



# Product Data Sheet

**ClimaCORR® CC 1000-TL FR 20/60 (-20°C...+60°C)**

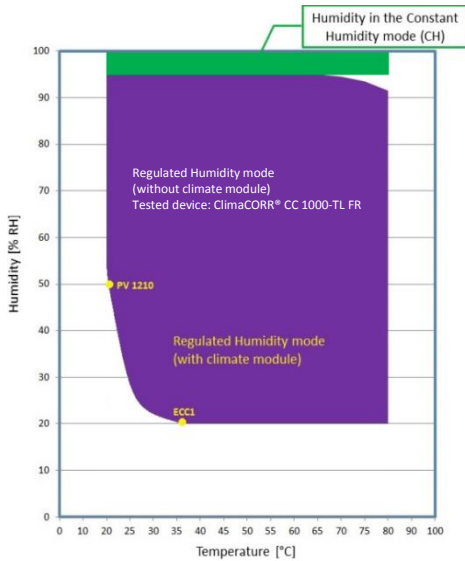


Figure 1 Operating range (regulated humidity vs temperature)

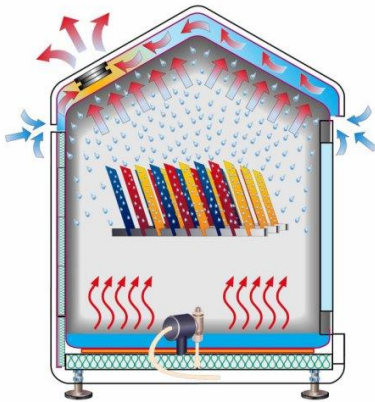


Figure 2 Patented Controlled Water Condensation (CWC) system



## Product Description

Compact, top loading test chest developed for the fully automated conduction of advanced cyclic corrosion tests pursuant to the most of the corporate standards in the international automotive industry such as:

- VDA 233-102 "New"
- Porsche PPV 4017
- Daimler KWT –DC PA PP PWT 3101
- 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)
- GMW 14872
- IEC 60068-2-52

This test chest is also suitable for conducting basic corrosion tests such as Salt Spray and Water Condensation tests.

## Order Information

### Model:

**ClimaCORR® CC 1000-TL FR 20/60**

Article number:

- V.785.072.570 (-20°C <T<+60°C)

### Sales & Support:

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Specification subject to changes  
Pictures might differ from original

## Customer Benefits

- Climatic test chamber (operating temperature range -20°C up to +60°C) combined with a fully featured corrosion test chamber in a single device
- Advanced steel design of the chamber (with ECTFE coating) allows for short temperature and humidity transient times making this test chamber perfectly suitable for accelerated corrosion tests – this results 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 at all geographical locations. 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 and less susceptible for damages 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



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## Relevant Test Standards:

### Cyclic Corrosion Tests:

- VDA 233-102 "New", DIN EN ISO 11997-1:2006 Cycle B (VDA 621-415)
- VW PV 1210 (climate module required)
- Nissan CCT I
- Renault ECC1 (climate module required)
- Porsche PPV 4017
- Daimler KWT-DC PA PP PWT 3101
- GMW 14872
- SAE J2334
- IEC 60068-2-52
- JASO M610-92

### Salt Spray Test:

- DIN EN ISO 9227:2012 NSS, ESS, CASS
- DIN 50942, DIN 53167
- ASTM B 117-73, ASTM B 368-68
- IEC 60068-2-11
- 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

