

TEST METHOD AS PER STANDARDS

Volvo accelerated corrosion test

VCS 1027, 149

Purpose of the test

This standard defines an accelerated corrosion test method to be used in assessing the corrosion resistance of metals in environments where there is a significant influence of chloride ions, mainly as sodium chloride from a marine source or by winter road de-icing salt. It specifies a test procedure to be used in conducting the accelerated corrosion test to simulate atmospheric corrosion conditions in a controlled way.

Salt solution

NaCl 1.0 % \pm 0.1% (by weight), acidified by the addition of sulphuric acid - 1 ml of 0.5 M H₂SO₄ to 10 litres of salt solution, & maintains a PH of 4.2.

A low conductivity water supply for humidification or evaporative spray humidifiers and for the preparation of salt solutions.

Test Conditions

Comprises 12- 12 hours of two sub cycles for 1 week

sub cycle 1- (controlled humidity cycling)

A 4 hour at 35°C & 95% RH

Increase the temperature 45 degree c while reducing the humidity to 50 % RH in a period of 2 hours. Then maintain chamber at 45 degree C & 50 % RH for 4 hours

Afterwards decrease the temperature to 35 degree C & increase Humidity to 95 % and maintain this for 2 hours.

sub cycle 2- (salt solution application)

Salt solution for 15 mins then keeping the samples at 35°C for 1 h 45 min & 95-99 % RH to keep the test specimen wet ., repeat the cycle for 6 hours.

Increase the temperature 45 degree c while reducing the humidity to 50 % RH in a period of 2 hours Then Drying at 45°C & 50% RH for a 2 hour period followed by a further 2 hour period of 35°C & maintaining 95% RH.



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INSTRUMENTATION

Test chamber is preferably equipped with an integrated rig for spraying salt solution of the required amount and accuracy, cooling capacity and a good internal circulation system for the conditioned air. The exposure chamber shall be designed so that the test conditions described in the subsequent sections can be obtained, controlled, and monitored during the test.

In automated testing, forced cooling is necessary, If spraying is applied manually (**either in or outside the test chamber, provided: 1. The minimum precipitation rate of 5 L/m² per 6-h wet session is fulfilled, 2. The spraying events are distributed over the 6-h period, so that the test pieces are kept constantly wet, and 3. The temperature requirement is fulfilled.**), then cooling the test objects by letting the chamber be open with test objects kept wet may provide an option that does not require the use of a built-in cooling unit.

In order to meet the temperature and humidity accuracy requirements throughout the test area, the chamber shall be equipped with means to provide well-distributed circulation of conditioned air meaning a local air velocity of at least a few cm/s over all parts of the test area.

For a fully automated procedure, the chamber shall be equipped with a spray device capable of producing a finely distributed, uniform spray falling on the test objects. The most reliable way of receiving a fairly uniform downfall is by installing a moving spray device, like the swaying rail with overlapping nozzles.

Compressed, clean air of 4 - 6 bar for cleaning salt solution from spray nozzles, as a source for the renewal of chamber air and for humidification, supplied by spray humidifiers.
A tank for preparation and storage of salt solution or, alternatively, a system for direct on-line mixing of water and saturated NaCl solution to the actual concentration

A conductivity meter with built-in temperature compensation for preparation and control of item 5 below.

A high-quality device for independent control of temperature and relative humidity shall be accessible. This instrument shall on a stipulated regular interval be used for independent monitoring and calibration of the conditions in the actual test plane of the exposure chamber. The total measurement error must not exceed 0,1 °C.

Racks of inert material for support and aligned fixation of test objects must not hamper a free air-flow around the test objects, nor collect standing wetness. The test objects in a rack must not screen one another from the salt solution downfall and they shall be exposed at the stipulated exposure angle to the spray (15-20° inclination from the vertical).

Funnels, beakers/measuring glasses and a balance with at least 0,1 g accuracy for monitoring and calibration of salt solution downfall throughout the test plane of the exposure chamber.

