INTRODUCTION

In the Computer Age, old tables and charts printed on paper are less useful than before. For example, formulas and equations may be put on an Excel spreadsheet, making it easy to plot the charts and construct the tables, in any format needed by the user, with an additional advantage: If the charts or tables include more than two independent variables, they can be created with the exact value of the third variable (for example, the local atmospheric pressure), without the necessity of interpolating data as it was usually done with "paper" charts and tables.

The objective of this paper is to develop all formulas and equations needed to plot the psychrometer graphs and tables by means of a Excel spreadsheet.

The product of this study is the presentation of three spreadsheets:

1. "**Quick_Start.xls**", to calculate the exact humidity values, given the local atmospheric pressure and the readings of two, a dry bulb and a wet bulb, thermometers. The Dew Point can also be calculated, or it may be introduced as an input value. The calculation is made one point at a time.

2. "**Psy-Table-XLS.xls**", presenting humidity values in a traditional "Psychrometer Table", similar to the printed ones, that are usually supplied with the instrument, calculated for a given atmospheric pressure, usually at sea level, i.e., 760 mmHg or 101.325 kPascal. This Excel Psy-Table, has the significant advantage that a chart cam be created for any given local pressure -- at sea level or not -- since this pressure is a user-defined input value.

3. "**Psy-Chart-XLS.xls**", showing the traditional Psychrometer Chart, usually found on books about refrigeration, used mainly by air-conditioner engineers and meteorologists, that plots the most important thermodynamic variables -- wet-bulb temperature, relative humidity, specific volume, Dew Point and enthalpy -- using the dry-bulb temperature and the absolute humidity as independent variables. With this spreadsheet, local atmospheric pressure is an input data, so that exact charts may be constructed, with no need of interpolated values.

The mathematical deduction of the formulas needed to build spreadsheets (1) and (2) above are developed in sections 4, 5 and 6. The equations for the spreadsheet (3) are developed in section 7. There are four Annexes, where the most basic equations are derived from physical principles.

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