

Psychrometric properties of humid air: calculation procedures and interactive education in java supported web browser format with real-time/online assignment grading module

Y. Onur Devres* and Gökhan Bingöl**

*Prof., Istanbul Technical University, Food Engineering Department, 80626 Maslak-Istanbul, Turkey, Tel: (+90) 212 285 60 36; Fax: (+90) 212 285 29 25; email: devres@itu.edu.tr

**Research Assistant, same contact information, email: bingolgo@itu.edu.tr

*Corresponding author

Abstract

In this study, a distance education and teaching courseware for psychrometry, namely Interactive Pychrometry Education (I-P-E) has been developed using Hyper Text Marked Language (HTML). In order to provide interaction, which has an important role in education, object-oriented programming language Java has been used. Since HTML and Java are platform-free languages, this program can be used in every kind of computer, which has a standard Internet browser.

In the study, procedures for calculating psychrometric properties are given in detail. Seven main properties of the psychrometrics, namely dry-bulb, wet-bulb and dew-point temperatures, atmospheric pressure, humidity ratio, relative humidity and enthalpy can be calculated in the program written in Java. According to the Gibbs Phase rule, in the humid air case, any three intensive properties will be sufficient to evaluate the remaining properties. Therefore the combination of three out of seven properties gives a total of 35 different sets. Java program has been developed and utilized to obtain the psychrometric properties of humid air in these sets. In addition to the Java program, in I-P-E, the psychrometry course text has been written in HTML. The equations and figures are prepared in suitable graphic format. The links and various information, and example problems have been also supplied in Java and text format. In example problems written in Java, parameters can be changed by the user within certain limits and in such a way, various results can be collected to analyze the affects of each parameter used. In addition to problems prepared, programs for unit conversion, thermophysical property calculation for water, air and some refrigerants are also presented in Java. Furthermore, a supplemental program is written to handle a part of Thermodynamic course's assignments. With this program, it is possible to deliver and grade the assignments online through internet. Each student has maximum five attempt to solve the problem where every wrong attempt decrease its grade point by 20%. With this module, more assignments can be given without any grading manpower while the student can get more practice with self-correction ability.