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ARAI
Progress through Research

ENVIRONMENTAL TESTING SERVICES

Product Performance and Reliability Testing

THE AUTOMOTIVE RESEARCH ASSOCIATION OF INDIA

ENVIRONMENTAL TESTING

State-of-the-art technology and increased demands for product & component reliability have intensified the need for advanced environmental testing.

Automotive Research Association of India (ARAI) has NABL accredited, ISO 17025 compliant, fully independent testing laboratories. Our Environmental Testing laboratories offer a broad range of vibration, corrosion and climatic testing capabilities. It provides Support to industry for design validation, product validation during various stages of product development. ARAI is equipped with tools & competency for "Testing With Solutions". In addition to environmental testing, required by safety and performance standards, ARAI also provides testing for Research & Development projects.

We test to a wide range of international, industry and client specific standards & provide services to many market sectors including:

- Automotive vehicle, components & sub systems
- Off road vehicle, components & sub systems
- Aerospace electronic equipment
- Defence
- Rails
- Consumer and electronic devices
- Industrial components
- Packaging
- Textile
- Plastic
- Pharmaceutical & Medical
- Consumer products

ARAI offers a variety of test facilities for a broad range of testing & validation requirements including:

- Vibration and shock testing
- Combined Temperature and Vibration testing
- Temperature and Humidity testing
- Thermal shock testing
- Highly Accelerated Life Testing
- Water and dust Ingress Protection testing
- Drive in Four Poster with Climatic Chamber
- Ozone testing
- Salt spray corrosion testing
- Solar radiation testing
- Chemical resistance and exposure testing
- Electric Vehicle Range Determination
- HVAC Performance testing
- Real Drive Emission Measurement at different climatic conditions
- Non-Road Mobile Machinery Cold Startability
- Electric Vehicle Charging at Different Temperatures
- Emission measurement at -7 Deg C as a Export homologation testing for Europe.

Covered Standards:

- IEC 60068-2-1, IEC 60068-2-2, IEC 60068-2-6, IEC 60068-2-14, IEC 60068-2-27, IEC 60068-2-30, IEC 60068-2-38, IEC 60068-2-64, IEC 60068-2-78, IEC 61373
- ISO 105-B02/04/06, ISO 3917, ISO 11341, ISO11507, ISO 12040, ISO 4892-2, ISO 4892-3, ISO 14993, ISO 16750 & IS 9000
- ASTM B117, ASTM B368, ASTM G85, ASTM G154, ASTM G155, ASTM D4799, ASTM D4303 and D4355
- SAE J1211, SAE J1455, SAE J1885, SAE J1960, SAE J2020a, SAE J2334, SAE J2412 and J2527
- DIN, JIS D1601 and JASO D001
- JSS 55555, MIL 810
- ISO 19453
- Other International, Domestic and Client specific standards

ELECTRO-DYNAMIC SHAKER WITH COMPATIBLE CLIMATIC CHAMBER

Parameter	Details of technical Specifications	Chamber Technical specifications
Sine Force Peak	6000 kgf	Operating temperature : -60°C to +180°
Max. Velocity	1.8 m/s	Humidity control : 10 to 95 % RH
Frequency	5-2000 Hz	Size : 2x2x2 m
Payload	Up to 200 kg (depending on test input)	Temp. change rate: 3.5°C/Min

Test Types:
Resonance search
Sine Vibration Test
Shock Test
Random Vibration Test
Vibration Durability test with environmental test conditions.

