

COOLING VEST

At left, a handicapped person is wearing a cooling vest developed by Ames Research Center to meet a special need of quadriplegics, who are often unable to tolerate heat stress because of their inability to perspire below the level of spinal injury. This condition restricts their activity outside of temperature controlled environments; thus the vest allows their participation in a range of outdoor activities in hot weather that would otherwise be denied them. Shown in closeup below, the vest is an adaptation of technology developed at Ames for thermal control garments used to remove excess body heat of astronauts wearing space suits.

Now being evaluated at the Palo Alto (California) Veterans Administration Hospital, the vest incorporates a series of corrugated channels through which cooled water circulates. It has a three-ply construction including two outer layers of urethane-coated nylon heat-sealed to form the flow pattern and a third, internal layer of synthetic material woven to form a three-dimensional corrugated structure that conducts the flow of water. The vest is connected by inlet/outlet tubes to a compact cooling unit, worn as a backpack or affixed to the back of a wheelchair. The unit includes a rechargeable battery, a mini-pump, a two-quart reservoir and a heat sink to cool the water; the heat sink can be a block of ice or a number of chemical frozen packs. A mechanical valve/sensor controls the water flow and keeps the temperature at a constant 68 degrees. In addition to its aid to quadriplegics, the system can be used by ambulatory patients who have heat control problems and it is suitable for industrial applications where personnel cooling is necessary.

