

APPLICATION NOTE

Determining the thickness of thermally sprayed aluminium (TSA) coatings on stainless steel

Ensuring the long-term protection of parts exposed to the extremely harsh conditions found in offshore environments requires specialised anti-corrosion coatings. For example, thermally sprayed aluminium (TSA) – used to protect stainless steel against corrosion even at high temperatures – can withstand marine influences for decades. However, to achieve such longevity, the TSA must have a certain coating thickness, making quality inspections mandatory.



Fig. 1: TSA (thermally sprayed aluminium) coating process

Thermal spraying techniques are very effective for applying thick layers over large areas, as the hot coating materials are literally squirted onto the surface. Compared to other coating processes, such as electroplating or chemical vapour deposition, the rates of deposition are high: the aluminium is fed in wire form, molten and accelerated as micrometre-sized particles towards the substrate, forming a tough, protective casing.

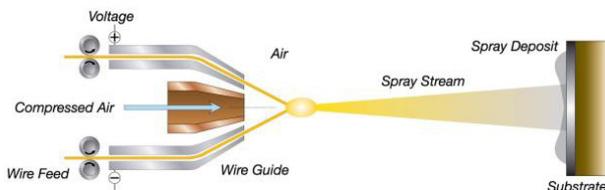


Fig. 2: Schematic diagram of an electric arc wire process

The TSA coatings used in the oil and gas industry are typically between 250 and 500 μm ; layers this thick can only be measured using the phase sensitive eddy current method. Controls are usually performed either right after the coating process or during maintenance to monitor the progress of corrosion and to determine whether parts should be re-coated.

FISCHER's handheld PHASCOPE[®] PMP10 instrument, together with the probe ESD20Zn, is used for measuring TSA coatings in situ. Calibrating the probe is easily done, as the user is guided step-by-step through the instrument's software: first measurements are taken in air and of the base material (e.g. stainless steel), then of the saturation-thick TSA coating (material depending, but >1 mm, on the same steel base); and finally, measurements are taken on real samples at the higher and lower ends of the expected range.



Fig. 3: The portable Phascope PMP10 uses the phase-sensitive eddy current measurement principle to determine accurately the thickness of TSA coatings.

The thickness of thermally sprayed aluminium (TSA) coatings – protecting offshore steel constructions and other parts exposed to corrosive salt water and harsh environmental conditions – can be measured easily and effectively using FISCHER's PHASCOPE[®] PMP10 handheld instrument. For further information please contact your local FISCHER representative.