

HotSense™ for measurements through TSA

HotSense™ 穿透热喷涂铝涂层进行测量

for applications in Oil & Gas, Energy and Process control
应用于油气，能源和工艺控制领域

HotSense™ ultrasonic sensors are the only fully intrinsically safe ultrasonic sensors which can be used to make **thickness measurements through thermally sprayed aluminium (TSA) coatings** at high or low temperatures.

HotSense™ 超声波传感器是唯一完全本质安全的超声波传感器，可用于在高温或低温下**通过热喷涂铝(TSA)涂层进行厚度测量**。

Keywords: wall thickness, thermally sprayed aluminium (TSA), oil & gas, corrosion, coatings

关键词：壁厚，热喷涂铝 (TSA)，油气，腐蚀，涂层

Key Features 主要特征:

▶ HotSense™ sensors can make thickness measurements through TSA without coating removal or damage.

HotSense™ 传感器可以通过TSA进行厚度测量，而不去除或损坏涂层。

▶ Protective coatings are preserved and un-damaged
保护涂层完好无损

▶ Coated assets can be monitored in-service without the need for shut down, plant access or isolation.

可以对带涂层资产在运行中进行监控，而不需要停车或隔离。

▶ -55°C/-67°F to +380°C/715°F (+550°C/1020°F on request) wide operating erature range for in-service monitoring

可以进行-55°C至+380°C(根据要求到+550°)的在线监测

▶ Sensors can be deployed while plant is in operation - no welding
传感器可在装置运行时安装，无需焊接

▶ A truly high temperature sensor powered by the Ionix HPZ piezoceramic

一个由Ionix HPZ压电陶瓷制造的真实高温传感器



Key benefits 主要收益:

▶ Increase safety with in-service monitoring of coated pipes
通过对涂层管道的运行监测来提高安全性

▶ In-service installation with no need for welding maximises plant availability
不需要焊接的在役安装最大限度地提高了装置的利用率

▶ Deployable across oil & gas and other hazardous industries with ATEX Zone 0 certification
具有ATEX 区域0认证，可安装在油气和其他危险行业

1. Thermally Sprayed Aluminium (TSA) – Inspection Challenge

热喷涂铝涂层 (TSA) - 检测挑战

TSA offers a barrier coating to assets which can offer protection across a wide temperature range.

TSA为资产提供了一种屏障涂层，可以在很宽的温度范围内提供保护。

- TSA removes the presence of aqueous solutions from the asset surface, preventing the formation of atmospheric corrosion or CUI. It also provides a large area sacrificial anode, particularly well-suited to marine environments, which prevents galvanic corrosion from more cathodic metals such as carbon and stainless steels.
TSA从资产表面去除水溶液的存在，防止大气腐蚀或CUI的形成。它还提供了大面积的牺牲阳极，特别适合于海洋环境，防止了来自更多阴极金属如碳钢和不锈钢的电化学腐蚀。
- TSA presents a challenge for conventional ultrasonic thickness measurements as its rough surface can prevent coupling of ultrasonic signals and internal pores and features may scatter any transmitted energy.
TSA的粗糙表面可以防止超声信号与内部孔隙的耦合，并可能会分散任何传输能量，这对传统的超声厚度测量提出了挑战。
- Pipes or structures which are TSA coated are a challenge for manual thickness measurements and cannot be monitored using standard fixed ultrasonic monitoring technologies.
TSA涂层的管道或结构对人工厚度测量是一个挑战，并不能使用标准的固定超声监测技术进行监测。

2. HotSense™ Solution

HotSense™ 解决方案

- HotSense™ sensors deployed directly onto TSA using the HotSense™ deployment clamp and solid metal couplant.
使用HotSense™安装卡箍和固体金属耦合垫直接安装HotSense™传感器到TSA上。
- Measurements can be made through TSA standard coating thicknesses of 0.2 – 1.2mm without coating removal or modification.
可以穿透TSA标准涂层厚度0.2 - 1.2mm进行测量，无需去除或修改涂层。
- Clamp coupling maintains TSA integrity.
夹具耦合维持TSA的完整性。
- Clamp solutions allows sensors to be repositioned as required.
夹具解决方案允许传感器根据需要重新更换位置。
- Stable thickness measurements can be made across the temperature range of -55°C/-67°F to +380°C/715°F (+550°C/1020°F on request) using the complete HotSense™ Monitoring Solution.
使用完整的HotSense™监测解决方案，可以在-55 °C到+380 °C(+550 °C)的温度范围内进行稳定的厚度测量。
- Plot below shows the data out put and measurements made through TSA when connecting the sensors to an automated UT thickness gauge platform.
下图显示了将传感器穿透TSA连接到自动超声波测厚平台时的数据输出和测量结果。

