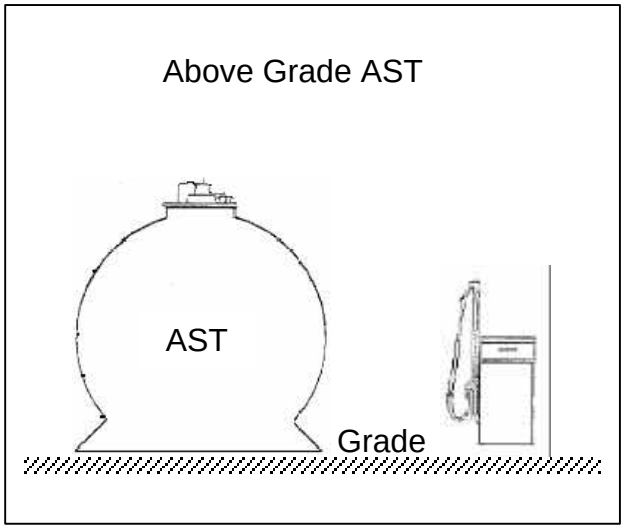
Prepared: 11/30/01

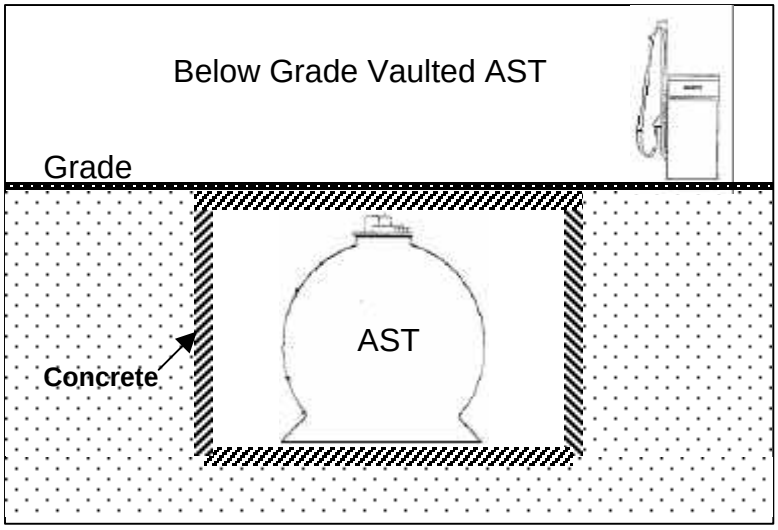
BACKGROUND

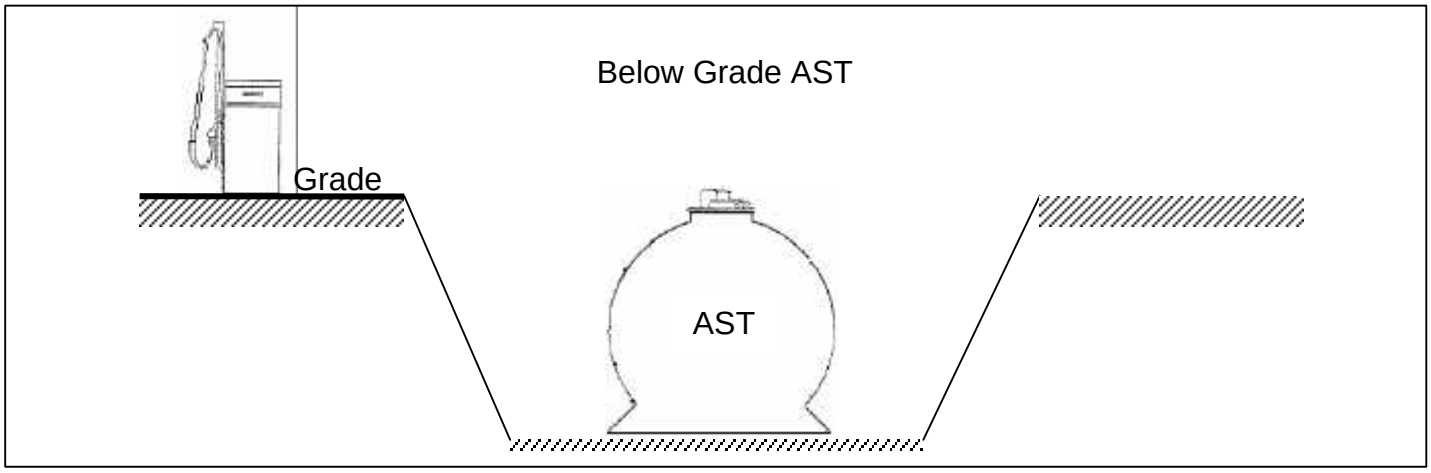
On March 23, 2000, the California Air Resources Board (ARB) approved the Enhanced Vapor Recovery (EVR) regulations for the purpose of improving the performance and integrity of vapor recovery system components and achieving greater vapor recovery system efficiencies. Above ground gasoline storage tanks (ASTs) were not included in the development of EVR regulations and therefore the EVR regulations do not apply to AST vapor recovery systems. It is ARB's intent to apply EVR improvements for AST vapor recovery systems through a new rulemaking process. In the interim, the ARB will use the following requirements, standards, and specifications to evaluate and certify AST Phase I and Phase II vapor recovery systems used at motor vehicle fueling operations. These interim requirements are consistent with currently adopted certification and test procedures for above ground tanks.

