



BATTERY SAFETY LAB

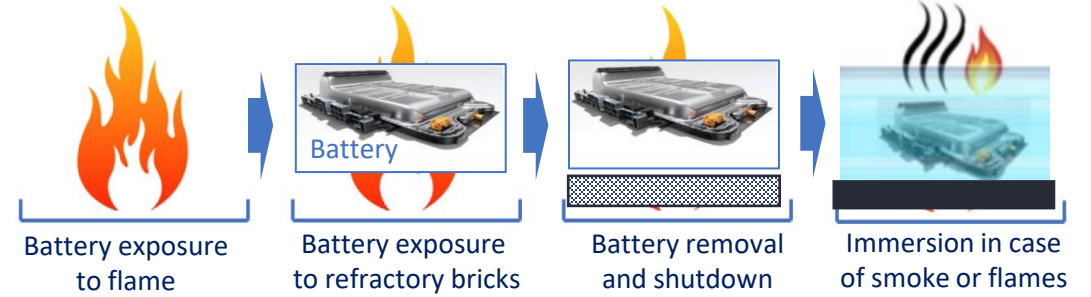
Engineering safety, powering tomorrow



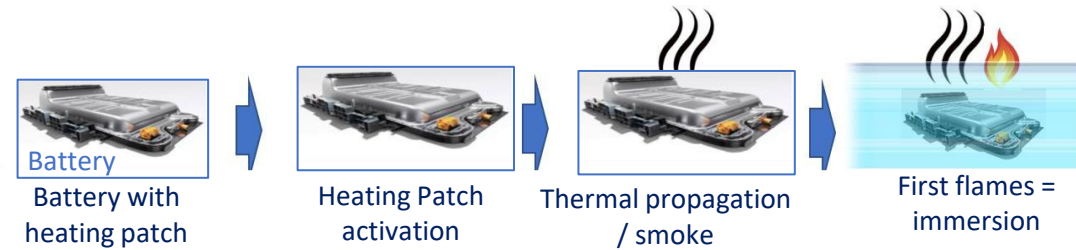
A NEW TEST BENCH, WHAT FOR ?



