Testing of the New Chemical Pre-treatments Types Applied on the Steel Substrate

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This article deals with the analysis of the chemical pre-treatment influence on the corrosion resistance of the low carbon unalloyed steel material after cold forming. These are the pre-treatments nanotechnology based. The layer is created by sol-gel technology. Except two used types of nano chemical pre-treatments is also used classical ferric phosphate. The six variants of chemical pre-treatments were prepared and these variants were then compared in terms of corrosion resistance and the way of exclusion and surface morphology using SEM and EDS analysis. The experimental samples were prepared for each variant. They were observed macroscopically and using SEM before corrosion load. These analysis shows the differences between each variant. Using SEM and EDS analysis was searched the typical elements for each variant and was observed the excluded layer and potential defects. The experimental samples were placed in the corrosion chamber and loaded according to the standard CSN EN ISO 9227 after this analyses. The surface of the experimental samples were without any other protection thus there was observed changes on the surface of the samples after one hour. The corrosion loading was finished after 24 hours. Experimental samples were evaluated macroscopically and were compared. The result of the experiment is the best variant of chemical pre-treatment in terms of corrosion protection of steel substrate concluded after all analyses and observations.

Keywords: Steel substrate, Chemical pre-treatment, Sol-gel, Nanotechnology, Corrosion

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