

TESTING REPORT

CTL_M-001
Rev.25
Date: 19/05/2023

N°23TRN673265_Rev.0

PTC TESTING LABORATORY

Via Silvio Pellico n°8
22100, Como
Italy

Customer Vondom S.L.U.
Customer's address Poligono 6 , 16 Beneixida, 46293
Valencia, Spain
Testing report n° 23TRN673265 Final [☒] Intermediate [☐]
Revision n° 0
Date 23/05/2023
Title **Vondom powder-coated Aluminum. Acetic acid salt spray test**
Attachment -

Sample

Description	Internal code
Aluminium profile with etch passivation (Bonderite M-NT 2040) and chrome III-based conversion (Bonderite M-NT 5923) pretreatment coated with Vondom powder coating Interpon D2525 YD365L	23CTL673265 - 1
Aluminium profile with etch passivation (Bonderite M-NT 2040) and chrome III-based conversion (Bonderite M-NT 5923) pretreatment coated with Vondom powder coating Interpon D2525 YD365L	23CTL673265 - 2
Aluminium profile with etch passivation (Bonderite M-NT 2040) and chrome III-based conversion (Bonderite M-NT 5923) pretreatment coated with Vondom powder coating Interpon D2525 YD365L	23CTL673265 - 3
Aluminium profile with etch passivation (Bonderite M-NT 2040) and chrome III-based conversion (Bonderite M-NT 5923) pretreatment coated with Vondom powder coating Interpon D2525 YD365L	23CTL673265 - 4

- **Sampled by:** not sampled by PTC Testing Lab but directly supplied by customer. The laboratory will test the samples as received by the customer.
- **Date of sample receipt:** 04/04/2023
- **Date of request approval:** 06/04/2023
- **Date of testing activity start:** 07/04/2023
- **Date of testing activity end:** 19/05/2023

The measurement uncertainties stated in this document, if indicated, are expressed as expanded uncertainty obtained by the coverage factor $k=2$ which gives a level of confidence of approximately 95%

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All results are referred only to samples tested, as delivered by the customer and only at the conditions agreed between customers and laboratory. Unless otherwise indicated, all the testing activities are performed at the above-mentioned laboratory facility. The laboratory is responsible for all the information provided in the report, except for those provided by the customer. The sample description in the report is provided by customer. If samples to be tested deviate from specified conditions of standards/specifications, the laboratory does not assume responsibility on the results affected by deviations. Unless otherwise required by standards and technical specifications or agreed with the customer, any declarations of conformity by laboratory are based on the comparison between results and reference values, taking into account the confidence intervals of the measures. The testing report shall not be reproduced except in full without the prior written permission of laboratory. Any alteration of the testing report for advertising or for any kind of promotion is not allowed.

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Testing activity performed

	Testing name	Testing method
1	Appearance after acetic salt spray test (AASS)	ISO 9227:2022 (exc. ch. 5.2.4, C.1, C.2 and C.3)
2	Quantity and dimension of defects after acetic salt spray test (AASS)	ISO 9227:2022 (exc. ch. 5.2.4, C.1, C.2 and C.3) + ISO 4628-2:2016
3	Quantity and dimension of defects after acetic salt spray test (AASS)	ISO 9227:2022 + Qualicoat Specification 2023_V01 Par 2.10

Results

The acetic acid salt spray test was carried out according to the customer and the experimental conditions are displayed in the table below:

Standard method	ISO 9227:2022
Cabinet model and manufacturer	Ascott S1000is
Type and purity of water used	Deionized water with a conductivity <20 µS/cm (at 25 °C)
Type and purity of acid used	Acetic acid with purity ≥99,7%
Type and purity of salt used	Coussinet sodium chloride with purity ≥99,9%
Salt concentration in the collected solution (g/L)	50 ± 5
Average collection rate (mL/h)	1,5 ± 0,5
Collected solution pH at 25°C	3,1 ÷ 3,3
Chamber temperature (°C)	35 ± 2
Any possible cleaning of samples before the test	No
Edges protection	Yes, with beeswax
Scribing Tool	Elcometer 1538 (1,0mm wide blade)
Scribe type	Single line: vertical
Tested area where the scribe was done	In the middle of one side
Inclination grade of the tested side (from the vertical)	15° ÷ 25°
Total test duration (hours)	1008
Tool for the measure of the infiltration	Callipers Storm (CTL_S-0017)
Note (chamber changing, deviation, anomalies, ...)	Due to the size of the specimens (smaller than 150x100mm) the laboratory cannot guarantee the traceability of the results to the test methods

