



## The South African Institution of Mechanical Engineering

### The Psychrometrics Toolbox: Its Principles, Uses and Applications Workshop

**Duration - 2 Days : Time - 08h30 – 16h30** (Registration at 08h00)

Manual, teas and lunch provided

**CPD Validation Number : SAIMechE-1111-12/20**

**This workshop will earn delegates 2 credit in Category 1**

This workshop is suitable for SAIMechE Groups 1 & 2

**This workshop is developed and presented by [Mr. Dean Sawich](#), BSc, AAS**

#### SAIMechE Group Classification

0 = Non-technical, e.g., HR, Finance

1 = Candidate (including GCC) with < 5 years experience

2 = Professional (including GCC) with < 15 years experience

3a = Professional and Appointment with > 15 years experience with specialist interest

3b = Senior Management with > 15 years experience

#### Overview

To anyone involved in engineering air conditioning systems, be they for comfort cooling, or industrial processes, a thorough understanding of Psychrometrics and its applications will be a beneficial addition to one's "Engineering Toolbox".

This Workshop will take the delegate through the fundamentals of the properties of the air / moisture relationships, and into the world of the Psychrometric Chart from which all the common air conditioning processes can be plotted and viewed. Once plotted, many different calculations can be made to determine various values which are useful to the system design engineer.

The overview of the properties of air will cover the relationships of air and water that manifest themselves in various ways. Topics will include: dry and wet bulb temperatures, dew points, relative and absolute humidity, sensible, latent and total heat content, enthalpy, and vapour pressures, amongst others.

The Psychrometric Chart will then be developed and all its intricate aspects discussed. All the items from the fundamentals will be brought to life on the Psychrometric Chart. Air conditions will be plotted and simple calculations performed of basic processes such as: heating, cooling, humidification, dehumidification, evaporative cooling, and chemical dehydration to ease the delegate into more complex air processes.

The transition from single processes into combined processes will illustrate the immense potential and usefulness of the Psychrometric Chart. From combined processes such as cooling / dehumidification, heating / humidification, cooling / reheat, and air mixtures, the delegate will work into complete cycles such as in an air conditioning system with return air and outside fresh air systems, and the associated calculations.

The final section will discuss the application of some special processes such as product dehydration, and enthalpy wheels.

#### Outcome and Benefits

At the completion of the Workshop the delegate will:

- Have an understanding of the principles and properties governing the air / water vapour relationship experienced in air conditioning systems.
- Be familiar with and use the items that make up the Psychrometric Chart.
- Be able to plot various air conditions and conduct appropriate calculations using the Psychrometric Chart.
- Be able to plot more complex psychrometric processes on the chart and execute appropriate calculations.
- Be familiar with various types of psychrometric processes and their applications.

#### Contents

- Understanding the Air / Water Vapour Relationships
- Revealing the Psychrometric Chart
- Simple Psychrometric Processes and Calculations
- Combining Psychrometric Processes
- Psychrometric Cycles and Calculations
- The Psychrometrics of Special Processes