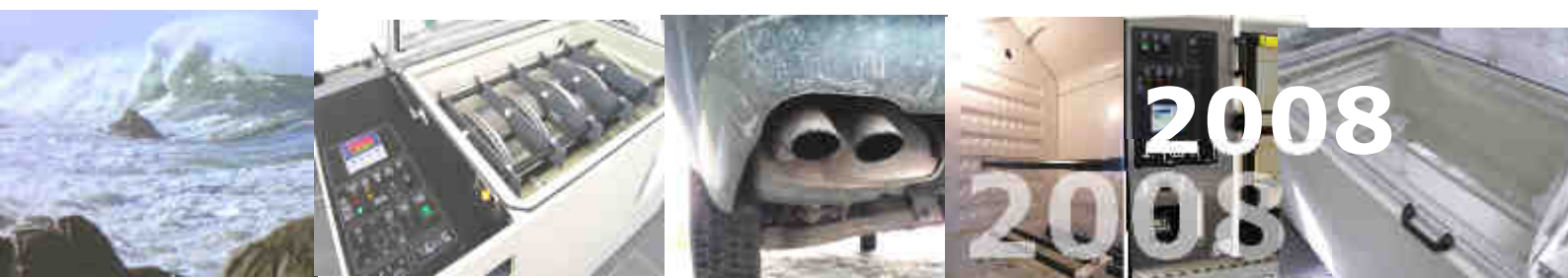


## *SALT SPRAY & Cyclic Corrosion Test Cabinets*



*Bench top cabinets and chest models for  
conducting :*

*Salt Spray Tests  
Combined Salt Spray-/High & Humidity Tests  
Fully automatic Cyclic Corrosion Tests*

### **VLM GmbH**

Advanced Corrosion Test Equipment,  
Laboratory Technology & Services

Fon.: +49 5205 87963-0

Fax: +49 5205 87963-50

E-Mail: [info@vlmgmbh.de](mailto:info@vlmgmbh.de)

Internet: [www.vlm-laborshop.de](http://www.vlm-laborshop.de)

Address: *Heideblümchenweg 50  
Bielefeld-Sennestadt  
D-33689*



VLM GmbH  
Heideblümchenweg 50  
D-33689 Bielefeld

Fon +49 5205 87 963-0  
Fax +49 5205 87 963-50

We have pleasure if you are calling us:

**Hans-Ulrich Vogler,** Fon **+49 5205 87 963-11**  
Managing Director e-mail hu.vogler@vlmgmbh.de  
Sales & marketing

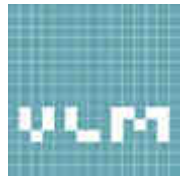
**Claudia Schumacher** Fon **+49 5205 87 963-12**  
Customer management e-mail c.schumacher@vlmgmbh.de

**Gisela Vogler,** Fon **+49 5205 87 963-0**  
Laboratory Supply e-mail gisela.vogler@vlmgmbh.de  
Account Department

**Josef Schubert** Fon **+49 5205 87 963-20**  
Managing Director e-mail j.schubert@vlmgmbh.de  
Production & Technical  
Support

**We are available at any time :**

[www.vlmgmbh.de](http://www.vlmgmbh.de) [www.vlm-laborshop.de](http://www.vlm-laborshop.de)



## Company Concept

*Corrosion-protection is still an important economic factor with increasing importance. World-wide economic cooperation and risen quality awareness set new standards for the reliability and comparability of applied testing methodes.*

*We therefore set ourselves the task to support our customers in research and development as well as in the quality control at their goal, to improve as well as to guarantee the corrosion-protection of their products.*

*We offer a wide program of advanced corrosion test equipment, distinguished of the successfully merge of creativity and long-time experience.*

*We advance innovations with new ideas in order to cover rising requests from new testing methodes, optimally with reliable equipment. In this sense, we strive for a lead position.*

*Our especially skilled staff are one of the important pillars of the company. Their esteemed performance makes us proud and committed us to expect an appropriate prize. They are the guarantee of the high quality standard and reliability of our equipment.*

*We use exclusively high-quality materials and prefabricated parts for our cabinets and integrate our suppliers into our quality-objectives.*

*We attach particular value to the competent advice before the purchase. We want to support our customers to make reliable decisions, thus investment into the picked equipment is worthwhile economically. Also after the purchase, we stay at their disposal and provide competent technical advice.*

*We estimate the dialogue with our customers. The feedback from the application of our appliances contributes decisively to focus the technology of our cabinets and perforances towards the individual needs in the practice. This guarantees a win-win relation between the users and VLM*



## More about VLM



Josef Schubert,  
Managing Director



Hans-Ulrich Vogler,  
Managing Director,  
Gisela Vogler

VLM is an independent company founded 1999, privately owned by Josef Schubert and Hans-Ulrich Vogler. Mr. Schubert is an electric mechanical technician whereas Mr. Vogler is a chemical technician and salesman. Both own long-time experiences in the corrosion testing technology.

The development, manufacturing and sales of advanced corrosion testing equipment is the core business of VLM.

