THE EFFECT OF THE POWDER COATING CURING PROCESS ON THE ADHESION STRENGTH OF COATINGS ON ST-37 STEEL

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ABSTRACT

The purpose of this study is to determine the effect of curing temperature variations on the adhesion strength of powder coating layers on ST-37 steel. The temperature variations used were 120°C, 140°C, and 200°C with a curing time of 15 minutes. Adhesion testing was carried out using the cross cut test and pull-off test methods in accordance with ASTM D4541 and D3359 standards. The results showed that increasing the curing temperature improves the adhesion strength of the coating layer. In the cross cut test, a temperature of 120°C resulted in a classification of 2B–3B, 140°C yielded 3B, and 200°C showed the best results, namely 4B–5B with very low peeling levels up to 0%. The pull-off test results also showed a similar trend, where the adhesion strength value increased with rising curing temperature and reached the highest value at 200°C with a better adhesion category compared to others, with a value of 10.68 MPa. It can be concluded that a curing temperature of 200°C is the optimal condition to produce maximum adhesion strength of the powder coating layer on ST-37 steel.

Keywords : powder coating , curing, adhesion, ST-37 steel