Technical Note 4.04
Quality and Performance Requirements for Prepainted Sheet Steel Used for Building Roofing and Cladding Products

Indian Sheet Steel Building Group: Technical Note 4.04
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The following specifications shall apply to continuously hot dipped metallic coated sheet steel prefinished with colours of proven durability and suitable for exterior exposure as delivered from the coil coater. Proven paint systems for building products have been designed for vertical cladding applications, (surfaces are no more than 30° to the vertical) and non-vertical roofing applications (surfaces ranging from 5° to 60° to the horizontal). It is not recommended for aggressive atmospheric exposure.

The prepaint system shall consist of a primer and an exterior polyester topcoat (per IS 15965) continuously applied and cured within the paint manufacturer's specifications on cleaned, pre-treated, metallic coated substrate. The pre-treatment specified shall be micro-crystalline zinc phosphate (or CR6) for galvanized steel and metal oxide pre-treatment for 55% aluminum-zinc alloy coated steel, applied in accordance with the pre-treatment manufacturer's specifications. Other polymer topcoats are also available. These include silicon modified polyester topcoats, having a minimum of 30% silicon, or poly vinilidene di-fluoride (PVDF) topcoats having a minimum of 70% Kynar resin.

Base Steel: The base steel furnished before painting shall conform to one of the following specifications: a) Zinc coated (galvanized) sheet steel to the requirements of IS 277 (ASTM A653/A653M), with metallic coating designation between Z90 (G30) and Z275 (G90); or b) 55% aluminum-zinc alloy coated sheet steel conforming to the requirements of IS 15961 (ASTM A792/A792M), with a metallic coating designation of AZM150 (AZ50).

Paint Qualification Tests

Film Thickness:

- The exposed surface shall have a dry film thickness of 25 ± 3 microns (1.0 ± 0.1 mils).
- The unexposed or reverse side shall have a dry film thickness that can be customized to meet customer requirements (i.e. wash coat only, primer + wash coat, or full coat).
- Test Method: ASTM D1005

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Film Cure:

- The baked film shall withstand 100 double MEK rubs in accordance with ASTM D5402.

Film Hardness (Pencil Method):

- The hardness of the paint film may be measured by means of Eagle Berol pencils using a flat round head applied at a 45° angle to the paint film. A minimum hardness of HB shall be obtained. Pencil Hardness is specified as the first pencil number that will not rupture the paint film when tested as described above.
- Test Method: ASTM D3363.

Formability/Adhesion Test:

- When using a representative sample at 20 ± 1.5°C (70 ± 5°F) using #610 Scotch brand cellophane tape, the paint system will show no loss of adhesion when subjected to a 3T 180° bend and tape pull test.
- This requirement does not apply to Grade 550 (Grade 80) material that is ordered as IS 277 (ASTM A653/A653M) or IS 15961 (ASTM A792/A792M).
- Test Method: ASTM D4145.

Gloss:

- The specular gloss shall be within 5 units of the agreed upon specified target when measured with a Gardner 60° Glossmeter. When other than the standard film build is ordered, the gloss range shall be mutually agreed upon prior to purchase.
- Test Method: ASTM D523.

Exterior Exposure (Weathering) Each proven colour of proven durability shall successfully meet the following weathering standards for applications in the Indian sub-continent (in the absence of aggressive fumes and/or other chemicals not normally encountered in the atmosphere) and shall be tested in India.

- Film Integrity: During the first 15 years of exterior exposure, the paint film shall have no evidence of cracking, chipping, peeling, crazing, spotting or loss of adhesion
- Chalking: During the first 10 years of exterior exposure, the chalk rating in vertical applications shall not be worse than #8 (ASTM D4214 Method A) and in non-vertical applications shall not be worse than #6 (ASTM D4214 Method A).
- Colour Change: During the first 10 years of exterior exposure, the colour change in vertical applications shall not exceed 5 colour units and in non-vertical applications the colour change shall not exceed 8 colour units. Colour change is measured on any accepted colorimeter designed to

produce reflectance readings in the Tristimulus Filter System of X, Y and Z based on the CIE values of illuminant C at 2°. (ASTM 2244, Hunter L, a & b Units).

Accelerated Corrosion Tests

Prohesion (Modified Cyclic Salt Spray)

- After 500 hours, typical average cut-edge corrosion of production samples shall not exceed 3 mm (1/8”).
- Test Method: ASTM G85, Method A5. The Prohesion test is a cyclic test incorporating corrosive sulphates, which have been demonstrated to correlate well with natural exposure testing.

Salt Spray Resistance

- After 1000 hours the surface shall show only a few # 8 blisters, and less than 3 mm (1/8”) creep from the scribe line.
- Test Method: ASTM B117.

Humidity Resistance

- The humidity resistance test shall be conducted at 100% relative humidity at a temperature of 38°C (100°F).
- After 1000 hours of exposure, the surface should have no field blisters (per ASTM D714).
- Test Method: ASTM D2247.

Colour Match: Colour match problems can be minimized if the following procedures are followed:

- Orders for larger projects that could involve more than one production order should be discussed with the supplier on the basis of one lot.
- Attempt to ensure that each building is clad with material from the same production lot.
- When a different production lot must be used for one elevation, such as could happen with an addition to an existing building, attempt to minimize colour variation by inserting at an elevation change or break in the building structure.

Shipping and Storage: It is important to keep prepainted steel dry in transit, storage and on site. The material is subject to wet storage stain and/or paint deterioration if moisture is allowed to remain between the laps or sheets. Prefinished steel must not be stored outside. Ideal storage consists of a clean dry warehouse where the steel can be used on a first in, first out basis. Plastic wrapping should not be used. Material that becomes wet should be used immediately and dried off in the process.

Other Prefinished Systems: There are other paint systems available for prepainted sheet steel building products to be used in applications where additional corrosion protection or weathering resistance is required. Consult the ISSBG sheet steel building products producer members for more information.

For additional information on sheet steel building products and applications, please contact the ISSBG member companies

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