In The Name Of God
Subject:

[Non-English text]

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What types of contaminants are you likely to encounter in a disaster?
Bacteria

- In an emergency, municipal water lines can be broken, causing sewage or storm runoff to mingle with treated drinking water.
- Bacterial contamination: most common threat to both public and private water supplies
- quick, and potentially deadly

- diseases caused by water-borne bacteria:
  - Legionnaire’s Disease, typhoid, and cholera
Parasites and protozoa

- common water protozoa: Giardia, cryptosporidium
- contribute an unpleasant odor to water
- Cysts: 2-50 microns in diameter, much larger than bacteria.
Viruses

• causing hepatitis, gastroenteritis, meningitis and even polio can also be transmitted by water.
• 0.004 to 0.1 micron in diameter.
Organic chemicals

- VOCs include most benzene derivatives, as well as compounds based on methane and ethylene.
- caused by: heavy industry, improper disposal of solvents and petrochemicals by individual consumers.
- In major storms, flood waters can cause large quantities of VOCs to wash from landfills, gas stations, or industrial areas into both public and private water supplies.
Inorganic chemicals

- Heavy metals, Cr, Cd, Pb, Zn, …., arsenic, and fluoride.
Turbidity

• Turbidity in itself may not be dangerous, however high turbidity is often associated with the presence of microorganisms, and it creates a challenge for water treatment.
Parasites and protozoa Removal

• To rid your water of protozoa, use any mechanical or membrane filter that excludes bacteria, in addition to UV, chemicals, and boiling.

• Viruses Removal
  • UV, boiling, and chlorine are all effective in reducing viruses to insignificant levels.

• Organic chemicals
  • Activated carbon and reverse osmosis can both reduce VOCs
  • boiling will also vaporize many VOCs which evaporate at a lower temperature than water

• Inorganic chemicals
  • Heavy metals, Cr, Cd, Pb, Zn, …., arsenic, and fluoride.

• Turbidity
  • Turbid water should be passed first through a filter capable of reducing particles
  • simple carbon filters work well, mechanical and membrane filters.
Survival Water Treatment Devices

Created for one reason:

keep you *safe* during a state of *emergency*, when *water* may become *scarce*.

- Practical solution
- Very simple to use
- Very compact
- Very small and *fits in your hand*
- Filter *many gallons* of water
• There are almost always water sources available, they just may not be fit for human consumption.

• Survival devices filter the water to make it safe for drinking. In the event of an emergency, you would be able to consume water safely from a lake, stream, or river, a hot water heater, a swimming pool, a toilet, a pond, or any number of other sources.
How Do Survival Water Devices Work?

• **Two** stages of filtration, so **99.9%** of bacteria and harmful elements are removed.

• The micro filter ensures even the smallest of impurities are being eliminated.
• Remove cryptosporidium, giardia, and microcystin, which are all parasites that would cause grave illness and sometimes death if consumed in your drinking water

• **Microcystin:**
  • a toxin produced by algae and bacteria “blooms”
  • serious liver damage
  • don’t boil your water (Boiling will only concentrate the toxins through evaporation)
  • reverse osmosis is the only treatment capable of removing microcystin.
Purifying Straws

It is recommended that straws using an iodine–type purification process only be used for about 2 weeks as the iodine becomes harmful to the body with prolonged use. These straws are ideal for emergencies but cannot safely be used on long–term basis.
• Straws cannot be used in chemically contaminated water, brackish water or seawater and they tend to clog up in water containing large quantities of debris, at which point, it becomes difficult to suck water through them.

• The main advantages of purification straws are that the water can be consumed immediately.

• They are light and relatively small in size.
Micro purification

- Straws using a micro purification technology, with no iodine involved, are better suited to long–term use.

- All manufacturers claim that 99.99 percent of all water–borne bacteria, including Giardia and Cryptosporidium are removed.
Life straw

- A small, lightweight, portable, durable, relatively inexpensive filtration device that can hang around your neck like a necklace, providing you with filtered water wherever you go.
Life straw

- The Life straw is a hollow-membrane filter built into a straw. You place the straw into the water, and drink. Sucking the water up through the straw forces it through the filter, which removes 99.9999% of bacteria, and 99.9% of protozoa, with a filter that lasts for 1000 liters.
- That’s pretty good, but on the downside, it won’t remove microscopic minerals, chemicals, or viruses.
- Clean by blowing through the filter after drinking.
Properties

Lifestraw offers a compact solution for clean drinking water in the field. It can be traced from the lightweight plastic used in its outer construction of only 9 inches in length and a weight of only 57 grams. The lightweight construction makes it easy to carry along, eliminating the need to carry heavy water bottles around.
Life straw

- Reduces *turbidity* in water.
- Lightweight drinking straw.
- No added chemicals.
- Very *high* flow rate.
- Very *durable* and *easy* to clean.
• it can deliver up to 0.05 microns, expect it to remove salmonella, E-coli

• You can drink straight from the stream by simply using this product, and it is that effective

• It is fast in filtering the dirty water to get you safe and drinkable water

• It is lightweight, making it better for portability. You can have it on your traveling trip, hiking or camping trip too.

