

## Corrosion resistance of Zn-Al-Mg automobile plate without painting

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**Abstract :** With the continuous development of the automobile industry, people have higher requirements for the quality of automobiles, and the corrosion resistance of automobiles has become one of the important projects for Oems and consumers to assess the quality of automobiles. Due to the different corrosion environment in different parts of the vehicle, the corrosion evaluation methods are also quite different. At present, the body interior where the environment is relatively moderate is mainly based on carbon steel with electrophoresis, and the general anti-corrosion requirement is that the neutral salt spray does not produce red rust in 720 hours. Zn-Al-Mg coating is a kind of high corrosion resistance alloy coating, which has excellent atmospheric corrosion resistance and chloride ion corrosion resistance. It can replace carbon steel with electrophoresis in the interior of car body. In this paper, the corrosion resistance of Zn-Al-Mg alloy coating after stamping into battery cover plate was studied. The results of the 720-hour neutral salt spray test show that there are less friction marks on the coating surface of the coated stamping parts, less white rust in the initial stage of the salt spray than that of the uncoated materials, and no red rust in the punching, cutting and scratches of the parts. This is because Zn-Al-Mg alloy coating has better self-healing properties. Zn-Al-Mg mainly provides protection for the steel matrix in two aspect. In the early stage of corrosion, the coating is mainly used as a sacrificial anode to provide cathodic protection for the steel matrix; In the later stage of corrosion, the metal ions generated by the coating structure migrate to the bare steel matrix at the cutting edge, forming high-dense corrosion products basic zinc chloride and basic zinc carbonate, which provide long-term protection for the cutting edge. When it is transformed into porous zinc oxide, the protection of the coating fails and the cutting edge is damaged. Zn-Al-Mg alloy coating shows a broad application prospect without painting application.

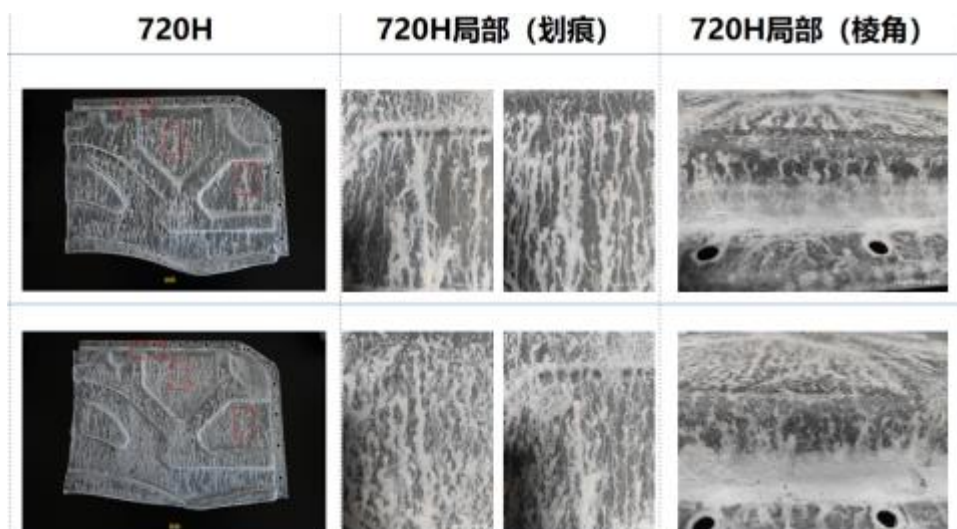


Figure 1 Photographs of ZM coated steel plates with/without passivation after 720h natural salt spray test

**Keywords** : Zn-Al-Mg ; Automobile plate; self-healing

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