

**INNOVATION  
SERVICE  
EXCELLENCE**





### Our Vision

To be a world class R & D centre assisting the automotive sector and to render services in the field of automotive design, test and validation.



### Our Mission

- ▲ To assist industry in adopting cutting edge technology in component and vehicle development.
- ▲ To adopt world class work practices in technology services and innovation.
- ▲ To build technical expertise driven by team work and commitment.
- ▲ To strive to deliver quality services for total customer satisfaction.
- ▲ To be a front runner in establishing global standards in the field of Automotive testing and R&D.



### Our Quality Policy

- ▲ To provide Research & Development, Design Testing, Certification, Homologation and Calibration support to Auto Industry.
- ▲ To guide Indian Auto Industry to manufacture safe, reliable and environmental friendly vehicles/ components.
- ▲ To provide a work environment and culture that promotes innovation and initiation through training and teamwork.
- ▲ Continual improvement of our processes, quality of our services and infra-structure to meet the varying needs of customers.



### Our Location

The International Centre for Automotive Technology (ICAT) is located at Manesar, Haryana on Delhi-Jaipur Highway (about 38 Kms from Delhi International Airport). The strategic location of ICAT in the automotive hub at Manesar provides the automotive and component industry faster access to the testing and developmental facilities.



## THE INTERNATIONAL CENTRE FOR AUTOMOTIVE TECHNOLOGY

The International Centre for Automotive Technology (ICAT), Manesar, located in the northern automotive hub of India, is a leading world class automotive testing, certification and R&D service provider under the aegis of NATRiP (National Automotive Testing and R&D Infrastructure Project), Government of India.

ICAT is providing quality services to the industry in all the domains of automotive and non automotive development, such as Powertrain, Noise Vibration and Harshness (NVH), Component, Fatigue, Photometry, Electrical and Electronics, Tyre & Wheel, Passive Safety, Vehicle Dynamics, Electromagnetic Compatibility (EMC) and Computer Aided design and Engineering (CAD/CAE) etc.

ICAT is emerging as a comprehensive technical partner of the automotive industry and currently undertakes the following major activities:

- ▲ **Certification**
- ▲ **Design and Development**
- ▲ **Testing and Validation**
- ▲ **Consultancy**



### OUR AUTHORIZATION & RECOGNITION

- ▲ As a Type approval and Homologation agency under Rule # 126 of CMVR-1989 by Ministry of Road Transport and Highways (MoRTH), Govt. of India.
- ▲ As a Scientific and Industrial Research Organization (SIRO) from Department of Scientific and Industrial Research (DSIR), since Feb 2010.
- ▲ For Emission and Noise testing of Generator Sets by Central Pollution Control Board (CPCB)
- ▲ For Tyre Testing, Safety Glasses and Engine Testing by Bureau of Indian Standards (BIS)
- ▲ For Diesel Genset by DGS&D

### OUR ACCREDITATION

- ▲ NABL (ISO 17025:2005) Accredited Labs in ICAT :- Emission Testing, Engine Testing, Automotive Electrical & Electronics Lab, UPS & Battery testing, Tyre Testing Lab, Pedestrian Safety lab, Photometry Lab, EMC Lab, Safety Glasses, RVM testing, Wheel Rims testing, CNG-LPG Comp., Vehicle Performance testing etc.
- ▲ VCA (UK)- Since 2008
- ▲ CAFE secretariat by MoRTH



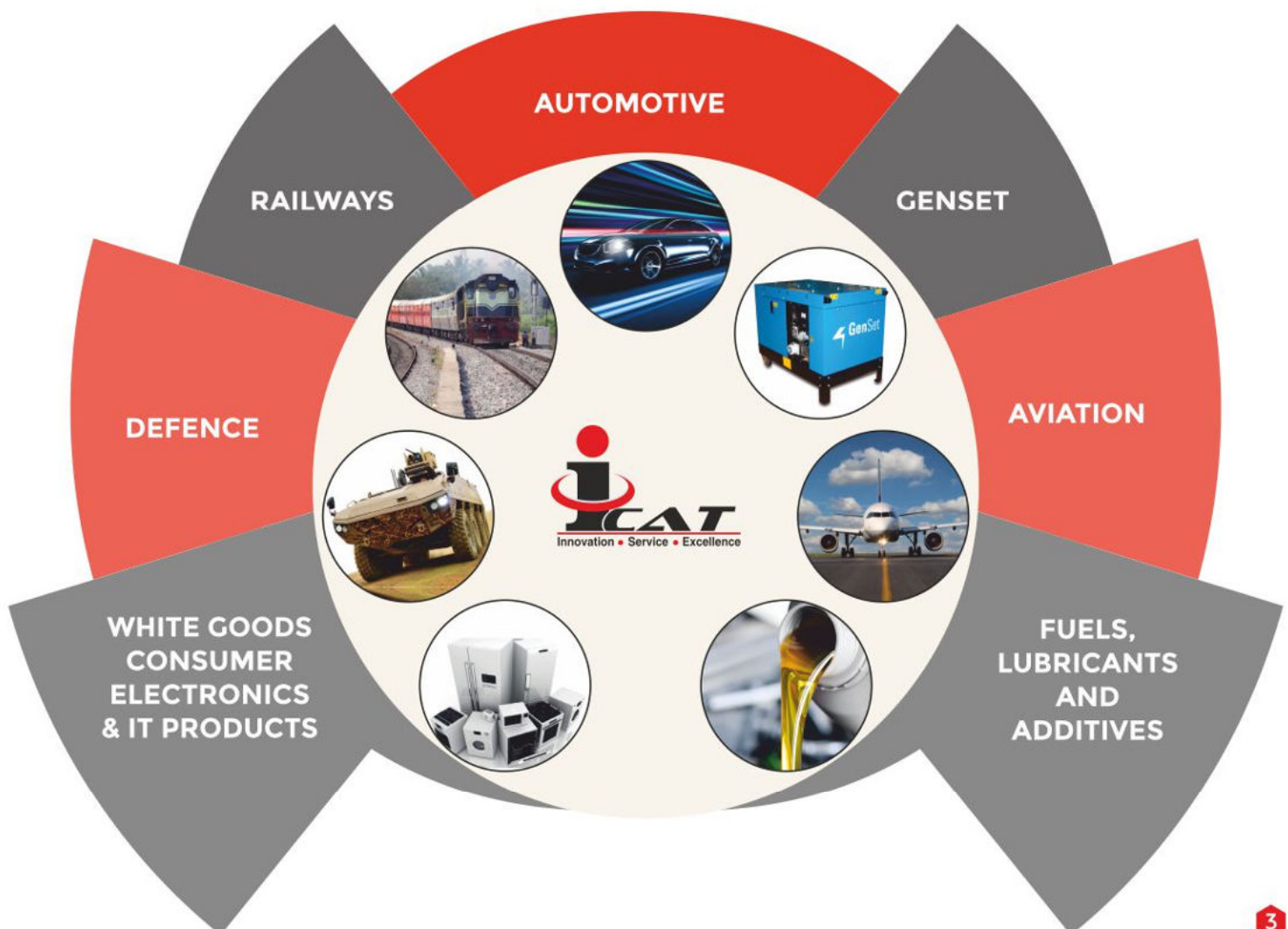
## SERVICES OFFERED

ICAT offers its customers a range of test, validation and support services with its wide array of facilities and caters to the requirements of automotive and non-automotive segments in the following domains:-

- ^ Type Approval as per Central Motor Vehicle Rules (CMVR), India
- ^ Testing as per IS/AIS/ EEC/ ECE/ FMVSS/ SAE-J standards
- ^ Type Approval of Gen-sets as per Central Pollution Control Board (CPCB) emission and noise norms
- ^ DGS&D and BIS Type testing of Genset
- ^ Developmental Testing
  - Pre-Certification
  - Durability & Validation (Component, Engine, Vehicle)
  - Functional Development and validation
  - Performance and Emission optimization
  - As per Customer specification (DV/PV tests)
- ^ Research and Development Projects

## SEGMENT

ICAT serves customers in the automotive, non-automotive, white goods, and defence industries from across the globe. We provide design, testing & validation services to the following segments :





## HOMOLOGATION & CERTIFICATION

ICAT is India's premier Homologation and Testing centre developed under NATRiP by Govt. of India. It is one of the agencies notified under CMV rule no 126 for issuance of "TYPE APPROVAL CERTIFICATE (TAC)" and "Conformity of Production (COP) Certificate".

ICAT is catering to the certification requirements of all categories of vehicles, components and engines.

### VEHICLE

2W, 3W, 4W, EVs,  
Tractor, E-Rickshaw,  
Bus, Truck, Trailer,  
CEV, Power Tiller

### COMPONENT

Lighting, Electrical  
& Electronic,  
Mechanical

### ENGINE

Automotive, Tractor,  
CEV, Genset,  
Power Tiller

It is also providing Type Approval Certification and COP Certification services for all the safety critical components like light and light signaling device, horn, tyre, traction battery, rear view mirror, brake hose, brake fluid, bulb etc.

