Contents

COMPARISON OF ReCorr® QCQ and ISO 16773 MEASUREMENT SETUPS

The ReCorr® QCQ Test closely follows the ISO 16773 measurements procedure with the exception of the electrode setup. The method EN 16773 (Part 2), describes a three-electrode system in a hollow bottom glass cell filled with liquid electrolyte (Figure 1) but also allows for the alternative electrode setups. The alternative setup of the ReCorr® QCQ technique consists of a single sensor electrode (Figure 2) or a pair of sensors electrodes (Figure 3). During the measurement, the electrodes stick to the coated surface by the aid of ReCorr® QCQ sticky, paste conductive electrolyte. For details of the measurement setup and the tips for correctly conducting the measurements, please see the Measurement Procedure application note.

The electrodes are connected to the EIS instrument run from the PC, tablet or phone application. For details of connecting the instrument to the PC or Android device, adjusting the measurement parameters and running the experiment please see the ReCorr® QCQ Software documents provided with the device or contact us at info@recorrtech.com.

In compliance with EN 16773 (Part 4), the impedance spectra typical of coated metallic samples are obtained and may be interpreted according to the same standard and/or literature references. For details of the simplified impedance data interpretation, please see ReCorr® QCQ Coating Assessment application note.

The measurement capability of the EIS instrument is verified according to EN ISO 13776 (Part 3), by ReCorr® QCQ Dummy Cell circuits with capacitance and resistance values of the order of magnitude expected for the actual coated specimen.

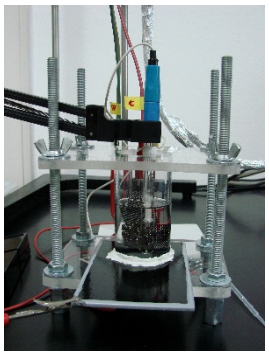


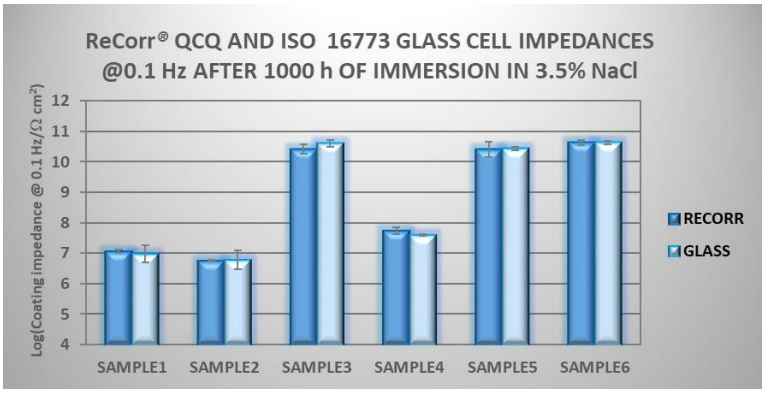
Figure 1. EN 16773 three-electrode glass cell setup.

Figure 2. ReCorr® QCQ one-electrode setup.

Figure 3. ReCorr® QCQ two-electrode setup.

COMPARISON OF ReCorr® QCQ and ISO 16773 TEST RESULTS

Figure 1 shows the exposure of the 6 coated samples in 3.5% NaCl solution, within the glass cell and by immersion. Figure 2 shows the one-electrode ReCorr® QCQ measurement setup and Figure 3 shows the glass cell, three-electrode measurement setup. Comparison of the coating impedances @0.1 Hz is shown in the figure below. Comparison of the impedance spectra collected by both methods is shown on page 3.



Repeated measurements were done in three sequences, from sample 1 to 6. ReCorr® QCQ measurements were done immediately after the sample extraction from the solution. Measurements in the glass cell were done immediately after the ReCorr® QCQ measurements. The samples were cleaned from the paste electrolyte by a short rinse in warm (approx. 45°) water and reconditioned by immersion for 1 h before repeating the measurements. A strong correlation is observed between the ReCorr® QCQ and ISO 16773 glass cell EIS results.

Visible signs of degradation, in the form of rust spots, appeared after 1500 h of immersion on the three samples that were detected to have lower quality. The visual appearance of the coating areas within the glass cells is shown in photographs on page 4, and of the immersed sample areas on page 5. The results of both methods are correlated with the visual appearance of the samples.

It should be noted that EIS is a technique that is very sensitive to coating degradation (water uptake, porosity and adhesion loss). Therefore, ReCorr® QCQ and ISO 16773 glass cell EIS results may differ significantly if the momentary degree of the coating degradation on the two measurement areas differs. However, the overall trend of impedance behaviour will be the same, either of the measurement areas preceding or following the other one in the extent of degradation.

Figure 1. Sample exposure to 3.5% NaCl.

Figure 2. ReCorr® QCQ one-electrode setup.

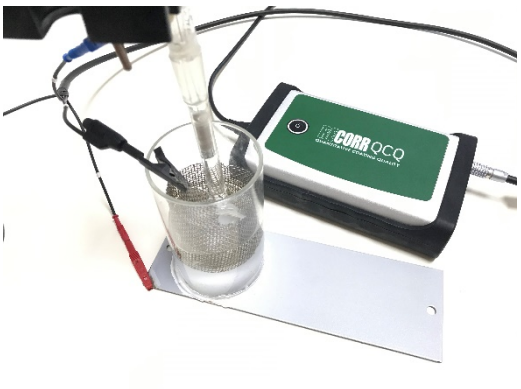
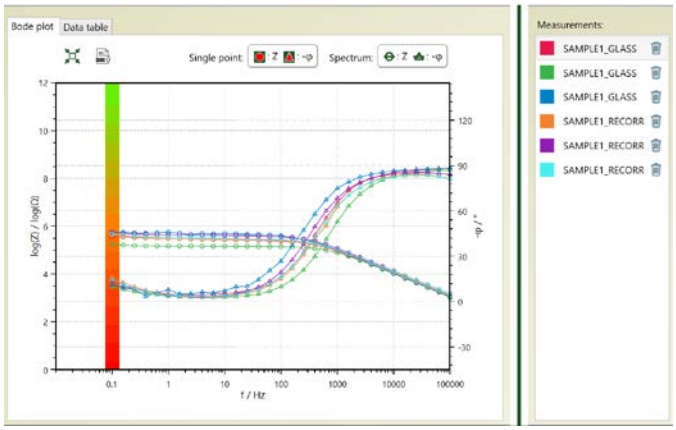


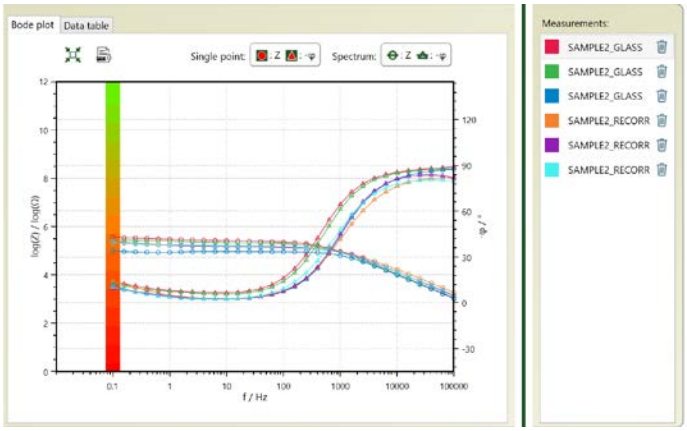
Figure 3. Glass cell three-electrode setup.

