



Product Data Sheet

ClimaCORR® CC 3500-FL (+80°C)

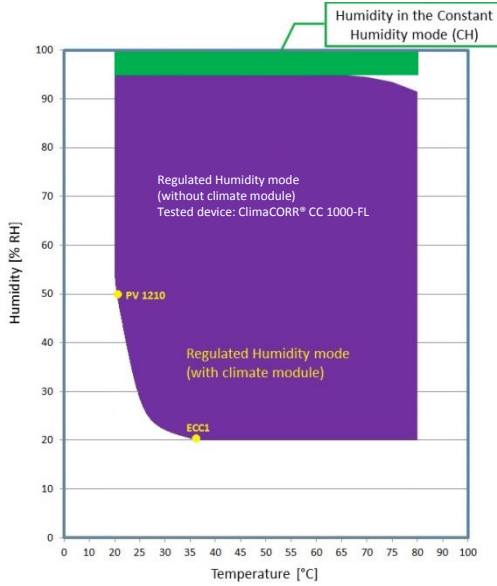


Figure 1 Operating range (regulated humidity vs temperature)

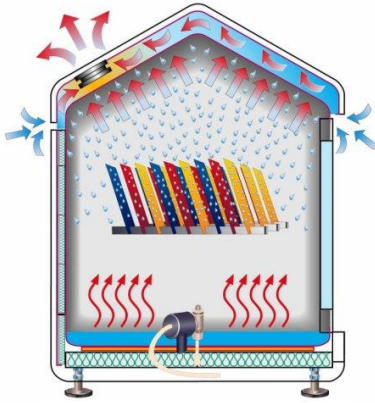


Figure 2 Patented Controlled Water Condensation (CWC) system

Applicable Corporate Cyclic Climate Tests

- + DIN EN ISO 11997-1:2006 Cycle B (previously VDA 621-415)
- + VW PV 1210 (external climate module required)
- + Nissan CCT1
- + Renault ECC1 (external climate module required)
- + Volvo STD 423_0014
- + GM GMW 3172
- + IEC-60068-2-52

Product Description

Compact front loading model of the test chamber developed for the automated conduction of advanced cyclic corrosion tests pursuant to the most of the corporate standards of the international automotive industry i.e. DIN EN ISO 11997-1:2006 Cycle B (previously VDA 621-415), VW PV 1210, Nissan CCT1, Renault ECC1 as well as the standard Salt Spray test acc. to ISO 9227 and High Humidity 6270-2.

Customer Benefits

- + Operating temperature range from ambient up to +80°C is a unique specification among the corrosion test chambers currently available on the market
- + Advanced steel design of the chamber allows for fast temperature and humidity transient times making this test chamber perfectly suitable for accelerated corrosion tests – these result in time and energy savings during the operational lifetime
- + The patented VLM technology allows the best possible reproducibility of the climate conditions being created in the test chamber regardless the environmental conditions and geographical location – same type of VLM corrosion test chamber will produce same test results in any location in the world. In total 9 different sensors are monitoring all relevant test parameters being temperature, humidity, air flow during the drying phase and the purity of the demineralized water
- + The test chamber made of steel is more robust compared to the competitive products made of glass reinforced plastic
- + Lower cost of ownership compared to the competitive products where the test chamber is made of glass reinforced plastic (shorter test periods, better energy efficiency, easier for service and maintenance, longer life cycle, more resistive to mechanical damages)
- + User friendly, menu guided and intuitive control system based on a touch screen in which most common standard corrosion tests are already preconfigured

Order Information

Model: ClimaCORR® CC 3500-FL
Article number: V.749.672.430

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Specification subject to changes
Pictures might differ from original



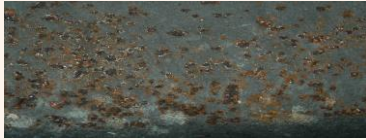
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Relevant Test Standards:

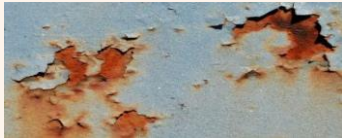
Cyclic Climate Tests:

- DIN EN ISO 11997-1:2006 Cycle B (previously VDA 621-415)
- VW PV 1210 (climate module required)
- Nissan CCT I
- Renault ECC1 (climate module required)
- Volvo STD 423_0014 (option)
- GM GMW 3172 (option)
- IEC-60068-2-52 KB



