

Comparison between Vukalovich Tables and IAPWS-IF97 Model for Water and Steam Parameters*

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Abstract.

The main objective of this paper is to verify the difference between water - steam properties obtained from Vukalovich tables (1940) and these obtained by IAPWS-IF97 model. Vukalovich tables are used as the main reference at Damascus University – Faculty of Mechanical and Electrical Engineering – to acquire water and steam parameters used for vapor power cycles (Rankine Cycle). The last revised release on IAPWS-IF97 (International Association for the Properties of Water and Steam of the Industrial Formulation 1997) was in 2012. IAPWS members are United States of American, Canada, Argentina, Brazil, Britain, Ireland, Czech Republic, Denmark, France, Germany, Greece, Italy, Switzerland (associate member) Japan, and Russia.

* For the paper in Arabic see pages (11-24)

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[12] www.iapws.org

[13] webbook.nist.org

[14] www.steamtablesonline.com

- [1] IAPWS, 2009, "Revised Release on the IAPWS Formulation 1995 for the Thermodynamics Properties of Ordinary Water Substance for General and Scientific Use," Doorwerth, the Netherlands.
- [2] Kretzschmar, H., J., Knobloch, K., 2008, "Supplementary Backward Equations for the Industrial Formulation IAPWS-IF97 of Water and Steam for Fast Calculations of Heat Cycles, Boilers, and Steam Turbines," 14th International Conference on the Properties of Water and Steam in Kyoto.
- [3] Kalova, J., Mares, R., 2008, "Equations for the Thermodynamic Properties at the Saturation Line in the Supercooled Water Region," ICPWS XV, Berlin.
- [4] Cooper, J. R., Dooley, R. B., 2007, "Revised Release on the IAPWS Industrial Formulation 1997 for the Thermodynamic Properties of Water and Steam (The revision only relates to the extension of region 5 to 50 MPa)," August, Lucerne, Switzerland.
- [5] ASME, 2006, "ASME Steam Tables, Compact Edition."
- [6] Wagner, W., Pruf, A., 2002, "The IAPWS Formulation 1995 for the Thermodynamics Properties of Ordinary Water Substance."
- [7] Wagner, W., Cooper, J.R., Dittmann, A., Kijima, J., Kretzschmar, H., J., Kruse, A., Mares, R., Oguchi, K., Sato, H., Sifner, O., Takaishi, Y., Tanishita, I., Trubenbach, J., and Willkinnen, Th., 2000, "The IAPWS Industrial Formulation 1997 for the Thermodynamics Properties of Water and Steam," J. Eng., Gas Turbine & Power 122, 150-182.
- [8] Cengel, Y., A., Boles, M., A., 2006, "Thermodynamics, An Engineering Approach," Fifth Edition, McGraw Hill, Appendix, Table A-4 to A7, Page 890-898.
- [9] Moran, M., J., Shapiro, H.N., 2006, "Fundamental of Engineering Thermodynamics," Fifth Edition, Wiley & Sons, Inc., Index to tables, Table A2 to A5, Pages 720 – 729.
- [10] Sonntag, R. E., Borgnakke, C., 2009, "Fundamental of Thermodynamics," Seventh Edition, Wiley & Sons, Inc., Appendix B, Table B 1, Pages 776 – 791.