Key Facilities

ARAI has wide range of environmental testing facilities including:

Thermal Shock Chamber: 2 nos (Air to Air)

Hot Chamber Temperature Range: 20°C to 220°C
Cold Chamber Temperature Range : - 80°C to 40°C
Internal Volume : 0.43m x 0.5m x 0.6m
Changeover time: < 10sec
Max. Specimen Weight : items up to 50kg

Cyclic Temperature & Humidity Chamber : 09 nos

Temperature range : - 80°C to 200°C
Humidity range : 10 to 98% RH
Max. Temp gradient : 5°C/min
Size : from 0.5m x 0.5m x 0.5m to 1m x 1m x 2m

Q-Lab Accelerated UV Weathering Chamber

Simulation of the effect of light, moisture and heat at a time
UV radiations: 313 nm (UV-B),
340 nm (UV-A) and 351 nm
Variable irradiance and temperature
Modes: light exposure, condensation and spray

Weather-o-Meter

Irradiance in w/m2 : 0.35 W/m2, 0.5 W/m2, 1.1 W/m2
Temperature range : 40°C to 60°C
Humidity : 10 to 100% RH
Radiation @ Filter : 340nm or 420nm or 300-400nm or 300-800nm
Sample Size : 130mm x 70mm x 5mm max

Weathering Chamber

Full-featured weathering, light fastness and photo-stability chamber
Rotating rack design with large specimen capacity
Control of Relative Humidity
Modes : light exposure, dark and spray
Filters : Window-Q, Extended UV-Q/B
Control options : 340 nm, 420 nm and TUV

Climatic Vehicle Test Cell (CVTC) with 4 X 4 Chassis Dynamometer @Chakan

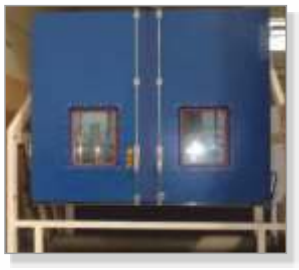
AC machine , 4X4 chassis dyno with 48" roller dia – AVL make
Inertia simulation range : 454 kg to 5448 kg &
Testing in 2WD and 4WD configuration
Exhaust emission analysers and
CVS system – Horiba make
Export Homologation emission testing @ -7°C & 14°C.
Facility can also be used for cold startability (Automotive, CEV, Gensets etc.)
HVAC validation
Electric vehicle performance
Engine calibration validation @ different temperatures
FE trials etc.

CVTC Dimension:
Width= 6.3 m, Length= 15.2 m, Height= 6.1m
Low Temperature Soak Room (LTSR) Dimensions:
Width= 9.8m, Length= 19.0 m, Height= 5.5m.

CVTC conditions		LTSR conditions
Temperature Range	From -30°C to +55 °C	From -30°C to +55 °C
Temp. rate	0.3K / min heat up or cool down	0.3K / min heat up or cool down
Humidity	Without heat load: 15 to 90 % With heat load of 100 kW: upto 85 %	NA
Solar Simulation	Area of radiation 7500 mm x 2500 mm	NA

Basic Corrosion Test Chamber

Temperature range : 35°C ± 3°C
Humidity : 96 % RH± 3%
Size : 2m x 1m x 1m
Sample weight : max 60 Kg



Salt Fog Chamber

Accelerated Corrosion resistance study
Copper Accelerated Acetic Acid Salt Spray (CASS)
Sea Water Acidified Accelerated Test (SWAAT)
Cyclic Corrosion Testing
Dry and Wet Cycles
Size: 250 liters

Cyclic Salt Spray Chamber

Temperature range : 25°C to 70°C
Humidity range : 20 to 100 % RH
Size : 1m x 1m x 1m
Sample weight : max 60 Kg

IP Test Chamber (Dust & water Test)

Tests can be performed : IP 54, 55, 56, 65, 66, 67 and 68
Chamber Size : 1.5m X 0.6m X 0.5m
Sample weight: max 60 Kg

Highly Accelerated Life Test (HALT)

Temperature range: -100°C to 200°C
Vibration Frequency Range: 10 Hz to 5000 Hz
Thermal Ramp Rate: Upto 60°C/min. for temp. range -65°C to 140°C
Direction & Type of Vibration: Six Degrees of Freedom (6 DoF) Broad Band Excitation
Vibration Amplitude: Upto 60 Grms
Internal Volume: 0.9m x 0.9m x 0.9m

