ACS | TESTING FOR A BETTER PLANET

Angelantoni

Dry Corrosion Test Cabinets

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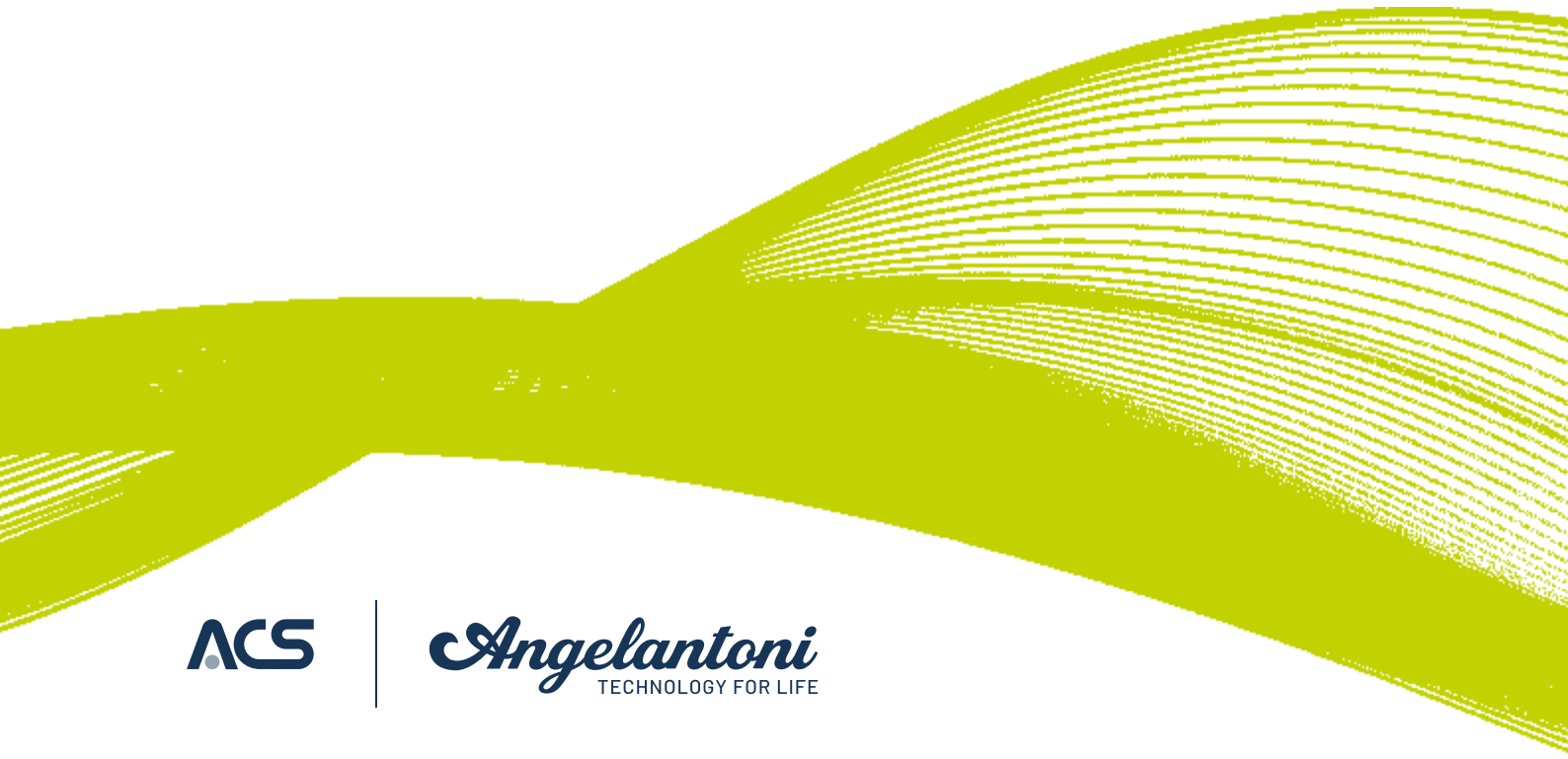

ACS
Angelantoni
TECHNOLOGY FOR LIFE

Dry Corrosion Test Cabinets

ACS is proud to announce the **new release** of its standard corrosion test chambers.

The footprint of the 600 and 1200 l models has been reduced to a minimum thanks to a basic configuration that does not include the salt solution tank which, however, is available as an option (200 l).
Traditionally specialized **in carrying out incisive stress** such as **“scab” and “filiform” corrosion**, DCTC™ chambers can also perform traditional **salt spray tests** (continuous, alternate, etc.) in compliance with the main international standards and norms. VDA, SAE J2334, and Kesternich tests are available as standardized options, while DCTC™ can perform any other test on request according to the customer’s needs.

Why Dry Corrosion Test?
Test Cabinets

DCTC™ - Dry Corrosion Test Cabinet

DCTC™ is a system designed to recreate the corrosion processes on both painted and bare metal surfaces in the laboratory. All DCTC™ equipment can perform tests in compliance with UNI 9399 (filiform corrosion) and UNI 9590 (scab corrosion) standards.
The systems can also perform traditional salt spray tests in compliance with the most important national and international standards (continuous salt spray tests - ISO 9227, ASTM B117 and DIN 50021; alternate salt spray tests- DIN 50907), and have also been customized to suit the specific corrosion test needs of some of the world's largest automotive manufacturers.

Under-paint film corrosion: filiform and scab corrosion

A professionally painted metal surface should never be corroded; the main function of the paint is actually to protect the metal support from corrosion, in addition to the aesthetic factor.
Nevertheless, painting cycles are sometimes performed on surfaces that have not been treated properly. In this case, the symbiosis between paint and surface becomes extremely vulnerable, and, for example, a small grain of dust on a poorly painted edge or any other cause is sufficient to trigger the corrosion process.
For example, if a car is struck by a stone, its paint cracks: corrosion propagates under the paint layer with short-term destructive effects, first on the sheet metal and then on the paint itself. The real enemy that traditional salt spray chambers fail to detect is this kind of corrosion, which propagates under the paint film and whose effects may be either a "scab corrosion" or "filiform corrosion".

Why Dry Corrosion Test?

The ISO (International Standards Organization) Standard 7253, drafted in 1984, sets forth both the application processes for salt spray tests and their limits. This standard actually states that salt spray tests are not valid as "corrosion tests" (not involving a real exposure to environmental agents), but only serve as a sort of "behavioral test" to check the quality of different lots of painted products and the quality of the painting processes. From what has been said so far, it can be clearly seen that there is a definite need for laboratory tests aimed at detecting and highlighting the two forms of under-film corrosion (filiform and scab) in a fast and easily reproducible manner. This test already exists: it is the so-called Dry Corrosion Test. The procedure is the same as that used for salt spray tests, but the two salts used are different: sodium chloride and ammonium sulfate. Moreover, in dry corrosion tests, any wetting cycle is followed by a drying cycle with dehumidified hot air. A complete test cycle may last from 500 to 1000 hours, depending on its severity.

Focus on Features

External Construction

- **Fiberglass** (600-1200 l)
- **Stainless steel** (2300 l)
- **External panels** are completely **removable** for easy maintenance

Access Hood

- **Completely transparent PVC hood**
- **Reversed V-form** to allow a better inspection of the test environment and an easier flowing of condensation drops to prevent them from falling onto the specimens being tested.
- **Servo-assisted opening/closing** by means of small gas pistons (600 - 1200 l). Pistons create a light pressure on the sealing gasket when the hood is closed and make it possible to keep the hood open. Automatic hood opening by means of an electro-pneumatic system (2300 l).
- **"Full-tight" silicon gasket** for perfect seal between the access hood and the test compartment (600 - 1200 l). Water-filled channel situated along the closing edge of the hood (2300 l).

Salt Solution Tank

- 600 l and 1200 l basic configurations do not include a salt solution tank (optional external 200 l tank available).
- 2300 l basic configuration includes a 120 l integrated salt solution tank (optional additional external 200 l tank available).

Internal Construction

- The test compartment is molded from a **single piece of fiberglass** to ensure long-life and a perfect seal

Salt Solution Atomization

- The salt solution is sprayed inside the test chamber through an adjustable universal nozzle made of polycarbonate, mounted on a hard plastic support. It is possible to adjust the intensity and precision of the spray by adjusting the speed of the membrane pump and the pressure of the compressed air (atomization). It is also possible to reduce the fumes inside the chamber with compressed air at the end of tests in order to discharge all residual fumes before opening the hood.

Heating

- Electrical heating system insulated with **self-extinguishing glass wool**

Compressed Air Humidification

- **By blowing compressed air** into a thermo-regulated bath (humidifier) made of AISI 304 SS

DCTC600 PN

Customized Corrosion Chambers

ACS has an extensive experience in the design and production of special chambers for corrosion testing, mainly for the automotive industry.
The advancement of corrosion test applications in the automotive field has led to the launch of new special testing benches, in which alternate exposure conditions cause more severe effects on the products under evaluation. Indeed, there are other conditions than just a salty atmosphere at play in the real-life use of vehicles, and these increase and worsen the effects of salt corrosion. Whole vehicles or single components can be subjected to an alternation of high and low temperatures, wet and dry conditions, and direct salt solution washing (i.e. splash test, salt rain) within a complete cycling test lasting many weeks.

Walk-in corrosion chambers
Pole Corrosion Renault

Walk-in chamber for corrosion tests combined with wind simulation

Test chamber for the accelerated aging of high voltage isolators: temperature, humidity, sun light, salt spray. Useful capacity: more than 700 m3 (courtesy EDF France)

weazy™ a lightweight, responsive and unique HMI for ACS chambers

Weazy™ is the onboard HMI, providing an intuitive and responsive interface for our powerful Control System, designed for use across an extensive range of our chambers.

Available on 7 inch display

Simple to use graphical interface

Clarity, consistency and efficiency of use

Fully Modular and User-Configurable Control System

The chamber is equipped with a **PLC** (Programmable Logic Controller) for managing all the chamber's functions and safety interlocks.

The chamber basic control is supplied by **Weazy™**, a very flexible HMI accessible on the 7 inch on board display.

WinKratos (optional) allows the complete management of the chamber functions: from manual control to the creation (through the graphic editor) of test profiles, including monitoring and recording, processing, graphical representation and analysis of data.

weazy

Control and Supervision Software for ACS Environmental Test Chambers

WinKratos

WinKratos is the Advanced Software developed by Angelantoni Test Technologies for the control and supervision of ACS environmental test chambers. Designed for comprehensive and intuitive management, the software enables full control of chamber functions, from manual operation to the creation of customized test profiles via a graphical editor.

WinKratos integrates advanced tools for monitoring, data recording, processing, and analysis, providing detailed graphical representations for optimal test management. Reliable and field-proven, the software supports the simultaneous management of multiple ACS chambers, offering exceptional flexibility to meet the specific testing requirements of each customer

Installed on a dedicated PC, WinKratos allows centralized control of multiple chambers from a single workstation.

The desktop-style graphical interface is designed for quick and intuitive access to all functions, simplifying system operation.

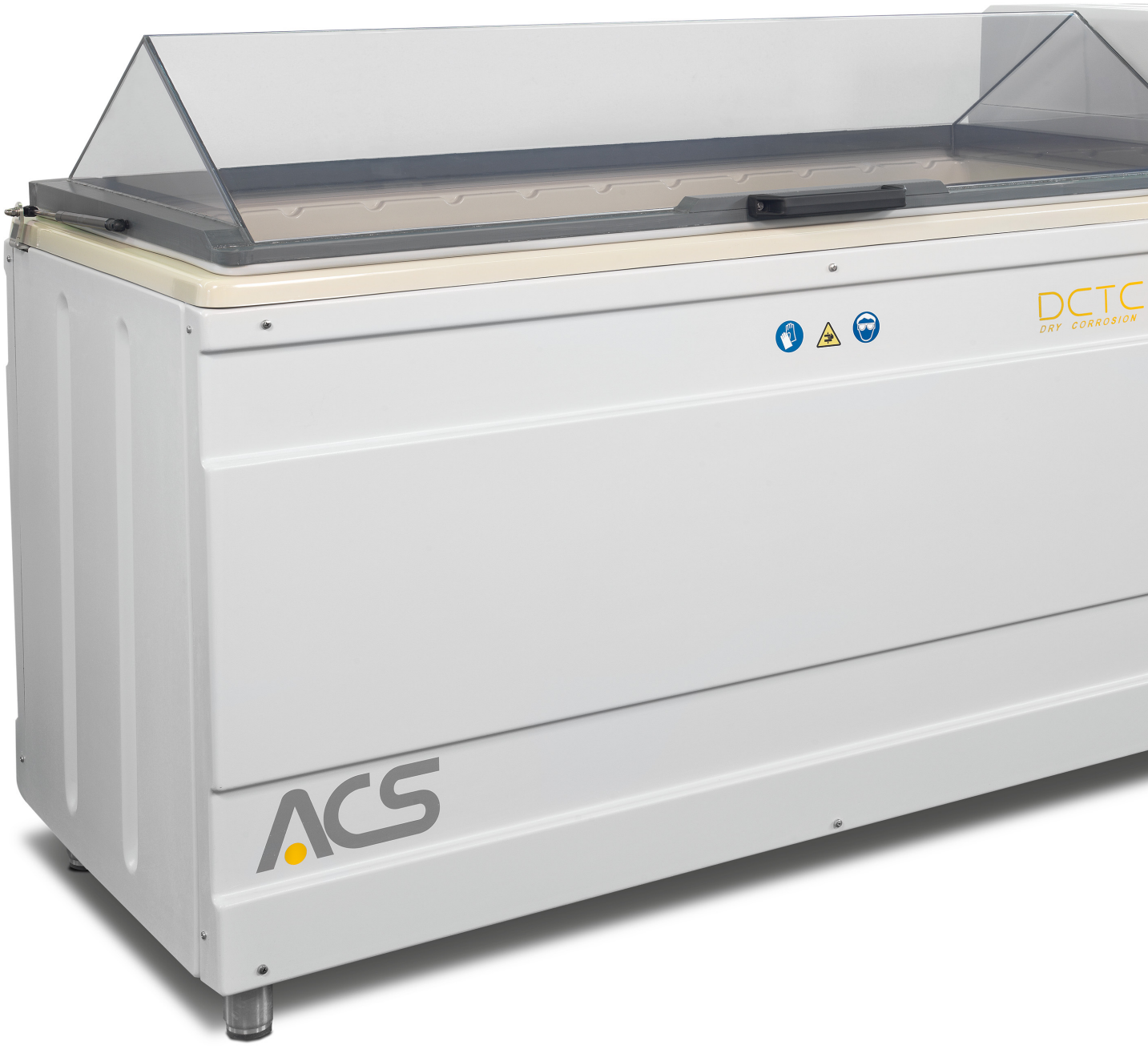
Additionally, the integration with a PC ensures scalable performance and expandable data storage capacity to meet operational needs.

Dry Corrosion test cabinets / **Technical features**

	MODEL	600 PN	1200 PN	2300 P
Useful capacity with hood approx. (l)		578	1105	2367
Internal dimensions approx. (mm)	Width	900	1700	2000
	Depth	640	640	1000
	Height	810 note 1	810 note 1	1000 note 2
External dimensions approx. (mm)	Width	1470	2280	3085
	Depth	830	830	1300
	Height	1320	1320	1575
Temperature Range (°C)		amb. …+55	amb. …+55	amb. …+55
Rated power (kW)		2,6	4	5,3
Rated current absorption (A)		11,6	18	10
Weight (without packing) (kg)		180	220	450
Supply voltage (Vac)		230V ±10% 50Hz 1+G	230V ±10% 50Hz 1+G	400V ±10% 50Hz 3+N+G

Note 1. +280mm at the cover top **Note 2.** +310mm at the cover top

DCTC1200 PN
Equipped with cooling unit for VDA test




1200PN
TEST CABINET


ACS

Standard functions

DRY CORROSION TEST

This kind of test consists of salt spray cycles followed by low relative humidity drying phases; it is performed in compliance with UNI 9399 and UNI 9590 norms to highlight in a short time and, above all, in a reproducible way, all under-film corrosion phenomena (filiform and scab). Particular care has been given to the generation of the salt spray, which deposits small uniform drops onto the specimen, triggering the start of a powerful corrosive attack when the water is evaporated during the drying phase.

CONTINUOUS SALT SPRAY
(CONVENTIONAL SALT SPRAY)

Includes all the ISO, ASTM, MIL standards, DIN, etc.

ALTERNATE SALT SPRAY

Includes DIN 50.907 and DEF standards, whose cyclical variations may be broken down into two phases:

- salt spray humid phase
- drying phase without air flow (stand-by period)

CYCLICAL TESTS

PLC programmer allows the setting and performance of temperature cycles.

INCLUDED ACCESSORIES

- Pluviometer
- Hanging supports (for 600 - 1200 l)

DCTC™ Performed Standards The following list of test standards is provided solely by way of example.

U.S.A.	U.K	GERMANY	ITALY	AUTOMOTIVE TEST
ASTM B117	PROHESION*	DIN 50907	UNI 9399*	GM*
ASTM B287	BS 2011 P2.1*	DIN 50021 SS	UNI 9590	FIAT*
ASTM B368 (CASS)	BS 3900 F9	DIN 50021 ASS	UNI 5687-73	BMW*
ASTM D1735	BS 7479	DIN 50021 CASS	ISO 7253	VOLVO*
ASTM D2247*	BS 7479 AASS	DIN 50017*	ISO 9227	NISSAN*
ASTM G85 (1,5)	BS 7479 CASS	DIN 40046	ISO 9227 NSS	TOYOTA*
ASTM G85 (2,3)*		DIN 50014*	ISO 9227 AASS	RENAULT*
MIL STD 202G		VDA 621-415*	ISO 9227 CASS	VOLKSVAGEN*
MIL STD 810G			CEI IEC 68-2-11	
MIL STD 883				Others
SAE J2334*				JIS Z2371*

* Only on request (optional)

Options

- **Additional portholes:** 100mm, see drawing for available positions.
- **Wheels:** wheels complete with feet (600 - 1200 l)
- **PT100 additional probe:** max. 3
- **Rack for specimens**
- **Rods for specimens:** wood rods (600 - 1200 l)
- **Compressed dehumidification kit**
- **Digital pH gauge:** portable gauge
- **Additional external tank:** 200-liter capacity
- **Cart with wheels for tank**
- **Air compressor demineralizer:** single-column system
- **Max. temperature +60°C**
- **Salt solution tank heater (according to JIS Z 2371)**
- **Software WinKratos™** for single-chamber remote control
- **Software WinKratos™** for multichamber remote control, max. 16 chambers
- **Wetting test:** temperature control in a saturated environment with water bath heated at the bottom of the testing space.
- **VDA test with cooling unit:** water bath temperature at the bottom of the testing space is controlled by an external cooling unit. The external fan provides for air circulation inside the chamber. The air circulation system is a closed loop. This configuration includes the following option:
  - Wetting test
- **SAE J2334 test:** this configuration includes the following options:
  - Max temperature +60°C
  - Wetting test
- **Kesternich Test (600 -1200 l) according to DIN 50018:** dedicated line for SO^2 inlet.

Main advantages

1. Salt solution top-loading (with salt solution tank accessory for 600 - 1200 l)
2. Flowmeter for salt solution flow reading
3. Adjustable-height feet (for 600 - 1200 l)
4. Salt solution pump for adjustment of the salt solution and improving the precision (atomization)
5. Easily inspectable stainless steel humidifier
6. Control panel:
   - Intuitive and responsive HMI interface
   - Automatic notifications of events and alarms
   - Delayed start of a program
   - Visualization of measures and recordings
   - USB port for test data export
   - Ethernet connection to the chamber
7. Magnetic switch for turning off the spraying when the hood is open
8. Hood: fully transparent, with servo-assisted opening (600 - 1200 l) and pneumatic handling (2300 l)
9. External structure with panels in polyester resin (600 - 1200 l) and AISI 304 stainless steel (2300 l) for easy maintenance
10. Specimen support slots (standard) for 600 - 1200 l
11. Adjustable nozzle (vertically and rotation) for 600 - 1200 l and rotation for 2300 l
12. Compressed air inlet to reduce the fumes inside the test compartment
13. Measuring system: temperature and humidity (psychrometric system) with Pt100 probes
14. Compensation valve for pressure compensation inside the chamber and discharge of fumes from the test compartment at the end of a cycle
15. Condensate drain

Angelantoni Test Technologies, owned by the **Angelantoni Group**, is the only company capable of offering a comprehensive range of environmental test chambers - **ACS** branded - for a great variety of applications, thanks to the expertise and technical know-how of its teams of experts. Innovation, flexibility and organization have always been the keys to success for ACS, world-famous since 1952 also for its high-tech test equipment such as Thermal High Vacuum Chambers for Aerospace applications and Calorimeters.

ENVIROMENTAL SYSTEM CERTIFICATION DNV·GL ISO 14001

QUALITY SYSTEM CERTIFICATION DNV·GL ISO 9001

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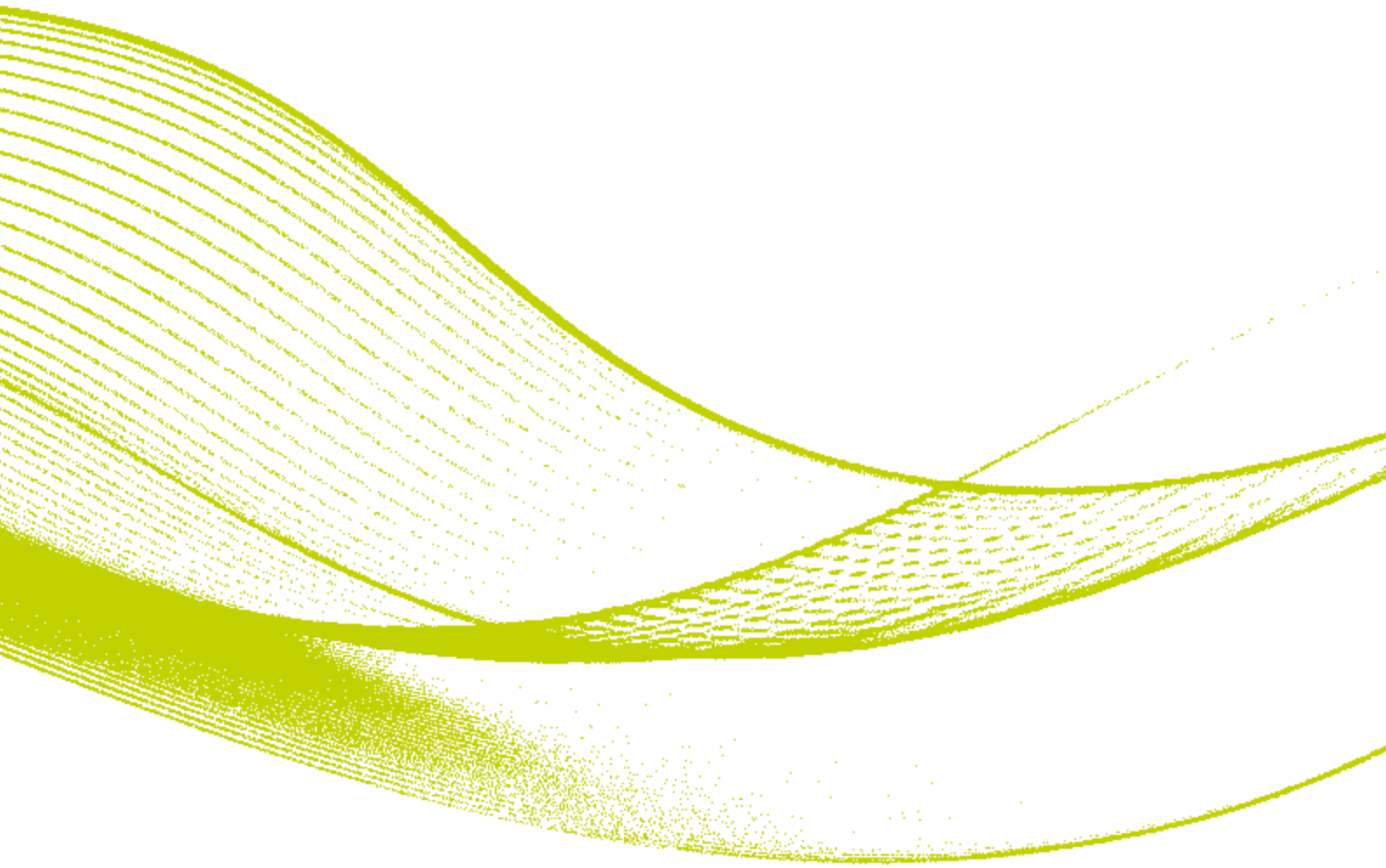

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