



High-Pressure Corrosion Testing

INTEGRATED SOLUTION FOR CORROSION TESTING OF MATERIALS

When selecting metallic or composite materials for transportation, biomedical and civil engineering applications, as well as materials for containing and transporting geothermal or nuclear energy, gas or oil, it is important to test for corrosion resistance. High pressure, high-temperature environments pose threats to metals, and some composites, resulting in increased possibility for corrosion and environment-assisted cracking, such as hydrogen embrittlement or stress corrosion. Top Industrie works with MTS as an individualized supplier to meet corrosion testing needs. Top Industrie's turnkey solution is ideal for gas corrosion testing, mixed flow gas testing, and evaluating the effects of atmospheric exposure to gases such as hydrogen, methane, carbon dioxide and syngas.

TOP INDUSTRIE TAILOR-MADE AUTOCLAVES

Top Industrie offers a wide range of versatile autoclaves in various force capacities, with high-temperature, high pressure testing capabilities. For gas applications up to 200°C (392°F), an internal force sensor provides the real loading force and compensates for the friction coefficient and pressure effects, increasing measurement accuracy.

» CONFIGURATION OPTIONS

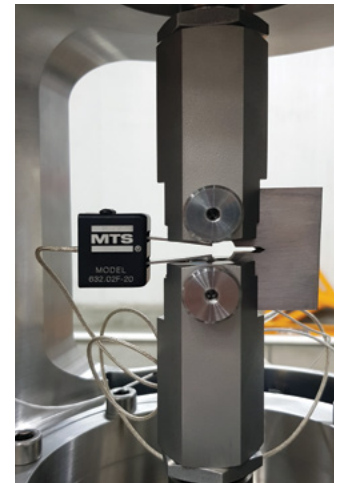
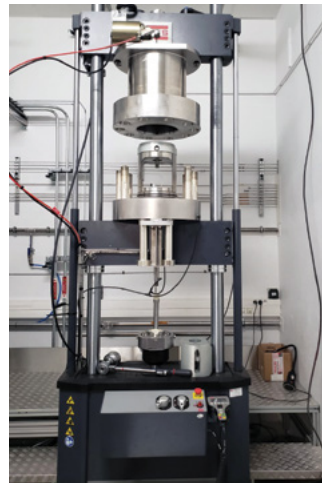
- Material options: MOC Stainless steel, 1.4571, 1.4980, alloy C276 and more
- Pressure range: 2 to 100 bar (.03 to 1.5 kpsi) up to 500 bar (7.5 kpsi) for H₂, and 1000 bar (15 kpsi) for other gases, fluids or liquids, other ranges available on request
- Temperature range: -20°C (-4°F) up to 200°C (392°F) for H₂ and up to 400°C (752°F) for other gases, fluids or liquids, other ranges available on request
- Orientation: Vertical or radial
- Internal volume capacities: 2L / 6L / 14L / larger sizes up to 20L on request

» STANDARD FEATURES

- Accommodates gases, fluids or liquids: gas H₂, CH₄, CO₂, mixed gases, syngas and more; corrosive liquids
- Double sealing with leakage collection
- Internal force sensor (gas applications up to 500 bar (7.3 kpsi) and 200°C (392°F))
- External force sensor (liquid and high-temperature applications)
- Adapted fixing clips for many types of specimen
- Gas feeding skids up to 1000 bar (15 kpsi)
- Compatible with a large range of extensometers

» OPTIONS

- Oxygen and humidity control
- Heating jacket or electric shell heating source depending on required temperature
- Sapphire window to accommodate DIC camera
- Advanced crack monitoring options, such as DCPD and others
- Complete feeding gas unit including gas booster, vacuum pump, pressure control (The feeding unit can be manufactured in accordance with ATEX 2014/34/UE zone 2. MTS equipment is not certified for use under ATEX, IECEx, or any other laws, rules or regulations that may apply to certification for use in hazardous or explosive environments.¹⁾)
- Safety equipment with appropriate gas detector
- Refilling tools that reduce gas volume for safety and economy
- Fixtures for standardized and typical specimen



Autoclave with optional optical quality glass window to accommodate non-contacting strain measurement solutions.

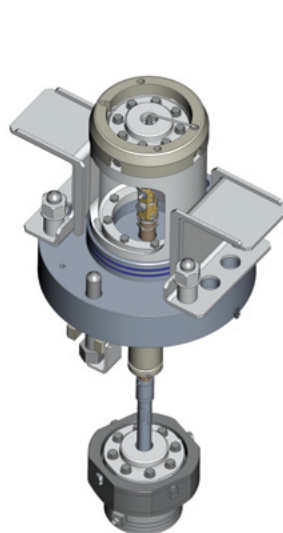
MTS LANDMARK TEST SYSTEMS

From complex fatigue studies to standard tension and compression tests, MTS Landmark® servohydraulic test systems deliver accurate, repeatable results. Robustly manufactured with SureCoat® technology that extends actuator rod longevity 10x over conventionally chrome-plated rods, these systems will perform reliably for years.

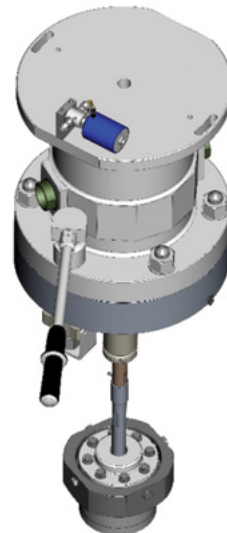
The MTS Landmark Test System provides the power and versatility to conduct the following test types in corrosion testing applications:

- » Fatigue & Fracture
- » Tension
- » Compression
- » Bend

Force range for typical corrosion testing applications: 5 kN to 100 kN (1 kip to 22 kip); more force capacity available on request.



Top Industrie Autoclave, cover up



Top Industrie Autoclave, cover down

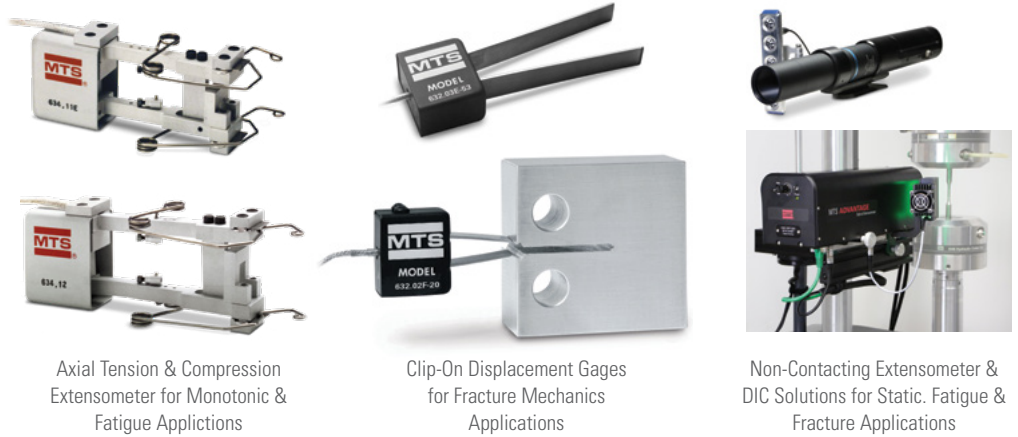


MTS Landmark Test System with Top Industrie Autoclave

MTS EXTENSOMETERS

Many high-pressure corrosion testing applications require accurate strain measurement. MTS has large selection of contacting extensometers that can be used both for cryogenic and gaseous applications.

Top Industrie autoclaves can be made with an optical quality glass window to accommodate MTS non-contacting strain measurement and digital image correlation (DIC) solutions if supported by the application.



