

*For Users of the DOE-2, PowerDOE, and SPARK Programs*

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# THE USER NEWS

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## \* MicroDOE2 Has Moved – Part III !

Acrosoft International, Inc., of Denver, CO, is now the sole distributor of MicroDOE. Gene Tsai has a new product, "BDL Builder", featured on p. 7. Acrosoft's new address is:

Gene Tsai, P.E.  
Acrosoft International, Inc.  
3435 South Yosemite Street, Suite 220  
Denver, CO 80231  
Phone: (303) 696-6888  
Fax: (303) 696-0388  
Email: 102447.2611@compuserve.com

## \* \* Keywords!! \* \*

### \* Need Help?? Call Bruce!!

Call or fax our DOE-2 expert, Bruce Birdsall, if you have a question about DOE-2 modeling. If you need to fax an example of your problem, please be sure to telephone him beforehand. This free service is supported by the Simulation Research Group. Phone or Fax: (510) 829-8459 between the hours of 10 a.m. and 3p.m. PDT.

### \* New Resource Center!

Rene' Meldem left the Simulation Research Group in June to return home to Switzerland. An expert DOE-2 user, Rene' has already established a DOE-2 Resource Center in Basel; see p. 25.

### \* HVAC on the Web/Internet

We've started a regular User News feature of listing Internet addresses and World-Wide Web sites for building energy efficiency (see p. 22-23 for the list and featured sites). If you have access, be sure to "surf" over to sci.engrg.heat-vent-ac on the Internet; there are at least 25-30 new messages a day devoted to HVAC.

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The User News is written by members of the Simulation Research Group. Direct suggestions, comments or submissions to Kathy Ellington, Editor, MS: 90-3147, Lawrence Berkeley National Laboratory, Berkeley, CA 94720. Fax (510)486-4089/email kathy%gundog@lbl.gov

## Update on the PowerDOE and SPARK Programs

by

Fred Winkelmann

### PowerDOE

As most of you know, the Department of Energy (DOE) and the Electric Power Research Institute (EPRI) are co-sponsoring the development of PowerDOE, an easy-to-use version of DOE-2 that features a graphical user interface running on PCs under Microsoft Windows. A beta test version of PowerDOE is scheduled for late October of this year, with a final release of PowerDOE 1.0 scheduled for late 1995 or very early 1996. Coincident with PowerDOE 1.0, we will release DOE-2.2, which will be the calculation engine for PowerDOE and a stand-alone workstation version of DOE-2. DOE-2.2 will retain the textual BDL style input of DOE-2.1E and earlier versions.

Work on PowerDOE is being done by the Simulation Research Group at LBNL, J.J. Hirsch & Associates in Camarillo, CA, Regional Economic Research in San Diego, and Southern Company Services in Atlanta. PowerDOE 1.0 will include screen-based, interactive input with graphical feedback, on-line help and documentation, graphical results display, and numerous user libraries, including ones for weather, building prototypes, spaces, schedules, materials, constructions, windows, and system types. A major calculation improvement in PowerDOE and DOE-2.2 will be to calculate Loads, Systems and Plant together in the same time step (rather than calculating a year of Loads, then a year of Systems, etc.) and merging Systems and Plant into a single HVAC module. This module allows closer coupling between Systems and Plant and will feature greater flexibility in configuring and operating multiple-chiller plants.

Other PowerDOE/DOE-2.2 enhancements include inside surface temperature calculation and improved radiator model (contributed by EMPA in Switzerland), improved duct and piping losses, independent control of exhaust fans, energy recovery from exhaust air during cooling, residential space heating by DHW heater, primary and secondary pumping, chilled and hot water reset, residential hydronic heating, dual-fan dual-duct system, and natural ventilation in many system types. There will also be a new residential system, RESYS2, with different evaporative cooling configurations, combined evaporative and compressor cooling, forced ventilation, natural ventilation, air-to-air heat recovery and duct losses. These enhancements are the result of work by LBNL, J.J. Hirsch & Associates, and EMPA (in Switzerland).

Documentation for DOE-2.2 is also being revised and combined. A new topic-oriented Reference Manual will include all the information from the old manuals plus all the Supplemental information. A dictionary of commands and keywords will incorporate definitions from the old Reference Manual and Supplement plus the default values and ranges from the BDL Summary. The PowerDOE documentation will be based on the DOE-2.2 manuals.

If you are interested in being a PowerDOE beta tester please fax or write Jeff Hirsch at 12185 Presilla Road, Camarillo, CA 93012-9243, fax (805) 532-2401.

\* \* \* \* \*

## SPARK

Work continues at LBNL and California State University at Fullerton on the development of the Simulation Problem Analysis and Research Kernel (SPARK). SPARK will allow you to quickly build models of innovative Systems and Plant configurations that are beyond the scope of DOE-2 by graphically connecting HVAC components like fans, coils, and chillers from a library. Initially, SPARK will be released as a stand-alone program. Later, it will be linked to DOE-2 (both PowerDOE and DOE-2.2) so that you can run custom HVAC models created with SPARK using hourly loads calculated by DOE-2. SPARK is similar to TRNSYS and HVACSIM+ but will be easier to use, faster, and more robust. Applications of SPARK include simulation of short-time-step dynamics, innovative controls, and advanced HVAC components and configurations.

The main elements of SPARK are an interactive graphical editor, an object library containing calculation modules for HVAC components, and a solver for solving the sets of simultaneous algebraic and differential equations that correspond to the HVAC system being simulated. With the graphical editor you can add your own components to the library, modify existing components, graphically link the components into networks that represent an HVAC system, specify input parameters, initiate runs, and plot results.

Current work on SPARK includes assembly of the HVAC component library, completion of the graphical editor, and development of methods to speed up execution and improve convergence.

A beta test release of the stand-alone version SPARK is planned for the first quarter of 1996. This version will run only on UNIX workstations, but later versions run-

ning under Microsoft Windows on PCs are planned.

