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Some Special Types of Paint

Anti Fungus Paint

These paints contain toxic compounds, which kill any fungi attempting to feed from it. Some paint have a fungicide added to them, these sometimes do not last the duration of the paint films life.

Fire Retardant Paint – Intumescent

This type of paint works as heat causes the paint to swell on the painted substrate, which forms a barrier insulating the surface from the flames. Other forms incorporate materials for example chlorinated paraffin or chlorinated rubber which on application of heat they fuse together preventing combustion.

Relief Texture Paint

These are often a heavy plaster like texture, which on application provide a rough finish. They can be moulded to make decorative elements such as borders and motifs. It generally comes as a powdered form, containing plaster, clay, mica and is mixed with water to the correct consistency required.

Heat Resistant Paint

Oil -Modified Alkyd Paints are suitable for application to surfaces on which their temperatures could reach 100°C. Light paint colors could discolor at this temperature though. There are other forms of paint that can withstand higher temperatures; all these paints generally contain Aluminium powder.

Multicolored Finish Paint

These paints contain combinations of colored globules, which on application to a surface by a spraying method form a flecked or speckled effect coating. This type of finish has good adhesion, is very durable and washable. It is ideal for the use in schools, large institutions and hospitals as it can be easily repaired on a patch basis, and is cost effective in these situations, saving the need to repaint entire walls.

ANTICORROSIVE PAINTS

Every year corrosion eats away wealth in billions. Neglected, corrosion can have disastrous consequences. Corrosion is death, there is no cure. Prevention is the only solution Corrosion occurs wherever a surface (metal, concrete) is exposed. Corrosion is primarily electrochemical in nature, with a chemical reaction accompanied by the passage of an electrical current.

There are two methods used for corrosion control

- Modifying the corrosive environment

  Inhibitors
  Cathodic Protection
- Excluding the corrosive environment

  Coatings(painting)

Modifying the environment is specific to some systems. Common approach to corrosion prevention is by protective coatings. Anticorrosive coatings have become an important part of paints and coatings industry in the industrialized countries As a result of significant growth in key end-user industries, such as shipping, oil & gas, power, the market for anti-corrosion coatings in India is developing at a fast pace and has significant potential for future development. The demand for heavy-duty coatings is particularly good. This market provides strong opportunities for new entrants. .

Paints are mixtures of many raw materials. The three major components are:

- Binder(other terms used include: vehicle, resin, film former or polymer)
- Pigment or Extender.
- Solvent.

The first two form the final dry paint film. Both act as protectors from corrosion. Solvent is only necessary to facilitate application and initial film formation. It leaves the film by evaporation and can therefore be considered an expensive waste product.

Different resins like alkyds, epoxy, and polyester are used in paint manufacture. Some of the resins can be manufactured in house based on economic considerations. Resin manufacture involves chemical reactions like condensation and polymerization.

Pigments like Iron oxide, Zinc chromate and aluminum powder are used in anticorrosive paints. Some of the specialty pigments can be produced in-house. Pigment manufacture involves steps like mixing, dissolving in suitable solvent, filtration, drying and powdering.

Anti-corrosive coating composition

An anti-corrosive coating composition comprises a pigment component dispersed in a film-forming binder. The pigment component comprises a salt comprising a polyvalent metal cation and an organic polyphosphonic acid containing at least two phosphonic acid groups. Generally, the molar ratio of polyvalent metal cations to phosphonate groups in the salt is at least 0.8 n:1, where n is the valency of the metal ion. However the composition may also include a corrosion passivator capable of modifying the metal oxide film on the metal to be protected to render it more protective, the ratio of the polyphosphonate salt to the passivator being 1:1 to 50:1 by weight, and in the latter alternative it is also possible to use a lower proportion of polyvalent metal cations.

The pigments which have been regarded as most efficient in preventing corrosion are red lead and the chromates, particularly zinc chromate. Unfortunately both red lead and the chromates are now considered to be health hazards. Many anti-corrosive paints sold at present contain zinc phosphate as anti-corrosive pigment, but the performance of paints containing zinc phosphate has not been as good as those containing red lead or zinc chromate. The present invention seeks to provide a paint giving better protection of iron and steel from rusting than zinc phosphate paints and without using chemicals regarded as health hazards.

Certain salts of organic polyphosphonates are particularly useful as anti-corrosive pigments.

The polyphosphonate salt can also be used in conjunction with other known anti-corrosive pigments such as a phosphate, for example zinc phosphate, silicate, borate, diethyldithiocarbamate or lignosulphonate or zinc dust or with an organic anti-corrosive additive such as a tannin, oxazole, imidazole, triazole, lignin, phosphate ester or borate ester.

What Is Eco-Friendly Paint?

Paint is a product of the non-sustainable petrochemical industry, and a litre of paint production can yield up to thirty litres of toxic waste. The World Health Organisation estimates that professional decorators are 40% more likely to contract cancer.

Typically, household paint will be composed of formaldehyde, lead, and volatile organic compounds (VOCs). Today, an emerging alternative to chemical solvents are eco-friendly paints. These use water-based solvents to reduce or eliminate the release of VOCs in indoor spaces. Plus, they're odour-free and have a significantly lower impact on the environment. Eco-friendly paint, or natural paint, is paint that has been specially designed to have lower levels of volatile organic chemicals (VOCs, for short). You know that generic paint smell you get when you open a new can or walk into a freshly painted room? It's the VOCs you're smelling. According to the Environmental Protection Agency, VOCs "may have short- and longer-term adverse health effects," and "while people are using products containing organic chemicals, they can expose themselves and others to very high pollutant levels, and elevated concentrations can persist in the air long after the activity is completed." VOCs are the main reason painting instructions advise that you only work in well-ventilated areas.

