

### SMALL MOBILE DESALINATION UNIT

Mounted on a bicycle and operated by muscle power, the mobile desalination unit for sea water and brackish water works with reverse osmosis, the leading process used today in industrial desalination plants.

The small mobile desalination unit is a robust and low-cost solution for the drinking water supply in remote areas and areas lacking power supply. It can also be a life-saving asset in disaster situations.

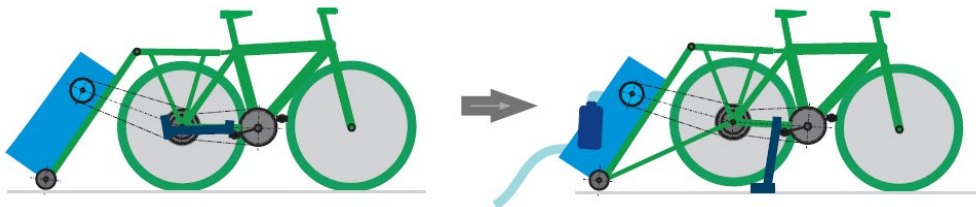
#### BACKGROUND

More than 2 billion people have no or only limited access to drinking water. The desalination of sea water is done in big industrial plants, supplying today about 300 million people with drinking water. It is a costly process with high energy consumption. There is a huge need for smaller desalination units at lower costs.

#### TECHNOLOGY

Reverse osmosis needs a pressure difference of at least 55-60 bars to work properly on sea water due to the osmotic pressure. Small state-of-the-art desalination units do not show this performance. TU Wien solved this challenge with the development of a piston pump with pressure energy recovery. The piston is driven by a bicycle pedal drive with adjusted transmission ratio. High-gear sprockets are added to the sprocket cassette of a conventional bicycle. The bicycle can be used for a ride as well as for operating the mobile desalination unit. It is construed as a bicycle trailer or can be mounted on the back of the bicycle. The mobile desalination unit is designed to easily supply the daily needs of drinking water for a family.

The desalination unit comprises a suction tube, a piston pump with 2 pump chambers for the pressure energy recovery and a membrane packet for the reverse osmosis. The suction tube is equipped with a coarse and an ultrafine inlet filter for the pretreatment of the seawater. An active carbon filter may be added, especially for brackish water. The seawater is sucked into the first pump chamber and pressed through the membrane packet. Desalinated drinking water is collected in a container. The rest of the water is pumped back in the second pump chamber. When the pressure of 55-60 bars is reached in the second pump chamber, a pressure relief valve opens and expels the used water.



#### ADVANTAGES

- Small, low cost unit
- High tech desalination by reverse osmosis
- Mobile and independent from power supply
- Robust with low maintenance costs (the membranes must be cleaned from time to time and preferably have a coating against fouling)

#### REFERENCE:

M042/2019

#### DEVELOPMENT STATUS:

Prototype available

#### APPLICATIONS:

High tech desalination  
in remote areas and areas  
lacking power supply

#### KEYWORDS:

Desalination  
Reverse osmosis

#### IPR:

Patent AT, DE, FR and IT  
granted

#### OPTIONS:

R&D co-operation  
License contract

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