If you are interested in being a SPARK beta tester please fax your request to Kathy Ellington at (510) 486-4089. As we near beta release, we will send you more information on the testing procedure.

## \* Meetings \*

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### Oct 11-12 — *Fundamentals of Lighting Efficiency*

To be held in Detroit, MI.

Sponsors: Association of Energy Engineers and the Demand Side Management Society.

Contact: AEE Energy Seminars, P.O. Box 1026, Lilburn, GA 30226. Fax (404) 381-9865.

\* \*

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### Nov 8-10 — *World Energy Engineering Congress*

To be held in Atlanta, GA.

Contact: Association of Energy Engineers, 4025 Pleasantdale Road, Suite 420, Atlanta, GA 30340. Phone: (404) 447-5083, Fax (404) 446-3969.

\* \*

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### Dec 4-6 — *Thermal Performance of the Exterior Envelopes of Buildings VI*

To be held in Clearwater Beach, FL

Contact: Mr. Pat Love, Bldg. 3147, Thermal Envelopes Conference, Oak Ridge National Laboratory, P.O. Box 2008 Oak Ridge, TN 37831-6070.

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### Feb 17-21, 1996 — *ASHRAE Winter Meeting*

To be held at the Georgia World Congress Center in Atlanta, GA.

Contact: ASHRAE Meetings Department, 1791 Tullie Circle NE, Atlanta, GA 30329. Phone: (404) 636-8400, Fax (404) 321-5478.

\* \*

# CALCULATION OF SURFACE TEMPERATURES IN DOE-2

by  
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The present version of *DOE-2.1 E* does not calculate the inside surface temperatures because of the weighting factor approach [1]. But the wall and window surface temperatures are important to estimate the radiant temperature as one of the key elements in a thermal comfort evaluation. Therefore, in the frame of the Swiss national project NEFF 640, a model which calculates the surface temperatures has been developed and the required FORTRAN routines have been written. The work was partly performed at the Lawrence Berkeley National Laboratory in cooperation with the Simulation Research Group.

## Model

The model is based on an energy balance on the wall surface. The different heat fluxes are shown in Fig. 1. The program *DOE-2.1 E* does not take the radiative heat exchange between the room surfaces  $\dot{q}_w$  separately into account, but as shown in Fig. 2, a combined convective and radiative film coefficient  $h$  is taken into consideration.

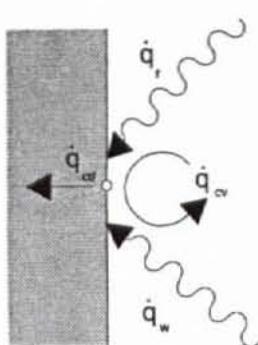


Fig. 1 Heat fluxes at the wall surface.

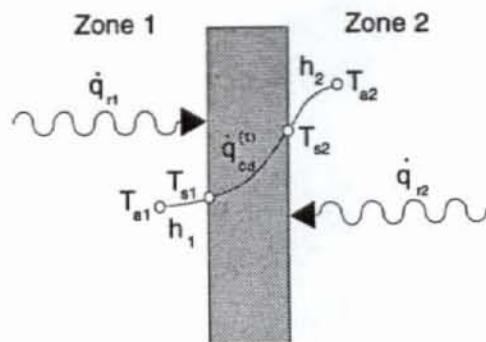


Fig. 2 Temperature distribution and radiant heat flux for an interior wall (*DOE-2.1 E* model).

The flux of heat conduction at the wall surfaces is described by the response factors [1] as follows:

$$\dot{q}_{cd1}^{(t)} = \sum_{i=0}^n X_i \cdot T_{s1}^{(t-i\Delta t)} - \sum_{i=0}^n Y_i \cdot T_{s2}^{(t-i\Delta t)} + CR \cdot \dot{q}_{cd1}^{(t-\Delta t)} \quad (1)$$

$$\dot{q}_{cd2}^{(t)} = \sum_{i=0}^n Y_i \cdot T_{s1}^{(t-i\Delta t)} - \sum_{i=0}^n Z_i \cdot T_{s2}^{(t-i\Delta t)} + CR \cdot \dot{q}_{cd2}^{(t-\Delta t)} \quad (2)$$

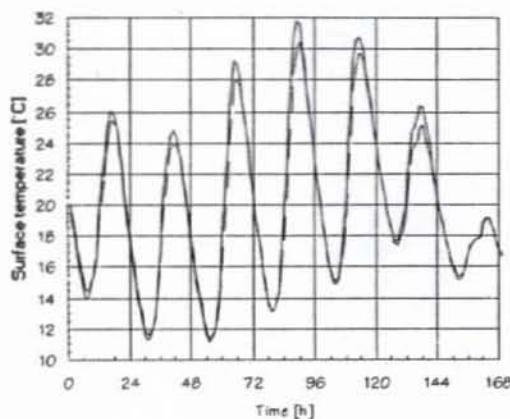
The surface temperatures can be calculated from an energy balance on both sides of the wall:

$$\begin{bmatrix} -X_0 - h_1 & Y_0 \\ Y_0 & -Z_0 - h_2 \end{bmatrix} \cdot \begin{pmatrix} T_{s1} \\ T_{s2} \end{pmatrix} = \begin{bmatrix} \sum_{i=1}^n X_i \cdot T_{s1}^{(\tau-i\Delta\tau)} - \sum_{i=1}^n Y_i \cdot T_{s2}^{(\tau-i\Delta\tau)} + CR \cdot \dot{q}_{cd1}^{(\tau-\Delta\tau)} - h_1 \cdot T_{a1} - \dot{q}_{rl} \\ -\sum_{i=1}^n Y_i \cdot T_{s1}^{(\tau-i\Delta\tau)} + \sum_{i=1}^n Z_i \cdot T_{s2}^{(\tau-i\Delta\tau)} - CR \cdot \dot{q}_{cd2}^{(\tau-\Delta\tau)} - h_2 \cdot T_{a2} - \dot{q}_{r2} \end{bmatrix} \quad (3)$$

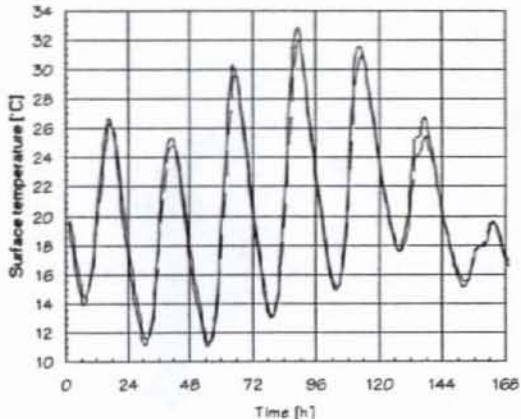
The right side of the system of equations (3) only contains surface temperatures and conduction heat fluxes from previous hours. The zone air temperature and the radiative heat flux to the wall for the current time step are output data of the present DOE-2 program and are therefore also known.

### Comparison with measurements

The model has been compared with the measured data sets used in the validation efforts within IEA-ECB Annex 21 [2] (see Figs. 3 and 4) and with measurements from the Pala test houses [3].



**Fig. 3** Inside surface temperature of the ceiling.



**Fig. 4** Inside surface temperature of the exterior wall.

Figures 3 and 4 show the good agreement between the measurements and the simulation.

### New Keywords and Hourly Reports

Two new keywords for the surface temperature calculation have been defined. The first one is the BUILDING-LOCATION keyword SURF-TEMP-CALC=YES/NO which defines whether the surface temperature calculation is performed or not. The second one is the wall-level keyword INSIDE-SURF-TEMP=YES/NO which defines whether the surface temperature of this specific wall is written to a separate output file or not. The new routine calculates the mean radiative temperature for every zone as a sum of the area

weighted surface temperatures and makes it available as an additional hourly report variable. Also the operative temperature which is defined as a combination of the zone air temperature and the mean radiative temperature is calculated and available as an hourly report variable.

#### List of Symbols

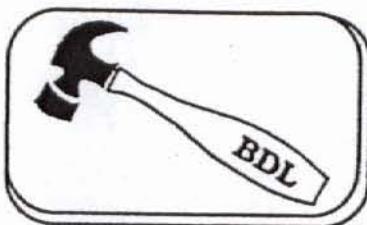
$CR$	Common ratio	[ - ]
$h$	Combined film coefficient (Convective and radiative)	$[W / (m^2 K)]$
$\dot{q}_{cd}^{(r)}$	Wall conduction	$[W / m^2]$
$\dot{q}_{cv}$	Convective heat flux	$[W / m^2]$
$\dot{q}_r$	Radiative heat flux from people, equipment and solar radiation	$[W / m^2]$
$\dot{q}_w$	Radiative heat flux from other surfaces	$[W / m^2]$
$T_a$	Air temperature	[K]
$T_s$	Surface temperature	[K]
$\tau$	Time	[h]
$\Delta\tau$	Time step	[h]
$X', Y', Z'$	Surface to Surface response factors	$[W / (m^2 K)]$

#### References

- [1] *DOE-2 Engineers Manual Version 2.1 A*,  
LBNL University of California Berkeley, Nov 1982.
- [2] *Empirical Validation Data Sets 099 and 110 from EMC Test Room*,  
BRE (Building Research Establishment), IEA Annex 21, March 1992
- [3] *R. Meldem and F. Winkelmann, Comparison of DOE-2 with Measurements in the Pala Test Houses*,  
California Institute for Energy Efficiency report, July 1995

#### \* \* \* \* \* DISCLAIMER \* \* \* \* \*

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## **BUILD BDL WITH BDL BUILDER™**

by

**Gene Tsai, P.E. & Jim Peterson**

**Acrosoft International, Inc.**

### **WHY WINDOWS?**

Why bother using a Windows program for DOE-2 input? Many experienced DOE-2 users have been using DOE-2 for over a decade. Even more started using DOE-2 after a PC version became available in the mid-80s. Many users have been used to (or addicted to) entering BDL input with DOS screen editors or word-processors. Several users have even developed their own template input tools using spreadsheet applications, such as Lotus 123, to speed up their input process. Indeed, we all need to survive and become more efficient using specialized software, such as DOE-2, which is indispensable in our jobs. So, why do we need a pre-processor? And, why do we need it in a Windows environment? What is the big deal?

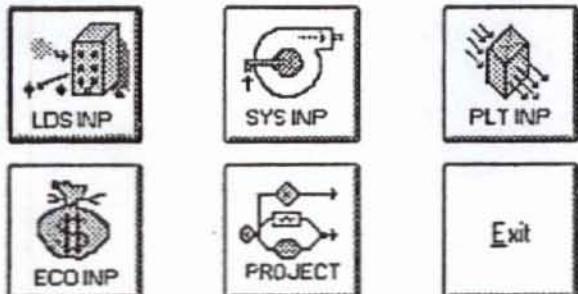
Not long ago, some people resisted switching from DOS programs to Windows programs. Faced with a new approach to operating environment, they naturally asked, "Why Windows?". Today, though, we can't imagine anyone asking that same question. Comparing a Windows program with a

similar DOS program, the feeling is that-well, it is not even close. It is much more efficient using Windows programs because they are easier to use and they have multi-tasking features.

You may find that inputting data for your first project, if you still keep your old habit, may take longer using BDL Builder. Certainly, the bottom line is getting the job done and getting it done fast. Switching to a new program for BDL input, such as BDL Builder, will initially feel strange and may even be somewhat inconvenient. With BDL Builder, you will be using a slightly different method of data entry- not the way in which you are presently accustomed. However, once you develop your own libraries of building blocks, you will be able to "point-and-click" to create a new BDL input file. Additional libraries developed by third-parties will also become available to speed up your data entry. After using BDL Builder you will never want to go back to entering BDL input the old way. Instead of asking "Why Windows?", you'll find yourself asking "What did we do before Windows?!".

