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Brief 71-10478

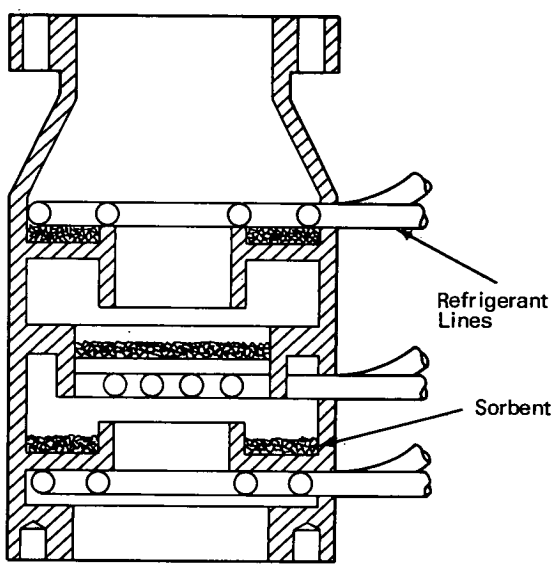
NASA TECH BRIEF

Ames Research Center

Improved Molecular Sorbent Trap for High-Vacuum Systems

The problem:

To improve the performance of high-vacuum systems which use molecular sorbent traps. Such systems can be improved by the addition of chilled



baffles connected in series with the sorbent traps, but these tandem combinations often reduce pumping speeds by a factor of two.

The solution:

Provide a closed-cycle refrigeration loop in which the trays holding the molecular sorbent are made to serve as cooling baffles. High performance is obtained with almost no decrease in pumping speed.

How it's done:

Stainless steel coils are welded onto the unused surfaces of the trays which contain the sorbent. The ends of the cooling lines are brought out through holes in the trap wall and are welded vacuum-tight. A closed-cycle refrigerant, such as a Freon, is circulated through the coolant coils. (Cold water may be an effective refrigerant, but liquid nitrogen is generally preferable.) Sorbent traps constructed in this manner reduce oil back-streaming because the molecular sorbent is more efficient at lower temperatures, and the cold metal surfaces themselves are effective collectors of condensable material.

In a prototype vacuum system, the ultimate pressure 4×10^{-7} torr without refrigeration of the sorbent trap was reduced to 1.5×10^{-7} torr with refrigeration at $-30°$ C.

Note:

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

Technology Utilization Officer
Ames Research Center
Moffett Field, California 94035
Reference: B71-10478

Patent status:

No patent action is contemplated by NASA.

Source: E. D. Knechtel and W. C. Pitts
Ames Research Center
(ARC-10056)

Category 03