

# SILICONES, KEY ENABLERS OF EUROPE'S JOURNEY INTO SPACE

Space technology and data are essential to the functioning of modern society. Since the beginning of the space age in 1957, more than 6000 rockets were launched, placing approximately 14 700 satellites into the Earth's orbit<sup>1</sup>. These satellites support many of our day-to-day activities, such as the use of mobile services or navigation. In addition, space technology is critical to our response to global challenges, from climate change to humanitarian crises.

The European Union (EU) has committed to an ambitious Space Policy, which would facilitate its sustainable and digital transitions. As one of the pillars of the EU Space Programme, the European Earth Observation (EO) system "Copernicus" provides atmosphere, marine and land monitoring services, as well as climate change, emergency management and security services<sup>2</sup>. Silicones are key enablers of space technology, helping the EU to leverage its industrial and scientific capabilities in the sector.

## Where are silicones used?<sup>3</sup>

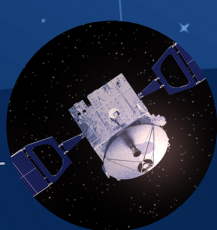
### Main Launch Vehicle

- Firing sealant
- Silicone paints
- Gap filling
- Thermal insulation attachment
- Protective coatings
- General bonding
- Sealing openings
- Coatings and adhesives for stabilisers
- Thermal barriers
- Adhesion and protection for sensors and optics
- Engine sealing



### Satellites

- Thermal shield bonding
- Thermally conductive materials
- Heat management
- Wire/cable sealing
- PV bonding
- Potting
- Avionics coating
- Solar panels



### Control Panels/Avionic

- Electrical box potting
- Computer ruggedisation
- Black box encapsulants
- Cockpit instrument sealing



### Crew Capsule

- Outer thermal protection layer
- Panel bonding
- Thrusters thermal protection
- PV Bonding



### Launch structure

- Launch pad coatings
- Thermal protection for support structures



## What makes silicones fit for flying?

The aerospace industry needs materials that can withstand extreme operating conditions. With launch frequency at an increasing pace, the demand for cost-effective, reliable materials is at an all-time high<sup>4</sup>. The properties of silicones meet many of the space industry's demands:



### ADHESION

Silicone adhesives and sealants can have a very low outgassing rate to avoid delamination under the low-pressure conditions in outer space<sup>5</sup>. They can perform on a wide variety of substrates.



### STABILITY

Silicone coatings, gels, and encapsulants protect against moisture, dirt, shock, and vibration fluxes.



### THERMAL RESISTANCE

Silicones can withstand extreme temperatures without losing their properties. They insulate sensitive electronic components and protect spacecraft and crews.

Silicones have been used by the aerospace industry for more than 60 years<sup>6</sup>.

## Silicones were part of...



### Neil Armstrong's boots

The first to walk on the moon



### The Mercury rocket

The first American crewed rocket into space

## Silicones are found in...



The International Space Station



Every manned space flight



The Hubble space telescope

1. [Space Environment Statistics](#), European Space Agency  
 2. [Copernicus Programme](#)  
 3. [Advanced Silicones from Launch to Landing](#), Momentive and RTV Silicone and Hardcoat Products for Aerospace, Momentive  
 4. [Aerospace and Defense](#), Dow  
 5. [Silicone adhesives for outer space applications](#), Wacker  
 6. [Rocket Legacy](#), Momentive