Honeywell
THE POWER OF CONNECTED

SmartCET® Corrosion Monitoring On-line, Real time

Product Information Note

“Live” corrosion monitoring brings Corrosion Management to life. SmartCET® technology is the only system of its kind, enabling operators to quantify internal corrosion processes in on-line and real-time mode.

On-time and accurate detection of uniform and localized metal corrosion is fundamental for safe and reliable operation of any process plant. Known values of corrosion rate allow prediction of the remaining service life for process piping or equipment, and furthermore help establishing proper preventive inspection and maintenance activities. Optimization of the turnaround’s costs and ensuring the highest reliability and safety of process equipment is not possible without knowledge about current status of internal corrosion processes.

Corrosion is not always continuous and can be intermittent

Traditional corrosion monitoring techniques like corrosion coupons, electrical resistance (ER) probes, ultrasonic thickness (UT) measurements etc. still can provide important and valid information about the average level of corrosion degradation. However, that information should be considered only as “historical relic” showing past corrosion activity with a limited correlation to the “live” and current situation in the process equipment.

FEATURES & BENEFITS

- Online, real-time corrosion monitoring
- Fastest electrochemical corrosion characterization in the industry (30 seconds) for CET5500 and CET6000M-W.
- Custom configuration
- Wireless communication capabilities utilizing Honeywell’s OneWireless technology
- Standalone DataLogger option for fast and easy corrosion monitoring system at low installation costs
- Standard, wired 4-20mA output with HART digital protocol with different interfacing options
- Local display of measured corrosion parameters
- Type 4X / IP66/67 transmitter housing
- Built-in galvanic isolation
- Intrinsically safe certificates for hazardous areas
- ATEX Ex ia Zone 0 and 1 for SmartCET® OneWireless and SmartCET® Datalogger,
- CSA Class I, Zone 0: Exia for SmartCET®CET5500

Multivariable output with:

- general corrosion rate
- localized corrosion indicator (Pitting Factor),
- dynamic B value
- CMI – capacitance-based variable for additional corrosion diagnostics

In reality corrosion is not always continuous but may appear/disappear at unexpected and irregular intervals and is therefore intermittent.

SmartCET- multi-technical monitoring approach

The SmartCET technology utilizes state-of-the-art algorithm that combines together three electrochemical corrosion measurement techniques:

- Linear Polarization Resistance(variant)
- Harmonic Distortion Analysis (HDA)
- Electrochemical Noise (ECN).

SmartCET accurately measures corrosion rate at 30 sec intervals by using a variant of the Linear Polarization Resistance (LPR) technique that can be more accurately described as a Low Frequency Impedance (LFI) measurement. Additionally, using Harmonic Distortion Analysis, SmartCET determines the system-related values of Tafel coefficients for anodic and cathodic reactions.

For fast detection of the localized corrosion potential SmartCET incorporates a third measurement technique: Electrochemical Noise.

The fourth variable determined by SmartCET is a parameter called Corrosion Mechanism Indicator (CMI). It is related to surface capacitance and provides information about the local conditions on the electrode's surface e.g. deposits buildup/removal.

These four corrosion variables bring to process/corrosion/integrity engineers a complete picture on the "live" corrosion situation in the given process stream.

SmartCET transmitters for all purposes

SmartCET technology is available in different configurations to fit a wide range of field-operational requirements.

Standard, multivariable corrosion transmitter SmartCET®-CET5500 (Figure 1) can be connected with any plant's DCS (Distributed Control System) by using standard 2-wire cables; just like any other control/measurement field device.

Using the popular protocol 4-20mA+HART, the control system and process data historian can updated at 30s intervals with four corrosion variables:

- General corrosion rate (mpy or mm/year)
- Localized Potential – Pitting Factor (dimensionless)
- Stern-Geary parameter "B" (mV)
- Corrosion Mechanism Indicator (CMI) – μF/cm2

SmartCET® technology is available in different configurations to fit a wide range of field operational requirements.

Figure 1: SmartCETCET5500 – for wired connection

When a cable connection is not feasible due to field obstacles, on-line, real time corrosion monitoring can be managed using modern wireless communication systems utilizing the Honeywell's OneWireless.

Figure 2: SmartCETCET6000 – OneWireless.

