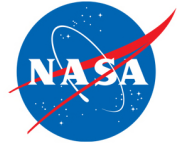




National Aeronautics and
Space Administration



TECHNOLOGY SOLUTION

Mechanical and Fluid Systems

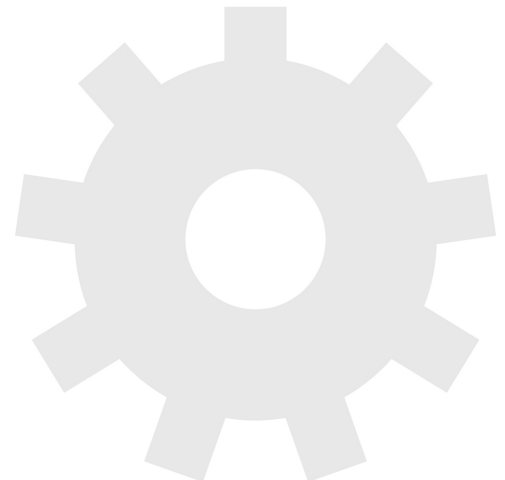
Drain System for Pools, Spas, and Tanks

Mitigates entrapment risks from the suction force of a recirculation system

Researchers at NASA's Marshall Space Flight Center have developed a system that reduces the entrapment risks associated with a pool or spa's recirculation drain. The technology prevents hazards caused by suction forces on the body, hair, clothing, or other articles. Employing a novel configuration of drainage openings along with parallel paths for water flow, the system redistributes force over a much larger area, minimizing suction force at any localized area. With more efficient drainage and recirculation, the device improves performance, increases safety, and decreases operating costs. The technology can also provide thorough chemical mixing, which improves processes in systems and allows continued operation in the event of localized debris clogging a portion of the recirculation area. All of these benefits come without a protrusive drain cover, leaving the area safe and aesthetically pleasing.

BENEFITS

- Improved effectiveness: System reduces risk of both suction entrapment and hair/clothing entanglement more efficiently than currently available devices.
- Increased safety: Design does not have external features or protrusions, eliminating the risk of bodily injury due to contact with the drain.
- Cost effective: System is durable and easy to build from inexpensive components.
- Increased performance: Chemical mixing is more thorough, which minimizes bacteria growth, increases safety, and reduces operating costs.
- Broad compatibility: Designed to be used as a new system or to retrofit an existing system.



THE TECHNOLOGY

This drain system, originally created to increase safety in neutral buoyancy tanks, has a high potential for increasing safety and performance in any application using a recirculation system. As opposed to a traditional cover for a drainage system, this device is comprised of many long, narrow channels through which water can flow. The openings are configured in a way that there is never a suction force large enough to trap one or multiple human bodies. In addition, the channels are deep enough that hair or other objects cannot become entangled or knotted because they cannot reconnect once in the channel. The drain system can be patterned to suit any pool (or spa, tank, container, etc.), and it can be placed on the floor, walls, or both. The technology is suitable for mass production methods such as extruding or molding.

Why It's Better:

The NASA innovation combines many desirable safety features into one simple system. Along with the decreased risk of limb entrapment and entanglement, the drain system also does a more thorough job of mixing chemicals, which diminishes bacteria growth and decreases operating costs. The system requires no protrusive drain cover, thereby eliminating the risk of injury due to bodily contact with the drain.

APPLICATIONS

The technology has several potential applications:

- Pools and spas: as a drainage recirculation system
- Chemical/food processing: for increased efficiency and safety in mixing
- Aerospace: to stabilize oscillations and vibrations in fuel tanks
- Aquariums and habitats
- Training facilities: as underwater tanks or pools used for training divers or astronauts (weightless operations in space)

PUBLICATIONS

Patent No: 8,316,884; 9,127,469; 9,885,190