

# federal civil defense guide

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PART D, CHAPTER 2, APPENDIX 4

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## FALLOUT SHELTER WATER REQUIREMENTS

(Supersedes Part D, Chapter 2, Appendix 4, dated November 1963)



DEPARTMENT OF DEFENSE  
OFFICE OF CIVIL DEFENSE

## FALLOUT SHELTER WATER REQUIREMENTS

### Program Objective

The requirement for a supply of potable water necessary for survival constitutes one of the fundamental problems in achieving shelter habitability. A minimum of 3½ gallons for each shelter space stocked should be available. This amount must be furnished either from sources available to the shelter or from water storage containers.

### General

Potable water may be furnished to the shelter from a variety of sources. These include entrapped water in building systems, wells, tanks, steel drums with plastic liners as furnished for public fallout shelters by OCD, gravity-flow community systems, or a combination of any of these sources. The purpose of this appendix is to furnish guidance in determining the most effective and desirable means of assuring the availability of at least the minimal quantity required.

### Systems Containing Trapped Water

Systems which may be expected to contain either potable or nonpotable trapped water are listed below. A positive determination of potability must be made for each separate system. Information on the availability of trapped water in shelter facilities is being obtained in the continuing updating of the national fallout shelter survey.

Fire Control Tanks	Air Conditioning or Chilled
Sprinkler Systems	Water Systems
Hot Water Heaters	Heating Tanks and Systems
Supply Pipes	Indoor Swimming Pools
Holding and Gravity	Hydraulic Elevators Using
Tanks	Water
Water Closet Flush Tanks	Reflector Pools Within Building

Detailed plans for the use of trapped water should be included in the shelter plan for the building concerned. Conditions considered basic to permit use of the above systems as a source of drinking water during shelter occupancy are as follows:

1. The potability of the water is established initially by a determination that the water is part of the supply normally furnished the facility from an approved source, or that tests have been conducted to assure a safe level of bacteria and chemical content.
2. A cutoff valve is installed (if not already in place) to avoid admittance of water which might be impure into the system. When turned off, this valve will also prevent syphoning of water in the system back into the main under conditions where the pressure in the main is greatly reduced.
3. The water is not contaminated by chemicals added for inhibiting corrosion or lowering the freezing point.
4. Suitable devices and services for dispensing water within the shelter area are available, including a valve or faucet which may be opened at the top of the system to permit drainage from below.
5. Water is available without dependence upon electric powered pumps, unless emergency power is available to drive such pumps.
6. Water is available throughout the year under extreme weather conditions, considering also the possibility of freezing due to heating system failure caused by power loss or other failure.

### Systems Normally Using Wells

The water supply of certain buildings is furnished from separate wells rather than from central distribution systems. In shelters having water available from such sources, a determination should be made that water in the quantity required is available to the shelter under conditions of electric power failure and during all seasons of the year. Information on the availability of water from wells for shelter facilities is being obtained in the continuing updating of the national fallout shelter survey.

## Gravity-Flow Community Systems

Certain communities, areas and cities which centrally distribute water through gravity-flow systems are proposing this source of water for shelter use. These proposals, where continued operation and protection against bacteriological contamination are assured, have promising potential. Where such potential exists, it should be fully evaluated for possible utilization within the program.

## Sanitary Requirements

The disposal of human waste in shelter may be accomplished by a variety of methods, including use of the existing sewerage systems, manholes providing access to sanitary or storm sewers, diversion of systems containing nonpotable water for flushing purposes, and the use of OCD-furnished drums as chemical toilets.

Where the water supply is furnished by means other than the OCD water storage container, the sanitation requirements may be provided for by furnishing a smaller number of drums than would normally be provided for water storage. The OCD sanitation kit, which contains items essential to the shelter occupants, is necessary even though an adequate operable waste disposal system exists. The fiber drum which contains the kit is available for sanitation use if required.

The amount of water available in shelter facilities for flushing purposes is being determined in the continuing updating of the national fallout shelter survey as a guide in estimating sanitary requirements.

Conditions that may permit the use of alternatives to the drum for sanitary requirements are as follows:

1. The sewage system may be of a gravity type likely to remain operative even under conditions of greatly reduced flushing water.
2. Manholes may be available in a protected location in or near the shelter for direct deposit of human waste, either packaged or from an improvised commode. Both sanitary and storm sewers may be considered under emergency conditions.
3. Existing toilets may be used to dispose of semiliquid waste. This may be done by forcing the waste with a small amount of flushing

water through the traps, using a plunger or other device; or by using nonpotable water diverted from other building systems or poured from a container for flushing purposes. Removal of the fixtures for deposit of the waste into the sewer pipe may also be considered as an emergency measure.

## Quality of Water Stored in OCD Water Containers

The water container furnished by the Office of Civil Defense for public fallout shelters consists of a 17½-gallon steel drum and a double 4-mil polyethylene liner. Detailed instructions for filling the containers are provided in a pamphlet which is packed with the polyethylene liners. These instructions require that the water used be from a source approved by the State and local health departments; that the greatest care be exercised to assure sanitary conditions during the filling operation; that the filling procedure be under the care of a State or local health department sanitarian; and, as an extra precaution, that one to two teaspoonfuls of household liquid bleach (active ingredient 5.25% sodium hypochlorite; 94.75% inert ingredients) be added to each drum. An equivalent to the liquid bleach in solid form is also acceptable where approved by the local health authorities concerned.

Instructions for dispensing the water provide for addition of iodine purification tablets as furnished by OCD in the medical kits to each 17½-gallon container. This treatment provides further assurance that the water is suitable for drinking.

Data assembled by the U.S. Public Health Service on the chemical quality and bacterial content of water stored in public fallout shelters over a one-year period reaffirmed that storage of water from approved public water supplies, under controlled filling conditions, and in the container provided by OCD, was a safe practice.