ICAT has also tied up with various certification agencies across the globe like VCA, IDIADA, CCIC Korea, NRCS, TUV-Nord, TUV-Sud etc. for providing Export Homologation services to OEMs and component manufacturers. ICAT is authorized by Central Pollution Control Board (CPCB) for Type Approval and COP certification of (Emission & Noise) generator sets of all types and power.

## DESIGN & ENGINEERING

Design & Engineering play very vital role in the Product Development Cycle (PDC). In today's competitive environment, Automotive Industry is emphasizing on reducing lead time of PDC. ICAT is supporting automotive industry in the field of Design & Engineering by conducting DV/PV Testing of various automotive components e.g. Plastic Interior Components, Rubber Parts, Exterior Components, Engines, Electrical Electronics Components, ECUs, Engine Parts, Tyres, Wheel Rims etc. Also ICAT's Fatigue Lab is providing services related to assessment of fatigue life by conducting durability/endurance testing of automotive components intended for suspension, steering system, transmission etc.

## RESEARCH & DEVELOPMENT

Our Research and Development team consists of highly qualified, competent, innovative and self motivated engineers backed by 'state of the art' testing and development facilities. In a short span, the centre has started undertaking advanced industry sponsored R&D projects in the areas of frontier technologies.

ICAT's vision is to emerge as a leading R & D centre, working together with the automotive industry in developing state-of-the-art technologies. The various projects in which ICAT has been working are:

- ▲ Atkinson Cycle Engine Development
- ▲ Compressed Air Engine Development
- ▲ Intelligent Speed Adaptation System Development
- ▲ Antiglare Headlighting System
- ▲ Dynamic Headlighting System To Improve Visibility And Reduce Glare
- ▲ Electric Vehicle Development
- ▲ Hybrid Vehicle Development
- ▲ Engine Development
- ▲ Crash Analysis
- ▲ Engine Performance Optimization For Indian Driving Condition
- ▲ EMC Solutions And Troubleshooting
- ▲ Fatigue Analysis
- ▲ Vehicle Emission & Fuel Consumption Performance Analysis
- ▲ Vehicle Emission Performance Analysis Under Virtual Conditions
- ▲ Vehicle Structural Analysis
- ▲ Component Failure Analysis
- ▲ Tyre Performance Analysis & Optimization

## CALIBRATION

ICAT have well equipped Calibration Laboratories for Mechanical and Thermal Calibration. Calibration Labs are NABL (ISO/IEC 17025:2005) accredited for calibration of Industrial Pressure Gauges and Temperature sensing devices. ICAT is also engaged to support the industries for ISO/IEC 17025:2005 implementation and NABL accreditation of their Laboratories.



## ICAT COMPETENCY CENTRES

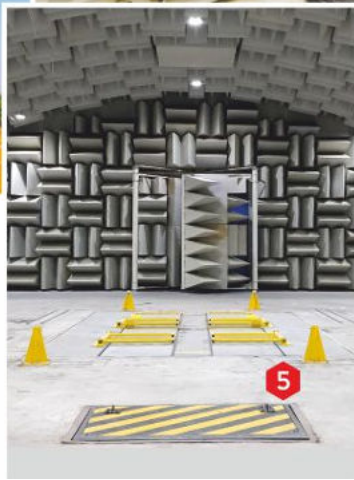
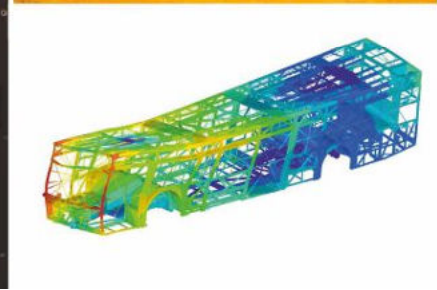
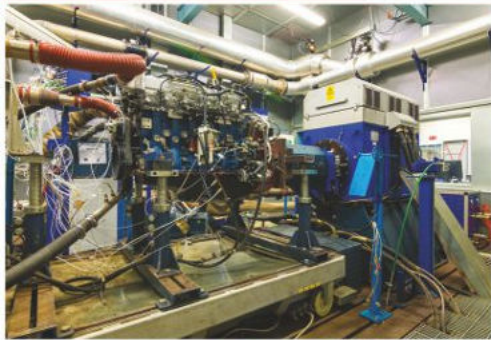
ICAT has two competency centres located at the northern hub of automotive industry in Manesar, Haryana. ICAT Centre I and Centre II are within the proximity of 7 kms and measuring area 8 acres and 46 acres respectively. The centre caters to the present & future homologation and R&D requirements of Automotive and non-automotive industry.

### CENTRE - I

1. ENGINE TEST CELL (ETC)
2. VEHICLE TEST CELL (VTC)
3. COMPONENT TEST LAB (CTL)
4. FATIGUE TEST LAB (FTL)
5. AUTOMOTIVE TRANSMISSION ENGINE TEST CELL (ATETC)
6. PHOTOMETRY LAB
7. AUTOMOTIVE ELECTRICAL AND ELECTRONICS LAB (AEEL)
8. INFOTRONICS LAB
9. CAD-CAE LAB
10. CNG-LPG LAB

### CENTRE - II

1. VEHICLE EVALUATION LAB (VEL)
2. TEST TRACKS
3. PASSIVE SAFETY LAB (PSL)
4. ELECTROMAGNETIC COMPATIBILITY LAB (EMC)
5. NOISE VIBRATION & HARSHNESS LAB (NVH)
6. TYRE TEST LAB (TTL)





# CENTRE - I

## POWERTRAIN LABORATORY

Powertrain lab offers services in the fields of vehicle and engine emission & performance test along with Calibration services. The labs are fully equipped to undertake the homologation testing of both the engine and the vehicle as per latest Indian, European and other International regulations of automobiles, all categories of gensets and agricultural tractor engines. Apart from homologation, various other projects are also undertaken like performance measurement of engine and vehicle, fuel consumption measurement and optimization, Emission tests and optimization including EGR, engine mapping, exhaust temperature optimization and ECU calibration. It is also capable of carrying out research work in the field of design and development of engine and transmission components.



## 1. ENGINE TEST CELL (ETC)

Engine Test Cell (ETC) facility at ICAT caters to the certification and development testing of engines as per National & International Standards. This includes emission testing of engines from automotive vehicles (with GVW above 3.5 tonnes) & Off-road engines (CEV's, Tractors, Power Tillers and Gensets). Also power testing of 2/3/4 wheelers is carried out in ETC. Also, any customized test trials as per customer specific cycles for various DV/PV requirements can be carried out including long duration non-stop endurance tests.



### Emission Measurement

Gaseous emission analyzers  
- single line & pre-post, PM  
Measurement, Ammonia slip  
measurement, Opacity &  
Smoke measurement  
capabilities

### Full Flow Dilution system

02 numbers of Transient  
Dynamometers with rating  
500kW & 220kW are equipped  
with Full Flow Dilution System  
with Horiba DLS-7200 (Full  
Flow), AVL SPC and Horiba PM  
Measurement. Modal sampling  
capability is also present

### Euro 6 Capability

Provision to measure particulate num-  
ber with the help of AVL PNC (APC Plus)

### AC Dynamometers

11 dynamometers with ratings ranging  
from 120kW-830kW

### Eddy Current Dynamometers

02 Eddy Current  
Dynamometers of  
rating 35kW & 250kW  
equipped with emis-  
sion measurement  
capabilities

### Upcoming Facilities

- ▲ Altitude Simulation up to 5000 m (~65 kPa)\*
- ▲ E - Motor and Hybrid Motor test facility



## SPECIFICATIONS OF TEST EQUIPMENTS

- ✦ **Emission Analyzers** (for NO<sub>x</sub>, CO<sub>2</sub>, CO, SO<sub>2</sub>, CH<sub>4</sub>, & THC) : **Horiba-MEXA 7200D(CVS)**, **MEXA 7100D(Raw)**, **MEXA 7500DEGR** (Dual Stream Analyzer); **AVL- AMA i60 SII R2C**(Dual Stream Analyzer)
  - ✦ **Particulate sampling units:** **AVL-SPC**; **Horiba-MDLT**; **NOVA-Microtrol-6**
  - ✦ **Ammonia Slip measurement units (FTIR'S):** **AVL-SESAM i60 FT**; **Horiba- MEXA 6000FTE**
  - ✦ **Urea Flow measurement units:** **AVL- PL Urea**; **Emerson**
  - ✦ **PN Counter unit:** **AVL-APC Plus**
  - ✦ **Opacity Measurement unit:** **AVL-439**
  - ✦ **Smoke Measurement unit:** **AVL-415S**
  - ✦ **Engine Intake Air handling units** (Pressure, Temperature, humidity control): **CP-Sierra**; **AVL**; **K.S.** with maximum flow 9000 kg/hr
  - ✦ **Coolant Conditioning units:** **AVL**; **Yantrashilpa**; **G-vision**
- 
- ✦ **Fuel Conditioning units:** **Ono Sokki**; **SAJ**; **C.P. Engineering**; **Horiba**; **AVL**
  - ✦ **Lubrication Oil Conditioning units:** **AVL**
  - ✦ **Intercooler units up to 850 kW engines:** **G-vision**; **Yantrashilpa**; **AVL**
  - ✦ **Air mass flow meter units** with max. range up to 4000 kg/hr
  - ✦ **Transient Fuel mass flow meter units:** 0-300 Kg/hr (Diesel, Ethanol, Gasoline, Biodiesel, CNG, LPG); **Ono Sokki**; **SAJ**; **C.P. Engineering**; **Horiba**; **AVL**

## 2. VEHICLE TEST CELL (VTC)

The Vehicle Chassis Dynamometer lab is capable of testing Vehicles upto 5000 kg GVW which include 2 Wheelers, 3 Wheelers and 4 Wheelers. Each test cell is equipped to test and check various emission parameters such as hydrocarbon, carbon monoxide, carbon dioxide, nitrogen oxides and particulates, as per BS VI and Euro VI norms. . The lab has capability to test vehicles running on conventional liquid and gaseous fossil fuel and non-conventional fuels as per the requirement of the customers. The lab has six emissions chassis dynamometer and three mileage Chassis dynamometers with robotic driving for durability.

The lab has state of the art emission measurement equipment which also includes Portable Emissions measurement for testing of vehicles for Real World Driving Emissions. One of the chassis 4WD dynamometer has capability to simulate temperature ranging from minus 30 deg Celsius to plus 55 deg Celsius. This lab also has a humidity simulation upto 95% RH and can also simulate solar load up to 1200W/m<sup>2</sup>.



## CAPABILITIES







## SPECIFICATIONS OF TEST EQUIPMENTS

### CLIMATIC VEHICLE TEST CELL

Mass Emission test at extreme temperatures (-30°C to +55°C) with humidity control and solar loading. Cold startability/Heater performance tests for all types of vehicles including 2W, 3W, 4W and heavy commercial vehicles

### VEHICLE TEST CELL-1

150 kW AVL Chassis dynamometer with Pierberg Emission analyzers  
Mass Emission tests on 2-Wheeler / 4-Wheeler upto BS VI

### NEW VEHICLE TEST CELL-1

150 kW AVL Chassis dynamometer (4 X 4) with Horiba Emission system  
Mass Emission tests on 4-Wheeler upto BS VI

### SEALED HOUSING FOR EVAPORATIVE DETERMINATIONS (SHED)

Sealed Housing for Evaporative emission development and certification for 2W/4W Gasoline vehicles as per the Indian, ECE, EPA and CARB regulations.  
VV/ VT SHED - Variable Temperature, Variable Volume SHED system.  
Type: Webber EMI Model 101 VV/VT SHED  
Movable roof type SHED

### MILEAGE ACCUMULATION CHASSIS DYNO - 1,2 & 3

MACD 1, 2 & 3 with chassis dynamometer of 200 Kw, 160Kw & 55 Kw respectively for running in of vehicles.  
Capable of robotic driving on Stahle SAP 2000

### VEHICLE TEST CELL-2

70 kW AVL Chassis dynamometer with Pierberg emission analyzers  
Mass Emission tests on 2-Wheeler / 3-Wheeler / 4-Wheeler

### NEW VEHICLE TEST CELL-2

150 kW dynamometer (2 x 4) with Horiba Emission System  
Mass Emission tests on 4-Wheeler upto BS VI

### PORTABLE EMISSION MEASUREMENT SYSTEM (PEMS)

Horiba OBS One capable of conducting mass emission test on road in real world scenario for light duty and heavy duty vehicles. Capable of measuring CO, CO<sub>2</sub>, NO<sub>x</sub>, THC and PM along with real time GPS data, environmental data and ECU data

## 3. COMPONENT TEST LAB (CTL)

With continuous expansion in Automotive Sector, there is a massive increase in development of variety of safety critical components. These components are evaluated as per the existing and upcoming national and international regulations/standards viz. IS, AIS, ECE, JIS, SAE etc.

Component Test Lab (CTL) provides services related to Certification & Homologation of Automotive Components as per Central Motor Vehicle Rules (CMVR).

The certification services include Type Approval & Conformity of Production (CoP) of safety components identified in AIS:037. Apart from certification, CTL supports OEMs and components manufactures for their needs of developmental testing, Environmental Testing (Vibration Testing, Hot & Cold Chamber, Weather-O-meter, Ozone Chamber, Salt Spray Chamber, Walk-In Chamber etc.), Materials Level Testing (UTM, IZOD, CHARPY, coolant corrosion testing, flammability etc.), DV/PV Testing of Plastic Parts, Instrument Panels, Floor Consoles, rubber parts, oil coolers, charge air coolers, Radiators, Heat Exchangers etc.





S.No.	SAFETY COMPONENT	IS / AIS	ECE
1	Brake Hoses	IS: 7079 - 2008 with its Amendment No 1, Sept.'2011	-
2	Metallic & Plastic Fuel Tank	IS:14681 and IS:15547	ECE R34
3	Safety Glasses	IS:2553 Part 1 & 2	ECE R43
4	Door Locks & Hinges	IS : 14225 - 1995	ECE R11
5	Rear View Mirror	AIS: 001 Rev. 01/2011	ECE R46
6	Wheel Rims	AIS: 073 - 2005	-
7	Brake Fluid	IS: 8654 - 2001	-
8	Safety Belts	IS 15140 - 2003	ECE R16
9	Seats for Buses	IS:15546-2005 & AIS 023:2005	ECE R80

## SPECIFICATIONS/DETAILS OF TEST EQUIPMENT

- ▲ Combined Vibration & Environmental Test System [Shaker Capacity 1000 kgf & Temp. Range - 60°C to 200°C ]
- ▲ Expansion, Burst & Whip Test Rigs for hydraulic brake hoses [Max. Hose Length : 600 mm]
- ▲ Ozone Chamber [Range : 0 to 500 pphm]
- ▲ Dust and Water Spray Chamber [Size : 1m x 1m x 1m]
- ▲ Cyclic Temperature & Humidity chamber [Range : -40°C to 180°C]
- ▲ Cyclic Salt Spray chamber (M/s. Atlas, USA)
- ▲ Weather-O- Meter (M/s. Atlas, USA. Model: Ci4000, Lamp: Xenon Arc)
- ▲ Bumper Impact Test Facility for M1 Category Vehicles
- ▲ Wheel Rim Test Facilities
- ▲ Seats Test Facilities
- ▲ Safety Belts Test Facility
- ▲ Servo hydraulic Test Facilities for Mechanical Couplings as per AIS:091 (P1 & P2)
- ▲ Thermal Cycle Chambers (04 Nos.)
- ▲ Walk-In Chamber (Size: 6m x 5m x 3.8 m)
- ▲ Flywheel burst tester (upto 9000 RPM)
- ▲ Steering lock test rig (Anti-Theft Device) for Passenger car as per AIS:075
- ▲ Hot Impulse Test Chamber
- ▲ Demisting & Defrosting Test Facility
- ▲ Thermal Cycle & High Temp. Cycle Test Rigs for Oil Coolers, CAC & Radiators.





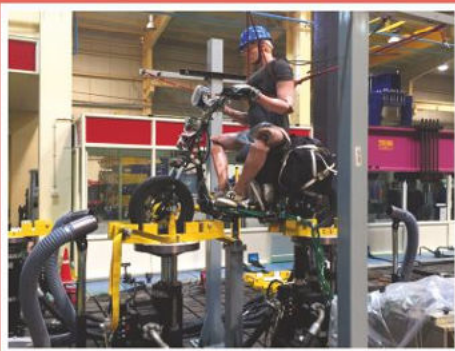
## 4. FATIGUE TEST LAB (FTL)

Fatigue Test Lab at ICAT is modern, state-of-the-art testing facility supporting automakers and suppliers for development and validation of various Structural Components, Sub-assemblies and vehicles. To ascertain the life of the product, lab is having expertise in the collection of road load data as per real world usage pattern, designing test specifications for accelerated duty cycle and execution of tests for customer correlation.



### CAPABILITIES

- ✦ Durability and Integrity assessment of vehicles, systems and subsystems under various driving and environmental conditions using linear & rotary servo-hydraulic actuators and environmental chambers.
- ✦ Fatigue testing of engine parts using resonance fatigue pulsator.
- ✦ Road load data acquisition like strain, displacement, acceleration, force and torque etc. and its analysis using N-Code-Glyph Works software.
- ✦ 4 Poster for bringing road inputs to lab.
- ✦ Multi-Axis Simulation Tables with 6-DoF under various temperature and humidity conditions.
- ✦ BSR test system designed to test automotive chassis, Body in White and assembly modules.
- ✦ Vibration shakers with environmental chambers.
- ✦ Flywheel burst testing.
- ✦ Residual stress measurement.
- ✦ In house fixture designing capabilities.
- ✦ HVAC Performance evaluation under various temperature and humidity conditions.
- ✦ 'Gesal1-certified' 2-experts in strain gauging activity.



### SPECIFICATIONS OF TEST EQUIPMENTS

#### UNIVERSAL TEST BENCHES

##### Linear Servo-Hydraulic Actuators

- Capacity up to 750kN testing loads and a stroke of up to 320 mm.

##### Electrical Actuator:

- Stroke up to 300 mm.

##### Servo Hydraulic Rotary Actuator:

- Capacity of Torque up to  $\pm 10$  kNm with Angular displacement of  $\pm 60^\circ$  with torque cells of  $\pm 10$  kNm &  $\pm 500$  Nm.



## MAST - MULTI AXIS SIMULATION TABLE

### MAST for Component (100Hz) with Climatic Chamber

MAST is available with 2 m \* 2.2 m table size for working upto 100 Hz for 6- DoF vibration simulation test facility with Climatic Chamber from -40° C to 80° C with 95% RH.

### HF MAST (200Hz) with Climatic Chamber

High Frequency Multi Axis Simulation Table is available with 2 m \* 2.3 m table size for working upto 200 Hz for 6- DoF vibration simulation & BSR testing.

### Climatic Chamber with Solar Simulation

Climatic chamber with Solar Simulation of size 8m \* 6m \* 5 m, temperature range is from -40° C to 80° C with 95% RH. Solar Simulation is also available with variable Intensity up to 1200 W/m<sup>2</sup> and Temperature from 0° C to 70° C.

## X-POSTER

X-Poster is a structural durability test system for 2W, 3W, Passenger cars & Heavy Commercial Vehicles.

### ▲ Heavy Duty 4-Poster (17 tons)

### ▲ Passenger Car 4-Poster (3.5 tons)

## VIBRATION TEST FACILITY (6 T) WITH ENVIRONMENTAL CHAMBERS

The Electroynamics Shakers are having capacity up to 6000kgf integrated with Climatic Chamber from -60° C to 180° C with 95% RH.

## MAST - MULTI AXIS SIMULATION TABLE

At ICAT we have experienced team specialise in all aspects of vehicle instrumentation, Road Load data collection, data analysis, Durability Analysis, Customer Data Analysis, Data Verification and Failure Analysis . Typical facility includes:

- ▲ High Speed Data Acquisition for 120+ synchronous channels
- ▲ Vehicle / Component level Duty Cycle measurement sensors & systems
- ▲ Wheel Force Transducers (WFT)
- ▲ Sensors like Accelerometers, LVDT, String Pots, microphones etc.
- ▲ Sensors like Pressure, Thermocouples, Flow meter etc.
- ▲ Strain Gauging & measurements
- ▲ Telemetry Systems for Wireless Data
- ▲ Rain flow cycle counting
- ▲ Fatigue Life & Damage Estimation
- ▲ Customer Correlation
- ▲ Ride Comfort analysis
- ▲ Duty Cycle Analysis & Block Cycle Creation
- ▲ Failure & durability analysis
- ▲ Route mapping w.r.t duty cycle
- ▲ 2D Road Profile Database

## 5. AUTOMOTIVE TRANSMISSION ENGINE TEST CELL (ATETC)

Automotive Transmission Engine Test Cell established in view to perform test on 'Front and Rear Wheel Drive' vehicles for 'Noise, Vibration & Harshness' purpose. The lab is also capable to test all drive line components along with various transmission units with respect to Noise, Vibration & Mechanical Performance. Broadly comprises Hemi-anechoic chamber (Sound Absorption Wedges), Vibration source identification devices (Microphone array) and Data Acquisition System for latter stage processing of vibration signals.





## CAPABILITIES

- ▲ Acoustic and vibration performance (acceleration, deceleration) with LMS Scadas Mobile SCM 09, 204.8 kHz sampling rate per channel, 24 bit resolution and with overall gained dynamic range of 178 dB
- ▲ Source localization with holography technique with moveable array module (with maximum focalization frequency from 200 Hz to 13.6 kHz) & Focalization resolution up to  $\lambda/2$  with set of spacing.
- ▲ Capability of source localization on skewed plan with robotic configuration (1D)
- ▲ Torsion Vibration measurement with the help of Laser sensor up to 100 kHz
- ▲ Active Suspension Isolation System
- ▲ Integration of the whole utilities with a drive NVH test set up with the help of one of the elite class user friendly software SPARC & STARS
- ▲ Real time environment actuation devices to foster exceptional performances for both NVH & durability testing such as:
  - Clutch Actuator (Core competence to understand the clutch behavior)
  - Gear Shift Actuator ( with 11 position set points makes it capable to track shift behavior of wide range of transmission)
  - Throttle command by wire Actuator

## SPECIFICATIONS OF TEST EQUIPMENTS

### Dynamometer



Left wheel  
Dyno: (263  
kW 2500  
Nm @ 1005  
rpm)

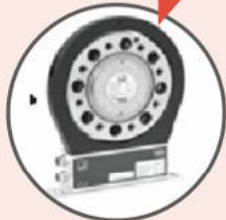


Right wheel  
Dyno: (263  
kW 2500  
Nm @ 1005  
rpm)



Torque flange  
for high  
torque  
measurement  
accuracy

Speed range  
caters 12000  
rpm



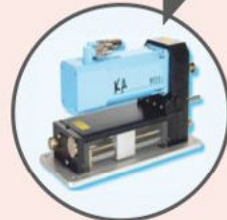
Test Bed  
Controller:  
SPARC &  
STARS



Gear Shift  
Robot is an  
actuator which  
is movable in  
two axes for  
fully automatic  
shifting of gear



Clutch  
actuator is  
highly precise  
linear  
positioning  
device for the  
clutch  
actuation



## 6. PHOTOMETRY LAB

ICAT, has a state-of-the-art facility to develop, test and certify lamps, lighting, signaling & reflex systems. ICAT photometry lab is among the best maintained and managed automotive lighting testing labs in the country and hold NABL certification (Certificate No. T-1944), we have also recently added LED Based Lighting test facility. We have been providing services for testing and certification to the lighting industry since our inception in 2006. We have also been trying to develop cutting edge technologies at ICAT such as demonstration project for adaptive lighting system and system development for anti-glare using polarizer technology.





## CAPABILITIES

- ⤴ Measurement of spatial intensity distribution of the lamps, which include lighting and light signaling devices (like headlamps, fog lamps, stop lamps, direction indicators, reversing lamps etc.)
- ⤴ Retro-reflection measurement of reflex reflectors, tapes, markings etc.
- ⤴ Measurement of luminous flux and luminous efficiency of bulbs (incandescent, metal halide, HID, LED etc.)
- ⤴ Lighting installation- and headlamp leveling device test
- ⤴ Luminance measurements of rear registration plate lamps, surfaces (roads, screens, etc.)
- ⤴ High Security Registration Plate (HSRP) testing
- ⤴ Measurement of lifetime of the bulbs and lamps
- ⤴ Dimensional measurement of bulbs
- ⤴ Measurements of glare characteristics of lamps
- ⤴ Measurement of reflectivity and transmittance of different materials
- ⤴ Tests on lamp under controlled conditions (voltage, temperature, humidity)
- ⤴ Colorimetric measurements on lamps, lamp covers and various industrial products (plastics, textiles, etc.)
- ⤴ LED measurement
- ⤴ UV & IR measurement



## SPECIFICATIONS OF TEST EQUIPMENTS

### TEST FACILITY

TYPE A GONIO PHOTOMETER FOR LIGHTING & SIGNALLING DEVICES (M/s. LMT, Germany)	LUMINANCE METER (M/s. LMT, Germany)	SPECTRORADIOMETER (M/s. Labsphere, USA)	SURFACE COLOR MEASUREMENT SET UP
RETRO REFLECTION MEASUREMENT UNIT (M/s. LMT, Germany)	TRANSMISSION & DIFFUSION MEASUREMENT SET UP	Wi41G M/s. Osram	MECHANICAL DETORINATION SET UP
TWO : TRISTIMULUS COLORMETER SET UP FOR RETRO REFLECTORS & LIGHTING & SIGNALLING DEVICES (M/s. LMT, Germany)	INTEGRATING SPHERE (0.5m dia) for SINGLE LED's (M/s. Labsphere, USA)	LN3 (M/s. LMT, Germany)	COLOR ENDURANCE FOR SIGNALLING SOURCES
INTEGRATING SPHERE (1m dia) for LIGHT SOURCES (M/s. LUMETRONICS)	INTEGRATING SPHERE (2m dia) for LED CLUSTERS & LUMINARIES (M/s. Labsphere, USA)	GLOSS MEASUREMENT	ENDURANCE TEST SET UP FOR LIGHT SOURCES
PROFILE PROJECTOR 10 X magnification	Warning Light Flash Measurement System (M/s. LMT, Germany)	STABILITY TEST RIG FOR LIGHTING DEVICES	ENDURANCE TEST SET UP FOR HIGH UV DISCHARGE LAMPS
INTEGRATING SPHERE (1m dia) for LIGHT SOURCES (M/s. LUMETRONICS)	INTEGRATING SPHERE (2m dia) for LED CLUSTERS & LUMINARIES (M/s. Labsphere, USA)	GLOSS MEASUREMENT	ENDURANCE TEST SET UP FOR LIGHT SOURCES
ULTRAVIOLET & COLOR LUMINANCE FACTOR MEASUREMENT SYSTEM	Climatic Chamber (M/s. Weiss Technique, Germany)	STANDARD LAMPS & KELVIN HOLDER (M/s. Philips & M/s. Osram)	-



## 7. AUTOMOTIVE ELECTRICAL AND ELECTRONICS LAB ( AEEL)

The AEEL at ICAT is an important lab considering the rapid increase in the use of electrical and electronics in the vehicles. The lab offers services for certification & validation for wide range of E & E components including infotainment systems, intelligent transportation systems, vehicle security systems, E-motors, ECUs, Batteries, RFIDs etc. The lab also provides consultancy services to the customers for product development and improvements. The major facilities available at AEEL are related to electrical measurements, ECU validation, environmental testing, altitude testing, dust and water ingress testing, thermal shock, vibration & shock testing, weather resistance, battery cyclers and motor test benches etc.

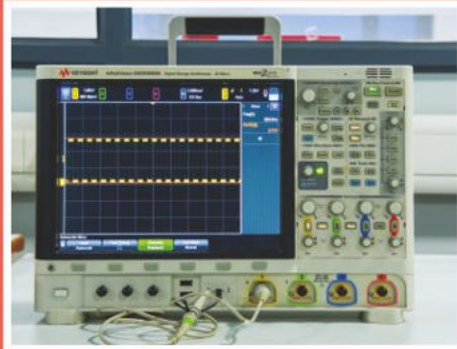


### AUTOMOTIVE TESTING

- ▲ Environmental Testing
- ▲ Electrical & Electronics Testing
- ▲ Vibration Testing
- ▲ ECU Validation
- ▲ Special purpose testing as per customer specific requirements
- ▲ xEV Validation
- ▲ Battery Validation
- ▲ Rapid Prototyping (Metal, Plastic)

### NON-AUTOMOTIVE TESTING

- ▲ White Goods (For BIS, BEE)
- ▲ IT Equipments (For BIS/DIETY)
- ▲ Special purpose testing as per customer specific requirements
- ▲ Battery & UPS Testing
- ▲ Industrial Equipment Testing



### SPECIFICATIONS OF TEST EQUIPMENTS

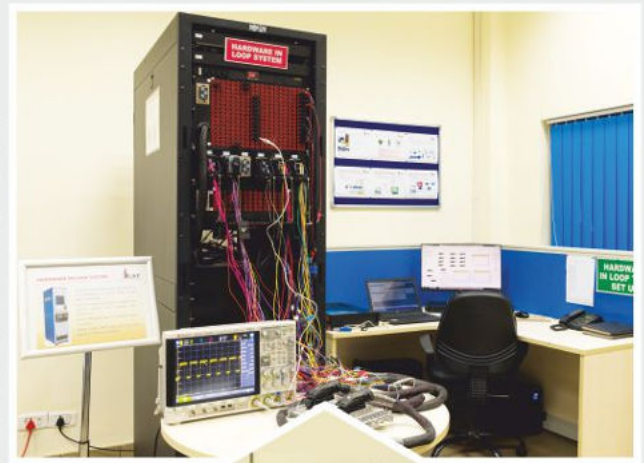
TEST FACILITY			
THERMAL SHOCK CHAMBER (M/s. CTS, Germany)	Water Sprinkle Chamber (M/s. Autotest, INDIA)	Linear Load & Non Linear Load (M/s. Ajay Instruments, New Delhi)	Pneumatic Short Ckt. Test setup (In house)
HOT & COLD CHAMBERS (M/s. MEMMERT, Germany) (M/s. ESPEC, Japan)	IMPACT MACHINE (M/s. Autotest, INDIA )	High Voltage Tester (M/s. Croma, USA)	Crush Test Setup (M/s MOOC, USA)
Electrodynamics Vibration Shaker (M/s. Spectral Dynamics, USA)	DC Power supply (M/s. TDK Lambda, USA)	Earth Leakage Current Tester (M/s. KIKUSUI, Japan)	Altitude Chamber
Programmable Power Supply (M/s. Sensorise)	DC Load Bank (M/s. Prodigit, TAIWAN)	Power Meter (M/s HIOKI, Japan)	SLS (M/s 3D Systems, USA)
Hardware in Loop	Oscilloscope	DATA LOGGER (M/s HIOKI, Japan)	SLM (M/s SLM, Germany)
IPXX Facility (M/s Autotest, INDIA)	AC Power Supply (M/s. Croma, USA) (M/s. Ajay Instruments, New Delhi)	IMPULSE & SURGE GENERATOR (M/s High voltage India, Bangalore)	-



## 8. INFOTRONICS LAB

Powertrain Centre for Excellence (PT-CoE) provides turnkey consultancy services to customers for Automotive Powertrain Development with a special focus on Indian specific conditions that too at a competitive and an affordable budget.

The core team has hands-on experience in the field of Powertrain Development and Calibration, Benchmarking, Engine and Vehicle functional validation, Automotive Manufacturing, Plant Audit, Field failures and production quality issues improvement etc. We work with latest development tools and methodologies required for the successful execution of the projects.



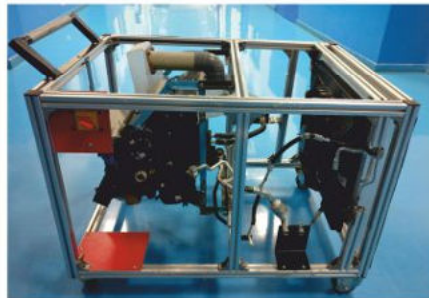
### CAPABILITIES

#### A. POWERTRAIN DEVELOPMENT

- ▲ Power train Development and Calibration.
- ▲ Functional Development and Validation.
- ▲ Cold start Calibration and testing.
- ▲ Energy audit and Friction Strip Down.
- ▲ Functional checks under different climatic conditions.
- ▲ Functional bench marking on component, Engine, Vehicle level.
- ▲ Climatic and Altitude Calibration (CVTC + Real world + Virtual).
- ▲ Drivability benchmarking.
- ▲ Real World Emission measurement under various operating conditions (RDE).
- ▲ OBD + Fleet Validation monitoring and data acquisition.
- ▲ Customer specific testing and data acquisition on engine and vehicle.
- ▲ Special testing rigs such as Alternator Load, N2 cylinder leak check, Breather Efficiency, Air conditioner Load etc.
- ▲ Expertise in specialized high speed data measurement for combustion, temp, pressure, current, voltage, frequency, RPM etc.

#### B. INFOTRONICS LAB (ECU SOFTWARE DEVELOPMENT AND VALIDATION)

- ▲ Testing and validation of existing ECU control functions.
- ▲ Design and development of new ECU control algorithms.
- ▲ Plant model development for ECU close loop validation and Engine hardware simulation.
- ▲ Virtual Calibration.
- ▲ SIL/MIL/HIL Simulation.



### SPECIFICATIONS/DETAILS OF TEST EQUIPMENT

#### COLD CHAMBER

Used for cold start development of engines of Genset, Passenger cars, SUV, Tractor & components testing etc. Temp range is -28 to 60 DegC. Internal dimension in mm is (5800 X 2150 X 2300)

#### MICRO SOOT SENSOR

Micro soot sensor works on photo-acoustic principle & is useful for measuring soot emissions which is an important indicator of combustion quality. MSS can detect soot in the range of 0.001- 50 mg/m<sup>3</sup> without dilution; 0.001 - 1000 mg/m<sup>3</sup> with dilution DR=20. It is one of the essential development tool required for emission calibration of BS VI Diesel engines.

#### AIR CONDITIONING LOADING RIG

Used for simulating real-life AC compressor load on the engine. This rig will be useful while executing accelerated durability cycles in Engine Dyno and will also aid in evaluating impact of AC load on engine's BSFC and Emissions.

#### ALTERNATOR LOADING RIG

Used for simulating alternator load on the engine via equivalent electrical load.

#### BREATHER EFFICIENCY RIG

Used for measuring oil separation efficiency in blow-by gases of engine.

#### ON THE ROAD OPACIMETER (OTR)

Used for measuring real time opacity with data logging. Can be used at both engine and vehicle level.

#### N2 LEAK CHECK

Special rig to check gasket/cylinder head leakage without opening cylinder head.

#### COMBUSTION ANALYSIS SYSTEM

High speed data acquisition system to measure cylinder pressure, manifold pressures, fuel line pressure, injection and ignition duration.





DOMAIN	SUB-DOMAIN	TOOLS
Structural Analysis	Linear, Non-Linear, Transient, Dynamic, Modal and Fatigue	Ansys, Radioss, Abaqus, MSC Nastran, MSC Fatigue
Thermal Analysis	Linear, Non Linear, Coupled Thermo-Mechanical High Temperature Fatigue	Ansys, Radioss, Abaqus, MSC Nastran, MSC Fatigue
CFD (Computational Fluid Dynamics)	Flow Simulation, Aerodynamics	Ansys CFX, Ansys Fluent, AcuSolve & Virtual Wind Tunnel
Multi-body Dynamics	Mechanism Study, Vehicle Dynamics	MSC Adams, Altair Motion Solve
Optimization	Topography, Topology	Altair Optistruct
3D CAD	Part Modelling, Assembly, Drafting	UG NX, CATIA

**HIGH PERFORMANCE COMPUTING CLUSTER**

- ▲ 4 Shared Memory Processor
- ▲ 90 Compute Nodes (64 GB RAM)
- ▲ 128 GB RAM
- ▲ Infiniband Interconnect

**ADVANTAGES OF HPCC**

- ▲ Massive Computing Power for simulating heavy simulations like Crash Analysis, Engine full cycle flow and combustion analysis, vehicle aerodynamics.





## 9. CNG - LPG LAB

The lab offers routine certification for CNG/LPG regulators & accessories, speed limitation devices of all types and automotive horns. The lab also undertakes development and validation tests based on customer specific requirements. The major facilities available with the lab are: continued operation test rig for CNG/LPG regulators, test facility for injector rail testing, test facility for rubber hoses, acoustic chamber for horn testing, test facilities for speed limitation device testing etc.



### CAPABILITIES

- ✦ Full testing of CNG Pressure Regulators as per Indian and International Standards (IS, ISO, ECE )
- ✦ Hydrostatic test/Burst test capability for up to 1000 bar.
- ✦ Seat Leakage test rig for external and internal leakage in the component.
- ✦ CNG Compatibility test rig for testing of component in CNG environment.
- ✦ Overpressure test setup for testing of LPG Vaporizer as per Indian and International standards.
- ✦ Testing capability for continued operation test for multiple step cycles.
- ✦ Oxygen aging test rig to perform various tests in oxygen environment.
- ✦ Semi-Anechoic chamber for Sound pressure Level measurement of automotive horns and development of various components.
- ✦ SPL Meter of BRUEL & KJAER make for measurement of Sound Pressure level as per various curves.
- ✦ Testing of Automotive Horns as per various Indian and International Standards (IS, ISO, ECE).
- ✦ Homologation services for regulatory approvals for CNG -LPG components, Horn, SLD, etc. for Indian market.
- ✦ Tie ups with various international agencies for homologation as per International Standards (ISO, ECE).
- ✦ Creep test facility for testing of LPG Vaporizer as per various Indian and international standards.





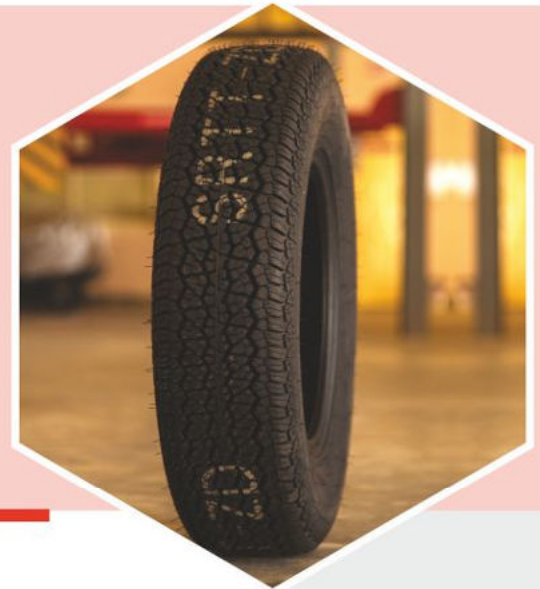
## 1. VEHICLE EVALUATION LAB (VEL)



Vehicle Evaluation Lab undertakes vehicle dynamic tests on test tracks using instrumentation required for different tests. This lab undertakes road worthiness trials for all categories of vehicles ranging from two wheelers, three wheelers, four wheelers to heavy commercial, construction equipment vehicles to agricultural tractors. Some of the key tests include coast down, brake performance, maximum speed, fuel consumption, acceleration and performance, driveability trials, tyre noise testing, endurance and durability tests, ABS test, etc. as per the specific needs of the customer.

### CAPABILITIES

- ▲ Testing as per CMVR 1989.
- ▲ Fuel efficiency testing of Car/Bus/Truck.
- ▲ PBC measurement as per ASTM E1337 - 90 (Reapproved 2012).
- ▲ Tyre testing for Mu-Slip Measurement.
- ▲ Evaluation of fuel additives on vehicle performance.
- ▲ Wet Grip testing as per R117 for C1 tyres.
- ▲ Coast by Noise as per R117.
- ▲ Verification and testing of special purpose trailers.
- ▲ Vehicle HVAC Performance.



### DETAILED FACILITY

- ▲ Data Acquisition System - BUSDAQ, µepc, V-Box
- ▲ Speed Sensor - Optical Sensor L-350, S-350, GPS based speed sensor
- ▲ Steering effort Measurement Systems
- ▲ Sound Measurement Equipment - Bruel & Kjaer, SVANTEK & LMS
- ▲ Weather station
- ▲ Tachometer
- ▲ Pedal and Hand Force Sensor
- ▲ Pressure Sensors
- ▲ Wheel pulse transducer
- ▲ Zero Level surface
- ▲ Manometers
- ▲ Digital height gauge up to 2000mm
- ▲ Digital Torque wrench up to 0 to 1000 Nm
- ▲ Riding gear-PPE (Personal Protective Equipment) for safety.
- ▲ Weighing Pads (1 ton, 5 ton and 10 ton capacity)





## 2. TEST TRACKS

The Vehicle Evaluation Lab (VEL) supports in homologation, research and development activities in the area of vehicle dynamics. For conducting the vehicle dynamics test, different test tracks are available at ICAT Centre II.

### ▲ OVAL TRACK

- Straight Portion 775 m \* 2 = 1550 m
- Max Angle of Parabolic Area = 35 deg

### ▲ HILL TRACK

- 4 different gradient slabs (6-10 %, 12.3%, 18% and 28%)

### ▲ ABS TRACK

- ABS Track Size ( Basalt Tiles) 300 \* 7 m

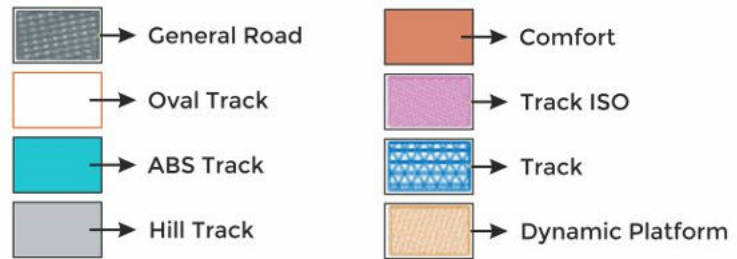
### ▲ FLOOD TRACK

- 500 \* 4 m (Water Can be filled upto 175 mm)

### ▲ Steering Pad Platform



## TEST TRACKS



\* Proposed Plan

## 3. PASSIVE SAFETY LAB

ICAT's Passive Safety Lab is dedicated to support automotive industry for their needs of Crash Testing (Regulatory as well as Developmental), Pedestrian Protection Testing, Sled Testing, Airbag Deployment Testing etc. The Passive Safety Lab has state of the art Test Facilities capable of conducting Crash Testing of vehicles as per Indian, International Regulations and NCAP's protocols. Some of the services offered are frontal impact crash test, side impact crash test, side pole impact, rear impact test, static rollover, pedestrian protection testing, etc. The lab has successfully completed Correlation activities with renowned OEMs.





## CAPABILITIES

- ▲ Compliance and Verification of Occupant Protection
  - Full Frontal Crash
  - Offset Frontal Crash
  - Side Impact Crash
  - Rear Impact Crash
  - Side Pole Impact Crash
  - Post-Crash Fuel Leakage Evaluation
- ▲ Sensor Development Testing
- ▲ Pedestrian Protection Testing
- ▲ Seat Anchorage Strength Test
- ▲ Seat Belt Dynamic Strength Test
- ▲ Side Door Intrusion Strength test
- ▲ Door Latches & Hinges Test Pulse
- ▲ Body block test
- ▲ Airbag Deployment Testing
- ▲ Interior fitment evaluation & head form impact test
- ▲ Testing of Energy Dissipating Material
- ▲ CRS Installation
- ▲ Static Airbag Deployment Test with Environmental Conditions
- ▲ Proposed Bharat NCAP and other NCAP's Testing



## SPECIFICATIONS OF TEST EQUIPMENTS

### • CRASH FACILITY

- ↻ Barriers
- ↻ Drive System
- ↻ Static Rollover
- ↻ Data Acquisition System /Sensors
- ↻ High Speed Lights
- ↻ 3D Dummy Positioning System & 3D Coordinate Measurement Machine
- ↻ High Speed Cameras
- ↻ Underbody Camera Pits

### • SLED FACILITY

SLED SIZE	PEAK FORCE	STROKE	PEAK g	MAXIMUM VELOCITY	MAXIMUM PAYLOAD	MAXIMUM JERK RATE
2m(w) x 3m(l)	1000KN (225,000 lb)	1.9m (74 in)	90g	85 kmph	1200kg (2640 lbs)	3.0g/msec (rise) 2.0g/msec (decay)

- ↻ High Speed Lights
- ↻ High Speed Cameras
- ↻ Data Acquisition System

### • PEDESTRIAN PROTECTION TEST FACILITY

- ▲ Maximum Vehicle Dimension for Test
  - Width: 2.8m, Height up to windscreen: 2.5m
  - Height up to front bonnet: 1.25m, Weight: 3500 kg
- ▲ Maximum Impact Speed: 54 km/h  
(40kmph is regulatory/NCAP test speed)

### • STATIC AIRBAG DEPLOYMENT TEST FACILITY

- ▲ Dual Stage Capability
- ▲ 10 to 100 ms delay between two stages
- ▲ Temperature range: -40°C to 110°C

### • SIDE DOOR INTRUSION STRENGTH TESTING

- ▲ Capacity : 100 kN
- ▲ Maximum Actuator Stroke : 750 mm





## 4. ELECTROMAGNETIC COMPATIBILITY LAB ( EMC)

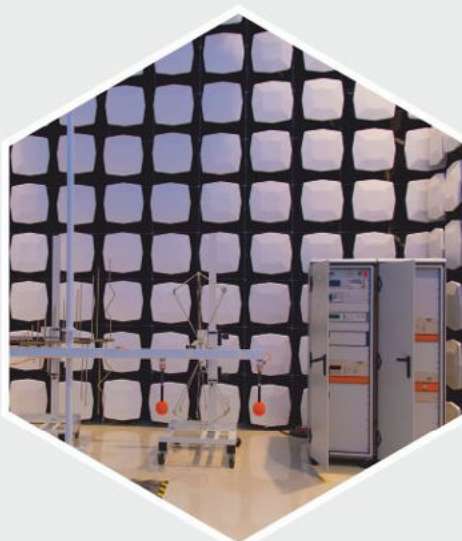
ICAT has a state-of-the-art facility to conduct EMI/EMC development and certification tests on vehicles and automotive electrical/electronic components. ICAT EMC lab is among the best maintained and managed automotive testing labs in the country and hold NABL certification (Certificate No. TC - 5360).

The lab is equipped with shielded semi-anechoic chambers to test EMC compliance of E & E components, 2 & 3 wheelers, passenger cars, light and heavy commercial vehicles. Services being offered at the EMC lab are homologation according to Indian/ European directives, production conformity tests and engineering solutions at development stage to meet EMC requirements of vehicles and components.



### CAPABILITIES

- ▲ Developmental tests on electrical/electronic components as well as vehicles.
- ▲ Troubleshooting, research and development of component and vehicle designs from EMC perspective.
- ▲ Component and/or vehicle certification tests for type approval according to Indian/European directives.
- ▲ Production conformity tests compliant with manufacturer's standards.





## SPECIFICATIONS OF TEST EQUIPMENTS

S.No.	GROUP OF PRODUCTS TESTED	SPECIFIC TESTS OR TYPES OF TESTS PERFORMED
1	EMI /EMC testing for Electrical/ Electronic automotive components	Off - Board Radiated Emissions (RE)
		Conducted RF Emissions (CE) by voltage method
		Conducted RF Emissions (CE) by current probe method
		Off - Board Radiated Immunity (RI), ALSE Method
		Radiated Immunity (RI), TEM Method
		Radiated Immunity (RI), Stripline Method
		Radiated Immunity (RI), Direct RF Injection
		Radiated Immunity (RI), Triplate Method
		Immunity to magnetic fields
		Electrostatic Discharge (ESD) test
		Conducted Transient Emissions on Power Leads
		Immunity to Conducted Transient Disturbances
		Enviromental Conditions and Testing of Electrical Loads
2	EMI /EMC testing for 2/3/4 wheeler passenger vehicles, commercial and agricultural vehicles	Off - Board Radiated Emissions (RE)
		On - Board Radiated Emissions
		Off - Board Radiated Immunity (RI), ALSE Method
		Onboard Transmitter Simulation Electromagnetic Immunity
		Bulk Current Injection (BCI)
		Electrostatic Discharge (ESD) test
3	EMI /EMC testing for Electrical/Electronic non-automotive components	Radiated Emissions (RE)
		Conducted Emissions (CE) on power lines

## 5. NOISE VIBRATION & HARSHNESS LAB (NVH)

A center of excellence on noise vibration & harshness (NVH) is the first of its kind of facility in India to offer services for development of vehicles and components, testings, and validation.

- ✦ Vehicle interior and exterior noise analysis
- ✦ Sound Source Identification
- ✦ Sound transmission Loss, Sound Absorption Coefficient
- ✦ Modal Testing on components, sub-assemblies and vehicles





# Facilities in NVH LAB

## 01 PASSENGER CAR VSAC

Expandable Load Capacity  
Interior Pass by Noise Test  
Optimal Inertia Range: 150Kg-3500Kg  
Maximum Speed: 200 km/h  
Maximum Weight: 3500Kg



## 02 HEAVY DUTY VSAC

Expandable Load Capacity  
Load Capacity for Trucks and Heavy Buses  
Maximum Speed: 130 km/h  
Maximum Weight: 10000Kg



## 03 MODAL ROOM

To perform FRF measurement & analysis on independent systems, assemblies, sub assemblies and entire vehicle



## 04 COUPLED ACOUSTIC ROOMS

Performance evaluation (transmission loss) for effectiveness of sound barriers and acoustic panels used in vehicles, buildings and other sound isolation applications.



## 05 LISTENING ROOM

Determination & generation of sound quality matrix with objective and subjective (jury sessions) methods.



## 06 INSTRUMENTATION

Pass by Noise system  
Vibration systems  
Scanning system  
Transfer path analysis  
Modal testing equipments and etc



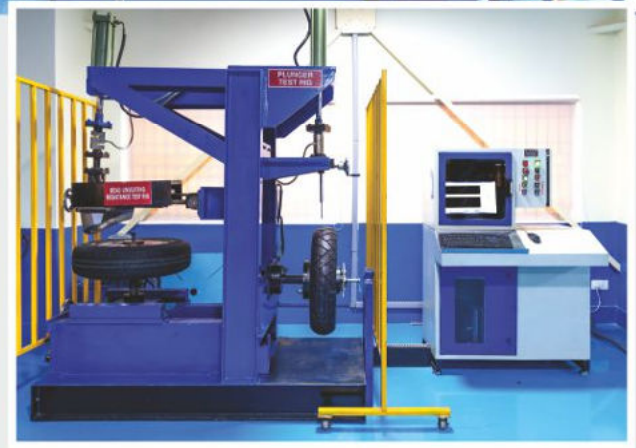
## 6. TYRE TEST LAB ( TTL)

ICAT has world class Tyre Test Facilities being operated & managed by highly skilled and experienced team to deliver quality & swift services to our esteemed customers. Tyre Test Lab is providing services to the tyre Industry, vehicle manufacturers/OEMs, Bureau of Indian Standards (BIS), Foreign Tyre Manufacturers etc. for tyres testing, Type Approval & COP as per AIS: 037.

ICAT has transformed this lab into Centre of Excellence (COE) by developing new capabilities including the Dual Station Endurance Test Rig and Tyre Rolling Resistance Test Rig.

### APPLICABLE STANDARDS/REGULATIONS FOR TYRE TESTING

Indian Standards	IS 15627, IS 15633, IS 15636, AIS 037, AIS 110
European Standards	ECE R 30, ECE R 54, ECE R 75, ECE R 117 rev2
Gulf Standards	GSO/02/FDS /646:2009, GSO 53/2007
US Regulations	FMVSS No. 139



### CERTIFICATION AND DEVELOPMENT

1

Tyre Testing of BIS Samples as per IS:15627, IS:15633 & IS:15636.

2

Testing of Tyres for inclusion in BIS License (for foreign & Indian tyre manufacturers)

3

Tyre Testing as per ECE Regulations and GSO Standards.

4

Consultancy for setting up Tyre Test Labs

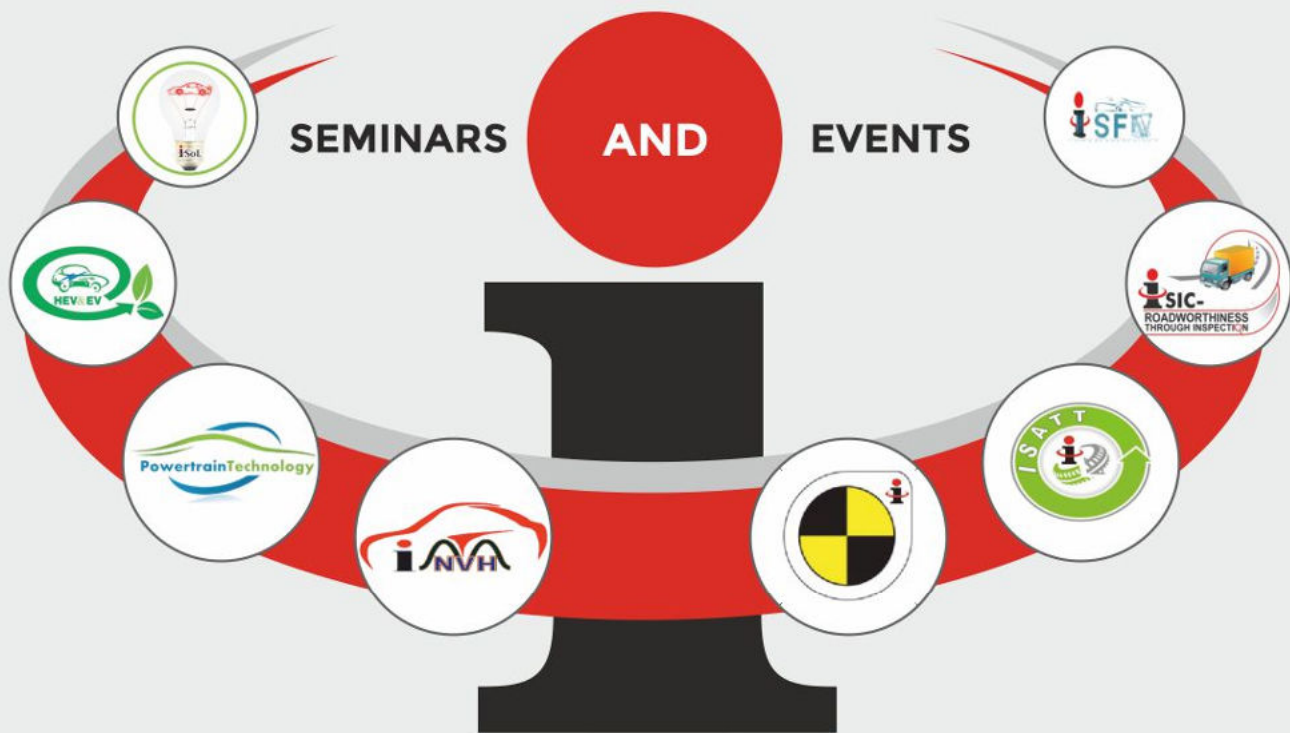
5

Rolling Resistance Measurement (Torque Method) as per ECE R117 & ISO Standards.

### SPECIFICATIONS/DETAILS OF TEST EQUIPMENT

TESTING FACILITY	SPECIFICATIONS	PARAMETERS
Load/Speed Performance & Endurance Test Rig	Reference Standards	IS 15627, IS 15633, IS 15636
	Maximum Load	150 kN
	Maximum Wheel Rim Size	24 inches
Dual Station Endurance Test Rig	Reference Standards	IS 15627, IS 15633
	Maximum Load	30kN
	Maximum Test Speed	350km/h
Plunger and Bead Unseating Test rig	Reference Standards	IS 15627, IS 15633, IS 15636
	Maximum Load	50 kN
	Maximum Wheel Rim Size	24 inches
Tyre Dynamic Growth Test Rig	Reference Standards	IS 15627
	Maximum Speed	300 km/h
	Applicability	2W/3W
Tyre Rolling Resistance Test Rig	Reference Standards	ECE R 117 rev2, ISO 28580
	Load Capacity	25 kN
	Maximum Test Speed	150 km/h
	Test Method	Torque





### 1. iSoL-INTERNATIONAL SYMPOSIUM ON LIGHTING

The International Centre for Automotive Technology (ICAT) organizes International Symposium on lighting (iSoL). This biennial event is one of the biggest automotive lighting symposiums in Asia Pacific region. The two days Symposium provides a common platform to professionals related directly or indirectly to the automotive lighting fraternity from all around the globe. The participants include experts from automotive industry, automotive lighting industry, rule makers, test houses, research centres, educational institutes & associations etc. In this event, the professionals share their experiences and learn about the trends & innovation in automotive lighting technology. The symposium also consists an exhibition (iSoL\_EXPO), where different automotive companies showcase their products and services. ISOL Awards are integrated part of this event, which motivates & appreciate automotive lighting industry for their achievement in Process Excellence, Innovation & Design.

### 2. HEV & EV WORKSHOP ON HYBRID ELECTRIC VEHICLES & ELECTRIC VEHICLES

The HEV & EV workshop focused on the challenges faced by energy security, depleting fossil fuels, growing global warming, environmental and health issues that have become increasingly prominent.

In view of these developments, it was opportune to organize these workshops focusing on the - HEV & EV - Opportunities, Challenges, and Technology. These workshops addressed the latest technological innovations with the real-world data on Hybrid and EV Technology with an aim at the successful identification of the road map for Hybrid and Electric Vehicle implementation regime in India.

The Speakers for the Workshop were from leading Research & Development Institutes such as Argonne National Laboratory, Dept. of Energy, USA, AVL of GRAZ, FEV of Germany, TUV Rhineland of Japan, Australia, ETAS of Germany, Horiba Japan, KPIT, Honda Japan, Mitsubishi Fuso Trucks & Bus Corporation of Japan.

### 3. CONFERENCE ON POWERTRAIN TECHNOLOGY

To help the industry on their path to meet the new requirements in terms of product development and regulatory compliance, this conference aims to bring together the industry and academic experts in the Powertrain development field to share and discuss new proposals, learning and experiences. It will open up presentations and discussions on analyzing current trends & upcoming technologies while aiming to propose prospective solutions to the challenges faced by the automotive industry in the India.

### 4. ICAT CONNECT

ICAT CONNECT is an event organised to create awareness about automotive new regulations and new segments with specific focus on type approval procedure.



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## 5. INVH-NOISE VIBRATION & HARSHNESS

With the INVH seminar-cum-workshop series, ICAT is aiming at creating awareness and providing a platform for exchange of information to cater to the needs of Professionals & Academia, with the involvement of leading experts in the field.

The previous events INVH-2011, 2013, 2015 & 2017 which were attended by more than 350 participants and more than 220 delegates from different sections of the automotive industry. The Speakers for the Symposium were from leading Research & Development Institutes, various leading International Scientific & Research Organizations and Testing Laboratories.

This biennial event is one of the biggest of its kind.

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## 6. ISFV-INTERNATIONAL SYMPOSIUM ON FATIGUE & VIBRATION

Fatigue Testing Laboratory in ICAT is conducting workshops and seminars frequently on Fatigue, Vibration and Durability Testing & technologies. The idea behind conducting this event is to bring everybody working in this field on the same platform for exchange of knowledge and also allow the attendees a forum to showcase their latest research.

The topics covered during the symposium & has a varied range and it covered Vibration Testing & analysis, Road Load Data Acquisition & Analysis, Ride and Comfort Evaluation, vehicle level & component level durability cycle definition and testing using new soft-wares & equipments like MAST (Multi axis simulation Table), X-Poster technologies. Also, this provides the testing equipment manufacturers an interface for networking with the Industry officials in the form of exhibition which is an integral part of the event itself.

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## 7. ISIC - INTERNATIONAL SYMPOSIUM ON VEHICLE INSPECTION & CERTIFICATION

International Symposium on vehicle inspection and certification (ISIC), widely acclaimed by global automotive fraternity, is a benchmark biennial international event, organized by International Centre for Automotive Technology(ICAT) in association with the Ministry of Road transport and highways, Government of India & National Automotive Testing and R&D Infrastructure Project (NATRiP), that serve as a forum for exchange of ideas & brainstorming for the automotive industry, with participation of eminent worldwide experts in various arenas. Theme of ISIC is "Roadworthiness through Inspection

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## 8. ISATT-INTERNATIONAL SYMPOSIUM ON AUTOMOTIVE TYRE TECHNOLOGY

In year 2012, ICAT started the Technical colloquium on tyre technology called iSATT 12 which helped us in understanding the perception of the automotive tyre industry. The 2014 edition of iSATT gave a comprehensive perspective on the global tyre technology with more than 200 experts representing all relevant stake holders in the tyre industry and received overwhelmingly positive feedback from the tyre Industry.

The 3<sup>rd</sup> edition, iSATT'16 has come up with an idea of sustainable development in the tyre industry and has focused on tyre performance, safety, power, impact of intelligent tyres on ABS/VCS performance, prediction of dynamic behaviour of a tyre through FE simulation which will be the key topics of this year's symposium.

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## 9. SEMINAR ON PASSIVE SAFETY

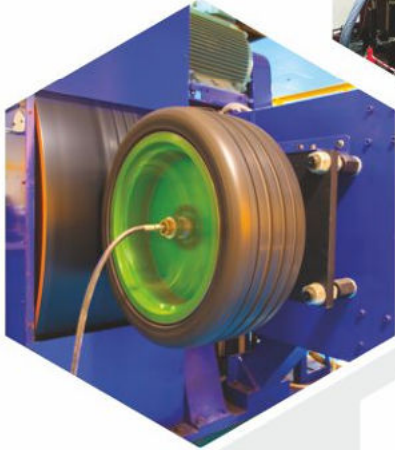
Seminar of Passive Safety provides platform to discuss the latest developments in the field of automotive passive safety. Experts from automotive industry and research institutes will share their experience about the development of safer automotive solutions and preventing injuries to vehicle occupants and vulnerable road users.

The seminar also focus on the latest advancements in the Indian and worldwide automotive passive safety regulations including Bharat NCAP.

### KEY TOPICS

- Accident data: analysis & interpretation
- Improvement in protection of adult, child occupants & pedestrians/vulnerable road users during accidents
- Better production methods using hot stamping & alternate material for crash worthiness
- Future of road safety in India (NCAP, road infrastructure, public awareness)





**Centre I**

Centre I - Plot No. 26,  
Sector 3, HSIIDC,  
IMT Manesar,  
Gurugram - 122050,  
Haryana

**Centre II**

Centre II - Plot No. 1,  
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