



Oxifree / Cygnus Ultrasonic Testing Case Study



Oxifree and Cygnus instruments conducted UT testing through applied TM198

Summary

Oxifree and Cygnus instruments carried out Ultrasonic Testing through applied Oxifree TM198.

The objective was to prove that substrate integrity and thickness can be measured directly through applied Oxifree Coatings and to provide proof that any oxygenated air gap between substrate and coating are completely eradicated. In addition we wanted to demonstrate that Cygnus instruments, Cygnus Dive, operates perfectly through applied Oxifree material.

Procedure

To perform base metal thickness tests, a host of different gauges of metal substrates were coated partially and in full with Oxifree TM198 to demonstrate the effectiveness of Cygnus Ultrasonic Testing (UT) equipment through different thicknesses of the Oxifree coating.

All test pieces were coated via gun application in a standard application fashion with portions of Oxifree material removed in order to illustrate and test the same substrate piece thickness. One plate had a three coat system employed to give a coating thickness of 6mm to confirm Cygnus' UT equipment works through varying gauges of coating. Another plate was coated and sealed in silicon mastic and immersed in water to demonstrate the effectiveness of sub-aqua testing.

All measurements were taken using a calibrated Cygnus Instruments, Cygnus Dive UT thickness gauge. All tests were carried out by a fully trained Cygnus Engineer in the presence of Oxifree Operations Manager.

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A variety of metal substrates were assessed using the Cygnus Dive UT Gauge. Test 1.



Test 2



Test 3



Test 4



Case Study

All testing included coated substrate, Cygnus couplant (blue gel) and Cygnus Dive UT thickness gauge.

Substrates were:

- 4mm blasted plates (Grey in colour)
- Gas Transfer pipe (Black in colour)
- Oxifree demonstration rig

Results

Test 1: 4mm blasted steel plate coated in Oxifree coating.

Measurement was taken through 6mm of Oxifree coating. The material was then removed from the exact spot of testing to demonstrate that the Oxifree coating had no effect on the thickness of the material reading.

Test 2: Gas transfer pipe partially coated in Oxifree coating.

This test involved measuring a section of the pipework coated in Oxifree material using Cygnus Dive UT gauge, then rotating the pipe to demonstrate that the only difference in reading is due to the manufacturing process.

Test 3: Testing of Oxifree coating while submerged.

A coated plate was submerged in water and tested for thickness as in the previous tests with the same level of results recorded.

Test 4: Testing Cygnus Dive on Oxifree Demonstration test piece.

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The various test conducted showed, without fail, that UT testing was suitable for TM198.



Conclusion

Based on tests performed, it proved that when correctly applied Oxifree TM198 completely eradicated any oxygenated air and electrolyte on the surface of substrates that cause and lead to corrosion. The test also proved that the multi-wave ultrasonic echo emitted and received by the Cygnus UT thickness gauge perfectly identified substrate thickness through Oxifree material, eliminating any need to remove any applied Oxifree coating in order to inspect and fully assess substrate integrity.

As a result of the testing Oxifree recommends UT testing as an alternative for routine inspection where the material would typically be cut away and refilled. UT testing can determine wall thickness and detect defects, without damage or interruption to process equipment. This is not possible with other corrosion protection methods.