



Characterisation of polymer materials in hydrogen

1. Characterisation of polymer materials before and after H₂ exposure

- 1.1. Physical stability
 - 1.1.1. dimensional, appearance
 - 1.1.2. Mass, density
 - 1.1.3. Compression set
- 1.2. Mechanical stability
 - 1.2.1. Tensile test (ISO 37 elastomers / ISO 527 thermoplastics)
 - 1.2.2. Hardness test
 - 1.2.3. DMA

2. H₂ Exposure

- 2.1. Static exposure; Parameters: Temperature : 20°C to 200°C,
gas pressure : up to 1000 bar
- 2.2. Initial cycling (currently: up to 10 cycles, 24 h)

3. Dynamic wear (in situ)

- 3.1. Oscillating friction (fretting fatigue): in H₂ up to 100 bar
- 3.2. Sliding friction: in H₂ and LH₂ (gaseous H₂: temperature : -250°C to 20°C)
 - test parameters: load, stroke, frequency, velocity, temperature, gas pressure,
 - recorded data : friction force ; linear wear
 - after the test : wear volume ; optical analyses of the wear scar ;
 - on demand : chemical analysis

4. Tensile Tests (in situ)

- 4.1 Tensile test (ISO 37 elastomers / ISO 527 thermoplastics)
- 4.2 H₂ up to 80 bar ; Temperature : -40°C to 55°C