COMPARISON ReCorr® QCQ and ISO 16773 IMPEDANCE SPECTRA

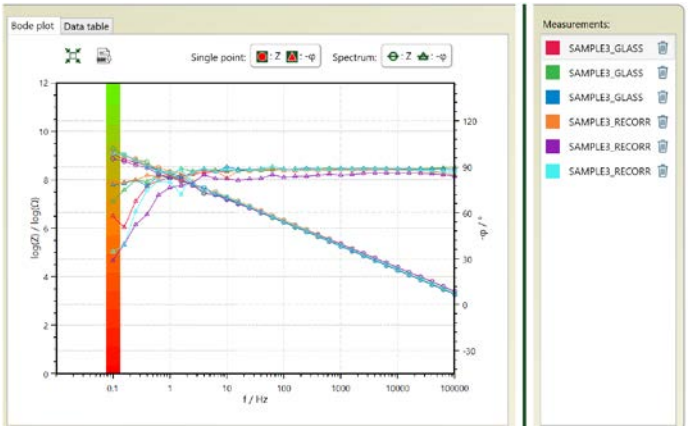
SAMPLE 1



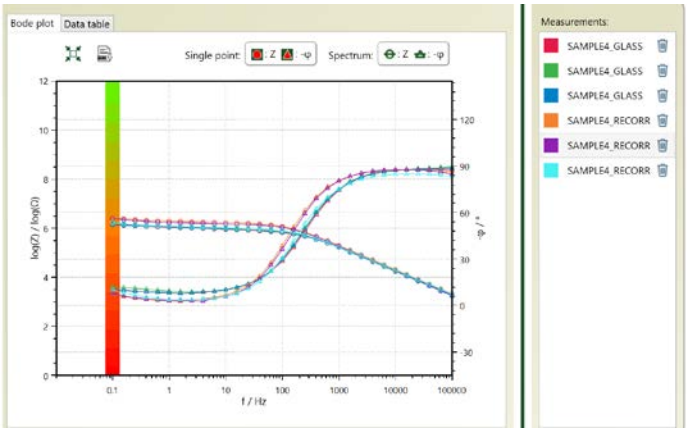
SAMPLE 2



SAMPLE 3



SAMPLE 4



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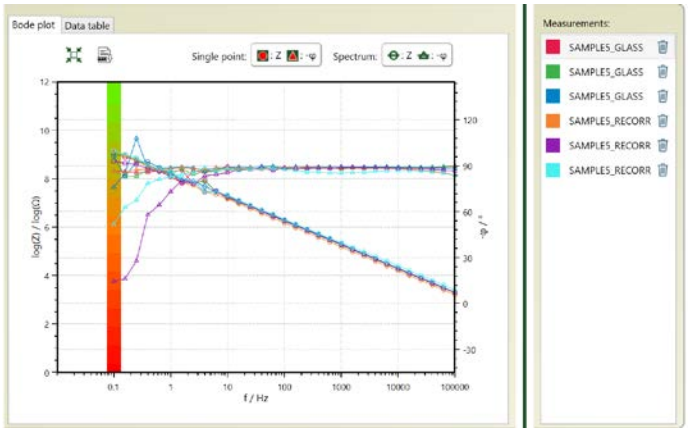
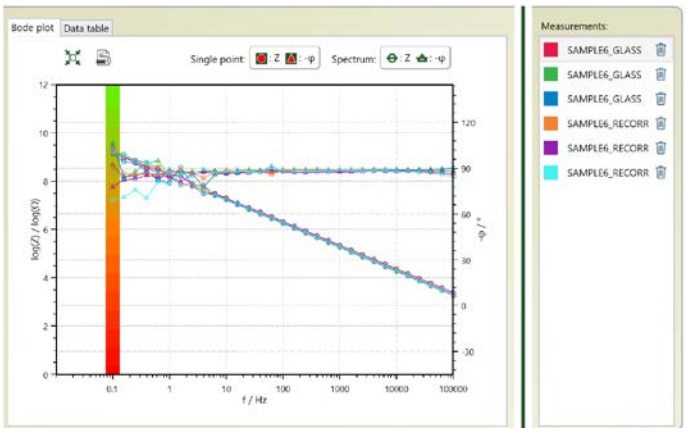


