

Topic Page: [spacesuit](#)

Definition: **spacesuit** from *Collins English Dictionary*

n

1 any of various types of sealed and pressurized suits worn by astronauts or cosmonauts that provide an artificial atmosphere, acceptable temperature, radiocommunication link, and protection from radiation for work outside a spacecraft

Summary Article: **spacesuit**

From *The Hutchinson Unabridged Encyclopedia with Atlas and Weather Guide*

Protective suit worn by astronauts and cosmonauts during launch and in space. During launch it acts as a high-altitude pressure suit and also guards against depressurization in the vacuum of space. A spacesuit has to be worn outside the spacecraft during extravehicular activity. It provides an insulated, air-conditioned cocoon in which a person can live and work for hours at a time while outside the spacecraft. Inside the suit is a cooling garment that keeps the body at a comfortable temperature even during vigorous work. The suit provides air to breathe and removes exhaled carbon dioxide and moisture. The suit's outer layers insulate the occupant from the extremes of hot and cold in space (−150°C/−240°F in the shade to 180°C/350°F in sunlight), and from the impact of small meteorites.

Types of spacesuit Astronauts and cosmonauts flying *Gemini*, *Mercury*, *Vostok*, and *Voskhod* spacecraft 1961–66 wore suits based largely on pressure suits developed for high-performance jet aircraft. NASA's *Apollo* spacesuit was called the state-of-the-art suit. The advanced design suits used on the Moon had 21 layers that successfully protected astronauts against temperature, radiation, and the absence of pressure. 60 suits were produced at a cost of \$90 million. NASA chose the name of extravehicular mobility unit (EMU) for the complete *Apollo* lunar suit system, which included a portable life-support system (PLSS). The suits had a more reliable (British-made) cooling system than the earlier *Mercury* and *Gemini* spacesuits because of the greater work required on the lunar surface. The astronauts' lunar gloves were made of a metal-woven fabric with strong nylon-covered fingertips, and later models added a slip-resistant silicon coating. Lunar boots had several layers, including one of Teflon-coated Beta cloth, and the soles were of moulded silicon rubber. The first hard boots were later replaced by a more flexible version.

The EMUs worn by *Apollo* command module pilots were lighter versions with fewer layers. For the Apollo-Soyuz Test Project in 1975, astronauts wore a modified *Apollo* spacesuit, with a new cover layer added.

After the *Challenger* accident in 1986, NASA created a new pressure suit to allow astronauts to escape by parachute in the event of an emergency during launch or before landing but only at certain altitudes. The bright-orange one-piece suit, resembling but not the same as the suit worn by the STS-1–4 space shuttle crews, has an oxygen supply, parachute, life raft, life preserver, and additional survival equipment.

For space walks from the space shuttle, astronauts wear a two-piece EMU which connects at the waist and which incorporates a PLSS backpack and a chest-mounted emergency oxygen supply and control panel. The suit resembles the *Apollo* Moon-walking suit in design but incorporates many improvements

to aid mobility. Early shuttle astronauts wore manned manoeuvring units (MMUs), large backpacks powered by pressurized nitrogen gas. These were later replaced by smaller simplified aid for extravehicular activity rescue (SAFER) units, which are safety devices to ensure that if an astronaut loses tether contact with the orbiter, he or she can manoeuvre back to the ship.

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