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Further information about coupon mass loss, test equipment, sample preparation and solution are registered and available on customer's request.

At the end of the test, without any conditioning the sample was evaluated according to the following procedure:

- rinse with tap water
- gentle drying of the sample surface with absorbent paper
- visual evaluation of the appearance after test according to ISO 9227:2022
- blistering evaluation according to ISO 4628-2:2016. The blistering caused by infiltration from edges and along the scribe was not take into account.
- measure the maximum infiltration from the scribe according to Qualicoat (2023-V01) specification with callipers
- measure the infiltration area (mm²) from the scribe according to Qualicoat (2023-V01) specification assigning 1mm² at one single blister

The blistering evaluation has been carried out according to the following tables:

Table 1 — Rating scheme for designating the quantity of defects

Rating	Quantity of defect
0	none, i.e. no detectable defects
1	very few, i.e. small, barely significant number of defects
2	few, i.e. small but significant number of defects
3	moderate number of defects
4	considerable number of defects
5	dense pattern of defects

Table 2 — Rating scheme for designating the size of defects

Rating	Size of defect ^a
0	not visible under ×10 magnification
1	only visible under magnification up to ×10
2	just visible with normal corrected vision (up to 0,2 mm) ^b
3	clearly visible with normal corrected vision (larger than 0,2 mm up to 0,5 mm)
4	larger than 0,5 mm up to 5 mm
5	larger than 5 mm
^a Unless otherwise specified in subsequent parts of ISO 4628.	
^b Typically, defects larger than 0,2 mm are visible with normal corrected vision.	

