

CHEMICAL AND PHYSICAL CHARACTERIZATION

Tribocorrosion machine

TRIBOCORR

Thanks to the industrial research activity and the competences acquired in the Reliability and Surface Engineering fields, Il Sentiero has designed and built TriboCorr. This machine is able to carry out tribocorrosion tests by means of the simulation of specific tribological conditions in a corrosive environment.

TriboCorr is able to reproduce not only operating conditions of materials to be tested, but also the most difficult working conditions accelerating degenerative phenomena that generally occur in the long term.

TriboCorr is both a versatile and modular tool: thanks to the interchangeable modules that compose it, it is possible to reproduce different operating conditions.

Wear is caused by a counterpart (often hard material) that puts pressure on the test-piece of material or on the treatment to be analyzed; this sample can have different shapes, according to customers' needs and the physical phenome-

non to be studied.

On the other side, corrosion is reproduced recreating an environment that simulates or reproduces aggressive conditions of the real working system.

Therefore, in TriboCorr we can find:

- Aqueous solution of chlorides
- Aqueous solution of hydrogen peroxide
- Lubricants
- Aggressive substances
- Acids and bases

The degradation of the test-piece can be monitored in real time through electrochemical analyses, thanks to the integrated potentiostat and the set of electrodes. It is possible also to control the friction coefficient and carry out other specific analyses.

The plant can also be used for static corrosion experiments.



Tribological aspect variables

Input data in the system

INPUT	GENERATED BY	MEASURED BY
Rotational speed/Linear speed	Electric motor + adapter	Servomotor
Normal load	Pneumatic actuator	Load cell
Test duration	-	Interface software
Environment	VHP-Circuit	Concentration detector
Temperature	Resistances	Thermocouple

Output data from the system

OUTPUT	GENERATED BY	MEASURED BY
Friction force (COF)	Test-piece sliding contact	Load cell
Volume of removed material	-	Profilometer, optical/electron microscope
Track depth	Test-piece sliding contact	Profilometer, optical/electron microscope
Wear rate	Test-piece sliding contact	Profilometer, optical/electron microscope

VHP plant, Vaporized Hydrogen Peroxide, allows recreating environmental conditions required by the customer.

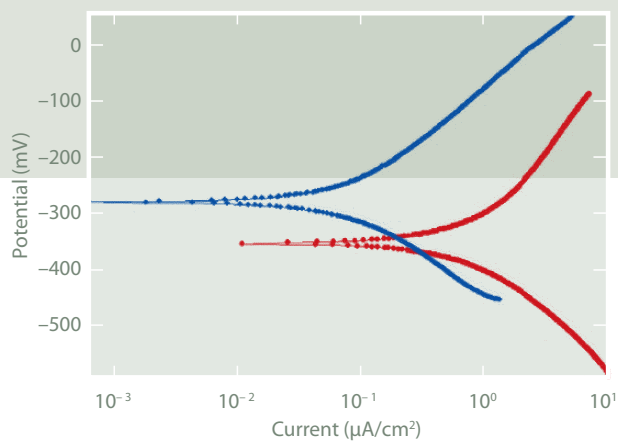
Corrosive aspect variables

Input data in the system

INPUT	GENERATED BY	MEASURED BY
Electrolyte composition	Circuit	Circuit
Electrolyte PH	VPH	PH-metro
% of chlorides	VPH	Conductivity meter
Polarization potential	Potentiostat	Potentiometer
Environment	VPH	Concentration detector
Temperature	Resistances	Thermocouple

Output data from the system

OUTPUT	GENERATED BY	MEASURED BY
Corrosion potential	-	Potentiostat voltmeter
Polarization density (potentiostatic tests)	Potentiostat	Potentiostat ammeter
Potentiodynamic polarization plot	Potentiostat	Potentiostat ammeter



Potentiodynamic curve