



HELIUM IN ROCKET : SCIENCE & TECHNOLOGY

NEWS : *What is helium and why is it used in rockets?*

WHAT'S IN THE NEWS ?

Past missions that have been affected by pesky helium leaks include ISRO's Chandrayaan 2

Importance of Helium in Rocket Operations:

- **Pressurization:** Ensures smooth fuel flow by pressurizing fuel tanks.
- **Cooling Systems:** Its low boiling point aids in cooling in extremely cold environments.
- **Non-reactive:** Inert nature prevents chemical reactions with tank contents.
- **Density:** Fills empty spaces in fuel tanks to maintain pressure.
- **Leak Detection:** Easily detectable in trace amounts for identifying leaks.
- **Alternative:** Argon and nitrogen can be used but helium's properties make it the preferred choice.

Helium is used for more than blimps and balloons

Helium crucial to industry, research, medicine, defense

Coolant in liquid form or in a superconductor, in machines such as ...



← MRI scanners



← Particle accelerators

Purges gas in rocket engine systems



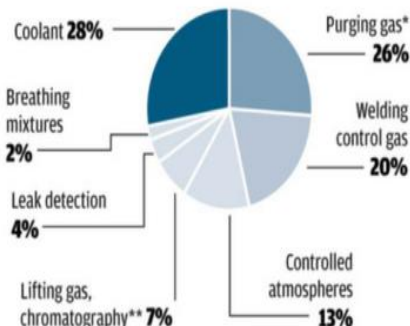
Used in some arc welding processes



Creates stable breathing mixtures in diving equipment



How helium is used



*Clear storage tanks of other gases or fuels **Gas chromatography is an analytical method of separating chemical components from a solution

Source: U.S. Geological Survey, Kansas Geological Survey, National Academy of Sciences, Bureau of Land Management, American Blimp Corp., NASA

McClatchy Newspapers

Boeing's Starliner Mission:

- **Objective:** Validate Starliner spacecraft for transporting astronauts to and from the ISS.
- **Launch Date:** Orbital Flight Test-3 (OFT-3) in late 2024 (uncrewed).
- **Destination:** Dock with the ISS for research and maintenance.

Significance: Supports regular ISS missions and future Moon/Mars missions.

SpaceX's Polaris Dawn Mission:

- **Objective:** Advance human spaceflight technology, conduct research, and test new technologies (spacewalk suit, laser communications).
- **Launch Date:** Early 2025.
- **Crew:** Jared Isaacman and three US Air Force personnel.



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- **Destination:** High Earth orbit (no ISS docking).
- **Significance:** Tests cutting-edge technology, contributing to space medicine and astrophysics, and commercial space exploration.

Source : <https://www.thehindu.com/sci-tech/science/what-is-helium-and-why-is-it-used-in-rockets/article68617045.ece>



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