



TD06.02 **Duralac *Green* Anti Corrosive Jointing Compound**

Description	Duralac <i>Green</i> is a chromate free jointing compound designed to inhibit electrolytic decomposition between dissimilar metals – often called galvanic corrosion. It is a single pack, air setting product. Used correctly, Duralac <i>Green</i> prevents anodic decomposition.
Form	Duralac <i>Green</i> is a free flowing paste based on a synthetic elastic resin and anti corrosive pigments, Duralac <i>Green</i> conforms to specification DTD 369B, which superseded DTD 369A.
Properties	Duralac <i>Green</i> has low solubility in water and will not erode with time; even when subjected to high pressure from considerable water flow. Duralac <i>Green</i> enjoys excellent adhesion properties to most substrates and because of its tough flexible composition, has very low water absorption. Duralac <i>Green</i> has a two year shelf life from the date of despatch when stored below 20°C. Once a container is opened, the remaining Duralac <i>Green</i> will form a skin.
Uses	Duralac <i>Green</i> is indispensable for the sealing of joints between dissimilar metals of all types; including magnesium and its alloys. Consideration should also be given to galvanic corrosion of the same metal where the electrolyte varies in concentration forming a concentration cell. Duralac <i>Green</i> has excellent protection properties for metals in contact with wood, synthetic resin composition, leather, rubber, fabrics etc. When components of a structure are of different materials, it is essential the 'points or faces' of contact be treated with Duralac <i>Green</i> to inhibit corrosion in the presence of an electrolyte where considerable differences in potential arise. Components of the same metal in contact with one another under different stresses will also benefit from the use of Duralac <i>Green</i> to inhibit corrosion. For example Duralac <i>Green</i> may be used: - Between aluminium alloy plates/extrusions and bolts or rivets used in building applications; - In general engineering applications where dissimilar contact cannot be avoided; - In vehicle building where aluminium alloy contacts steel; - For marine application where corrosion is accelerated by brine concentration; - In close proximity to the sea where a salt laden atmosphere will meet with structures and set up electrolytic cells; - In Aerospace where rivets/bolts are secured into aluminium plates.