## Welcome to the BDL Builder

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BDL BUILDER MAIN MENU

## COMPATIBILITY WITH CURRENT BDL

You probably don't believe that it is possible to implement all of the features and functionality of BDL in DOE-2.1E in a Windows BDL pre-processor software (or even a DOS pre-processor), especially the macros to insert statements wherever you want. We understand that and we can tell you - it was not easy but we have come very close. BDL is designed to be flexible, efficient, and easy to understand. After many years, it has proven itself to be a useful language, one of the reason LBL continues to work on a combined new document for the BDL today. In the past, however, there were no timely-provided pre-processors to speed up the input process or make it easy to follow. With the BDL Builder, this has changed. We also plan to keep BDL Builder current with future versions of DOE-2. If DOE-2.1F became available today, you could expect that a BDL Builder for the F version would be available in about a month.

## INPUT STYLE

Input is through database tables for almost all commands. Database input, just like spreadsheet input, is two-dimensional. Each record (or row) is assigned a BDL u-name

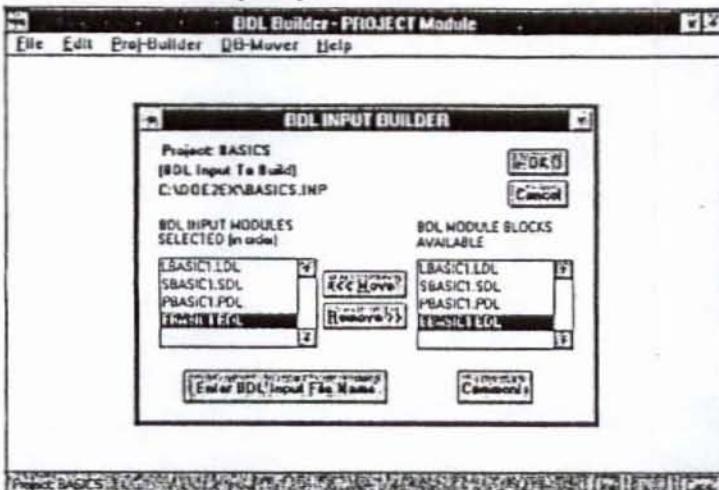
and each field (or column) represents a BDL keyword. You only need to enter the right hand side values of keywords, all keywords are displayed as fields, each one is a column. They are listed in the same order as they are in the BDL SUMMARY manual. Tables of abbreviated and complete keyword names for commands are provided to help enter input.

## MACRO

There are two ways to enter macro input with the BDL Builder. One is to use the "#include" feature. You can insert a ##include file name or a ##fileprefix path name before any command. The other way to enter macro input is through the snippet feature. You can create any number of snippets. These snippets can be entered in place of any unused command or field in the tables. The macro input will be inserted in place of the command, which means you can insert blocks of macro input or comments anywhere in the BDL input file.

## RUN DECK

A flexible feature of DOE-2 is that you can collect a number of input modules to make up a single run file. The Project-Builder option of BDL Builder allows you to do just that and save the ready-to-run BDL input file in the directory of your choice.



PROJECT BUILDER

## BDL BUILDER DESIGN CONCEPT

We developed BDL Builder with several guidelines in mind. First, it had to be a Windows program. Second, it had to use the most appropriate software development tools. Third, it had to be innovative and compact, we did not want to create a monster that would be expensive to develop and maintain. Fourth, we had to be able to quickly modify it and add new features.

BDL includes a lot of input. If we were to treat every command input uniquely, we would exhaust all of our development time creating input windows. We wanted to design BDL Builder uniformly for every BDL module so that input could be easily produced and procedures could be used repeatedly. We wanted to create a nice, sharp, and easy-to-use tool for DOE-2 users, and not a complicated and expensive software product.

We used a construction/building blocks concept for BDL Builder input. This concept makes the whole process more understandable and manageable. You are able to concentrate on one task at a time. First, you build the building blocks through the library databases. The libraries are stored with construction descriptions, material descriptions, system descriptions, plant descriptions, utility rate descriptions, schedules and several other inputs that are used by DOE-2 users over and over again in different building models. Next, you assemble these building blocks together as necessary to construct each building you are modeling. The construction stage (assembling the building blocks together) is very quick. Most of the construction stage is done by pointing and clicking to select the appropriate building blocks to create your building model.

Building the building blocks is probably the most time-consuming task. However, after you have used BDL builder to create a few models, you can use the building blocks developed in previous models to create new models. These building blocks are designed to be used over and over again in future models. The more you use BDL Builder, the more time it will save you because you will have to develop fewer building blocks. If third party libraries are purchased, the time needed to create new models is immediately reduced.

The screenshot shows a Windows application window titled "BDL Builder - LOADS Module". The menu bar includes File, Edit, Builder, Space-Entry, Report, Database, Include, Help, and Text. The main area displays a table titled "Construction" with columns: Name, Desc, Layered-1, U-value, V-Abs, and Recycled-1. The table lists various building components like SLAB-1, STUD-SS, STUD-RF-1, STUD-WL-1, WL1-MED1, WL2-MED1, WL3-MED1, D1, ROOF-1, WALL-1, and FLOOR-1, each associated with a specific description (e.g., LAY-5, KAY-6-SPG, LAY-4, LAY-2, WALL-1, etc.). Below the table, a memo window titled "Construc.Desc" contains the text "FLOOR CONSTRUCTION OF THE BASICS SAMPLE." The status bar at the bottom indicates "CONSTRUCTION LIBRARY WITH MEMO WINDOW".

