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CC Technologies

*SOLVING MATERIALS PROBLEMS
THROUGH INNOVATION*

January 6, 2003

Mr. Mike Sand
United Coatings
19011 E.Cataldo
Greenacres, WA 99016

Dear Mike,

Attached is the report for our test project on the EN10290 evaluation of a protective coating. If you have any questions, feel free to call me at (614)761-1214.

Sincerely,

Greg Ruschau
Testing Manager

Objective: Determine the specific electrical insulation resistance of the coating in accordance with EN10290, Steel tubes and fittings for onshore and offshore pipelines – External liquid applied polyurethane and polyurethane-modified coatings.

Experimental: Two panels, each 10” in diameter, were supplied to CC Technologies. A section of 8” PVC pipe, 4” high, was affixed to each sample using RTV silicone. The cell was filled with 2” of a 0.1 mol/l NaCl solution. A copper wire was used as a counter electrode. The setup is pictured in Figure 1.

A voltage of 50V was applied across each coating and the resulting current was measured weekly. The insulation resistance, in accordance with the standard, was calculated by the following formula:

$$R_s = VS/i$$

Where V = applied potential

S = immersed test surface in square meters

i = resulting current

The slope, α , of the resistance between day 70 and day 100 was calculated by:

$$\alpha = R_{s100}/R_{s70}$$

The results are reported in Table 1, and shown graphically in Figure 2.

Table 1: Results of specific electrical insulation resistance test

Days	Sample 1	Sample 2
7	1.92E+04	3.21E+08
14	2.19E+04	3.46E+05
21	1.15E+06	5.77E+06
28	8.88E+05	5.41E+06
35	8.97E+05	7.22E+06
41	1.58E+06	8.66E+06
49	1.58E+06	5.09E+06
64	3.52E+06	8.66E+06
70	2.55E+06	6.67E+06
88	2.34E+06	2.58E+06
100	1.86E+06	6.66E+06
	$\alpha_1 = 0.73$	$\alpha_2 = 1.00$

It was observed in sample #1 that there were two localized areas where red rust was noted. This explains why this sample initially had a low resistance but later increased, as the corrosion product likely filled the pores to create a more electrically insulating pathway.

