

## General Guide for Painting

### 1. Surface Preparation

#### a) Primary Surface Preparation

The life of a coating is very much depend on the degree of surface preparation. The main function of surface preparation are as follow

- To clean the surface of substrate from any contaminants such as oil, salts, mill scale that will induce premature failure of the coating system.
- To provide anchor profile for good wetting and adhesion of the coating.

A brief introduction of surface preparation standard

Spec.	Process	Description
SSPC-SP 1	Solvent Cleaning	To remove oil, grease, dirt, salt and contaminants by solvent, vapour, alkali, water or steam.
SSPC-SP 2 ISO-St 2	Hand Tool Cleaning	To remove loose rust, mill scale and paint film by hand chipping, sanding, scarping and wire brushing.
SSPC-SP 3 ISO-St 3	Power Tool Cleaning	To remove loose rust, mill scale and paint film by power tool chipping, sanding, grinding and wire brushing.
SSPC-SP 6 ISO- Sa 2	Commercial Blasting	To blast clean by grit, shot, garnet or other abrasive to at least 2/3 of surface area is free from any visible residue.
SSPC-SP 10 ISO- Sa 2.5	Near White Blast	Blast clean until at least 95% of the surface area is free from visible residue
SSPC-SP 11	Power Tool Cleaning to Bare Metal	Complete removal of rust, mill scale and paint film by power tools.

- SSPC- Steel Structure Painting Manual, ISO – International Standard, ISO8501-1

The blast- cleaned surface will rust rapidly when expose to air, so shop primer with fast dry property, good welding and gas cutting properties is use to prevent rusting during storage, fabrication and fitting.

#### b) Secondary Surface Preparation

For shop priming surface, a secondary surface preparation is require to remove any contaminants, spot repair for any mechanical damage area and thoroughly wash down by high pressure fresh water before apply subsequent primer system.

For Old paint film, the surface must be cleaned by scrapping, thinner or fresh water washing to remove salt, dirt, oil and other contaminants. All rust or loose paint film should be remove by suitable tools like disc sander before a suitable coating is applied.

## 2. Painting

Painting only can achieve its best performance by proper selection of paint system, application method and condition, film thickness control, inspection and repair procedure.

### 2.1. Selection of Paint

To achieve optimum result of desire properties and maximum protection against corrosion, anti-fouling, heat resistance or specific function, a proper coating system should be use.

Some of the factors to be considered are as follow :

<b>Factors</b>	<b>Purpose, Function and Condition</b>
Classification of work to be carried out	New building, maintenance and repair
Required Properties	Weathering, chemical, water, anti-fouling, heat resistance
Purpose of Painting	Corrosion protection, cosmetic, marking
Application condition	Environment(temperature, humidity), period of coating, drying condition
Expected life expectancy	Expected service life, period of guarantee
Condition of Object to be coated :-	
- Type of substrate	Steel, wood, non-ferrous, galvanizing, concrete
- Condition of substrate	Smooth, kind of existing paint, grade of rust
- Structure	Shape of structure and assembly
- Service Condition	Service temperature, immersion, chemical
- environment	Outdoor/indoor, underwater, off shore

### 2.2. Method and Application of Paint

#### 2.2.1. Preparation of paint

**Storage** – some paint component may react or affected at high or low temperature causing thickening etc. So the paint should be ideally store at 20 – 40<sup>0</sup>C.

**Shelf Life** – generally epoxy, acrylic and other organic resin basically stable for at least 24 months under proper storage condition. Inorganic zinc by hydrolysis mechanism have shelf life of around 6 months.

**Settling** – Paint are normally tends to separate slightly due to different specific gravities of its ingredients. Therefore, all paint must be properly stir with suitable method until homogenous state before. Stirring should carry out from time to time while painting in order to prevent separation. As for zinc rich paint, constant stirring is require while painting.

**Left over** – The un-use paint should be tightly close. Some quick dry paint may develop skinning due to reaction with air which is a natural process of drying. The 'skin' must be remove before painting to prevent choking on the nozzle or hose.

## 2.2.2. Mixing of Paint

### a) Mixing

A two component paint is cure through chemical reaction, so this two component ( part A and B ) should be mixed according to specified ratio and ensure a homogeneous state before use. Poor stirring or incorrect ratio will cause improper curing and affect its performance.

### b) Thinning

Most paint do not require adjustment, however under conditions of excessive high or low temperature, a suitable thinner may be added for better applicability. Do not exceed the amount of thinner use recommended by the manufacturer.

### c) Pot Life / Working Life

For two component paint, observe the pot life as specified by the manufacturer, paint exceeded the pot life should not be use.

## 2.2.3. Application of Paint

### a) Brush

The paint should be applied on the substrate by crosswise and lengthwise. Care should be taken for sharp edges, corner, and tough surfaces.

### b) Roller

Paint at a slow and even space up and down and overlap. Do not spread the paint excessively. Care should be taken when painting rivet, sharp edges and welding seams for under thickness.

### c) Airless spray

The more effective and economical way of application as compare to conventional method for large areas. It is faster and can be applied in thicker paint film. Depending on type of paint, pressure, thinning percentage and tip size should be select properly.

### d) Paint Film Thickness Control

The wet film thickness (WFT) and Dried Film Thickness (DFT) should be measured with proper gauge equipment as per recommended painting specification.

### e) Cleaning of Tools

The tools should be cleaned immediately after use. This is particular important for quick dry or two component paint. Spray equipments should be cleaned after use by flushing with adequate thinner. For quick dry paint like inorganic zinc, the equipment should be flushed whenever there is break to prevent choking of nozzle or gun.

## 2.2.4. Painting Condition

Generally, painting should be done at temperature over 5 °C ~ 50 °C and below 85% relative humidity. Painting should not be carry out when the surface temperature is less than 3 °C above the dew point.

Painted surface should be kept free from dirt ,moisture, water or other liquid before drying through. Allow adequate drying time before handling as per manufacturer recommendation.

### 2.2.5. Safety and Health Precaution

Always refer to material safety data sheet (MSDS) before using the paint. Observe the hazards clauses and labels when using the paint. Solvents are flammable , so attention must be given to prevent fire hazard. When painting is carry out at confine space such as tank interior, proper ventilation is required during painting and drying process.

Personal protection equipment like gloves, goggles, mask and protective clothing is require during painting work to prevent contamination of the skin. In case of in contact with paint, it should be wipe off with a suitable thinner and wash the area with water and soap.