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METALLIC SALTS DECONTAMINATION AND MEASUREMENT

Although dry blasting will remove soluble salts, this method is not particularly effective. It is advisable, wherever it is known that salt levels are high, to use wet blasting or dry blasting in conjunction with water washing.

The evidence of soluble salts on a blast-cleaned surface can readily be seen. Where soluble salts are at low levels, any oxidation of the surface will be slow and usually result in either flash rusting giving a light brown dusty appearance to the surface or a gradual darkening of the blast condition. However, where high levels of soluble salts are present, the hygroscopic effect of the salts drawing moisture to the surface will result in rapid discoloration, which can be dark blue/purple through to black. This effect usually occurs within 4 hours or less but, when contamination is deep, pustules may appear on the surface after 8 to 10 hours, indicating more severe contamination.

Where water blasting is used, any salt contamination will normally be depleted to an acceptable level with the first blast, however, with dry blasting contamination will not be readily removed.

TESTING

There are several methods for testing for soluble salt retention and Corrocoat approve 4 methods. The first method (washing) is more accurate but somewhat impractical in many instances. The second method (absorption) is less accurate but practical and in most cases suitable for Corrocoat coatings. Methods 3 and 4 allow for a direct reading of metallic salt levels.

1. WASH METHOD

After blasting (and allowing to dry in the case of water blasting) a selected area of 150mm x 150mm is swabbed using cotton wool soaked in demineralised water. The swabbing is carried out with 50ml of distilled water in a glass beaker and the surface is washed and the contents drained back into the beaker repeatedly for approximately 1 minute, the surface being mopped dry at the end of the test. The cotton wool is then placed in the beaker and demineralised water added to the beaker to bring the level back to the 50ml mark. The cotton wool swab is stirred and tamped with a glass rod for approximately 1 minute. On completion of the stirring, a Merckoquant Fe²⁺ test strip (manufactured by Merck and available from BDH Chemicals) is placed on the beaker and its color checked after removal. The color will show a concentration of Fe²⁺ ions to be read in terms of mg/dm³. Multiplication of this figure by 2 will give a value for the ferrous ion density in mg/m².

If the test described gives a result of greater than 25 mg/m² ferrous ion density, then the routine of wash/blast/test shall be repeated.

When the test described gives a result of less than 25 mg/m², then the surface shall be re-blasted, as necessary, to restore an overall 'bright metal' condition before application of the coating.

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2. ABSORPTION METHOD

After blasting (and drying in the case of wet blasting) the retention of the soluble salt shall be measured by lightly damping the surface of the steel with a water spray of demineralized water and allowing it to stand for a period of 5 minutes.

Excess moisture is then removed from the surface by patting (not rubbing) the surface with a clean lint-free cloth. A ferricyanide paper of approximately 2 square inches is then pressed against the surface for approximately 5 seconds. On removal of the ferricyanide paper, the total absence of blue spots indicates a manageable level of soluble chlorides salts. Light speckling indicates a low and acceptable contamination level, whereas large blue spots indicate the necessity for further washing and blasting.

Corrocoat can supply pre-prepared ferricyanide papers of the correct type but these may be prepared in the following manner:-

A Watman filter paper, Grade 541 is soaked in a 2% w/w solution of potassium ferricyanide in distilled water and dried. The papers should be left for 24 hours before use. They should be kept in an airtight jar or container and should be used within 3 months of preparation.

3. CORROCOAT CHLOR *RID SALT TEST KITS

After blasting Corrocoat Chlor *test F Kits may be used to measure the soluble salt on the surface. Kits should be stored and used in accordance with the manufacturer's recommendations.

Chlor *test kits for assessing the level of metallic salt within blast abrasive and wash water are also available.

4. CONDUCTIVITY TESTER (e.g. SCM400 type equipment)

After gritblasting a conductivity tester such as the Elcometer 130 SCM400 Salt Contamination Meter or its type/equivalent may be used to assess the level of metallic salts on the substrate.

In the case of the SCM400, soluble salts on the substrate are taken into solution by placing a wetted 110mm- diameter high purity sample paper on the area to be tested and left in contact for a timed period. The sample paper containing the salt solution is placed over the electrodes within the SCM400 and its resistivity is measured. The SCM400 relates the resistivity to a calibration of known sodium chloride solution and the known surface area tested to give surface salt levels in $\mu\text{g}/\text{cm}^2$.

The SCM400 or its equivalent should be used in accordance with the manufacturer's recommendations.

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ACCEPTANCE STANDARDS

Whilst at times higher levels are unavoidable and Corrocoat coatings have been shown to offer long term protection at higher levels the following levels are generally used for Corrocoat materials.

Less aggressive application areas 70mg/m² (7µg/cm²)

Aggressive service areas 25mg/m² (2.5µg/cm²)

Note: 10mg/m² = 1µg/cm²

For further advice contact Corrocoat technical services.

REMOVAL OF METALLIC SALT

Where tests show that soluble salt is present at unacceptable levels, this must be reduced to an acceptable standard by further surface treatment.

Whilst this is traditionally done by using copious amounts of clean water, drying and re-blasting, this process can be slow and in some cases e.g. porous substrates such as cast iron, may require multiple washes and re-blasting to achieve the required standard.

Corrocoat recommend that for optimum results and speed of cleaning, Corrocoat Chlor *rid is added to the wash water to remove the soluble salts. Corrocoat Chlor *rid to be used in accordance with the data sheet recommendations.

CORROGLASS COATINGS

Where Corrocoat/Polyglass coatings (not other coatings in the Corrocoat range) are used in aqueous environments at a temperature below 158°F (70°C) and on surface areas capable of being covered within a two hour period, it is permissible to carry out the following procedure which avoids the requirement for salt testing levels, which, due to the logistics of operation, may be totally impractical in some circumstances.

- 1) The surface to be coated should be blast cleaned and blast residues removed in the normal way.
- 2) The prepared surface should be left for a minimum period of 8 hours and the surface examined for pustules and surface blackening.
- 3) Where the surface to be coated is cast iron, a small cofferdam should be made on the surface to cover an area of approximately 200mm square. The dam should be filled with fresh water and observation made over a 10 minute period for gassing from the metal surface, indicated by a continuous stream of bubbles from one or more locations.

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- 1) Where no blackening, pustulation or gassing is found, the surface should be 'sweep blasted' and coated immediately.
- 2) Where blackening or pustules are found, the surface should be either washed with fresh water then dried and sweep blasted or simply sweep blasted. (It is advisable where heavy salt contamination is apparent to water wash.)
- 3) The surface should be left for a further period of two hours and re-examined.
- 4) Where on re-examination, no pustules or blackening are found, the surface should be immediately coated, preferably after sweep blasting.
- 5) Where severe blackening or pustulation is found on re-examination of where gassing was evident, the surface should be left for a longer period (at least 3 days) before further sweep blasting and observation. Alternatively, high-pressure water washing of the surface and drying will normally effect a rapid solution to the problem where time is a limited factor and where the large volume of water effluent can be accommodated.
- 6) When preparation of cast iron is carried out by this method, the minimum coating thickness should be 1.5mm.

Note: Where water blasting or water injection blasting is used for surface preparation, it is essential that a polyphosphate rust inhibitor is used to avoid oxidation on drying out. Otherwise, dry blasting must be used as the final stage of preparation before coating application. See Other Information, Page 8/06, "Rust Inhibitors".

In case of doubt, refer to Corrocoat Technical Services for further information.

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