TRAX
balance weight technology

Uncoated zinc weights

Zinc balance weights and 'white rust' corrosion

ARTIFICIAL TESTS DO NOT REPRESENT WHAT HAPPENS IN REAL CONDITIONS ON A WHEEL

Laboratory tests for the corrosion testing of zinc balance weights rely on spraying a salt water solution in a chamber to create a "fog" (mist) around the weight for several hundred hours (eg ASTM B117, ISO 9227, DIN 50021 SS). Typically 240 hours in a laboratory test is claimed to represent 5 years life on a car.

Balance weights put into a static salty wet environment for several hundred hours can display a heavy flocculent white deposit (zinc hydroxide) and pictures of such weights have been shown around the balance weight market as below:

LABORATORY ENVIRONMENT

Example of a picture of weights shown in the market. This hows uncoated zinc weights placed into an artificial laboratory salt spray environment.

REAL ENVIRONMENT

Uncoated zinc weight after having been fitted to a steel wheel running approximately 16,000Km (10,000 miles) over 18 months (UK).

The surface has darkened with superficial corrosion which does not affect the weight performance or the steel wheel. This weight was fitted to a 3.5 tonne light truck with no wheel trims for maximum exposure to the road.

Laboratory tests are useful for a comparison between the performance of different surfaces and materials but do not represent what happens on wheel in real life conditions. In addition the aftermarket would not expect a weight to last for 5 years but the life of the tyre which would typically be around half of this time or less with the seasonal change over from summer to winter tyres. Car companies use weights with corrosion protection as the specification is for the part to last the life of the car or a minimum 5 years.

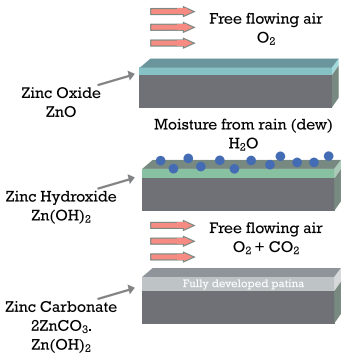
The primary reason given for the difference between laboratory test and real conditions is that when exposed to the weather the weights develop a protective skin called a "patina". This patina comprises of zinc carbonate and offers an inert corrosion protection layer for the zinc metal. Detail of how the zinc carbonate "patina" will form are as below. This process is more commonly known as "weathering" with the effects of exposure to rain water, free air circulation, and constant wetting and drying. In addition there is often a heavy deposit of black brake dust and dirt building up on the weights which will give some additional protection. The continuous wetting and drying as seen in real life on a wheel gives fast "weathering" and the build up of the protective "patina" zinc carbonate layer.

PATINA INFORMATION

The formation of the zinc patina begins with exposure of the zinc weight to atmospheric oxygen. Initially a thin layer of zinc oxide develops on the surface as a result of the oxygen reacting with the zinc. This oxide layer reacts with water to form a white gelatinous zinc hydroxide ("white rust").

During a drying phase the zinc hydroxide reacts with the carbon dioxide in the atmosphere forming a thin layer of zinc carbonate (patina). The rate of patina formation will depend on the environmental conditions but the constant wetting and drying as found on a wheel represents good conditions for this weathering process.

If the drying phase does not happen the zinc hydroxide ("white rust") continues to form thereby showing heavy "white rust" formation as shown by the above left hand photograph.



TRAX offers the market a choice of coated or uncoated clip-on weights. There is a market for both. Distributors and tyre retailers are being advised it is essential to corrosion protect zinc balance weights and are not given a choice encouraging them to use more expensive coated weights.

Uncoated weights are now being widely fitted across aftermarkets in Europe.