



LATRINES

Standard Range Types



Purpose

This building provides lavatory facilities for the troops and trainers who are using the range. The document covers all standard types used on SRP Range Facilities.

Design Requirements

See the standard drawings in the RDG for details of construction not included in this document.

General

The standard design must be site adapted to local conditions such as climate, typical construction materials and methods, and the installation design guide. Design the facility in accordance with the design codes and criteria of the specific location, geotechnical information, structural loads, mechanical design criteria, etc.

The facility typically requires access only by able-bodied personnel and does not require ADA compliance.

Siting

Site the Latrine to allow convenient access for both trainees and operators. Consider code requirements for distances from mess facilities. Consider the prevailing winds to aid in odor control.

Architectural

Standard Latrine Types

SRP ranges use many different types of latrine facilities. The type of latrine used must be determined during the planning/programming phase of a range project. Consider the range type, anticipated usage, male to female ratio, and the availability of water and sewer when determining the size and type of latrine facilities. Ranges usually include a vault latrine because of the typically remote location. Vault latrines either include a simple waste holding tank or add an aeration system with a blower to aid decomposition. The maintenance requirements of permanent toilet facilities lead some installations to prefer the use of commercial portable chemical toilets, (Port-a-Let); a concrete pad and wind walls are sometimes included in the construction project. Ranges with a source of water and method of handling sanitary sewer often use the water/sewer latrine with sinks and flush toilets. Some installations prefer the use a commercial packaged or other type of composting toilet. Design toilet facilities that are combined with another ROCA facility in accordance with standard practices and installation requirements.

Coordinate building material choices with the user and the installation design guide. The standard designs depict both Concrete Masonry Unit (CMU) and pre-engineered metal building versions as these are the most commonly used materials. Provide interior finishes that are easily cleanable, durable and maintainable. Due to the location and training environment of the ranges, these facilities commonly have sealed concrete or vinyl tile floors

Provide windows to add natural lighting and ventilation. Typically, bottom-hung, in-swing windows with insect screens best meet the functional requirements.

Provide gutters, downspouts and splash blocks where required by climatic conditions. Covered entries and ice guards may be necessary in northern climates.

Forced entry resistant doors and windows, both glazing and frames, are often required to meet installation security requirements.

Seal floors and slope to floor drains or out the front as appropriate to ease cleaning.



The installation must get an exception to policy for anything other than the standard sized Vault Latrine, Water/Sewer Latrine, or commercial chemical toilets.

Capacity

The standard vault and toilet latrine will accommodate up to a company sized training unit, up to 190 men and 35 women for the vault and 150 men and 35 women for the toilet version. These facilities are standard size on most ranges. Some Service School Ranges may add an additional fixture to the women's side due to the additional training load, (there is a blanket exception to policy approved for this case).

Building Size

The standard size for Vault Latrines is 330 sf (30.7sm). For a water/sewer latrine, the size is 550sf (51.1sm). Adding an additional fixture for a Service School range would add 50sf (4.6sm) to either type of facility. The size of a commercial composting toilet must not exceed the square footage of the vault latrine.

Mechanical

HVAC

Latrines do not have comfort cooling, but may have unit heaters in accordance with installation requirements to prevent the latrine temperature from dropping below 45 degrees F in mild climate regions and 20 degrees F in extremely cold climate regions. Latrines with running water normally include freeze protection. Other than freeze protection, heat should operate only when latrine is in use. Ventilation is required on all latrine types. Exhaust fans must provide 50-70 cfm per water

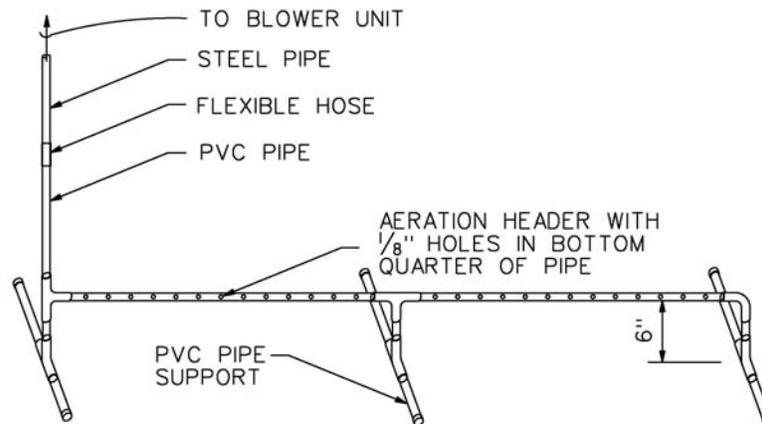
closet and urinal. Properly sized door louvers provide make-up air. In the water/sewer latrine, connect the fans to operate with the lights. Locate fans to provide good cross ventilation. In vault latrines, exhaust fans are located on the roof and pull air from the vault through a stainless duct that extends 6-inches below the concrete floor. Exhaust fans in the vault latrines should run continuously to aid decomposition and help control odor.

