



Pocket CORPAC™: Portable Non-Intrusive Localized Corrosion Testing System

OVERVIEW

The Pocket CORPAC™ combines an industry staple in non-intrusive corrosion testing with the portable convenience made possible by the latest in Acoustic Emission (AE) technology. The Pocket CORPAC™ detects active localized corrosion in a variety of industrial structures and materials before costly and dangerous effects can be seen or felt. Pocket CORPAC™ can tell customers when corrosion is active, what to do to decrease or stop it, and if those solutions are ultimately working.

Pocket CORPAC™ detects a variety of localized corrosion mechanisms (see list at right). Most importantly, it provides the only early-stage detection capability of corrosion effects like micro-cracks, pitting and micro-delamination. Besides the Pocket CORPAC™, no other traditional or advanced non-destructive testing options exist in the field to identify such corrosion effects due to their limited size detectability. In fact without the Pocket CORPAC™, detection of these defects could be done only through destructive testing.

At less than a quarter the size of its predecessor and with the latest turn-key software, the Pocket CORPAC™ provides anyone with early localized corrosion detection capabilities – not just AE experts. Since Pocket CORPAC™ uses proprietary algorithms that can differentiate corrosion signals from the background noise produced during normal operation of plant equipment, there is no need for an AE expert to perform tests or take assets offline.

The Pocket CORPAC™ increases operational safety with short, periodic, in-service monitoring, while simplifying asset maintenance on a variety of industrial structures and materials, such as:

Localized Corrosion Mechanisms Detected

- Pitting
- Stress Corrosion Cracking (SCC)
- Hydrogen Induced Corrosion (HIC)
- Fatigue Corrosion

Industrial Structures

- Storage tanks
- Pipe connections
- Reactors
- Railroad tank cars
- Distillation towers
- And more

Industrial Materials

- Stainless steel
- Carbon steel
- Hastelloy
- Nickel alloys
- Aluminum alloys
- Zircaloy
- And more

THE SOLUTION

Active localized corrosion is tough to detect because its causes – pitting and/or stress cracking – are long in initiation and unpredictable in terms of propagation. The limited size of corrosion effects like micro-cracking and micro-delamination is another hurdle. But the Pocket CORPAC™ — built on the successful platform of the original CORPAC™, the industry standard in corrosion detection since the 1990s — supplies the only solution for early detection of active localized corrosion without the effect of external loading or the relaxation of stress from existing damage. In essence, the problem is discovered before it is felt.

PITTING DETECTION IN 2 HOURS

In a stainless steel industrial reactor, CORPAC™ technology was able to detect pitting after just two hours. In two days, the areas of pitting were identified. And in four days a visual depiction of the active corrosion was produced.

In just four days, CORPAC™ technology was able to detect, identify and quantify the areas of pitting, a perfect illustration of the value of real-time monitoring. This sort of real-time, non-intrusive corrosion monitoring prevented asset failure and allowed for preventive maintenance, saving offline time and cutting repair/replace costs.

ACTIVE CORROSION IDENTIFIED

In this example, CORPAC™ technology was used to detect active corrosion.

Upon detection, the active corrosion was arrested by a simple change in process parameters, and CORPAC™ was able to verify that active corrosion was no longer continuing. The change in process parameters proved much more cost-effective than a potential repair/replace scenario.

VARIOUS CORROSION DISCOVERY IN WELDED JOINTS

In use on a stainless steel pipe with a welded joint, the CORPAC™ technology detected corrosion where more standard NDT assessments like dye penetrant could not.

Using Acoustic Emission technology, stress cracking corrosion (SCC) below the joint surface was identified, before its effects were visible or quantifiable.



