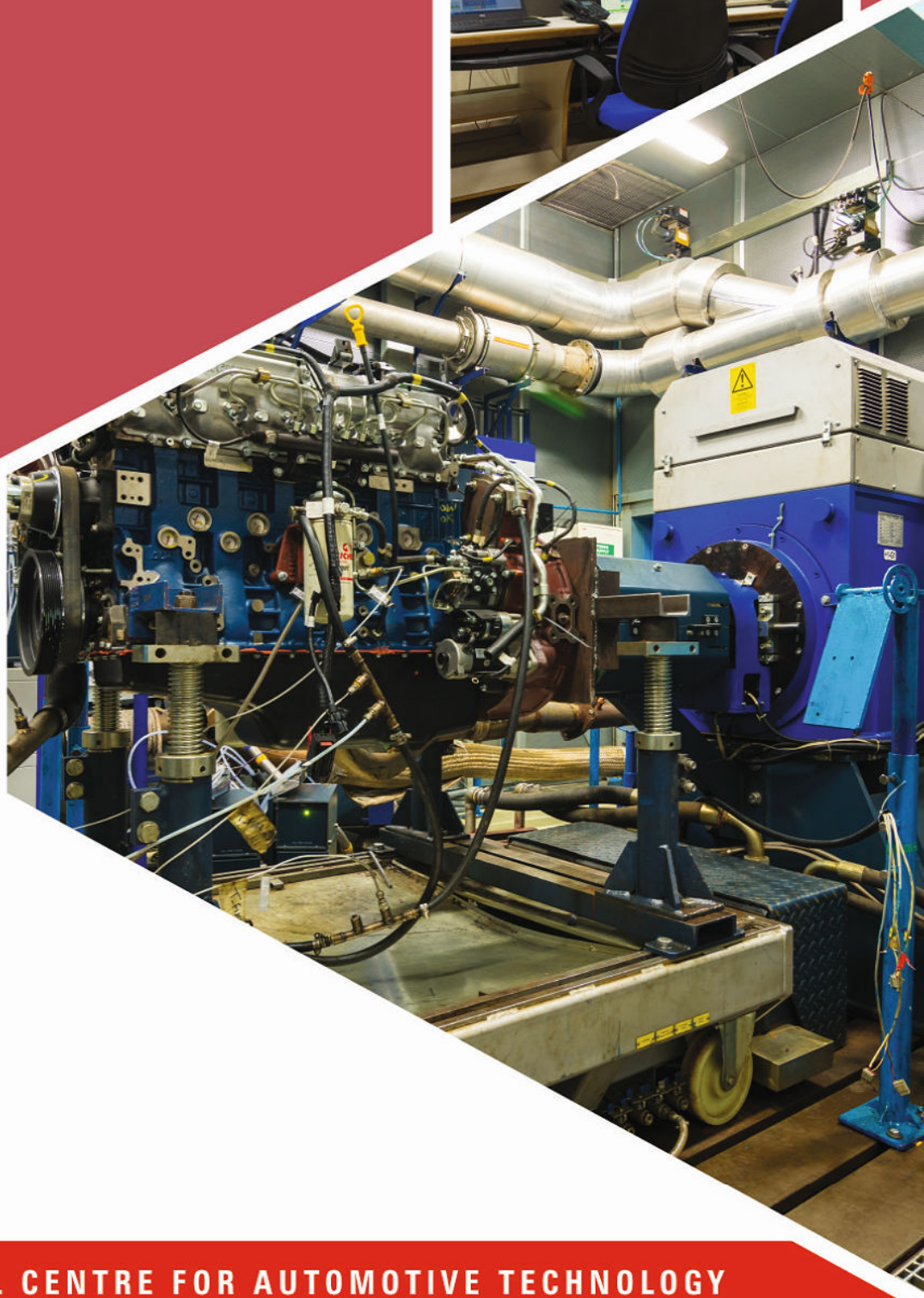
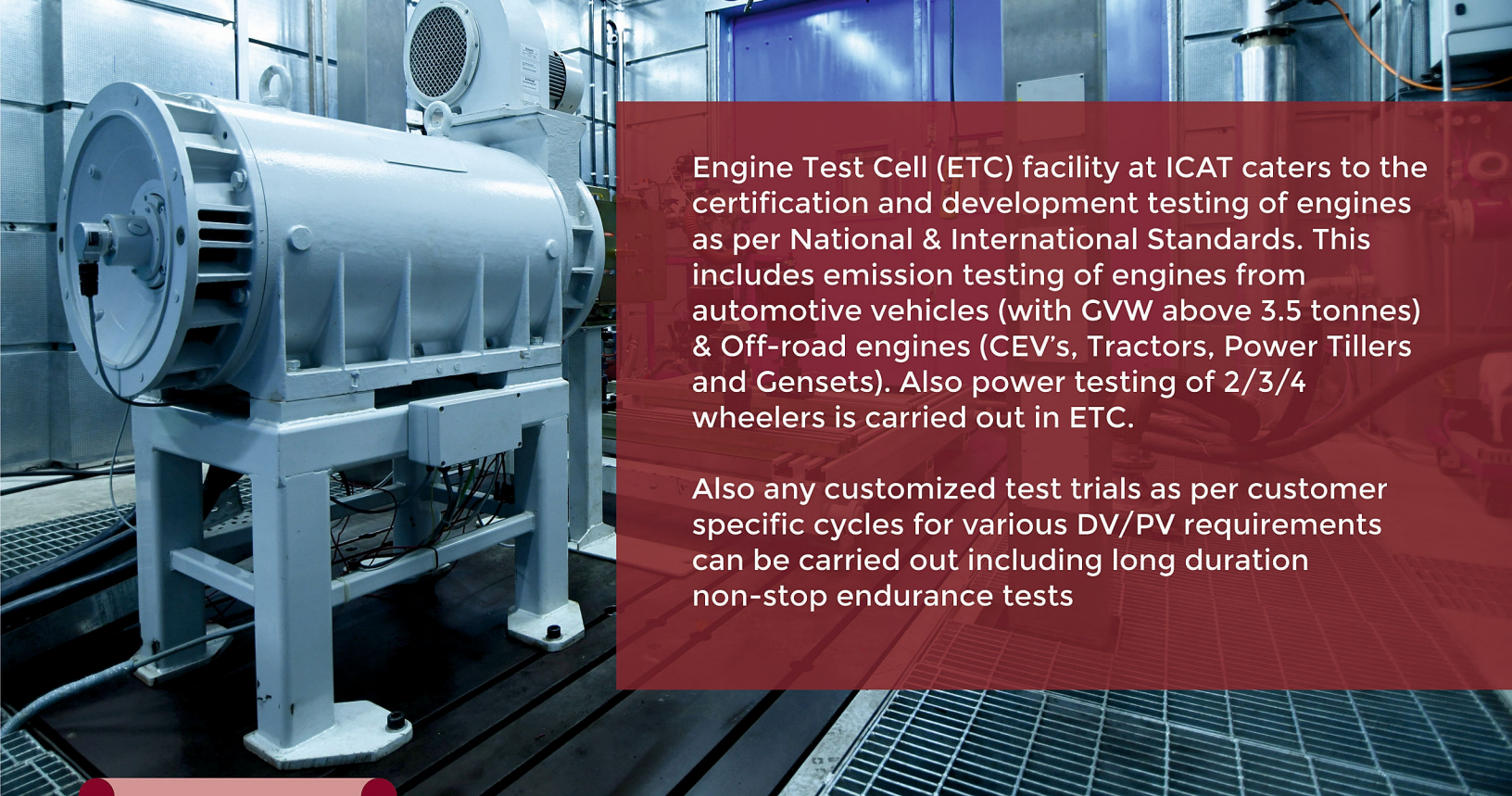


ENGINE TEST CELL (ETC)





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

CAPABILITIES

As of now, there are 11 Transient Test Beds with AC Dynamometers and 02 Steady State Test Beds with Eddy Current Dynamometers. The details of the same are given below:-

AC Dynamometers

11 dynamometers with ratings ranging from 120kW-830kW

Eddy Current Dynamometers

02 Eddy Current Dynamometers of rating 35kW & 250kW equipped with emission measurement capabilities

Euro 6 Capability

Provision to measure particulate number with the help of AVL PNC (APC Plus)

Emission Measurement

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

Full Flow Dilution system

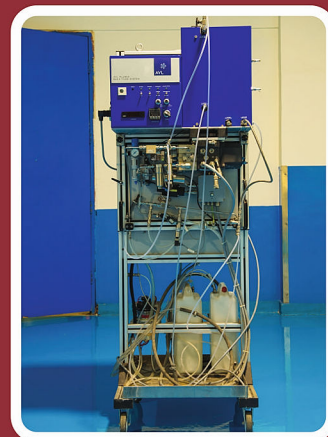
02 numbers of Transient Dynamometers with rating 500kW & 220kW are equipped with Full Flow Dilution System with Horiba DLS-7200 (Full Flow), AVL SPC and Horiba PM Measurement. Modal sampling capability is also present

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_x, CO₂, CO, SO₂, CH₄ & 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



STANDARDS/REGULATIONS (NATIONAL AND INTERNATIONAL):

- ✦ Type Approval as per MoRTH Rule No. 126A, TAP/115-116, AIS-137
- ✦ Automotive Bharat Stage III to Bharat Stage VI Testing (ESC, ELR, ETC, WHTC, WHSC, WNTC, NRSC etc.)
- ✦ ISO 8178 (TREM-III, III A, Stage-IV) for Tractor, CEV & Power-Tillers
- ✦ Tractors and PTO IS:12036-1999 & IS:9253-1987
- ✦ Tractor smoke test EPA 40 CFR - Part 89
- ✦ Bharat (Non-road) Stage IV Testing
- ✦ Genset - CPCB-II
- ✦ IS 11170, IS 7347 & IS 10000
- ✦ FTP test as per IS:14599
- ✦ ECE Regulations: 24, 40, 47, 49, 83 & Type IV, V, VI & OBD,96,101
- ✦ EEC Directives: 70/220/EEC up to & including as amended by 2003/76/EC, Type IV, V, VI & OBD,
 - : 80/1268/EEC, 97/24/EC as last amended by 2006/120/EC
 - : 88/77/EEC amended by 91/542/EEC

SPECIFIC CAPABILITIES

- ✦ Durability Test as per customer desired test cycles for development and validation with auxiliary loading rigs as may be required
- ✦ Altitude Simulation up to 2000m above Sea Level (81-101 kPa)
- ✦ Thermal Shock (+30°C to 140°C)
- ✦ Ammonia slip measurement Units (FTIR)
- ✦ Urea Flow Measurement
- ✦ PN Counter, PM sampling
- ✦ Smoke, Opacity and Blow By Measurement
- ✦ Pre-Post (Dual Stream) Emission Measurement (CO, THC, NOX, CH₄, CO₂)
- ✦ Combustion Analysis via AVL Indicom
- ✦ Micro Soot Sensor



KEY PROJECTS

- ✦ Tier IV Engine emission optimization & Development Test
- ✦ Hot & Cold Cycle
- ✦ Euro-6 Development Trails for Heavy Duty Automotive Engines
- ✦ Cold Start ability
- ✦ Genset Development for CPCB-II
- ✦ BS-IV automotive engine development (CNG)
- ✦ SCR after-treatment system development
- ✦ BS-IV emission optimization & development test
- ✦ ATS development
- ✦ Cold Startability Testing for Diesel and CNG Engines
- ✦ Euro-4 EGR Engine Development Trials
- ✦ BS-IV automotive engine development (CNG)
- ✦ BS-III CEV development
- ✦ Long duration endurance for components validation
- ✦ Wear Measurement analysis

LAB ACCREDITATION

- ✦ MoRTH Central Motor Vehicle (CMV) - Rule 126 for "TYPE APPROVAL"
- ✦ Central Pollution Control Board (CPCB) for Emission and Noise testing for Generator Sets
- ✦ VCA(UK) - for export homologation (Since 2008)
- ✦ DGS&D Recognition for Type Testing

COMPLIANCE

- ✦ ISO 9001:2008, ISO 14001:2004, OHSAS 18001:2007
- ✦ ISO 17027:2005 (NABL)

BENCHMARKING CORRELATION INFORMATION

To maintain the consistency and the quality of test data internal benchmarking of ICAT test cells is done with a GOLDEN (Master) engine, Benchmarking and Inter Lab Comparison is being conducted with the master engine on a quarterly basis (Golden Engine) and presented to the management during our internal quality review.

ENGINE TEST CELL (ETC)

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