

**Here is ....**

**Good news !**



**at a very affordable cost to remove  
arsenic, fluoride and iron of water**

## **Domestic filter**



Government of West Bengal

Manufactured by: Sanitary marts



UNICEF

3. Place the upper part of the filter over the lower part and put water in the upper chamber. Please ensure that the iron removal candle is totally submerged. Now with the help of mouth, blow air through the vent. Air bubbles will come through the candle. This will ensure cleaning of the candle by backwash with air. Throw away the water.
4. The wastewater should be disposed of carefully as the iron deposited over the candle may also contain some arsenic. The water may be disposed off either in the pan of the latrine or in a pit filled up with sand.
5. Open the valve and see that the two parts of the filter are in position with the help of the rubber gasket. The filter is now ready for use.

### Replacing the sachet:

1. Every six months, the sachet of activated alumina is to be regenerated. Trained personnel of the sanitary mart will do regeneration. For this, the sachet is to be detached and brought to the sanitary mart. The mart will replace the old one with a regenerated sachet. The user is to pay Rs 20 for this regeneration. This will be recorded on the user's card issued by the sanitary mart at the time of purchase.
2. Attach the new sachet. The filter is ready for use.

### Note:

Since the filter treats water round the clock, it is suggested that all the filtered water is stored in another vessel before going to bed at night leaving the lower chamber free to collect filtered water throughout the night. This will ensure that filtered water does not overflow during the night.

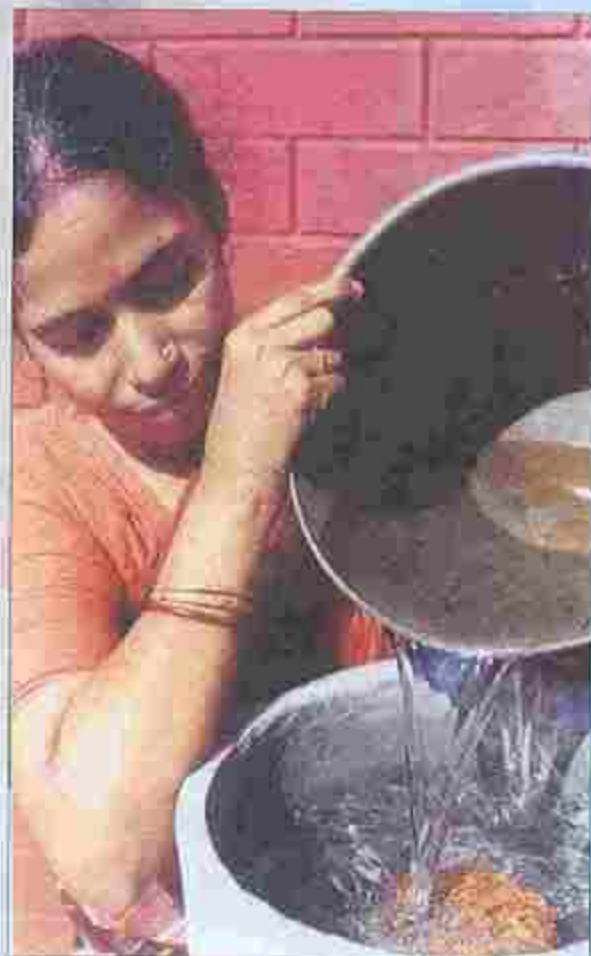




## How to use the filter

It is very easy to use and maintain the filter. However, the following procedure will obtain best results:

- a) Both inside and outside portions of the filter are to be washed properly with clean water before use. The filter should be kept in the kitchen on a stool so that it is 8-10 inches above the floor level.
- b) Water is to be put in the upper chamber. Filtration will start and the filtered water will be stored in the clear water chamber. After sometime, the upper part of the filter should be detached and the sachet of the activated alumina removed. Raw water in the upper chamber and water stored in the bottom chamber should be thrown away.
- c) The filter is now clean and ready for use. The sachet of activated alumina is to be fitted again in the valve and the upper part of the filter placed on the top of the lower part. Take care so that the rubber gasket keeps the two portions in position properly.
- d) Now fill up the upper chamber with tube well water. Filtered water will be stored in the bottom chamber. This water is free from iron, arsenic and fluoride, and is fit for drinking and cooking.
- e) After few days of use, it will be noticed that there is deposition of iron over the iron removal candle. This will reduce filtration capacity of the candle and thus it is to be cleaned.



## Maintenance of the filter

### Cleaning the candle:

1. Lift the upper part of the filter and close the valve. Detach the sachet of activated alumina.
2. Clean the surface of the filter with a scrubber and then with water to clear the iron deposit.



Water is life. We cannot live without water. The problem of drinking water in our country has been solved to a great extent. Thanks to the good work done by the government in this front, almost all villages in the country now have facilities for drinking water.

