

Zinc-iron

Electroplated zinc coat is one of our most common coatings. It has many advantages:

- It is anodic in relation to steel.
- It has a low price.
- The process is simple.

The corrosion protection is in many cases sufficient, but does not meet the demands set by the motor industry today, in particular when the coat is black chromated. Also, the chromate coats used on unalloyed zinc-coats are broken down when heated above 70 °C. This temperature is for instance exceeded in and around the engine of a car.

This has pushed the development of processes for precipitation of alloyed zinc-coatings forward. These processes were first developed for coating of strip steel, since it is easier to maintain unvarying precipitation conditions and get a uniform coat when coating strip steel. These processes have later on been developed to be used when coating hanging metals or coating in drum. Every process has its advantages and disadvantages, they all have the common disadvantage compared to regular electro-coating, that they require a more extensive control of the process.

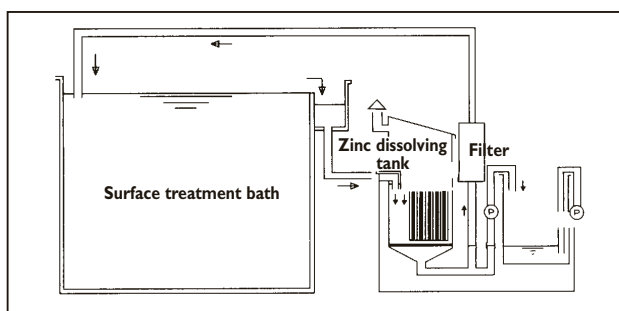
Considering the demands made by our customers for coating properties of alloyed zinc-coats, we have chosen zinc-iron coats. This greatly improves the corrosion protection, which is made clear by the table below.

CHROMATE TYPE	TEMPERATURE AFTER CHROMATING	IRON ZINC ALKALINE WHITE/RED RUST		ALK. ZINC CYANIDE FREE WHITE/RED RUST	
YELLOW	ROOM TEMP.	500	2000	200	900
BLACK	ROOM TEMP.	600	2000	48	800
YELLOW	100°C 3 HRS	500	2000	24	600
BLACK	100°C 3 HRS	600	2000	24	600

The corrosion protection in neutral salt spray test for 8 µm coats. Number of hours until the first corrosion is observed.

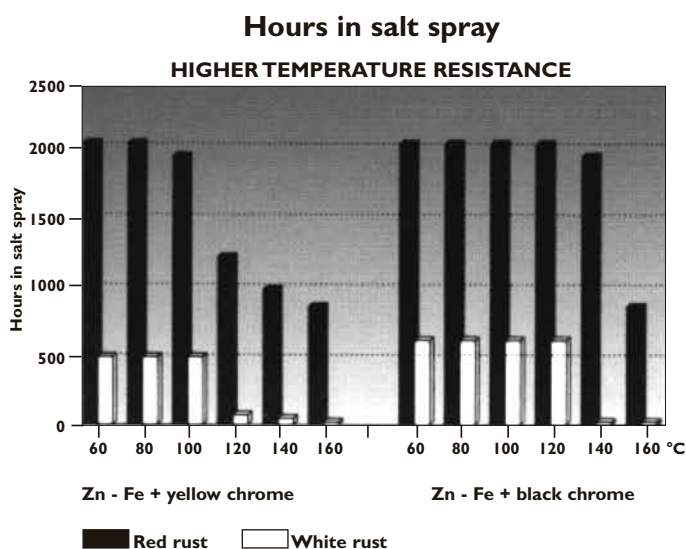
When the coating for yellow iridescent chromating is exposed to temperatures above 100 °C and 140 °C for black iridescent chromating, you get a break down of the chromate coat even with zinc-iron coats.

The coating process is a bit different from ordinary zincplating. Anode steel plates are used, but no iron is dissolved in the strongly alcalic solution, and the iron is added through a special chemical. Zinc is added to the solution through chemical dissolving in a tub apart from the coating tub. The solution is continuously pumped through the dissolver. The bath is continuously filtered. It is important to stay within the given temperature limits and percentage of iron as it affects the iron content, and consequently also the corrosion resistance of the layer.

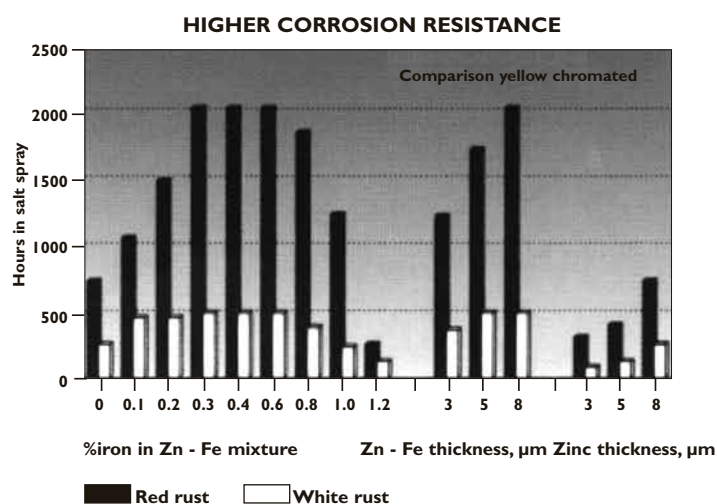


Environmental aspects: Please see page 608.

Environmental effects: Please see page 608.



These diagrams show that hydrogen embrittlement relief must take place before the chromating or it will break the chromate coat down.



The need for hydrogen embrittlement relief is the same for hydrogen-sensitive steel as for ordinary zincplating.