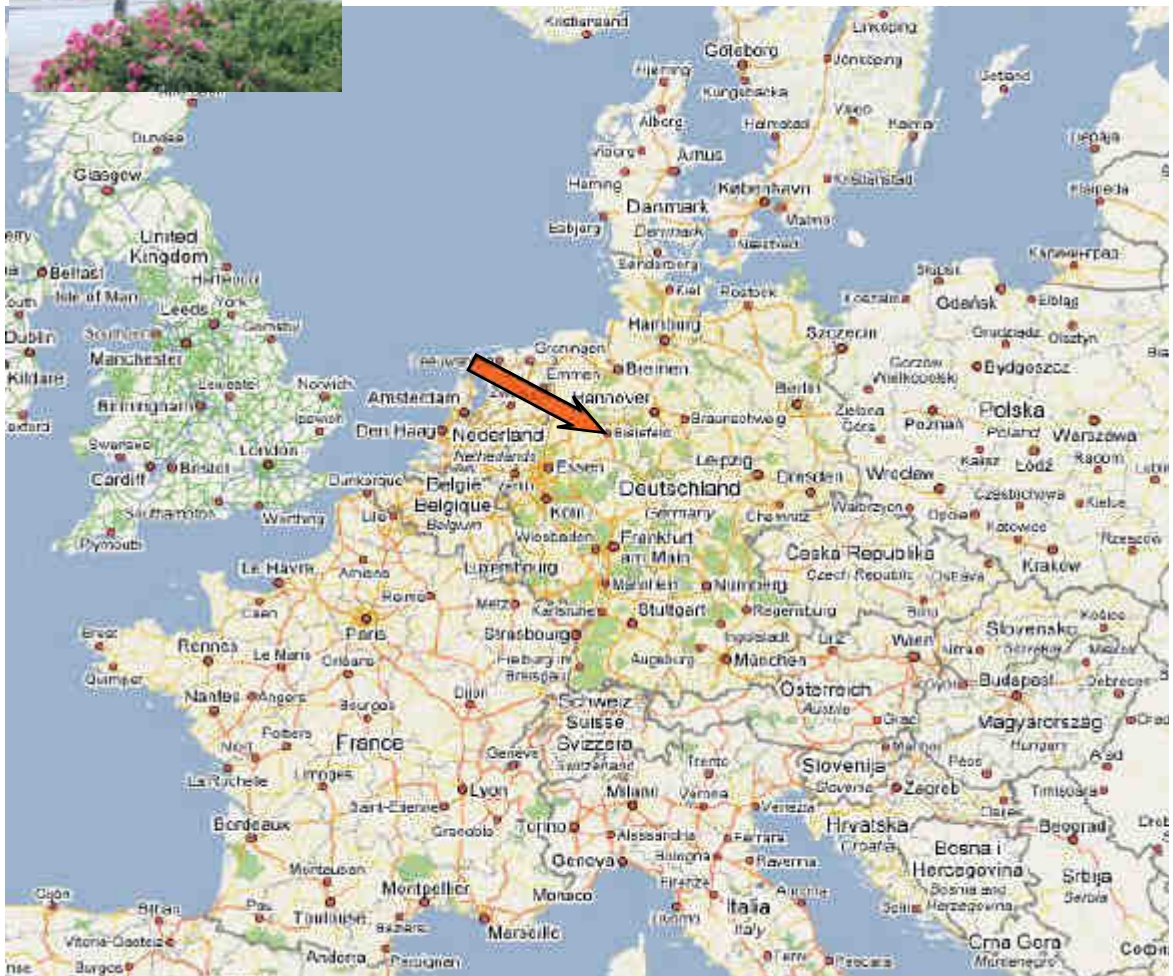
Additionally VLM offers a wide range of measuring gauges and devices for testing of surfaces, paints and materials.

Metablock thermostats and evaporators are also made by VLM. A further unit led by Mrs. Gisela Vogler supplies all kind of laboratories with chemicals, reagents, consumables, laboratory equipment and furniture.

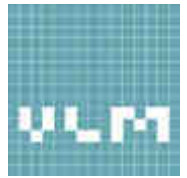
The possibility of purchasing the complete equipment from one source makes VLM unique.



## Where is VLM located ?



VLM moved to the city of Bielefeld in June 2007. Bielefeld has 326.000 inhabitants and is located in the north-west part of Germany between Hannover in the East and Dortmund in the West



## *Innovative Corrosion Testing Technology*

We committed ourselves to the task of contributing substantially to the improvement of the reproducibility of wet chemical corrosion testing procedures resp. short weathering tests. For that purpose we developed an innovative device concept.

The foundations of this concept are mainly:

- to grant a fast and even heat transmission into the testing chamber
- to allow a heat loss to concede for example ideal conditions for a norm - conforming condensation
- to achieve fast and reproducible heating- and cooling rates
- to create a sensitive responding temperature control system with a high temperature constancy

For these reasons our testing chambers and chests are made of stainless steel, which are coated with Halar® (ECTFE) a corrosion resistant fluorine polymer used in chemical technology. The side walls are made of polyethylene in which supports for the specimens holders are milled into.

This unique design meets especially the demands of advanced alternating climate tests issued mainly by the international automotive industry. These modern test procedures require a technology being able to create climate conditions alternating in a short time with a simultaneous consideration of a good reproducibility. At this point, traditionally designed full plastic testing devices often reach their limits.

On the following pages we are presenting you our wide range of bench top cabinets as well as chest models offering you decisive advantages:

- compact designed cabinets, saves space in the laboratory
- high reproducibility of the testing climates
- high degree of reliability on the test results
- ergonomic placing and unloading of specimens
- great weight load of the testing chamber
- easy operation and handling, especially of the fully automatic devices
- high operation safety with monitoring and alarm devices
- service- and userfriendly design, lowers operation expenses
- favourable cost/performance ratio
- wide range of products and accessories "Everything from one source"
- hire purchase and leasing possible
- low priced "second-hand" devices
- competent technical support (also in English)
- environmental friendly construction, high rate of recyclable materials.

What performances do you expect from your new cabinet?

Please tell us your requirements. We would like to give you our best advice. Benefit from our long lasting experiences and flexibility.

We are looking forward to your e-mail or phone call:

+49 5205 87 963-0.



## Salt Spray Test Cabinets "ECONOMY"



VLM salt spray cabinets EC are second to none due to its innovative design of the testing chamber. The chest models are available with a chamber capacity of 600 L or 1000 L for conducting:

- Salt Spray Tests
- ESS, CASS Tests
- Condensed Water Tests
- Cyclic Corrosions Tests

"ECONOMY" means most favourable price / performance ratio, but not second rate equipment. We use only VDE approved components and longlife materials.

The walls of the testing chamber are made of polypropylene (PP) known as especially resistant to aggressive chemicals and quick alternating temperatures. Moreover in contrast with glass fibre reinforced plastic PP is not sensitive against cracks.

The acrylic glass cover supported by gas springs allows the observation of the process or a quick check of the function. A seal made of silicon foam provides tight close which is checked by a sensor. Before opening the cover the chamber should be evacuated so no fog will escape and contaminate the room.

In contrast with standard salt spray chambers the test solution reservoirs are stand alone units and can placed wherever possible. Moreover, they can be easily disconnected for thoroughly cleaning outside the lab. In case of a central test solution supply a 16 L buffer reservoir with refill automatic can be installed.

### Surface heaters for quick and even heat transfer

Most important: The base is made of stainless steel coated with ECTFE, a fluorine polymer. So there is an excellent quick and even transfer of the heat into the testing chamber. This provides best conditions for a very accurate regulating of the chamber temperature. The surface heaters are mounted under the base and can be interchanged very easily in case of faulty. This saves service costs.

### Suitable for conducting High Humidity tests

As the water bath is heated over the whole base VLM salt spray cabinets can also be applied for conducting High Humidity tests with constant climate or upgraded to cycling corrosion test cabinets such as VDA.

### Standard accessories delivered with the cabinet:

- Fall-out collecting and measuring set
- spare testsolution filter
- spare water inlet filter
- 5 - 7 specimen support rods
- 2 m exhaust hose
- 2 m drain hose
- Instruction manual, Wiring Diagram

### Options:

- rotating nozzle for convenient cleaning of the testing chamber
- Intermittend working mode - Prohesion® Test
- System for spraying of salt solution independent from the jet-nozzle

### Salt Spray Test

#### ISO 9227

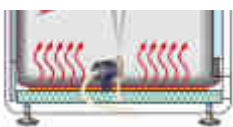
(DIN 50021)  
 ASTM B 117  
 ASTM B 287  
 ASTM 368  
 ASTM D 1735  
 MIL STD 202D  
 MIL STD 810 C  
 ISO 1456  
 ISO 3768  
 ISO 3769  
 ISO 3770  
 ISO 3773  
 BS 3900/F4  
 NF X 41-002  
 JIS Z 2371  
 SIS 184 190  
 ECCA T 8  
 DEF 1053 Meth. 24  
 DEF 1053 Meth. 36  
 Option: Prohesion®

### High Humidity Test

ISO 6270-2  
 ISO 3231  
 ISO 11503  
 ASTM D 2247

### Cycling Corrosion Test

VDA 621-415  
 VW PV 1210  
 as well as further corporate standards of the automotive and coating industry



## Working System SAL (Salt Spray )



Principle of the test procedure:

5 % sodium chloride solution (NaCl) is sprayed by the means of a two component jet nozzle using compressed air saturated with humidity thus there is a fine mist evenly distributed in the testing chamber. The fall out of the fog reacts with the surface material of the specimens and cause corrosion depending on the resistance of the surface.

The standard neutral salt spray test according with the ISO standard 9227 NSS is running at a temperature of 35 °C.

### Adjustable Spray nozzle



The jet nozzle is made of polycarbonate and can be adjusted to achieve an even fall out rate in the testing chamber. It can be shifted if the spraying cone will be interfered by large specimens. A fog leading pipe (duct) is available as an accessory. It can be placed on the right hand side of the chamber if necessary. As there is a permanent even flow rate independently from the air pressure the nozzle can be freely positioned in the testing chamber.

Option: Separate nozzles for spraying of salt solution without compressed air

### Precise electronically controlled Diaphragm Pump



VLM EC salt spray test chest cabinets are furnished with electronically controlled diaphragm pumps thus there is an permanent even and accurate flow rate to the spraying nozzle. The flow rate is indicated on the LCD display at the front side of the cabinet. A further flow meter is not necessary.

Advantage: The flow of the test solution can be adjusted independently from the air pressure and can be monitored electronically (Option) in combination with the PLC of the VDA cabinets.

### Regulation of the compressed air



The pressure of the compressed air can be adjusted by turning the knob at the front side of the cabinet and is indicated on one of the manometers. The second manometer indicates the pressure of the air passing the humidifier after pressing the switch on the operating panel. The pressure difference allows the check of the permeability of the filter in the humidifier at any time.

The tube on the right hand side allows observing the flow of the test solution.

Please note that in accordance with the standards mainly the ISO 9227 the compressed air has to be oil- and particle free. We strongly recommend the installation of a filter unit offered as an accessory by us. Moreover low noise compressors are available by us which supply clean air.

### Service friendly most efficient humidifier



The tube of the transparent humidifier is made of borosilicate glass (Duran®) protected by a safety plastic foil. After removing the glasfibre heat insulation the humidifier can be inspected easily and need not to be displaced for interchanging of the filter. This can be done from below after emptying the humidifier.

The humidifier must only be fed with demineralised water with a maximum conductivity of 20 µS/cm. We strongly recommend to install the water purification plant as offered as accessories. An automatic refill will keep the level within the maximum and minimum level. Low level as well as overfilling will be indicated by pilot lamps or in the display of the LED controller or the screen of the touch panel of the PLC. In this event the cabinet will be cut off due to safety reasons.



## Precise Tempering - High Reproducibility



- Compact Microprocessor control PID
- LED Display indicating the actual temperatures of the testing chamber and humidifier simultaneously.
- well protected very sensitive Pt 100 temperature sensor
- quick heat transfer from the surface heater into the testing chamber
- excellent temperature stability  $\pm 0,2$  K
- integrated timer function 0 - 9999 hours
- Option: separate working hour counter
- Option: Interface RS 232 upon request
- Option: VisiCORR® Software for documentation of the process data
- Calibration Certificate of the chamber temperature stability upon request



- Clear operating panel
- Pilot lamp (orange) for indicating if the chamber heater is on.
- Pilot lamp (orange) for indication if the humidifier heater is on.
- Pilot lamp (red) for indicating if the overheating protection of the testing chamber has been actuated
- Pilot lamp (red) for indicating if the overheating protection of the humidifier chamber has been actuated
- Pilot lamp (green) for indicating of the proper supply of compressed air
- Pilot lamp (green) for indicating if the cover has been tightly closed
- Main switch (green) illuminated when "ON"
- Switch for evacuating of the salt mist by compressed air
- Option: Socket Interface RS 232 upon request
- Option: Switch for chamber cleaning with tap water by a rotating spray nozzle.



- Protected Electrical Installation
- easily displacing after pulling the plugs.
- The installation box can be sent to us or an agency if a repair on site is not possible. - Saving of service costs.
- only VDE approved components of well-known suppliers applied



### Conformity

The SAL EC cabinets are no machines but laboratory devices. For that reason they are manufactured in accordance with the following guidelines and standards valid for laboratory technology:

73/23/EWG amended by 93/68/EWG,  
89/336/EWG amended by 92/31/EWG and 93/68/EWG,  
EN 61010-1, EN 61010-2



## Salt Spray Test Cabinets "ECONOMY"



### Technical Data

	SAL 600-T EC	SAL 1000-T EC
Chamber capacity	600 L	1000 L
Working Systems	"Salt Spray" "High Humidity CH" only constant climate acc. to DIN EN ISO 6270-2 CH (Part 1)	
Materials	Walls : Polypropylene, Cover : Acrylic glass, Base: stainless steel coated with Halar® (ECTFE)	
Chamber dimensions W/D/H1/H2 mm	910 x 710 x 660 / 1000	1400 x 710 x 660/1005
Case dimensions W/D/H mm	1478 x 788 x 1213	1895 x 890 x 1245
Working temperature	5°C > ambient up to + 55°C, overtemperature protection	
Temperature Control	Jumo dTron 304 Compact Microprocessor PID control, Interface RS 232 upon request	
Temperature sensor	1 Pt 100 PTFE coated	
Heaters	2 Mikanit surface heaters power 400 W each	2 Mikanit surface heaters power 700 W each
Electrical supply	230 V 50/60 Hz	230 V 50/60 Hz
Connected load	approx. 2.0 kVA	approx. 2.5 kVA
Compressed Air	oil and particle free, 3,5 - 5,0 bar, connection plug size 5	
Water supply	demin. Water, conductivity max. 20 µS/cm, pressure min. 2 bar	
Waste water, drain	permanently open, for High humidity drain port closed by a rubber stopper manually	
Exhaust pipe outer diameter	50 mm	75 mm

Technical Data are subject to amendments!



## Upgrading Options

### Combined Salt Spray /High Humidity Cabinets SAL/CON AIR



The EC Salt Spray cabinets can be additionally furnished with the working systems "High Humidity" and "AIR", so that they can be used either for salt spray test or cyclic Water Condensation tests according with DIN EN ISO 6270-2.

The working system "Salt Spray" will be cut off and kept electronically locked by a built-in PLC after pressing the switch to change over to the working system "High Humidity/AIR". The drain valve will be closed pneumatically and the testing chamber will be filled with demineralised water automatically. The chamber temperature has to be adjusted to normally 40°C manually.

After 8 hours the heater will be cut off and ambient air will be blown for 16 hours into the chamber by a fan and evenly distributed by a perforated pipe. This cycle can be permanently repeated while the water level will be kept constant.

	SAL/ CON 600-T EC AIR	SAL/CON 1000-T EC AIR
Chamber capacity	600 L	1000 L
Working systems	"Salt Spray", "High Humidity", "AIR" Manually selectable,	
Materials	Walls : Polypropylene, Cover : Acrylic glass, Base: stainless steel coated with Halar® (ECTFE)	
Chamber dimensions W/D/H1/H2 mm	910 x 710 x 850 / 1000	1400 x 710 x 660/1005
Case dimensions W/D/H mm	1478 x 788 x 1213	2000 x 891 x 1265
Working temperature	5°C > ambient up to + 55°C, overtemperature protection	
Temperature Control	Jumo dTron 304 Compact Microprocessor PID control, Interface RS 232 upon request	
Temperature sensor	1 Pt 100 PTFE coated	
Heaters	2 Mikanit surface heaters power 400 W each	2 Mikanit surface heaters power 700 W each
Electrical supply	230 V 50/60 Hz	230 V 50/60 Hz
Connected load	approx. 2.0 kVA	approx. 2.5 kVA
Compressed Air	oil and particle free, 6,5 - 8 bar, connection plug size 5	
Water supply	demin. Water, conductivity max. 20 µS/cm, pressure min. 2 bar	
Waste Water (Drain)	pneumatic drain valve, requires 6 bar	
Aeration acc. with DIN 50014	built-in fan, electrical PVDF inlet valve	built-in fan, pneumatic PVC ball-cock, requires 6 bar
Exhaust pipe outer diameter	50 mm	75 mm

**Technical Data are subject to amendments!**

## Upgrading Options

### Cabinets for automatic Cyclic Corrosion Tests - VDA



These combined EC Salt Spray cabinets are also furnished with the working systems "High Humidity" and "AIR", but furthermore with a programmable controller (PLC). For that reason cyclic corrosion tests such as VDA 621-415 can be carried out automatically and of course the basic tests according with the DIN EN ISO 9227 as well as the DIN EN ISO 6270-2.

The standard test methods are already stored in the PLC and can be easily recalled.

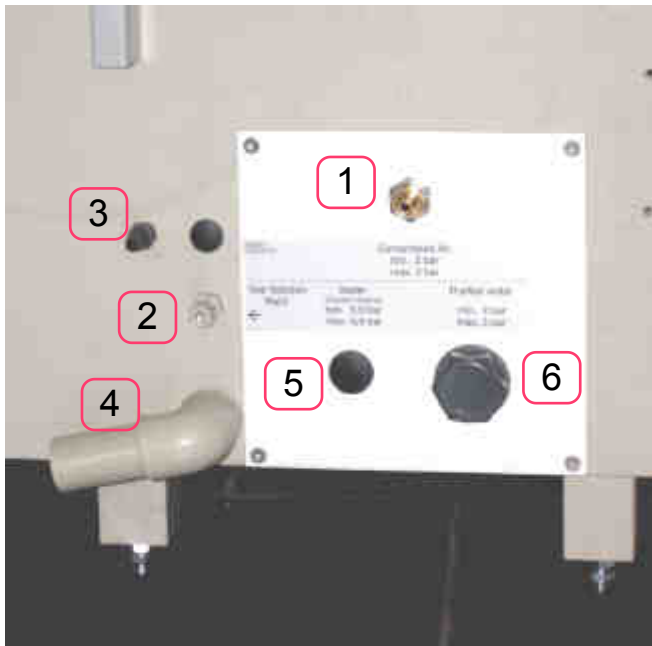
The process can be monitored by the application of the VLM software VisiCORR®.

	<b>CCT 600-T EC VDA</b>	<b>CCT 1000-T EC VDA</b>
Chamber capacity	600 L	1000 L
Working systems	"Salt Spray", "High Humidity", "AIR" automatically running cycles	
Materials	Walls : Polypropylene, Cover : Acrylic glass, Base: stainless steel coated with Halar® (ECTFE)	
Chamber dimensions W/D/H1/H2 mm	910 x 710 x 850 / 1000	1400 x 710 x 660/1005
Case dimensions W/D/H mm	1478 x 788 x 1213	2000 x 891 x 1265
Working temperature	5°C > ambient up to + 55°C, overtemperature protection	
Temperature Control	PLC with touch panel, pass word protected, Interface RS 232 upon request	
Temperature sensor	1 Pt 100 PTFE coated	
Heaters	2 Mikanit surface heaters power 400 W each	2 Mikanit surface heaters power 700 W each
Electrical supply	230 V 50/60 Hz	230 V 50/60 Hz
Connected load	approx. 2.0 kVA	approx. 2.5 kVA
Compressed Air	oil and particle free, 6,5 - 8 bar, connection plug size 5	
Water supply	demin. Water, conductivity max. 20 µS/cm, pressure min. 2 bar	
Waste Water (Drain)	pneumatic drain valve, requires 6 bar	
Aeration acc. with DIN 50014	built-in fan, electrical PVDF inlet valve	built-in fan, pneumatic PVC ball-cock, requires 6 bar
Exhaust pipe outer diameter	50 mm	75 mm

**Technical Data are subject to amendments!**



## Installation



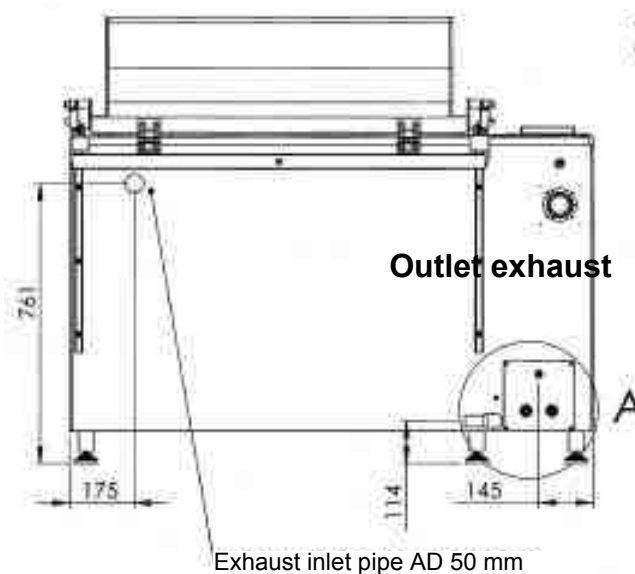
- 1 male connector Size 5, inlet of compressed air, must be oil and particle free (see ISO 9227)  
Supply pressure: min. 2 bar, max. 5 bar
- 2 fitting for test solution hose
- 3 inlet pipe for spraying of test solution
- 4 drain pipe d = 25 mm
- 5 inlet of tap water min. 3,5 bar max. 5,0 bar for cleaning the testing chamber by a rotating nozzle (Option)
- 6 inlet of purified water min. 2 bar max. 5 bar ¾ " outer thread (the same as for washing machines) protected from contamination during the transport by a plastic cap. Do not remove the inner filter disc as this is to protect the inlet valve from contamination

### Exhaust

The exhaust of salt spray cabinets is corrosive! Therefore a plastic pipe of 50 mm diameter has to be installed preferably leading to outdoors.

We recommend to install the plastic pipe to the vicinity of the cabinet so the delivered 2 m exhaust hose (standard accessories) will not droop and consequently be blocked by condensate.

Do not connect the hose of the exhaust to a laboratory exhaust system. In this case an atmospheric equilibration has to be provided by inserting of the 50 mm pipe into the pipe leading to the vent system. This means that there is no risk that the fog will be sucked out of the cabinet.



### Aligning of the cabinet

The proper function requires a downward slope of the base thus there is a sufficient flow of the waste through the drain port.

Therefore there are height adjustable feet so any unevenness of the floor may not cause any problem.

## Installation - Accessories



### Demineralised Water

Connection to the cabinet: 3/4" Outer thread

Water purity: max. 20µS/cm

If there is no supply of demin. Water at a minimum pressure of 2 bars, a ion-exchanger cartridge has to be installed. For this purpose a stop cock of the fresh water supply has to be installed in the vicinity of the cabinet. If there is no floor drain a leakage safety unit has to be installed in order to avoid a floatation in case of a break of the tubing resp. a hose.

A 230 V socket has to be installed.



We recommend to buy a spare cartridge with a quick coupling system so there is no interruption of the test when the exhausted cartridge has to be regenerated by VLM or at a local service company.

### Very Important!

**Any connection pipe or hose between the water purification plant and the corrosion test cabinet must either be made of stainless steel or plastic for demineralised water is very aggressive to brass, iron or copper and would cause a failure of the humidifier due to contamination by those metal oxides.**



### Drain

The waste water is led into a siphon by a plastic hose with 25 inner diameter. In case of CASS solutions regional environmental protection regulations have to be taken into account.

If there is no sufficient downward slope we offer a sewage water pumping system.



### Compressed Air

According to the standard ISO 9227 the compressed air has to be oil and particle free. For this purpose a maintenance unit has to be installed and connected to the cabinet. There is an inlet nipple of size no. 5.

In case there is no permanent supply of compressed air or for energy savings we recommend a low noise screw compressor.



### Current

2 m Cord with plug permanently installed at the cabinet

Power: Please look at the technical data table

Voltage: 230 V Frequency: 50-60 Hz, fault-current circuit breaker,

Recommendation: pursuant to the requirement 3-5 sockets



## Accessories

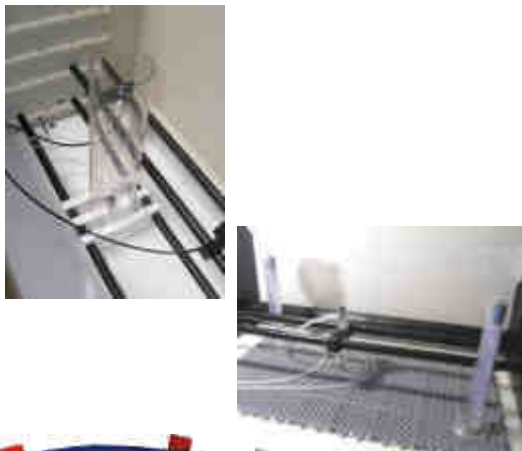


### Specimen holders

Standard holders are for 21 or 26 test sheets and slitted with an angle of 20 ° acc. with the DIN EN ISO 9227 or with an angle of 15 ° acc. with the DIN EN ISO 6270-2

Besides these standard holders we offer ones for very small pieces or for pipes, shafts or any other specimens which have to be individually placed.

Moreover there are special adjustable holders for disc brakes available.



### Spray duct

Tube made of polycarbonate to form a very fine mist and allow the positioning of the spray nozzle at the right hand wall in case of large specimens.

### Base protection

Plastic floor to prevent the base from damaging by falling down specimens.

### Checking the test solution

We offer all kind of laboratory technology, measuring gauges and equipment, for instance pH -meter, refractometer for checking the testsolution.

### Specimen preparation

There are certain tools stipulated in the standard which have to be used to prepare the specimens before the salt spray test, for instance, scratching tools acc. with Sikkens, van Laar . We offer all other kind of devices used in the coating industry.

### Evaluation

Swedish rust scale for comparison of the specimens with this standard.



## Accessories



### Set for checking of the function of salt spray cabinets acc. To Iso 9227

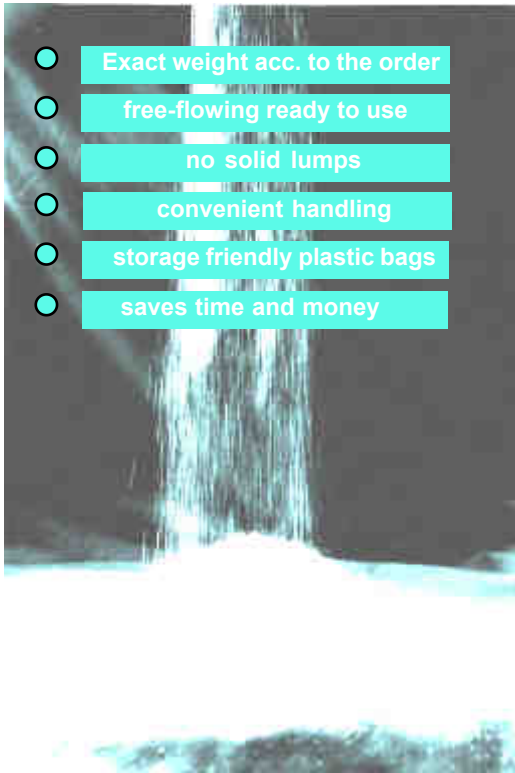
- 10 Pcs. Standard-sheet 100 x 50 x 0,8 mm Steel DC 04 B (ST 1405) blanc, without holes for the determination of the degradation rate acc. to DIN 50021 individually wrapped in plastic foil Order no. V.852.000.500
- 1 Stck. Petroleum benzene 100-140 purris.  
Order no. A.0762.2500
- 1 Pack. Hydrochloric acid inhibited with 3,5 g Hexamethylentetramin D= 1,10 g/ml, for the treatment of test sheets acc. to ISO 9227, DIN 50021  
Bottle á 500 ml, Order no. V.851.320.0500
- 1 St. Desiccator with cover, 200 mm - Duran  
Order no. 122478161
- 1 St. Plate made of porcelain Ø 190 mm DIN 12911  
for Desiccator Ø 200 mm  
Order no. 2121227191
- 1 Pack Drying beads 2 L  
Order no. 357802100
- 1 St. Precision balance, / Weighing range 220 g,  
Integrated calibration weight  
Increment 0,001 g  
Weighing plate stainless steel D= 118 mm  
Dimensions: BxTxH 180 x 230 x 85 mm. Weight: 2,5 kg  
Order no. KE.EG-220-3NM

and further equipment such as beakers, brushes, gloves etc.



# SaliCORR® Sodium Chloride for Corrosion Tests

Ready to use sodium chloride without anticaking compounds



- Exact weight acc. to the order
- free-flowing ready to use
- no solid lumps
- convenient handling
- storage friendly plastic bags
- saves time and money



According to the standards impurities of the applied sodium chloride must not exceed 0,3 %. Particularly the content of sodium iodide must not more than 0,1 % and that of copper and nickel not more than 0,001%. The special quality of sodium chloride offered by VLM complies with the requirements described in the standards Important: Do not use sodium chloride commonly used in the food industry or technical applications. Those kind of salt often contents anti caking substances such as calcium carbonate which inhibits the corrosion process and affects the function of the function of the cabinet.

Another method to prevent sodium chloride from caking is spraying with potassium hexacyanoferrate solution. However, it has been proved by scientists of the university of Graz (Austria) that this compound has an accelerating effect as a catalyst on the corrosion process on metal surfaces.

## Sample

### Quality Certificate

SaliCORR® Sodium Chloride, NaCl Special quality for Salt Spray Tests acc. to DIN EN ISO 9227, ASTM B117, NASM1312-1

Batch: V-AP 32204600-12.07	Batch values
Assay (argentometric; calculated on dried substance)	100.0 %
Identity	passes test
Appearance of solution	passes test
Acidity or alkalinity	passes test
pH-value (5 % Water)	6.1
Bromide (Br)	≤ 0,005 %
Nitrite (NO <sub>2</sub> )	passes test
Hexacyanoferrate (Fe(CN) <sub>6</sub> )	≤ 0,0001 %
Iodide (I)	≤ 0,001 %
Phosphate (PO <sub>4</sub> )	≤ 0,0025 %
Sulphate (SO <sub>4</sub> )	≤ 0,01 %
Nickel (Ni)	≤ 0,0005 %
Copper (Cu)	≤ 0,0005 %
Barium (Ba)	passes test
Calcium (Ca)	≤ 0,002 %
Iron (Fe)	≤ 0,0002 %
Potassium (K)	≤ 0,003 %
Ammonium (NH <sub>4</sub> )	≤ 0,002 %
Magnesium, Earth alkali metals (as Ca)	≤ 0,01 %
Loss on drying (130°C)	< 0,1 %

VLM GmbH

Hans-Ulrich Vogler  
Managing Director

33689 Bielefeld, 2007, 12.07



## Alternative Salt Spray Cabinets



**SAL 1000-T HL Capacity : 1000 L**

This model has been designed especially for heavy specimens and can be loaded up to 500 kg due to its stainless steel frame construction.



**SAL 400-S Capacity : 400 L**

This bench top model is the most compact cabinet of a capacity of 400 L and offers a very convenient operating and handling of the specimens particularly in case of smaller ones. In contrast to chest model long hanging specimens can be inspected easily. The testing cabinet can be placed on a laboratory table if there is no space for the complete unit. The foot standing bench houses the test solution reservoir as well as the water purification plant.



**SAL 1000-S Capacity : 1000 L**

This bench top model with its compact design is an alternative to chest models and offers a high grade of convenience. The foot standing bench houses up to two 200 L test solution reservoirs as well as the water purification plant.



## Cyclic Corrosion Test Cabinets CCT

VDA 621-415, VW PV 1210, Further Corporate Standards upon request.  
ISO 9227, ISO 6270-2, ISO 6988, ISO 4541,  
ASTM B 117, ASTM 287, ASTM B 368, ASTM 380, ASTM G 85 A3,  
BS 3900 F4, F12, Prohesion,

### CCT- Cabinets, 400 L, 1000 L,

The CCT- Bench top cabinets as well as chest models are serially furnished with the working systems:

- Salt Spray SAL
- High Humidity CON
- Aeration AIR

and upon request the following options:

- Forced Air Drying WL
- Kesternich SO<sub>2</sub>
- Controlled Humidity RF
- Conditioned ambient air (acc.to VW PV1210)



CCT 400-S



CCT 1000 -S

The bench top cabinets are serially furnished with the CWC System for controlled condensation for high constancy of the climate conditions due the high humidity test. Chest models are commonly used with the cover made of acrylic glass, but are also available upon request with the double shelled cover and the CWC System.

Following the recommendation of the corporate standard VW PV 1210 a stand-alone air conditioning module (see picture CCT 400S) is available upon request, if the air introduced into the chamber during the aeration phase should be  $23^{\circ}\text{C} \pm 2^{\circ}\text{C}$  and  $50\% \text{ rH} \pm 6\%$ .

In addition to that feature a fan with variable speed can be installed to adjust the drying period of the specimen corporate standards or comparable to cabinets of different behaviour.

Moreover bench top cabinets can be additionally furnished to carry out Kesternich Tests with SO<sub>2</sub> manually or even fully automated pursuant to ISO 6988 or ASTM G 85 A4 .

The easy to operate PLC allows the access to 3 different user levels due to security reasons. Common standard CCT-Tests are already stored by us but can be modified by the user or put together by selecting the various segments as well stored.

The test procedure can be monitored and documented by our software VisiCORR® For that reason Ethernet and RS 232 interfaces are existing.

The testsolution is sucked from the reservoir by a diaphragm pump and pumped to the spray nozzle. The latter can be additional be furnished with a flowcheck module in order to achieve the highest constancy of the flow and in addition to monitor the testsolution flow.

## Multifunction Cabinets **CCT-MF** and **CCT-MF HT**

VDA 621-415, VW PV 1210, ASTM G85, ASTM G85 A3 (SWAAT), SAE J2334, SAE 1563, Mazda MCT-2M, MCT-1H, Honda 5100Z, Nissan CCT I, CCT II, CCT IV, Renault 3 C, Toyota TSH 1555G, TS H1552G, GM 9540 P, Ford EU B 153-2, Ford BI123-02, JIS-K 5622-7, ISO 9227, ASTM B 117, ASTM B 368, BS 3900 F4., BS 3900-F18 Part 1, ISO 6270-2, (DIN 50017), ASTM D2246, BS 3900 F2, BS 3900 F9, Under development : **Renault D172028, Peugeot D271571**, Further corporate standards upon request

**+ 60 °C / + 80 °C (HT)**



CCT 1000-T MF HT max. + 80°C



CCT 1000-S MF



### Multifunction chest models and benchtop cabinets **CCT MF**

A variety of advanced corporate standards particularly issued by the international car manufacturers stipulate accelerated test procedures simulating natural environmental conditions at elevated temperatures in order to get reliable test results at the earliest time. Especially laboratory and engineering service companies as well as automotive suppliers have to adjust on these increased requirements and have to be most flexible.

Due to their second to none design and applied approved materials VLM corrosion test cabinets offer the best technology for conducting those high sophisticated cyclic corrosion tests with rapidly changing climate conditions.

For this reason the water bath, walls and roofs are made of stainless steel coated with Halar® (ECTFE). Compared to full plastic cabinets VLM cabinets have a second to none heat conductivity and so can be heated up and cooled down far quicker without any damage of the chamber as it has been concerned in case of GFR.

This advantage has a very important additional effect for as the temperature is controlled very accurately consequently the humidity will also be controlled in very narrow tolerances, such as  $\pm 1\%$  r.H.

According to the corporate standards the Multifunction Cabinets are furnished serially with the working systems:

- Salt Spray SAL
- High Humidity CON with CWC System
- Aeration AIR (speed controlled fan)
- Forced Air Drying WL
- Wall rinsing water cooling system
- Controlled Humidity RF

The max. temperature of the standard MF Cabinets is limited to +60°C. The HT-Cabinets are designed for increased temperatures **up to +80°C**.

To provide ambient air according to the VW 1210 V a stand alone air conditioning module is available and supplies air during the aeration phase at a temperature of  $23^{\circ}\text{C} \pm 2^{\circ}\text{C}$ , and of a humidity of  $50\% \pm 6\%$ ,

The serially installed speed controlled fan allows to adjust the air flow to special standards as well as to simulate the behaviour of other cabinets.

The testsolution is sucked from the reservoir by an advanced peristaltic or diaphragm pump and pumped to the spray nozzle. The latter can be additionally be furnished with a flowcheck module in order to achieve the highest constancy of the flow and in addition to monitor the testsolution flow.

The easy to operate PLC allows the access to 3 different user levels due to security reasons. Common standard CCT-Tests are already stored by us but can be modified by the user or put together by selecting the various segments as well stored.

The test procedure can be monitored and documented by our software VisiCORR® For that reason Ethernet and RS 232 interfaces are existing.