SAMPLE 6



APPEARANCE OF COATINGS WITHIN THE GLASS CELL AFTER 1500 h OF IMMERSION

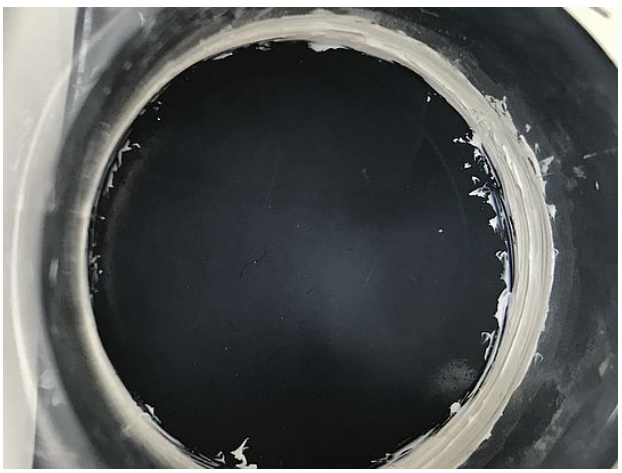
SAMPLE 1

SAMPLE 2

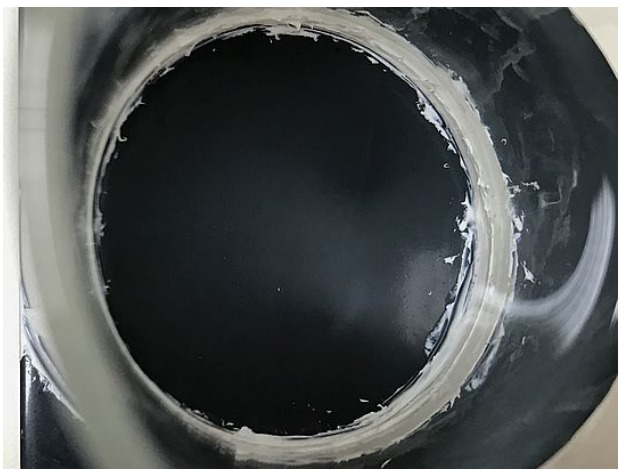
SAMPLE 3

SAMPLE 4

SAMPLE 5



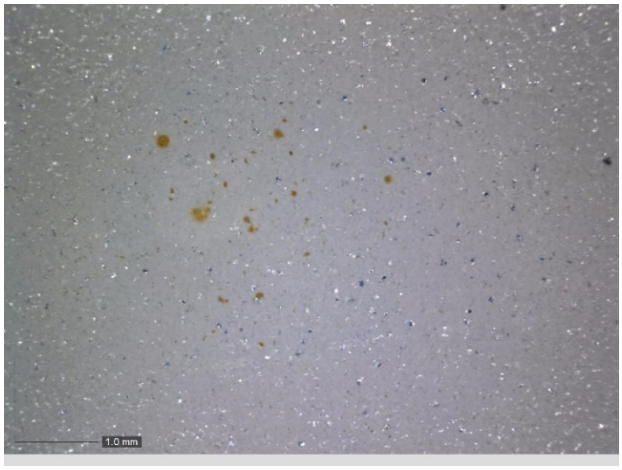
SAMPLE 6



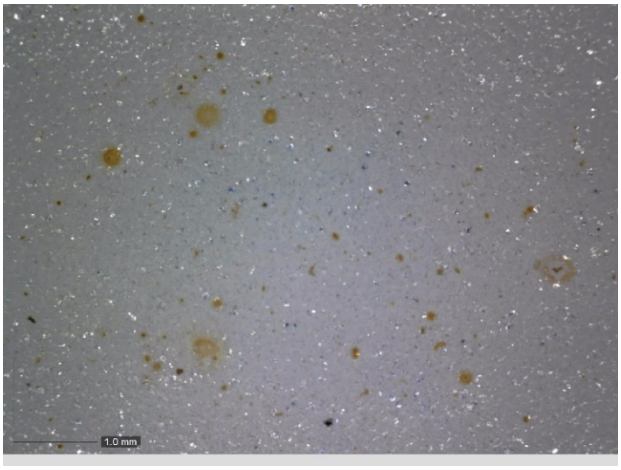
