

The Effect of Batch Oven Curing Schedule Variations on the Thickness and Adhesion of Powder Coating Layers on ST-37 Steel Plates

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ABSTRACT

Powder coating is a metal coating method in the form of dry powder that is applied to metal substrates through several processing stages. The quality of the powder coating layer is influenced by various process parameters, one of which is the curing schedule in a batch oven, including variations in temperature and heating time. This study aims to analyze the effect of temperature variations of 160°C, 180°C, and 200°C with curing times of 15 and 25 minutes on the thickness and adhesion of powder coating applied to ST-37 steel plates. The research method employed was an experimental approach. The coating process was carried out using a spray technique with a two-layer system, preceded by sandblasting pretreatment to enhance surface roughness and improve coating adhesion. Thickness testing was conducted using an Extech CG204, while adhesion testing was performed using a Cross Cut Tester. The results indicate that variations in the curing schedule significantly affect the coating thickness and adhesion. The highest thickness, 99 μm , was obtained at 200°C for 15 minutes, whereas the lowest thickness, 59 μm , occurred at 200°C for 25 minutes. Thickness values meeting the 60–80 μm standard were achieved at 180°C for both curing time variations. The adhesion test results showed the best adhesion performance at 200°C for 25 minutes with 0% damage, while the lowest adhesion was observed at 160°C for 15 minutes with 15% damage.

Keywords: *curing schedule, batch oven, thickness, adhesion*