

International Space Station USOS Potable Water Dispenser On-Orbit Functionality vs Design

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ABSTRACT

The International Space Station (ISS) currently provides potable water dispensing for rehydrating crewmembers' food and drinking packages with one system located in the United States On-orbit Segment (USOS) and one system in the Russian Segment. The USOS Potable Water Dispenser (PWD) was delivered to ISS on ULF2, Shuttle Mission STS-126, and was subsequently activated in November 2008. The PWD activation on ISS is capable of supporting an ISS crew of six but nominally supplies only half the crew. The PWD is designed to provide incremental quantities of hot and ambient temperature potable water to US style food packages. PWD receives iodinated water from the US Laboratory Fuel Cell Water Bus, which is fed from the Water Processing Assembly (WPA). The PWD removes the biocidal iodine to make the water potable prior to dispensing. A heater assembly contained within the unit

supplies up to 2.0 liters of hot water (65 to 93°C) every thirty minutes. This quantity supports three to four crewmembers to rehydrate their food and beverages from this location during a single meal. The unit is designed to remain functional for up to ten years with replacement of limited life items such as filters.

To date, the PWD on-orbit performance has been acceptable. Since activation of the PWD, there have been several differences between on-orbit functionality and expected performance of hardware design. The comparison of on-orbit functionality to performance of hardware design is outlined for the following key areas: microbiology, PWD to food package water leakage, no-dispense scenarios, under-dispense scenarios, and crewmember feedback on actual on-orbit use.

REFERENCES

1. Barreda, J., Shaw, L., International Space Station USOS Potable Water Dispenser Development, SAE paper 2008-01-2010, 38th International Conference on Environmental Systems, San Francisco, CA, June 29-July 7, 2008.

ACRONYM LIST

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| °C | Degrees Celsius |
| ISS | International Space Station |
| PWD | Potable Water Dispenser |
| STS | Space Transportation System |
| ULF | Utilization Logistics Flight |
| US | United States |
| USOS | United States On-orbit Segment |
| WPA | Water Processing Assembly |