Innovation Days Efficient Dynamics.
Energy and Environmental Test Centre.

BMW Group

Energy and Environmental Test Centre (ETC).
Workshop: Cold test chamber.

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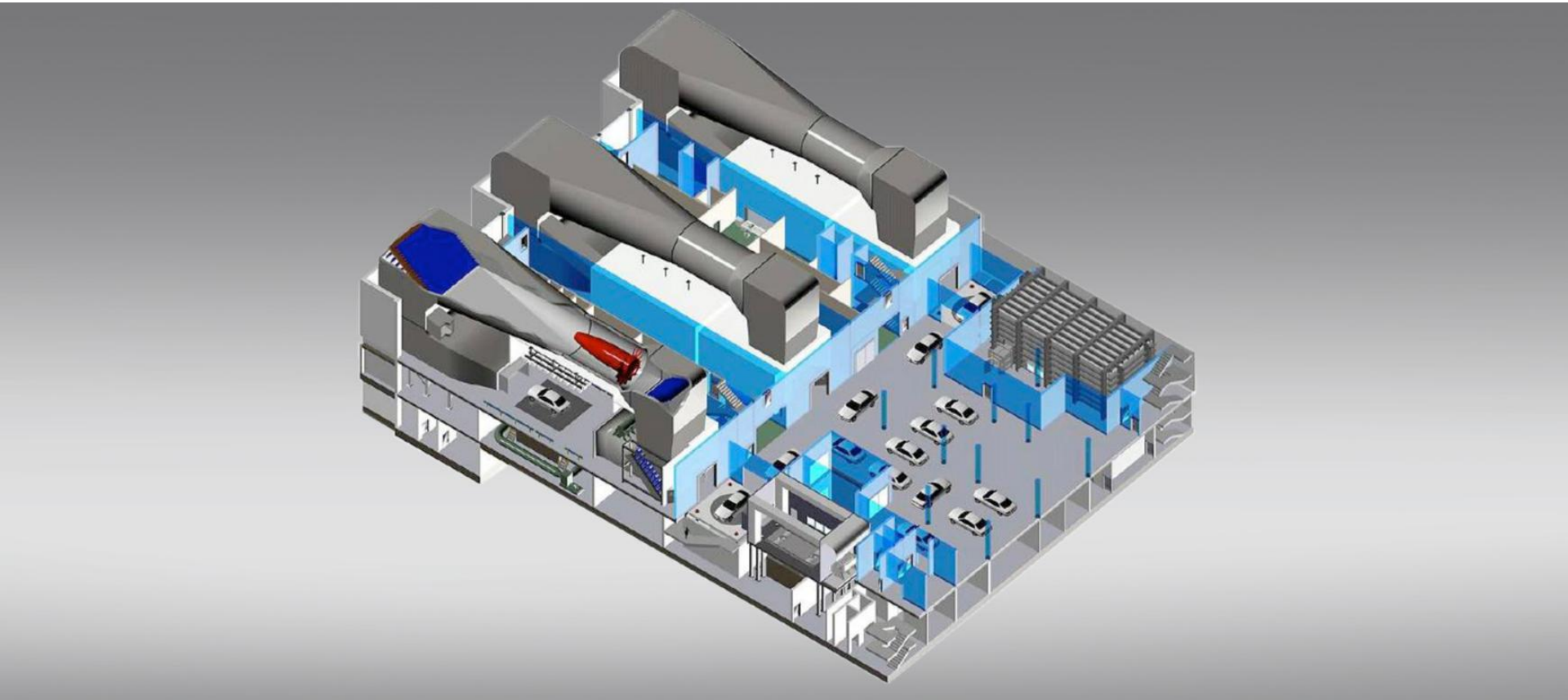
Cold test chamber.