For further information, please contact us by e-mail: info@recorrtech.com or phone:+385(91)5335101.

APPEARANCE OF COATINGS AT IMMERSED AREAS AFTER 1500 h OF IMMERSION

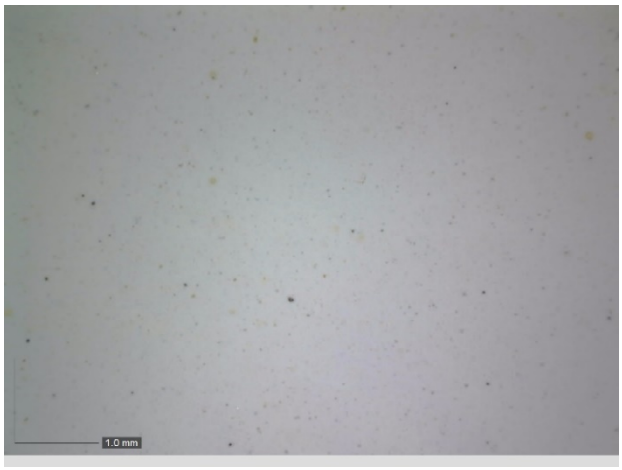
SAMPLE 1



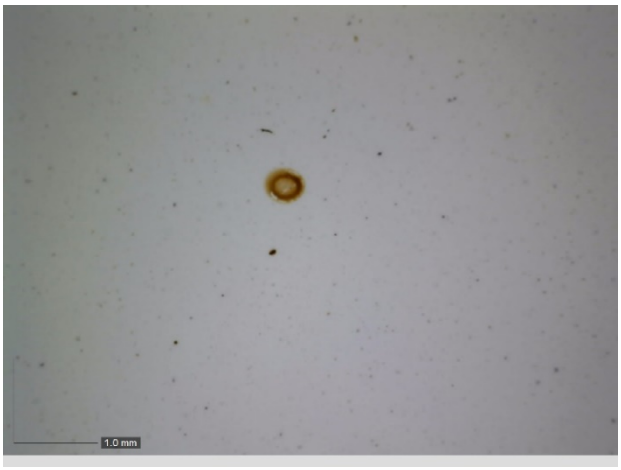
SAMPLE 2



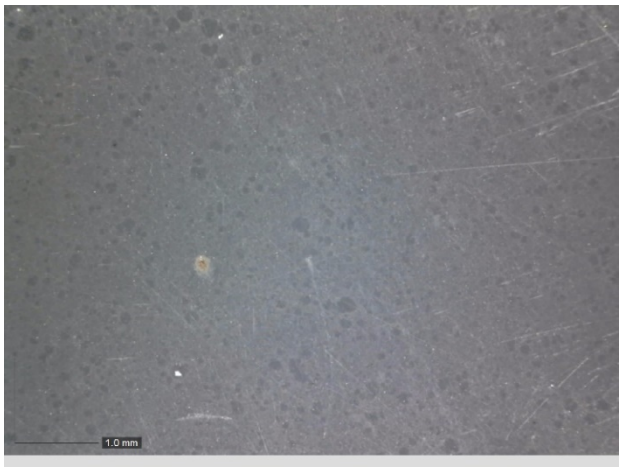
SAMPLE 3



SAMPLE 4



SAMPLE 5



SAMPLE 6