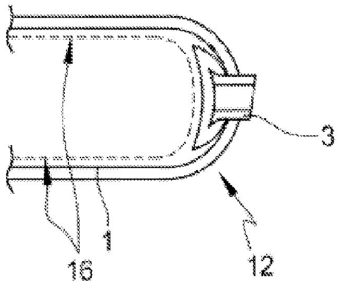
TANK FOR CRYOGENIC PROPELLANTS

Technological advantages

- Optimal lightness due to an all-composite carbon/epoxy structure replacing heavy aluminum.
- Enhanced cryogenic sealing through a vacuum-infused internal liner that eliminates porosity and micro-leaks.
- High structural cohesion : liner and shell share the same material nature, delamination risks reduced.
- Thermal shock resistance improved by flexible junction elements at the interface with metal connectors.
- Total chemical compatibility (especially with LOX/GOX) provided by an internal Teflon coating.



Schematic view of the set-up
1) Sealing envelope
2) Reinforcement layer
3) End fitting
12) Hemispherical cap
16) Fluoropolymer coating
100) Composite tank

Invention synthesis

This invention describes a high-performance storage tank designed for cryogenic fluids. Unlike traditional heavy metal tanks or expensive composite tanks with metallic liners, this design utilizes an "all-composite" architecture consisting of two main parts: an internal sealing liner made from draped textile infused under vacuum, and an external reinforcement layer applied via filament winding. The system works through the synergy of these layers: the liner ensures absolute tightness and prevents micro-cracking due to its high-precision manufacturing, while the outer shell provides the necessary mechanical strength to withstand high pressure. This is a significant invention as it overcomes the typical thermal fatigue issues of composites while offering substantial mass savings and lower production costs compared to conventional metallic solutions.

Potential applications

- Space Sector: Propellant tanks (liquid oxygen or hydrogen) for launchers and satellites.
- Aeronautics: Storage for alternative fuels or cryogenic propulsion systems.
- Ground Transportation: High-pressure tanks for hydrogen-powered vehicles.
- Gas Industry: Transport and storage of pressurized or liquefied gases.

Commercial benefits

- Lower manufacturing costs compared to the expensive shaping and welding of aluminum tanks.
- Increased payload capacity for space launchers thanks to significant weight reduction.
- Extended product lifespan and reduced maintenance due to superior resistance to oxidation and fatigue.
- Streamlined production process : the internal liner serves as a permanent mandrel for the outer reinforcement.

Patented invention - under license.

For more information :

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