Evaluating the Performance of MCU-Ecocleaner Gel on Steel & Aluminium

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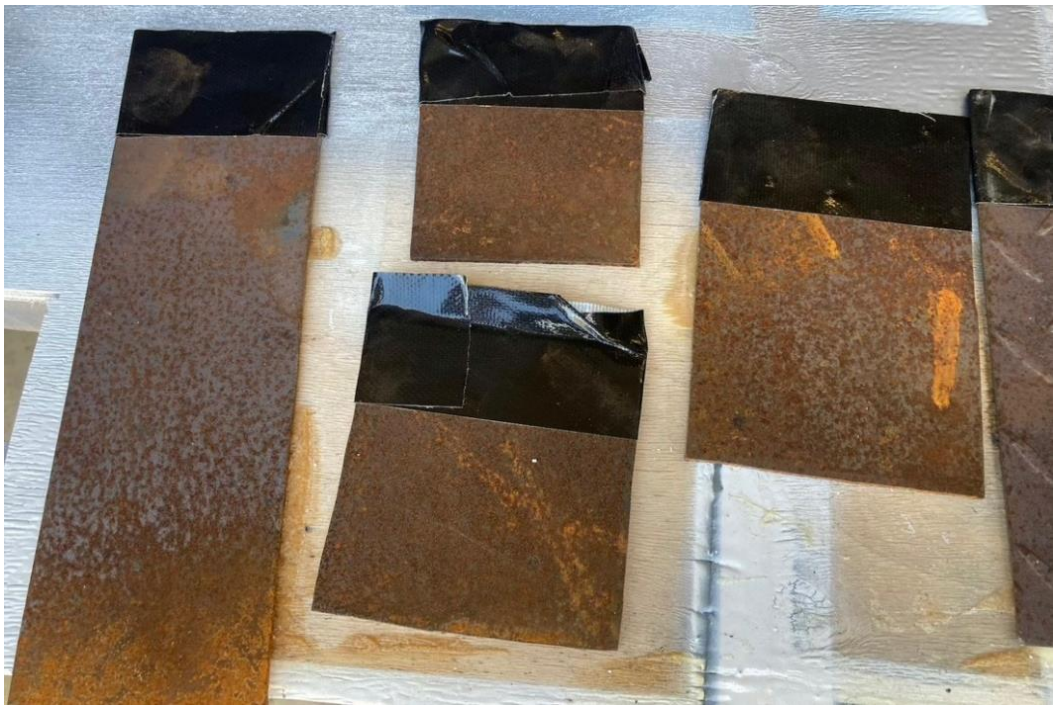
INTRODUCTION:

The following testing and evaluation were carried out to test the ability of MCU-Ecocleaner Gel to remove corrosion on weathered steel and aluminium panels with varying stages of corrosion, using SSPC SP1 Solvent Cleaning Principals.

TEST PANELS:

Below - Grade B corrosion - Steel with spreading surface rust.



Below: Grade C corrosion – Rusty steel with mill scale layer flaked or lost and minor evidence of pitting

Below: Grade D corrosion – Steel with spreading surface rust and pitting

APPLICATION OF MCU-ECOCLEANER GEL:

A liberal coat of MCU-Ecocleaner Gel was applied between 400µm to 800µm

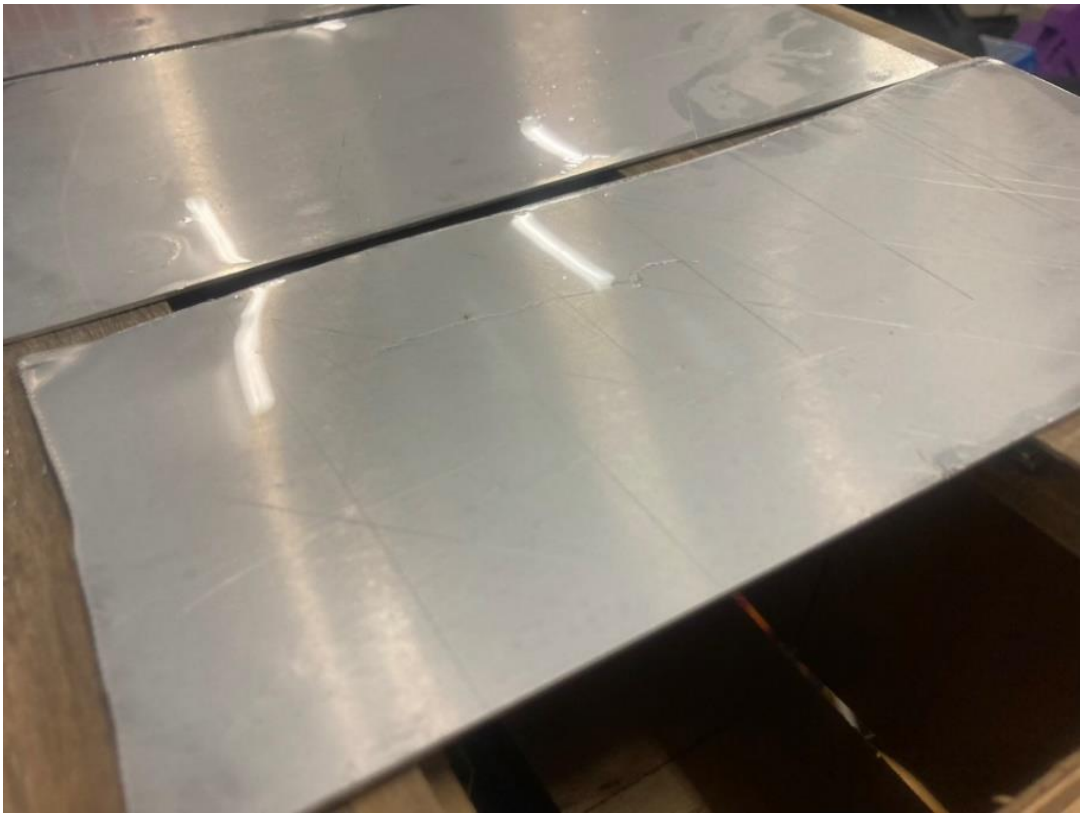
Below: Steel panels were then covered with plastic film to prevent the cleaner from drying out

ALUMINIUM COATING AND ETCHING:

Below: Oxidised aluminium panels were also coated and covered with plastic film

ALUMINIUM RESULTS:

After 3 hours the MCU-Ecocleaner Gel was then washed off the aluminium panels using a brush and fresh water, leaving the surface clean and visibly etched - as is evident below.



GRADE B CORROSION RESULTS:

After 6 hours the Grade B corrosion panels are unwrapped and cleaned with fresh water and a brush and fine scouring pad, See the results below.

GRADE B CORROSION RESULTS CONT'D:

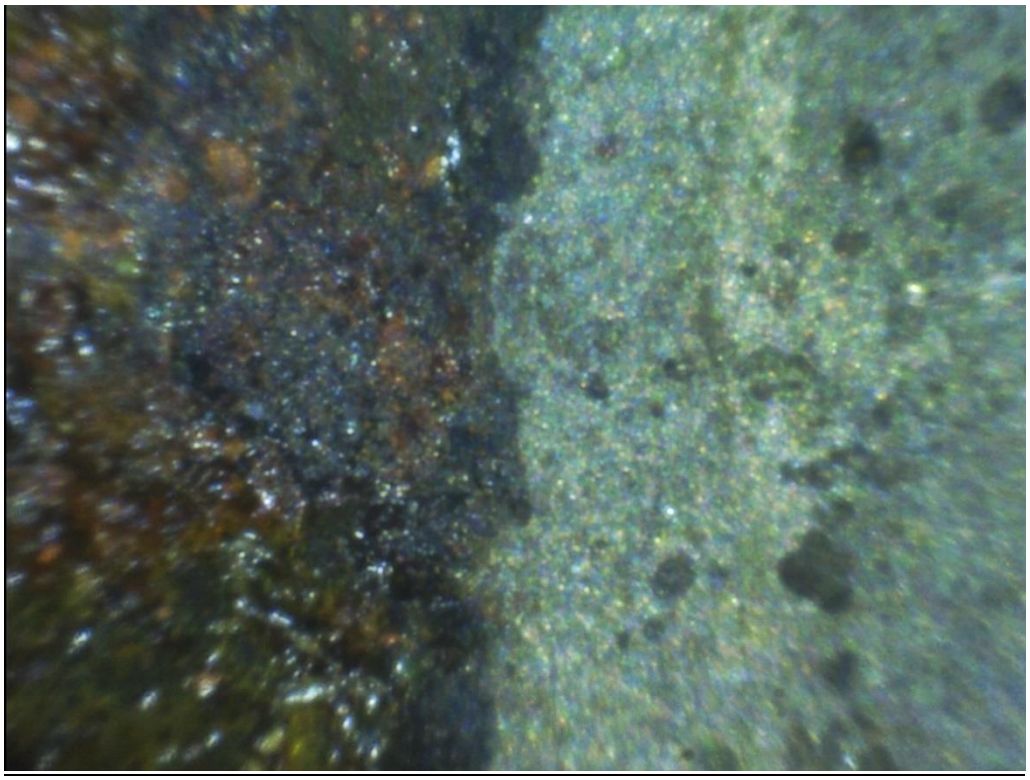
GRADE C CORROSION RESULTS:

After 9 hours the Grade C corrosion panels were unwrapped and cleaned with fresh water, a brush and a fine scouring pad. The surface is shown below.

GRADE C CORROSION RESULTS CONT'D:

GRADE C UNDER MAGNIFICATON:

Above - at 3.5x magnification and below at 35x magnification on the border that was masked the level of penetration of MCU-Ecocleaner Gel is clearly evident.

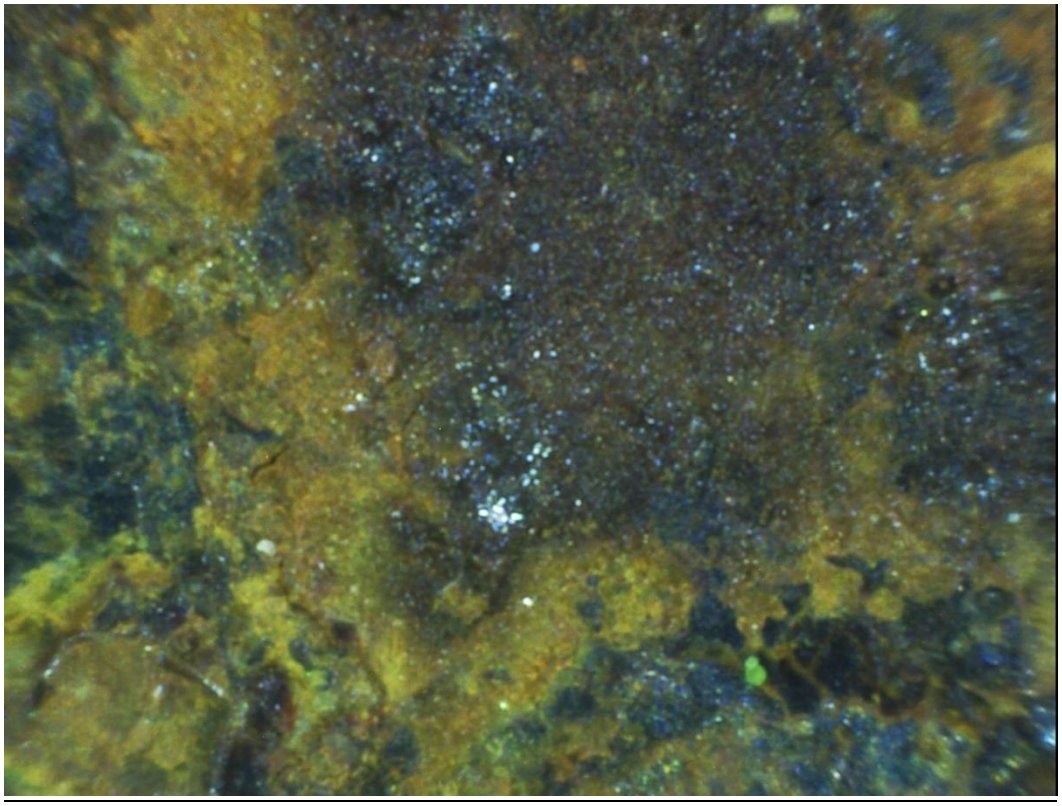


GRADE D CORROSION RESULTS:

After 36 hours the Grade D corrosion panels were unwrapped and cleaned with fresh water, a brush and a fine scouring pad. See the results below.