Salt Spray Test:

- DIN EN ISO 9227
- DIN 50942, DIN 53167
- ASTM B 117-73, ASTM B 287-74
- ASTM B 368-68
- ISO 7253 ISO 3678
- BS 1224, BS 2011, BS3900 F4
- BS 3900 F12
- BS 5466 Part I, BS 5466 Parts 2 + 3
- NFX 41002,
- AS 21331 Section 3.1
- SIS 1841190
- JIS Z 2371



Condensation water test:

- ISO 6270-2
- BS 3900F2, BS 3900 F15
- ASTM D2242

Technical Specifications	
Capacity	ca. 3500 L
Inner test chamber dimensions W/D/H1/H2	ca. 2200 x 1100 x 1306/1640 mm
Outer dimensions of the casing (overall) W/D/H	ca. 3358 x 1283 x 2460 mm
Required power supply	400 V, 50/60 Hz, 10,7 kW, CEE plug 16 A, 5P
Weight	1200 kg
Materials used	test chamber is made of stainless steel and coated with ECTFE (Halar®), additional side walls made of special Polyethylene with milled openings for supporting rods
Heating	Flat Micanite heaters under the bottom of the chamber and behind the side walls for fast and uniform heat transfer
Sensors	- corrosion resistant and highly sensitive temperature sensors above the floor, at the side wall and under the roof - a mobile temperature sensor in the sample zone - humidity sensor
Cooling	Wall rinsing for rapid cooling of the test chamber and quick alteration of the climate conditions
Regulated humidity	Regulation from ambient up to 95% (including humidity ramp function)
Other specification	
Purity demineralized water (connection type)	< 20 µS/cm (fitting ¾" outer diameter)
Tap water (connection type)	Always via Ion-exchanging cartridge (fitting ¾" outer diameter)
Compressed Air	6-8 bar (connection nipple size 7)
Waste water, drain	Pipe fittings (spiral hose ID 32 mm)
Exhaust pipe outer diameter	Pipe fitting (125 mm external diameter)
Test solution tank capacity	A 300 L tank is available which fits in the bench cabinet underneath the test chamber
Recommended accessories	Demineralized water plant, filter for compressed air, pump for mixing test solution, racks for specimen

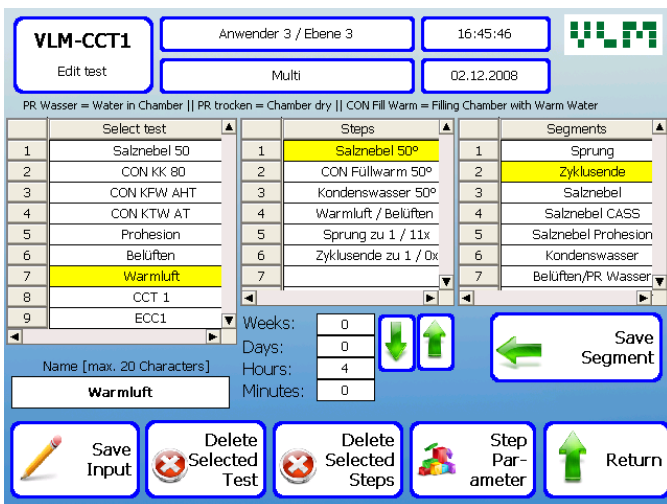
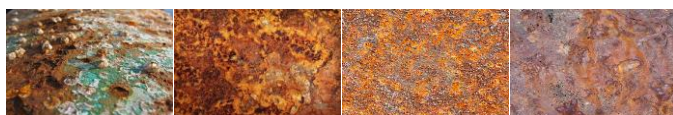


Figure 3 Menu screen with test management functions



- ### Process Control
- ✚ User friendly, menu guided PLC (Beckhoff) controller with touch panel (Windows CE)
 - ✚ Ethernet interface for connecting to local intranet (features remote control and test data transfer)
 - ✚ Restricted access for operators to three different operating levels
 - ✚ Memory storage with the capacity to hold of 50 test programs, most common corrosion tests already preconfigured in the factory, users can easily program own tests
 - ✚ All tests data and relevant test parameters are recorded and can be via Ethernet exported to a PC for further processing (e.g. Microsoft Excel)
 - ✚ The Beckhoff PLC controls remotely the external climate module for the tests which require such module (typically PV 1210 and Renault ECC1)
 - ✚ The Beckhoff PLC controls remotely the powering of test specimen (switch ON and OFF)
 - ✚ Alarm table and history log
 - ✚ Full overview of all digital and analog inputs / outputs



