

Challenges of Life Support/Medical Support for Human Missions (8)
Challenges of Life Support/Medical Support for Human Missions (2) (2)

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MAINTAINING ALLOWABLE CONCENTRATION OF CARBON DIOXIDE IN THE ATMOSPHERE
OF HABITABLE PRESSURIZED MODULES OF SPACE STATIONS.

Abstract

The paper discusses the effect of carbon dioxide (CO₂) concentration in the atmosphere on human health and issues involved in scrubbing it from the atmosphere in space station environment. It shows that, according to respiratory physiology, CO₂ is a gas essential for human respiration, which turns into a toxic contaminant, when its concentration exceeds the threshold of 40 mm Hg (5.3%) in human lung alveoli, and, accordingly, of 46-49 mm Hg (6.0-6.5%) in arterial blood, which occurs when CO₂ content in the atmosphere 7.6 mm Hg (1.0%), (these nominal values, which go back to the origins of life, to the times when CO₂ content in the Earth atmosphere was orders of magnitude higher than now, can be observed in all living things that breathe with lungs). Whenever CO₂ concentrations in human air vesicles and alveolar blood go below these values, the human experiences oxygen deprivation, even when there is a high oxygen concentration in the blood. Neither does the use of CO₂ for breathing in medicine, aviation, athletics, support blood. Neither does the use of CO₂ for breathing in medicine, aviation, athletics, support the opinion that CO₂ content in atmosphere below 7.6 mm Hg affects human health. Data from NASA studies of the link between CO₂ levels in space station atmosphere below 6.0 mm Hg (0.8%) and astronauts' headaches does not prove this link. NASA's unfounded lowering of standards for CO₂ content down to 2.0-3.0 mm Hg requires an increase in the number of systems for CO₂ scrubbing onboard the space station. According to the minutes of AQS subpanel of the panel, no scientifically proven standards currently exist for CO₂ content in the atmosphere of space vehicles, their substantiation requires further scientific studies conducted by testers and cosmonauts.