Testing of stored water is considered necessary only where exposure to abnormal environmental conditions such as flooding, fire, or accident, has occurred, or where surveillance inspection or observation of the shelter indicates a condition likely to result in contamination. Tests for bacterial and chemical quality control may be necessary. The responsible local official

should establish the need for tests and arrange for their performance.

### Policy

The availability of water is basically dependent upon local, on-site conditions, and, therefore, decisions to eliminate water containers from the supply requisitions for individual shelter facilities can best be made by local civil defense directors.

This policy, which places the responsibility for the decision to use, or not to use, water containers with the local civil defense director, is not intended to substitute for a detailed technical survey. However, the probability is high that a considered decision of the local director to rely on alternate sources of water for the shelter will be confirmed by the detailed technical advice from the Federal Government developed during the updating survey. Eventually these decisions on interim actions will be confirmed, or more appropriate methods will be determined and recommended.

Upon consideration of these factors, the local civil defense director is authorized to waive the stocking of water containers pending detailed survey by the U.S. Army Corps of Engineers/U.S. Navy Bureau of Yards and Docks, when, in his opinion:

1. Water may be available (a) trapped within the building water system, (b) from an existing well, or (c) from a gravity-flow community water system or portion thereof; and
2. Methods of human waste disposal may be adequate to allow elimination of water drums for sanitation purposes.

Heretofore, OCD policy has required supplies to be located in the same building which houses the shelter area, or in close proximity to the shelter area. This policy is revised as follows:

A minimum of 2 days supply of potable water must be available to the shelter occupants within the shelter—either from the sources mentioned in 1., above, or from filled, OCD-provided drums. If water drums are needed (after the 2-day minimum has been satisfied) to meet the minimum requirement of 3½ gallons of water per stocked shelter space, the local CD Director may, at his option, store drums as follows:

1. Filled in the shelter area.
2. Unfilled in the shelter area, but with a firm emergency filling plan.
3. Unfilled in a location separate from the shelter facility, but with a firm plan for transportation and filling in an emergency.

### Procedures

When the responsible official has considered the above policy and, in his best judgment, has determined that existing potable water and sanitary facilities with respect to a specific shelter will provide all or a portion of the basic requirements, and that reduction or omission of water drums is in the best interest of the program, he will take the following action:

1. Calculate the number of drums, if any, required for water storage or sanitary purposes, using the following formulae:  
 A = number of spaces stocked  
 B = quantity of potable water estimated to be available from existing facilities, gallons  
 C = number of steel drums required for potable water  
 D = quantity of sewage estimated to be removable by means other than drums, gallons  
 E = number of steel drums required for sanitary purposes  
 F = number of fiber drums furnished (one for each sanitation kit)

For Water Storage:

$$\frac{(3.5 \times A) - B}{17.5} = C$$

For Sanitary Purposes:

$$\frac{(2.1 \times A) - D}{15} - F = E$$

Constants used in the above formulae are identified as follows:

- 3.5 = minimum number of gallons of water per shelter space stocked.
- 2.1 = minimum number of gallons of capacity required for human waste disposal per shelter space stocked.
- 17.5 = number of gallons capacity per drum filled.

15.0=number of gallons capacity per drum to sanitary fill line.

The number of steel drums to be requisitioned should be C or E, whichever is greater. One bag liner set should be requisitioned for each drum required.

2. If the requisition has not been submitted to the Defense General Supply Center, complete and annotate the requisition (DGSC Form 2078) as follows:

a. Under Section 4, check the main block opposite the words "Initial Issue."

b. Under Section 5, check main block opposite title and strike out the words "replacement or" in the title. Check block opposite word "other" and enter the following: "Water is available to shelter; number of drums and bag liners required is (C or E, whichever is greater) each. Other supplies are required for (number) spaces."

c. Under Section 7, add item "d" as follows: "In my best judgment, the minimal requirements of water and sanitation are provided for the shelter and the adjusted number of drums and liners only are required." When receiving such a requisition, the DGSC will process a shipping order for the reduced requirement of drums and liners, and for the other supplies required for the number of spaces stocked.

3. If the shipping document has been issued, the local civil defense official will at the time of pickup of supplies, or before arrangements are completed for shipment by the warehouse, furnish the warehouse a separate certification (in duplicate) as follows: "In my best judgment, the minimal requirements of water and sanitation are provided for the shelter and (number) drums and liners only are required in lieu of the quantity listed on shipping doc-

ument voucher number \_\_\_\_\_." (Signed and dated.)

The warehouse will issue or ship as appropriate the reduced quantity of drums and liners, and attach one copy of the certification to the shipping document retained for file and forward the second copy with the completed shipping document to DGSC.

4. If the shelter stocking is completed, and the detail plan when prepared indicates that an adjustment in the quantity of supplies is possible, additional supplies may be requisitioned. The actions described under "procedures", paragraph 2b and 2c above will apply.

### Water for Private Shelter

The same requirements for water that apply to public shelters also may apply to private shelters. Water in hot water tanks, flush tanks and pipes may be used for drinking purposes. Closing the valve leading in from the street water main will prevent the admission of water which might be impure. Opening a faucet high in the system will break the air lock and permit drainage of water from the hot water tank.

Tap water may be safely stored in clean, covered, corrosion resistant, glass or plastic containers. The sodium hypochlorite household bleach used in treating water stored in containers in public shelters may be used in approximately the same ratio for added protection. Instructions for water purification are frequently furnished on the label of household bleaches.

Optionally, the purification tablets referred to above may be procured commercially for treatment of water suspected of being impure. If the water has a cloudy appearance or has suspended particles, these may be removed by settling or straining through paper towels or clean cloth prior to treatment.