



FIGURE 6.46 Details of architectural vertical-rib roofing over solid substrate at fixed low eave with posthung box gutter. (MBMA.)

that offers a good chalk (gradual erosion of the film) resistance and gloss retention. Acrylic- and polyester-based paints normally offer 3- to 5-year guarantees, while siliconized polyesters may come with 10-year or even prorated 20-year warranties.

Fluorocarbon-based paints are made with polyvinylidene difluoride (PVDF) resin, introduced around 1970. PVDF resin is an exceptionally stable compound that offers extraordinary durability, color stability, and resistance to ultraviolet radiation, heat, and chalking. The finished surface is dense, smooth, and stain-resistant. According to its manufacturers, PVDF does not absorb ultraviolet rays that account for common metal-roof color deterioration. In one study, it was the only paint type virtually unaffected by Florida sun and salty air after 12 years of exposure. PVDF-based coatings can easily outlast their 20-year performance guarantees.

The PVDF resin is supplied by Elf Atochem North America, Inc., under the trademark of Kynar 500 and by Ausimont USA, Inc., under the trademark of Hylar 5000. These two companies license their products to some American paint companies; the complexities of the production process restrict the list to only a few. To reflect the dual origin of this finish, it is often referred to as Kynar 500/Hylar 5000 fluoropolymer resin. The actual coating is commonly made with 70 percent resin and 30 percent pigments and solvents by weight, the so-called full strength, or with a 50–50 split, where some of the PVDF resin is displaced by acrylic. The 70 percent formulation has a slightly better resistance to color fading and chalking, but the 50 percent resin offers better scratch and abrasion resistance. Therefore, the former has long been used for the high-rise curtain walls, while the latter may be better suited for low-rise metal building systems subjected to physical abuse.

The AAMA standard 605.2 specifies criteria for PVDF-based paints such as the acceptable limits for gloss retention, color change, and coating erosion. In addition, it prescribes testing of some other properties such as salt spray resistance, durability under heat, humidity resistance, adhesion, and chemical resistance.

PVDF finish can come in various thicknesses. The standard coating is 1 mil (0.025 mm) thick, often stated as 0.9 mil. This coating may consist of a 0.7-mil-thick topcoat and a 0.2-mil primer. Perfect for mildly corrosive environments, it may be insufficient for moderately corrosive situations, where a premium 2-mil (0.05-mm) finish may be called for. (This premium finish may require a special setup by the coil coater and will probably need a longer lead time.) For exceptionally aggressive or abrasive environments, a special 4-mil (0.1-mm) finish may be considered. However, the expense and difficulty of obtaining this thickness, coupled with the fact that any field-cut panel edges, holes, and scratches will reduce the effectiveness of the “superfinish,” make stainless steel or aluminum more suitable for such applications.

A relatively new and increasingly popular protective coating for metal roofing is two-coat *PVC plastisol*. The system is made up of a corrosion-resistant primer and topcoat of polyvinyl chloride (PVC) resin dispersed in a plasticizer. When applied in a 4 mil (0.004 in) or greater thickness, plastisols offer excellent resistance to corrosion (including common acids, alkalis, and inorganic compounds) and abrasion, even exceeding those of PVDF. Their color performance and gloss retention are generally less than of PVDF paints.

Should the back side of the panel be painted? The extra finish is obviously not required for aesthetics, but it can help resist abrasion during shipping and installation and improve resistance to corrosion caused by interior condensation. Some manufacturers suggest applying a full paint finish, while others are satisfied with a “backer” coat.

The traditional shop-applied baked-on paint finishes have been recently joined by a field-applied PVDF architectural coating introduced by Ausimont USA Inc. According to the manufacturer, the Hylar 5000 ACS (Ambient Cured System) can be applied by spray or brush.

The warranties offered on panel finishes are often prorated. Upon completion of the job, the manufacturer files a chip of the material which could be used for comparison if and when the fade-out claim is made.

6.8.3 Stainless Steel, Copper, and Aluminum

For those special applications that demand a cut above the coated steel, or for the purists who believe that any paint will ultimately fail, stainless steel, copper, or aluminum may be the materials of choice.