



NATIONAL PETROCHEMICAL COMPANY
STANDARDS

MATERIAL STANDARD
FOR
PAINTS

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1 SCOPE

This standard covers the minimum requirements for the composition, properties, storage life, packaging, inspection, and labeling of protective coats and anticorrosive painting materials.

2 STANDARDS AND CODES

2.1 Steel Structures Painting Council (SSPC) volume 2 (latest edition).

2.2 American Society for Testing and Material (ASTM) Standards (latest editions).

2.3 US Federal Standards (latest editions).

2.4 American National Standards Institute (ANSI) standards (latest editions).

2.5 National Association of Corrosion Engineers (NACE) standards (latest editions).

3 GENERAL

3.1 All painting materials shall be performed in strict accordance with this standard.

3.2 No substitution or modification to materials detailed in this standard is permitted, unless prior approval of client has been obtained.

3.3 All containers of paint shall be the same as the original containers and unopened.

3.4 Ingredients of paint shall be uniform, stable in storage, and free from grit and coarse particles. No rosin or rosin derivatives may be used.

3.5 All paints materials within a system should have compatibility between coats and with the metal substrate (i.e. there should be adequate adhesion to the substrate and between coats over the operating temperature range and there should be no under-softening to cause lifting, wrinkling or bleeding through of stains).

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For this and other reasons, it is generally advisable to obtain all the components of a paint system from the same source; otherwise, assurance of such compatibility should be obtained. If cathodic protection is applied to the structure, the paint system should be compatible with it.

3.6

High-build (Hi-build) coatings formulations permit much greater film thickness per coat. They are usually applied by airless spray but can be applied by roller or brush.

4

COATING SYSTEMS

Coating systems usually consist of primer, intermediate coat(s) or under coat(s) and topcoat or finish. For serious corrosion situations, the system approach (primer, intermediate coat, and topcoat) provides an excellent answer to many specific coating requirements. Figure 4.1. indicates a five-coat impervious coating system and the purpose for each of the three different kinds of coats.

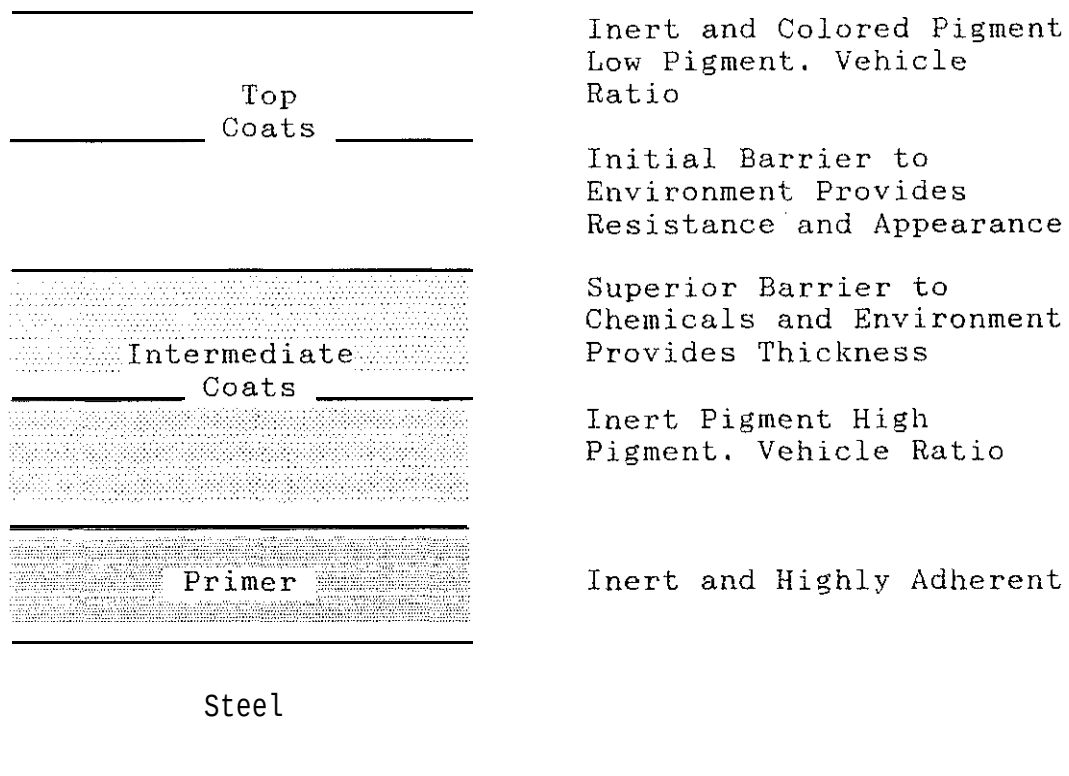


FIGURE 4.1 - Five-coat impervious coating system.



4.1 PRIMERS

The primer is universal for all anticorrosive coatings and is considered one of the most important components of the coating system, as it is the tie-coat between the metal and subsequent coats (See table 4.1).

The adhesion to the substrate is primarily a function of the resin binder in the primer. The anti-corrosive nature is largely contributed by the pigments. Where as the formation of a good base for the topcoat is partly a function of the binder also the ratio between the quantities of pigment and binder play an important part.

