STELLANTIS

INDUSTRELEC Groupe ICM

BATTERY SAFETY LAB

Engineering safety, powering tomorrow

Donzé ARCHITECTES · M&K Développement · SIEMENS Ingenuity for life · IPM MONDIA · EUROVIA · TED · mécanique e.p.h industrielle · MEDIACO · LEGOUPIL INDUSTRIE · PRO CONCEPT 90 · HUGUES PERSONENI · LACOSTE · STH · Bohl Plast Environnement · fondasol # CONCEPTION GÉOTECHNIQUE · Shaping a World of Trust · RÉPUBLIQUE FRANÇAISE · INERIS

A NEW TEST BENCH, WHAT FOR ?

STELLANTIS

STRATEGIC & CONFIDENTIAL

VALIDATION & HOMOLOGATION

ENVIRONMENTAL CONSTRAINTS

UN R100 TESTS

PREPARATION & EXPERTISE
of the specimen outside

1 Battery fire resistance

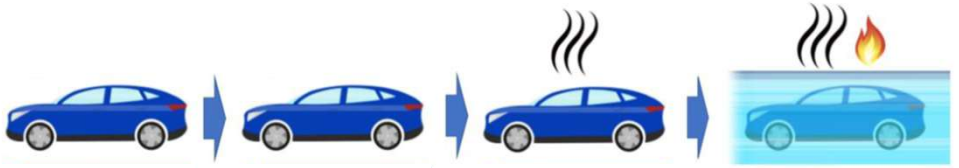
Battery exposure to flame | Battery exposure to refractory bricks | Battery removal and shutdown | Immersion in case of smoke or flames

2 Battery thermal runaway ~50/y

Battery Trolley

Battery with heating patch | Heating Patch activation | Thermal propagation / smoke | First flames = immersion

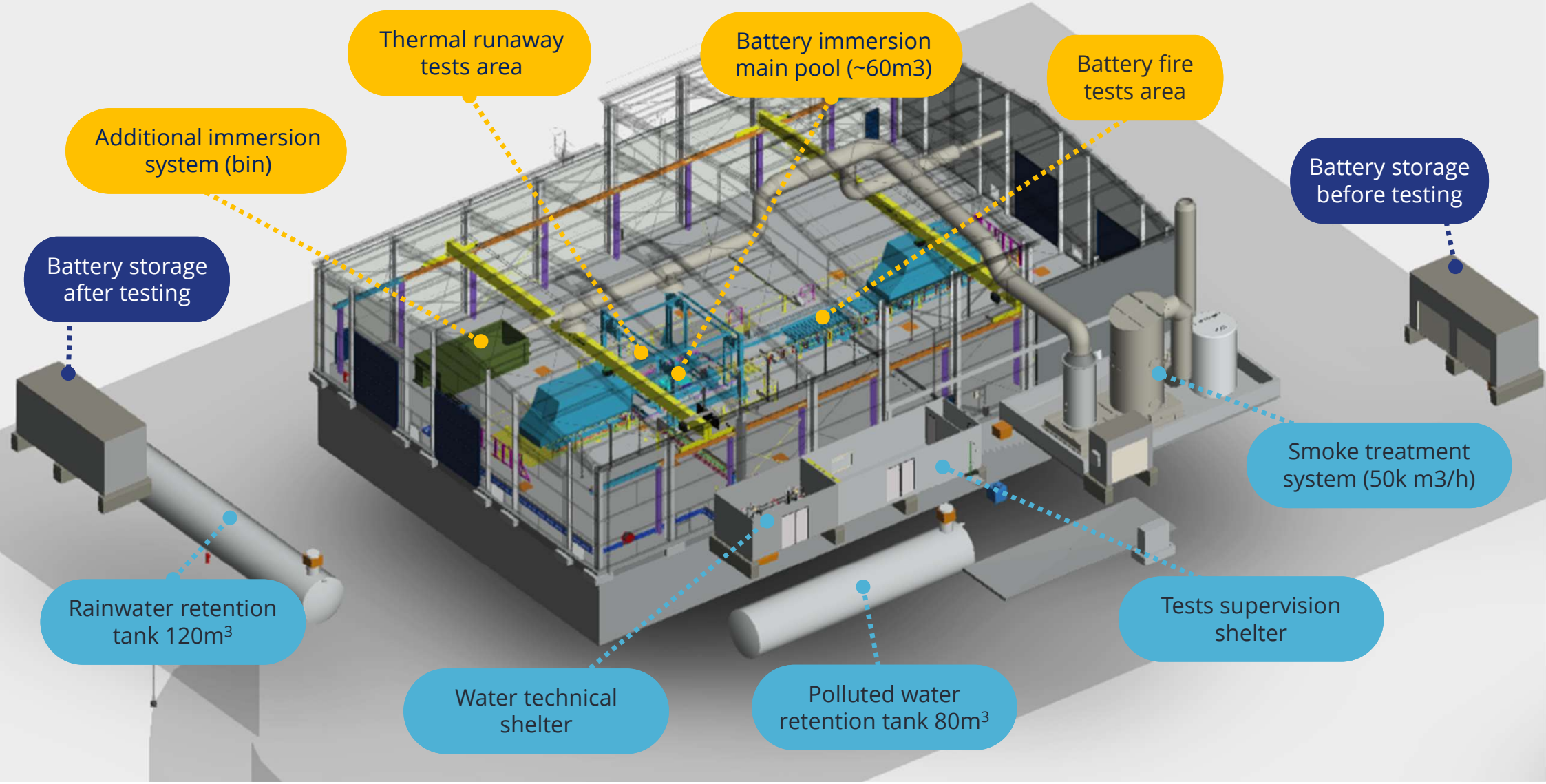
3 Vehicle thermal runaway ~15/y



Battery with heating patch | Heating Patch activation | Thermal propagation / smoke | First flames = immersion

Thermal Propagation

TEST FACILITY DESCRIPTION

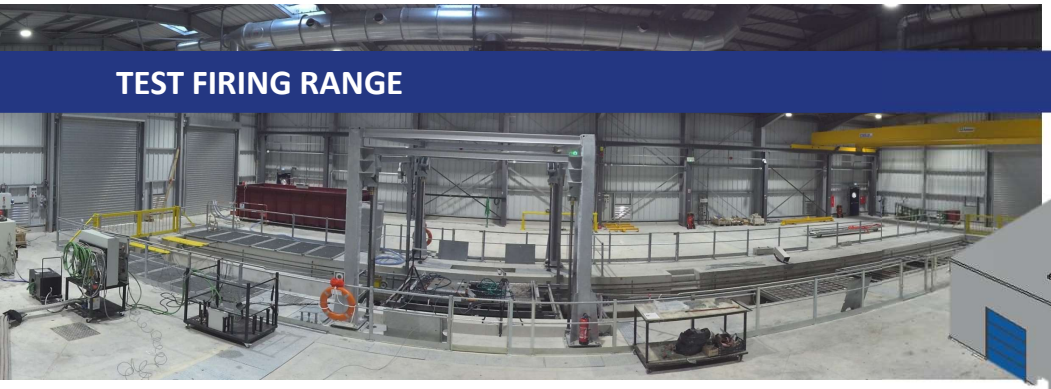


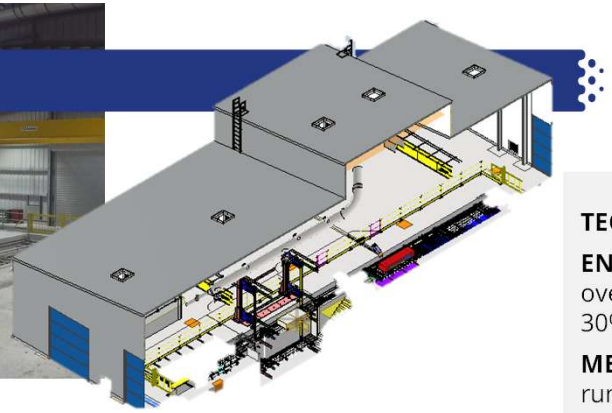
PLANNING

PROJECT COSTS

Budget = 7M€

TEST FIRING RANGE





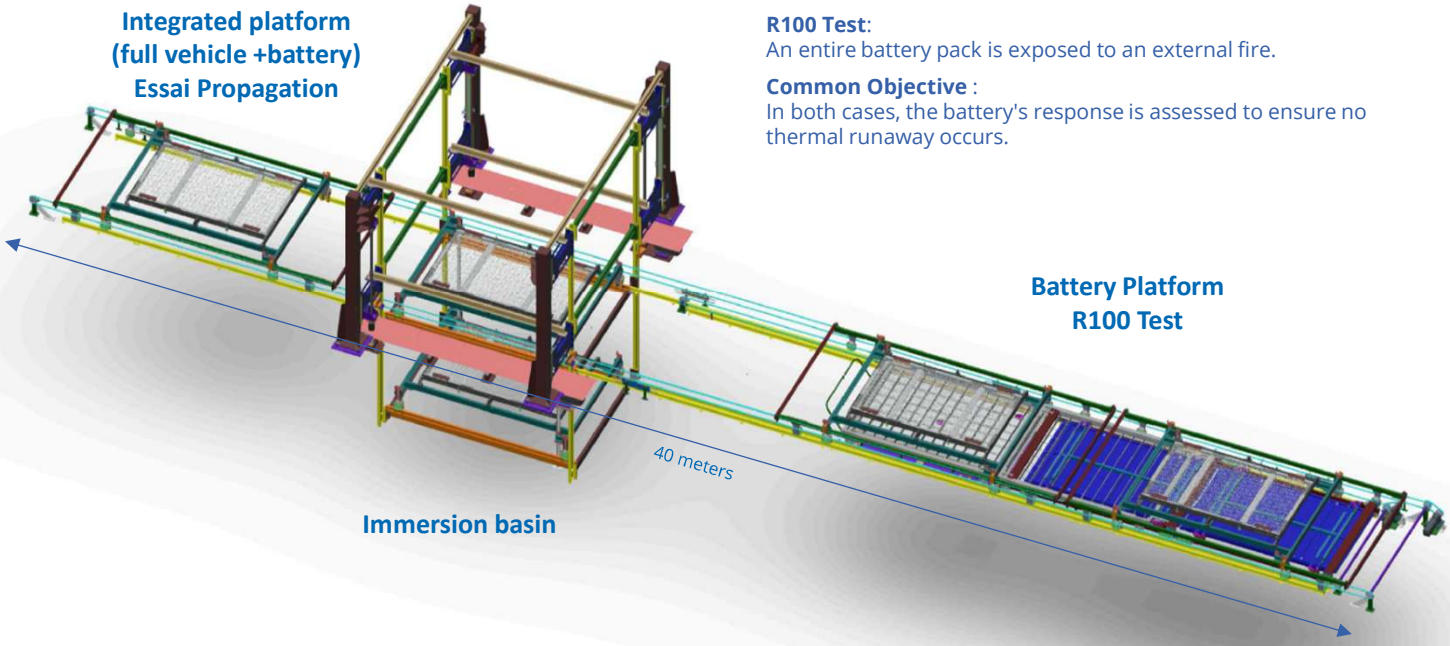
Facility for inducing thermal runaway conditions & evaluating battery behavior“

Thermal Propagation Runaway Test :
A battery cell is heated to 80°C to induce thermal runaway. The behavior of the modules is monitored and analyzed.

R100 Test:
An entire battery pack is exposed to an external fire.

Common Objective :
In both cases, the battery's response is assessed to ensure no thermal runaway occurs.

Integrated platform (full vehicle +battery) Essai Propagation



Battery Platform R100 Test

Immersion basin

TECHNICAL DETAILS

ENVIRONMENT : Building resistant to 50 mbar overpressure. Scrubber system using softened water and 30% caustic soda.

MECHANICAL : Specimen immersion in case of thermal runaway via an elevator with 4 synchronized lead screws, controlled by a variable frequency drive.

SENSORS : ~200 thermocouples, 10 pressure channels, 1 thermal camera, and 10 4K cameras to analyze specimen behavior and smoke flow.

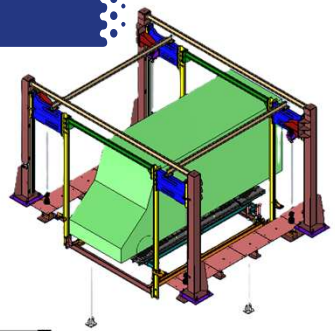
SAFETY : Smoke detection and thermal surveillance cameras, triggering immersion if test scenarios deviate. Emergency stop & remote-control station in a pressurized container at 50 mbar to prevent smoke entry and protect the operator.

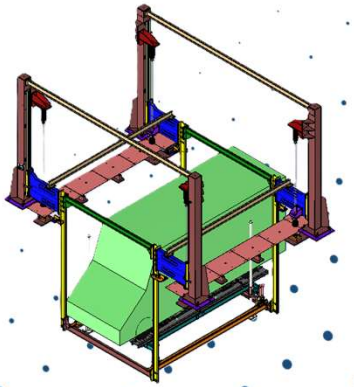
DATA ACQUISITION : Sampling frequency of 1 kHz. Real-time monitoring via VECTOR software. INCA software for battery communication.

Test bench control shelter resistant to a 50 mbar overpressure

Battery fire resistance

IMMERSION BASIN





Immersion basin stops the induced fire on the battery and prevents the spread of fumes

TECHNICAL DETAILS

STRUCTURE : Reinforced concrete tank with chemical-resistant resin coating (pH 9.5). Includes a 6-ton elevator and secure mechanical platform for vehicles/batteries.

DIMENSIONS : 3.8m × 5.8m × 2.7m depth, suitable for batteries or vehicles.

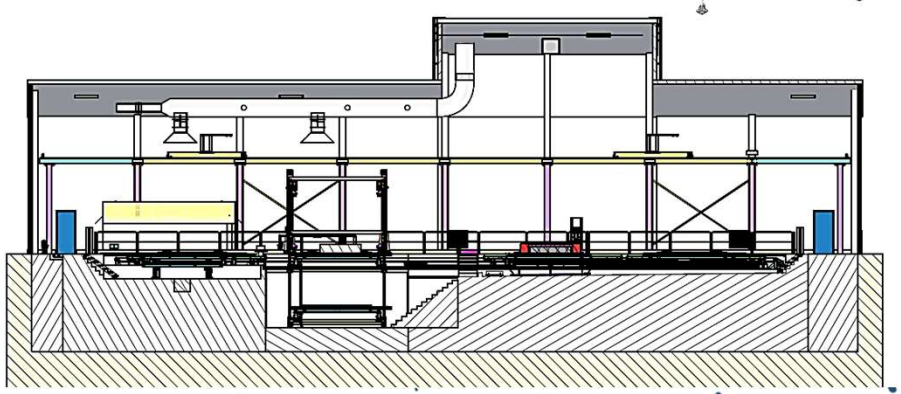
CAPACITY : ~60m³ water volume.

WATER SOURCE & MANAGEMENT : Rainwater collected via integrated system. Manual drainage to double-walled underground tank. Specialized company handles retreatment. Leak-proof storage with pH monitoring.

WATER MANAGEMENT: IMMERSION DURATION : Up to 5 days for complete extinguishing and cooling.

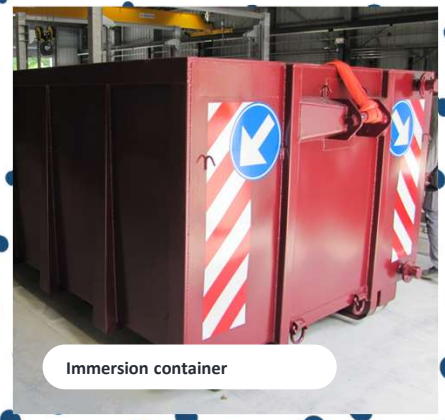
SAFETY : Sensor-monitored double walls, compliant with environmental standards.

MAINTENANCE : Regular cleaning, corrosion inspections, and management of rainwater, mechanical, and scrubber systems.



Immersion basin

Immersion basin with van

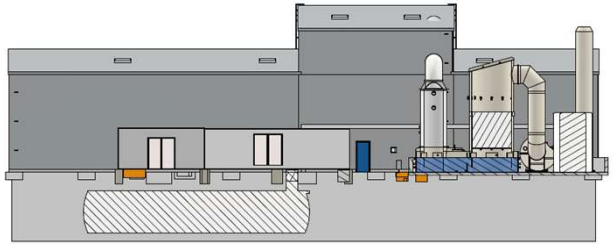


Immersion container

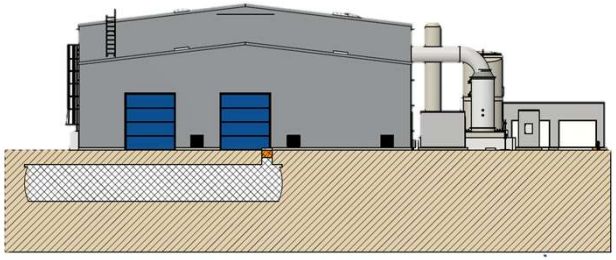
AIR TREATMENT SYSTEM WITH CHEMICAL ABATEMENT

Water technical shelter

Chemical treatment of gases emitted by the battery



Collection tank for contaminated water after battery tests, prior to recycling by a specialized company



Rainwater collection tank

TECHNICAL DETAILS

AIR TREATMENT SYSTEM : Chemical treatment of gases (HF, HCl, HCN) emitted by the battery & 1 hydrogen gas detector at the scrubber level.

GAS SCRUBBER : Scrubber composed of softened water and 30% caustic soda.

CHEMICAL REAGENTS : Injection of caustic soda to maintain a pH of 9.5.

FORCED VENTILATION : Flow rate of 50,000 m³/h (40,000 m³/h for ambient air and 10,000 m³/h for work areas such as the pool, thermal, and R100 test areas) to prevent the accumulation of explosive gases and capture polluting fumes.

REAL-TIME SENSORS : pH monitoring sensors in the water for caustic soda injection.

Air treatment system with chemical abatement

BATTERY SAFETY LAB

Project 2026

Thank you to the STELLANTIS and INDUSTRELEC teams, as well as to our partner companies, for supporting us in the successful completion of this project.

Project managed by SEWP/GFME/TENG : B. PAPIN | P. PINAUD

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Y. DAUCOURT (Battery validation)
VEHE/VEPE/EMAT : JM. DEZEURE | M. LACLEF

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Environment : A.C. GAUTHIER
TB Maintenance : J.M. AUVIGNE
FM Maintenance : S. VINCENZI

Study and manufacturing
Managed by INDUSTRELEC Audincourt agency | C. Dupont & his team.


BATTERY
SAFETY LAB


BATTERY
SAFETY LAB
INDUSTRELEC
INTEGRATEUR PROCESS
CONCEPTION REALISATION MAINTENANCE


32 tonnes
BiA