

Contents

<i>Zhu D., Pritchard E., Dadam S.R., Kumar V., Xu Y.</i> Optimization of rule-based energy management strategies for hybrid vehicles using dynamic programming	3
<i>Stoeck T.</i> Methodology of testing common rail fuel injectors with the use of Gauss's formulas	11
<i>Stepień Z.</i> Influence of physicochemical properties of gasoline on the formation of DISI engine fuel injector deposits	16
<i>Milewicz J., Mokrzan D., Szymański G.M.</i> The assessment of the technical condition of SO-3 engine turbine blades using an impulse test.....	24
<i>Pielecha I., Sidorowicz M.</i> Effects of mixture formation strategies on combustion in dual-fuel engines – a review	30
<i>Engelmann D., Hüßy A., Comte P., Czerwinski J., Bonsack P.</i> Influences of special driving situations on emissions of passenger cars	41
<i>Andrych-Zalewska M., Merkiş J., Pielecha J.</i> The influence of the heating time of a catalyst-covered glow plug on the exhaust emissions from a diesel engine	52
<i>Bielaczyc P., Woodburn J., Joshi A.</i> World-wide trends in powertrain system development in light of emissions legislation, fuels, lubricants, and test methods	57
<i>Hunicz J., Krzaczek P., Gęca M., Rybak A., Mikulski M.</i> Comparative study of combustion and emissions of diesel engine fuelled with FAME and HVO	72

Declaration of the original version
The original version of the Combustion Engines journal
is the printed version.

Editorial:

Institute of Combustion Engines and Powertrains
 Poznań University of Technology
 60-965 Poznań, Piotrowo 3 Street
 tel.: +48 61 2244505, +48 61 2244502
 E-mail: papers@ptnss.pl
 Prof. Jerzy Merkiş, DSc., DEng.
 (Editor-in-chief)
 Miłosław Kozak, DSc., DEng.
 Prof. Jacek Pielecha, DSc., DEng.
 (Editorial Secretary for Science)
 Prof. Ireneusz Pielecha, DSc., DEng.
 Wojciech Cieřlik, DEng.
 (Technical Editors)
 Joseph Woodburn, MSci
 (Proofreading Editor)
 Wojciech Serdecki, DSc., DEng.
 (Statistical Editor)
 and Associate Editors

Editor
Polish Scientific Society
of Combustion Engines

60-965 Poznań, pl. M. Skłodowskiej-Curie 5, Poland
 tel.: +48 61 6475966, fax: +48 61 6652204
 E-mail: sekretariat@ptnss.pl
 WebSite: <http://www.ptnss.pl>

The Publisher of this magazine does not endorse the products or services advertised herein. The published materials do not necessarily reflect the views and opinions of the Publisher.

© Copyright by
Polish Scientific Society of Combustion Engines
 All rights reserved.

No part of this publication may be reproduced, stored in a retrieval system or transmitted, photocopied or otherwise without prior consent of the copyright holder.

Subscriptions

Send subscription requests to the Publisher's address.
 Cost of a single issue PLN 40.

Preparation for print

ARS NOVA Publishing House
 60-782 Poznań, Grunwaldzka 17/10A Street

Circulation: 100 copies

Printing and binding

Zakład Poligraficzny Moř i Łuczak, sp. j.,
 Poznań, Piwna 1 Street

The journal is registered
 in the Polish technical
 journals content database
 – BAZTECH www.baztech.icm.edu.pl



The journal is listed
 in the international database
IC Journal Master List
 – Index Copernicus www.indexcopernicus.com



Papers published in the
Combustion Engines

quarterly receive 20 points as stated
 by the Notification of the Minister of Science
 and Higher Education dated 31 July 2019.

Cover

I – Cummins X15 Engine
 (fot. www.oemoffhighway.com; background
 (abstract-cool-orange-texture – www.123freevectors.com)
 IV – MAN 20V35/44G Otto gas engine
 (fot. vehiclecue.it/)

Contents

Woodburn J. Emissions of reactive nitrogen compounds (RNCs) from two vehicles with turbocharged spark ignition engines over cold start driving cycles3

Abramek K., Osipowicz T., Mozga Ł. The use of neural network algorithms for modeling injection doses of modern fuel injectors 10

Idzior M. Aging of engine oils and their influence on the wear of an internal combustion engine 15

Giechaskiel B., Melas A. Emissions of a Euro 5 motorcycle over the world harmonized motorcycle test cycle (WMTC) ...21

Pazura K., Orkisz M. Experimental determination of compressor map of the DGEN 380 engine compressor using the WESTT CS/BV turbine engine simulator26

Batura K.P., Waligórski M. Methodological basis of road acoustic researches32

Siadkowska K., Czajka B., Ścisłowski K., Wendeker M. Analysis of propulsion units dedicated to test stands for aviation systems ..39

Dziubak T., Bąkała L. Problems of selecting filter partition in passenger car engine intake air filters44

Declaration of the original version
The original version of the Combustion Engines journal
is the printed version.

Editorial:

Institute of Combustion Engines and Powertrains
Poznan University of Technology
60-965 Poznan, Piotrowo 3 Street
tel.: +48 61 2244505, +48 61 2244502
E-mail: papers@ptnss.pl
Prof. Jerzy Merkisz, DSc., DEng.
(Editor-in-chief)
Miłosław Kozak, DSc., DEng.
Prof. Jacek Pielecha, DSc., DEng.
(Editorial Secretary for Science)
Prof. Ireneusz Pielecha, DSc., DEng.
Wojciech Cieślík, DEng.
(Technical Editors)
Joseph Woodburn, MSci
(Proofreading Editor)
Wojciech Serdecki, DSc., DEng.
(Statistical Editor)
and Associate Editors

Editor
Polish Scientific Society
of Combustion Engines

60-965 Poznan, pl. M. Skłodowskiej-Curie 5, Poland
tel.: +48 61 6475966, fax: +48 61 6652204
E-mail: sekretariat@ptnss.pl
WebSite: <http://www.ptnss.pl>

The Publisher of this magazine does not endorse
the products or services advertised herein. The
published materials do not necessarily reflect the
views and opinions of the Publisher.

© Copyright by
Polish Scientific Society of Combustion Engines
All rights reserved.

No part of this publication may be reproduced, stored in
a retrieval system or transmitted, photocopied or otherwise without
prior consent of the copyright holder.

Subscriptions

Send subscription requests to the Publisher's address.
Cost of a single issue PLN 40.

Preparation for print

ARS NOVA Publishing House
60-782 Poznan, ul. Grunwaldzka 17/10A

Circulation: 120 copies

Printing and binding

Zakład Poligraficzny Moś i Łuczak, sp. j.,
Poznań, ul. Piwna 1

The journal is registered
in the Polish technical
journals content database
– BAZTECH www.baztech.icm.edu.pl



The journal is listed
in the international database
IC Journal Master List
– Index Copernicus www.indexcopernicus.com



Papers published in the

Combustion Engines

quarterly receive 20 points as stated
by the Notification of the Minister of Science
and Higher Education dated 31 July 2019.

Cover

I – Jaguar F-PACE SVR 5.0 Liter V8 Engine
([for. media.jaguar.com](http://for.media.jaguar.com)); background (abstract-cool-orange-texture
– www.123freevectors.com)
IV – McLaren Artura axial flux electric motor
([for. www.apex.one](http://for.www.apex.one))

Contents

<i>Biały M., Grabowski Ł., Skórzyński B., Barański G., Majczak A.</i> Analyzing mechanical vibrations of an aircraft opposed piston engine	3
<i>Krakovski R.</i> Research on the effect of the effective microorganisms, silver solution and colloidal nanosilver addition on the engine oil base number (TBN)	8
<i>Kaźmierski B., Górka K., Kapusta Ł.J.</i> A conceptual design and numerical analysis of the mixerless urea-SCR system	12
<i>Fafara J.-M., Modliński N.</i> Numerical investigation of the internal flue gas recirculation system applied to methane powered gas microturbine combustor	21
<i>Żmudka Z., Postrzednik S.</i> Improving the effective efficiency of a spark ignition engine through the use of a fully independent valve control system	30
<i>Szymlet N., Kamińska M., Lijewski P., Rymaniak Ł., Tutak P.</i> Use of toxicity indicators related to CO ₂ emissions in the ecological assessment of an two-wheel vehicle	36
<i>Kałwara M., Kuźniar M., Orkisz M.</i> A rotating piston engine with electric generator in serial hybrid propulsion system for use in light aircraft	42
<i>Andrzejewski M., Nowak M., Woch A., Stefańska N.</i> Analysis of pollutant emissions and fuel consumption for the use of a multistorey carpark	46
<i>Walentyłowicz J.</i> The aircraft engines in the land vehicles	52
<i>Chmielewski Z.</i> Cylinder liner wear as a function of selected physicochemical indicators of engine oil	60
<i>Szramowiat M., Szalek A.</i> Analysis of the operation of the hybrid drive system in the light of the proposed Euro7 standard	65
<i>Wołczyński Z., Żak M.</i> SI engine fuel mixture type indicator and an assessment of its suitability of an economic driving style ...	69
<i>Kaźmierczak A., Tkaczyk M.</i> Team durability test of a 1.3 MW locomotive diesel engine with prototype piston rings	77
<i>Czarnigowski J., Rękas D., Ściśłowski K., Trendak M., Skiba K.</i> Analysis of operating parameters of the aircraft piston engine in real operating conditions	83
<i>Bogdanowicz A., Kniaziewicz T., Zadrąg R.</i> The emission of harmful compounds from the marine diesel engine fueled by a blend of n-butanol and marine fuel	90
<i>Urbański B., Przybyła G.</i> Hybrid drivetrain systems 48 V in rally cars	96
<i>Laskowski P., Zimakowska-Laskowska M., Zasina D., Wiatrak M.</i> Comparative analysis of the emissions of carbon dioxide and toxic substances emitted by vehicles with ICE compared to the equivalent emissions of BEV	102
<i>Wołczyński Z.</i> Examples of the use of the embedded systems for the long-term collection of slowly-changing parameters in the traction of a car	106

Editorial:

Institute of Combustion Engines and Powertrains
Poznan University of Technology
60-965 Poznan, Piotrowo 3 Street
tel.: +48 61 2244505, +48 61 2244502
E-mail: papers@ptnss.pl

Prof. Jerzy Merksiz, DSc., DEng. (Editor-in-chief)
Miłosław Kozak, DSc., DEng.

Prof. Jacek Pielecha, DSc., DEng. (Editorial Secretary for Science)

Prof. Ireneusz Pielecha, DSc., DEng.

Wojciech Cieślak, DEng. (Technical Editors)

Joseph Woodburn, MSci (Proofreading Editor)

Wojciech Serdecki, DSc., DEng. (Statistical Editor)
and Associate Editors

Publisher:

Polish Scientific Society of Combustion Engines
60-965 Poznan, pl. M. Skłodowskiej-Curie 5, Poland
tel.: +48 61 6475966, fax: +48 61 6652204
E-mail: sekretariat@ptnss.pl
WebSite: <http://www.ptnss.pl>

The Publisher of this magazine does not endorse the products or services advertised herein. The published materials do not necessarily reflect the views and opinions of the Publisher.

© Copyright by

Polish Scientific Society of Combustion Engines

All rights reserved.

No part of this publication may be reproduced, stored in a retrieval system or transmitted, photocopied or otherwise without prior consent of the copyright holder.

Subscriptions

Send subscription requests to the Publisher's address.
Cost of a single issue PLN 40.

Preparation for print

ARS NOVA Publishing House
60-782 Poznan, ul. Grunwaldzka 17/10A

Circulation: 100 copies

Printing and binding

Zakład Poligraficzny Moś i Łuczak, sp. j.,
Poznań, ul. Piwna 1

The journal is registered and listed in the Polish and international database

BazTech

Crossref

DOAJ DIRECTORY OF OPEN ACCESS JOURNALS

SHERPA/ROMEO

INDEX COPERNICUS
INTERNATIONAL

EBSCO

POL-index
Polska Baza Cytowań

ROAD

Papers published in the

Combustion Engines

quarterly receive 20 points as stated
by the Notification of the Minister of Science
and Higher Education dated 31 July 2019.

Declaration of the original version

*The original version of the Combustion Engines journal
is the printed version.*

Cover

I – DEUTZ TCG 7.8 H2 + KEYOU Technology (fot. keyou.de);
background (Abstract colorful of night star – pexels.com)

IV – Land Cruiser 3.3 dm³ V6 diesel twin turbo engine
(fot. www.opposite-lock.com)