### Water Condensation Tests:

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

## Technical Specifications

|                                                   |                                                                                                                                                                                                                                                                                                                 |
|---------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Capacity                                          | ca. 1076 L                                                                                                                                                                                                                                                                                                      |
| Inner test chamber dimensions WxDxH1/H2           | ca. 1400 x 800 x 790 / 1060 mm                                                                                                                                                                                                                                                                                  |
| Outer dimensions of the casing (overall) WxDxH    | ca. 3000 x 1100 x 1500 mm                                                                                                                                                                                                                                                                                       |
| Required power supply                             | 400V, 50Hz, 5200W                                                                                                                                                                                                                                                                                               |
| 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 rear wall for fast and uniform heat transfer                                                                                                                                                                                               |
| Stability regulation                              | ± 1% humidity, ±0,5°C temperature                                                                                                                                                                                                                                                                               |
| Sensors                                           | <ul style="list-style-type: none"><li>- corrosion resistant and highly sensitive temperature sensors above the floor, at the side wall and under the roof</li><li>- a mobile temperature sensor in the sample zone, which is relevant as reference sensor for temperature control of the testing room</li></ul> |
| Cooling                                           | Wall rinsing for rapid cooling of the test chamber and quick alteration of the climate conditions                                                                                                                                                                                                               |
| Operating temperature                             | -20°C up to +60°C                                                                                                                                                                                                                                                                                               |
| <b>Other specification</b>                        |                                                                                                                                                                                                                                                                                                                 |
| Purity demineralized water (connection type)      | < 5 µS/cm (¾" outer diameter)                                                                                                                                                                                                                                                                                   |
| Tap water (connection type)                       | ¾" outer diameter (demineralized water required)                                                                                                                                                                                                                                                                |
| Compressed Air                                    | 6-8 bar (connection nipple size 5)                                                                                                                                                                                                                                                                              |
| Waste water, drain                                | Pipe fittings (spiral hose ID 32 mm)                                                                                                                                                                                                                                                                            |
| Exhaust pipe outer diameter                       | Pipe fitting (75 mm external diameter)                                                                                                                                                                                                                                                                          |
| Intermediate reservoir for test solution (option) | Internal reservoir 10 L with automatic replenishment from a central supply of demineralized water                                                                                                                                                                                                               |
| Accessory                                         | Drain water pump in case the drain opening in the laboratory is on the higher level than the drain of the test chamber                                                                                                                                                                                          |

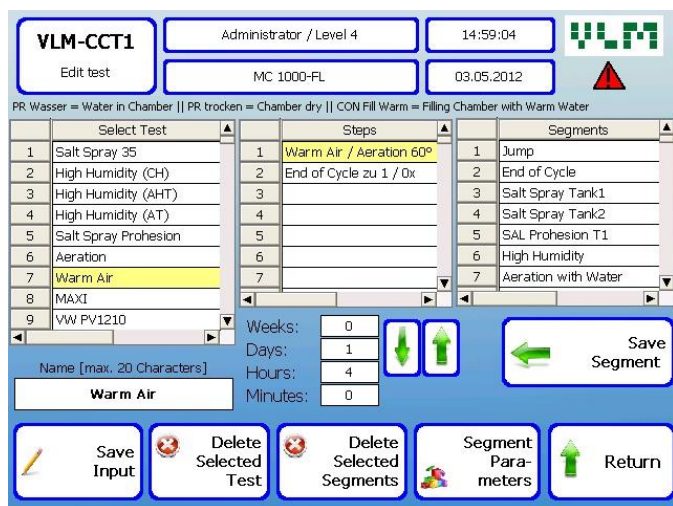


Figure 3 Test management menu



## 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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## The following accessories are included:

- 7 rods for supporting test specimen
- 2 m exhaust hose Ø 75 mm
- 2 m drain water hose Ø 32 mm
- 1 female connector for compressed air hose (size no. 5)
- 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; this nozzle is fixed on the movable cylinder which is extended into the test chamber during the salt spray test and is extracted from the chamber during the cooling phase and sub-zero temperatures
- 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
- 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 hood
- **Accessories:** 210 L PE storage reservoir for salt solution, level indicator is an option
- **Option:** Operating system for Volvo spraying (according to ACT 1 and ACT 2)
- **Option:** Operating system for Direct Spraying of the Test Solution for spraying of the test solution on specimens without mixing with compressed air.

## Operating system Controlled 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 (patented technology) 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 that regulates the temperature gradient between the bottom and the roof of the test chamber of exactly  $\Delta T = 1^\circ\text{C}$  – 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 water in the trough
- Temperature stability in the chamber  $\pm 0,5^\circ\text{C}$
- Automatic refilling of the test chamber for maintaining the constant water level in the trough
- 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  $+60^\circ\text{C}$  for forced air drying phase
- Adjustable air distribution system for uniform drying of the test specimens
- Fan with controllable rotation speed and sensor for measuring the air flow (sensor standard only for ClimaCORR® types) for automatic regulation of the air flow
- Temperature control range: from  $-20^\circ\text{C}$  up to  $+60^\circ\text{C}$  (accuracy  $\pm 1^\circ\text{C}$ )
- Transition time for ClimaCORR® FR type: from  $-15^\circ\text{C}$  up to  $35^\circ\text{C}$  within 30 min (empty test chamber)
- Transition time from Dry  $60^\circ\text{C}$  to "Wet" Humidity  $50^\circ\text{C} > 95\%$  (not condensing humidity) within 20 min
- Transition time from Wet  $50^\circ\text{C}$  to Spray  $35^\circ\text{C}$  within 20 min
- **Option:** Air conditioning module to provide the standard climate acc. to DIN 50014 / ISO 554 ( $23^\circ\text{C} \pm 2^\circ\text{C}$  and  $50\% \pm 5\%$  RH)
- **Option:** Air conditioning module to provide the standard climate for conducting Renault ECC1 test ( $35^\circ\text{C} \pm 2^\circ\text{C}$  and  $\leq 20\%$  RH)



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### Option: Volvo and Ford direct spraying system

This option features a direct spraying system according to Volvo VCS 1027-1449 (ACT-II) respectively Ford CETP L-467. This spraying system contains a swaying tube along the axes of the test chamber with spraying nozzles and a dedicated membrane pump for pumping the test solution. A special, adjustable pneumatic system is controlling the swaying motion of the tube.

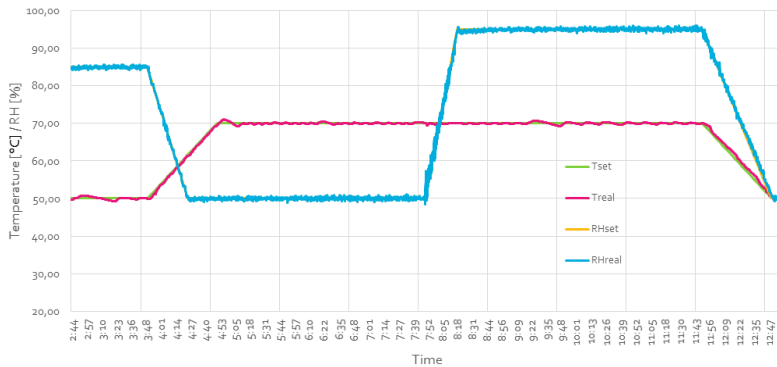


Figure 4 Test results: ClimaCORR® CC 1000-TL FR control of humidity and temperature

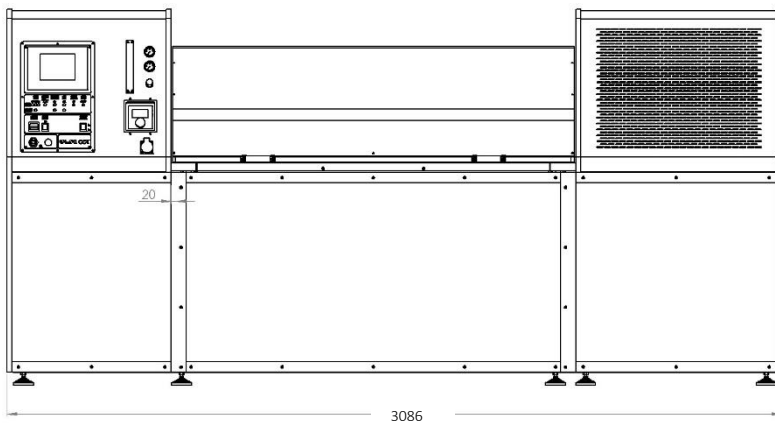


Figure 5 Physical dimensions of CC 1000-TL (-20/60) test chest

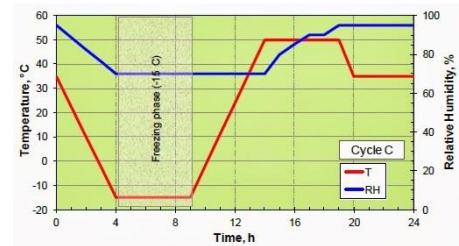
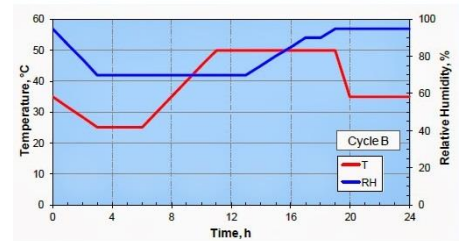
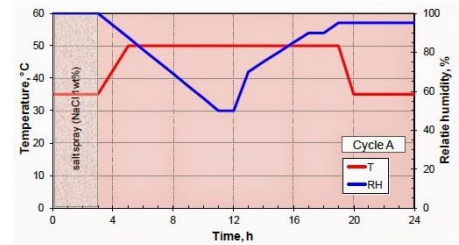


Figure 7 VDA 233-102 test standard



Figure 6 Cooling unit



Figure 8 Interior of the test chamber

### Notes: