

NVH laboratories

Noise and vibration measurements are performed either in our laboratories or at our [proving grounds](#). The measurements are performed at vehicle or system and sub-system level. The assessment and solving of issues are typically performed in the laboratories.



Hemi-anechoic chamber:

The hemi-anechoic chamber is used to perform any type of test that requires no distraction from foreign noises and **vibration** events. The room is completely isolated from the rest of the building and the dynamometer inside the chamber is capable of reproducing the driving conditions existing in the proving ground. The **noise** absorbing wedges installed in the walls and ceiling minimize noise reflection emulating free field condition. The anechoic space of the chamber is approved according to **ISO 26101:2017** and is used for measurement according to UN Regulation 138 (AVAS, minimum **noise**) and UN Regulation 28 (horn **noise**).

Facility's main characteristics:

- Hemi-anechoic chamber with chassis dynamometer for full NVH vehicle characterization
- Room dimensions: 14,7 m x 11 m x 5,1 m
- Cut-off frequency (ISO 26101): 50Hz
- Anechoic space large enough for UN R138 and UN R28 measurements
- Background noise: 22 dB(A)
- Reversible vehicle ventilation
- Temperature control: 24 C +/- 1 C
- Single axle chassis dyno (with 2 independent motors)
- Maximum speed: 250 km/h

- Roller diameter: 72" or 1.828 m
- Nominal power (temporally up to): 320 kW (480 kW)
- Tractive force (temporally up to): 14,000 N (21,000 N)
- Noise level: 48 dB(A) at 100 km/h at 1 m
- Inspection pit available
- Impact strip to perform impact noise tests
- Maximum drive axle weight: 2,500 kg
- 220 V AC, 380 V AC (three-phase) and 12 V DC sockets available (max power 8 kW)

Modal analysis test bench:

The **modal analysis test bench** is placed in a quiet room and is suitable for performing modal analysis over trimmed body and body-in-white. Measurements are also performed on systems and sub-systems. On top of that, the modal analysis measurement setup can be scaled up to commercial vehicle body size, upon request.

The team is, therefore, experienced in analysing anything from small single parts, like brake pads and instrument panels, up to commercial vehicle cabins and complete bus structures.

Four-poster bench:

The four-poster bench is generally **applied for known vibrational inputs to the vehicle's wheels**. This allows investigating multiple vehicle issues. Some examples are the evaluation of body resonances, system eigenmodes or squeaks and rattles.