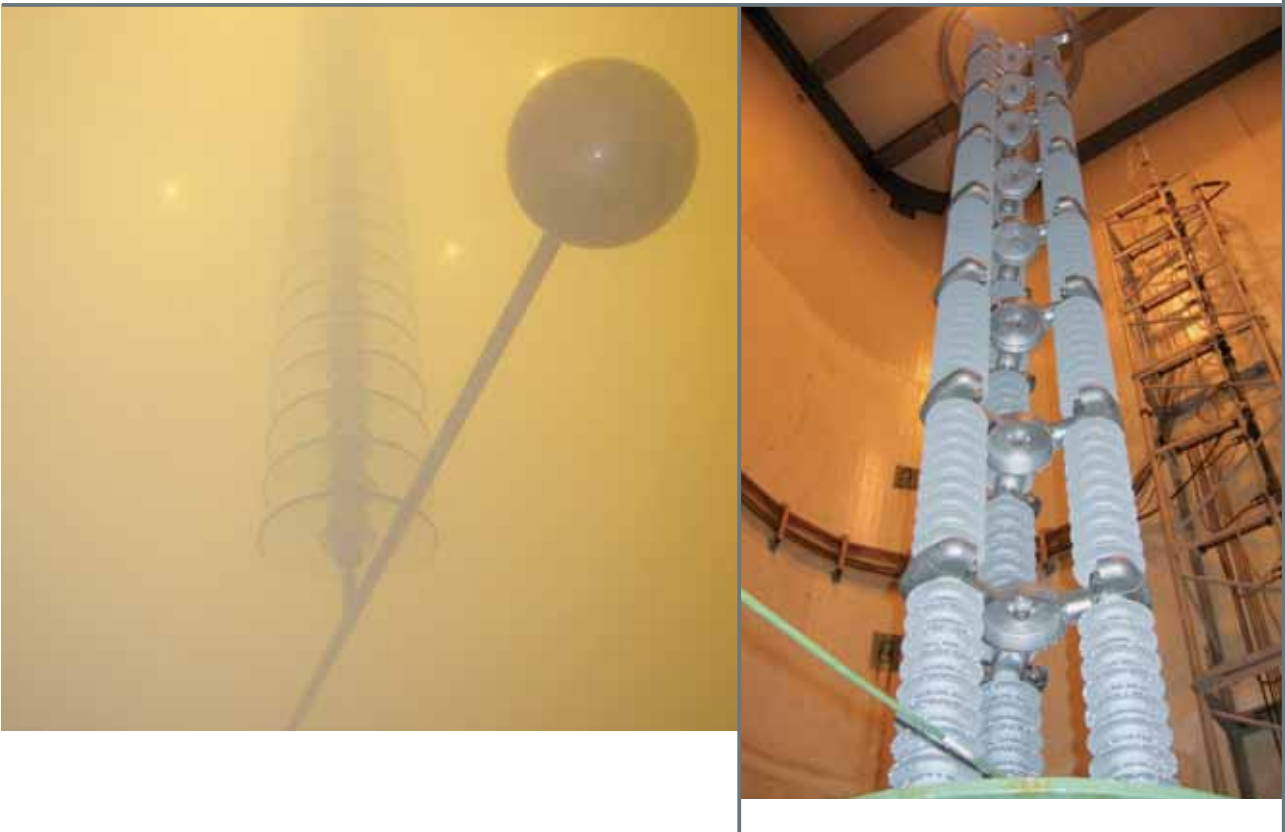


# Pollution and environmental Laboratories

## Electric equipment under **harsh environmental conditions**: **Ensure Safety to your Product Design.**

The reliability of electrical equipment and its capability to properly carry out the functions it was designed for is influenced by many variables which are often extremely difficult to be simulated. The environmental and climatic conditions are among the most critical variables and therefore it is essential to simulate them in laboratory in order to test the behavior of the equipment in an unfriendly environment.



CESI is worldwide leader in third party Conformity Assessment Services, Testing, Inspection and Certification of electromechanical components. Our certificates and reports are internationally recognized by first parties (manufacturers or seller) and second parties (purchaser or user). CESI is a well-recognized Conformity Assessment Body accredited according to ISO / IEC 17020, ISO / IEC 17025 as well as ISO / IEC 17065. Furthermore CESI is notified body for IECEx Certification Scheme and ATEX.

# CESI

Trust the Power of Experience

Testing • Consulting • Engineering • Environment

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Salt fog stress in coastal areas, industrial pollution, mist or rain can cause flashovers on outdoor high voltage equipment. You can reduce this risk by testing it with the aid of FGH laboratories.

The international standardization bodies have laid down several tests:

- climatic tests;
- tests under extreme conditions such as ice;
- rain tests with applied voltage;
- artificial pollution tests (e.g. dust, salt-fog, solid layer);
- thermal ageing tests.

FGH, part of the CESI Group, is specialized in performing artificial pollution tests in accordance with IEC 60507 on high voltage equipment such as:

- support insulators;
- hollow insulators;
- bushings;
- cable terminations;
- circuit breakers;
- suspension and tension insulators;
- surge arresters etc.

On customers' request, it is possible to perform tests in accordance with other standards or specifications, e.g. for composite insulators.



FGH has built a new test chamber in order to meet all requirements of current international standards for corresponding tests:

- pitch roof to avoid dripping;
- up to 14 leakage current measuring channels per chamber;
- test chamber volume in accordance with international standards;
- powerful voltage supply;

The new Salt Fog Test Facility is specialized for:

- tracking and erosion tests (IEC 62217);
- weather ageing tests (IEC 60099-4);
- humidity tests (IEC 61442);
- salt fog tests (IEC 61442);
- tests on clients' request.



FGH's pollution test room with a dimension of 12x12x14 m (LxWxH) is intended for salt fog or solid layer tests with a test voltage of up to 600 kV and variable test positions. During the tests leakage current is measured continuously and flashovers are recorded by a digital storage oscilloscope.

The salt water is prepared with de-ionized water made by an in-house reverse-osmosis system. Each salt fog nozzle is regulated separately by flow meters. The offered services are:

- determination of withstand salinity;
- test voltage of up to 600 kV (AC or DC);
- variable test position;
- tests also available for composite insulators;
- leakage current measurement.

Computer-controlled data acquisition permits storage of test voltage and leakage current values during the whole test period. The measuring system is directly integrated in the voltage control to de-energize the test circuit in case of overcurrent trip-outs or flashovers.

### **Voltage Supply**

- test transformer up to 400 kVA;
- variable transformer up to 150 A;
- test voltage of up to 120 kV;
- three-phase transformer for cable accessories.

### **Leakage Current Measurement**

- continuous measurement for up to 14 channels;
- scan rate of 25 kHz per channel;
- flashover detection;
- overcurrent trip-out detection.

### **Salt Water**

- prepared with de-ionized water made by an in-house reverse-osmosis system;
- continuous flow rate control.



**CESI Group** in Milan offers a wide range of testing services, on electrical and non-electrical equipment used in hazardous areas thanks to special laboratories capable of simulate such extreme conditions:

- tests in explosive mixture (Explosion proof and Flameproof tests);
- impact tests;
- static overpressure tests;
- ex-i spark ignition tests;
- ingress protection tests (IP code);
- environmental exposure Tests;
- thermal tests;
- dimensional checks;
- non-electrical product tests.

CESI Group Explosion proof laboratory is accredited according to IECEx Certification Scheme and according to ATEX Directive 94/9/CE.

In CESI Milan thermal chambers and climatic cells with the following capabilities are available:

Specifications		Heraeus	ACS	Perani	ACS	Vötsch	ACS	Heraeus
Dimension	m	3.5x3x3	2.4x3.6x2.3	1x1x2	1x1x2	1x1x1.2	–	–
Useful room	m <sup>3</sup>	31.5	11	11	2	1.2	0.6	0.3
Max weight	kg/m <sup>2</sup>	–	–	–	–	200	–	–
Temperature range	°C	–40/+75	–30/+100	–25/+70	–70/+180	–40/+180	–40/+180	–40/+180
Relative humidity range	%	10-95	10-95	10-95	10-98	10-98	10-98	10-98
		con ΔT 5-95 °C	–	–	con ΔT 5-95 °C	con ΔT 5-95 °C	con ΔT 5-95 °C	con ΔT 5-95 °C
Freezing power	kW	–	–	–	–	4	–	–
Heating power	kW	–	–	–	–	10	–	–

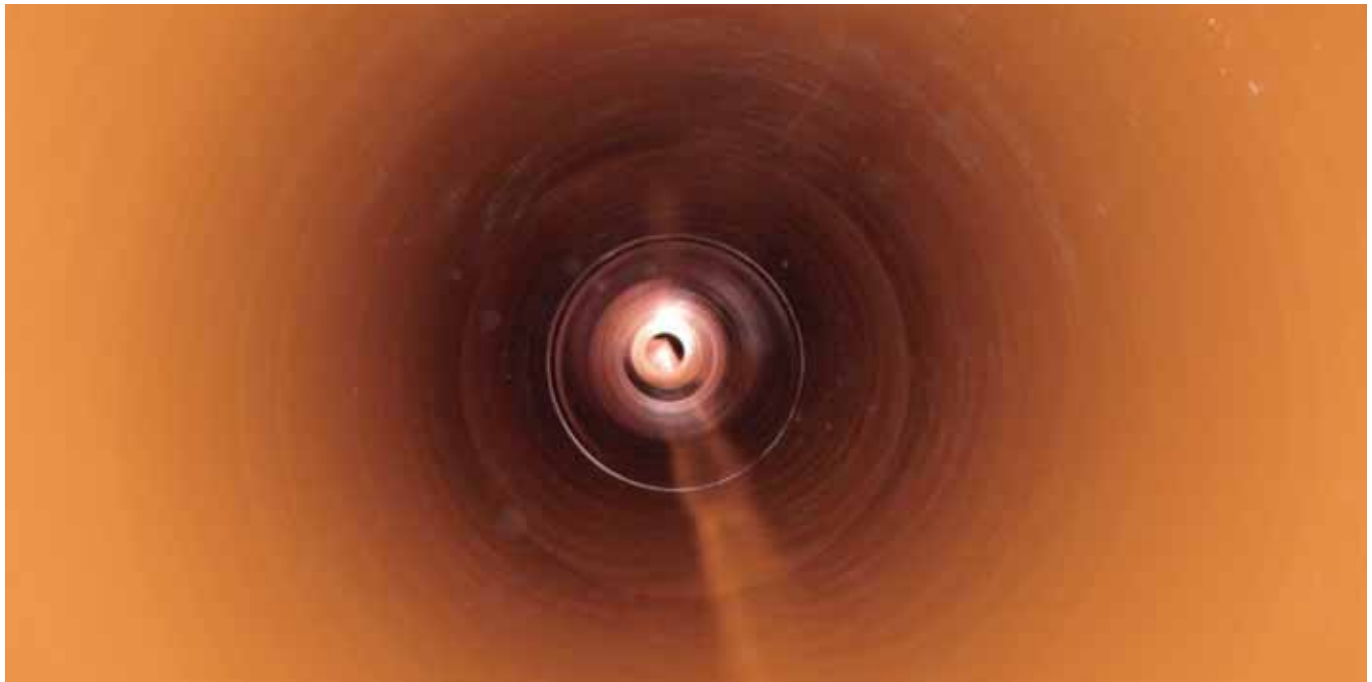
Specifications		GDF 750	GDF 400	GDF 33
Dimension	m	5x10x13	5.5x8x9	4x2.5x3.3
Useful room	m <sup>3</sup>	750	400	33
Max weight	kg/m <sup>2</sup>	9.000	9.000	1.500
Temperature range	°C	–30/+65	–30/+65	+30/+180
Freezing power	kW	90	45	–
Heating power	kW	85	54	35

## Overview about pollution testing services in FGH laboratories

Electrical, mechanical and environmental tests:

- artificial pollution tests on high-voltage insulators in accordance with IEC 60507;
- tracking and erosion tests (1000-hour salt fog test):
  - on composite hollow insulators in accordance with IEC 62217 (IEC 61462);
  - on composite suspension and tension insulators in accordance with IEC 62217 (IEC 61109);
  - on composite line post insulators in accordance with IEC 62217 (IEC 61952);
  - on composite station post insulators in accordance with IEC 62217 (IEC 62231);
- humidity and salt fog tests on accessories for power cables (terminations/sealing ends) in accordance with IEC 61442;
- on metal-oxide surge arresters in accordance with IEC 60099-4 (1000-hour salt fog test, weather ageing test series A);
- tests on ceramic and glass types of insulators in accordance with IEC 60383-1/-2;
- type tests and design tests on non-ceramic insulators (NCI) in accordance with IEC 62217, IEC 61109, etc. (sample and routine tests on request);
- artificial pollution tests in accordance with IEC 60507, for example salt fog tests;
- RIV/Dielectric tests in accordance with IEC 60437, IEC 61284;
- AC power arc tests in accordance with IEC 61467;
- mechanical tests on insulators, bushings and surge arresters;
- design and type tests on composite insulators.

Other tests in accordance with international standards or customer specifications are possible.



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## CESI's Business Areas:

- **Testing, Inspection** and **Certification** services for HV, MV and LV electrical components;
- **Engineering** and **Consulting** services for power systems and markets, transmission and distribution grids, generation plants, renewable and hydro plants;
- **Environmental Consulting** and **Structural Engineering** services for Energy, T&D, Industry and Transport sectors;
- Production of **Solar Cells** for Space and Terrestrial (CPV) applications.

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