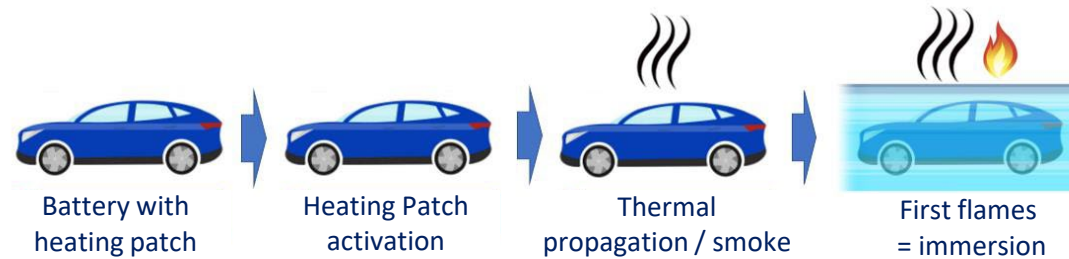
1 Battery fire resistance

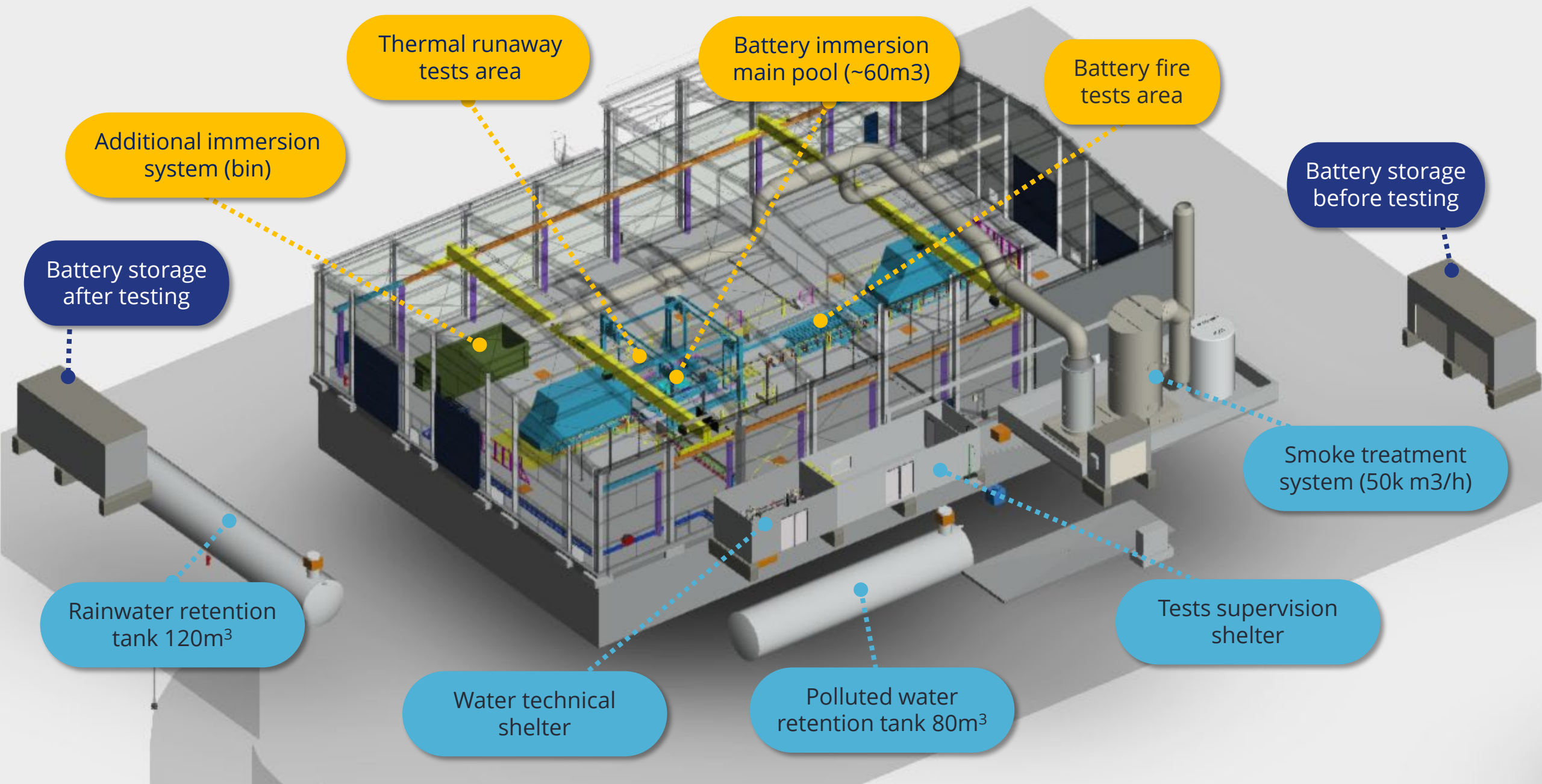


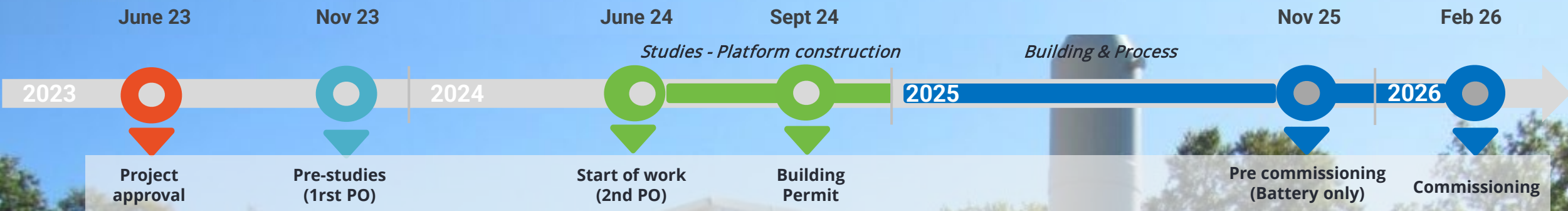
2 Battery thermal runaway ~50/y



3 Vehicle thermal runaway ~15/y

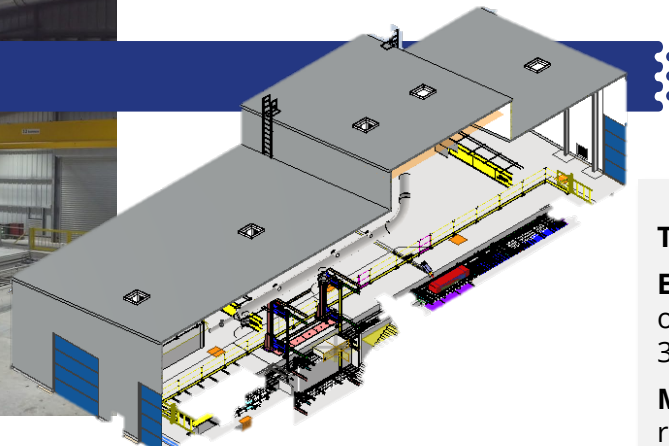






PROJECT COSTS

Budget = 7M€



