

PSYCHART OVERVIEW

The Elite Software PsyChart program displays a colorful high resolution psychrometric chart on the computer screen and allows the designer to carry out all operations and analysis normally done using a conventional psychrometric chart. However, PsyChart is more than a simple electronic display of the standard psych chart. For example, it can quickly display all the property values for any selected state point on the psych chart. Points on the psych chart can be labeled for future reference, and reports of their properties can be displayed on the screen or printer. Additionally, PsyChart allows psychrometric processes to be analyzed. The lines for all standard psychrometric processes, such as heating and humidification, cooling and dehumidification, mixing, collecting, etc., are calculated and automatically displayed on the chart with simple user commands. Although the initial display is the standard ASHRAE sea-level chart, this can be changed by the user to show a chart for any elevation or barometric pressure, and for a wide range of dry bulb temperatures. The user can further customize the psych chart by specifying to show or omit any of the property lines which can be displayed with either English or SI metric units. User notes can be placed as desired on the chart. The font and type size can even be specified for the property line labels and user notes. Another chart appearance feature involves the option to display the standard ASHRAE comfort zone on the chart. This is helpful in proving for example that a room condition is within the standard comfort zone. The comfort zone limits can be set as well. In order to view sections of the psych chart in fine detail, PsyChart allows the user to zoom in and create an expanded "window" around the selected region of the psych chart. Zoomed windows enhance the clarity of processes where state points tend to crowd together.

CALCULATION METHOD

The PsyChart Program uses the psychrometric equations for moist air in Chapter 6 of the ASHRAE Handbook of Fundamentals. Rapid converging iteration techniques have been employed to allow PsyChart to solve problems with virtually any combination of input parameters.

PSYCHART FEATURES

- **Displays and Prints High Quality Psychrometric charts, Similar in Appearance to ASHRAE charts**
- Charts Are Completely Customizable in Appearance
- Displays and Prints Fully Customizable Notes Positioned anywhere on the Chart
- **Supports both English and Metric Units**
- Adjusts for Elevations Between -1000 and 24,000 Feet
- Allows Dry Bulb Temperatures From -40 to 200 F
- Zooms in and out and Scrolls Smoothly and Quickly
- **Allows Unlimited State Points and Processes**
- Allows Unlimited Number of Charts in a Single Project & Unlimited Number of Chart Windows Open at One Time
- Easily Creates Processes for General Linear, Sensible Heating, Zone, Cooling/Dehumidification, Humidification, Heat & Humidify, Mix & Humidify, Collection & More!
- Imports Air Handler Model Data from CHVAC & RHVAC
- Allows Saving the Chart Image to the Clipboard or as a bitmap (.bmp) file for use in other programs
- Extensive Help/User's Guide built into the program, including fully-worked examples
- **No Copy Protection Hassles!**

PROGRAM INPUT

The PsyChart program is completely interactive in that the chart is continuously displayed while menu selections are presented as required. As selections are made and values entered, the results are immediately displayed. Menu selections are provided to define, label, and erase state points. A single state point can be defined with any two of the following inputs: dry bulb temp, relative humidity, enthalpy, wet bulb temp, humidity ratio, and dew point. Seven processes are allowed: general linear processes, heating, cooling & dehumidification, collection, mixing and various processes for air as it passes through a zone. Each process allows numerous combinations of input data in order to obtain the desired results. Data from Elite's CHVAC and RHVAC programs can be imported as well for extra quick creation of a psych chart. Notes can optionally be placed on the chart to explain various points and processes.

DEMONSTRATION VERSION

If you would like to evaluate PsyChart in further detail, you can order a demonstration CDROM for only \$35 plus shipping. This evaluation version is a full version of the program, including the complete manual, but with a limitation on the elevation and range of temperatures allowed. Demonstration versions can be "unlocked" into full versions by typing in a password you'll receive upon purchase. \$35 of the demo price can be credited to the full purchase price. A demonstration version of PsyChart (without manual) may also be **downloaded free of charge** from Elite's internet site, www.elitesoft.com.

SYSTEM REQUIREMENTS

PsyChart is a Windows program and will run on any computer with Windows 200 or higher including Windows 7.

PROGRAM OUTPUT

Shown below is an example of a psych chart created with a zone cooling process and various notes to document the state points. Notice also that the standard ASHRAE comfort zone was included on this chart. The State Point Report lists all six psychrometric parameters for all defined state points. The Process Input/Output Report lists the air volume rates, percentages for mixing and collecting processes, and the input and output state conditions for the processes. The Process Energy Report lists air volume, sensible, latent and total loads, along with water addition/removal for all defined processes. These reports provide complete data listings concerning state point conditions, sensible and latent loads encountered from state point to state point, and psychrometric conditions created by each process. PsyChart's color chart reports can be previewed, printed, or saved as .bmp graphic file.

