

PM 32 69632-3

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US ENVIRONMENTAL PROTECTION AGENCY OFFICE OF PESTICIDES PROGRAMS REGISTRATION DIVISION (TS-767) WASHINGTON, DC 20460 NOTICE OF PESTICIDE: <input checked="" type="checkbox"/> REGISTRATION <input type="checkbox"/> REREGISTRATION <i>(Under the Federal Insecticide, Fungicide, and Rodenticide Act, as amended.)</i>	EPA REGISTRATION NO. 69632-3	DATE OF ISSUANCE APR 9 1997
	TERM OF ISSUANCE Conditional	
	NAME OF PESTICIDE PRODUCT Unibed (URC 90220)	

NAME AND ADDRESS OF REGISTRANT (Include ZIP code)

NASA
 EC3/Johnson Space Center
 2101 NASA Road 1
 Houston, TX 77058

NOTE: Changes in labeling formula differing in substance from that accepted in connection with this registration must be submitted to and accepted by the Registration Division prior to use of the label in commerce. In any correspondence on this product always refer to the above U.S. EPA registration number.

On the basis of information furnished by the registrant, the above named pesticide is hereby Registered/Reregistered under the Federal Insecticide, Fungicide, and Rodenticide Act.

A copy of the labeling accepted in connection with this Registration/Reregistration is returned herewith.

Registration is in no way to be construed as an endorsement or approval of this product by this Agency. In order to protect health and the environment, the Administrator, on his motion, may at any time suspend or cancel the registration of a pesticide in accordance with the Act. The acceptance of any name in connection with the registration of a product under this Act is not to be construed as giving the registrant a right to exclusive use of the name or to its use if it has been covered by others.

This product is conditionally registered in accordance with FIFRA sec. 3(c) (7) (A) provided that you:

1. Submit/cite all data required for registration/ reregistration of your product under FIFRA section 3(c) (5) when the Agency requires all registrants of similar products to submit such data; and submit acceptable responses required for reregistration of your product under FIFRA section 4.
2. Add the phrase, "EPA Registration No. 69632-3" to your label before you release the product for shipment.
3. Submit one copy of your final printed labeling before you release the product for shipment.

If these conditions are not complied with, the registration will be subject to cancellation in accordance with FIFRA sec. 6(e). Your release for shipment of the product constitutes acceptance of these conditions.

ATTACHMENT IS APPLICABLE

SIGNATURE OF APPROVING OFFICIAL _____ DATE **APR 9 1997**

BEST AVAILABLE COPY

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A stamped copy of the label is enclosed for your records.

Sincerely,

Robert Brennis

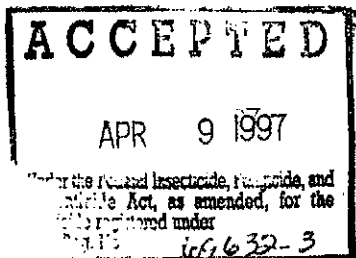
Robert S. Brennis
Acting Product Manager (32)
Antimicrobial Program Branch
Registration Division (7505C)

Enclosures

PRECAUTIONARY STATEMENTS

HAZARDS TO HUMANS & DOMESTIC ANIMALS

CAUTION: This cartridge contains iodinated resin which causes irritation to skin and eyes.



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RECD EPA/OPP/DPDI

Unibed®

URC 90220

For use in the NASA International Space Station Water Recovery System

Contains MCV® Iodinated Resin:

ACTIVE INGREDIENT:
Iodine*.....46%
INERT INGREDIENTS:.....54%
*Bound to strong base anion exchange resin

KEEP OUT OF REACH OF CHILDREN

CAUTION

This product causes irritation to skin and eyes. In case of contact, flush thoroughly with water. If irritation persists, consult a physician.

