



**ELLEBOGEN**

**SALT SPRAY**

**CHAMBER RESULTS**

**ZINC NICKEL + 2 LAYER PU PAINT**

# Objective

- Simulation of the corrosion resistance for different coating solutions, based on real measured data.
- The analyzed parts have the following coating properties:
  - Base with Zinc Nickel coating.
  - Complete part with double PU paint coating.
- The test that has been carried out consists of a salt spray test chamber (SALT SPRAY FOG TESTING) where the three assemblies have been tested for over 750 hours, periodically checking the condition of the samples regarding the red and white rust values.
- The test was carried out by the company Galvanizados Arrate S.A. between 05/09/2022 and 06/10/2022, according to ISO 9227.

## Test conditions

- **Method according to:** ISO 9227
- **Sodium chloride:**
  - Ok, -Mínimum 99,8 % purity
  - Ok, -Iodide of sodium <0,1%
  - Ok, -Copper and Nickel < 10 mg / kg for both elements
- **Number of samples tested:** 3
- **Angle of the surface exposed in the chamber:** Ok, 20°
- **Test temperature:** Ok, 35°C ±2°C
- **Deionized water:** Ok, conductivity
- **Pluviometry:** Ok, 1-2 ml/ hora
- **pH of the saline solution:** Ok, 6,5 - 7,2
- **density of the solution:** Ok, 1030/1036 kg/m<sup>2</sup>
- **Concentration NaCl (%):** Ok, 5% ± NaCl (50 gr/l ± 5 gr/l)
- **Pressure:** Ok, 1,2 bar

# Setup description

- The coating is composed of a Zinc Nickel coat + 2 coats of the below paint.

## ZINC-NICKEL COATING

- Zinc-Nickel coating meets:**
  - Current European regulations such as 2000/53/EC, 2002/95/EC.
  - Other standards such as; REACH, RoHS
- Zi-Ni coating contemplated in:**
  - Standards of automotive manufacturers:
  - Fasteners. Electroplated coatings (ISO 4042:1999)
- Internationally renowned coating for its quality** (excellent mechanical and anti-corrosion properties).

## 2 COMPONENT POLYURETHANE (SATIN BLACK 6549 REF 3626)

- Vehicle: Acrylic isocyanate
- Solvent: Aromatic
- Goo: 50" Ford cup n°4 mixture 1.2 gASTM D1200
- Density : cm<sup>3</sup> UNE-EN-ISO 2811-1 40%
- Solids in volume: Theoretical UNE-EN-ISO 3251
- Drying: Touch 20' -total 7 days or 20 minutes at 80° C UNE-EN-ISO 1517
- Hardness: 180"±10% persoz after 7 days UNE-EN-ISO 1522
- Adherence: 100% GT0UNE-EN-ISO 2409
- Bent: 6mm±10% UNE-EN-ISO 1519
- Impact: 70cm±10% UNE-EN-ISO 6272-1
- Glow: 40-60% 60° angle±10% UNE-EN-ISO 2813
- Voc's: 55.32%

- The test that has been carried out consists of a salt spray test chamber (SALT SPRAY FOG TESTING) where the parts have been tested for 750 hours, periodically checking the condition of the samples regarding the red and white rust values.
- For the test, the following table has been fulfilled, where the number refers to the number of concerned parts for each observation (for the following table, means that after 504 hours of test, the 2 parts analyzed where in A situation, with no white rust).

A: no white rust B: 1st white rust point occurring C: white rust >5% of the surface D: 1st red rust point occurring

A	2	2	2	2			2	2	2	2			2	2	2	2			2		
B																					
C																					
D																					
Hours	24	48	72	96	120	144	168	192	216	240	264	288	312	336	360	384	408	432	456	480	504

# Test results

## ZINC-NICKEL COATING

- The results obtained after the test would be the following:
  - For the base, the part did not show any traces of red rust after 768 hours.

A: no white rust B: 1st white rust point occurring C: white rust >5% of the surface D: 1st red rust point occurring

A	2	2	2	2																		
B							2	2	2	2	2											
C														2	2	2	2	2				2
D																						
Hours	24	48	72	96	120	144	168	192	216	240	264	288	312	336	360	384	408	432	456	480	504	

  

A																						
B																						
C	2	2	2	2			2	2	2	2	2											
D																						
Hours	528	552	576	600	624	648	672	696	720	744	768	792	816	840	864	888	912	936	960	984	1008	



# Test results

## 2 COMPONENT POLYURETHANE

- The results obtained after the test would be the following:
  - For the complete parts, both parts showed the first traces of red rust after 528 hours. Before that point, no signs of white rust was detected.

A: no white rust B: 1st white rust point occurring C: white rust >5% of the surface D: 1st red rust point occurring

A	2	2	2	2			2	2	2	2	2			2	2	2	2	2			2
B																					
C																					
D																					
Hours	24	48	72	96	120	144	168	192	216	240	264	288	312	336	360	384	408	432	456	480	504

A																					
B																					
C																					
D	2	2	2	2			2	2	2	2	2			2	2	2	2	2			2
Hours	528	552	576	600	624	648	672	696	720	744	768	792	816	840	864	888	912	936	960	984	1008



# Conclusions

- For the complete analysed parts, with 2 layers of PU coating, no traces of red rust corrosion points were found until over 500 hours.
- For the Zinc Nickel base, no traces of red rust corrosion were found after 768 hours of test.

