



Corrosion testing in H₂S and CO₂ environment

Materials are exposed to aggressive environment containing acids, chlorides, H₂S and CO₂ in many oil and gas industry, chemical industry and refinery applications. Cormet supplies all the instruments needed for the corrosion and inhibitor testing purposes.

Hydrogen Induced Cracking (HIC)

Cormet provides instruments needed for HIC tests according to **NACE TM0284**. The instrumentation includes testing chambers, gas feed, waste gas neutralisation systems or even the entire laboratory. A delivery includes also detailed manuals and software to manage the operation parameters.

Sulfide induced stress corrosion cracking (SSCC)

Testing standards **NACE TM0177** and **ASTM G39** describe instruments needed for testing the sulphide stress corrosion cracking susceptibility of pipeline steels. Cormet provides proof rings (Method A) as well as four point bending instruments (Method B) with stressing frames. The proof rings will be instrumented with regular gas management tools and timer devices that measure the time-to-failure – value (TTF). The four point bending frames will be positioned in Cormet's HIC containers.



SSRT instruments

Cormet's computer controlled loading units are designed for the investigation of various forms of stress corrosion cracking (SCC) phenomena under different environmental conditions. The instrument is capable to perform tests described in **NACE TM0177**, **NACE TM0198** and **ASTM G44** standards.

The loading unit can perform slow strain rate (SSRT, CERT) tests, constant load tests and cyclic fatigue tests. The versatile computer controlled loading device is available in room temperature and high temperature high pressure autoclave versions.

The PC controlled loading devices can be instrumented with various accessories such as LVDT sensors for strain measurement, DC PD device for crack growth rate monitoring and electrochemical tools.

Controlled flow instruments

Controlled-flow instruments are used for flow accelerated corrosion (FAC) and inhibitor studies. Operation of rotating electrodes, jet impingement and certain high speed loops is based on hydrodynamic parameters such as shear stress. Some large scale high speed loops have real life pipeline components as specimens and they can be operated with corresponding parameters such as water flow rate. Cormet builds all these instruments for high temperature high pressure applications.

Rotating electrode is an inexpensive and simple but a versatile technique to study the effect of liquid flow rate on the electrochemical and corrosion behaviour of materials. Rotating cylinder electrodes (RCE) and rotating



cage (RC) are used to study corrosion inhibitors in oil and refinery environment as described in **ASTM G170**.

Recirculation loops

Recirculation loops simulating **oil and gas industry** applications are designed to resist aggressive hydrogen sulphide (H₂S) and carbon dioxide (CO₂) gases. They are built of corrosion resistant materials such as Hastelloy and certain polymers. Recirculation loops maintain high temperature and high pressure environment in an autoclave. They also provide aggressive H₂S and CO₂ containing environment needed in tests described at NACE standard TM0198-2011: Test levels IV-VII. Loops regenerate the dissolved gas content of autoclave. They provide large water volume which stabilises water chemistry during long test periods.

LABORATORIES

Typically corrosion testing instrument is only one part of the package that is needed to perform corrosion tests. Cormet provides supporting instruments and processes for corrosion testing and quality assurance purposes, including laboratories.



A R&D or H2S quality assurance laboratory can be built in a house or in a container. A container is a potential alternative to a conventional house lab, because as a separated unit it can be better isolated from the environment in terms of ventilation and poisonous gases such as H2S and CO2. If needed, a container lab can also be moved easily, for example if testing requires connection to a plant's process flows or presence close to pipe factory. A container laboratory will be fully instrumented

and tested before the delivery. After a short installation period at the laboratory's final location, a complete training will be held for the operators.



Cormet manufactures material- and corrosion-testing instruments for the laboratory and field environments. We specialise in high-temperature high-pressure applications. Cormet delivers instruments to university and industrial laboratories including the power-generation, chemical, transportation and oil & gas industries. Nearly all the products are tailored according to customers' needs.