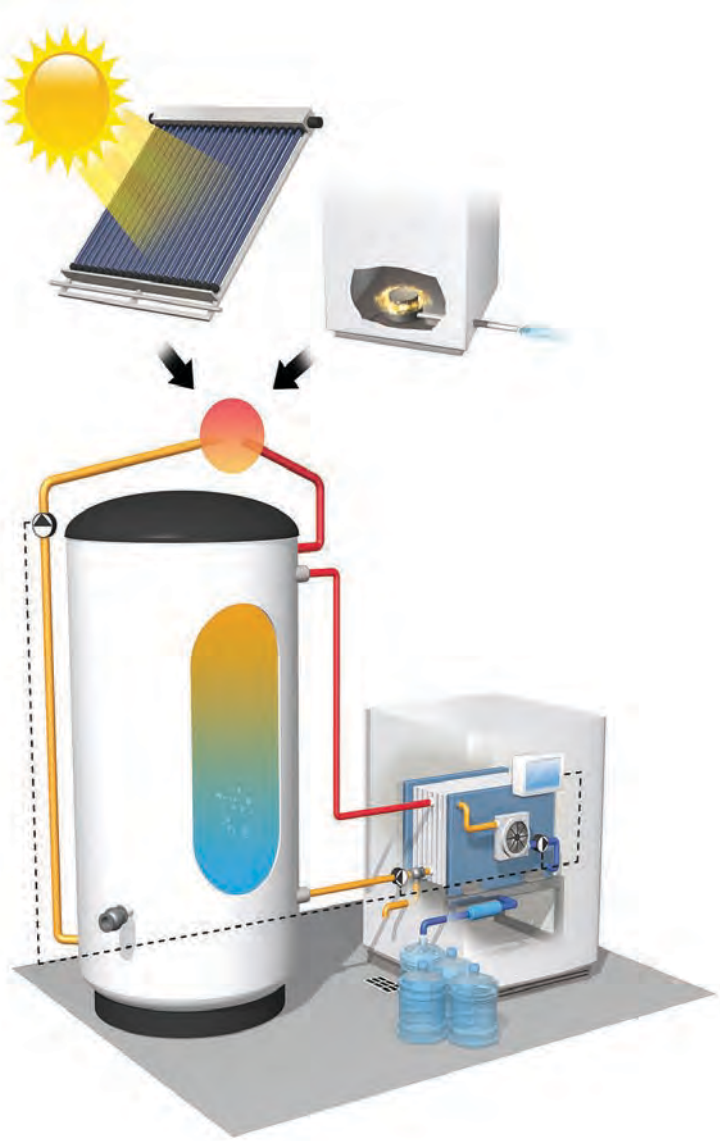
ELIXIR 500

When you want to be sure to drink pure water

ELIXIR 500

HVR has successfully combined the advantages of efficient thermal processes with membrane distillation to a very small modular configuration. The name of this new product is Elixir 500 and is developed for purifying water to drinking water with > 99% purification efficiency with a nominal capacity of 20 litres per hour or 500 litres per day.



The product is suitable for installation in multiple households, larger individual households, or installations where demand of drinking water is 20 litres per hour.

The products do not require filter changes. Elixir offers the consumer a reliable and trouble – free method to produce absolutely pure drinking water. The water is free from harmful contaminants – irrespective of initial water quality. The payoff time is short.
In addition, Elixir 500 also desalinates seawater. In countries where tap water is unfit for drinking and cooking purposes, Elixir is a competitive alternative to bottled water.

HVR Technology is based on membrane distillation, which is an efficient evaporation process using modular membranes. The Elixir 500 modules consist of innovative flat sheet membranes. Membrane Distillation is a unit operation that uses hydrophobic membranes through which water vapor can pass only.

The basic principle of standard Membrane Distillation is simple:

Hot feed water flows into a cassette with side - walls of micro-porous, hydrophobic membranes. Different temperature and vapor pressure on both sides of the membrane force the evaporating water vapor only to pass the membrane. Condensation of distillate occurs on the other side. Non-volatiles stay in the feed and are rejected with the brine. The module consists of one loop for feed water, one loop for the cooling water, and a loop for the heat input can be provided by various heat sources such as Solar panels, and or a gas burner.

Additional modules can be added to the standard Elixir 500 unit. Thus virtually unlimited drinking water capacity can be obtained. The concept can also be supplied as a single module design suitable for integration with residential comfort systems for heating and or cooling. The product is delivered on a cabined skid and equipped with pumps, heat exchangers and auxiliary components.

