



Test

The application of 'good tribology' contributes significantly to the efficiency, reliability and performance of European Spacecraft mechanisms. ESTL offers independent, specialist support in this field for the benefit of the European Space mechanisms community. Part of ESTL's remit is to provide thermal vacuum facilities to evaluate the performance of space mechanisms, which we can utilise to test your mechanism at various stages of its development.

Test Capabilities

ESTL's test capabilities are optimised to the testing of spacecraft mechanisms and their components and subsystems. We routinely test ball bearings and gears, as well as other tribological components such as balls screws and actuators for example. For qualification, life and acceptance level testing, ESTL has considerable heritage and expertise in testing complete spacecraft mechanisms in our larger thermal vacuum chambers.

We recognise that our customers may require varying levels of support, according to the nature of the specific test required. ESTL can tailor the test program, and hence the price, according to your requirements. For a full (or 'gold standard') level test, we can support you with a conventional or full test programme, providing bespoke interfaces, test procedures, analysis and post-test inspection with a report. For a lower cost approach, a standardised chamber interface and drive could be used, with ESTL providing the test procedure, environment, post-test inspection and reporting, but leaving the data analysis to you. The lowest cost approach would exclude the test procedure, data analysis, inspection and reporting, with ESTL using standardised interfaces and drives, effectively only providing you with the raw data from the test.

As well as testing spacecraft mechanisms and their components and subsystems in thermal vacuum environments, ESTL can also perform tribometer level testing on our Spiral Orbit Tribometer and Pin-on-Disc test facilities. We also perform adhesion testing, long term storage and evaluation of creep barriers through test.

Test Facilities

ESTL has 19 vacuum chambers, ranging from 150mm to 1m diameter, with typical test temperatures within the range -50°C to +80°C. However, this temperature range can be widened for projects such as BepiColombo where temperatures of +400°C were achieved or JWST on which cryogenic testing down to 20K was performed. While most chambers are configured for the testing of the components, and subsystems of mechanisms, they can easily be configured for general thermal vacuum test use.

In addition to its test facilities described above, ESR Technology has many specialist facilities that support ESTL's test capabilities including:

- **Precision inspection and measurement facilities** including digital microscopy
- **CMM and other metrology** as well as an instrumented pre-loading press
- **Comprehensive metallurgical inspection and test facilities** for forensic inspection and materials characterisation including fatigue, hardness, tensile testing and profilometry
- **X-ray Fluorescence (XRF)** for the measurement of thin film thickness
- **Scanning Electron Microscopy (SEM)** with Electron Dispersion Spectroscopy (EDS) capability for chemical characterisation



Whatever your tribological needs, ESTL can provide tailored test campaigns to support you on your project. Please contact us for further information.

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