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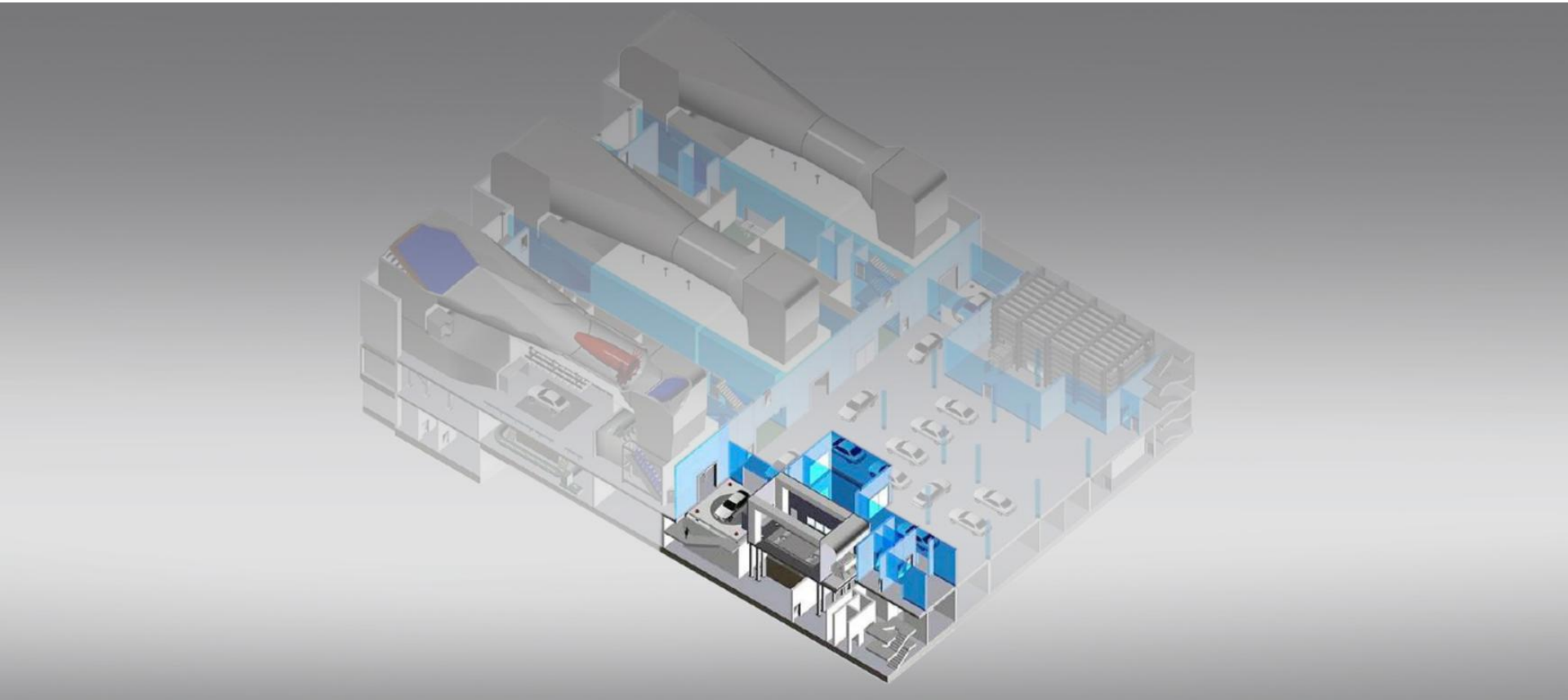
Cold test chamber.



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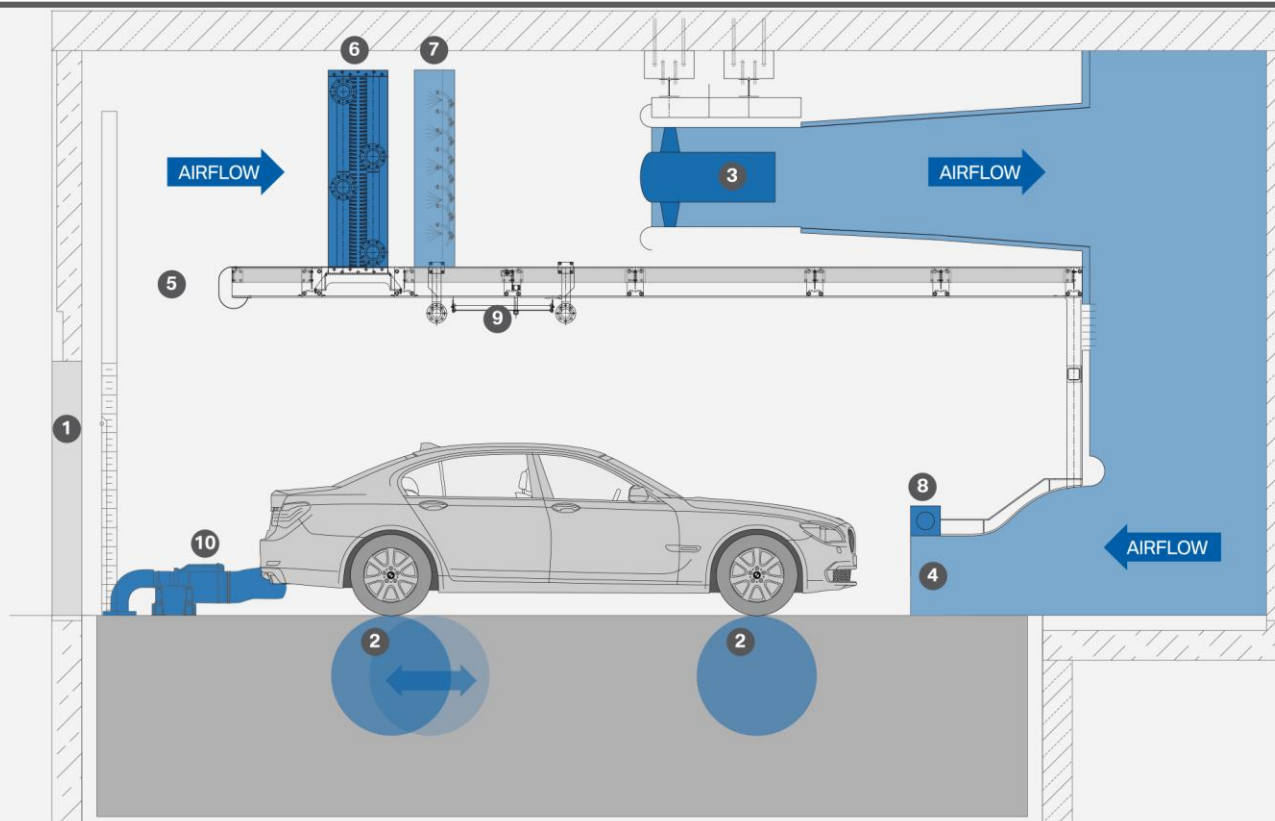

