

REPORT

on IAPWS-related activities: August 2012 – August 2013

submitted by the

Czech National Committee for the Properties of Water and Steam (CZ NC PWS)

to the Executive Committee Meeting of 2013 IAPWS Meeting, London, United Kingdom in September 2013

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Participating institutions

The following Czech Institutions have participated in the research of thermophysical properties and chemical processes between August 2012 and August 2013:

Institute of Thermomechanics AS CR, v. v. i., ("IT ASCR"), Department of Thermodynamics, Dolejšková 1402/5, CZ-182 00 Praha 8

Czech Technical University in Prague ("CTU"), Faculty of Mechanical Engineering, Department of Fluid Mechanics and Thermodynamics, and Department of Power Engineering, Technická 4, CZ-166 07 Praha

Institute of Chemical Technology, Prague ("ICT"), Department of Power Engineering ("ICT-DPE") and Department of Physical Chemistry ("ICT-DPC"), Technická 5, CZ-166 28 Praha 6

University of West Bohemia ("UWB"), Faculty of Mechanical Engineering, Department of Power System Engineering, Univerzitní 8, CZ-306 14 Plzeň

DOOSAN ŠKODA POWER, Plzeň, Inc., Tylova 57, CZ-316 00 Plzeň

Technical University of Liberec ("TUL"), Department of Chemistry, CZ-461 19 Liberec

SIGMA Research and Development Institute Ltd. ("SIGMA"), Jana Sigmunda 79, CZ-783 50 Lutín

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Board of CZ NC PWS for 2010-2013:

Dr. J. Hrubý
 Prof. R. Mareš
 Dr. T. Němec
 Prof. P. Šafařík
 Prof. J. Šedlbauer

List of IAPWS-Related Activities

Information about new documents adopted and authorized by IAPWS have been published on the CZ NC PWS website.

The joint project of IT ASCR and UWB sponsored by the Ministry of Education, Youth and Sports of the Czech Republic provided financial support for international collaboration with IAPWS since 2009. The project support ended on 31/12/2012.

The joint project of IT ASCR and TUL sponsored by the Ministry of Education, Youth and Sports of the Czech Republic provided financial support for international collaboration with IAPWS since 2013. The project support will end on 31/12/2016.

The team around Dr. Hrubý and Dr. Vinš (IT ASCR) focused on the development of thermodynamic models for gas hydrates (in joint cooperation with the team of prof. Roland Span from the Ruhr-University Bochum), experimentally investigated surface tension of supercooled water, developed of an experimental apparatus for the measurement of density of supercooled water and developed thermodynamic formulations suitable for computational fluid dynamics [1-7].

Prof. Mareš (UWB) and Dr. Kalová studied thermophysical properties of supercooled water [8]. Dr. Kalová has a research project entitled Thermodynamic modeling of supercooled water.

Prof. Maršík (IT ASCR) and his research team studied problems of the efficiency of hydrogen fuel cells [9-12] and a new hydraulic turbine [13, 14].

Prof. Šedlbauer (TUL) and his collaborators investigated thermodynamic properties of hydration for selected organic solutes and gases [15, 16].

Assoc. Prof. Kolovratník (CTU) and his collaborators investigated wet steam energy losses in LP steam turbines and determined heterogeneous particles in the superheated steam in turbines [17, 18].

Mr. Nový (DOOSAN ŠKODA POWER) and his collaborators studied parameters of shock waves in saturated steam [19-21].

Dr. Sedlář (SIGMA) and his collaborators studied the problems of modelling cavitation erosion in hydrodynamic cavitation [22], [23], and modelling of cavitation instabilities in hydrodynamic pumps [24]. The team collaborates on the project entitled “Experimental research and mathematical modelling of unsteady phenomena induced by hydrodynamic cavitation” funded by the Czech Science Foundation

In September 2012, the Institute of Chemical Technology in Prague, the Faculty of Environmental Technology and the Department of Power Engineering (ICT-DPE) organized the 10th International Power Cycle Chemistry Conference (CHEO-10) focused on water treatment for power and environment, corrosion in power engineering and renewable energy sources [25-31].

Dr. Hnědkovský (ICT-IPC) and his collaborators studied the properties of organic solutes in water [32-36].

Prof. Šťastný (UWB) and his co-workers tested and applied a numerical model of steam flow with and without chemical impurity in nozzles and turbine blades [37-39].

IAPWS Young Scientist Fellowships

In 2012, **Dr. Holten** completed his IAPWS Young Scientist Fellowship Project (exchange between the Czech Republic and USA) entitled “Towards an IAPWS Guideline for the Thermodynamic Properties of Supercooled Water” jointly supervised by Dr. Hrubý, Prof. Anisimov, and Dr. Sengers. The preliminary results were presented and discussed during the 2012 IAPWS Meeting in Boulder. The final Project Report will be presented during the 2013 IAPWS Meeting in London.

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