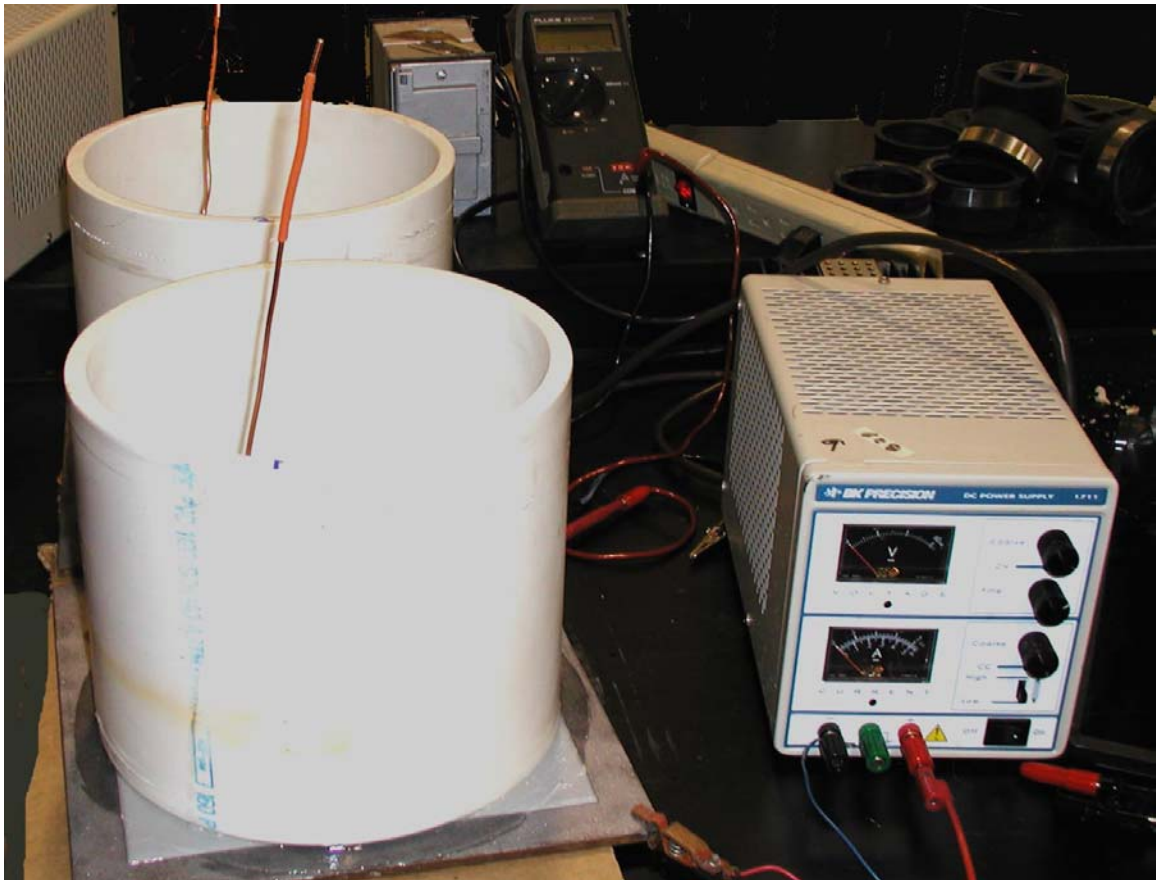


Figure 1: Specific electrical insulation resistance test setup

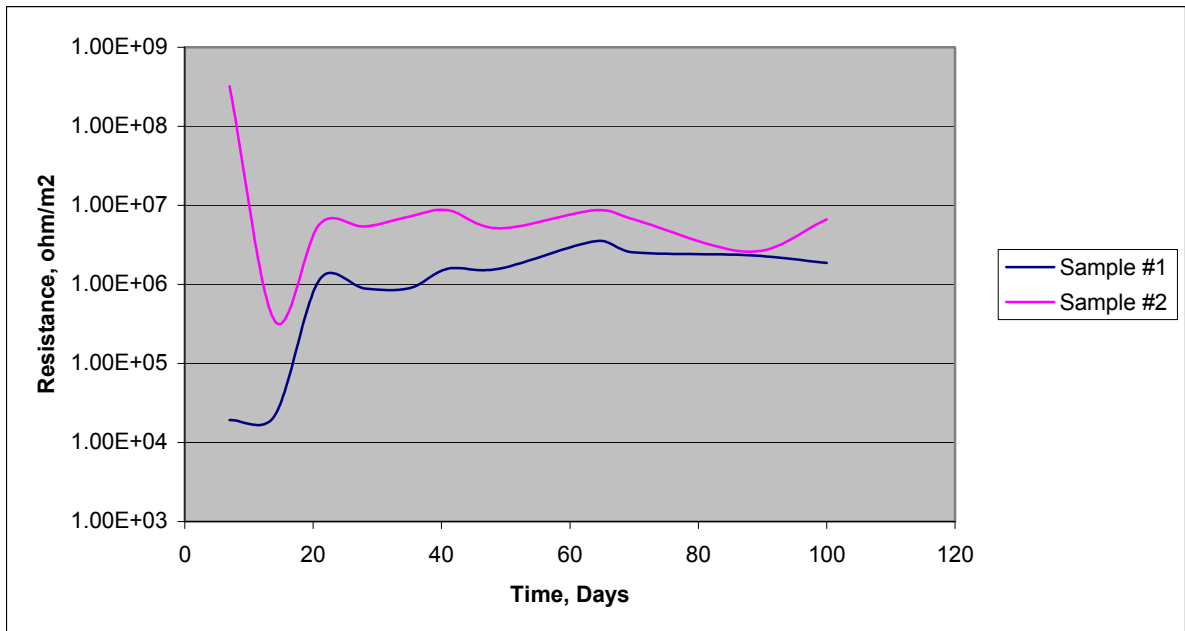


Figure 2: Electrical resistance as a function of time