Name	Desc	Layered-1	U-value	V-Abs	Recycled-1
SLAB-1	memo LAY-5				
SLAB-SS	memo KAY-6-SPG				
STUD-RF-1	memo LAY-4		.86		
STUD-WL-1	memo LAY-2				
WL1-MED1	memo WALL-1				
WL2-MED1	memo	1.05			
WL3-MED1	memo	.26			
D1	memo	.5			
ROOF-1	memo R8-1-1				
WALL-1	memo WA-1-2				
FLOOR-1	memo	.05			

CONSTRUCTION LIBRARY WITH MEMO WINDOW

## HOW TO BEST-USE BDL BUILDER

Quite frankly, we do not know how to best-use BDL Builder at this time. We continue to find useful ways of running BDL Builder. We will publish tips for using this program in quarterly newsletters and will encourage users to contribute their tips as well.

### TABLE-STYLE EDITING

The powerful edit window for database tables is very easy to use. All records are sorted alphabetically. You can append, delete, or make changes to any existing records; choose vertical or horizontal record displays; split the window and leave the record names without scrolling; use cut,



clear, copy, and paste basic windows features to save time; and open several database tables simultaneously for referencing side-by-side.

### POINT-AND-CLICK MOVE/REMOVE

For many inputs you will use the "Move" window to choose commands referenced in your application. The right side is a list box with alphabetically listed records from database tables. The left side is a list box with all the selected records. Use the move and remove buttons to select referenced records. All selected command records will be translated to BDL input in the order selected. You do not have to worry about typing incorrect u-names.

### THIRD-PARTY LIBRARIES

In the future, we will encourage the development of third party libraries that BDL Builder users can develop and sell or buy. This will become a clear advantage to using BDL Builder. From purchased libraries, you can select the "tested" records you need through the "Move" window and generate BDL input much more quickly.

### ACCUMULATION/ PRESERVATION LIBRARY

After a few projects, you will accumulate a substantial amount of useful building blocks in your library tables. You can use these repeatedly without entering the same data multiple times. This data entry does not have to be done by technical personnel. It can be easily done by clerical staff under the supervision of technical personnel.

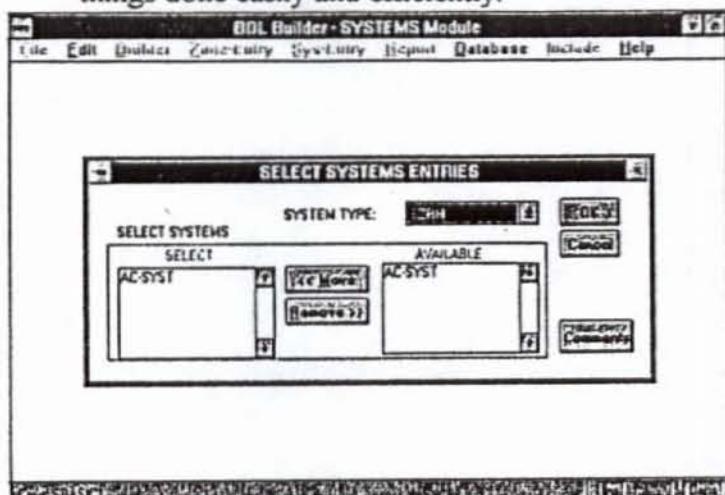
### MULTI-WINDOWS DISPLAY

Using BDL Builder without taking advantage of multi-tasking and multi-window database display features is like

sitting in a movie theater and just eating popcorn and not watching the movie. One nice thing about Windows is that it is event-driven, this means that you can run several applications at once in different windows. This allows you to run DOE-2 in a DOS shell window and BDL Builder in another.

### WINDOWS INPUT-EDIT-RUN ITERATION

With BDL Builder, you can complete all your DOE-2 analysis without exiting Windows. You can input, edit, and generate BDL input, and then switch to the DOS shell by simply toggling a keyboard combination. In the DOS shell, you can run the DOE-2.1E BDL processor and/or simulators. The input-edit-run iteration process will get things done easily and efficiently.



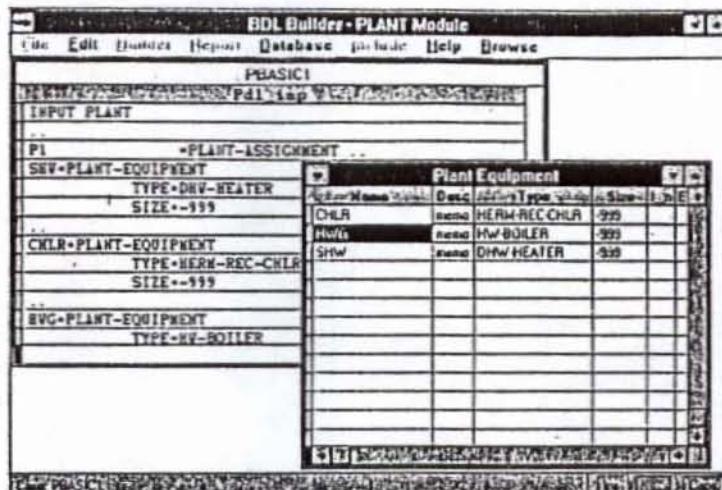
MOVE WINDOW

### WHAT'S NEXT?

Before the release of the BDL Builder, Mr. Mike Roberts of Kansas City, Missouri, one of our beta version testers, suggested we create a translation program which would convert an existing BDL file to BDL Builder input. We decided to take his good suggestion and develop a conversion program. As a valuable tool for all existing DOE-2 users, it will make BDL Builder even more attractive. We will begin developing it

immediately after the release of BDL Builder and the conversion program will be available in October (1995, of course). The price will be in the neighborhood of \$300.

