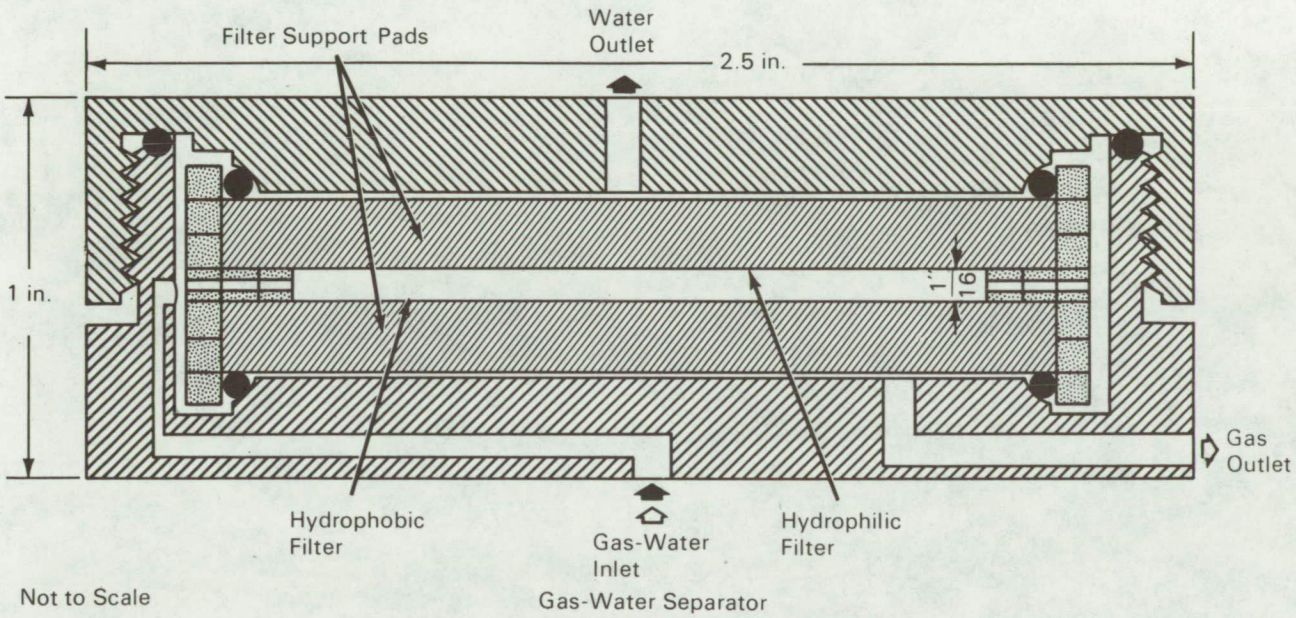
NASA TECH BRIEF

Elimination of Gases and Contamination from Water



A novel filter eliminates both free gases and bacterial contamination from water; filter life depends on its filtration area and the quality of the feed water. The device is small, simple (no moving parts), inexpensive, and easily replaced; handles pressures up to 100 lb/in^2 at temperatures up to 121°C; depends in no way on gravity; gives absolute filtration, with automatic venting of freed gases; and prevents backward transmission of contamination, with no bacterial growth through the filters.

The figure shows a model for separation of H_2 from the H_2O product of a fuel cell. The commercially available hydrophilic and hydrophobic filters, made of cellulose esters, are of the membrane type and 150μ thick; they have absolute holes with 80% porosity. In such close proximity the filters provide a ready surface for passage of either phase—gas or water. The chosen physical dimensions of the filter separator depend on the desired rate of flow of the water and on the system's operating pressure. An upstream intermediate filter may greatly prolong the life of the separator filter.

This model could be refined to a 1 × 2-in., lightweight, throw-away unit made of plastics, weighing about 0.1 lb, and using relatively low cost filters. Pore sizes might range from 0.01 to 5.0μ, each filter having an effective area of 10 cm^2. The smaller the pores, the greater the area required. Even viruses could be filtered.

The new filtration system has many possible applications: degassing of industrial solutions such as hydraulic systems, possibly by recirculation of a

(continued overleaf)

solution until all traces of gases are removed; and filtration of oxygen from sea water. When filtering beer through membrane filters, brewers are troubled by blockage of the filters by bubbling of CO_2; the new system could remove the free CO_2. Cavitation affects certain pumps handling mixtures of gases and liquids. The device could be used in reverse for saturation of liquids with gases—as for saturation of blood with oxygen.

Note:

No additional documentation is available. Specific questions, however, may be directed to:

Technology Utilization Officer
Kennedy Space Center
Kennedy Space Center, Florida 32899
Reference: B70-10456

Patent status:

Inquiries about obtaining rights for the commercial use of this invention may be made to NASA, Code GP, Washington, D.C. 20546.

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