Intrinsically safe and ATEX Zone 0,1 certified, battery powered wireless SmartCETCET6000M-W (Figure 2) can be installed at any hazardous zones in Oil & Gas, Refining, Petrochemical or Chemical industries.

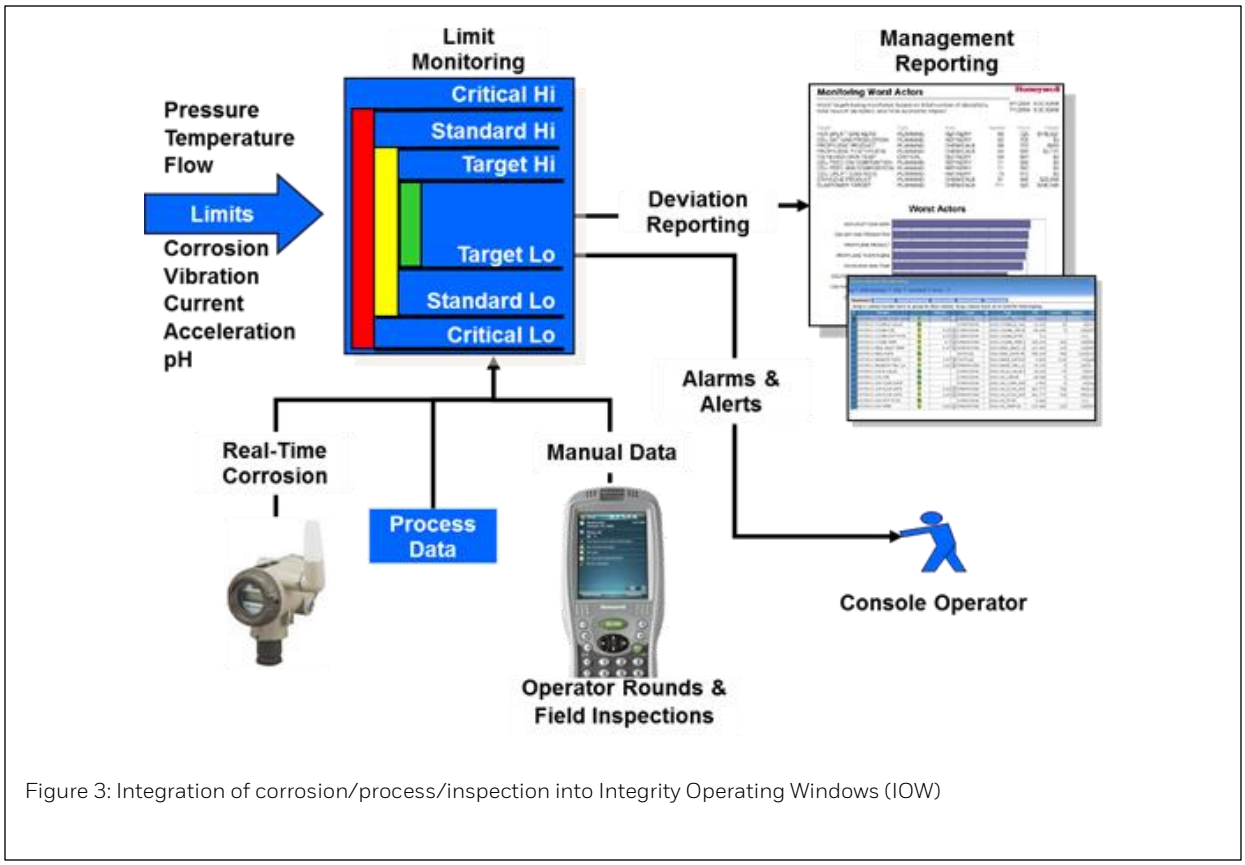

Figure 3: Integration of corrosion/process/inspection into Integrity Operating Windows (IOW)

An alternative option – SmartCETCET6000M-D Data Logger - provides the cheapest and the most flexible option for non-DCS corrosion monitoring system when circumstances make the installation of either wired or wireless transmitters not possible.

SmartCET- Real time Integrity Operating Window

Modern corrosion management systems incorporate several elements from basic corrosion engineering through corrosion prediction and modeling software up to sophisticated solutions which accommodates Risk Based Inspection (RBI), process data, alarm management and on-line corrosion measurements.