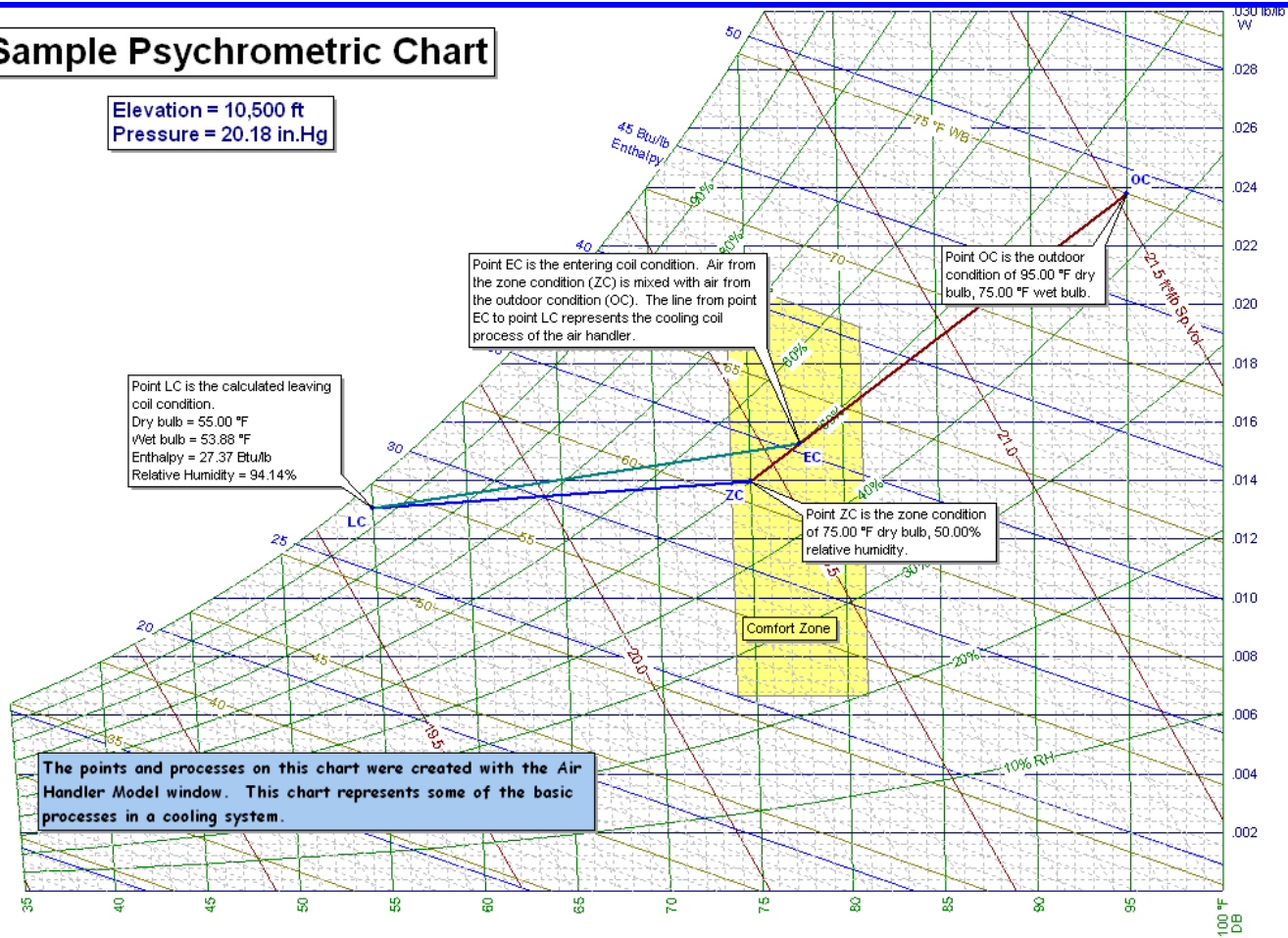
Name	DB	WB	RH	h	w	v	DP
LC	55.00	53.88	94.14	27.37	0.0131	19.640	53.34
ZC	75.00	60.87	50.00	33.27	0.0140	20.432	55.13
OC	95.00	75.00	44.20	49.03	0.0238	21.524	69.81
EC	77.69	63.06	49.89	35.36	0.0153	20.577	57.54

Process	Flow	Type/%	DB	h	w	RH	WB	v	
LC / ZC	2,264	Zone	75.0	33.3	0.0140	50.0	60.9	20.432	
EC / LC	2,264	Cool	55.0	27.4	0.0131	94.1	53.9	19.640	
* / EC	2,264	Mixing	77.7	35.4	0.0153	49.9	63.1	20.577	
...ZC	1,964		96.7%	75.0	33.3	0.0140	50.0	60.9	20.432
...OC	300		13.3%	95.0	49.0	0.0238	44.2	75.0	21.524

Type	From Pt.	To Pt.	Flow	Sens.Heat	Sens.Cool	Lat.Heat	Lat.Cool	Water Add.	Total Load
Zone	LC	ZC	2,264	50,000	0.0	10,000	0.0	9.1	60,000
Cool	EC	LC	2,264	0.0	56,954+	0.0	24,297+	-22.4	-81,251
Mixing	ZC	EC	1,964	0.0	0.0	0.0	0.0	0.0	0.0
Mixing	OC	EC	300	0.0	0.0	0.0	0.0	0.0	0.0
Totals:				0.000	56,954	0.000	24,297	0.0	

Sample Psychrometric Chart

Elevation = 10,500 ft
Pressure = 20.18 in.Hg



Point LC is the calculated leaving coil condition.
Dry bulb = 55.00 °F
Wet bulb = 53.88 °F
Enthalpy = 27.37 Btu/lb
Relative Humidity = 94.14%

Point EC is the entering coil condition. Air from the zone condition (ZC) is mixed with air from the outdoor condition (OC). The line from point EC to point LC represents the cooling coil process of the air handler.

Point OC is the outdoor condition of 95.00 °F dry bulb, 75.00 °F wet bulb.

Point ZC is the zone condition of 75.00 °F dry bulb, 50.00% relative humidity.

The points and processes on this chart were created with the Air Handler Model window. This chart represents some of the basic processes in a cooling system.