

**SANTA BARBARA COUNTY**  
**AIR POLLUTION CONTROL DISTRICT**  
**POLICIES AND PROCEDURES**

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Topic:	<u>Fixed Roof Tank Vapor Control System Efficiency</u>		
Distribution:	<u>Engineering Division Staff</u>		

This policy and procedure provides guidance in estimating the vapor control efficiency of various control systems for use on fixed roof tanks. The EPA's technical document entitled "AP-42" is the primary information source for estimating overall vapor control efficiencies.

Typical vapor control systems include:

- (1) Vapor Recovery Systems. Typically, these systems collect vapors from storage vessels using compressors and directs the vapors to a sales systems or control device. For example, in oil & gas processing, the vapors are routed to a gas gathering system. The overall control efficiencies of vapor recovery systems are as high as 90 to 98 percent depending on the method used, the design of the unit, the composition of the vapors recovered, and the mechanical condition of the system.
- (2) Vapor Balance Systems. This vapor collection system does not use compressors to gather the vapors, but rather relies on a naturally produced vacuum. These systems are typically used for the loading and unloading of organic liquids, where the vapors collected are subsequently recovered or destroyed elsewhere. The overall control efficiency of vapor balance systems are as high as 90 to 99 percent.
- (3) Thermal Oxidation Systems. This system involves first collecting the vapors via a compressor or by vapor balance and then destroying the collected vapors in an incinerator or a boiler. The control efficiency for these systems (across the control device) can range for 96 to 99 percent. The overall control efficiency can range from 86 to 97 percent depending on the vapor collection efficiency used.
- (4) Hybrid Systems. Some systems may use vapor recovery with refrigeration and thermal incinerators to dispose of the remaining vapors. Overall system efficiency is calculated based on multiplication of the individual efficiencies of the collection and control devices.

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Policies and Procedures Memoranda are intended to provide agency staff, applicants and the public guidance relative to standardized APCD procedures. These policies and procedures shall not be interpreted in conflict with APCD Rules and Regulations or administrative policies, and may be modified or updated periodically without advance notice.

During the permit and emission inventory process, District staff will be required to evaluate a permittee's overall vapor control efficiency. Many factors can influence the actual efficiency of a system. These include: the method of vapor collection used, the method and ultimate fate of the vapor recovered, the design of the unit, the composition of the vapors, and the mechanical condition of the system. Two similar control systems can yield far different overall control efficiencies. The vapor control efficiencies listed in Table 1 shall be used by Engineering staff when processing permit applications and reevaluations. As noted above, vapor control systems may achieve far greater efficiencies if designed and operated correctly. This policy is not intended to restrict a permittee from requesting that a higher control efficiency be assigned their project. Engineering staff shall follow the procedures outlined in Table 2 when a permittee requests higher overall vapor control efficiency

**TABLE 1 - Standard Vapor Control Efficiencies: Fixed Roof Tanks**

<u>System</u>	<u>Control Efficiency</u>
Tank with openings	0 %
Functional PV Valves	10 %
Vapor Balance System	95 %
Vapor Recovery System	95 %
Thermal Oxidation	95 %

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**TABLE 2 - Procedure for Acceptance of Vapor Control Efficiency**

- Step 1 - Permittee supplies detailed engineering calculations on the system design. All system components and process variables must be addressed in detail. Drafters-quality design P&IDs and PFDs are required. Submittal must be certified by a licensed Professional Engineer.
- Step 2 - The District or its appointed representative reviews the design submittal for completeness, requests additional information (if necessary) and either approves or denies the design. District costs associated with the review and approval of the system design shall be on a cost reimbursable basis (Rule 210. III.C).
- Step 3 - The permittee conducts vapor control system performance tests to verify that the overall control efficiency can be achieved. Standard source test requirements, such as plan submittal, testing according to District-approved methods, test witnessing, and report submittal will apply. All costs associated with source testing shall be on a cost reimbursable basis.
- Step 4 - If the tested efficiency is equal to or greater than the design value, then the permit shall be issued at the design value. If the tested value is less than the design value, then the tested value shall be used for the permit.
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