# AERONAUTICAL Qualification

commercial@emitech.fr

## Expertise - Reactivity - Availability

"The Emitech Group is a major actor of the qualifications in the aeronautical sector.
**Known and recognized for their know-how**, our laboratories are equiped with means and skills to lead **complete qualifications.**
Our test capacities, allow us to control your **deadline and schedule imperatives**."

### Tests

**Standards**
RTCA DO 160
MIL STD 461/462
MIL STD 704
MIL STD 202, 810, 883
GAM EG 13
DEF-STAN
STANAG

**Test specifications**
DASSAULT
AIRBUS HELICOPTERS
BOEING
BOMBARDIER
ARIANE

### Engineering

Calculation and simulation in EMC (CST MICROWAVE)
Calculation of static and dynamic structure (ANSYS)
Embedded measures and customization of test (GLYPHWORKS)
Calculation of fatigue damage (DESIGNLIFE)
Writing test specification and qualification plans
Design/achievement of test bench and fixing tools

## EMITECH: laboratories with complementary activities

Emitech offers you a comprehensive service concerning your qualification needs in different fields such as: EMC, Electrical Tests, Lightning, Climatic, fire and Reliability.
Our methods & technology are in accordance with the most demanding standards & specifications.

## A support at every step of your projects

Emitech can help you to manage a key point of your qualification: the identification of costs & deadlines. Our services in Engineering intervene in all the steps of your project: from the training courses of your team to the specific missions such as file analyses, technical or normative researches, design assistance right up to the assistance with manufacturing.

## Exceptional Tests Equipment & Closeness Services

Our aeronautical test equipments are spread throughout our centers in France, permitting Emitech to offer the highest level of service on the market. The whole equipment concerning the more specific demands (lightning, high intensity radiated field, tests benching 800 Hz, EMC Rooms, shakers 105kN, chamber 93m$^3$, ...) remains unique in Europe.

ilac-MRA

cofrac MULTI ACTIVITÉS
EMITECH
TESTING / ACCREDITATIONS N° 1-0107, 1-0826, 1-0827, 1-1925, 1-2069, 1-2070, 1-2376 AND 1-6086
CALIBRATION / ACCREDITATIONS N° 2-5656 AND 2-5658
PRODUCTS AND SERVICES CERTIFICATION / ACCREDITATION N° 5-0549
DIRAC, ENVIRONNE'TECH, EUROCEM AND LEFAE ARE TESTING ACCREDITED / RESPECTIVE ACCREDITATION N° 1-2043, 1-1245, 1-0744 AND 1-1972
LIST OF SITES AND SCOPE AVAILABLE ON WWW.COFRAC.FR

EMITECH GROUPE

EMITECH EUROCEM ADETESTS ENVIRONNE'TECH DIRAC PIEME LEFAE

# ELECTROMAGNETIC COMPATIBILITY

**Immunity - HIRF**
- Electric field from 10 kHz to 40 GHz
  - up to 3000 V/m CW
  - up to 10000 V/m pulsed
- 5 Steering mode chambers with testing methods: DO160 and MIL STD461
- Magnetic field from 10 Hz to 150 kHz
- B.C.I. up to 1 Ampère from 10 kHz to 1 GHz
- AM, FM, pulsed and combined modulations

**Emission**
Measuremnts from DC to 40 Ghz :
- Clamp current probes10 Hz - 1 GHz (1kA)
- Magnetic loop antennas (20 Hz - 30 Mhz)
- Electric field antennas (10 kHz - 40 Ghz)
- Temporal Analysis (DC - 500 Mhz)

**Electrical tests**
- Transient surges according to RTCA DO160 F/G, ABD0100.1.8, ABD 0100 1.8.1C (A350), AMD 24C
- Voltage subtransients and specific waveforms by direct injection or by coupling
- Power supply interruptions
- Electric (AC/DC) and climatic (-70 °C/ 180 °C) combined tests
- Low frequency immunity on power supply
- Feasible tests on AC and DC from 50 Hz to 800 Hz (rack 45kVA x3 according to AIRBUS, BOEING, DO 160E/F/G section 16)
- Harmonic measurements

**Lightning**
- Amplifiers, transformers, inductors and generators according to:
  - RTCA DO 160 C/D/E/F/G; AC 20-136; ABD 0100.1.2
- Waves Generators, Multiple Stroke & Multiple Burst according to waveforms:
  - WF 1 or 4 : 6,4/70 µs - WF 5B : 50/500 µs
  - WF 5A : 40/120 µs - WF 2 : 0,1/6,4 µs
  - WF 3 : 1 MHz and 10 MHz - WF 6 : 0,244 / 4 µs - up to level 5 of DO 160 and even beyond in WF5A! (ABD Airbus level)

**ElectroStatic Discharges**
Up to 30 kV
- C = 150 pF, 330 pF, 500 pF, ...,
  R = 150Ω, 330 Ω, 2 kΩ, 500 Ω, 5 kΩ, ...

**Measurements on cables and shielded connectors**
- measurements of transfer impedance on cables and connectors in tri-axial cell (EN 62153-4-7, EN 62153-4-3) from 10 kHz to 200 MHz
- measurements of transfer impedance on connectors by injection line (60512-23-3) from 10 kHz to 100 MHz
- measurements of transfer impedance by injection probe (BCI) from 10 kHz to 200 MHz
- measurements of shielding efficiency in reverberation chamber (EN 61726) from 200 MHz

# CLIMATIC & MECANICAL

**Salt spray chambers**
Number: 8
Workspace: 0,4 to 13 $m^3$

**Climatic chambers**
Number: 60
Workspace: from 0,1 to 93 $m^3$
Temperature range: -70 to +650 °C
Rapid variation temperature: 20 °C/min
Relative humidity: from 10 to 100 % Hr

**Shock machines**
Number: 8
Acceleration: 5 000 g * - 10 000 g **
Max mass: 900kg *
Table dimension (mm): 900 x 900 *
* free fall **pyrotechnic shocks

**Centrifuges**
Number: 4
Acceleration: 400 g
Max diametre (mm): 3000

**Combined test chambers**
Number: 6
Temperature: -70 up to +150 °C
Rapid variation temperature: 20°C/min
Relative humidity: 20 to 100 % Hr
Software monitoring, remote alarms
Useful dimensions (mm) : 1200x1200x1200

**Electrodynamic shakers**
Number: 35
Frequency: 3 to 3000 Hz
Force: 7 to 105 kN
Max displacement: 3 inches
Table dimensions (mm): 1500 x 1500

**Hydraulic shakers**
Number: 12
Frequency: 0 to 300 Hz
Force: 200 kN
Displacement: 300 mm
Table dimensions (mm): 3000 x 3000

**Piezoelectric shakers**
Number: 2
Frequency: 2 kHz to 50 kHz
Force: 50 kN
Max acceleration: 100 g

**Specific tests**
Contamination by fluid
Sunshine
Altitude and rapid decompression
Solar radiation
Cooling
Wind-milling
Wind and rain
Sand and dust
Icing
Static mechanical tests up to 1500kN
Fire testing

**Specific measurements**
Voltage
Current
Rotation speed
Micro cut
Thermal camera
Laser vibrometry
Strain gauges
...

# FIRE

**Aeronautics fire testings - Interior cabins and cargo compartment**
Tests carried out according to standards: FAR 25 (Part F, 25.869, 25.853, 25.855); CS 23, CS 25 et CS 29; AIRBUS METHODS ABD0031, AITM 2.0002, AITM 2.0003, AITM 2.0004, AITM 2.0005; BOEING METHODS BSS7230; NF EN 3844-1, NF EN 3844-2, NF EN 3844-3

**Measurement of opacity and toxicity of smoke released during combustion**
Tests carried out according to standards: FAR25 Part 25 appendix F, FAR 25.853; AIRBUS METHODS ABD 0031, AITM 2.0007, AITM 2.0008, AITM 3.0005; BOEING METHODS BSS7238, BSS7239; NF EN 2824, NF EN 2825, NF EN 2826

**Seat Cushion test**
Tests carried out according to standards: FAR25 Part 25 appendix F, FAR 25.853; AIRBUS METHODS ABD 0031, AITM 2.0009

**Flame propagation for Thermal and acoustic insulation**
Tests carried out according to standards: FAR25 Part 25 appendix F, FAR 25.856; AIRBUS METHODS AITM 2.0053

**Flame penetration cargo liner**
Tests carried out according to standards: FAR25 Part 25 appendix F, FAR 25.855; AIRBUS METHODS AITM 2.0010

**Fire Hazar test**
We simulate fires in controlled environments to demonstrate the ability of the tested systems to maintain their operating conditions despite the presence of a fire in a specific area (hold, hydraulic sheet, passenger baggage compartment)

# RELIABILITY HALT & HASS

**HALT chamber: TYPHOON 3**
Workspace: 1140 $dm^3$
Temperature: -100 to +200 °C
Rapid variation in temperature: up to 60°C/min

Vibrations:
- random and omniaxial
- frequency from 10 to 10000 Hz
- max acceleration: 60 gRMS

Make your equipment more mature.

- **In the design development process**, by improving the product's robustness being focused on the operating & destruction limits;
- **In the manufacturing process**, by removing the latent defects & validating the process & source of supply.

# HYDRAULIC **Test means for equipment with various fluids* from -70 up to +600 °C (ambient)**

- **Liquid**
  6 oil power units: from 1 to 75 l/min, 10 to 250 bar, -20 to 130°C
  4 glycol benches: 8 m³/h, 3 bar, 130°C
  2 Skydrol power units: 1 to 9 l/min, 350 bar
  4 syringe systems 10 to 525 bar
  Oil heater, hand-pumps, glycol refrigerated unit, …
- **Air**
  1 pressure/vacuum bench: 0,1 to 2 bar
  5 pressure/vacuum chambers
  3 air boilers 250 to 300°C – 1 air boilers (fuel) 650 kW
  Air heater, warm chamber, valves 454°C – 60 bar, …

* synthetic oil, mineral oil, brake fluid, power stearing fluid, coolant, fuel, air, vacuum, skydrol, ...



**Centre of Trois Peuples (Montigny le Bx): +33 1 30 57 55 55 - commercial@emitech.fr - www.emitech.fr**