4.2 INTERMEDIATE COAT

Intermediate coat or body coat are usually used in coating systems which are designed for specific purposes. This is intended to be used between primer and topcoat in a coating system (See table 4.1).

4.3 TOPCOAT

Topcoat or finish coat intended to be the last coat applied in a coating system, usually applied over a primer, or intermediate coat. Topcoat provide a resinous seal over the intermediate coat and the primer (See table 4.1).

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TABLE 4.1 - FUNCTIONAL SUMMARY OF THE COMPONENT
OF A COATING SYSTEM

Coat	Main Function	Specific Requirement	General Requirements
Primer	Adhesion	Adhesion to substrate Bond to intermediate	(Adhesion, Cohesion, Resistance, Flexibility, Internal bond)
Interm- ediate	Thickness & structure	Bond to primer Bond to top coat	Cohesion, Intercoat bond Thickness Strength Resistance -Chemical -M.V.T. -Electrical
Topcoat	Resistance to atmosphere	Atmosphere and/or environment resistance Bond to Intermediate	Seal surface Strength Resistance Flexibility Appearance Toughness

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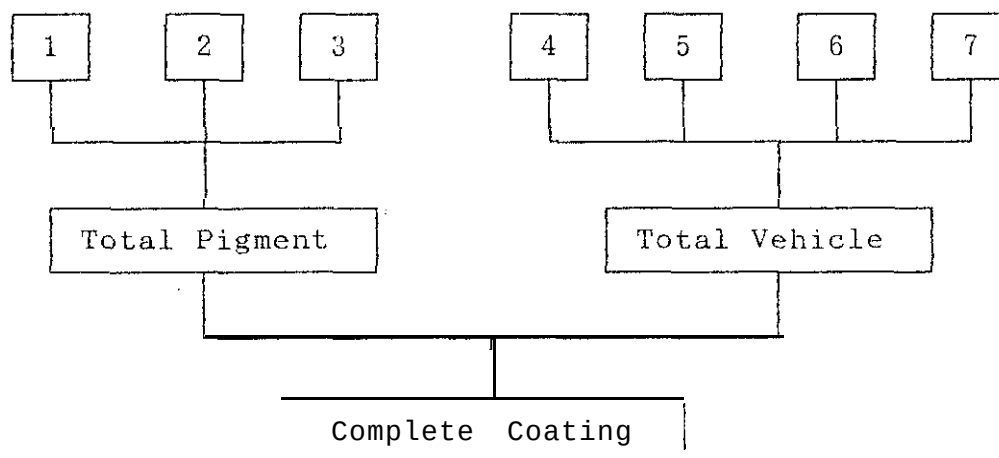


4.4

COATING COMPONENT FUNCTIONS

Individual coating components may be combined in to certain categories, and any one coating may be made of more than one component type, all of which serve different functions.

Figure 4.2 shows the general components of a coating and the manner in which they are ultimately combined in to the complete and finished product.



- 1) Inhibitive Pigment (Primer Only)
- 2) Inert and Reinforcing Pigments.
- 3) Color Pigment.
- 4) Primary Resin (Binder)
- 5) Secondary Resin.
- 6) Solvents.
- 7) Plasticizers or Modifier.

FIGURE 4.2 - General Components of a Coating.

4.4.1

Pigments

The function of a pigment in a coating is either to hide to a greater or lesser degree the underlying surface or to serve as a chemical capable of combining with some substance in the coating to form a third function such as corrosion inhibition or ultraviolet absorption, or finally to help decorate.

Primary pigment functions are color, protection of resin binder, corrosion inhibition, corrosion resistance, film reinforcement, sag control, and increased coverage, etc.



4.4.2

Binders

The binder more clearly defines the essential characteristics of the coating (APP. B of BS 5493). Drying-oil-type paints, like alkyd paints, dry in the presence of atmospheric oxygen; the action is catalytically promoted by metallic soaps. Chlorinated rubber paints usually dry by evaporation of solvent. But epoxy paints form by chemical reaction of binder; the two component have to be mixed just before use. Binder provides uniformity and coherence to any coating system.

The binder's ability to form a dense, tight film is directly related to its molecular size and complexity. Binders can generally be classified according to their essential chemical reactions, as one of the following types:

- a) Oxygen reactive (alkyd, epoxy).
- b) Lacquer (chlorinated rubber, bituminous materials).
- c) Coalescent (non-immersion).
- d) Inorganic (silicates).

4.4.3

Solvents

A function of the solvents is to dissolve the binder in to a compatible and workable liquid. Solvents aid in the control of the viscosity of the overall vehicle. They also aid in the wetting of the substrate surface. Important type of solvents are aliphatic hydrocarbons, aromatic-hydrocarbons, ketones, esters, ethers, etc.

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MATERIAL REQUIREMENTS

5.1

ZINC-RICH PAINTS

Metallic zinc-rich paints may be organic (Type 3 as specified in BS 4652) or inorganic. With 90% or more of zinc-dust (which may contain up to 6% zinc oxide) in the dry film the coating will afford cathodic protection but will be slightly permeable. The formation of zinc salts gradually render the coating impermeable and it will then be a barrier coating.

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