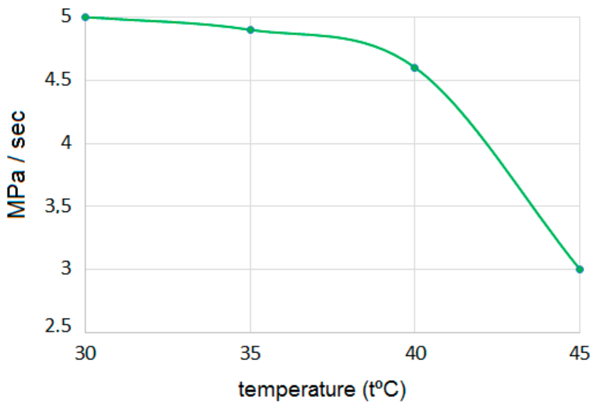

Figure 8. The rate of detachment of the oxide-zirconium coating with deposition temperature.

As seen in Figure 8, at a deposition temperature of 30 °C, the rate of detachment of the coating from the sample surface was 3.17 MPa/s. With a further increase in the deposition temperature, the adhesive strength of the coating was reduced. Consequently, the optimum deposition temperature at which the most durable coatings were formed was 30 °C.

Corrosion tests (ASTM B117 [17].) of steel samples painted with polyester powder paint with an adhesive zirconium-containing coating deposited from a solution of 0.2 g/L Zr (IV) + 0.15 g/L W (VI) + various concentrations of Mo (VI) are shown in Table 3 and Figure 9. The salt spray test was carried out for 240 h.

Table 3. Influence of the concentration of Mo (VI) in the precipitation solution 0.2 g/L Zr (IV) + 0.15 g/L W (VI) on the depth of corrosion penetration determined in the salt fog chamber.

Concentration Mo (VI), g/L	0	0.05	0.1	0.15
Depth of corrosive penetration, mm	6	2.3	1.8	3.3

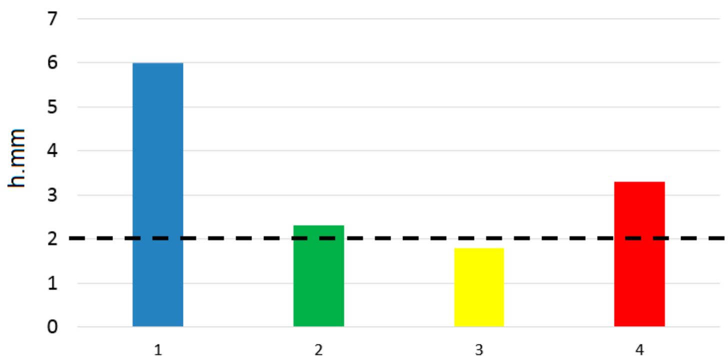

Figure 9. Dependence of the width of the separation of the paintwork from the cuts on concentrations of Mo (VI) g/L: (**1**) 0; (**2**) 0.05; (**3**) 0.1; (**4**) 0.15 in deposition solution 0.2 g/L Zr (IV) + 0.15 g/L W (VI).

As seen in Figure 9, the depth of corrosion penetration after 240 h of testing on steel samples with oxide-zirconium coatings deposited from a solution of 0.2 g/L Zr (IV) + 0.15 g/L W (VI) with a concentration of Mo (VI) 0.05 g/L was less than 2 mm, exceeding the corrosion resistance of crystalline amorphous phosphate coatings.

4. Conclusions

Thus, by studying the electrochemical behavior of individual components and their compositions it was possible to select the optimal composition of the deposition solution in which the formed coatings had the highest corrosion resistance. Based on the studies carried out, it was found that the optimal conditions for the deposition of oxide-zirconium