

## MARTE (Mars Simulation Chamber)

### Objectives

Testing instruments and devices in real or invented atmosphere (pressure, temperature, gas composition, radiation), including dust storm and humidity control. Space qualification of instrumentation. Biologicals studies. DHMR, and outgassing control in planetary protection procedures.

### Environmental conditions

- Temperature range: from 80K to 450K in sample holder computer controlled. Different fluid intercoolers (Liquid Nitrogen, Glycol or Silicone oil).
- Temperature in the atmosphere range from 200K to 400K.
- Atmosphere: vacuum base pressure from  $10^{-7}$ mbar by turbo pump (LF flanges). Pressure stable up to 1013 mbar.
- Irradiation: Xenon and Deuterium sources, and 6 halogen/Led lamps to simulate sun illumination at different azimuths.
- Humidity control: Water injection in vacuum with ALI (Atomic Layer Injection) technologies.

### Technical parameters

- Dust storm module (Fe particles for Mars simulation).
- Rotary, scroll and Turbo pumps.
- Cooling by  $IN_2$ , and closed circuit of glycol and silicone oil and heating by conduction and radiation.
- Sample size: should fit on a 205mm x 205mm optical table. Maximum height 400mm.
- Modular chamber, (diameter 500mm), possible to modified the volume in few hours.
- RGA (Residual Gas Analyzer) by differential pumping.
- Easy to connect electronic components.
- PAM (Pulse-Amplitude-Modulation) for chlorophyll fluorescence