Plumbing

In freeze prone areas, design the water system to allow for draining and winterization. Water heaters are not normally included. Well-supplied water may require chlorination or other form of treatment in accordance with installation requirements. Low flow and/or waterless fixtures may be required in accordance with installation requirements. Provide stainless steel stools over the vault with seats but no covers that would interfere with exhaust airflow. Design sewer systems in accordance with local codes and installation requirements.

Aerated Vault Latrine Aerobic Air Supply System

The aeration system continuously supplies air to the waste in the vault, supporting the growth of aerobic organisms, which break the wastes down to carbon dioxide and water. Decomposition is about four times faster with a properly maintained system than a non-aerated vault. The aeration system and fan will also reduce the latrine odor. The aeration system consists of an oil-free, lobe or vane type positive displacement air blower and a perforated air distribution pipe. The air blower provides 10 to 20 cfm of airflow at a pressure of 5 to 15 psig. Connect $\frac{3}{4}$ " galvanized steel pipe above the vault to $\frac{3}{4}$ " Schedule 40 PVC below the vault with a 2-foot long flexible hose. Extend the aeration header along the entire length of the vault, supported on PVC legs approximately 6 inches above the vault floor. Provide the aeration header with $\frac{1}{8}$ " diameter holes spaced at 2" staggered in the bottom $\frac{1}{4}$ of the pipe to allow the supplied air to bubble through the waste. Alternate manufactured air diffusion devices may also be used.



Aeration Header Detail

Vault Latrine Operation

Non-Aerated Vault Latrines require regular pump out and replenishment of water to the vault. Add water as required to maintain a liquid consistency of waste. Some installations use chemical additives to reduce odor. Remove non-waste items such as bottles and cans to prevent clogging of

disposal truck hoses. Running exhaust fans continually while the range is in use may help odor issues from anaerobic decay of wastes, especially during warm weather.

Aerated Vault Latrines require added water to maintain the liquid level to cover the aeration header (about 8 inches). For best results, the aeration and exhaust systems should run continuously. However, if the range will be idle for several months, continue to run the aeration blower and exhaust fan for 1-2 weeks, and periodically thereafter, to avoid maintenance problems with the aeration system. Chemical additives are not required. Pumping the vault is required as needed.

Electrical

Power Distribution

Primary distribution service may be overhead or underground. Considerations must be given to type of tactical vehicles used in the Range Operations and Control Area, proximity of Latrine to Ammunition Supply/Breakdown/Distribution points, and local utility requirements for determining the routing of primary power to the facility. Provide 120/240V, single-phase, 3-wire secondary power to the facility. Provide this facility with a power panel supplied with main circuit breaker that serves separate circuits for the lighting, convenience outlets, aeration system, and HVAC equipment.

Lighting

Design illumination levels in accordance with the IES. Provide red lenses or red lamps in addition to standard lighting on ranges where training will occur at night. See Night Operations Lighting paragraph for more information. Provide Emergency and Exit lighting in accordance with NFPA 101 and NFPA 70.

Lightning Protection and Grounding

Grounding and lightning protection systems are required for safety. Building electrical system grounding will consist of one or more ground rods connected to the service panel in accordance with NFPA 70.

Provide lightning protection system if required by NFPA 780 Risk Assessment. Follow local installation requirements for lightning protection systems where they are more stringent than the requirements defined in the Range Design Guide; there are no range program specific requirements for this building. The lightning protection system may be provided as a mast-style system or air terminals located on the building structure. Use exothermic welds for cable connections and connections to the ground rods and structural steel.

Night Operations Lighting

To prevent interference with specialized equipment used during night operations, provide separate fixtures with red lenses or red lamps in addition to standard lighting on ranges used for night training where the lights will be visible from training and/or staging areas. Include the following areas as a minimum

- exterior lighting visible from the training area
- rooms where ROCA building has windows that are facing the training area and cannot be covered
- rooms where the building has a doors that opens to the training area



Provide separate switching for the standard and red lighting. Clearly label switches and provide covers over white lights, or similar protective measures, to deter turning on white lights while red lights are in use. Locate switches near points of egress. Provide a means to turn off all exterior white lights including an over-ride for lights controlled by a photocell.

Special Considerations

Fire protection is not normally required for this facility, though installation requirements may differ. Consult the installation Fire Marshal for local requirements. Typically, a local audible fire alarm is required. Fire extinguishers and cabinets are required per NFPA.

Seal vault to prevent water intrusion and leakage; include waterstops at concrete joints. Slope the bottom of vault to allow easier pumping.