Cold test chamber
Kälteprüfstand

1. Access for vehicle / Einbringung Fahrzeug
2. Roller dynamometer / Rollenantrieb
3. Fan / Gebläse
4. Nozzle / Düse
5. Collector / Kollektor
6. Heat exchanger / Wärmetauscher
7. Humidity regulation / Feuchteregulierung
8. Idle city flaps / Idle City Klappen
9. Defrost camera system / Defrost Kamerasystem
10. Exhaust extraction / Abgasabsaugung

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Cold test chamber – specifications.

- Thermally isolated chamber
- Plenum: 10 m x 5 m
- Temperature range: -30 to +30°C
- Relative humidity controllable between 0 and +30°C
- Four-wheel dynamometer with max. power 180 kW per axle
- Max. wind speed: 130 km/h
- Nozzle: 1 sq.m.
- Two fans, each with a diameter of 1000 mm
  Max. rpm: 1760 rpm | max. power: 110 kW
- Linked to closely adjacent soak area via a vehicle lift which is continuously swept with cooled, dried air

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Range of tests.




Cold start performance, engine calibration and batteries

Cold start performance, transmissions

Energy management strategies for extremely cold conditions

Heating and climate control system design, including optimised design of ventilation
Windscreen de-icing and dehumidification (type approval)

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Deicing test. Aim: to achieve 95% windscreen defrosting within 25 minutes (max.) at minus 20°C.

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Type approval: demisting/deicing.

Deicing test aim: to achieve 95% windscreen defrosting within 25 minutes (max.) at minus 20 °C

Test procedure

1. Cold-soaked vehicle admitted to cold test chamber from soak room via dried and cooled transfer zone
2. Set up vehicle and test equipment
3. Spray windows with water to create a defined ice thickness
4. Start engine and run at constant rpm, set heater to defrost position
5. Monitor defrosting process using digital imaging processing (previously manual)
6. Post-processing and evaluation after completion of test
7. Remove vehicle. Start preparations for next test

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Type approval test past and present.

Previously: test conducted and evaluated manually	**Today: fully automated testing and evaluation**
Defrosted areas copied with crayon and traced onto car	Digital imaging Fully automated evaluation
Manual measurement	
Total time required: approx. 5 hours	Time required: approx. 5-10 minutes

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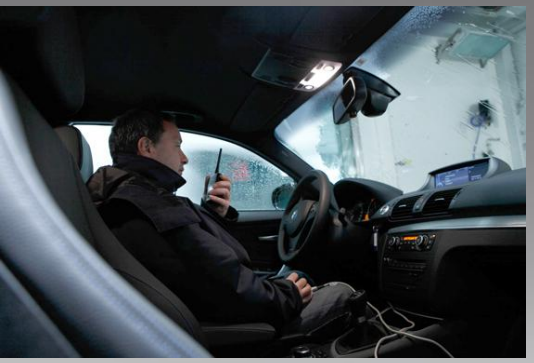
Cold test chamber: benefits for technical departments