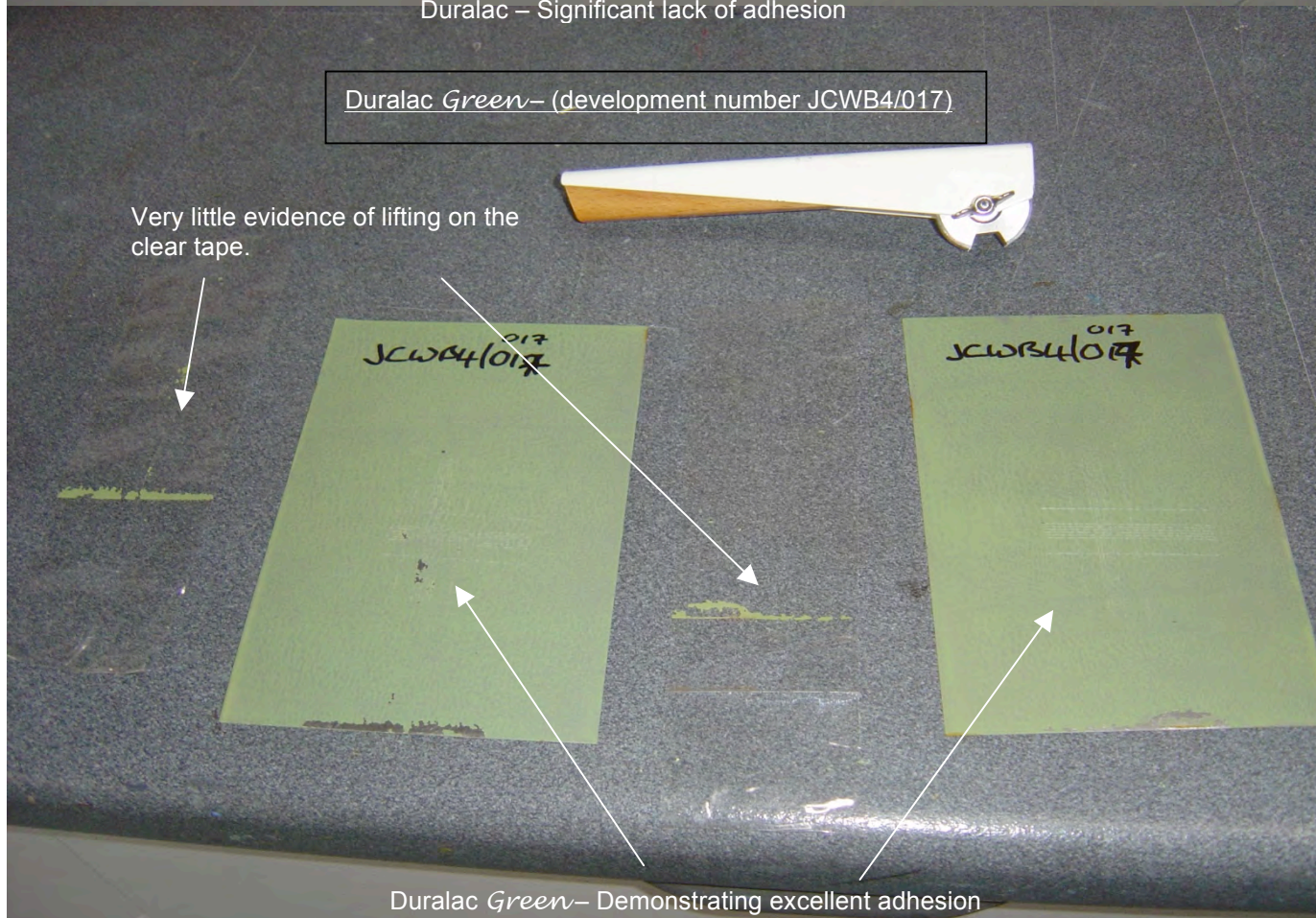
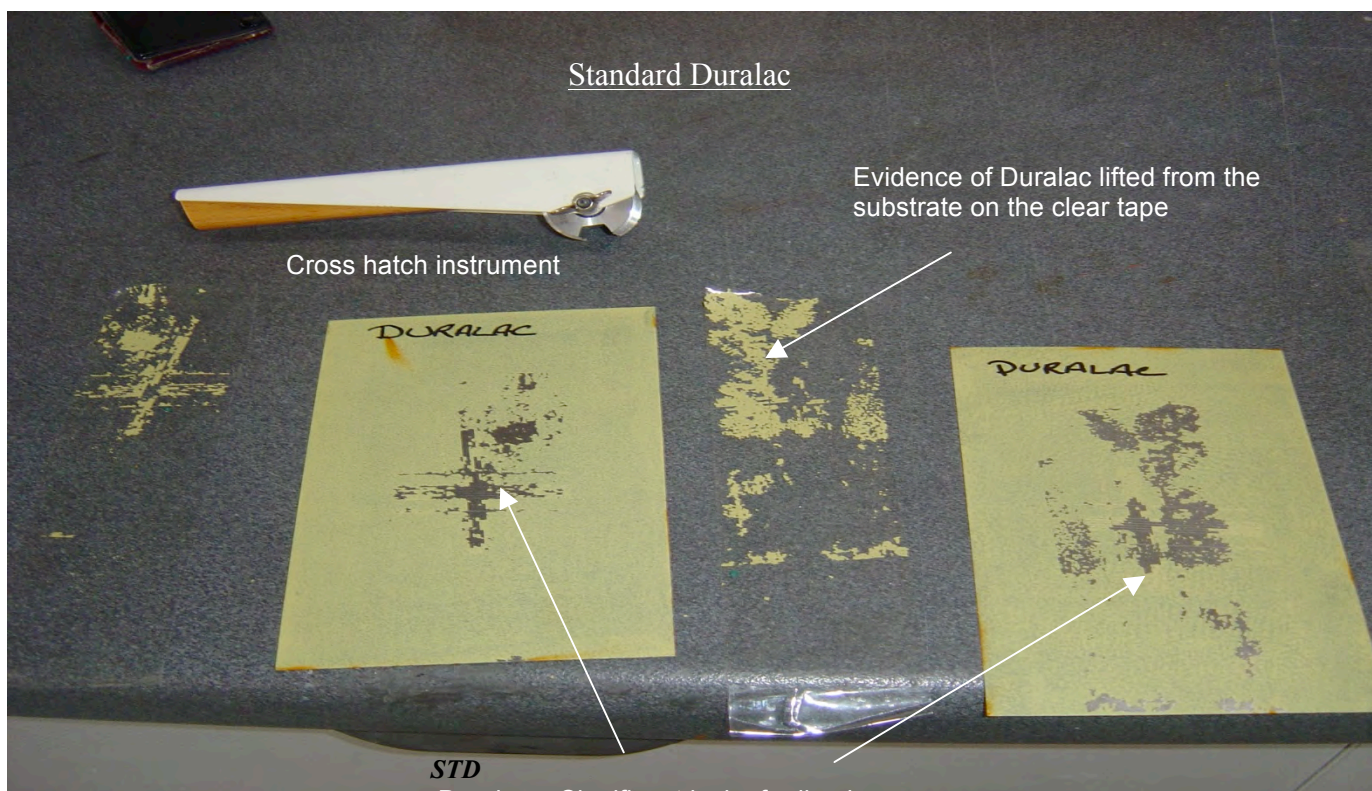
Application	Duralac <i>Green</i> is supplied ready for use and must not be thinned. It is best applied by brush. When Duralac <i>Green</i> is applied to metal or other surfaces the volatile solvent evaporates and the compound sets to the touch, but remains tacky for a considerable period. It is important that the joint should be closed while Duralac <i>Green</i> is still tacky – to ensure that it will flow sufficiently under pressure to close the gaps in the joint. It will harden somewhat if a thin film is left exposed to the atmosphere for a long period and this will prevent the making of a close joint.
Technical Data	Technical staff are available to advise upon Duralac <i>Green</i> applications and special requirements. 100 Gms/m ² coverage.

Comparative testing of Duralac *Green* against Standard Duralac

Introduction	Together with DTD369B a number of internal tests were designed to compare the anti-corrosive properties of standard Duralac to the newly developed environmentally-friendly Duralac <i>Green</i>. Standard Duralac is a mature, tried and tested product that has been in the marketplace since around 1924 and as such has a long case history. It would be impossible to replicate all applications for which Duralac has been used and therefore it was deemed best practice to combine DTD369B with other commonly used anti-corrosive test methods.
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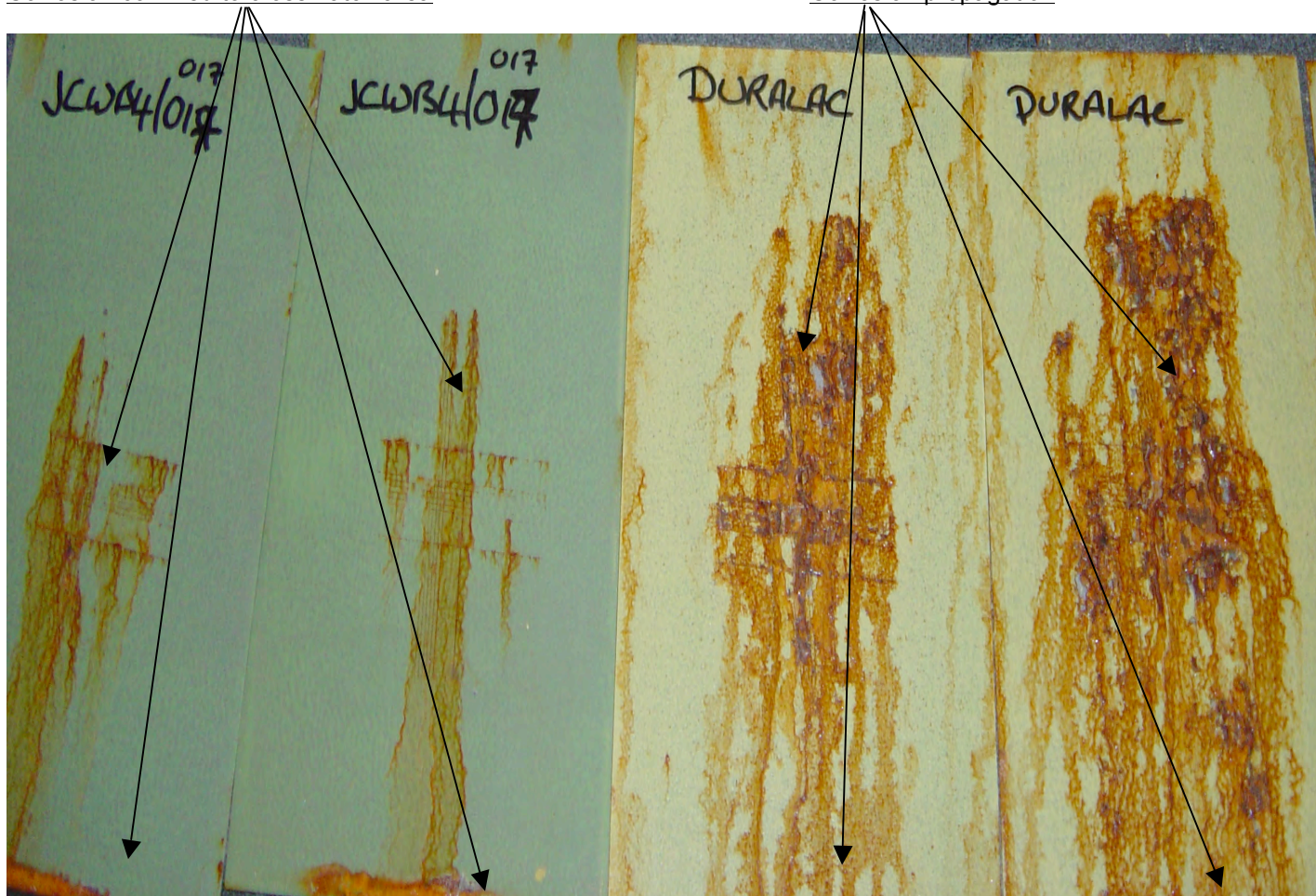
Cross Hatch Adhesion test

Test Method	75+/-5gms/m² of Standard Duralac and Duralac <i>Green</i> were applied to burnished tin plated steel, galvanised steel, mild steel and aluminium panels and allowed to dry @ 50°C for 8Hrs. All panels were then totally immersed in artificial sea-water compliant to BS3900 F4 clause 6.1 for 24Hrs at 23°C. All panels were allowed to dry @18°C for a further 24Hrs prior to test. Panels were scored with a cross hatch instrument in the centre of the panel. The scored area then had clear tape pressed onto its surface and quickly peeled away. Adhesion is assessed by how much of the film was lifted from the substrate.
Results	Duralac <i>Green</i> demonstrated better adhesion to all substrates than standard Duralac. Photographs illustrate Duralac <i>Green</i> exhibiting greater adhesion to the tin plated steel over standard Duralac.
Conclusion	Duralac <i>Green</i> has an improved adhesion to various tested metal substrates than standard Duralac.



Cross hatch tin plate panels placed in salt spray for 7 Days test

Test Method	Tin plated steel panels used in the cross hatch test were placed in a salt spray chamber. Salt water prepared in accordance with BS3900 F4 clause 6.1 was continuously sprayed into the chamber for 7 days at 18°C. After 7 days the panels were removed from the chamber and assessed for sign of corrosion.
Results	Duralac <i>Green</i> demonstrated far greater resistance to salt spray corrosion than standard Duralac. (see photographs below) Duralac <i>Green</i> corrosion was confined to the exposed metal area of the cross hatch test whilst with standard Duralac corrosion had propagated.

Corrosion confined to cross hatch areaCorrosion propagation

Determination of Protection against sea water on mild steel – DTD369B test**Test Method**

75+/-5gms/m² of standard Duralac and Duralac *Green* were applied to burnished mild steel panels and allowed to dry @50°C for 8Hrs.

All panels were then partially immersed in artificial sea-water compliant to BS3900 F4 clause 6.1 for 3 days at 23°C.

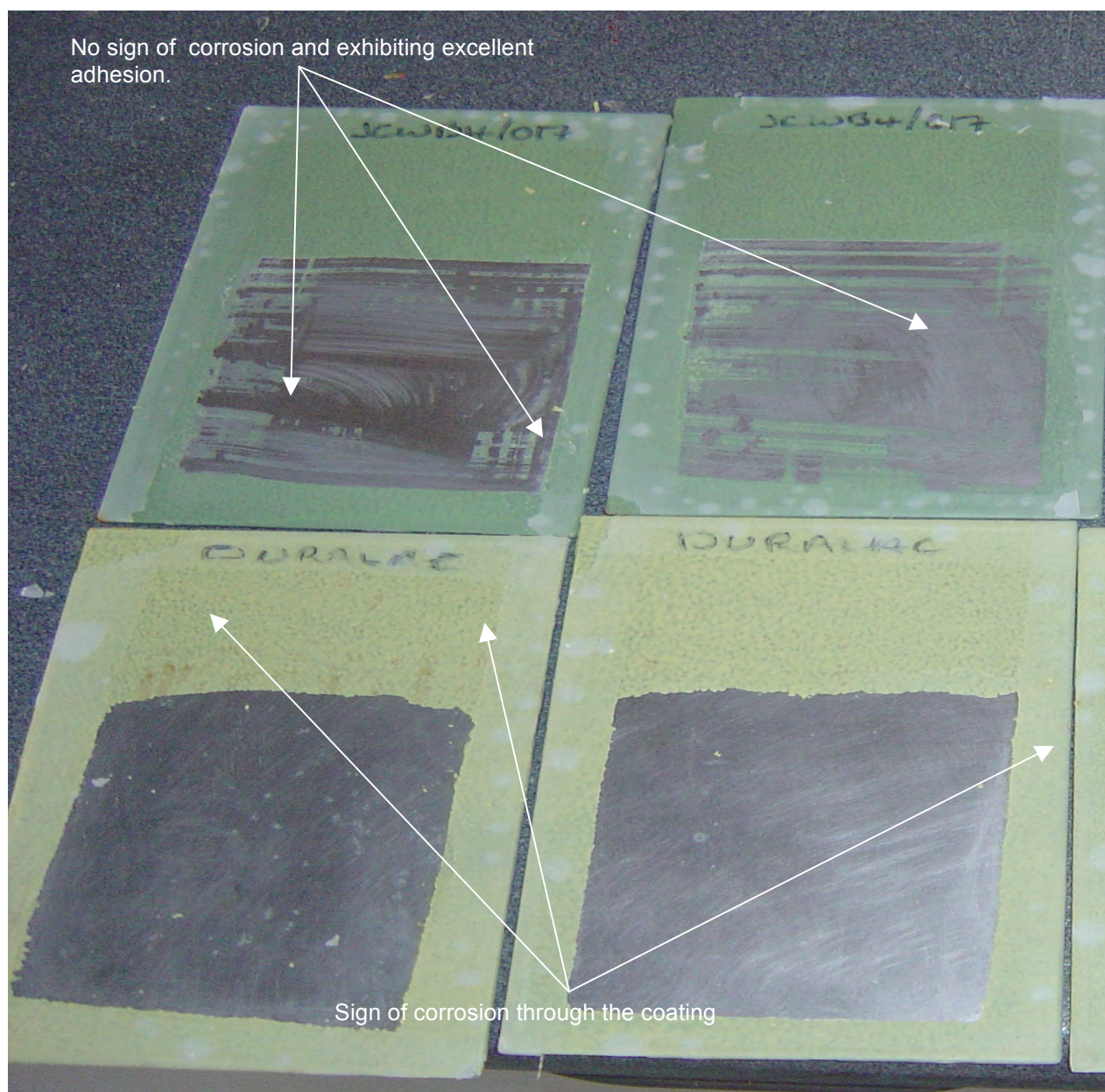
After 3 days part of the coating was removed and the substrate examined for sign of corrosion.

Results

Removal of standard Duralac from the mild steel substrate was relatively easy and rubbed away with acetone on a cloth whilst, the removal of Duralac *Green* was extremely difficult even with an acid remover and scraper.

On close examination of the protected substrate signs of corrosion could be detected above and below the applied standard Duralac.

No corrosion was evident on Duralac *Green*.



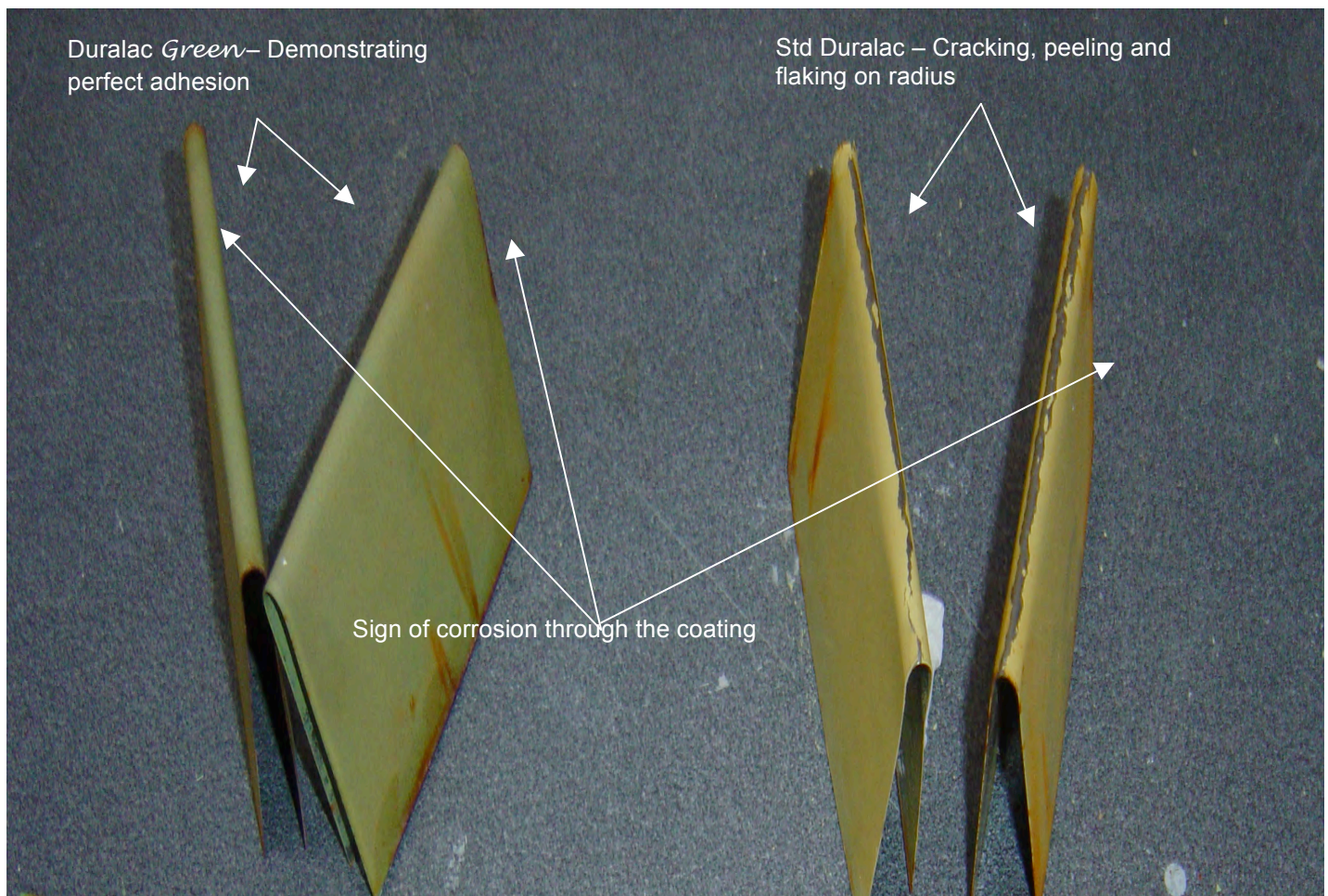
Determination of Adhesion on tin Plate panels – DTD369B test

Test Method 75+/-5gms/m² of Duralac and Duralac *Green* were applied to burnished tin plated steel panels and allowed to dry @50°C for 8 hours.

All panels were submitted to a period of 14 day, daily stoving for 6Hrs at 70°C and immersed in artificial sea-water compliant to BS3900 F4 clause 6.1 at 23°C for the remainder of the time.

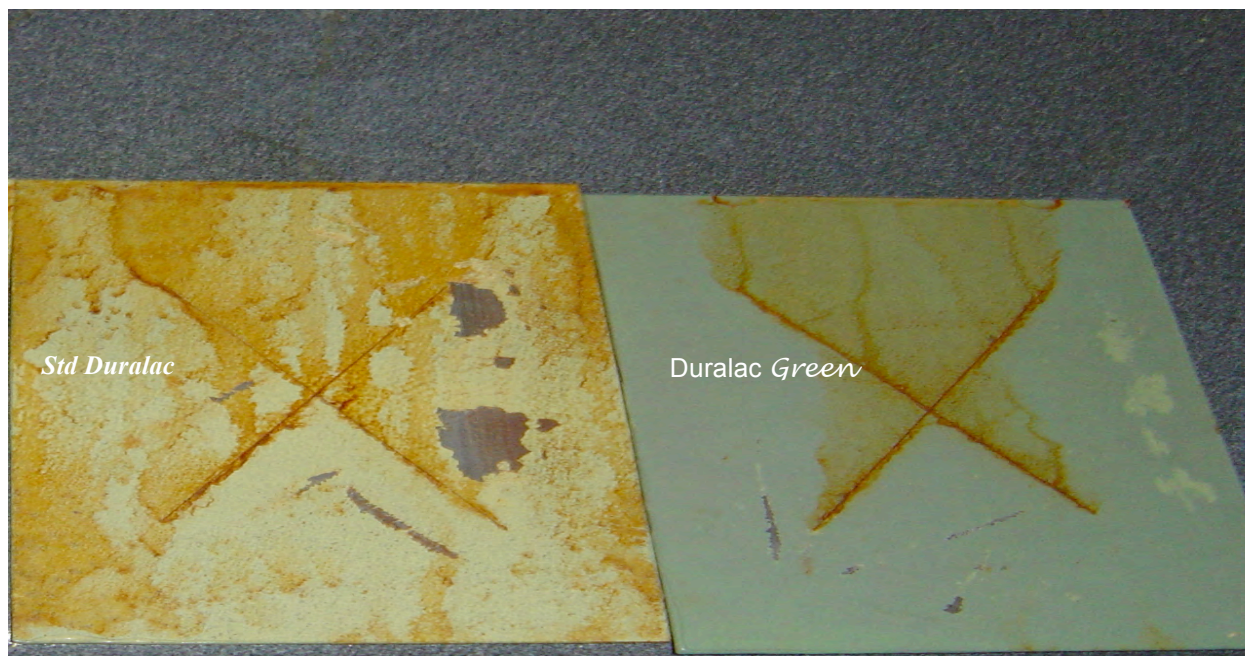
All panels were subjected to bend test in accordance with BS3900 E1 at 0°C using a 6mm mandrel.

Results Standard Duralac cracked across the radius of the bend and subsequently peeled and flaked away. Duralac *Green* remained an integral coating.



Mild steel panel, cross cut through the coating and submitted to salt spray for 7 days.

Test Method	75+/-5gms/m2 of Duralac and Duralac <i>Green</i> were applied to burnished mild steel panels and allowed to dry @ 50°C for 8Hrs. All panels were scored with a steel blade to cut the coating and etch the substrate. All panels were subjected to artificial sea-water spray compliant to BS3900 F4 clause 6.1 for 7 days at 18°C.
Results	Panels based on standard Duralac showed sign of corrosion randomly over the panel as well as specifically in the area of the cross cut. Duralac <i>Green</i> showed corrosion in the specific area of the cross cut. It was also noted that on standard Duralac the coating started to rub off when the panels came out of the salt spray and were being dried with a paper towel; demonstration a softening and lack of adhesion.

**Electrolytic decomposition testing**

Test Method	75+/-5gms/m2 of standard Duralac and Duralac <i>Green</i> were applied to burnished tin plated steel, galvanised steel, mild steel and aluminium panels. Within a 3 hours touch dry period, combinations of tin plate mild steel, galvanised steel, mild steel and aluminium were joined together. All panels were subjected to artificial sea-water spray compliant to BS3900 F4 clause 6.1 for 1000Hrs at 18°C. On removal all panels were examined then totally immersed in artificial sea-water compliant to BS3900 F4 clause 6.1 for 12 months at 18°C.
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Results No sign of electrolytic decomposition was evident on the joint of any panel although corrosion due to salt water penetration of the coating was evident on all the panels.

Conclusion Duralac Green out performed standard Duralac in every test to which it was subjected and is intended as an environmentally friendly alternative.

Although Llewellyn Ryland has witnessed improved properties of Duralac *Green* over standard Duralac when tested to DTD369B and a number of internal tests, the customer is recommended to carry out his own trials to ascertain the suitability of Duralac *Green* in specific applications.