



# HIGH SPEED CORRODER - HSC 512



**HSC 512 (High Speed Corroder) is a salt spray test tool which accelerates corrosion on test specimens and surfaces.**



High Speed Corroder model HSC 512

The method is known as "Highly Accelerated Corrosion Test" or just HACT. This method is based on the same basic idea as HALT (Highly Accelerated Life Test) where a test specimen is subjected to a stepwise stress test until its destruction. It is therefore a relative robustness test.

By using HALT weaknesses are identified in a few hours, thus preventing problems which would otherwise not have materialised for months or years.

HACT has the same properties with respect to surfaces, metals and test specimens with a capillary effect. Corrosion and damage which it would otherwise take months to provoke with traditional salt spray testing, can be produced in a single week or a few weeks with HSC 512.

When using the HACT method, products can be tested for corrosion and capillary damage already during product development phase and a need for an alternative solution can be found within a short time. Exposed metals, sealing, combinations of different metals and crevice corrosion etc. are factors which can now be tested already at the prototype stage.

The HSC 512 corrosion chamber uses technologies which enable integration of all the components for accelerated corrosion into one independent chamber. This makes it possible to apply the HACT technology in-house without using external heating source, compressed air or air extraction system, thus obtaining the effect of decades of corrosion in just a few weeks, and with HSC 512 this can be done in the company's own facilities.

HACT and HSC 512 cannot and should not replace the more traditional corrosion and salt spray tests. The main reason for this is that there is no internationally recognised HACT profile or standard - the value lies primarily in the comparison of results from several identical tests, where the test specimen has been improved between each course of HACT sequence.

## Description of the typical HACT cycle

The test specimen is sprayed with a salt brine solution for 5-15 minutes. The test specimen is then dried for 60 minutes at a relatively high temperature. Dehumidification is ensured by low air humidity, typically <35%rh, and high convection in the test space.

When the specimen has dried out, air humidity is increased to >95%rh at minimum +70°C while still maintaining high convection. The duration of this stage is approx. 5 hours, which means that a full cycle can be completed in approx. 6 hours.

The cycle starts over and during the next spraying the test specimen is chocked with relatively cold water, which stimulates the capillary and corrosion weaknesses in the structure.

The HACT cycle is usually repeated 4 times, which corresponds to 24 hours. The test specimen is then removed and inspected for any damage. When documentation has been obtained, usually by thorough photographing of problem areas, the test specimen is put back into the High Speed Corroder for another full 24 hours of testing. This is repeated until the test specimen no longer displays any noticeable changes for each 24 hours of testing.

It is important that the test provides repeatable results to be able to compare changes in a product. The HACT cycle runs a fixed program, which ensures that the same test conditions are applied for every test run. The test specimen may then subsequently be optimised and the quality of the new improvements is exposed by new testing and comparison of the test results from the various runs. Since HACT is not an exact science, times and test parameters are not locked in the above cycle. It will be possible to change these in order to adjust times/temperature to the test specimen. It is, however, important that all tests to which the test specimen is subjected, are identical.



## Description of High Speed Corroder, model HSC 512

The test chamber itself consists of six glass sides, of which five are heated. The door is made of insulating glass and two LED strips on each side of the door, ensure lighting in the test chamber. The test specimen is placed on a plastic grill so that the salt brine can run from the test specimen and back into the drain for the brine container.



Contactless magnetically coupled fan wheel

Air circulation is provided by a fan wheel with magnetic contactless motor coupling. The fan helps to oxidize the corrosion process and guarantees a homogenous environment in the test space. A port hole with a size of  $\varnothing 50$  mm in the top left side, allows the user to insert cables and connections to the test subject if needed.

When used correctly, the test chamber is virtually airtight and no salty fumes leak to the surroundings. There is therefore no risk of corrosion for the room and other equipment in close proximity of the HSC 512.

## Sprinkler system

At the top of the test space, the salt brine is sprayed from a nozzle which evenly distributes the brine in the chamber. The pumping system is composed of diaphragm pumps, which are very well suited for the corrosive salt water.



Salt water spray nozzle

## Humidity control

HSC 512 has a controlled and constant water level in the test space floor, which constitutes the humidity control. The humidity in the chamber is effectively controlled by adjusting the temperature of the water in the water level bath beneath the grill, measured and verified by a robust no-maintenance capacitive humidity sensor.

## Control unit

A PLC controls the cycle and adjusts the temperature and humidity in the chamber. The process is created, started and stopped on a HSC touch display. This display also shows the current data such as temperature, humidity and time remaining for the relevant job etc. When the job has been completed, data can be extracted and included as documentation or comparison to other tests.

## Technical specifications:

Chamber specification	High Speed Corroder HSC 512
Outer dimensions: H x B x D	1850 mm x 1200 mm x 910 mm
Test space volume:	512 l made of glass
Entry/cable port:	Yes, $\varnothing 50$ mm on the left side
Net weight:	250 kg
Mains voltage:	3 x 400 Volt AC @ 50 Hz / 7 Amp
Fault current protection:	HPFI protection
Daily power consumption:	Approx. 16 kWh
Test specimen specification	Test specimen
Size: H x B x D	$\leq 580$ mm x 580 mm x 700 mm
Weight:	$\leq 20$ kg
Cycle specification	Test parameter
Cycle temperature:	70 °C $\pm 1$ °K
Test space convection:	Yes, contactless
Max. humidity during cycle:	$\geq 95\%$ rH
Cycle time:	Usually 6 hours
Brine capacity:	20 litres
Salt brine solution:	Usually 5%

## Service & Warranty

The HSC 512 test cabinet is serviced when required. It is recommended that the unit is serviced twice annually by a qualified technician. Furthermore, the chamber can be returned to the manufacturer for main service every other year. Warranty is covered according to Danish law. In B2B trade; warranty is normally 12 months from invoice date. Wearing parts such as grill, door seal, fan, wheel and filters are not covered by this warranty.

## Consumption

It is recommended to replace the brine container with the salt water solution for each completed HACT. There may potentially be precipitation of metallic chips, particles and other residue washed from the test specimen. To avoid cross-contamination, which may result in unintended and false test results, the container with contents must therefore be replaced for each new HACT.

The container with salt for a 5% solution is delivered ready for replacement as a spare part. Just add 20 l. demineralised water to the new brine container and installed it in the designated place below the test space. The HSC 512 will automatic mix the brine solution at the first run.

Technical data and description may be changed without prior notice.