DO NOT CONTAMINATE
DO NOT ALLOW TO FREEZE
DO NOT EXPOSE TO DIRECT SUNLIGHT

Manufactured By: Umpqua Research Company
PO Box 609 - 125 Volunteer Way
Myrtle Creek, OR 97457

Phone: (541) 863-7770
FAX: (541) 863-7775

EPA Establishment No. 58538-OR-001
EPA Registration No. 6932-
Net Contents: Contains 400 CC Iodinated Resin

DIRECTIONS FOR USE

It is a violation of Federal Law to use this product in a manner inconsistent with its labeling.

The Unibed® contains a series of sorbents to remove dissolved inorganic and organic contaminants in waste water. Biostatic integrity is maintained by beds of MCV® Iodinated Resin at the inlet and outlet of the Unibed®.

STORAGE & DISPOSAL

STORAGE: Store this product in non-metallic containers resistant to the corrosive action of Iodine, such as glass or polyethylene containers. Keep moist (preferably with deionized water), by storing resin beads with a small layer of water above the settled resin. Keep away from direct sunlight or excessive heat. Do not allow resin to freeze. Do not store in open or unlabeled containers.

DISPOSAL OF UNUSED RESIN: This resin contains Iodine (I₂), which is corrosive to most metals. Do not dispose resin in sewers or storm drains. Place in non-metallic containers and dispose in sanitary landfill approved for pesticide disposal.

CONTAINER DISPOSAL: Glass or plastic containers: triple rinse or equivalent. Then, dispose of in a sanitary landfill, or by other approved state and local procedures.

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ATTACHMENT

INTERNATIONAL SPACE STATION (ISS) WATER RECOVERY SYSTEM (WRS)

The room temperature iodinated resin is used in ground-based qualification and verification testing of the ISS prototype WRS at Marshall Space Flight Center (MSFC) prior to use in the ISS WRS in-flight missions. The WRS components required that contain room temperature iodinated resin (Unibeds and Volatile Removal Assembly (VRA) anion exchange resin beds) are essential for performing the current ground-based testing to support the ISS WRS. These items are purchased from Umpqua Research. These assemblies undergo treatment with gamma irradiation for sterilizing the materials within the bed assemblies prior to shipment to NASA for use in the WRS.

ISS WRS - The WRS (Figure 1) uses the room temperature iodinated resin in two assemblies (Unibed system and volatile removal assembly (VRA) Ion Exchange Bed) as mentioned above. The WRS processes shower, handwash, oral hygiene, wet shave, and urine produced by the crew and the humidity condensate that is collected from the air revitalization system. Waste water with organic impurity content of 300,000 to 500,000 ppb total organic carbon (TOC) is purified to < 500 ppb TOC in the recovered water. The microorganism content is reduced from levels of 10⁸ colony forming units (cfu)/cc to <1 cfu/100 cc's in the recovered water. Conductivity is <5 micromho/cm and total solids are <5000 ppb in the recovered water. The iodinated resin plays a key role in providing disinfection within the hardware system and providing residual disinfection in the potable water supply produced by the WRS.

Unibed System - Waste water is pumped from a waste tank at the inlet of the WRS through an in-depth 0.5 micron filter to remove particulate impurities to prevent premature saturation of the Unibed

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train. Each Unibed is identical, containing various adsorbents and ion exchange resins designed for removal of a particular group of contaminants expected in the process stream. Adsorbents are geared towards removing non-ionic organics and the resins towards removing ionic species. The room temperature iodinated resin is located at the inlet and outlet of each bed to control microbial growth in the Unibeds by imparting 2 ppm iodine into the process stream. The control of microbial growth within the Unibed is critical to maintaining optimum capacity of the Unibed system for the removal of the chemical impurities. Table 1 lists the adsorbents and resins and their order and quantity in a typical Unibed.

