

## NIST-Journal Cooperation to Improve the Quality of Published Experimental Data: New On-line Tools

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In August of 2008, the Editorial Boards of the *Journal of Chemical and Engineering Data*, *Fluid Phase Equilibria*, *The Journal of Chemical Thermodynamics*, *International Journal of Thermophysics*, and *Thermochimica Acta* agreed to implement simultaneously a process for the submission of manuscripts that include experimental thermophysical and thermochemical property data. Requirements for submission have always included a literature search, plus detailed comparisons with previously reported values. Unfortunately, it is often impossible for reviewers to make informed decisions regarding manuscripts because many authors make only cursory or highly selective literature reviews and provide minimal comparisons. It is unacceptable to require reviewers to research the literature to ensure that proper comparisons have been made, and hence, determine the value of the manuscript. To alleviate this problem, an arrangement was made between the journals and the Thermodynamics Research Center (TRC) of the National Institute of Standards and Technology (NIST). Specifically, for articles reporting new thermophysical property data, NIST provides an initial report of relevant data sources from the NIST Archive (*NIST Literature Report*). This report is provided to Editors, who at their discretion, forward it to reviewers and/or authors. After peer review, but before acceptance, the experimental data are captured with NIST with *Guided Data Capture* (GDC) software and compared against the NIST SOURCE Data Archive using the dynamic-data-evaluation algorithms of the NIST *ThermoData Engine* (TDE) software. A *NIST Data Report* is generated and any typographical or data-inconsistency problems are resolved in consultation with authors and Editors. These procedures are mandatory and are implemented on the basis of a collaborative agreement between NIST and the Journals noted above. Authors are now required to submit sample information and experimental data with uncertainties in consistent table formats across all journals. The editors have concurred that, "this additional data review will substantially benefit the scientific and engineering communities because of the increase in quality and usefulness of the reported experimental data." Details of the present implementation of this process will be described. These procedures have been part of operations for approximately three years. A review of the successes and challenges of the cooperation will be presented, together with recent modifications to the process, including new free-access online tools to allow generation of a *NIST Literature Report* on demand by any interested party (authors, reviewers, editors, students).