

THE PAINT INSPECTOR'S FIELD GUIDE

The Inspection of protective coating systems for corrosion control includes a wide range of test methods and techniques. In the Paint Inspector's Field Guide a wide range of these inspection methods are covered in an effort to aid individuals with the basic fundamentals of protective coating inspection whilst in the field.

Experienced author

Lee Wilson, who is a highly qualified and well respected inspector with many years of field experience, provides an excellent description of the actions performed by an inspector and the tools they use. The Paint Inspector's Field Guide covers all aspects from specification review and surface preparation works all the way through to application and final reporting.

Inspection and experience notes

The Paint Inspector's Field Guide is complemented by a wide range of inspection and experience notes making it easy to solve those special problems which are commonly encountered in the field. Besides the textual support, the rich graphics provide clear visual reference to inspection techniques, standards and defects. The years of experience and the editing by Brian Goldie makes the Paint Inspector's Field Guide a pleasure to read and the best reference book available.

Must have tool

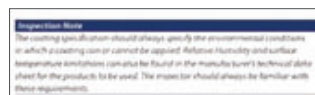
The Paint Inspector's Field Guide is a must have tool for any individual involved or interested in corrosion control by protective coatings and the inspections required to achieve this.



The paint inspector's field guide is easy to take with you



Experience Note



Inspection Note



ORDERING INFORMATION

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Test Method: The Breker flow ASTM D 4595-03 "Standard test method for detecting oil or water contamination".

The compound or used during the dry blowing blasting and spray application process must be clean and free from any residual oil or water contamination. If the compound or blasting compound used is not clean, it will result in the surface area to be cleaned or painted also becoming contaminated.

A simple test is often used to determine this, as it can be carried out in experience with ASTM D 4595 "Standard test method for detecting oil or water contamination".

The compound can be checked for contamination easily by holding a white absorbent paper in the air stream and subsequently covering the amount of residue contamination of any which appears on the paper. ASTM D states that an absorbent collector such as paper or cloth should be supported on a right backing and placed in the center of the discharge of air from the compressor and held no further than 10 cm from the discharge point. This should be maintained in the air stream for no longer than 1 minute. A small specimen is then carried out to determine the presence of any contaminants that remain on the absorbent collector. Any water or oil residues will appear as other contaminants are ground by impact of the air supply.

Observation Note: The compound used for coating during the process of maintenance operations must be clean and free from any residual oil or water contamination. If the compound or blasting compound used is not clean, it will result in the surface area to be cleaned or painted also becoming contaminated.




These environmental inspection requirements include checking the following:

- Dust temperature
- Air temperature
- Relative humidity
- Dew point
- Ambient weather conditions (i.e. wind, rain, dust or snow)

Steel temperature should be checked regularly by the inspector as there is a danger of potential that moisture may condense resulting in rust forming on the blasted surface. As well as this, certain coatings require base temperature and humidity limitations at which they can be applied.

Checks for steel temperature include:

- Surface contact thermometer or long gauge
- Thermocouple used in temperature devices
- Infra-red thermometer

Relative Humidity (RH): Can be defined as the amount of moisture vapor present in the air compared with the maximum amount that can be held in the air. This is usually expressed as a percentage, since relative humidity reaches 100% moisture may form on the substrate due to the air reaching its saturation point, this will lead to the deterioration of any base material already in place which is later applied. Most coating specifications should quote a maximum RH to allow which blasting and painting operations should not be carried out.

High relative humidity also prevents solvents from leaving the coating system early and may well result in surface entrapment. Close monitoring and quality control can prevent these risks.

Relative Humidity is usually measured with instruments such as:

- Blowing Hygrometer or psychrometer
- Electronic environmental gauges such as the data check Data logger




The Blowing Hygrometer is a hand held device which should be manually rotated 90° for approximately 45 seconds. This is done quickly in order to achieve the required air movement around the thermometer bulb.

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Checking is another common coating film defect which appears as fine cracks on the coating surface. This is commonly caused by shrinkage and tension in the coating surface but often does not penetrate down to substrate.

Remedial Action: Remove affected area back to sound coating and re-apply.

Caution: Ensure the manufacturer's own coating times and application temperatures are adhered to, monitor environmental conditions (i.e. dew point etc. ensure substrate is clean prior to application and salts are removed. Check the material's flexibility properties with the manufacturer.

Cracking is defined as the formation of small areas in the wet film of a coating material where the coating material has retained shrinkage hollows in the film. This defect is also commonly known as hollows and most often caused by a lack of flow of the paint material due to the presence of surface contamination.

Remedial Action: Remove affected area back to substrate and re-apply.

Caution: Ensure that the substrate is clean and free of any surface contamination.

As can be seen by the above the closer to a 54 solution the greater the degree of adhesion of the protective coating or between coats.

ASTM D 3359 - Test Methods for Measuring Adhesion by the Tape Test



3 to 1 10 Inch Cuts
30 to 45 Degrees
Over 5 Mils

2 to 5 3/16-Inch Cuts
6 to 12 1/16-Inch Cuts

Grade 5 to 1

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Method: ASTM D 3359 is the cross-hatch test is usually carried out under laboratory conditions however it can also be carried out in the field.

Using a sharp knife lines down apart are cut both vertically and horizontally on the test area to produce a number of squares or a lattice. The number of squares depends upon the number of lines forming a typical test area usually consists of 8 lines vertically and 8 lines horizontally producing 25 squares. More commonly a pre-designed test with a set number of holes is used.

Again the pressure sensitive transparent tape is applied to the test area and subsequently removed and assessed this is then compared with the standard evaluations.

These evaluations are as follows:

- 5B The edges of the cuts are completely smooth, none of the squares of the lattice are detached.
- 4B Some flakes of the coating are detached at intersections but no more than three sides and not more than one inch between the adjacent ends of the intersections on the perimeter of the lattice.
- 3B Small flakes of the coating are detached along the edges and at intersections of the cuts (the area affected is 5 to 15% of the lattice).
- 2B The coating has flaked along the edges and on parts of the squares the area affected is 15 to 35% of the lattice.
- 1B The coating has flaked along the edges of the cuts to large hollows and whole squares have detached. The affected area is 35 to 65% of the lattice.
- 0B Flaking and detachment worse than grade 1

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Another common test method for adhesion testing which is often required for areas of adhesive testing and which the inspector may encounter is ISO2409 this describes a test method for assessing the resistance of paint coatings to separation from substrates when a right angle lattice pattern is cut into the coating penetrating through to the substrate. The property measured by this empirical test procedure depends, among other factors, on the adhesion of the coating to either the underlying metal or the substrate as per ISO guidelines however the test method described within ISO2409 may be used either as a pass/fail test or where circumstances are appropriate, as a one-step classification test. When applied to a multi-coat system, assessment of the resistance to separation of individual layers of the coating from one another may be made.

17. MAINTENANCE COATING AND INSPECTIONS

The vast majority of inspectors at some stage during their inspection career will be involved in maintenance coating inspection. As we have already established all coatings eventually fail, and at some point will require to be replaced or refurbished.

MACT defines maintenance coating operations as applying a coating over a substrate that has been installed in the field environment and has been placed in service.

Unlike new fabrication projects there are special points to consider about carrying out inspection of maintenance painting projects, examples of these factors include:

- Is the coating system chosen for maintenance compatible with the existing system.
- Will the existing coating need to be abraded or sanded to promote adhesion for the new system.
- What level of surface preparation can be carried out.
- Is a protective required for sensitive equipment.
- It may not be possible to apply the coating to specified surface cleanliness standards.
- What is the condition of the coating to be repaired or maintained.
- Is access available to the substrate.
- What is the thickness of the system that is currently protecting the substrate.
- What are the re-dry requirements.
- Does over-paint understand about feathering.
- What is the final appearance of the maintenance system.
- Adherence of the existing coating.

These problems have been involved in many maintenance coating projects and often encounter the same factors as stated above. The pre-job conference is critical during any maintenance coating programme and an ideal time to get resolution of some of the above points to queries which the inspector may face.