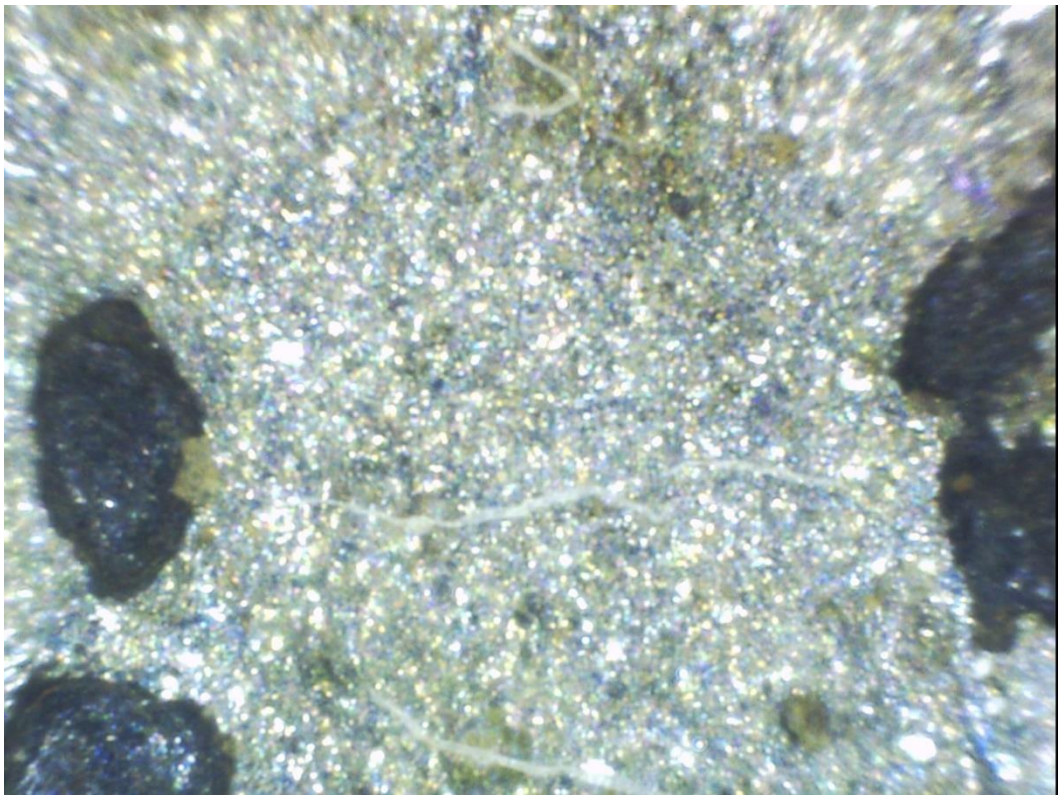
GRADE D CORROSION RESULTS CONT'D:

GRADE D UNDER MAGNIFCATON:



Above, the variation between 'before and after' on Grade D corrosion.

Below, Grade D 'after' at 35x magnification.