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Accessories included:

- ✚ 7 rods for supporting test specimen
- ✚ 2 m exhaust hose Ø 125 mm
- ✚ 2 m drain water hose Ø 32 mm
- ✚ 1 female connector for compressed air hose (size no. 7)
- ✚ 1 bag sodium chloride special quality for corrosion testing, accurate weight 5000g
- ✚ 1 set of measuring cylinders for measuring the fall out rate
- ✚ 1 spare filter for the test solution in the reservoir



Operating System Salt Spray (according to ISO 9227)

- ✚ Electronically controlled diaphragm pump for accurate flow control of the test solution with automatic monitoring of the presence of the air in the pump system
- ✚ Adjustable high performance acrylic spray nozzle for an optimal generation and distribution of the salt fog
- ✚ **Option (standard for all ClimaCORR® types):** Second nozzle for spraying/washing of the test chamber with demineralized water after the salt spray test is finished
- ✚ Transparent humidifier made of heat resistant Borosilicate glass with a replaceable PE air filter for creating fine air bubbles in order to fully saturate the compressed air with humidity
- ✚ Automatic refilling of the test chamber for maintaining the constant water level in the trough
- ✚ Safety air pressure valve on the humidifier
- ✚ Over temperature protection of the humidifier
- ✚ Air purge function for rapid evacuation of the salt fog out of the chamber (after a salt spray test is finished) and prior to opening the door
- ✚ **Accessories:** 210 L PE storage reservoir for salt solution, level indicator is an option
- ✚ **Option:** Operating system Direct Spraying of the Test Solution for spraying of the test solution on specimens without mixing with compressed air.
- ✚ **Option:** Operating system Volvo STD 423_0014 test
- ✚ **Option:** Operating system GM GMW 3172 test

Operating system Regulated Humidity

- ✚ The humidity in the test chamber at temperatures below 50°C is achieved by injecting the compressed air saturated with humidity into the test chamber through the spray nozzle
- ✚ The humidity in the test chamber at temperatures above 50°C is achieved with the special steam generator (patent pending) capable of injecting controllable quantities of steam into the test chamber
- ✚ Humidity is monitored by a high performance humidity sensor which is pneumatically inserted into the test chamber only when the operating system Controlled Humidity is active
- ✚ Operating range for controlled humidity (see Figure 1): from environmental up to 98% RH at 35°C
- ✚ Accuracy of the humidity regulation is $\pm 3\%$ over the full control range and $\pm 1\%$ in the high humidity control range ($\pm 90\%$ RH)
- ✚ For humidity below environmental (typically $< 50\%$ RH) an external climate module is required (e.g. to achieve 20% RH at 35°C as specified by ECC1 test)

Operating system High Humidity with Controlled Water Condensation - CWC (according to ISO 6270-2 CH)

- ✚ CWC system (Figure 2) is the patented VLM technology which regulates the temperature gradient of exactly $\Delta T = 1^\circ\text{C}$ between the bottom and the roof of the test chamber – this is essential for an optimal condensation process in the test chamber at 100% RH regardless the environmental conditions outside the test chamber
- ✚ Flat heaters under the bottom of the chamber and behind side walls allow for uniform and rapid heating of the chamber
- ✚ Temperature stability in the chamber $\pm 0,5^\circ\text{C}$
- ✚ Air fan with adjustable rotation speed for controllable drying of specimen in the Drying Phase; all ClimaCORR® types feature an extra air flow sensor which feeds the information about the air flow through the chamber back to the PLC controller which regulates the fan rotation speed according to common standard corrosion tests are already preconfigured

