

Appendix 4: Water Related Technical Guidelines

Planning Guidelines for Minimum Water Quantities for Institutions and Other Uses	
Health centres and hospitals	5 litres / outpatient 40-60 litres / inpatient / day Additional quantities may be needed for laundry equipment, flushing toilets, etc.
Cholera centres	60 litres / patient / day 15 litres / carer / day
Therapeutic feeding centres	30 litres / in-patient / day 15 litres / carer / day
Schools	3 litres / pupil / day for drinking and hand washing (use for toilets not included; see below)
Public toilets	1- 2 litres / user / day for hand washing 2- 8 litres / cubicle / day for toilet cleaning
All flushing toilets	20-40 litres / user / day for conventional flushing toilets connected to a sewer 3-5 litres / user / day for pour-flush toilets
Anal washing	1-2 litres / person / day
Livestock	20-30 litres / large or medium large animal / day 5 litres / small animal / day

Adapted from: *The Sphere Project Humanitarian Charter and Minimum Standards in Disaster Response*, 2003, p. 93

Planning Guideline for Minimum Numbers of Toilets in Public Places and Institutions in Disaster Situations

Institution	Short term	Long term
Market areas	1 toilet to 50 stalls	1 toilet to 20 stalls
Hospitals/medical centres	1 toilet to 20 beds or 50 out-patients	1 toilet to 10 beds or 20 out-patients
Feeding centres	1 toilet to 50 adults 1 toilet to 20 children	1 toilet to 20 adults 1 toilet to 10 children
Reception/transit centres	1 toilet per 50 people 3:1 female to male	
Schools	1 toilet to 30 girls 1 toilet to 60 boys	1 toilet to 30 girls 1 toilet to 60 boys
Offices		1 toilet to 20 staff

Adapted from: *The Sphere Project Humanitarian Charter and Minimum Standards in Disaster Response*, 2003, p. 94

Instructions for Chemical Sterilization of Wells, Reservoirs and Tankers with Strong Chlorine Solutions

1 Stop supplying the public with water from the source (well, reservoir, etc.) that is to be disinfected. For reservoirs and tankers, clean the inside thoroughly by brushing and flushing.

2 Use one of the chemicals listed in the table. The amount of chemical should correspond to the maximum capacity of the reservoir (tanker).

3 First dissolve the chemicals in a bucket (not more than about 100 g of calcium hypochlorite or bleaching powder in one bucket of water.

4 For wells, pour the solution (one or more bucketsful one after another) into the well. If possible, agitate the water to ensure good mixing. For reservoirs and tankers, pour the solution into the tank when it is half full of water and top it up completely afterwards.

5 Leave the strongly chlorinated water for at least 12 hours in the well or tank. This water should not be used for drinking purposes.

6 For wells, pump the strongly chlorinated water from the well and reject until the residual chlorine level is below 0.7 mg per litre of water. For tanks, empty the tank completely and let the water run to waste. Then restart normal operations and supply the public.

Source: *Guide to Simple Sanitary Measures for the Control of Enteric Diseases*,
by S. Rajagopalan and M.S. Shiffman WHO, Geneva, 1974

Potential Sources of Chlorine	
Sodium Hypochlorite	Liquid form, e.g. typical household disinfectant (5 to 15 % available chlorine), laundry bleach (5%) or antiseptic 'baby care' products (1 to 2 %). Avoid using scented disinfectants as this will taint the water.
Calcium Hypochlorite	Available in granules (known as <i>High Test Hypochlorite</i> or HTH with 60 to 70 % available chlorine).
Bleaching Powder or Chlorinated Lime (20 to 35 % available chlorine)	Bleaching powder needs to be carefully mixed with a little water to make a cream paste, stirring with a wood rod. Then add more water to achieve a one per cent solution.
Water Purification Tablets	These usually contain 1 mg of chlorine or typically 2 mg of iodine. They are designed to treat 1 l of clear water, but leave a taste. Most tablets have shelf lives and need to be stored in a cool dark room with dry conditions.

Adapted from: *Emergency Water Treatment Following an Outbreak of Diarrhoea: Guidance Notes*, p.4 WHO, Sri Lanka

Water (cu.m.)	Bleaching Powder (25- 35 %) grams	Hi strength calcium hypo- chlorite, 70% (grams)	Liquid bleach (5% sodium hypochlorite) (millilitres)
0.1	10	4.3	60
0.5	50	22	300
1.0	100	43	600
5.0	500	220	3000
10	1000	430	6000
50	5000	2200	30.000
100	10.000	4300	
500	50.000	22.000	

Source: *Guide to Simple Sanitary Measures for the Control of Enteric Diseases*, by S. Rajagopalan and M.S. Shiffman WHO, Geneva, 1974

Example: Using Bleaching Powder or Chlorinated Lime with nominal 30% available chlorine	
Volume of water in a well	3000 litres
Volume of one percent chlorine solution	9 litres
Amount of chlorine in 9 litres of one percent solution	90 grams
1000 grams of bleaching powder contains	300 grams chlorine (30% available chlorine)
The amount of bleaching powder required is	$90 / 300 \times 1000$ g or 300 grams

Source: *Emergency Water Treatment Following an Outbreak of Diarrhoea: Guidance Notes*, p.4 WHO, Sri Lanka