

# APPLICATION OF PAINTS

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Paint is applied onto a substrate surface which has been previously treated by the methods of Enhancement of adhesion (surface preparation): Cleaning, Surface roughening, Primers, Adhesion promoters, Plasma treatment.

The following techniques are used for application of paints:

- ☐ **Brush**
- ☐ **Roller**
- ☐ **Air spray**
- ☐ **Airless spray**
- ☐ **Electrostatic spray**
- ☐ **Rotating disc or bell**

## Brush

Brush application is used for decorative coating of relatively small and complex areas. Brush painting is a slow application method but it provides good penetration of the paint. Brush application prevents paint losses associated with the spray application method.

## Roller

Roller technique is applied for coating large flat surfaces. The method is faster than brush application. In contrast to the brush method roller painting is not suitable for applying high film build.

## Air spray

In the air spray application method the paint in form of atomized droplets is delivered by a stream of compressed air. The paint is pumped from the tank into the gun where it is atomized (broken into small droplets) by the flowing compressed air. The typical air pressure in the air spray is 40-50 psi (0.28-0.34 MPa). Spray application is a simple and inexpensive method which is capable to coat objects of various shapes and dimensions. High quality coatings are achieved if the paint composition (the content of Solvents) provides the required levels of viscosity and the drying rate. The disadvantage of the air spray application is unavoidable overspray: losses of the paint and expensive organic solvents and thinners. Besides the costly losses the method requires additional investment in safety equipment in order to protect the workers exposed to the hazardous solvent vapors.

## Airless spray

In the airless spray (in contrast to the air spray) the paint is not mixed with air.

The liquid paint is delivered to the gun by a hydraulic pump producing a high pressure 300-7000 psi (2-48 MPa).

The pressurized paint is atomized in the gun nozzle. The nozzle is commonly made of tungsten carbide. It has an orifice, diameter of which (together with the paint viscosity and the pump pressure) determines the delivery rate and controls the coating thickness.

Using high pressure pumps and preheated paints allows to apply high viscosity paints having a decreased amount of solvents and thinners (e.g. High-solids paints). Lower solvent content in the paints for airless application results in a reduced overspray.

A combination of the airless and the airless application methods is used in the air assisted airless spray application technique.

The paint is supplied to the gun and atomized like in the airless method. However the paint is additionally atomized by low pressure compressed air which also controls the fan pattern.

## Electrostatic spray

Electrostatic spray application is based on the electrostatic attraction of electrically charged atomized particles (either dry powder or liquid paint droplets) to the grounded (having earth potential) workpiece. The charged particles coming out from the gun hit the whole surface of the object including the back surface therefore the electrostatic spray technique is mainly used for inside coating of tubular objects where the back surface painting (wraparound effect) is negligible.

Due to electrostatic effects the coating is thicker on the surfaces of protruding corners and thinner on inside corners and holes.

Electrostatic spray is characterized by very low overspray. The method utilizes at least 95% of the paint.

## Rotating disc or bell

In the rotating disc/bell application technique the liquid paint is pumped to the center of the disc/bell rotating at high speed (at least 10,000 RPM).

The centrifugal force drives the liquid to the edge where it is atomized and spun off.

The rotating disc commonly has an electrical potential which provides an electrical charge to the paint. The paint particles propelled by the centrifugal force are attracted by the grounded workpieces located around the rotating disc.

Rotating disc or bell method is used for automatic application of high viscosity paints(e.g. High-solids paints) in conveyor lines.

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