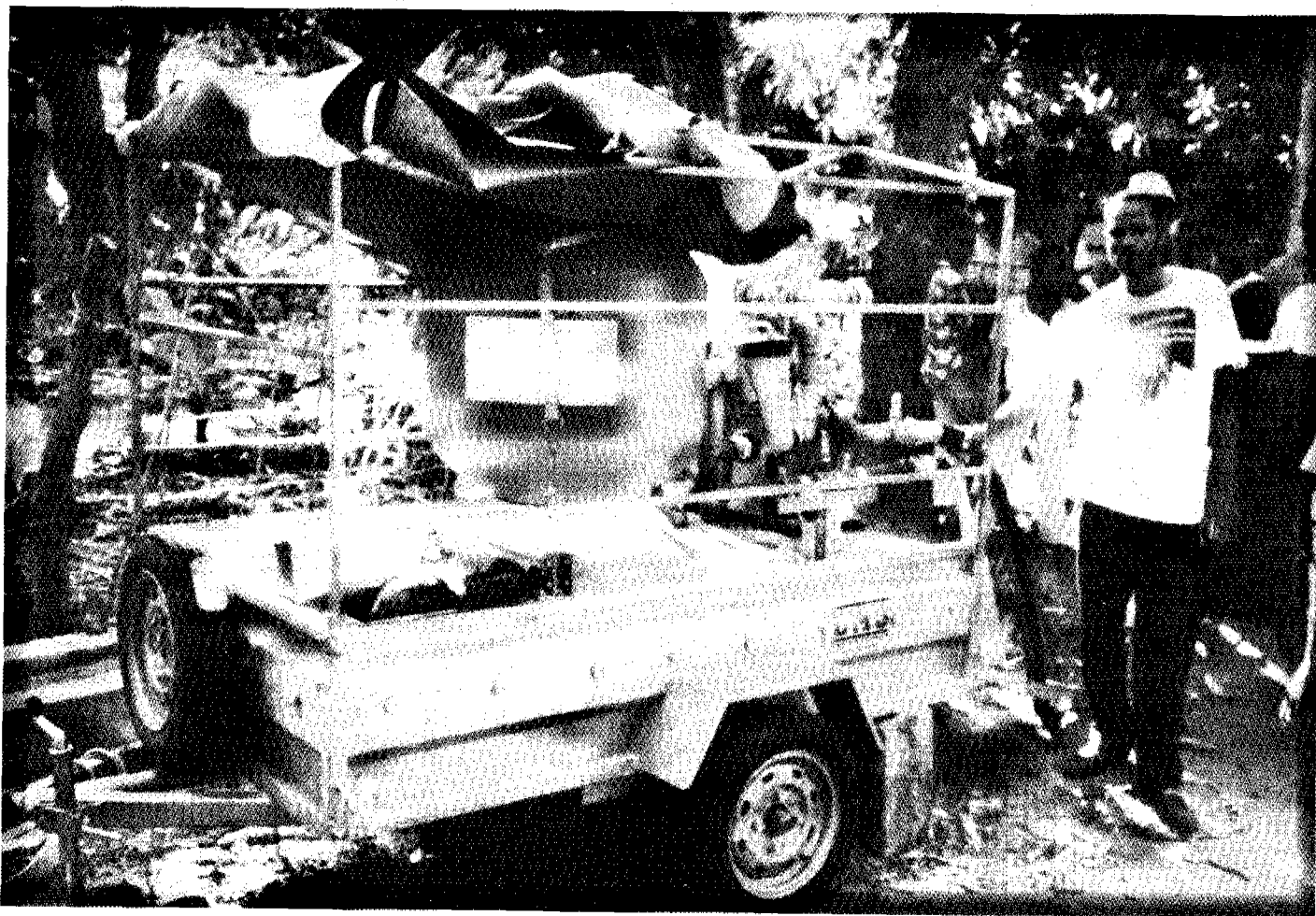




# WATER and ENGINEERING

Technical Supply Bulletin No. 8

**Water-Purification-Unit**



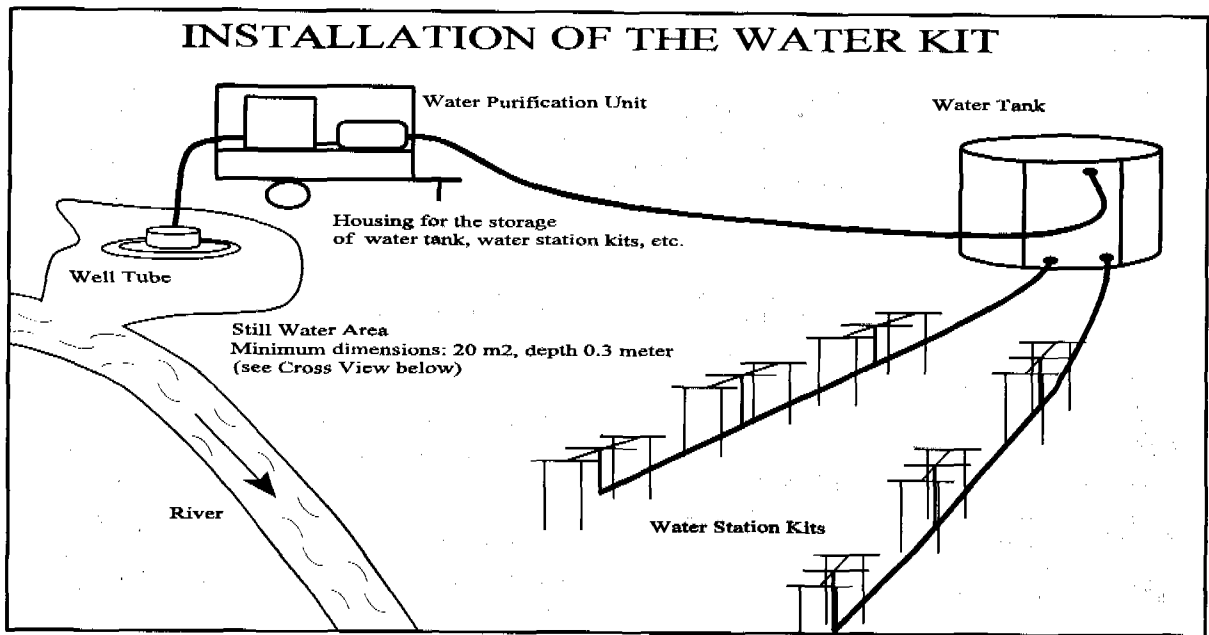
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SANITATION (IRC)

# PUMPING, PURIFICATION, STORAGE, AND DISTRIBUTION OF WATER COMBINED IN ONE UNIT

## POTABLE WATER WITHIN 6 HOURS!

When an emergency situation occurs because of a civil war or a natural disaster, clean water is always urgently needed to prevent epidemics such as cholera or dysentery from spreading among refugees and displaced or resident population. Therefore, urgent action and fast response are essential. Water is often available in situ but needs to be purified before it can be consumed. The process of providing people with drinkable water involves four steps: Water Pumping, Water Purification, Water Storage, and Water Distribution.

Based on these observations, UNICEF decided to develop a fully self-contained water purification unit that could combine the four aforementioned processes and would be appropriate for field use, i.e. it would be mobile, sturdy and easy to use and to maintain. The new self-contained water kit is mounted on a trailer designed for off-road application, and can be towed by any four wheel-drive vehicle available. It comprises a diesel driven centrifugal pump, a sand filter, a chlorine dosing unit, a 40 cubic meter capacity water storage steel tank, and six water station kits complete with piping (see drawing below). The unit can fulfill the daily water requirement of 10,000 people.



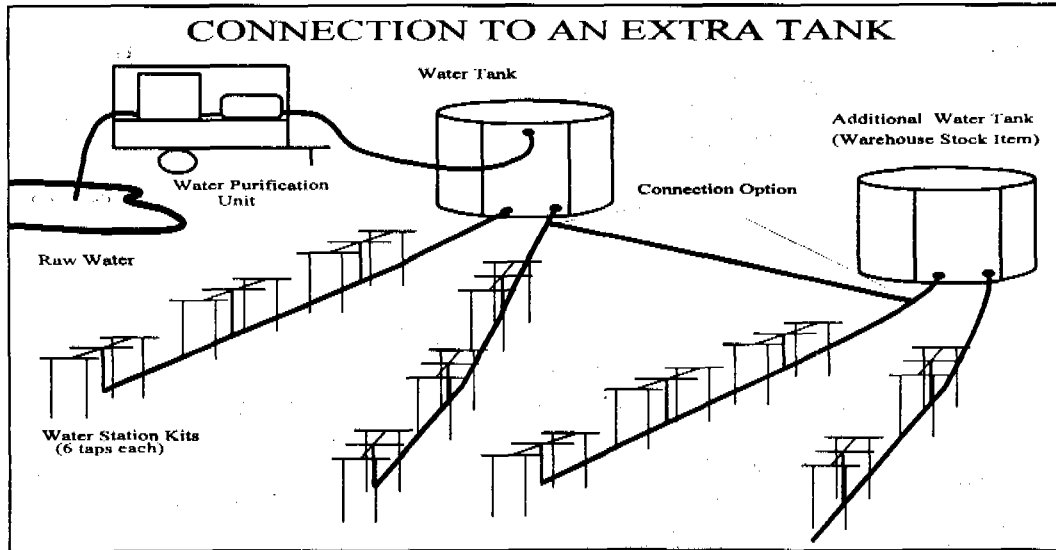
The water kit components can be fully installed and operational within 6 hours, and no special skills are required. It is supplied with consumables for at least 6 months of use (only gasoil is needed). The water purification components (the sand filter and the chlorine dosing unit) have no moving parts, consequently no wear.

*The uniqueness of the design is that it combines all 4 major steps required to provide clean water: Pumping, Purification, Storage, and Distribution.* This means that water can be immediately provided once the equipment arrives on site and is set up. This would not be the case if separate packs were used (one for pumping, one for purification, one for storage, and one for distribution of water). With individual packs, there is always the risk of split delivery, meaning that because one pack is missing, the other ones could not be used.

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**FLEXIBILITY**

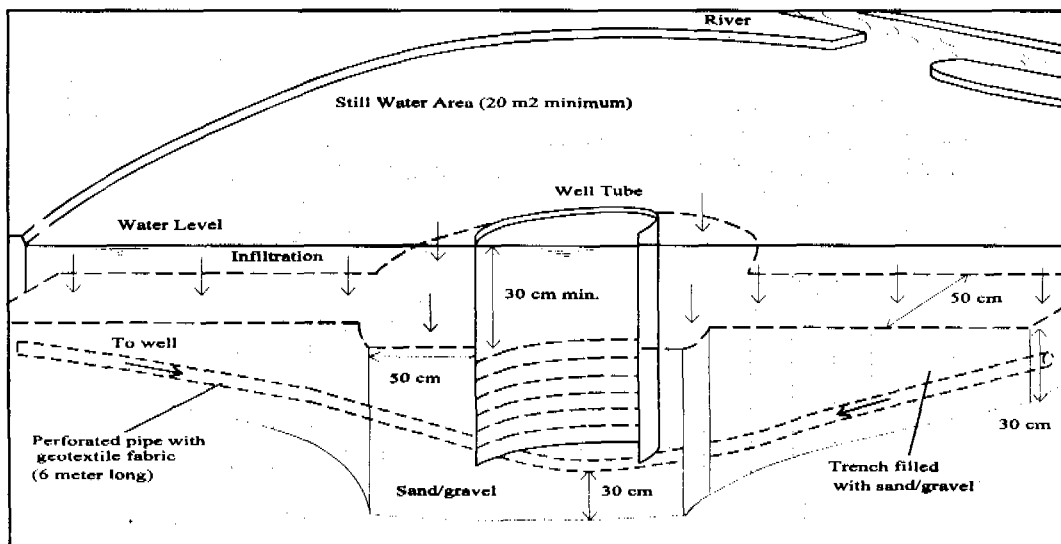
The storage capacity can be doubled if required. An additional Steel Water Tank, complete with piping and six Water Station Kits, available from UNICEF's Warehouse, can be connected to the Steel Water Tank that is supplied with the trailer (see drawing below). Both tanks can then be simultaneously filled by the Water Purification Unit. All connection accessories (such as tees, ball valves, etc) are included with the Water Purification Unit, as well as with the individual Steel Water Tank. Therefore, to connect the additional water tank, only one length of 50 mm diameter Nylon Reinforced Hose should be ordered.



**DETAILS HAVE BEEN CAREFULLY THOUGHT THROUGH**

When designing and field testing the unit, importance has been attached to details based on past experience, e.g. the trailer is equipped with an adjustable height towing bar that will fit any type of vehicle, test kits have been included for residual chlorine and turbidity measurement, extra jerry cans for the storage of gasoil are supplied, wire netting is provided for the concrete slab of the water station kits, etc.

The most interesting feature is probably the slotted PVC pipe that is included and that should be used whenever water is too turbid. Turbidity in water is caused by suspended particles of matter such as organic material, bacteria, algae, clay, mud, lime, rust, etc. These may consume chlorine or interfere with disinfection by sheltering micro-organisms. Furthermore, a high level of turbidity will also have undesirable consequences in the filtration process as it will cause the sand filter to clog more rapidly and backwashing will then have to be repeated more frequently. Settlement, or very slow movement, is adequate to reduce turbidity considerably. For that reason, if raw water is pumped from a river where water movement causes turbidity, a still water area should be dug next to the river (see drawing below). In the middle of this area, the slotted pipe must be installed and the screened part of the pipe should be packed with gravel, collected in situ. After less than one day's settlement, the turbidity will be considerably reduced and clear water will come out of the water purification unit.



RN: 12823  
LO: 274 gjs WA

**What you need to know to order  
"Emergency Water Kits":**

5680020 (Warehouse Stock No.)

**Self Contained Water Purification Kit**

contains: 1 trailer mounted water purification unit, 1 steel tank 40cum, 6 water distribution kits - 6 taps each, piping, tools, necessary accessories and consumables

~ \$ US 29,000

average stocking level: 2 items

In addition to the above mentioned Kit you can order:

5675050 Steel Water Tank, 40 cum, complete with distribution kits

~ \$ US 8,800

average stocking level: 2 items

5675030 Collapsible Water Tank, 10 cum, complete with distribution kits

~ \$ US 2,700

average stocking level: 4 items

5007300 Collapsible Jerry Can, 10 liters,

~ \$ US 6,2

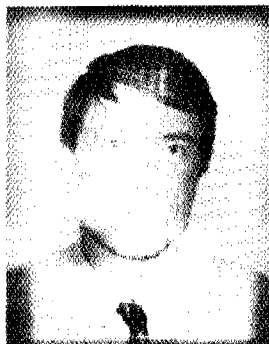
average stocking level: 2500 items

Nylon Reinforced Hose (no stock no.)

~ \$ US 21 per/meter

**Delivery times! All products can be shipped within less than a week.**

If it is urgent, do not hesitate to get in contact with:



ERIC DUPONT

Tel.: (+45) 35 27 30 27

Internet

edupont@unicef.dk

**Mailing List Request:** Please add my name and address to the mailing list

1. [Name:] .....
2. [Position:] .....
3. [Organisation:] .....
4. [Address:] .....
5. [Zip Code, City:] .....
6. [Country:] .....

Please send photos, illustrations for future covers.

Telefax: + +45 / 35 26 94 21

Reference: Water and Sanitation

The best and most economic way to contact us is

- by sending a telefax with a short description of your problem. This can save money and helps us to organize our work load.

- contact the procurement group directly via telephone. If you do not have the direct extension numbers, please ask for bulletin No. 7, which includes a personal profile of all procurement people in the water and sanitation section.

Whenever problems occur - concerning **water and sanitation**, or in a wider sense **engineering** - you should not hesitate to contact us. Our aim is to provide you with the best service and technical assistance available.

By the way, you can still order editions from previous years (only English):

- No. 0 AQUA PLUS GUIDE LIST, 1988
- No. 1 HYDRAULIC FRACTURING, HOW IT WORKS AND WHERE TO USE IT
- No. 2 IMPROVED EQUIPMENT FOR RESISTIVITY MEASURING
- No. 3 NEW LUBRICATION FOR DOWN THE HOLE HAMMER DRILLING
- No. 4 STEP DRAW-DOWN PUMPING TEST
- No. 5 TEST PUMP UNITS
- No. 6 MONDESH COUPLERS
- No. 7 PERSONAL PROFILE - PROCUREMENT
- ...
- No. 9 WAREHOUSE EQUIPMENT GUIDE