TESTING, RESEARCH CERTIFICATION OF INTERNAL COMBUSTION ENGINES WORKING ON BIOFUELS LABORATORY

Contact details

Name	**Testing, Research and Certification of Internal Combustion Engines working on Biofuels Laboratory**
Acronym	**TestEcoCel**
Logo	Departamentul de Autovehicule Rutiere si Transporturi – Testare, Cercetare şi Certificare a Motoarelor cu Ardere Internă – Laborator de Universitatea Tehnică din Cluj-Napoca
Site	http://www.testecocel.utcluj.ro/
Tüv Certificate	No. S-120.99.241.00, given on 19.12.2012 for ISO 8178, Part 1,3 and 5
RAR Certificate	No. 04/2015, given on 05.03.2015 and is designated as an A category Technical Service, meeting Directive 2007/46/CE (Annex V, Appendix 2) and ECE/TRANS/WP.29/1059
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Areas of expertise

Engine testing:
In the TestEcoCel Laboratory a series of functional, reliability and dynamic analysis can be performed on internal combustion engines designed for vehicles, powered by conventional fuel and also non conventional fuels.
Testing the quality of fuels on engines:
An analysis of the physical and chemical properties of fuels used in internal combustion engines can be made, and also the evaluation of pollutant emissions generated in the burn process.
Optical analysis of the combustion:
Using an endoscopic camera and the transparent components of the single cylinder research engine inside the Laboratory, some tests regarding the characteristic phenomenon of the combustion process can be made, based on the particularities of the burning flame generated by the different fuels used to powered the internal combustion engine.

Team

Prof. PhD. Eng. NicolaeBurnete, Assoc. Prof. PhD. Eng. Florin Mariaşiu, Assoc. Prof. PhD. Eng. Bogdan Varga, Lecturer PhD.. Eng. Calin Iclodean, Lecturer PhD. Eng. Dan Moldovanu, Lecturer PhD.. Eng. Doru Baldean

Representative projects

ECOTRANS, "Possibilities and limits of greening urban transportation through vegetable oil fuels", CEEX Program, (2005-2008)
BIOBENZ, "New, modern, unconventional technologies of superior biomass capitalization from sugar beet – obtaining gasoline", (2006-2008**)**
EnergoEcoFarm,"**Studies regarding the usage of oil based fuels as a reliable energy source for agricultural farms**", PN II-21046, (2007-2009)
BIOGEF, "High energetic efficiency technology for producing an integrated biogas system and electrical energy from bio mass, for Romanian farms", (2006-2008)
"The influence or the energetic contribution on functional parameters and emissions of internal combustion engines that work with blends of biofuels", (2007-2009)
TestEcoCel, "Testing laboratory of internal combustion engines that run on biofuels", POS CCE, (2009-2011)
"**Endurance testing of various gasoline blends mixed with metallic additives**", Industry research, (2012-2013)

Significant results

The most representative publications of the past 5 years:

1. N. Burnete, B. Varga, D. Moldovanu, E. Borza, D. Baldean, "Process Investigation possibilities of an internal combustion engine", in *The 8th International Conference Fuel Economy, Safety And Reliability Of Motor Vehicles, ESFA*, Bucharest, 2009, pp. 283-290
2. N. Burnete, B. Varga, D. Baldean, P. Bolba, Biofuels, "Alternative energy source in Romania, in *The 11th International Congress on Automotive and Transport Engineering*, Brasov, Romania, 27-29 October, 2010, pp. 343-356
3. F. Mariasiu, B. O. Varga, "Possibilities to improve the cold start process of tractors engines fuelled with biodiesel", in *Journal of Food, Agriculture and Environment (JFAE)*, vol. 8, no 3-4, 2010, pp. 1120-1122
4. B. O. Varga, "Electric vehicles, primary energy sources and CO2 emissions: Romanian case study", in *The International Journal of Energy*, vol. 49, 2013, pp. 61-70
5. N. Burnete, D. Moldovanu, D. Baldean and L. Kocsis, "Studies Regarding the Influence of Exhaust Backpressure on the Performances of a Compression Ignited Engine", *Proceedings of the European Automotive Congress EAEC-ESFA 2015*, Springer International Publishing Switzerland, DOI 10.1007/978-3-319-27276-4_13

Significant solutions:
Research regarding the use of rape seed oil based fuels with diesel, for the compression ignited engine, to reduce pollution; Studies regarding combustion modeling in a compression ignited engine fueled with biodiesel for better performance; Studies and research regarding simulation of an internal combustion engine that works with biofuels; Studies and research regarding the possibilities of improving the internal combustion engine performance through supercharging;

Products and technologies:
Active Dynamometer – capable of functioning also as a motor, for starting the single cylinder engine, capable of working at 12000 rot/min, developing a power of 220kW and a torque of 540Nm; and capable of working as a controlled generator, for loading the engine; Single cylinder research engine – the engine has three interchangeable kits: Kit for gasoline engine, for direct injection and indirect injection (PFI); Kit for transparent engine, with a quartz liner in order to film inside the combustion chamber using cameras and a quartz cylinder head, for filming using the camera and a mirror system; Kit for Diesel engine, common rail, direct injection, with two orifices in the cylinder head for the endoscopic camera, to film the processes inside the combustion chamber; Open ECU – the Electronic Control Unit of the engine
Patents:

Mariasiu E, Burnete N, Varga B., Cold start device for internal combustion engines supplied with biodiesel fuel, RO127032-A2

The offer addressed to the economic environment

Research & development	In the applied engineering service domain, our research group offers technical expertise regarding the dynamic performance, chemical and nuisance while using different types of fuels for the internal combustion engines; Modeling and analysis of the combustion process of an internal combustion engine using different types of fuels; Analysis of biodiesel burn particularities in a compression ignited engine and study of bio-ethanol burn performance in a spark ignited engine.
Consulting	In the consulting domain, our research group can provide data regarding fuel performance and internal combustion engine performance to internal combustion engine producers, to fuel producers and also for research centers. The internal combustion engine is tested as if it is mounted on the vehicle, due to the high performance of the dynamometer.
Training	The available trainings are in Engine testing, Engine certification, and Fuel testing domain.