

1. Introduction

1.1 FUNCTIONS OF PAINT

Paint is a fluid that dries to form a continuous solid film when spread over a surface or substrate. Depending on its type and properties, paint can perform one or more of the following functions:




Functions of Paint	Descriptions
<p>a) Decorative</p>  <p>Decorative paint for aesthetic purpose</p>	<ul style="list-style-type: none"> Paint can be used as a coating to decorate a surface or substrate. It has a wide variety of colour, texture, finishes and gloss level.
<p>b) Protective</p>  <p>Protective paint for fuel tanks</p>	<ul style="list-style-type: none"> Paint can be designed to protect the surface or substrate against ultra-violet rays, humidity, chemicals, corrosion, algae, abrasion etc.
<p>c) Special Purposes</p>  <p>Luminous paint for emergency signage</p>	<ul style="list-style-type: none"> Paint can also be formulated for specific uses such as luminous paint that glow in the dark for emergency signage, anti-condensation paint to provide an insulating layer to minimise condensation, fire retardant paint to enhance the fire resistance of combustible surfaces such as softboard or hardboard. For application of special paints, refer to manufacturer's recommendations.

Table 1.1: Functions of Paint



1.2 PAINT SYSTEMS AND COMPONENTS

A paint system is basically composed of primer/sealer, undercoat and topcoat as shown in Figure 1.1. Depending on the design requirement, texture coating may be provided. Due to volume constraint, this guidebook will focus on paints that are commonly used in the local market. The functions of each system component are illustrated in Table 1.2 below.

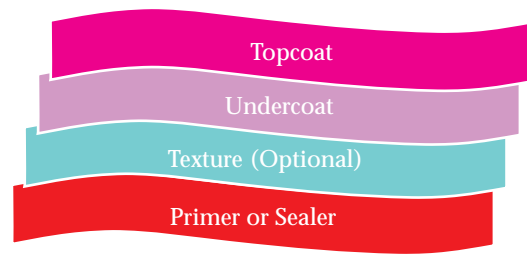


Figure 1.1: Typical paint system

System Component	Function	Remarks
Primer	<ul style="list-style-type: none"> To improve adhesion To protect metal against corrosion To reduce porosity of receiving substrate so as to prevent undue absorption of resin from subsequent coats of paints 	<ul style="list-style-type: none"> Primer should be used to reduce the porosity of the surface and to provide adequate moisture resistant capability Etching Primer should be used as pre-treatment on non-ferrous surfaces such as galvanised metals, aluminium to ensure good adhesion
Sealer	<ul style="list-style-type: none"> To resist alkali attack from cement based materials To improve adhesion To seal problematic surfaces, e.g. resinous wood To stabilise loose surface particles To reduce porosity of receiving substrate so as to prevent undue absorption of resin from subsequent coats of paints 	<ul style="list-style-type: none"> Sealers are applied to prevent migration of substances from the substrate into later coats and should be used to reduce the porosity of the surface and to provide adequate moisture resistant capability
Texture (Optional)	<ul style="list-style-type: none"> To give a distinct 3-dimensional appearance. 	<ul style="list-style-type: none"> If applied, this is introduced as the second coat after application of sealer/primer. Commonly applied by spray or roller Textures are available in multiple colours to simulate the look of granite, tiles, and wallpaper Mock-ups are important to understand the appearance of the product
Undercoat	<ul style="list-style-type: none"> To impart opacity and film build To level out minor irregularities and provide uniform texture To improve inter-coating adhesion 	<ul style="list-style-type: none"> Choice of undercoat should be compatible with the primer/sealer and the finishing coats
Topcoat	<ul style="list-style-type: none"> To provide the required functions of paint as discussed in Section 1.1 	<ul style="list-style-type: none"> This is the finishing coat of a paint system which gives the final appearance in term of colour, gloss or sheen to the substrate.

Table 1.2: Functions of the Various Components of a Paint System



1.3 CLASSIFICATION OF PAINT

With technological advancements, the traditional classification of paints into either enamel or emulsion has become misleading. Today, the industry has enamel paints that can be diluted with water and emulsion paints that have smooth, glossy finishes. Hence, it becomes essential to identify paint by its resin components to minimise confusion.

Appendix A shows some examples of paints classified by their resin components and properties. In general, “enamel” refers to solvent-based Alkyd resin which is generally used for wood and metal surfaces.

Apart from classifying paints by their resin components, paints may also be classified in accordance with their curing mechanism, solvent used, function and market segment as shown in Table 1.3.

Classification by	Type of Paints
Curing Mechanism	Baking or Air-dry
Solvent for the Paint	Water-based or Solvent-based
Function of System Component	Primer, Sealer, Undercoat or Finishing Coat
Resin component	Epoxy, Alkyd, Acrylic, Polyurethane, etc
Market Segment	Architectural Coating, Heavy Duty Coating, Marine or Industrial Coating

Table 1.3: Classification of Paint

1.4 PROPERTIES OF PAINT

The properties of paint determine the general quality of the coating and its workability, ease of application and resistance characteristics. Table 1.4 shows some basic properties of paints.

Properties	Examples
Appearance	Gloss/ Matt/ Semi-gloss
Application Method	By Brush, Roller or Sprayer
Drying Time	Fast dry/ Slow dry
Adhesion	Adhesion to substrates/ Existing coating/ Intercoating
Mechanical Characteristics	Hardness/ Flexibility
Resistance	Ultra-violet/ Chemical/ Abrasion/ Fungus/ Algae
Outdoor Durability	Gloss retention/ Colour / Ultra-violet
Storage Stability	Settling tendency/ Viscosity stability

Table 1.4: Essential Properties of Paint