AST SYSTEM DEFINITIONS

For purposes of this document, an AST vapor recovery system is defined as a system that uses a gasoline storage tank that is intended for fixed installation, without backfill, and is located above or below grade. Section 41950(c) of the Health and Safety Code defines "gasoline" to mean any petroleum distillate having a Reid vapor pressure of four pounds or greater. Examples of an above and below grade AST are as follows:







Other definitions:

Top Mount Configuration – AST system components mounted in direct contact with the top surface of the tank shell.

Side Mount Configuration – AST system components mounted in direct contact with the side wall of the tank shell.

Remote Configuration – AST system components not mounted in direct contact with the tank shell.

PHASE I SYSTEM REQUIREMENTS, STANDARDS, AND SPECIFICATIONS

All Phase I systems will be required to incorporate the following:

- Two-point system (fill and vapor connections);
- Location of Phase I vapor line connection will be evaluated for ease of use. Side mounted vapor connection may be required for taller tanks;
- Cargo tank and bobtail truck delivery line and vapor line to storage tank fill adapter and vapor recovery adapter shall be consistent with Executive Orders G-70-97-A, G-70-102, and G-70-142-B. Storage tank equipment to be consistent and compatible with delivery vehicle equipment;
- Emergency vent with seal. Emergency vent to be tested as outlined in Table 1;
- Pressure/vacuum valve with a positive pressure of 3.0±0.5" H_2O and negative pressure of 8.0±2.0" H_2O;
- Spill containment with drain valve to pass leak rate requirement outlined in Table 1;
- Mechanical liquid level gauge shall be of a type provided with a metal casing or provided with a glass insert if of a type with a plastic gauge top. Electronic liquid level gauges shall be intrinsically sealed;
- Exterior of the storage tank and exposed Phase I piping shall have a reflectivity of 75% or greater. Reflectivity shall be determined by visual comparison of the paint with paint color cards obtained from a paint manufacturer who uses the "Master Pallet Notation" to specify the paint color (e.g. 40YY *75*/084 where the number in italics is the percent reflectivity). The appropriate color card shall be available at the gasoline dispensing facility or at a central location for remote or unattended locations.
- Tank capacity greater than 250 gallons;
- All Phase I systems are required to meet the standards and specifications listed in Table 1.

TABLE 1
PHASE I SYSTEM PERFORMANCE STANDARDS AND SPECIFICATIONS

Performance Type	Requirement	Std. Spec.	Test Procedure
Phase I Efficiency	95.0%	Std.	TP-205.1
Static Pressure Performance	In accordance with TP-201.3B	Std.	TP-201.3B
Emergency Vent	No indication of vapor leak at 2.0 inches H_20	Std.	Vapor Leak D-200
AST Vent Pipe Pressure / Vacuum Relief Valve	Pressure Settings 3.0±0.5 inches H_2O Positive Pressure 8.0±2.0 inches H_2O Negative Pressure Leakrate ≤0.38 CFH at 2.0 inches H_2O	Std.	TP-201.2B Appendix 1
Pressure Integrity of Drop Tube with Overfill Protection	Leakrate ≤0.38 CFH at 2.0 inches H_2O	Std.	TP-201.20
Phase I Vapor Adapter	Poppeted, no indication of vapor leak at 2.0 inches H_20	Std.	Vapor Leak D-200
Fill and Vapor Dust Caps	No indication of vapor leak at 2.0 inches H_20	Std.	Vapor Leak D-200
Fill & Vapor Disconnect Drippage (top fill & vapor recovery)	2 ml / disconnect (average of three disconnects)	Std.	Liquid Leak D-200
Fill & Vapor Disconnect Drippage (bottom fill & vapor recovery)	10 ml / disconnect (average of three disconnects)	Std.	Liquid Leak D-200
Vapor Connectors and Fittings	No indication of vapor leak at 2.0 inches H_20	Std.	Vapor Leak D-200
Containment Boxes With Drain Valve	Leakrate ≤0.38 CFH at 2.0 inches H_20 No standing fuel in box	Std.	TP-201.2B Visual
Compatibility with Fuel Blends	Materials shall be compatible with approved fuel blends See section 3.8 of CP-201	Spec.	Testing and Eng. Eval.