In addition to package software development, we also develop custom Windows programs. We are available to work with your company on projects in which we would be responsible for Windows software development. For the BDL Builder or potential software projects, please feel free to contact us. To receive your free BDL Builder Demo please call or write to-

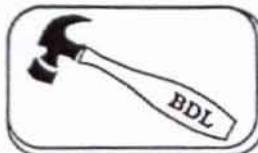


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Fax: (303)696-0388  
Email: 102447.2611@compuserve.com

#### GENERATED PLANT INPUT

A screenshot of the BDL Builder - LOADS Module. The window title is "BDL Builder - LOADS Module". The menu bar includes File, Edit, Builder, Space-Entry, Report, Database, Include, Help. A sidebar on the left lists categories: General, As Is Input, Design/day, Day-Schedule, Week-Schedule, Schedule, Building-Shade, Fixed-Shade, Material, Layers, Construction, Class-Type, Space-Conditions. The main window shows a "GENERAL" dialog box with sections for "SELECT LDL INPUT TYPE" (radio buttons for INPUT LOADS, PARAMETRIC INPUT LOADS, LIBRARY INPUT LOADS), "INPUT UNIT" (radio buttons for English, Metric), "OUTPUT UNIT" (radio buttons for English, Metric), "ABORT" (radio buttons for Errors, Warnings, Cautions), and "DIAGNOSTIC" (checkboxes for Errors, Warnings, Cautions, Defaults, Comments). Below this are "BUILDING LOCATION" fields for "Title Lines" and "LOCATION" with dropdown menus for "Un Periodic" and "Site Specific Entry".

LOADS MODULE INPUT



# BDL Builder

## ORDER FORM

Today's Date: / /

DESCRIPTION	QUANTITY	UNIT PRICE	AMOUNT
BDL Builder™	x	\$750	=
BDL Builder™ + MICRO-DOE2 E Version™	x	\$1,175	=
MICRO-DOE2 E Version™	x	\$500	=
MICRO-DOE2 E PowerPath™	x	\$650	=
MICRO-DOE2 E NetPath™ (2-5 users)	x	\$950	=
LBL Update Documentation (all 3 volumes below)	x	\$150	=
DOE-2.1E <input type="checkbox"/> Basics (\$45) <input type="checkbox"/> Supplement (\$65) <input type="checkbox"/> Sample Run Book(\$65)		PER VOLUME	=
LBL Reference Manual, Part 1 and 2	x	\$130	=
<b>Additional Weather Files</b>		\$30 each . . .	=

WEATHER FILE NOTES: The purchase of a single user package of MICRO-DOE2 or PowerPath comes with two weather files of your choice. The NetPath (2-5 users) comes with up to four weather files of your choice. Use the weather file order form to order files.

3.5" 1.44 MB    Other, specify:

**SUB-TOTAL \$**

	USA	CANADA	OTHER	AMOUNT
ANY SOFTWARE PACKAGE	\$20.00	\$25.00	\$32.00	PER PACKAGE \$
LBL UPDATE DOC.(all 3 vol.)	\$25.00	\$30.00	\$70.00	PER SET \$
ANY INDIVIDUAL VOLUME	\$10.00	\$13.00	\$27.00	PER VOLUME \$
DOE-2 REFERENCE MANUAL	\$15.00	\$20.00	\$50.00	PER SET \$
WEATHER FILE	\$5.00	\$6.00	\$8.00	PER ORDER \$

Enclosed is my Charge my PO Number	<input type="checkbox"/> Personal/ Company check <input type="checkbox"/> Visa <input type="checkbox"/> Mastercard
Card Holder Signature	_____
Credit Card Number	_____
Expiration Date	____ / ____

**Shipping Total \$**

⇒If you would like us to ship via an overnight carrier, please call for rates or include your carrier billing code.

Colorado Residents add  
3.8% sales tax on  
**SUB-TOTAL, above**

**TOTAL \$**

\*If ordering more than one item, call for special discounts. \*This order form is valid through Dec. 31, 1995.

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VOICE (303) 696-6888 • FAX (303) 696-0388

\* \* \* \* DOE-2 DIRECTORY \* \* \* \*

*Program Related Software and Services*

**Mainframe and Workstation Versions of DOE-2**

<p><b>DOE-2.1D and 2.1E</b> (Source code, executable code and documentation) For 2.1E DEC-VAX, Order #000158-DOVAX-02 For 2.1E SUN-4, Order #000158-SUN-0000 For 2.1D DEC-VAX, Order #000158-D6220-01 For a complete listing of the software available from ESTSC order their "Software Listing" catalog ESTSC-2.</p>	<p>Energy Science and Technology Software Center P.O. Box 1020 Oak Ridge, TN 37831-1020 Phone: (615) 576-2606 FAX: (615) 576-2865 email: ESTSC@ADONIS.OSTI.GOV www: <a href="http://www.doe.gov/html/osti/estsc/estsc.html">http://www.doe.gov/html/osti/estsc/estsc.html</a></p>
<p><b>FTI-DOEv2.1E</b> (Source code and documentation) Combined source code package for both VAX and SUN versions of DOE-2.1E. Available on most distribution formats and for most operating systems (1/4" QIC tape, TK50 tape, 3.5" floppy, etc). Note: this is the distribution package only, no executables. Complete documentation for DOE-2.1E, digitally reproduced, spiral bound, and separated into multi-volume sets. [See <i>User News</i> Vol.12, No.4, p. 16]</p>	<p>Finite Technologies, Inc 3763 Image Drive Anchorage, AK 99504 Contact: Scott Henderson Phone: (907) 333-8933 FAX: (907) 333-4482 email: info@finite-tech.com www: <a href="http://www.finite-tech.com/fti/home.html">http://www.finite-tech.com/fti/home.html</a></p>