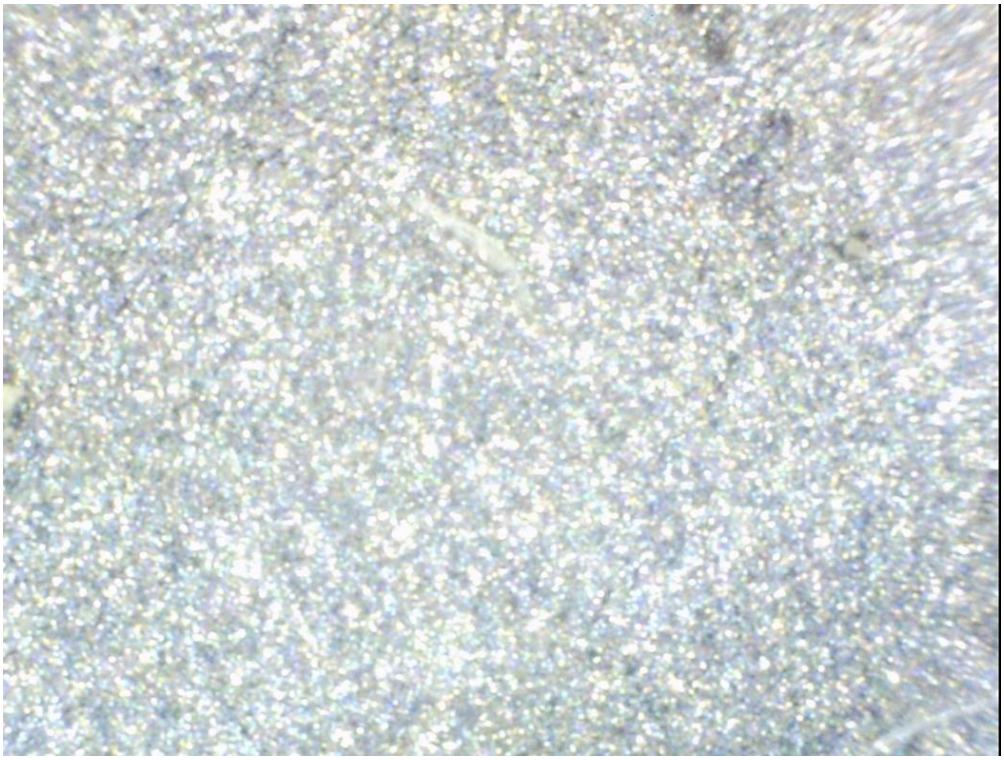


The darkened areas in the image above are due to the inconsistent quality of the steel. They are small in percentage terms and have been neutralised by MCU Ecocleaner Gel so they are safe to overcoat. With more exposure to the MCU-Ecocleaner Gel they will reduce.

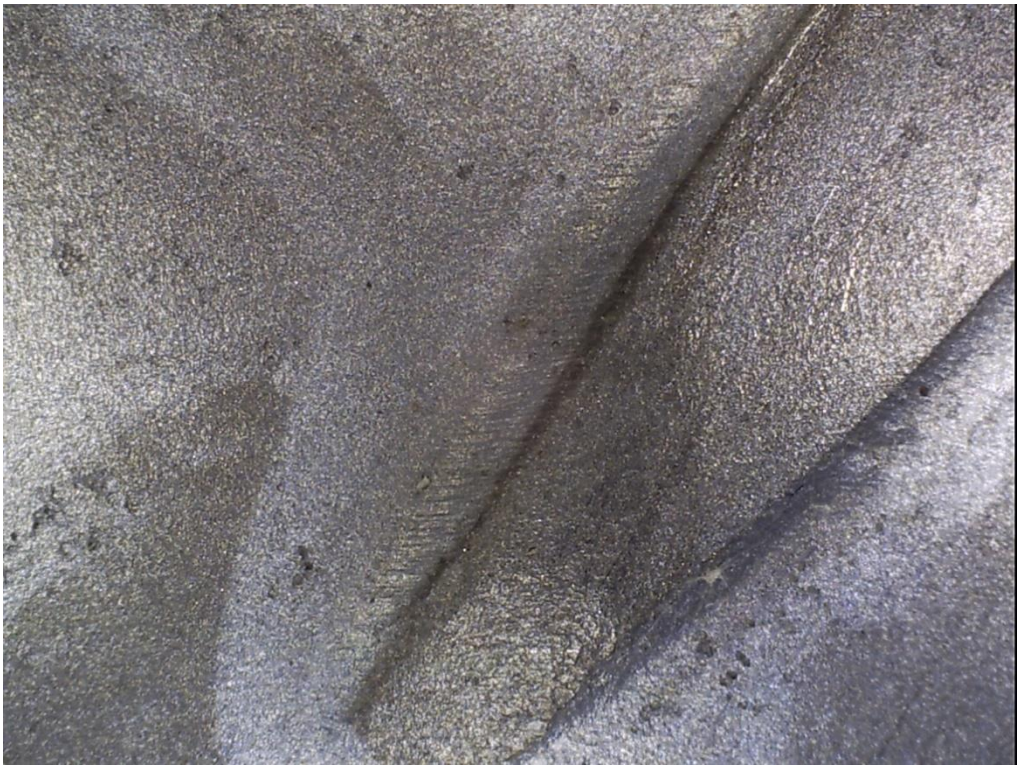
SURFACE PROFILE:

With the acid etching and cleaning, pitting of the surface will perform as a surface profile, this was measured on the Grade B corrosion (Grade C could not be measured due to the checker plate pattern, the Elcometer 224 could not give an accurate reading with the probe). 10 sets of 5 readings gave an average surface profile of 23.8µm, with an acceptable profile for MCU Coatings being 20µm, meaning coating can be direct applied to the MCU-Ecocleaner Gel prepared surface.

PROFILE UNDER MAGNIFCATON:



Above the profile shown at 35x magnification and below shown at 3.5x magnification



CHLORIDE TESTING:

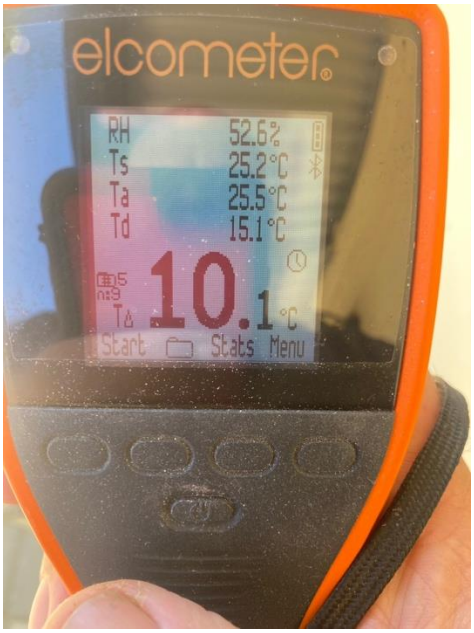
The MCU-Ecocleaner Gel removes all salts and contaminants very effectively.

To ascertain the cleaning characteristics of MCU-Ecocleaner Gel, chloride testing using ISO 8502-9, test measurement is in µg/cm² readings were .09 µg/cm²

ATMOSPHERIC CONDITIONS ON APPLICATION OF MCU-ECOCLEANER GEL:

Temperature of substrate recorded at 25.2°C, dew point 15.1°C with a Relative Humidity 52.6%.

Covering the MCU-Ecocleaner Gel with plastic retains the moisture level in the gel,, which is important because the gel will not do its job if it has been dried out.



CONCLUSION:

MCU-Ecocleaner Gel is highly effective on Grade B & C corrosion and while, after 36 hours, the Grade D corrosion panels required a 2nd coat of MCU-Ecocleaner Gel and/or further time under-wrap.

As all MCU-Coatings primers are surface tolerant and have outstanding adhesion characteristics, the + 20µm surface profile that was evident on all the test panels means that the MCU-Ecocleaner Gel surface preparation is suitable for coating the Corrosion Grade B, C and aluminium panels with no additional surface preparation required prior to coating.

As MCU-Ecocleaner Gel has a low viscosity it will access most areas that are currently impossible to reach with conventional surface treatment methods, as described in ISO ST3, SSPC SP11 standards. It can also be used to supplement power tool cleaning processes.

The product is effective at removing chlorides and contaminants, reducing to levels below ISO 8502-9 Norsok 1 1.8 µg/cm² levels.

After surface treatment of MCU-Ecocleaner Gel the substrate is suitably prepared for application of MCU products.

SUBSTRATE	CORROSION LEVEL	TIME DURATION FOR MCU-ECOCLEANER GEL	COMMENTS
Aluminium	New or weathered	3 Hours	Surface cleaned and etched
Carbon Steel	Grade B	6 Hours	Surface cleaned and etched with >20µm surface profile
Carbon Steel	Grade C	9 Hours	Surface cleaned and etched with >20µm surface profile
Carbon Steel	Grade D	36 Hours	Surface cleaned and etched with >20µm surface profile

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