Axial Tension & Compression Extensometer for Monotonic & Fatigue Applications

Clip-On Displacement Gages for Fracture Mechanics Applications

Non-Contacting Extensometer & DIC Solutions for Static, Fatigue & Fracture Applications

APPLICABLE INDUSTRIES:

- » Geothermal energy
- » Nuclear energy
- » Gas & Oil
- » Automotive
- » Aerospace
- » Construction
- » Medical device

SUPERIOR CONTROLS, SOFTWARE & DATA ACQUISITION

Top Industrie Autoclave Supervision and Data Acquisition:

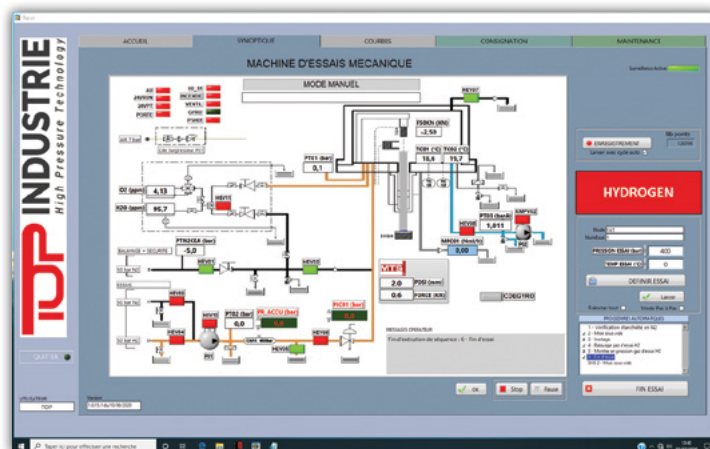
- » Control for pressure, flow, temperature
- » Process sequencer controls all steps for flushing, vacuum, gas filling and safety parameters
- » LabVIEW (National Instruments) data acquisition

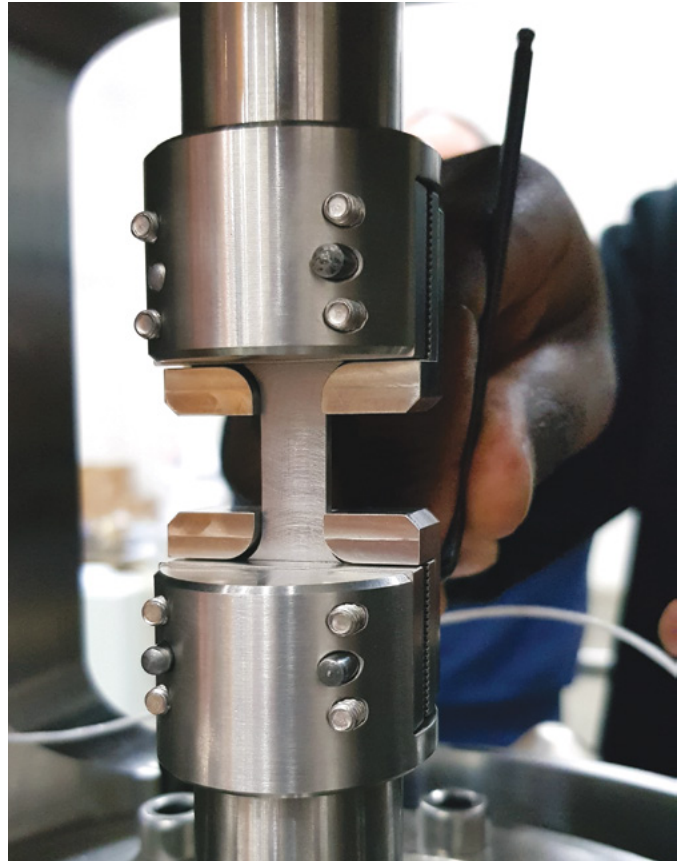
MTS Landmark System Control:

- » MTS FlexTest® controller
- » MTS TestSuite™ MP software

SERVICE & SUPPORT

Top Industrie will provide system integration, safety and certification, and MTS can provide installation, calibration and training support for the MTS equipment.





LEARN MORE ABOUT SOLUTIONS FOR YOUR APPLICATION

How a material behaves in a corrosive environment will determine whether it is a viable choice for its intended end use, especially in pressure-sensitive applications. Contact either Top Industrie or MTS today to discuss options for testing material responses to gases, fluids and liquids in high-pressure, corrosive environments.

¹Use of any of non-certified equipment in any application for which certification for use in hazardous or explosive environments is required or advised shall be at the sole risk and liability of Top Industrie and the equipment end-user.



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