

## DISINFECTION OF CONTAMINATED WELLS AND CISTERNS

### MAKING WATER SAFE FOR HUMAN CONSUMPTION

Water of uncertain bacteriological quality should be disinfected before it is used for drinking or in food preparation. Boiling the water will kill disease-producing organisms that may be present, but boiling large quantities of water is inconvenient and impractical. It is usually more practical to disinfect a water supply with an oxidizing agent such as chlorine.

There are several commercial products that may be used for disinfecting water. These include dry chlorinated lime (also called bleaching powder), household bleaches such as Clorox or Purex and calcium hypochlorite compounds such as HTH, Perochloron or B-K Powder.

The amount of chlorine compound required to make water safe varies according to both quality and amount of water to be treated. The general rule is to add enough disinfectant to give the water a distinct chlorine odor and taste. The odor or taste will disappear within a few days following treatment.

### GENERAL INSTRUCTIONS

Table 1 on the back of this sheet lists various chlorine compounds and shows the amount of material ordinarily required to disinfect 1000 gallons of water. A chlorine concentration of five parts per million is sufficient for routine disinfection; a heavily contaminated supply may require up to 50 ppm for complete disinfection.

If a powdered or granular compound is chosen for use, blend the material with water until it becomes a smooth paste. Allow this mixture to settle; then strain the liquid through a finely woven cloth. The disinfectant is then ready to add to the water supply.

If a liquid compound is used, the required amount should be mixed in one or two gallons of water, and poured into the well or cistern. If possible, the water should be stirred to aid distribution of the disinfectant. (This may be accomplished by recirculation the water back into the well with the use of a garden hose or other method of conveyance.)

After the Chlorine compound has been added to well or cistern, open all faucets and flush all toilets till you smell chlorine. This will disinfect the plumbing.

### DISINFECTION OF WELLS

When disinfecting a deep well, there is a possibility that liquid or powdered material will not reach the bottom of the well in sufficient quantity to be effective. Calcium hypochlorite in tablet form, which will sink to the bottom of the well before dissolving, is preferable in this case. If the well has been flooded or if tests indicate heavy contamination, add enough chlorine material to the well water to establish a chlorine concentration of 50 ppm. The well can be pumped to reduce the chlorine content to a level suitable for drinking (5 ppm), after 12 hours.

If surface drainage or shallow underground water can enter the well, disinfection provides only temporary protection. To permanently safeguard the supply, the well should be reconstructed to protect against further contamination. Literature showing proper well construction is available from the Department of Health and Senior Services.

### DISINFECTION OF CISTERNS

To disinfect a water supply in a cistern, add enough chlorine material to establish a concentration of 5 ppm. Unless the water is excessively turbid, this amount should oxidize all the organic matter and leave enough residual chlorine to be detected by taste or odor.

When the exact volume of water to be treated is not known, the amount of chlorine material needed must be estimated. If the material used has oxidized all the organic matter and a chlorine odor remains after 12 hours, the water is safe for drinking. If no trace of chlorine remains at the end of the disinfection period, it can be assumed that the treatment has been inadequate and more chlorine material should be added.

### CAUTION:

1. When handling powdered or granular products, use care not to inhale the dust for it is extremely irritating to the lungs.
2. Chlorine-bearing compounds are strong bleach agents and should not come in contact with clothing.
3. Prepare chlorine-bearing compounds in clean containers, for grease or oil in a container may react violently with the chlorine.
4. Wash the skin with water as soon as possible after contact with any chlorine-bearing compounds, for they may cause irritation.
5. Read product labels and strictly observe all statements of caution.

**TABLE 1**

Material	% Chlorine in material	Amount to add per 1000 gal. to produce 50 ppm chlorine	Amount to add per 1000 gal. to produce 5 ppm chlorine
Sodium Hypochlorite (liquid laundry bleaches such as Clorox or Purex)	5.25	1 gallon	1 ½ cups
Sodium Hypochlorite Commercial Strength	12	7 cups	¾ cup
Chlorinated Lime (powder)	25	3½ cups	5 tablespoons
Calcium Hypochlorite (B.K. Powder)	50	1½ cups	2½ tablespoons
Calcium Hypochlorite (H.T.H., Perchloron, etc.)	70	1 ⅛ cups	2 tablespoons

Note: 16 Tablespoons = 1 cup and 256 tablespoons = 1 gallon.  
 For materials not listed above, the percent of available chlorine will be found on the label under "active ingredients."

**TABLE 2**

**TO DETERMINE AMOUNT OF WATER IN WELL OR CISTERN**

CIRCULAR WELL OR CISTERN	
Diameter of well in feet	Gallons of water per foot depth
½	1½
1	6
2	24
3	53
4	94
5	147
6	212
7	288
8	376
9	472
10	587
11	710
12	846

<p><b>RECTANGULAR OR SQUARE CISTERN:</b></p> <p>Length x width x water depth x 7 ½ = gallons</p>
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**EXAMPLES**

(Circular well)

To disinfect a well that measures 1 foot across and has 250 feet of water in it:

First, find the number of gallons of water in the well from table 2 above.

$$6 \times 250 = 1500 \text{ gallons.}$$

**EXAMPLES (Continued)**

Second, determine the material to be used for disinfection and from Table 1 find the amount of material required for each 1000 gallons of water.

For laundry bleaches 1 gallon is required for each 1000 gallons and there are 1½ thousand gallons of water in the well, so 1½ gallons of laundry bleach are required.

(Circular Cistern)

For a cistern 7 feet across that has 10 feet of water the amount of laundry bleach required would be found by:

$$288 \times 10 = 2880 \text{ gallons of water.}$$

$$1\frac{1}{2} \text{ cups} \times \frac{2880}{1000} = 4.3 \text{ cups of bleach.}$$

(Rectangular or Square Cistern)

To disinfect a cistern that is 6 feet long, 7 feet wide, and has 12 feet of water in it:

First, find the volume of water in the cistern.

$$6 \times 7 \times 12 \times 7\frac{1}{2} = 3780 \text{ gallons}$$

Second, determine the material to be used for disinfection and from Table 1 find the amount of material required for each 1000 gallons of water.

For B-K powder (50 percent chlorine) 2½/ tablespoons is required for each 1000 gallons of water and there are 3780 gal-lons in the cistern.

$$\frac{3780}{1000} \times 2\frac{1}{2} = 9.5 \text{ tablespoons of B-K powder required 1000}$$

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