Unique Operating Characteristics of the SRV®5 Test System

- Maintenance-free, electronically controllable linear motor
- Unique software
- Tailormade for tribological analysis
- Preinstalled test sequences
- Flexible software interfaces and export functionalities
- Automatic cutoff criteria
- Low-resonance and low-vibration design which minimizes any dynamic influences
- Inclination of the complete test chamber from horizontal (0°) to vertical (90°)
- Two kinds of motion (oscillation and rotation) in one machine
- Several temperature ranges from -45°C to +1000°C available
- Highly sensitive recording of the friction coefficient through a Piezo sensor directly underneath the test specimen pair
- Several load ranges (max. 2500 N) available
- Freestanding solid machine
- Fully automated test execution with A-POS
- Manufactured completely in Germany by experienced experts
- Quick and easy change between different modus and setups
- German patent with the number 10 2006 022 349 "Test device for the tribological examination of materials"

The SRV® test system is a model testing instrument, which is very flexible in its use and its fields of application, for the characterization of the friction and wear properties in a tribosystem. The most important unique characteristics of this machine can be summarized as follow:

**Tribological Hydrogen / Fuel Measuring Cell**

**Tribology - the answer to the challenges posed by green energy**

**THE TRIBOLOGICAL CHALLENGES POSED BY HYDROGEN**

Bearings, joints, seals and piston rings are among the most heavily stressed components. With the change from air or other gas environments to a hydrogen atmosphere, the behaviour of materials and lubricants changes in terms of wear, fatigue and friction.

It is for this reason that the materials and lubricants intended for hydrogen infrastructures, engines, compressors, etc. must be selected under test scenarios that are as close to reality as possible, thus simulating a hydrogen environment. This makes a decisive contribution to the development and operation of durable, fail-safe and energy-efficient plants and systems.

**MEASURING PRINCIPLE**

Developed in cooperation with research partners, the tribological hydrogen cell is intended for translational friction and wear tests. The cell can optionally be integrated into existing SRV®5 tribometers. Hydrogen, fuel and other gases can be introduced into the cell at pressures of up to 100 bar. With a total of approx. 160 ml, the pressure volume has been calculated in such a way that tests can be carried out at 100 bar without taking into account the Pressure Vessels Safety Regulation. The tribological hydrogen/fuel measuring cell includes gas supply regulation and fundamental safety monitoring features. The cell has been designed for tribological model testing within a temperature range from -40°C to +150°C (requires an external temperature control for low temperatures).

The specimen geometries that can be used are spheres in a diameter of 10 mm (point contact), cylindrical rollers (line contact) and surface contacts (ring surface), all of which are inserted against a plate as the lower specimen. Stroke, standard force and frequency are within the parameter ranges which must be adhered to according to the relevant lubricant and material testing standards applicable to the SRV® tribometer.
1. SRV®5 Rotary guide with unloaded measuring element and precision drawer
2. Drive arm (extension of the oscillation axis)
3. H₂-N₂-Pressure cap
4. Sensor cable Temperature sensors
5. H₂-Supply line
6. Modified headstock with recess
7. Standard oscillation basic block
8. Gas detectors for H₂ and N₂ in the test chamber atmosphere
9. Pressure control valves for H₂ and N₂

**CUSTOMER REQUIREMENTS**
- Point contact: ball Ø 10 mm, test disc Ø 24 mm x 7.9 mm
- Line contact: cylinder Ø 6 x 8 mm test disc Ø 24 mm x 7.9 m
- Ring/area

**CUSTOMER REQUIREMENTS**
- H₂ and N₂ gas supply
- Suction device for the gas outlets (with flow rate limitation, so that a sudden venting of the test setup can be prevented)
- Safety supply must be provided on site

**SPECIFICATIONS – ITEM NUMBER: 295.549.00**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature range</td>
<td>−40 °C to 150 °C</td>
</tr>
<tr>
<td>Stroke</td>
<td>0.01 – 5 mm</td>
</tr>
<tr>
<td>Frequency</td>
<td>0.001 - 100 Hz</td>
</tr>
<tr>
<td>Normal force</td>
<td>2000 N (±1%) at up to 30 bar or at least 1200 N at up to 100 bar</td>
</tr>
<tr>
<td>Sensors</td>
<td>2 piezo sensors to measure the frictional force (preferably outside of the H₂-chamber)</td>
</tr>
<tr>
<td>Max. Friction force</td>
<td>360 N</td>
</tr>
<tr>
<td>Medium in pressure cell</td>
<td>H₂ (or NH₃, CH₄, CO₂)</td>
</tr>
<tr>
<td>Pressure maximum</td>
<td>100 bar</td>
</tr>
<tr>
<td>Total gas volume</td>
<td>&lt; 200 ml</td>
</tr>
<tr>
<td></td>
<td>Changeable sensors/ bearings/ linear guides/ sealings inside the chamber</td>
</tr>
</tbody>
</table>