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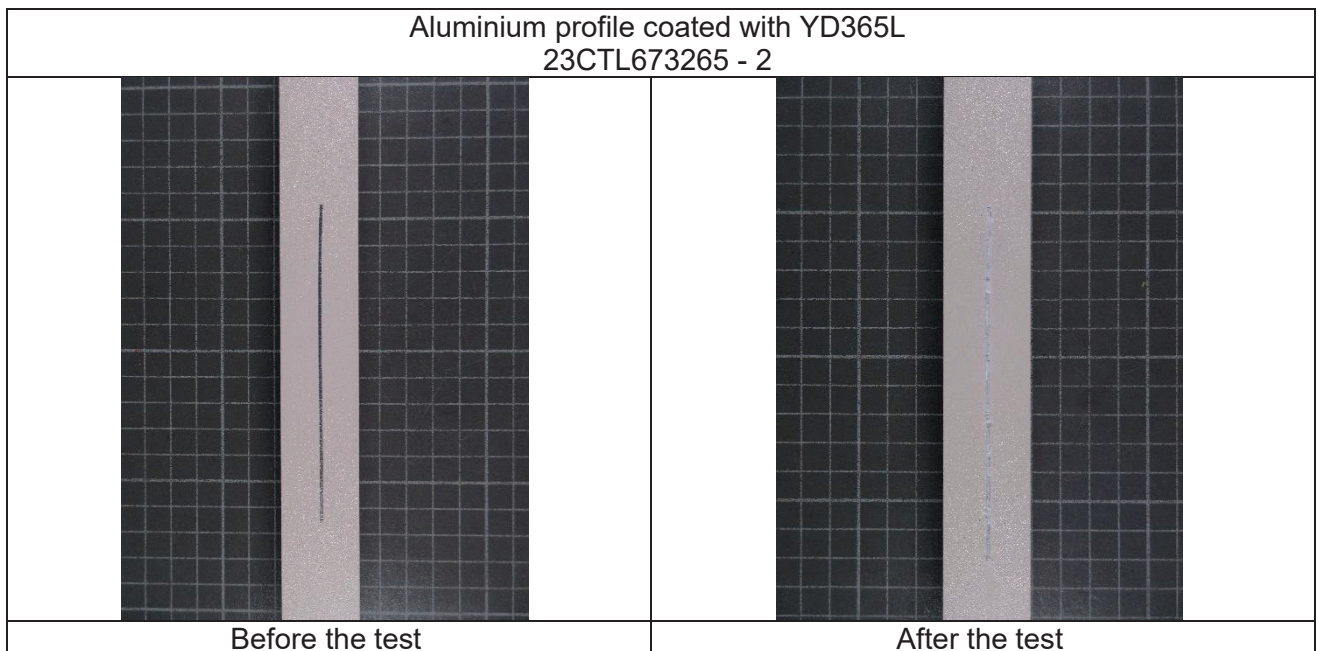
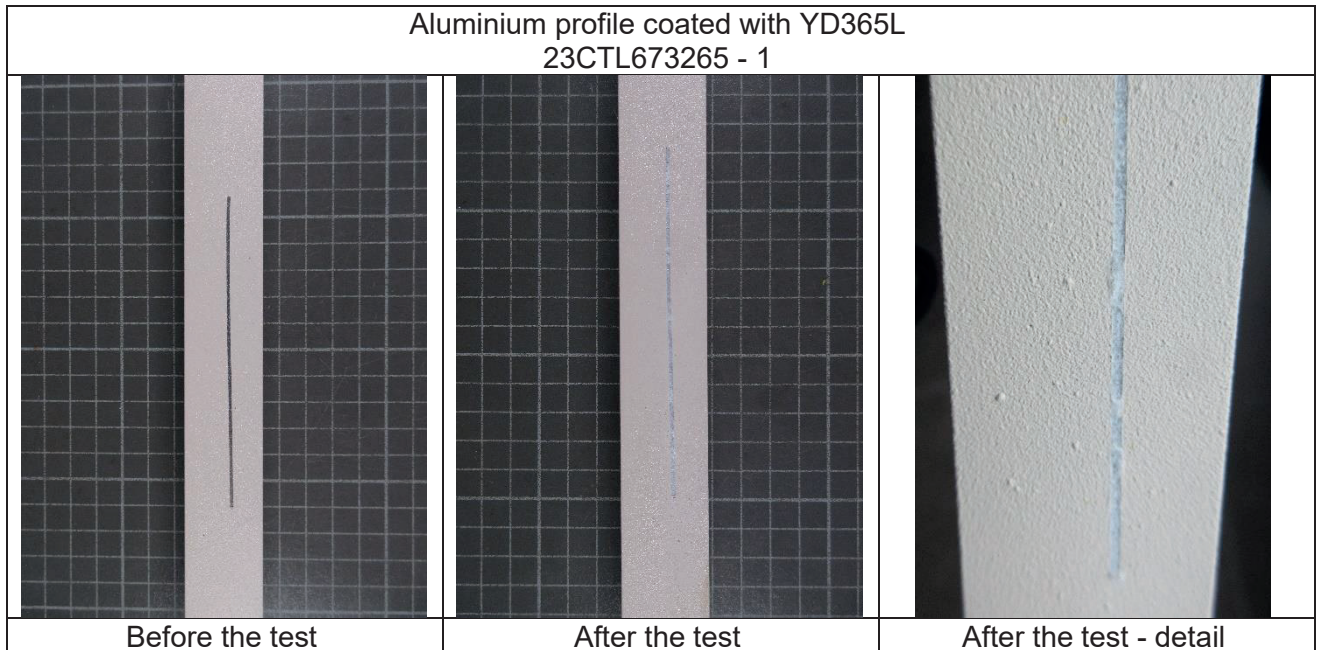
		Check (hours)			
		1008			
Internal code	Description	Appearance after test	Blistering ISO 4628-2	Max infiltration from the scribe (mm)	Area of infiltration (mm ²) normalized to 10 cm
23CTL673265 - 1	Aluminium profile coated with YD365L	Blistering on the surface and white oxidation along the scribe	2(S2)	0,0	0
23CTL673265 - 2	Aluminium profile coated with YD365L	Blistering and white oxidation along the scribe	0(S0)	1,0	1
23CTL673265 - 3	Aluminium profile coated with YD365L	No blistering but white oxidation along the scribe	0(S0)	0,0	0
23CTL673265 - 4	Aluminium profile coated with YD365L	Blistering and white oxidation along the scribe	0(S0)	1,5	3

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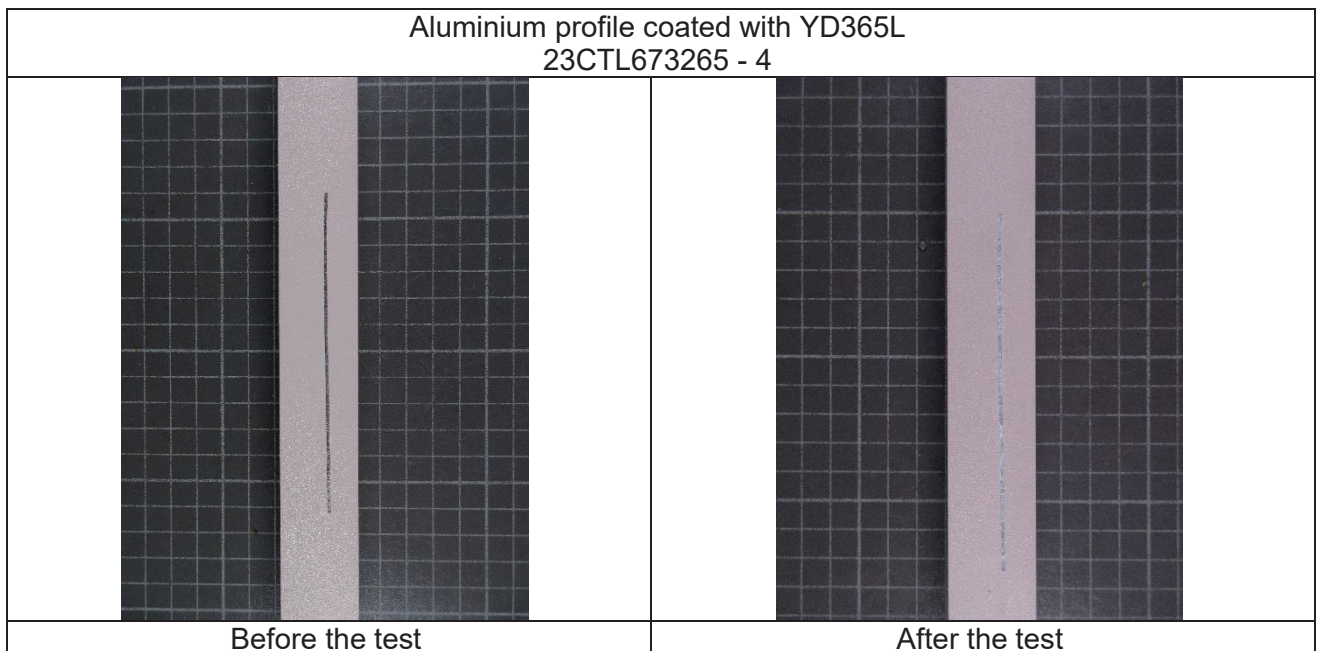
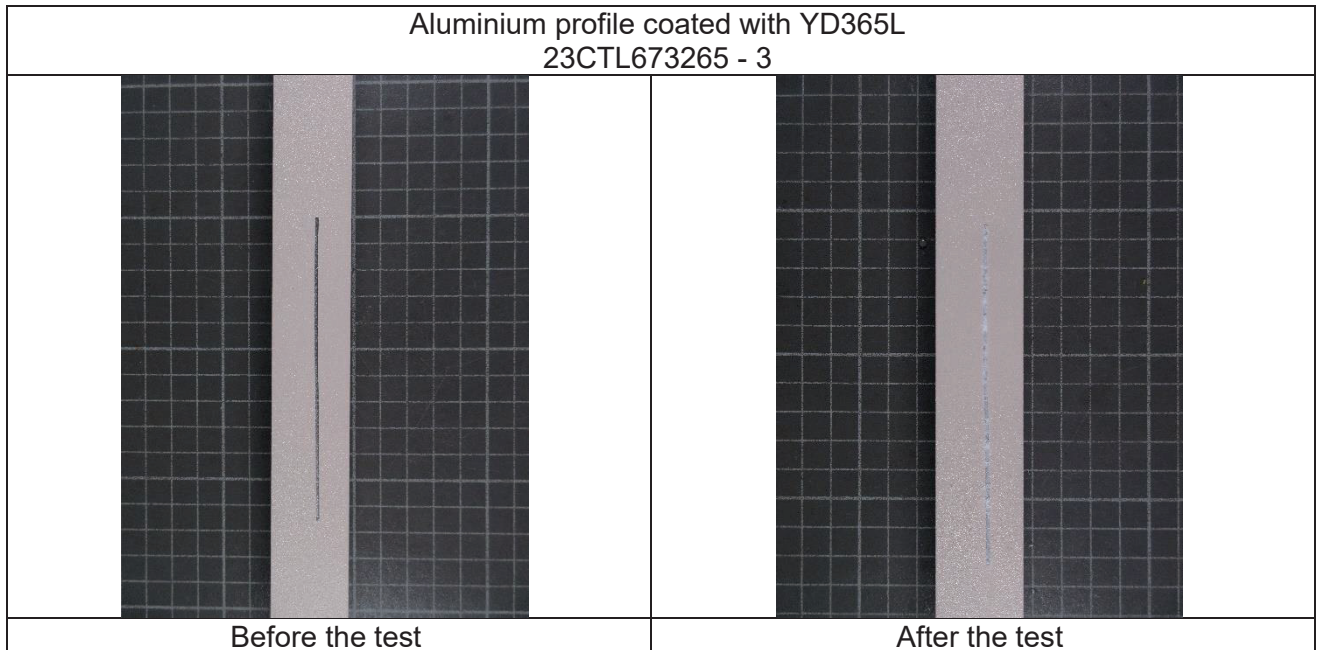
Pictures after 1008 hours of AASS



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Summary

At the end of the test, all the samples showed white oxidation along the scribe. Two of four were affected by infiltration along the scribe with average value of 1,2mm as maximum and 2mm² as area.

Only one sample showed blistering on the surface with a rating of 2(S2).

Total estimated value for testing activity:

The tested samples will be kept by "PTC Testing Laboratory" for 6 months from the testing report issue date, unless otherwise agreed with the customer. After this period, samples might be disposed. If interested, please contact the laboratory for the delivery of the tested samples.

Approved by:

Silvia
Trimboli

Digitally signed by Silvia Trimboli
DN: cn=Silvia Trimboli, c=NL,
Date: 2023.05.23 12:14:10 +02'00'

Silvia Trimboli - PTC Testing
Laboratory Deputy Manager

SALT SPRAY CHAMBER CORROSION REPORT

LLOVE S.L.	TEST DATA	Test No.: 3.16 Date: 18.01.16
Client: VONDOM, S.L.U. Specification: UNE EN ISO 9227	Type of coating: Various (see type of parts) Requested demand: 240h without signs of corrosion (Resistance Grade 4 according to UNE EN 1670:2007). It is advisable to point out discolorations as well as changes in visual appearance.	
Start date: 18.01.16 End date: 28.01.16		
Type of parts: (according to data provided by the customer): • 12 pieces of zinc-plated iron (10 zinc-plated + 2 with some parts protected with plastic). • 1 piece of aluminum (two different pieces coupled by means of thread) • 4 pieces of brass • 3 pcs. stainless steel (INOX quality not specified)		
Thermal shock: NO		

For a better evaluation of the results, they will be grouped according to the type of part:

- A) ZINC-PLATED PARTS
- B) ALUMINUM PARTS
- C) BRASS PARTS
- D) STAINLESS PARTS

TEST PARAMETERS

The test is based on the UNE EN ISO 9227 specification. In which the sample pieces are introduced in a controlled saline environment chamber, being the concentration of the solution used 50g/l of NaCl and a pH of 6.5- 7.2.

The temperature of the chamber will be 35°C and the volume of salt mist collected in the 10cm diameter collectors will be 1.0-2.0 cc/h.

After the exposure time in the assay, the samples are washed with water at room temperature.

Manufacture of the saline solution used: No. 15.025

Control of the parameters during the test:

Date and time	Volume collected (1.0 - 2.0cc/h)	pH (6.5 - 7.2)	Concentration (5±0.5%)
18.01.16	1.6 cc/h	6,8	5,01%
25.01.16	1.7 cc/h	6,8	5,01%

REVIEW BY: J.M. Glanadell

REVIEWED BY: Sonia Vera

RESULTS OBTAINED IN THE TEST

GROUP A: ZINC PLATED PARTS (12 UNITS)

For each observation indicate the number of pieces affected. The sum of each column must correspond to the total number of pieces in the test.

- A. No corrosion
- B. Appearance of white corrosion
- C. White corrosion on more than 5% of the surface.
- D. Appearance of red corrosion

	24	48	72	96	120	144	168	192	216	240	264	288	312	336	360	384	408	432
A	12																	
B		2																
C		7	4	1	1	1	1	1										
D		3	8	11	11	11	11	11	12	12								



240h in C.N.S.

GROUP B : ALUMINUM PARTS (1 UNIT)

For each observation indicate the number of pieces affected. The sum of each column should correspond to the total number of pieces in the test.

- A. No corrosion
- B. Appearance of white corrosion
- C. White corrosion on more than 5% of the surface.
- D. Appearance of red corrosion

	24	48	72	96	120	144	168	192	216	240	264	288	312	336	360	384	408	432
A	1	1																
B																		
C																		
D			1	1	1	1	1	1	1	1								



72h in C.N.S.

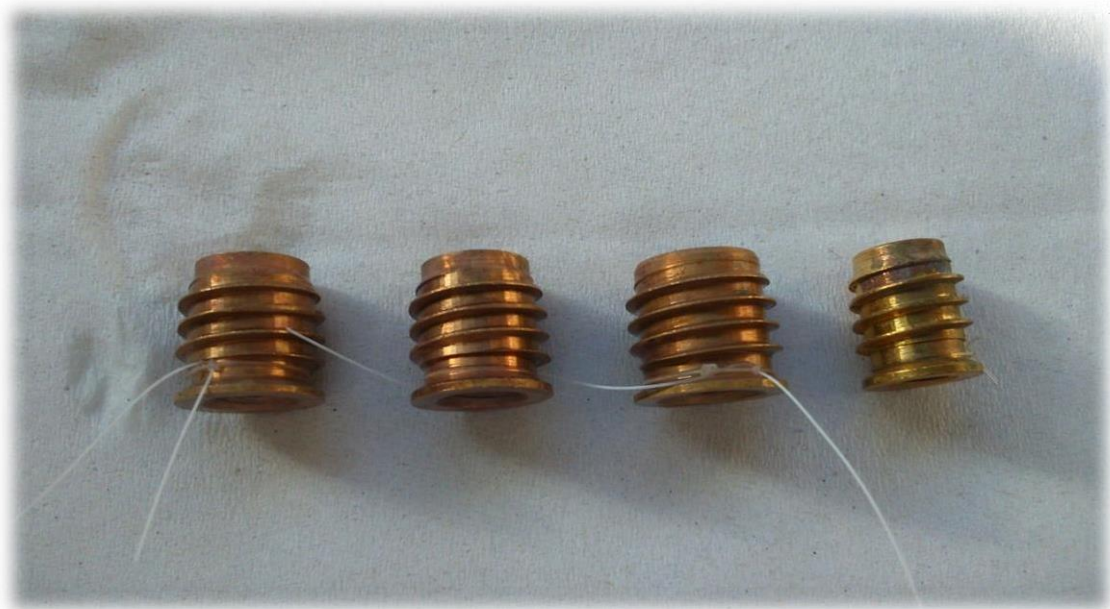
GROUP C : BRASS PARTS (4 UNITS)

For each observation indicate the number of pieces affected. The sum of each column should correspond to the total number of pieces in the test.

- A. No corrosion
- B. Appearance of white corrosion
- C. White corrosion on more than 5% of the surface.
- D. Appearance of red corrosion

	24	48	72	96	120	144	168	192	216	240	264	288	312	336	360	384	408	432
A	4	4	4	4	4	4	4	4	4	4								
B																		
C																		
D																		

NOTE: with the passage of time only a discoloration of the metal is visible.



240h in C.N.S

GROUP D : STAINLESS STEEL PARTS (3 UNITS)

For each observation indicate the number of pieces affected. The sum of each column should correspond to the total number of pieces in the test.

- A. No corrosion
- B. Appearance of white corrosion
- C. White corrosion on more than 5% of the surface.
- D. Appearance of red corrosion

	24	48	72	96	120	144	168	192	216	240	264	288	312	336	360	384	408	432
A	3	2	2	2	2	2	2	2	2	2								
B																		
C																		
D		1	1	1	1	1	1	1	1	1								



240h in C.N.S

TEST CONCLUSIONS

- Zinc plated parts have the worst corrosion resistance. They are probably zinc-plated and passivated parts with finishes that have good decorative properties, brightness and tone, but provide little resistance to corrosion. In this sense, it has caught our attention that one of the pieces (the one located at the bottom right according to the photo) has a higher resistance than the rest of its group, probably because it has been treated with a different product. It should be noted that there are other types of zinc finishes on the market (high-strength passivated and/or sealed) that can provide much greater corrosion resistance.
- The aluminum part: shows oxidation at 72h and also black colorations.
- The brass parts withstand visually well the 240h of test. However, during the test they are slightly tinged and at the end of the 240h, once dry, they show some green oxidation stains.
- Two of the three stainless steel parts withstand 240h without oxidation. In one of them there are rust spots, but these are localized areas, there are no generalized areas of corrosion on the entire surface of the piece, probably produced by iron contamination at the time of machining.

**REPORT OF TEST MADE BY THE AIDIMA LABORATORY. S.C..**

Company: VONDOM, S.L.U.
Address: AVENIDA DE VALENCIA 3
Town: 46891 PALOMAR (VALENCIA)
C.I.F.: B-98.195.746

Product: METALLIC STRUCTURE.
Stainless steel ring of 250 mm diameter , 74 mm height
and 1,8 mm of nominal thickness.

Samples provided by the client corresponding to initial tests for
obtaining the AIDIMA's Quality Symbol (S.C.)

Reception date: 20/05/2010
Starting/finishing test date 7/06/2012 – 28/06/2013

ELEMENT	TEST METHOD	RESULT
Corrosion resistance (*)	(REQUIREMENTS)	
ESTRUCTURA DE ACERO INOXIDABLE	EN ISO 9227:2007 UNE 56 843 :2001	Appearance of isolated stains. Without corrosion of the metallic support CORRECT

(*) pH of the dissolution $7,0 \pm 0,2$. Exposure time 500 hours

CONCLUSIONS:

The sample fulfills the characteristics contemplated in the internal procedures of AIDIMA for the concession of the S.C (Quality Symbol) for PUBLIC OUSTIDE USE (according UNE 56843:2001: Test exposure 500 hours)

Date: 08TH July 2010

Signed: Jose Molla Landete
Department of Materials of AIDIMA

The result of this report only refer to the tested sample.

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