Operating system Forced Air Drying / Aeration

- ✚ Warm air up to $+80^\circ\text{C}$ for forced air drying phase
- ✚ Adjustable air distribution system for uniform drying of the test specimens
- ✚ Fan with controllable rotation speed and sensor for air flow (sensor standard only for ClimaCORR® types) for automatic regulation of the air flow
- ✚ Temperature control range: from ambient up to $+80^\circ\text{C}$ (accuracy $\pm 1^\circ\text{C}$)
- ✚ Transition time from Dry 60°C to "Wet" Humidity $50^\circ\text{C} > 95\%$ (not condensing humidity) within 15 min
- ✚ Transition time from Wet 50°C to Spray 35°C within 20 min
- ✚ Transition time from Spray 35°C to Dry 60°C within 20 min
- ✚ **Option:** Air conditioning module to provide standard climate acc. to DIN 50014: ambient air at $23^\circ\text{C} \pm 2^\circ\text{C}$ and $50\% \pm 5\%$ RH
- ✚ **Option:** Air conditioning module to provide standard climate for conducting Renault ECC1 Test ($30^\circ\text{C} \pm 2^\circ\text{C}$ and $20\% \pm 5\%$ RH)



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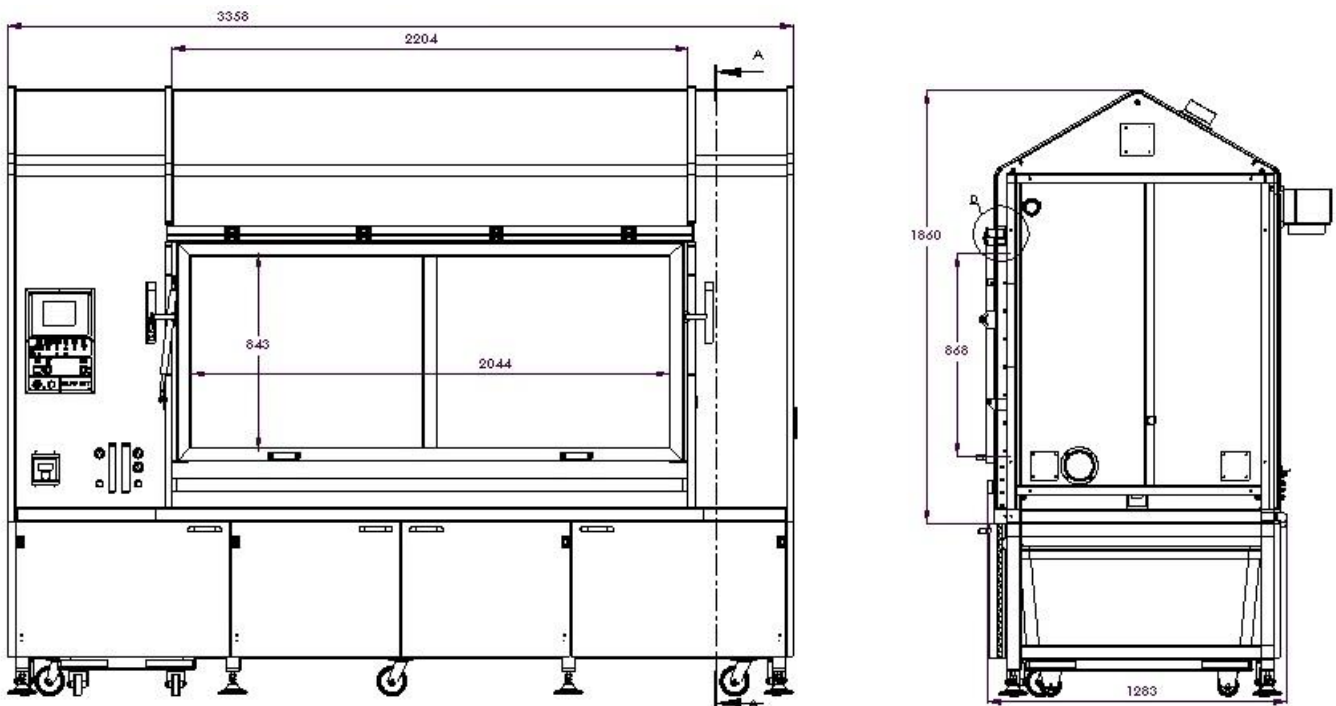


Figure 4 Mechanical dimensions ClimaCORR® CC 3500-FL

Notes: