Environment

Personal Water Reclaim System

A device that provides a life support system that is biologically and chemically passive

Water is becoming an increasingly important commodity on Earth for drought-stricken populations, during emergencies and rescues, in remote areas, and for military behind enemy lines with no access to potable water. Water is also a crucial provision for astronauts to live and work in space. Astronauts must conserve as much water as possible when orbiting the Earth, but water conservation becomes even more crucial when talking about missions at a lunar base or traveling to Mars. Therefore, NASA has developed a unique Personal Water Reclamation System: a device that provides a life support system that is biologically and chemically passive and thus not vulnerable to mechanical failure. This technology is a simple and reliable device that’s easy to use. It is currently intended for personal urine recycling and water recovery during water emergencies. It may also be applied to desalination of seawater, providing potable water from the marine environment and from highly contaminated brackish water that would otherwise not be safe to drink.

BENEFITS

- Effectively reclaims water from urine
- Reduces TOCs by 99.4 percent when treating human urine
- Potential application to other highly contaminated wastewaters
- First ever isothermal distillation bag
- Better chemical quality of product solution compared to other hydration bags
- Higher mass savings
- Improved flexibility
- Simple and easy to use passive system
- Requires little or no training to operate
NASA Technology Transfer Program
Bringing NASA Technology Down to Earth

THE TECHNOLOGY

The technology produces a food-grade liquid product solution from a concentrated solution, by passively treating the users urine locally. This method yields potable water when no other sources exist. The mass efficiency of the technology is very high compared to other filtration techniques or distillation.

This innovation uses a one step process, an osmotic distillation membrane, to achieve an extremely high quality product. The design allows the reuse of the system multiple times. The Total Organic Carbons (TOC) are reduced significantly, giving the water an acceptable health and taste profile. The system is designed to optimize weight and achieve the highest mass savings to water recovery rate ratio. The design also allows to maximize drainage of the product solution and to maximize the flexibility of the system itself.

APPLICATIONS

The technology has several potential applications:
- Military operations
- Forest Fire Crews
- Drought-stricken areas
- Emergency situations/survival kits/rescues
- Scale-up for broader desalination use
- Scientific missions to remote areas
- Human space missions

PUBLICATIONS

One of the applications of the technology is for emergency situations/survival kits