• It is trusted by many health agencies all over the world, making it easily acceptable by many people who live in different places around the world.

• You might have to suck hard to get the water through the water filter
Personal Water Purifier Model

• The Pre–Mac Personal Water Purifier Model (PWP) has been specifically designed to exacting standards and produces safe drinking water from sources with high levels of bacterial, viral and parasitic contamination.

• The Model PWP will also remove organic matter that exists in most natural water sources, improving taste, smell and appearance of the water.

• Compact and easy to use, it will purify 1,000 liters of water before replacement is necessary.
Personal water filters

Personal Water Purifier (PWP)

Photos courtesy of Pre-Mae Ltd. (UK).

The PWP’s civilian cousin, the Travel Well Ranger
Mobile Water Purifier (MWP)

• valuable where weight and size of equipment is important and it can realistically provide daily support for 1–4 persons at normal consumption rates.

• provide 1 liter of purified water in 2.5 minutes and has a nominal capacity of around 200 liters with absolute safety.

• These purifiers use replaceable cartridges, which should be replaced once the unit becomes hard to pump.
Mobile Water Purifier (MWP)
Survival Water Purifier (SWP)

- SWP is **smaller** and designed to meet specific requirements for treatment of water in emergency or survival conditions.
- It will provide an emergency supply of safe drinking water for **one or two** persons from **contaminated** sources at normal consumption rates.
- The **small** size and **weight** of this purifier makes it an excellent addition to any survival pack or personal survival kit.
- It works in **exactly the same way** as the Mobile Water Purifier.
Survival Water Purifier

- The rated nominal capacity of The SWP is 50 litters, but needs only be discarded when the unit becomes hard to pump.
- Flow rate: 0.2 liters per minute.
- Unit Weight: 60 g
- The water is not immediately ready for drinking, as the secondary disinfection continues for at least 3 minutes.
Survival Water Purifier

Survival Water Purifier (SWP)
Sweet Water Purifier System

- After **pumping** through the Sweet Water microfilter, add 5 drops of Sweet Water purifier solution per liter of water.
- **Mix** for at least 10 seconds.
- **Wait 5 minutes** before drinking the water.
Sweet Water Purifier System

Inactivates 99.99% of waterborne viruses, eliminates over 99.9999% of all waterborne bacteria and 99.9% of common protozoa and parasites, such as Giardia and Cryptosporidium, as well as particulates and chemicals/toxins.

Activated carbon core helps eliminate taste and odours.
Specification

Weight: 397 g
Width: 5 cm
Length: 19 cm
Filter pore size 0.2 microns
Flow: 1 liter / minute
Cartridge life: 750 liters
Katadyn Hiker Pro Water Filter

- physically removes particles, protozoa and bacteria down to 0.3 microns in size, including Giardia, salmonella, Cryptosporidium and others.
- Glass fibre with activated carbon
- Output: 1 litre/minute
- Weight: 312 g
LifeSaver® Bottle

• The LifeSaver Bottle is a water purification device that can remove debris, bacteria and viruses from water.
• It is based on a unique membrane filtration system.
• With 15–nanometre diameter filtration
• it effectively creates fresh water instantly and safely but cannot filter salt water.
LifeSaver

Initial flow rate 2.5 litre/min
Cartridge service rating 4–6000 litre
Bottle storage capacity 750ml
Bacteria retention >99.999995%
Virus retention >99.999%
BCB Aquastraw

• produces microbiologically safe water from contaminated fresh water.
• It will purify approximately 50 litres of water
• When water is sucked through the straw, it passes over iodine, charcoal and resin elements that act as a defence against bacterial and water-borne diseases.
• The straw is constructed as a series of filters, each building up resistance/cleansing/extraction properties against whatever may be present in the water source.
BCB Aquastraw

- Because it uses iodine to purify the water it should not be used by pregnant women and people with thyroid conditions except in an emergency; it does not work in saltwater, brackish water or chemically contaminated water.
BCB Aquastraw

- Weight **17** g
- **22** g in carrying tube
- **18** cm long x **1** cm
- No waiting, just suck and drink; instructions are printed on the label.
Etekcity 1500L Water Personal Filter

The hollow fiber UF membrane, 0.01 microns.

1500 liters of filtration at any time on the same filter.

• It is tested in agreement with FDA standards
Solar Ball
3 LITRES PER DAY
SOLAR EVAPORATED WATER