

# Case Study

## Katadyn Survivor 06 Titan

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**Project:** Custom made product

**Client:** German Army, Air Force

**Product:** Katadyn Survivor 06

Titan

**Date:** 2017

### Project description

Katadyn delivered a custom product of the smallest manually operated desalinator in the world, the Katadyn Survivor 06 Titan, to the German Air Force. It is used for the following purposes:

- Equipment on life rafts on transport and reconnaissance planes (Transall & AWACs)
- Equipment on life rafts on helicopters (MH 90, CH53)
- Backup desalinator and filter unit for Army Special Forces

Life rafts on board these planes and helicopters are designed for either 6 or 20 people. In the case of ditching the plane, all life rafts, including emergency equipment, must afford the survival of all crew members. The supply of drinking water on the high seas in this case represents the most essential survival factor. In contrast to alternative systems (e.g. packaged drinking water), a manually operated desalinator is the best solution since it can treat an unlimited volume of water. That means the supply of drinking water for all crew members in the event of an emergency at sea is guaranteed, no matter how long the distress.



### Operating conditions

In addition to the normal demands on desalimators regarding performance, size and weight, additional requirements for this special makeup were that it:

- Could also be used if needed in very cold conditions (down to the freezing point), since cold seawater has a much higher density than warm seawater.

- Can handle exposure to extremely wide swings in temperatures. This is indeed the case because as a part of emergency gear the desalinator is transported in an area inside that plane (e.g. in the wing) that is not climate controlled. Temperatures can reach as low as  $-65^{\circ}\text{C}$  when at the service ceiling. Product modifications Use of the desalinator with very cold seawater requires a highly specific selection of materials and workmanship. That is because the higher density of cold seawater demands higher pressure to diffuse water through the desalinator's membrane. To this end, a special titanium housing was developed to be sufficiently durable and it proved suitable for the requirements. In addition, the semipermeable membrane of the desalinator was protected and preserved with a special biocidal / Antifrogen mixture to fight the effects of temperatures. This guarantees the performance ability of the membrane by extreme temperatures up to 30,000 feet in altitude and down to  $-65^{\circ}\text{C}$ . Furthermore, for this custom version, the silicone (the seawater suction intake hose and the output hose for saline concentrate brine) had to be lengthened to simplify application of the unit.



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Remove, to fulfill the logistical demands of the air force, the packaging and identification of the unit also had to be adapted. With these modifications, the unit passed extreme long-term testing of the German Air Force, and the reliability of this unit in an emergency is now guaranteed at all times.

### Product

Desalinator Survivor 06-LL-7 Titanium Housing

Weight: 2.02 kg

Technology: Reverse osmosis, manually operated pump mechanism

Output: 0.89L/h

Salt Rejection: 98.40%

Dimensions: 12.7 x 20.3 x 6.5 cm

NATO Stock Number: 4620014486409



Product-specific details:

### Application

With the ability to treat approximately 0.89 L per hour of drinking water, the Katadyn Survivor 06 is a desalinator for emergencies and contingencies. Extremely lightweight, compact and without the need for external energy sources (manual operation), the Survivor 06 is an indispensable part of emergency gear on life rafts and lifeboats and in individual survival kits.



### Improved use

The pump handle is extendable for improved leverage. Furthermore, a leg strap is attached to the unit so one can secure the unit to your thigh. This enables the user to generate counter pressure during the pumping process, which also helps to make pumping much easier. This is a decisive advantage since the pumping process demands considerable strength. In addition, with this, the unit can also be operated with one hand, a detail that can be essential for survival in case the user is injured.

### Safety

In order to ensure that this unit, which is essential for survival, isn't inadvertently washed overboard for any reason, it comes with a highly visible cord and a clip. This allows the Katadyn Survivor 06 to be attached to a life raft.

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### Reverse osmosis technology

Reverse osmosis reverses the pressure of the natural osmosis process. This means that salt or brackish water is pressed through a semipermeable membrane to be transformed into drinking water. In contrast to the traditional membrane filter, the pores of the membrane are not permeable. Instead, the ions and molecules move through the membrane material by diffusion. The necessary pressure for the Katadyn Survivor 06 is generated by hand in order to remain completely independent of external energy sources.

### Quality

Handmade in Switzerland, all Katadyn Survivor 06 Titan units conform to the highest quality standards. Rigorous incoming quality inspections of all components and 100% performance testing at 120 bar of all delivered units guarantee very high durability and reliability of each desalinator. The maintenance plan stipulates a complete disassembly and overhaul of all components of every delivered desalinator every three years (the same maintenance schedule as for an airplane or helicopter). The membrane is to be replaced every 10 years as a preventative measure.

### References

J. Dengler (procurement consultant for the army):

«The Katadyn Survivor 06 Titan is the result of a long and close partnership between the German Air Force and Katadyn Products Inc. During the development phase, the current Survivor 06 model was modified in such a way that it conforms to the high standards of the air force and has now been used successfully since approximately 2000. Crews are of course more pleased if they never have to use the unit; however, they have practiced with the Survivor 06 enough during regular trainings so much that they trust the reliability of the unit in an emergency.»

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