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ionix ADVANCED TECHNOLOGIES

# Enhanced service life with high-temperature corrosion surveys
# 对于**高温腐蚀**测量有更高的**使用寿命**

Longer lasting, higher availability of UT tools for on-stream, high-temperature corrosion surveys to maximise plant availability, productivity and safety.
使用寿命更长，可用范围更高的超声波工具，用于装置运行中的高温腐蚀调查，可最大限度地提高装置的在线率、生产率和安全性。


## Overview 概述

A large chemical refinery sought a solution for conducting multiple point and scan measurements for on-stream, in-service corrosion surveys across their facilities infrastructure. Ultrasonic testing (UT) is critical to the plants needs and used extensively for corrosion surveys but the refinery includes assets with surface temperatures over 250 °C including gas boilers, pressure vessels, piping and chemical storage during service, requiring robust transducers which can reliably make high-temperature remaining wall thickness measurements to prevent the need for unplanned shutdown and maintain productivity while reducing costs.

一家大型化工型炼厂寻求一种解决方案，对其基础设施进行多点测量和扫描，从而进行在线运行中腐蚀调查。超声波检测(UT)对有腐蚀调查的装置至关重要，并且其被广泛使用，但炼油厂具有包括燃气锅炉、压力容器、管道和化学品存储设备等表面温度超过250 ° C的运行中的设备，需要稳健的探头，对其进行可靠地高温剩余壁厚测量，以防止计划外停车，在降低成本的同时保持生产力。

## The Challenge 面临的挑战

The primary challenges for the refinery were:
炼厂面临的主要挑战是：

- Transducers were required to **operate continuously up to 260 °C** to undertake a high volume of spot measurements and scans of remaining wall thickness in pipes carrying various fluids including steam, water, gas and process fluids used for the process.
  探头需要在260 ° 连续工作，以便对输送包括蒸汽、水、气体和工艺物流的各种流体的工艺管道的剩余壁厚进行大量的点测和扫描。
- Regular spot measurements and scans for remaining wall thickness are needed to be **conducted while the plant was operational** and running through a wide temperature range.
  当装置在大的温度范围内运行时，需要对剩余壁厚进行定期的点测和扫描。

## The Solution 解决方案

Ionix HS582i dual element, 5 MHz transducers based on the HotSense™ ultrasonic platform were applied with the operators own industry standard UT flaw detectors making for immediate implementation.

Ionix的HS582i双晶5 MHz探头基于Hotsense™ 超声波平台，与作业者自己的行业标准超声波探伤仪一起应用，可以立即实施。

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- The HS582i transducers were chosen because of their wide operating temperature range; -55 to +550 °C, reducing the need for intermittent cooling and re-calibrating (duty cycling) to reduce the inspection time and prevent the need for shutdown or isolation of assets.
  选择HS582i探头是因为其工作温度范围宽；从-55到+550 ° C，减少了间歇冷却和重新校准(工作循环周期)的需要，以减少检测时间，避免停车货或隔离资产的需要。
- Increased wear resistance increased productivity and measurement collection up-time, and allowed extensive coverage by scanning on asset surfaces.
  增强的耐磨性，提高了生产率和测量收集的可使用时间，并通过在资产表面扫描进行广泛的覆盖。
- Manufactured in compliance with international standards made it easy to fit directly into existing site UT inspection procedures and NDT professionals' qualifications.
  按照国际标准制造，使得它很容易直接适应现有的场地超声波检验程序和无损检测专业人员的要求。
- Compatible with commercial high temperature couplants.
  与商用高温耦合剂兼容。


## Execution 执行

- One transducer was able to cover over 2,900 spot measurements, and 511 scans (80 to 230 $cm^2$ sections at a time) of wall thickness from 100 to 260 °C
  一个探头能够完成超过2,900个壁厚点测以及511次壁厚扫描(每次80到230 $cm^2$面积)，温度为从100到260 ° C
- An additional 34 pipe surveys were conducted with the same transducer up to 150 °C with multiple spot and scan measurements in each survey, using UT flaw detectors and equipment owned by the sites NDT team without additional training or integration.
  另外还用通一个探头对温度为150 ° C的34根管道进行了测量，在每次测量中都进行了多个点测和扫描，使用的是现场无损检测团队已经拥有的超声波探伤仪和设备，没有进行额外的培训或整合。

## Highlights 亮点

- One HS582i transducer enabled the refinery site NDT team to reduce the number of transducers used to complete the corrosion surveys required across the plant, without degradation and maintain accurate measurement data.
  一个HS582i探头使炼油厂现场无损检测团队能够减少用于完成整个工厂腐蚀测量所需探头的数量，且性能不会下降，并保持准确的测量数据。
- The HotSense™ transducer allowed 4-5X more asset coverage than the previous incumbent transducers before needing to be replaced.
  在需要更换之探头之前，与之前的探头相比，HotSense™ 探头可以检测其4-5倍的资产。

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- The HS582i enabled the refinery site NDT team to increase the efficiency and productivity of their corrosion surveys without the need for shutdown, improving the safety and maintaining production at the site.
HS582i使炼厂现场无损检测团队无需停车就可以提高腐蚀测量的效率和生产力，提高了现场的安全性，并保持了生产。