Example: heating/climate control systems



- Precise, reproducible development and verification testing of heating performance, temperature behaviour, control stability, airflow …
- Speedier testing of windscreen defrost function
- Efficient performance of mandatory type approval test
- Hybrid and electric vehicle testing
- Systems testing of electrically or fuel-powered heater boosters
- Objective benchmark for comparisons with competitor vehicles
- Enhanced testing capability avoids the need for later changes
- Validation and continuous refinement of flow simulation calculations

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Cold test chamber: benefits for technical departments

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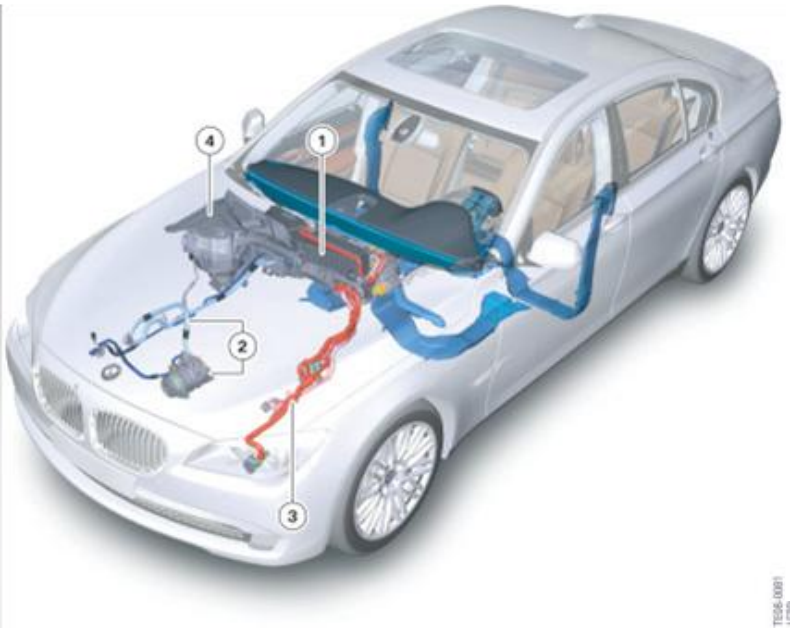

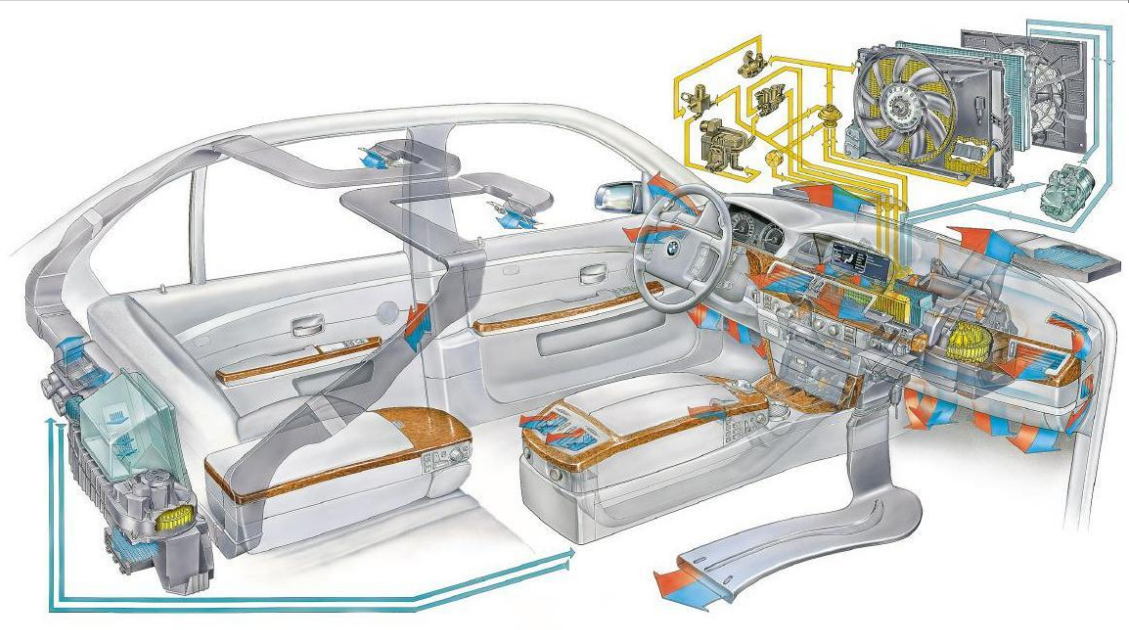

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Thank you for your attention.