IMPURITIES REMOVED BY ELIXIR

Elixir 500 generates very high quality of the water purified. No minerals, bacteria or viruses can pass the vapor phase. Even raw water with a mineral content of more than 50.000 mg/l TDS can be purified to a single digit level.

This high quality of separation is achieved for all mineral parts and organic elements including dangerous elements like Boron and Arsenic, which can pass mechanical filtration processes like, reverse osmosis. A sterile environment id achieved by simple measures like high enough temperatures in the process.

Elixir 500 removes at least 99% of all impurities in the feed water and the product is unique on the market as to degree of purification. Typical pollutants in drinking water that are removed by Elixir:

- Salt
- Pharmaceutical remains
- Lead and other heavy metal
- Pathogenic microbes (bacteria, viruses, protozoa, fungi, and the like)
- Fertilizers and other nitrogen-containing chemicals
- Pesticides and herbicides
- Disinfection by-products
- Radioactive materials

ENERGY REQUIRED

Distillation requires high thermal energy consumption for its process. One more major advantage of HVR distillation is that it can be powered by temperatures of 80°C or lower. This allows combination of cheap and/or environmental friendly heat sources like waste heat from industrial processes or diesel generators, biogas/natural gas or solar energy from thermal solar collectors. Therefore up to 90% of the required energy can be saved.

Energy required for the process can be supplied by various thermal sources. The energy needed for evaporation in the membrane module process is regained on the condensation side where the condensed heat can be used for other purposes.

Energy required for the process is about 0, 7 kWh for every litre produced with a heat input of 15 kW. About 0, 05 kWh of electricity for every litre of produced water for pumps and fan is required to drive the process.

ENVIRONMENT

Environmental issues become increasingly important for modern processes. Especially seawater desalination has been critized for environmental impact of pre-treatment used.
The HVR process is non critical towards raw water quality. Non-polar surfaces of used materials prevent scaling and fouling. Low process temperatures are also minimizing risk for scaling. If bio fouling occurs it can be removed by maintaining the system with regular short process runs with high temperatures. If any pre - treatment is needed due to bad raw water quality it will be on a very environmental friendly base by using household acids.

MATERIALS OF ELIXIR 500

All components needed for the Elixir 500 process are made from food approved plastic. This has a massive impact on costs, weight and reliability as no corrosion occurs. Raw materials of process parts exposed to water to be purified are PP and PTFE, which are cheap, easy for further processing and recyclable. Frames and cabinet are produced in metal. Thanks to moderate temperatures and low process pressure all pipework and pumps can be made of plastic as well.

DIMENSIONS OF ELIXIR 500 STANDARD

Weight of unit:	**< 75 kg**
Length of unit:	Max 1,5 m
Width of unit:	Max 1,0 m
Highest point of unit:	Max 1,8 m

CAPACITY OF PRODUCT WATER

The Elixir 500 standard model is designed to nominally generate 20 litres of drinking water per hour, or 500 litres per 24 hours. If higher capacity is requested, additional modules can be added to the standard module.

NOMINAL DESIGN TEMPERATURES AND HEAT INPUT POWER

The nominal capacity of product water of Elixir 500 standard model is based on the following key temperature designs and heat power supply.

Heat input system power capacity: (Solar power, biogas burner, waste energy via or without thermal storage system)	15kW
Feed water temperature to module inlet	80 ° C
Leaving water temperature from heat input source:	> 85 ° C
Leaving water temperature from air-cooled unit. Max air ambient temperature 35 ° C	< 32 ° C

MONITORING AND CONTROL OF PROCESS

A standard electrical cabinet includes contactors for the pump motors, protection and switches for start and stop of the pumps. Indication lamps and alarms are provided on the front panel of the cabinet. Terminals for power supply connection and for the connection of signal cables are included in the cabinet. Power supplies to the pump motors are connected to safety switches.

Scada Software monitors the system from a PC. All transducers are of well-proven design and produced by internally recognised manufacturers. The logic related to the contact signals is included using auxiliary relays. Cables on the skid are installed on cable plates and protected.

The electrical standard installation in the control panel and on the skid is done according to IEC standard.

HVR WATER PURIFICATION AB (Publ), www.hvr.se, is a Swedish company located in Stockholm, Sweden. During the last 20 years, HVR AB has developed a product line for the production of absolutely pure drinking water based on the water purification technology, Membrane Distillation. The products are designed for domestic use and satisfy the consumer´s need for drinking water free from all pollutants.

HVRs mission is to develop and market water purification technology based on Membrane Distillation for pure drinking water – irrespective of the original water quality – for consumer markets.