Chassis Dynamometer Facility for Heavy Duty Vehicle testing @ Kothrud

AC machine, 1119kW - BEP Make
Inertia range 3500kg to 60000kg
Tractive Efforts – 32250N for 3 loadcells & 3 motors of 1500HP.
Max speed- 160kmph
Maximum Permissible Axle Load - 20000kg
Torque & Response time - <100 ms
Motor base inertia, kg – 8000±10%
Minimum Acceleration with 60 tonnes full load- 1 m/s2
Testing with Tandem axle
Temperature Simulation up to 50°C
Gradient simulation capability
Vehicle loading device up to 2-8 Ton to avoid bumpy ride

Exclusively used for: Low floored buses/HCV/HCV with Tandem axle & up to 60 Ton

Fuel Economy and oil/fuel performance evaluation projects
PEV battery range test
Emissions measurement using PEMS on a shortened On-road / standard driving cycle
Determination of drive train losses.

Key Facilities

Vibration Testing

EDVS: 3 nos

System Capacity: 1000kgf / 3000kgf (Sine/Random) 6000 kgf (Shock)

Frequency Range: 5 Hz to 2 kHz

Displacement (pk-pk): 38mm and 50mm

Velocity: 1.2m/s and 1.8 m/s

Slip Table: 600mm x 600mm

Pulse Shape (Shock) : Half Sine, Saw-Tooth, Rectangular

Mechanical Shock Profile of 50g 11 ms & 100g 6ms for units less than 4kg

Hydraulic: Up to 60kN, 2-90Hz, 300mm displacement

Mechanical: 2-8Hz, 25mm displacement, 1500kg, 2m x 1.2m x 1.2m table

Drive In Four Poster With Climatic Chamber

Temperature range : - 45°C to 80°C without solar simulation 0°C to 70°C with solar simulation

Temperature constancy : ≤ ±1K (in time) & ≤ ± 2K (in space)

Temperature change rate : ≥ 1K/min. on average, between 80°C and - 40°C, with specimen 1.000 kg

Humidity range : 10 to 95%RH

Radiation Capacity : Max. 1.200W/m²

Max. heat load inside the chamber: approx. 60kW by solar radiation device

Internal Volume of cell : 5m (H) x 6m (W) x 8m (D)

Cell entrance dimensions : 3.5m (H) x 3m (W)

Combined Temperature & Vibration Testing

Temperature range : - 50°C to 150°C

Ramp rate: 5°C/min

Vibration Shaker : 3 Axis, 3000 kgf, Sine/ Random/Shock.

Frequency Range : 5Hz to 2kHz

Ozone Chamber

Temperature range: - 20°C to 70°C

Ozone Concentration: 500 pphm max.

Chamber Size : 0.5m x 0.5m x 0.5m

Capability : Static as well as Dynamic Ozone testing

Large ED Shaker with Environmental Chamber

Capacity: 6000 kgf (Sine/Random) 11500 kgf (Shock)

Frequency Range: 5 Hz to 2 kHz

Displacement (pk-pk): 50mm

Velocity: 1.8m/s

Max. Payload capacity: 600 kg max

Slip Table: 1.2m x 1.2m

Climatic Chamber:-

Temperature range: - 30°C to 80°C

Humidity range: 10 to 95 % RH

Internal Volume : 2.3m x 2.5m x 2.5m

Walk in Hot and Cold Room

Temperature range: - 20°C to 70°C

Cyclic: 25 to +40°C with 95% RH

Chamber Size : 6 m x 3 m x 3 m

Thermal Imaging Camera

Temperature range : - 20°C to 1200°C

Accuracy : ± 2°C or ± 2% of reading

Field of View : 25° x 19° / 0.4m

IR Resolution : 200 x 150 (30000 pixels)
Image Modes : Thermal, Visual, Thermal Fusion

IPX9K

Temperature Upto : +80°C

High Pressure Upto : 10000 Kpa

Flow Rate : 14 – 16 L/min

The Automotive Research Association of India
(Affiliated to Ministry of Heavy Industries, Govt. of India)

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