

CASE STUDY



Welltec

Profile

Welltec is an international provider of robotic well solutions for the oil and gas industry. Welltec technology is used in all types of onshore and offshore environments including deepwater, subsea and extended reach, high-yield, heavy oil and unconventional gas well programmes. Headquartered in Denmark, the company has more than 45 offices around the world and employs more than 1,000 people.

One of the company's proprietary technologies is the Welltec® Flow Valve (WFV), a component of Welltec's Flex-Well® completions concept. The WFV is a full-bore valve that enables the circulation and fluid displacement from the bore to the annulus of the upper completion in an oil well.

Challenge

A project for a well in an onshore field required a proppant to be pumped through the flow valve which caused severe internal erosion to the sleeve. A coating was required that could overcome this extreme erosion challenge and enable the valve to operate to optimum performance in this harsh environment.

Project economics meant that it was preferable to find a suitable coating solution rather than change the substrate material from AISI 420 Mod stainless steel to an Inconel alloy. Welltec had previously tried HVOF and ceramic coatings but they had both failed, presenting issues of cracking and peeling.

The Welltec engineer working on the project had experience of Hardide-T from a role with another global oilfield service company and was aware that Hardide coatings have consistently lower erosion rates at different impingement angles than other coatings and hard materials including HVOF and cemented carbide.

Solution

Under ASTM G76-95 erosion resistance testing, Hardide-T shows seven times lower erosion than HVOF 85WC-10Co-4Cr. In addition, the Hardide chemical vapour deposition (CVD) process means that the coating can be applied to internal surfaces, complex geometries or parts with a small internal diameter that prohibit spray gun application.



The unique combination of hardness, toughness and compressive stresses make it an ideal and proven solution for components operating in harsh, high-erosion environments.

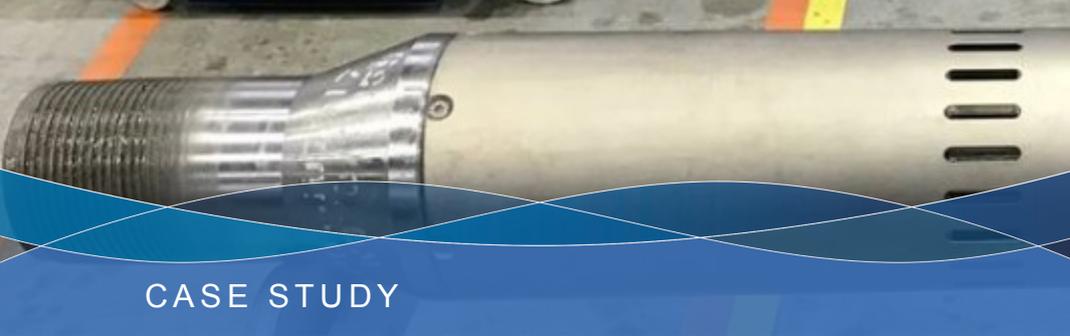
FURTHER INFORMATION

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A Hardide-T coating with thickness 50 +/-15microns was applied to the internal surface of the 330mm long sleeve. The unique combination of hardness, toughness and compressive stresses make it an ideal and proven solution for components operating in harsh, high-erosion environments.

Hardide-T coated sleeves are now deployed permanently downhole in WFVs in three land wells.

Welltec and Hardide Coatings are now working together on additional applications including the use of Hardide-T as a solution to sulphide stress cracking and stress corrosion in H₂S environments. In 2020, Hardide Coatings invested in larger processing equipment including a new CVD reactor that can coat parts up to 1.5m in length. This is of interest to Welltec which is considering using the Hardide coating on larger downhole components.