Integrity Operating Windows (IOW), as formulated by the American Petroleum Institute in their Recommended Practice 584, plays a key-role in any modern asset integrity management program. A generic approach to integrate Integrity Operating Windows within a process-corrosion-alarm system is presented in Figure 3.

The process for establishing the limits of key-operating parameters and their criticality is based solely on their known or predicted impact on corrosion and degradation rates. The actual corrosion rates should be visible to the process and corrosion engineers for validating the IOW limits. This is done by comparing the actual corrosion rates with the expected levels of material degradation when the limits were set.

The timely information provided about the potential activity of non-uniform corrosion helps operating the process within safe corrosion boundaries (see Figure 4).

Linking on-line, real time corrosion monitoring with the IOWs and Key Performance Indicators (KPI) Dashboards provides the corrosion and integrity engineers a reliable, decision-support tool for enabling preventive mitigation action and therefore reduce the risk of failure.

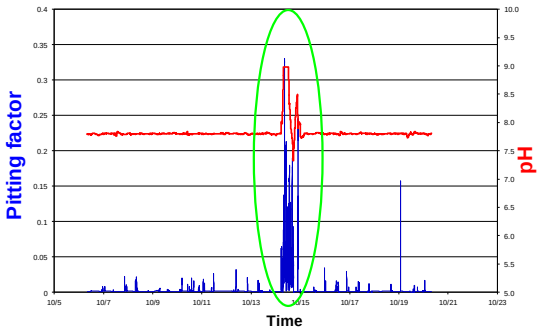

Figure 4: Impact of pH excursion on pitting potential of stainless steel in water-based environment.

Combining the latest corrosion prediction tools from the Honeywell Predict® software family, together with on-line SmartCET corrosion monitoring into Honeywell's Operation and Alarm management platform allows achieving the highest level of integrity for process pipelines and equipment in a real time basis.

SmartCET- proven track records of successful applications

Over a decade, hundreds of SmartCET transmitters have been successfully used for rapid corrosion detection in many industrial applications varying from simple cooling water systems to hydrotreating and crude distillation units.

Utilizing SmartCET technology, corrosion and material engineers are now enable to:

- View in real-time corrosion and process data simultaneously in the Plant DCS
- Analyze the impact of process fluctuations on corrosion
- Monitor and evaluate the effect of inhibitor and chemical treatments in real time
- Deploy effective and pro-active corrosion management strategies based on leading corrosion indicators

Honeywell Predict® Corrosion Suite

Honeywell Predict Corrosion Suite provides next generation corrosion management solution or oil and gas and refining industries seeking to move from reacting to corrosion damage to a more proactive and effective approach, Honeywell Predict Corrosion Suite provides the next generation of corrosion management solutions. Unlike conventional corrosion management methods, we employ unique prediction models that encapsulate deep expertise and extensive process data to correlate corrosion rates to specific process units, damage mechanisms, and operating conditions. Using Honeywell's tools, global major companies have achieved significant operational and business benefits.

The Honeywell Predict Corrosion Suite is a unique solution for today's industrial facilities, driving a paradigm shift in tackling difficult corrosion problems, and enabling efficient and safe operations. These software tools help users move away from a reactive response to corrosion based on qualitative, manual inspections, to a proactive, reliability-centric predictive approach based on quantitative information from soft sensors, sound process deviation management, and "what-if" scenario analysis tools.

Why Honeywell?

Your operation can benefit from partnering with a proven leader in corrosion asset integrity and preventive/predictive corrosion management. Honeywell has extensive intellectual property in the corrosion field, including unique corrosion prediction and material selection models, and patented corrosion monitoring technology. Our deep expertise includes an in-house team of experts with decades of experience in developing corrosion solutions. Honeywell's IP-based models are licensed and used by many global oil & gas majors, and our company has a recognized track record of world-class execution of projects.

Honeywell has also established a unique corrosion knowledge community through our Center of Excellence (COE). We assist customers with expert local and remote support. Our state-of-the-art corrosion and materials research and engineering laboratory provides a host of standard and tailored services. Utilized in Joint Industry Programs and customized testing, this facility can simulate any service environment.

For More Information

Learn more about Honeywell's Corrosion Solutions visit www.honeywellprocess.com/Corrosion or contact your Honeywell Account Manager, Distributor or System Integrator.

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