Non-toxic paints are made up of formulas containing natural raw ingredients like milk, water, casein, plant oils, resins, natural dyes, and essential oils, some of them also include formulations containing VOC's.

However, these eco-friendly paints that contain VOC's have a much lower environmental impact as they contain very low or negligible levels of these compounds.

Protective Metallic Coatings

Metallic coatings provide a layer that changes the surface properties of the workpiece to those of the metal being applied. The workpiece becomes a composite material exhibiting properties generally not achievable by either material if used alone. The coatings provide a durable, corrosion resistant layer, and the core material provides the load bearing capability. The deposition of metal coatings, such as chromium, nickel, copper, and cadmium, is usually

achieved by wet chemical processes that have inherent pollution control problems. (corrosion costs study)

Alternative metal deposition methods have replaced some of the wet processes and may play a greater role in metal coating in the future. Metallic coatings are deposited by electroplating, electroless plating, spraying, hot dipping, chemical vapor deposition and ion vapor deposition. Some important coatings are cadmium, chromium, nickel, aluminum and zinc.Plating and surface treatment processes are typically batch operations, in which metal objects are dipped into and then removed from baths containing various reagents to achieve the desired surface condition. The processes involve moving the object being coated through a series of baths designed to produce the desired end product. These processes can be manual or highly automated operations, depending on the level of sophistication and modernization of the facility and the application.

Metallic coatings -

The most widely used metallic coating method for corrosion protection is galvanizing, which involves the application of metallic zinc to carbon steel for corrosion control purposes. There are four commonly used **methods** of applying **metal coating** to **steel** surfaces. These are hot-dip galvanizing, thermal spraying, electroplating and sherardizing. The latter two processes are not used for structural steelwork but are used for fittings, fasteners and other small items.Hot-dip galvanizing is the most common process, and as the name implies, it consists of dipping the steel member into a bath of molten zinc.

Metallizing is defined as the application of very thin metallic coatings for either active corrosion protection (zinc or aluminum anodes) or as a protective layer (stainless steels and alloys). Application can be by flame spraying or electroplating. Other advanced processes such as plasma arc spraying can be used for exotic refractory metals for very demanding applications, but most of the advanced processes are not used for corrosion control.

Thermally sprayed metal coatings

Gas (flame) spraying aluminium to steel bridge component *(Image courtesy of Metallisation)*

Thermally sprayed coatings of zinc, aluminium, and zinc-aluminium alloys provide long-term corrosion protection to steel structures exposed to aggressive environments. They are an important component of coating systems that are currently specified by Network Rail and they are commonly used on steel bridge decks prior to surfacing with mastic asphalt systems.

For bridge components, thermally sprayed aluminium is usually preferred and it acts as a barrier coating. However, for rail bridges likely to be subjected to collision damage, zinc is often preferred due to its sacrificial nature.

The metal, in powder or wire form, is fed through a special spray gun containing a heat source, which can be either an oxygas flame or an electric arc. Molten globules of the metal are blown by a compressed air jet onto the previously grit blast cleaned steel surface. No alloying occurs and the coating consists of overlapping platelets of metal and is porous. The adhesion of sprayed metal coatings to steel surfaces is considered to be essentially mechanical in nature. It is therefore necessary to apply the coating to a clean roughened surface and blast cleaning with coarse grit abrasive is normally specified.

What is Anodizing?

Anodizing is an electrochemical process that converts the metal surface into a decorative, durable, corrosion-resistant, anodic oxide finish. Aluminum is ideally suited to anodizing, although other nonferrous metals, such as magnesium and titanium, also can be anodized.

The anodic oxide structure originates from the aluminum substrate and is composed entirely of aluminum oxide. This aluminum oxide is not applied to the surface like paint or plating, but is fully integrated with the underlying aluminum substrate, so it cannot chip or peel. It has a highly ordered, porous structure that allows for secondary processes such as coloring and sealing.

Anodizing is accomplished by immersing the aluminum into an acid electrolyte bath and passing an electric current through the medium. A cathode is mounted to the inside of the anodizing tank; the aluminum acts as an anode, so that oxygen ions are released from the electrolyte to combine with the aluminum atoms at the surface of the part being anodized. Anodizing is, therefore, a matter of highly controlled oxidation—the enhancement of a naturally occurring phenomenon.

Anodizing's Benefits

The unique anodized finish is the only one in the metals industry that satisfies each of the factors that must be considered when selecting a high performance aluminum finish:

Durability. Most anodized products have an extremely long life span and offer significant economic advantages through maintenance and operating savings. Anodizing is a reacted finish that is integrated with the underlying aluminum for total bonding and unmatched adhesion.

Color Stability. Exterior anodic coatings provide good stability to ultraviolet rays, do not chip or peel, and are easily repeatable.

Ease of Maintenance. Scars and wear from fabrication, handling, installation, frequent surface dirt cleaning andusage are virtually non-existent. Rinsing or mild soap and water cleaning usually will restore an anodized surface to its original appearance. Mild abrasive cleaners can be used for more difficult deposits.

Aesthetics. Anodizing offers a large increasing number of gloss and color alternatives and minimizes or eliminates color variations. Unlike other finishes, anodizing allows the aluminum to maintain its metallic appearance.

Cost. A lower initial finishing cost combines with lower maintenance costs for greater long-term value.

Health and Safety. Anodizing is a safe process that is not harmful to human health. An anodized finish is chemically stable, will not decompose; is non-toxic; and is heat-resistant to the melting point of aluminum (1,221 degrees F.)

Since the anodizing process is a reinforcement of a naturally occurring oxide process, it is non-hazardous and produces no harmful or dangerous by-products.