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TEST CERTIFICATE

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REF NoN707705/7-8 Issue 2
 Ord No Cash account

Date Tested 01/12/2007
 Date Reported 12/11/2008

Test Product: TIAL-M80 sleeve installed on Ø 4" steel pipe with TIAL-P primer prior to application

Specification - ASTM G42 - 03

Description of product tested

TIAL-M80 heat-shrinkable wrap-around sleeve operating at temperature up to 80°C with TIAL-P wet epoxy primer.

ASTM G42 - 03 (impress current)			
Cathodic Disbonding of Pipeline Coatings			
TIAL-M80 with TIAL-P Primer on steel substrate.			
Item number	Test Duration (Days)	Test Temperature (°C)	Cathodic Disbondment Immersed (mm)
1	30	80	9.77
2	30	80	10.77

Note:

- The mean radius values of six reading were measured from the outer edge of the holiday and reported as the cathodic disbondment result.

ASTM G42 - 03				
Cathodic Disbonding of Pipeline Coatings				
TIAL-M80 with TIAL-P Primer on steel substrate.				
Item number	Test Duration (Days)	Test Temperature (°C)	Disbondment Reference Vapour Zone (mm)	Comments
1	30	80	0.00	The coating system exhibited no disbondment at the test area.
2	30	80	0.00	The coating system exhibited no disbondment at the test area.

Test Product: TIAL-M80 sleeve installed on Ø 4" steel pipe with TIAL-P primer prior to application
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ASTM G12 – 07					
Coating Thickness					
TIAL-M80 with TIAL-P Primer on steel substrate.					
Item number	Number of measurements	Maximum (mm)	Minimum (mm)	Mean (mm)	Coating thickness at holiday site (mm)
1	12	2.82	2.28	2.59	2.27
2	12	2.83	2.40	2.63	2.35

Test equipment used:

Elcometer 256Fs3 serial number GC898/-40 Calibration on use against reference foils.
 Elcometer reference foils serial number PC0787-795 Calibration due 07/2008
 RS Megger BMM80 Insulation Multimeter serial number 6111-417/030903/1280 Calibration due 08/2008
 Gallenkamp OMT 150 xx2.c fan oven serial number SG98/06/251 Calibration due 04/2008
 C.D. unit TH039-ASSY serial number 002 Calibration due 11/2008
 Thermo reference electrode
 Platinum wire 99.9% pure
 Digital calliper serial number 06591053 (NW 225) Calibration due 02/2008

The end of the pipe was sealed with a plastic end cap and Dow Corning 732 silicone sealant

The resistance measurements in accordance with section 8.1.1 at 500 volts are item 1 before = 3.29 GΩ after = 3.29 GΩ and item 2 before = 3.43 GΩ and after = 3.44 GΩ

One Ø 7.5mm artificial holiday was used and had an impressed current of -1.50 ± 0.01 volts through a pure platinum wire anode (99.9%).

Immersed surface areas of the coating system are item item 1 = 82938 mm² and item 2 = 82938 mm²

The electrolyte solution was made in accordance with ASTM G42 section 6.1.

The test specimens were conditioned for 24 hours at $23 \pm 2^\circ\text{C}$ and $50 \pm 5\%$ relative humidity.

The test specimens were maintained within $\pm 2^\circ\text{C}$ of the required temperature throughout the test.

The above testing has been carried out in accordance with the requirements of the governing specification and or clients requirements, and controlled within the laboratories BS/EN/ISO/IEC 17025 UKAS accredited quality system. However, the testing is not covered under the laboratories UKAS testing schedule.

The results have been report in accordance with the client's instructions.
 The report has been re-issued due the clients address change.

John Carter
 Operations Manager
 Bodycote Testing Ltd.
 North West Laboratory

 For and on behalf of
 Bodycote Materials Testing. Ltd

Authorised by: Mr T S Haynes
 AMI MechIE, TMIIE, Eng Tech
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Witnessed by

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