Facility for inducing thermal runaway conditions & evaluating battery behavior“

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.

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.

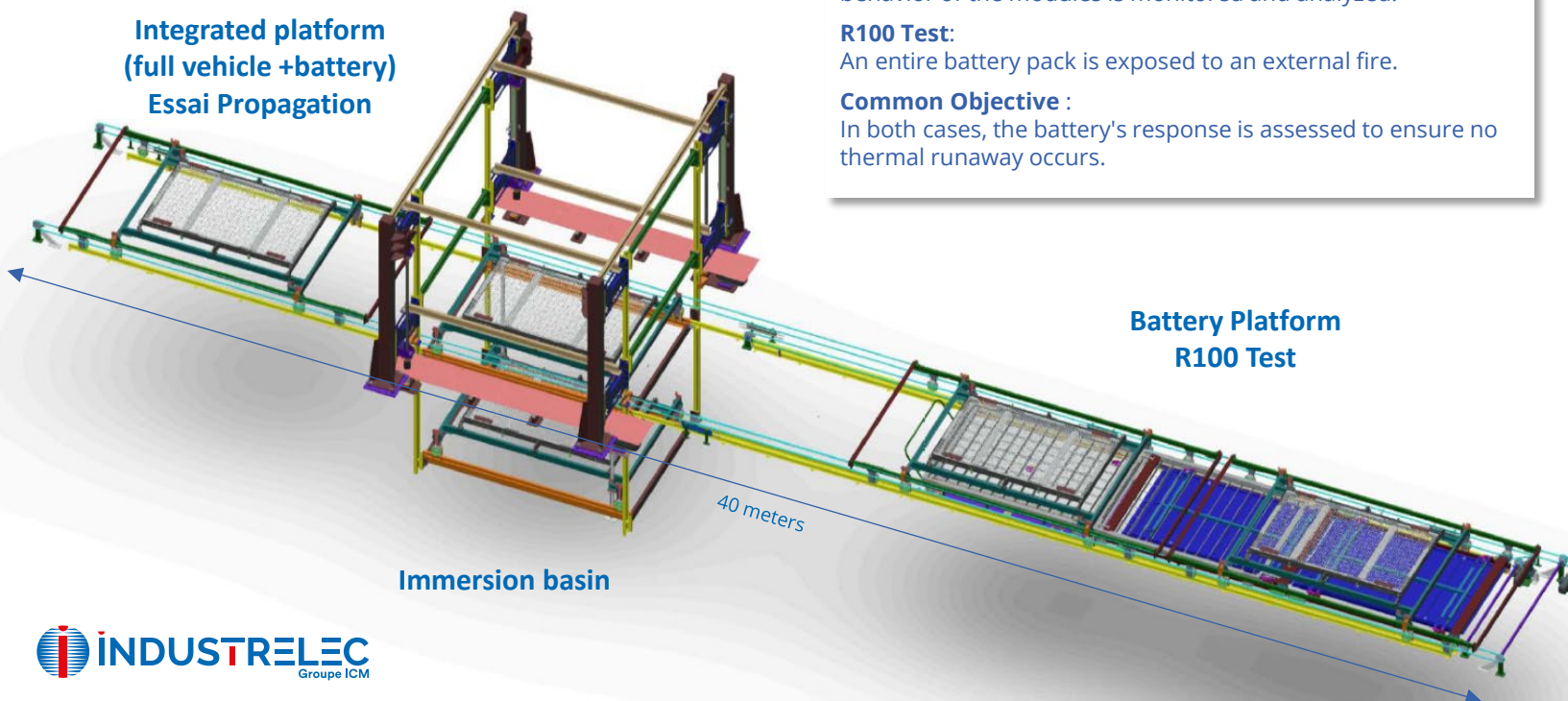
R100 Test:

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

40 meters



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.

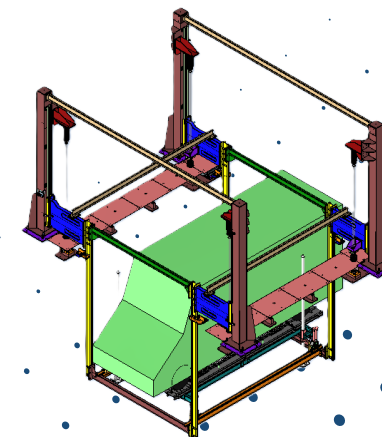
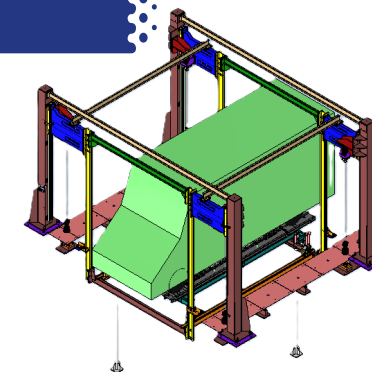
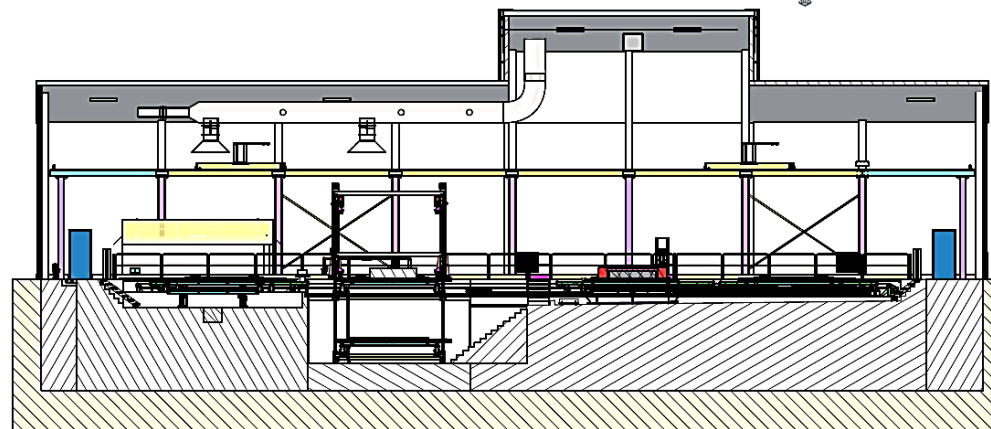
CAPACITY : ~60m³ water volume.

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



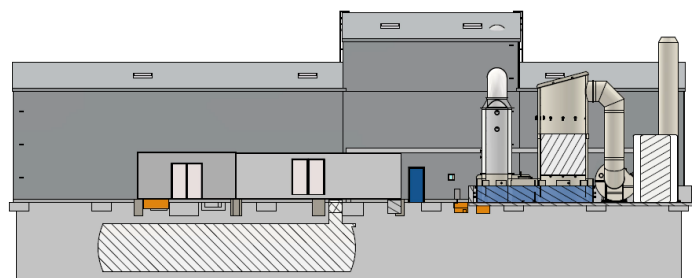
Immersion container



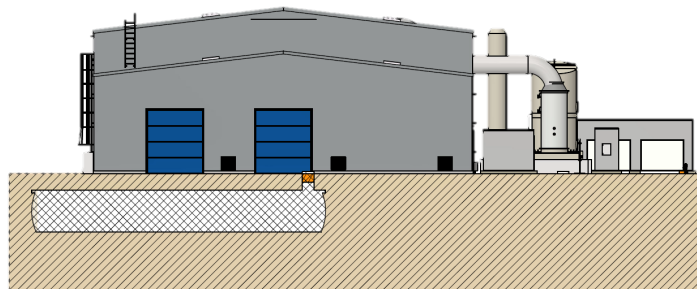
Chemical treatment of toxic gases emitted by the battery



Water technical shelter



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 toxic 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

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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.



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Y. DAUCOURT (Battery validation)

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Partners :

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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.

