

# DUPLEX ZINC-POLYESTER POWDER COATING SYSTEM.

Fusion Bonded Polyester Coating and Touch Up System, Hot Dip Galvanized Zinc A 123 and A 153. This duplex system consists of a cathodic and barrier zinc layer applied by the hot dip galvanizing process, and an additional barrier layer of polyester powder coating. Prior to application of a duplex system, the applicator shall have demonstrated the ability to properly apply and cure the materials of the powder coating system. Cleaning and coating shall be performed in an environmentally controlled plant that is fully enclosed and approved by the owner's representative.

## Materials.

### Galvanizing:

All materials to powder coated shall be galvanized in accordance with ASTM A 123 or A 153 as appropriate. Only the dry-kettle (pre-fluxing) process shall be used. The material shall not be water or chromate quenched. Galvanized materials to be powder coated shall be air cooled only. An American Galvanizers Association trained Master Galvanizer shall be on the premises during the hot dipped galvanizing process.

### Powder:

Powder coating material shall be a thermosetting, super-durable, TGIC polyester powder of a degassing grade. Such coating powder must be recommended by its manufacturer for use over hot dipped galvanizing. The coating powder's particle size distribution shall be recommended by its manufacturer to produce the best results for powder coating components under this specification.

## Surface Preparation:

**Zinc Coating.** The polyester powder is to be applied over hot dip galvanizing. The surface shall be prepared for powder coat application using the following procedures. The powder coating shall be applied within 12 hours of the surface being prepared.

- All drainage spikes, tears, high spots, protrusions or other surface defects shall be removed using hand or power tools. The zinc shall be removed until it is level with the surrounding area. Such operations shall not remove the galvanized coating below the thickness allowed by ASTM A 123. Thickness of the galvanizing shall be verified using a properly calibrated magnetic thickness gauge as per ASTM E 376. Any item falling below the required zinc thickness, before or after removal of any high spots, shall be repaired in accordance with Practice A 780.
- The galvanized surface shall be clean and free of oils and grease before they are powder coated. For zinc coated steel that has been galvanized for 48 hours or more, or has had a surface treatment after galvanizing, such as water quenching or chromate conversion coating, the surface must be checked for wet storage stain or chromate coating. These must be removed as per ASTM D 6386.
  - The Hot-dip galvanized surfaces must be free of chromate conversion coating before they are powder coated. The surfaces shall also be clean and free of oil and grease by either solvent cleaning per SSPC SP-1, or cleaning per SSPC SP-2 or 3.
  - The surface cleaning shall be followed by preparing the surface to promote adhesion. This can be achieved either by applying chemical conversion coating or by brush blasting.

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- There are emerging methods of providing an appropriate substrate on which to place the powder coating material. These materials will be used in accordance with manufacturer's directions as stated in the manufacturer's Product Data Sheet.
- The surface may also be brush off blast cleaned using grit per SSPC SP-7. The blast profile shall be 2 to 3 mils as determined per D 4417, Method C. If the blast cleaning exposes bare steel, the bare steel shall be spot primed with an organic zinc rich coating.
- Following surface preparation, the surface shall be thermally treated in a bake off oven to remove residual moisture from the work prior to powder application to reduce pinholing. The bake off oven shall be capable of maintaining a temperature of 500° F. The pre-baking oven should be operated at higher temperatures than the curing oven. The temperature of the prebake oven should be at least 50° F (28° C) above the curing temperature as recommended by the powder coat material supplier. The piece should be kept in the oven for a sufficient time for the galvanized surface to reach the temperature of the prebake oven. Typically, this is one hour to assure all moisture and entrapped gasses are expelled.

## Polyester Coating.

- The thickness of the polyester coating shall be a minimum of 3.5 mils when measured per D 1186. The color of the coating shall match the color number as specified. Using a 67-1/2 volt wet sponge detector, the polyester coating shall be checked for holidays, pinholes, and discontinuities. There shall be no more than one deficiency per 5 ft<sup>2</sup>.
- The power coating component of the duplex coating shall, at a minimum, meet the following requirements:

Direct impact	: ASTM D 2794	160 in/lb (9.0 m/kg)
Reverse impact	: ASTM D 2794	160 in/lb (9.0 m/kg)
Pencil hardness (scratch/gouge)	: ASTM D 3363	2H
Flexibility (Mandrel test)	: ASTM D 522	1/8 in. (3m mm)
Minimum adhesion	: ASTM D 3359	5A,5B (100% crosshatch)
Salt spray	: ASTM B 117	+ 1000 hrs < 2mm
Gloss loss:	: AAMA 2604-05	40% @ 5 yrs (S. Florida)
Color change	: ASTM D2244	≥ ΔΣ 5.0 (Hunter Scale)
- **Repair.** Material used for the touch up system shall be a two component aliphatic polyurethane, and color matched for patching the polyester coating used. The coating thickness of the touch up material shall be the same as the thickness of the polyester and can be applied in multiple coats.