**PC Versions of DOE-2**

<p><b>ADM-DOE2</b> ADM-DOE2 (DOE-2.1E) is compiled for use on 386/486 PCs with a math coprocessor and 4MB of RAM. It runs in a DOS or Windows environment and is a highly reliable and tested version of DOE-2 which contains all of the 1994/95 enhancements to the program. The package contains everything needed to run the program: program files, utilities, sample input files, and weather files. More than 300 weather files are available (TMY, TRY, WYEC, CTZ formats) for the U.S. and Canada. [See <i>User News</i> Vol.7, No.2, p. 6]</p>	<p>ADM Associates, Inc. 3239 Ramos Circle Sacramento, CA 95827 Contact: Marla Sullivan, Sales Alex Lekov, Support Phone: (916) 363-8383 FAX: (916) 363-1788</p>
<p><b>CECDOEDC (Version 1.0A)</b> A microcomputer version of DOE-2.1D integrated with a pre- and post-processing system designed strictly for compliance use within the State of California. It generates some of the standard compliance forms as output. Order P40091009 for the CECDOEDC Program with Manuals. Order P40091010 for the DOE-2.1 California Compliance Manual. [See <i>User News</i> Vol.12, No.4, p. 13]</p>	<p>Publication Office California Energy Commission P.O. Box 944295 Sacramento, CA 94244-2950 www: <a href="http://agency.resource.ca.gov/cectext/ETEC.html">http://agency.resource.ca.gov/cectext/ETEC.html</a></p>

*Caveat:* We list third-party DOE-2-related products and services for the convenience of DOE-2 users, with the understanding that the Simulation Research Group does not have the resources to check the DOE-2 program adaptations and utilities for accuracy or reliability.

## PC Versions of DOE-2 (continued)

### **DOE-24/Comply-24**

DOE-24 is a special DOE-2 release which is both a California-approved compliance program for the state's 1992 non-residential energy standards, and a stand-alone version of DOE-2.1E that includes a powerful yet easy-to-use input preprocessor. A demonstration program is available upon request. [See *User News* Vol.12, No.2, p. 2]

Gabel Dodd Associates

1818 Harmon Street  
Berkeley, CA 94703-2416  
Contact: Rosemary Howley  
Phone: (510) 428-0803  
FAX: (510) 428-0324

### **DOE-Plus™**

DOE-Plus, a complete implementation of DOE-2.1D, is used to interactively input a building description, run DOE-2, and plot graphs of simulation results. Features include interactive error checking, context-sensitive help for all DOE-2 keywords, a 3-D view of the building that can be rotated, and several useful utilities.

Also from ITEM Systems:

**Demand Analyzer™**, uses templates of building types and vintages to simplify DOE-2 input requirements. Online help feature.

**Prep™**, a batch preprocessor, ideal for parametric studies, that enables conditional text substitution, expression evaluation, and spawning of other programs. [See *User News* Vol.11, No.4, p. 4 and Vol.13, No.2, p. 54, and Vol.16, No.1, p. 28-32]

ITEM Systems

1402 - 3rd Avenue, #901  
Seattle, WA 98101  
Contact: Steve Byrne  
Phone: (206) 382-1440  
FAX: (206) 382-1450  
email: byrne@item.com

### **EZDOE**

EZDOE is an easy-to-use PC version of DOE-2.1D. It provides full screen, "fill in the blank" data entry, dynamic error checking, context-sensitive help, mouse support, graphic reports, a 750-page user manual, extensive weather data, and comprehensive customer support. EZDOE integrates the full calculation modules of DOE-2 into a powerful, full implementation of DOE-2 on DOS-based 386 and 486 computers.  
[See *User News* Vol.14, No.2, p. 10 and No.4, p. 8-14]

Elite Software, Inc.

P.O. Drawer 1194  
Bryan, TX 77806  
Contact: Bill Smith  
Phone: (409) 846-2340  
FAX: (409) 846-4367  
email: 76070,621@compuserve.com

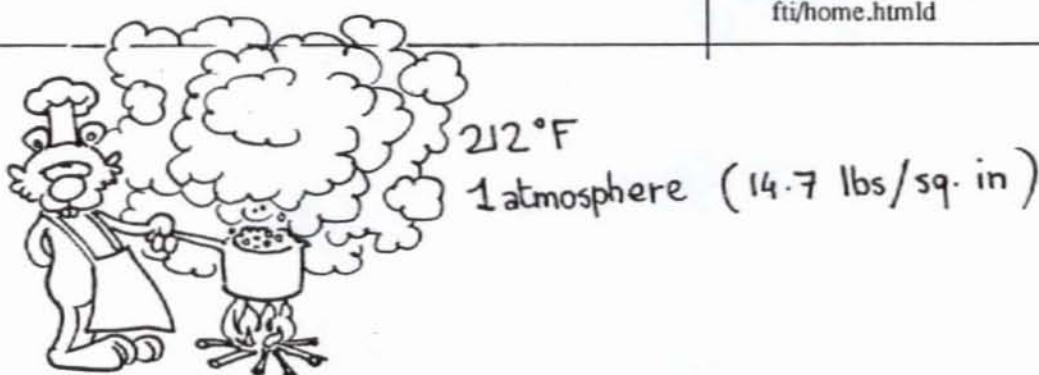
### **FTI-DOEv2.1E**

Highly optimized version of DOE-2.1E software, available for most computing systems. Current support: MSDOS and Windows 3.x, Windows NT, OS/2, RS/6000 (AIX), NeXT, SUN, UNIX (most systems). Call for platforms not listed. Documentation and weather files are available. Also FTI-DOEv2.1E source code, highly optimized and portable version; will compile for most systems.

[See *User News* Vol.12, No.4, p. 16]

Finite Technologies, Inc

821 N Street, #102  
Anchorage, AK 99501  
Contact: Scott Henderson  
Phone: (907) 272-2714  
FAX: (907) 274-5379  
email: scott@finite-tech.com  
www: <http://www.finite-tech.com/fti/home.html>



Steam rising from water at its boiling point (212°F) has a pressure equal to the atmosphere (14.7 lbs to the square inch).

## PC Versions of DOE-2 (continued)

### MICRO-DOE2™

MICRO-DOE2 (2.1E), which runs in a DOS or Windows environment, is a widely used, reliable, and tested PC version of DOE-2. It includes automatic weather processing, batch file creation, and a User's Guide with instructions on how to set up a RAM drive. System requirements: 386/486 PCs with 4 MB of RAM and math co-processor.