PHASE II SYSTEM REQUIREMENTS, STANDARDS, AND SPECIFICATIONS

All Phase II systems will be required to incorporate the following:

- Routing of coaxial hose shall be consistent with the configurations outlined in Exhibit 1 (top-mount dispenser), Exhibit 2 (end-mount dispenser) and Exhibit 4 (adjacent ground-mount dispenser with high-hang hose). Routing of coaxial hose for remote dispensers shall be consistent with the configurations shown in Exhibits 5, 8, 9a, 9b, 9c, 10, 11 and 11a in Air Resources Board Executive Order G-70-52-AM.;
- Liquid removal capability on low points with automatic evacuation system. A liquid removal system will not be required if gasoline within the vapor passage of the coaxial hose can be cleared through natural drainage into the vehicle. In the case of top and side mounted tank dispensers located within tank bollards, natural drainage will be determined at a distance of 24 inches and a height of 30 inches from the plane of the bollards closest to the dispenser. Remote dispensers, located outside of bollards, will

require a liquid removal device if the drape of the hose exceeds 10 inches below the base of the nozzle when hung on the dispenser;

- Certified balance system components from Executive Order G-70-52-AM;
- Exterior of Phase II piping shall have a reflectivity of 75% or greater. Reflectivity shall be determined by visual comparison of the paint with paint color cards obtained from a paint manufacturer who uses the "Master Pallet Notation" to specify the paint color (e.g. 40YY *75*/084 where the number in italics is the percent reflectivity). The appropriate color card shall be available at the gasoline dispensing facility or at a central location for remote or unattended locations;
- All Phase II systems are required to meet the standards and specifications listed in Table 2.

TABLE 2
PHASE II SYSTEM PERFORMANCE STANDARDS AND SPECIFICATIONS

Performance Type	Requirement	Std. Spec.	Test Procedure
Applicable to all Phase II Vapor Recovery Systems			
Phase II Efficiency(1)	95.0%	Std.	TP-205.2
Static Pressure Performance	In accordance with TP-201.3B	Std.	TP-201.3B
ORVR Compatibility(2)	Interaction of Refueling ORVR Vehicles Shall Not Cause the System to Exceed the Applicable Efficiency, Including ORVR Penetrations to 80%	Std.	CARB Approved Procedure Developed by Mfr.
Liquid Removal System	Capable of Removing 5 ml/gal. (ave.)	Std.	TP-201.6
Liquid Condensate Traps	Shall Have Automatic Evacuation System	Spec.	Testing and Eng. Eval.
Nozzle / Dispenser Compatibility	Vapor Check Valve Closed When Hung; Hold Open Latch Disengaged When Hung	Spec.	Testing and Eng. Eval.
Connectors and Fittings	No indication of vapor leak at 2.0 inches H_20	Std.	Vapor Leak D-200
Compatibility with Fuel Blends	Materials shall be compatible with approved fuel blends See section 3.8 of CP-201	Spec.	Testing and Eng. Eval.
With Remote Dispensers:			
Phase II Vapor Riser	Minimum 1" Nominal ID	Spec.	Testing and Eng. Eval.
Vapor Return Piping	No liquid or fixed blockage Minimum 3" Nominal ID after first manifold Recommended slope 1/4" per foot Minimum slope 1/8" per foot Rigid piping or equivalent	Spec.	Testing and Eng. Eval.

*Balance Systems (a*pplicable to Phase II balance vapor recovery systems)			
Pressure drop from nozzle to AST	ΔP at 40CFH of $N_2 \leq 0.16$ inches H_20 ΔP at 60CFH of $N_2 \leq 0.35$ inches H_20 ΔP at 80CFH of $N_2 \leq 0.62$ inches H_20	Std.	TP-201.4
*Assist Systems (a*pplicable to all Phase II vacuum assist systems)			
Maximum Air to Liquid Ratio	≤1.00 (without processor) ≤1.30 (with processor)	Std.	TP-201.5
Air to Liquid Ratio Range	Established during certification process	Spec.	TP-201.5
Assist Systems Utilizing a Destructive / Non-Destructive Processor			
Typical Load on Processor	Established During Certification	Spec.	Testing and Eng. Eval.
Processor Operation Time	Established During Certification	Spec.	Testing and Eng. Eval.

(1) The sample of vehicles to be used in TP-205.2 for testing vapor control systems shall be made up of vehicles representative of the on the road vehicle population in terms of vehicle miles traveled. The composition of the representative vehicle matrix shall be determined for each calendar year by the ARB Executive Officer per TP-201.2A. The Executive Officer may approve an alternative matrix to be used in special cases where a vapor recovery system is demonstrated to serve a vehicle population substantially different from the California vehicle population as a whole. A total of 100 vehicles are required to be tested for determining the efficiency of Phase II systems.
(2) "On-Board Refueling Vapor Recovery System" refers to a vehicle based system required by Title 13, California Code of Regulations, Section 1978, or Part 86, Code of Federal Regulations.

Additional Requirements

AST Vapor recovery systems will be subjected to an operational test of at least 180 days to ensure that the system and/or components will be able to meet all of the applicable requirements, standards, and specifications for at least the warranty period. The operational test shall be conducted during the summer months when heat transfer rate and diurnal temperature variations are at a maximum. Pressure in the AST shall be monitored and recorded continuously throughout the operational test.