VRA - The VRA in the WRS consists of an aqueous phase catalytic oxidation reactor that oxidizes the low molecular weight polar organic impurities present in the Unibed effluent to low molecular weight organic acids and carbon dioxide. The reactor operates at a temperature of 260 to 265 °F. Oxygen (1 and 1/2 to 2 times stoichiometric) for the oxidation reaction is added to the process stream through a gas sparger located at the reactor inlet. Effluent from the reactor is passed through heat exchangers in the VRA system to reclaim heat generated in the VRA reactor and is then degassed with a hollow-fiber membrane phase separator. The phase separator removes waste gases generated in the reactor and excess oxygen not consumed in the oxidation reaction. The effluent from the phase separator is then treated with an anion exchange resin bed for removal of any organic acids or other ionic contaminants generated in the VRA reactor and to impart a nominal residual iodine level (1 to 4 ppm) in the product water for microbial control. A typical VRA anion exchange resin bed consists of the following: 200 cc of room temperature MCV iodinated resin, 12775 cc of IRN-78, 200 cc of IRN-150, 200 cc of IRN-77, and 200 cc of room temperature MCV iodinated resin.

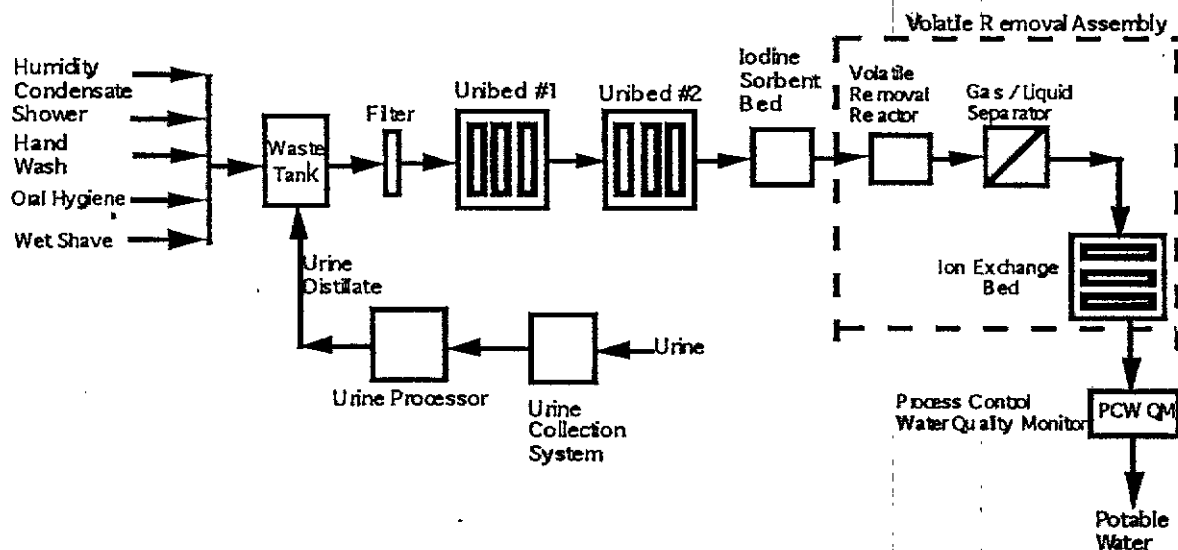


Figure 1. Simplified Functional Schematic of the International Space Station Water Recovery Subsystem

Media	Media Quantity (cc)	Description of Media
MCV-RT	200	Room temperature iodinated anion exchange resin (Umpqua Research)
IRN-150	9750	Mix of IRN-77 and IRN-78, a strongly basic anion exchange resin (Rohm and Haas)
IRN-77	695	A strongly basic cation exchange resin (Rohm and Haas)
IRA-68	4275	A weakly basic anion exchange resin (Rohm and Haas)
580-26	4630	Activated carbon produced from coconut shell (Barneby Cheney)
APA	1325	Activated carbon produced from bituminous coal (Calgon)
XAD-4	1325	Polymeric Adsorbent (Rohm and Haas)
IRN-150	200	A mix of IRN-77 and IRN 78, a strongly basic anion exchange resin (Rohm and Haas)
IRN-77	200	A strongly basic cation exchange resin (Rohm and Haas)
MCV-RT	200	Room temperature iodinated anion exchange resin (Umpqua Research)

Table 1. Example Urined Media (in direction of flow)