While providing drinking water, most of the developing countries used groundwater to serve the villages. It is comparatively easy to exploit ground water, which in most cases, is free from bacteria. However, it has been noticed that sometimes groundwater is chemically contaminated. Groundwater of many places has been found to contain chemical substances like iron, fluoride, arsenic etc. While the presence of iron in water has no public health significance; the presence of arsenic and fluoride in water is detrimental to human health. Drinking of fluoride contaminated water may lead to dental and skeletal fluorosis. Due to this, a person can be invalid after some time. Drinking of arsenic contaminated water is even worse. At the initial stage, there is pigmentation (melanosis) of the skin, then the skin of the palms and soles of feet thicken (keratosis) and finally this may lead to cancer of liver, kidney, skin, etc. resulting in the death of that person.

Arsenic has been found in groundwater of almost 20 countries. However, the problem is very serious in Bangladesh and West Bengal where vast areas are affected by arsenic contamination. Till September 2002, it has been found that 75 blocks of 8 districts of West Bengal are affected, putting about 14 million people at risk. The government is trying to solve the problem of providing safe drinking water to the people in these areas in different ways. Safe water is being supplied through pipes after treating river water, sinking deep tubewells, attaching arsenic removal plants with the tubewells, etc. Supplying of drinking water after treating river water is costly and time consuming. The handpump attached arsenic removal plants are difficult to maintain.

Household treatment of contaminated water by domestic filter, may be the best possible immediate solution to tackle the problem. The domestic filter can remove arsenic or fluoride so that one can have the required quantity of safe water for drinking and cooking. Household treatment also avoids wastage of drinking water.

There are different types of domestic filters available in the market for removal of arsenic. But these are very costly and many of them are also not very effective. As a result, these filters are not popular. Recently, with UNICEF support, the government of West Bengal has developed a domestic filter. This filter is very cheap but also very effective in removing arsenic and fluoride. The approximate cost of the filter is Rs 400 and thus it can be purchased by most of the rural families.

The main characteristics of the filter are:



1. The filter can treat water and lower down the presence of iron and arsenic within the maximum permissible limit as prescribed by the Bureau of Indian Standards (Fe-0.10 and As-0.05 mg/l).
2. The filter is produced locally at a very low cost. Well-trained masons of the sanitary marts (that are in charge of implementation of sanitation programme in West Bengal at block levels and have production centres) are producing the filters.
3. The filter is made of concrete (ferro-cement body with outer wall mosaic finished). Thus, there is little chance of emission of any toxic substance into the water. Moreover, water remains cool in the filter.
4. This filter treats water in two stages. At first, instead of conventional ceramic candle, a special type of candle (made by burning mixture of soil and paddy husk) which is highly efficient in removing iron, is used. At the second stage, the water is further treated by a media of AA to remove arsenic. The sachet containing AA used in the filter, serves for six months after which it is to be regenerated. Trained persons at the sanitary marts do the regeneration. After six months the villagers can get a regenerated sachet at a cost of Rs.20 (40 cents) from the sanitary marts. The arsenic rich sludge is safely used by the sanitary marts for construction of sanitary wares.
5. The filter can treat about 3 litres of water per hour, easily catering to the demand of water that is required for drinking and cooking of one family.
6. The filter is very durable and once purchased, will serve at least ten years. Maintenance cost of the filter is also very low.

### Salient features of the filter

- |                                    |   |
|------------------------------------|---|
| 1. Total capacity                  | 23 litres   |
| 2. Materials used for construction | Ferro-cement body with outer surface mosaic-finished. The candle is made by burning soil and paddy husk.  |
| 3. Manufacturer                    | Trained sanitary mart   |
| 4. Treatment capacity              | Can remove dissolved iron, fluoride and arsenic in water very efficiently. It also removes other suspended, colloidal substances including bacterial contamination to a great extent. |



5. Life

Life of the filter is very long. Every two years, the filter candle and the sachet of activated alumina are to be replaced at about Rs.100/-.

6. Regeneration of activated alumina

Every six months the activated alumina is to be regenerated. The sachet of AA is to be brought to the sanitary mart who will issue another sachet (regenerated by the mart earlier) in place of the used sachet at a charge of Rs.20/-.

### Description of the filter

The filter has two parts. The upper part is placed over the lower part. The two parts are connected firmly with the help of a circular rubber gasket. Raw water is placed in the upper chamber for filtration. There is a cover over this chamber. The iron removal candle is fixed to the floor of the upper chamber. There is a valve in the lower part of the filter through which the flow of water can be controlled. The sachet of activated alumina is connected with the valve and placed in the upper portion of the lower chamber of the filter. The sachet can easily be fixed or detached with or from the valve. After treatment by the iron removal candle, the iron free water passes through the sachet. Finally, the filtered water is stored in the lower chamber of the filter. Treated water can be collected with the help of a tap fitted at the lower part of the chamber. The various components of the filter are shown in the drawings below:

