

STANDARD: **VDA 621-415**EQUIPMENT: **Ascott Cyclic Corrosion Chambers & Accessories****1. Scope**

**1.1** This methodology is to be used to perform the VDA 621-415 Cyclic Corrosion test standard in an Ascott corrosion chamber.

This should be used in conjunction with the VDA 621-415 standard document. The test standard takes precedence over this method statement and this method may need to be altered to follow/comply with the standard.

**1.2** This method is based on VDA 621-415, which is a 7day cycle that consists of:

- 24 hours of Salt spray at 35°C (+/-2°C)
- 8 hours of Condensation humidity at 40°C (+/-2°C) 100%RH
- 16 hours Controlled humidity at 23°C (+/-2°C) 50% (<100%RH)
- 8 hours of Condensation humidity at 40°C (+/-2°C) 100%RH
- 16 hours Controlled humidity at 23°C (+/-2°C) 50% (<100%RH)
- 8 hours of Condensation humidity at 40°C (+/-2°C) 100%RH
- 16 hours Controlled humidity at 23°C (+/-2°C) 50% (<100%RH)
- 8 hours of Condensation humidity at 40°C (+/-2°C) 100%RH
- 16 hours Controlled humidity at 23°C (+/-2°C) 50% (<100%RH)
- 48 hours Controlled humidity at 23°C (+/-5°C) RH not specified. (e.g50% (<100%RH)).

**1.3** The chamber will be loaded with test samples as required by the customer or in accordance VDA 621-415 (60-75° from horizontal).

**2. Instrumentation**

**2.1** All measuring equipment must be calibrated. The recalibration renewal date must not fall within the test duration.

**2.1.1** The Ascott corrosion chamber should be calibrated for chamber air temperature and relative humidity as a minimum.

If required, the following 'chamber' items may also be calibrated:

- Chamber air saturator temperature.
- Chamber air pressure gauge (atomiser pressure).

**2.2** Peripheral devices also should be calibrated prior to use and may include the following:

- **Hand Held pH Meter** - is calibrated using buffer solutions and following manufacturers' instructions. The first solution pH 4.01 and second solution pH 7.01. Tolerance acceptable is +/- 0.01.

Once completed the electrode is rinsed using Electrode Rinse solution. The buffer solution is certified to NIST Standard Reference material.

**Hand Held pH Meter** (Ascott Accessory No: ACC11)

Digital pH meter, for measuring the pH of salt solution fallout over range 0-14 pH with a resolution of 0.01 pH. Supplied complete with buffers for calibration.

[View all our accessories at www.ascott-analytical.com](http://www.ascott-analytical.com)

- **Salinity Refractometer** is calibrated using Refractometer calibration liquid calibration solution (3.5%).

**Salinity Refractometer** (Ascott Accessory No: ACC100)

A salinity refractometer optimized to give a direct reading of percentage sodium chloride in the range 0 to 28%, with automatic temperature compensation.

[View all our accessories at www.ascott-analytical.com](http://www.ascott-analytical.com)

- **Conductivity meter** is calibrated using standard solution, used for checking the conductivity of the water used for the salt solution.

**2.3** The chamber temperature and relative humidity may be continuously monitored if required, using an independently calibrated data logger or Ascott's logging software (ACC120).

#### **2.4 Exposure to Salt Solution**

Collection rates are monitored manually using collection vessels placed at sample height. The collection rates are to be within the range of range of 1-2ml/hr/80cm<sup>2</sup>.

**2.5** VDA 621-415 refers to DIN 50 021 for the salt spray stage. The salt solution exposure is by means of atomisation using compressed air. DIN 50 021 requires that the air delivered to the spray nozzle(s) is 'heated and moistened' by passing the air through an air saturator.

Refer to the table within the test standard for the air saturator temperature value which is directly linked to the air pressure at the nozzle (corresponding pressure gauge on the front of the chamber).

### **3. Salt Solution Preparation**

#### **CorroSalt for Salt Spray Testing** (Accessory No: SALA530)

Highest purity salt for fully compliant testing. For all salt spray testing including the stringent ASTM B117. Available in 25Kg (55lb) drums or bags.



[View all our accessories at www.ascott-analytical.com](http://www.ascott-analytical.com)

- 3.1** 4.1 Salt solution to be prepared in accordance with VDA 621-415. (The 'collected' solution should be 50(+/-5) g/L).
- Check that the water conductivity is measured and monitored and is within the requirements of the standard using a conductivity meter.
  - Salt solution concentration is measured & monitored and is within the requirements of the standard using a calibrated Salinity Refractometer.

- Salt solution pH is measured & monitored and is within the requirements of the standard using a calibrated pH Meter.
- After allowing the solution to stabilise for several hours, the salinity and pH is measured and recorded.
- Any adjustments to the pH can be made using reagent grade hydrochloric acid (HCL) to increase the acidity or reagent grade Sodium hydroxide (NaOH) to reduce the acidity. Record all results.

### **4. Sample Preparation**

**4.1** Samples are prepared to customer requirements or in accordance with VDA 621-415.

Latex gloves must be worn at all times when handling samples.

Photographs should be taken of each sample prior to starting the test.

### **5. Operation**

#### **5.1 Pre-test evaluation**

- Run a 24-hour salt spray test with the chamber empty and collection funnels positioned. Record the temperature and ensure it remains in tolerance of 35C (+/-1C).
  - Ensure the salt fog collection rates are within the expected range of 1-2ml/hr/80cm<sup>2</sup>. Record all results.
  - Check that the collected salt solution has a concentration of 50(+/-5) g/L.
  - Check that the collected solution pH falls within the requirement of the standard. Record all results. (pH 6.5-7.2).
  - If required, adjust the pH of the salt solution within the solution reservoir to offset any change to the pH when collected; so that the collected solution is within requirements of the standard
- This may require additional testing to prove results before testing with samples commences.

- Create and run a complete 24-hour cycle of the controlled humidity (E.g. 6 hours of Condensation humidity at 40C (+/-2C) 100%RH followed by 6 hours Controlled humidity at 23C (+/-2C) 50% RH (+/-20%RH) repeated twice)
- Record the profile using an independent data logger or Ascott's logging software (ACC120).
- Verify that the chamber can follow the example test profile and that the transition times and values for temperature and relative humidity are within tolerance of the standard.

## 5.2 Starting the test cycle

### 5.2.1 Test Exposure Conditions

- Position samples within the chamber in accordance of the test standard (60-70°) or to customer requirements.
- Ensure that no samples 'shadow' other samples and that droplets from one sample cannot fall onto other samples.
- Photographs to be taken prior to starting the test and at customer specified times.
- Start the test cycle and record test parameters at start.

## 5.3 Quality Control

- 5.3.1 Daily checks to ensure the standard is being followed with variable parameters within limits - Record all parameters.
- Check that the chamber temperature is within acceptable limits (for each part of the cycle if applicable)
  - Record the conductivity of the DI water when used.
  - Check that atomiser air pressure is within acceptable limits

- Check the reservoir salt solution concentration is within (50 (+/-5) g/L).
- Record the reservoir salt solution pH.
- Monitor the level of salt solution in the reservoir and ensure that there is enough for the next 24/48 hours. (Allow extra for weekends).

## 5.4 After Exposure

- 5.4.1 At the end of the test period the samples should be removed from the chamber and rinsed with clean water to remove salt residues and dried with compressed air if required, before immediate examination.

Photographs of the samples should be taken.

## 5.5 Deviation Handling

- 5.5.1 General deviations such as downtime, out of tolerance recordings should be noted in the test report, including details of any alterations made.

For further information, please contact us.

### Ascott Analytical Equipment Limited

6-8 Gerard, Lichfield Road Industrial Estate,  
Tamworth, Staffordshire,  
B79 7UW, Great Britain

**T** +44 (0)1827 318040

**F** +44 (0)1827 318049

**E** sales@ascott-analytical.com

**W** www.ascott-analytical.com

### Typical Daily Checks

Hours	Chamber Temp °C	Air Sat Temp °C	Collected ml/hr (2 vessels per atomiser)		Collected Solution pH	Reservoir Salinity %	Pump Speed	Atomiser Air Pressure PSI	Initials	Photos Taken
			1	2						