

01 BASIC CONCEPTS

e) SURFACE PREPARATION (see also Paint Systems)

Preparation is very important to get a good result.

A badly prepared surface painted with a high quality paint has normally worse results than a cheaper paint with a correctly prepared surface.

The type of material, the condition of the surface (presence of oxid, or previous old paint coats), size of the part and cost of the operation indicates the preparation you need.



DEGREASING

Grease and oils are always found on structural materials and must be removed completely before starting to paint. The most common way to remove this dirt is to use a solvent based or water based degreaser.

Cleaning with a solvent/ thinner can be done with soaked cloths, this is the most common method. Cleaning can also be done with spray solvents and immersion in solvent vapour. The solvent must easily dissolve grease and have a low toxicity. Cloths that are

used in this operation must be replaced frequently to stop them getting covered in grease. Finally, the object must be washed down with cleaning thinner.

High pressure water cleaning with a minimum of 750-1,000 kg/cm² and flowrates up to 4,000 litres /hour can be also considered. This will remove salt, rust, grease and old paint.

MANUAL AND MECHANICAL CLEANING

Manual preparation can be done by brushing, scraping, grinding or sanding of the metal to remove corrosion and old layers of paint. This method takes a lot of time. It will not totally remove the dirt, but it can be used when access is difficult or the cost of cleaning is high. Wire brushes or wire wool are normally used to do this.

The grades of preparation by scraping and wire brushing is shown in the first section of UNE EN ISO 12944-4.

Scraping & Brushing

St 2. Mill scale, rust and previous paint and foreign matters with low adhesion are removed. The surface must show a metallic appearance.

St 3. Mill scale, rust and previous paint and foreign matters with low adhesion are removed. In any case, the surface must be more thoroughly cleaned as for grade St 2 to show a metallic gloss. The surface must show a noticeable metallic appearance.

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BLAST CLEANING

Blast cleaning is cleaning the surface with small particles of abrasive material. These are fired at high speed using compressed air with a spray gun through a special nozzle. The abrasive material may be small steel balls, sand or synthetic abrasives. Blast cleaning is the best way of cleaning because it removes rust, mill scale, paint coatings, welding residues, oils, etc. This method also gives an excellent surface for paint to stick to.

Specification SIS-055900 describes the different grades of preparation you can achieve through blast cleaning.

Sa 1, Sa 2, Sa 2½, Sa 3

Blast cleaning metal has a very active surface, very easy to rust, therefore should be immediately repainted.

Grades of preparation by blast cleaning (SIS 055900):

Sa 1. Light blast cleaning.

Poorly adhering mill scale, rust and paint coatings and foreign matter are removed.

Sa 2. Thorough blast cleaning.

Most of the mill scale, rust and paint coatings and foreign matter is removed. Any residual contamination shall be firmly adhering.

Sa 2½. Very thorough blast cleaning.

Mill scale, rust and paint coatings and foreign matter are removed. Any remaining traces of contamination shall show only as slight stains in the form of spots or stripes.

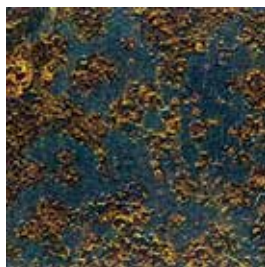
Sa 3. Intensive blast cleaning.

Mill scale, rust, paint coatings and foreign matter are removed. The surface shall have a uniform metallic colour.

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PHOTOGRAPHICAL PATTERN



Initial state



St 2



St 3



Sa 2



Sa 2½



Sa 3

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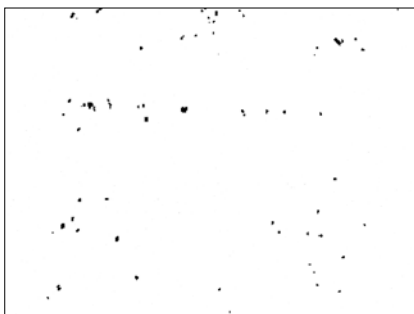
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IMAGES FOR CALIBRATION / GRADES OF CORROSION

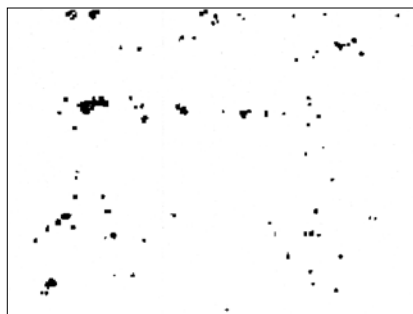
Ri 1



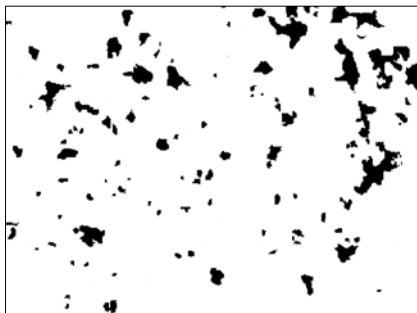
Ri 2



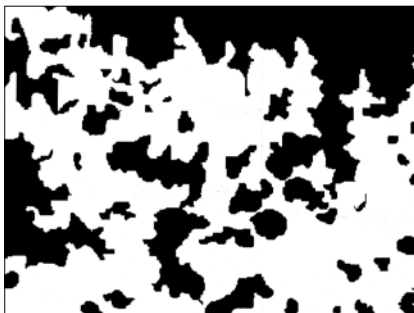
Ri 3



Ri 4



Ri 5



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CORROSION GRADES OF PAINTED STEEL

Equivalence between UNE 48258-3 (equivalent to ISO 4628-3) and the

European scale of corrosion grades and ASTM D610.

% Rusted area	UNE	European scale	ASTM
0	Ri 0	Re 0	10
0,05	Ri 1	Re 1	9
0,5	Ri 2	Re 2	7
1	Ri 3	Re 3	6
8	Ri 4	Re 5	4
15 - 20	-	Re 6	2 - 3
40 - 50	Ri 5	Re 7	1 - 2
75 - 85	-	Re 8	-
95	-	Re 9	-
100	-	-	0

ZINC PHOSPHATING

This treatment covers the surface of the steel in Zinc Phosphate. This gives better resistance to corrosion and

allows the next coat of paint to stick properly. Before phosphating, the surface must be free of rust, oil and dirt.

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SELECTION OF PAINT SYSTEMS

If you want to get a good surface protection at a minimum of cost, you must consider carefully all the factors involved.

As a general rule, the following things must be considered:



Type of material to be painted.

Shape of the object.

Previous condition of the surface, as shown by the corrosion grade.

Location of the surface to be painted: indoors or outdoors.

Weather conditions.

Aggressiveness of the environment and the effect it will have on the object.

Mechanical conditions it will face i.e knocks, scratches or scrapes.

Colour and degree of gloss required.

Most practical available cleaning method, eg hand cleaning using solvents or mechanical cleaning with shot blasting, etc.

Available methods of application.

Consideration of time, corrosion grade and specifications to be compliant with.

