

# REPORT

## on IAPWS-related activities: May 2014 – May 2015

submitted by the

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

to the Executive Committee Meeting of 2015 IAPWS Meeting, Stockholm, Sweden in June 2015

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### National Committee Contacts

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### Participating institutions

The following Czech Institutions participated in the research of thermophysical properties and chemical processes between May 2014 and May 2015:

**Institute of Thermomechanics** of the CAS, v. v. i., (“IT CAS”), Department of Thermodynamics, Dolejškova 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 2014-2017:

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

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### 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 CAS and TUL sponsored by the Ministry of Education, Youth and Sports of the Czech Republic has been the source of financial support for the international collaboration of CZNC PWS with IAPWS since 2013. The project support will end on 31/12/2016.

The research team of Dr. Hrubý (IT CAS) focused on the experimental investigation of the surface tension of supercooled pure water, the development of thermodynamic models for gas hydrates (in joint cooperation with the team of prof. Roland Span from the Ruhr-University Bochum), molecular simulations of the vapor-liquid interfacial properties and nucleation of water droplets, development of an experimental apparatus for the measurement of density of supercooled water [1-8].

Prof. Mareš (UWB) and Dr. Kalová (USB) studied surface tension of water and investigated a theoretical approach to the velocity of motion of the liquid column in the capillary [9-11].

Prof. Maršík (IT CAS) and his research team developed a thermodynamic theory of mixtures and formulated the generalized exergy analysis [12-13].

Dr. Němec (IT CAS) studied nucleation of bubbles theoretically and a scaling law for bubble nucleation data [14].

Assoc. Prof. Kolovratník (CTU) and his collaborators investigated binary homogeneous nucleation and wet steam energy losses in LP steam turbines and measured the heterogeneous particles in the superheated steam in turbines and the wet steam liquid phase structure in the 1000 MW LP steam turbine [15-22].

Mr. Nový (DOOSAN ŠKODA POWER) and his collaborators studied the speed of sound in steam and developed a data reduction method for reference parameters of steam flow fields [23-26].

Dr. Sedlář (SIGMA) and his collaborators studied the risk of cavitation erosion in hydrodynamic cavitation and cavitation instabilities in hydrodynamic pumps [27-31]. 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.

Mr. Jiříček (ICT-DPE) and his collaborators studied corrosion in power engineering, water treatment for power engineering and environments, and renewable resources of energy. ICT-DPE organized the CHEO10 Conference on Chemistry of Power Plant Cycles in September 2014 [32-37].

Dr. Hnědkovský (ICT-IPC) and his collaborators studied the properties of organic solutes in water [38-49].

Prof. Šťastný (UWB) and his co-workers tested a numerical model of steam flow in a nozzle and in turbine blade cascades with NaCl binary nucleation and condensation and applied it to the solution of thermodynamic losses in turbine cascades [50-51].

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