POCKET CORPAC™ KIT CONTENTS:

- Carrying case containing foam and lockers for each component
- Pocket CORPAC™ unit
- Technology package including end-user procedure and an internal database
- Turn-key software
- Sensor holder/Waveguide
- Sensor CD1 with a 1 meter cable (SMB)
- 1 GB memory card
- Ferromagnetic plates
- USB cable
- Power supply
- Manual

Real-time corrosion monitoring can identify areas of concern in a variety of industrial structures, which in turn can prevent not only leaks, but also the propagation of localized corrosion like pitting and/or stress cracking. Spot monitoring with the Pocket CORPAC™ provides users with the option to schedule full inspections based on the presence of active corrosion. Pocket CORPAC™ is at the center of any predictive maintenance and inspection program aiming to identify potential degradation as early as possible.

KEY FEATURES/BENEFITS

ONE-OF-A-KIND EARLY-DETECTION CAPABILITY

- Using Pocket CORPAC™ is the only non-destructive, on-line method to detect corrosion phenomena in their earliest stages

PORTABILITY

- Less than a quarter of the size of the original CORPAC™, Pocket CORPAC™ was designed with portability and ease-of-use in mind. It builds on the original CORPAC™, which was developed over six years in a partnership between MISTRAS Group, SA (France), the European chemical industry and a French university, all in conjunction with a European Union Grant. We take full control of the acoustic signal processing and automated corrosion type classification.
- The sleek, updated design can be used for many applications where portability is important. With a four-hour battery life and added ability to operate the unit from battery belt or AC power, the Pocket CORPAC™ can be

used for long-term testing or carried into the field for on-the-spot inspections.

- It can be set up during process operation, which means it can help to identify the stage of process or conditions at which a corrosion phenomenon is active or increasing.

IN-SERVICE USE

- Included sensor holder/waveguide allows for testing on high-temperature structures
- Able to be used in high-noise environments, avoiding asset shutdowns

SIMPLICITY

- Turn-key Pocket CORPAC™ software is designed for non-AE specialists, guiding the user through the test. The software allows users to carry out on-site tests, perform diagnosis and create a report in PDF format.

VERSATILITY

- Pocket CORPAC™ provides fast diagnostics on a wide array of structures and materials.
- In the event of unknown areas susceptible to corrosion, or when it's required to locate a specific location, it's possible to set up a multichannel system, which enables the use of zonal and planar location testing.

TECHNOLOGY BEHIND POCKET CORPAC™

Active localized corrosion detection is difficult because its processes (cracking and pitting) have long times of initiation coupled with unpredictable speeds of propagation. Yet the Acoustic Emission technology in the Pocket CORPAC™ is able to

"listen" to the subtle signals cracking and pitting emit. The Pocket CORPAC™ hardware is capable of high-speed data acquisition and waveform processing thanks to its 16-bit A/D converter and parallel DSP processor.

SENSOR SPECIFICATIONS

Dimensions:.....0.75" dia x 0.88" H (19 x 22.4 mm)
Weight:.....34 grams
Case Material:.....Stainless Steel
Face Material:.....Ceramic
Connector:.....SMB
Connector Locations:.....Side
Operating temp:.....-65°C to +170°C

POCKET CORPAC™ SPECIFICATIONS

Dimensions:.....9.5" H x 3.5" W x 1.4" D
 (241 mm x 89 mm x 36 mm)
Weight (with batteries):.....2.5 lbs. (1.13 kg)
Display:.....3.52" Color LCD, QVGA portrait mode, 240 pixels W x 320 H transreflective with LED backlight
Display Touchpad:.....Built-in touchpad on screen for use with stylus and on-screen processing
Storage Memory:.....128 Mbytes Flash for OS and data storage
External Interfaces:.....Compact Flash port, USB 2.0 Port
Power Consumption:.....Approximately 4 Watts
Power Requirements:.....External DC adapter (12 V @ 1A) OR Internal 7.2V NiMH battery pack, rechargeable in-situ or with optional charger
Battery Life:.....4 hours intermittent use
Operating Temp:.....23° to 115° (-5° to 45° C)
Storage Temp:.....-4° to 140° F (-20° to 60° C)

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