

Chassis dynamometer (ϕ 1.2 m) for dynamic testing on autovehicles



Chassis dynamometer testing

The Chassis dynamometer installed in "Centro Prove Avigliana" (Torino Italy), has 2 rollers 1.2 m diameter conformal to standard for vehicles testing and homologation.

Tracking simulation: vehicle under test is braken to simulate real test conditions of a vehicle running on roads flat, rising or pending

Acceleration: acceleration test under different test conditions. Evaluation between two pre-set speed within a pre-set time.

Coast Down: test of the pre-set braking curve starting from a pre-set max speed.

Constant Torque: Vehicle can be dragged or braken with constant torque value without regard to the actual speed.

Constant speed: vehicle speed is kept constant at all time.

Speed limit: giving full power to the vehicle, the chassis start braking at a pre-set speed.

Power lossed: Calculation of power lossed of the test bench or bench + vehicle from coast down time measurement. Similar to coast-down but without braking the vehicle from the pre-set speed.

The chassis dynamometer is allocated inside a semi-anechoic chamber conformal to ISO 3745 standard, with a Background noise level < 15 dBA. When a car in standard setup is running at 120 km/h with engine off, the Sound Pressure Level is < 60 dBA.

Dynamic Testing

- Heating up
- Power losses
- Coast Down
- Constant Torque
- Constant Speed
- Speed limit
- Tracking Simulation
- Acceleration
- ...

Acoustic Testing

- Cabin Noise
- Acoustic Confort
- Engine Noise Radiation
- Sound Perception and Sound Quality
- Pass/by Noise simulation
- ...

Vibration Testing

- Vibration confort on toeboard and seats
- Engine mounts filtering
- Inherthances on engine mount locations and exhaust suspensions points
- Transfer path analysis
- Force to Noise ratio (Structure born)
- Body dynamics and vibration test
- ODS of operation cinematic chains
- ...

Technical data:

V max 206km/h

P max 160kW

F max 5570N

$L_{p,A} < 60dB$

Torque measurement: Torquemeter

Full scale: $\pm 4000Nm$

Analog output: 10V

Max error: 0.2%

Speed measurement: Digital Encoder

Power supply: 5Vcc

Impulse /tour: 16384

Speed resolution: 0.1km/h



What else we can do for you

NVH Test and Analysis - Components Testing

Air-inlet and Exhaust airborne noise testing
 Vibration confort of steering wheel, suspensions, tires, etc.
 Vibration filtering of vehicle suspensions
 Sound insulation and Acoustic Transparence of complete vehicles; i.e. P/P and F/P
 Propagation Noise from air inlet and Exhaust
 Noise from climatic units, air diffusers, forced ventilation
 Squeak and rattle localization and classificatio
 Disk brake squeal and resonances identification
 Engine cooling system noise emisison
 Noise from windows motors, electric rear-mirrors, wjheap glass, seat motors
 Noise from door slam, sealing optimization for air leakage noise
 Sound insulation of nibody elements w/out sond packages
 Noise and Vibration Testing of mechanical parts of powertrains and diagnostic



BW Modal Analysis



S&R Test Bench



Gearbox vibration



Sound Absorption

Certification test

Acoustic power of vehicle components, house hold appliances. Machines according to EU directive
 Pass-by noise on private test track
 Modal analysis and SDM trials
 Sound images systems based on Acoustic Holography and Beamforming
 Cabin Interior acoustic (Short time Reverberation)
 Translation of subjective test into Psycho-acoustic objective parameters (Sound Quality) and Jury testing sessions.

Material Testing

Sound insulation
 Random incidence Sound absorption (Reverberant room)
 Small cabine Reverberation measurement for automotive components
 Impedance tube and Flow Resistance for porous materials
 Tortuosity, Bulk modulus, Elastic modulus, Damping loss factor

Facilities and Equipments (Hardware e Software)

Material Testing

Kund tube for sound absorption, sound insulation, Impedance, Zc complex impedance
 Flow Resisance and Tortuosity of porous materials
 Elastic Modulus, Poisson ratio and Damping Loss Factor (Oberst and SAE methodologies)
 Random incidence Sound absorption coefficient
 Sound Insulation between adjacent rooms
 3-d Bulk Modulus of porous materials
 Visco analyzers

Noise and Vibration Test Benches

Electrodynamic Exciters from 200 N to 10 kN, 1 or 2 axes
 Closed loop vibration controllers (UD, DP, Ucon)
 6 kN shaker 2-axes, 2 kHz, 50 mm displacement
 Hydraulic actuators 50 kN - 200 Hz
 Vibratoin Table 300 X 300 cm up to 200 Hz
 Climatic Chambers
 Semi-anechoic chamber with Chassis dyno for car, trucks, bus,
 Squeack and Rattling test bench
 Squeack and Rattling localization on moving vehicle

Measurements and Analysis Systems

Real Time Analyzer, multichannels (NetdB, VXI, SQ-Lab, Oros)
 Binaural test head (Head, Cortex)
 Jury testing
 Sound Quality (dBSonic, Head Acoustic Artemis)

Simulation Software

Fatigue Analysis (Glyphworks®)
 FEM Analysis (Ansys® e I-deas®)
 Non linear Analysis (Marc®)
 FEM refining (Femtools®)
 FEM-BEM in frequency domain (Rayon®)
 FEM-BEM in time domain (Astryd®)
 SEA Modelling (AutoSEA®)
 Modal Analysis (I-deas®, ME-Scope®, CadaX®, Testlab®)
 Acoustic Holography (dBVision) and Beam-forming (Noise Vision)
 Sound Intensity and Sound Power
 Environmental Noise Prediction (CadnaA®)
 Calculation on Physical models for poro-acoustic and poro-elastic materials
 Pass-by noise ISO 362 and tires noise