Also from Acrosoft International, Inc.:

NETPath, a network edition of MICRO-DOE2 allows you to store and run DOE-2 application files on one machine using input files from another machine. The result is improved space usage and project file management.

POWERPath, for single machines, allows you to keep MICRO-DOE2 application files in one directory and submit input from any other directory.

BDL Builder, is a pre-processor for DOE-2.1E that allows you to describe specific building and HVAC characteristics by preparing databases, or "building blocks", and then selecting records from the databases to assemble a complete input.

[See *User News* Vol.7, No.4, p. 2; Vol.11, No.1, p. 2; Vol.15, No.1, p. 8; Vol.15, No.3, p. 4; and Vol.16, No.2, p. 1,7]

Acrosoft International, Inc.  
3435 South Yosemite St., #220  
Denver, CO 80231  
Contact: Gene Tsai  
Phone: (303) 696-6888  
FAX: (303) 696-0388  
email: 102447.2611@compuserve.com

### PRC-DOE2

A fast, robust and up-to-date PC version of DOE-2.1E. Runs in extended memory, is compatible with any VCPI compliant memory manager and includes its own disk caching. 377 weather data files available (TMY, TRY, WYEC, CTZ) for the U.S. and Canada

Also from the Partnership for Resource Conservation:

PRC-TOOLS, a set of PC programs that aids in extracting, analyzing and formatting hourly DOE-2 output. Determines energy use, demand, and cost for any number of end-uses and periods. Automatically creates 36-day load shapes. Custom programs also available.

[See *User News* Vol.13, No.4, p. 11, Vol.14, No.2, p. 9, and Vol.15, No.1, p. 5]

Partnership for Resource Conservation  
140 South 34th Street  
Boulder, CO 80303  
Contact: Paul Reeves  
Phone or FAX: (303) 499-8611  
email: paulreeves@aol.com

### VisualDOE for Windows™

VisualDOE, which uses DOE-2.1E as the calculation engine, enables architects and engineers to quickly evaluate the energy savings of HVAC and other building design options. Program is supported by context-sensitive on-line help. Program includes climate data for the 16 California weather zones. [See *User News* Vol.15, No.2, p. 10 ]

Eley & Associates  
142 Minna Street  
San Francisco, CA 94105  
Contact: Charles Eley  
or John Kennedy  
Phone: (415) 957-1977  
FAX: (415) 957-1381

## Pre- and Post-Processors for DOE-2

<p><b>DOE 1 2 3</b>          Uses Lotus 1-2-3 to graphically display DOE-2.1D output as barcharts, pie charts, and line graphs.          [See <i>User News</i> Vol.10, No.3, p. 5]</p>	<p>Ernie Jessup          4977 Canoga Avenue          Woodland Hills, CA 91364          Phone: (818) 884-3997</p>
<p><b>DrawBDL</b>          DrawBDL, Version 2.02, is a graphic debugging and drawing tool for DOE-2 building geometry; it runs on PC's under Microsoft Windows. DrawBDL reads your BDL input and makes a rotatable 3-D drawing of your building with walls, windows and building shades shown in different colors for easy identification.          [See <i>User News</i> Vol.14, No.1, p. 5-7, Vol.14, No.4, p. 16-17, and Vol.16, No.1, p. 37]</p>	<p>Joe Huang &amp; Associates          6720 Potrero Avenue          El Cerrito CA 94530-2248          Contact: Joe Huang          Phone/FAX: (510) 236-9238</p>
<p><b>Graphs for DOE-2</b>          2-D, 3-D, hourly, daily, and psychrometric plots          [See <i>User News</i> Vol.13, No.1, p. 5]</p>	<p>Energy Systems Laboratory          Texas A&amp;M University          College Station, TX 77843-3123          Contact: Jeff Haberl          Phone : (409) 845-6065          FAX: (409) 862-2762</p>
<p><b>Pre-DOE</b>          A math pre-processor for BDL.</p>	<p>Nick Luick          19030 State Street          Corona, CA 91719          Phone: (714) 278-3131</p>

### DOE-2.1E Bug Fixes via FTP

If you have Internet access you can now obtain the latest bug fixes to DOE-2.1E by anonymous ftp. The procedure is as follows:

ftp gundog@lbl.gov  
 (or)  
 ftp 128.3.254.10  
 login: anonymous  
 passwd: your email address

After logging on, go to directory "pub/21e-mods"; bug fixes are in files "\*.mod". A description of the fixes is in file VERSIONS.txt in directory "pub". Each fix has its own version number, *nnn*, which is printed out as DOE-2.1E-*nnn* on the DOE-2.1E banner page and output reports when the program is recompiled with the fix.

You may direct questions about accessing or incorporating the bug fixes to Ender Erdem (ender@gundog.lbl.gov).

### Keeping Cool With Home Energy Magazine! *How to Properly Select an Air Conditioner*

The good people at Home Energy Magazine are offering a reprint of their popular 8-page article on how to properly select an air conditioner. The article is entitled *Bigger is Not Better: Sizing Air Conditioners Properly*; among the issues discussed are the causes and effects of oversizing, sizing by square foot, problems with manufacturers data, etc. All of this expertise can be yours for the low price of \$2.00! And if you order more than 50 copies there is a price reduction. Please contact Ann Kelly at (510) 524-5405 to place your order for the reprint or to subscribe to the magazine.

## R E S O U R C E S

<p><b>User News</b>          Sent without charge to DOE-2 users, the newsletter prints documentation updates and changes, bug fixes, inside tips on using the program more effectively, and articles of special interest to program users.          Regular features include a directory of program-related software and services and an order form for documentation. In the summer issue an alphabetical listing is printed of all commands and keywords in DOE-2, and where they are found in the documentation. The winter issue features an index of articles printed in all the back issues.</p>	<p>Simulation Research Group          Bldg. 90, Room 3147          Lawrence Berkeley National Laboratory          Berkeley, CA 94720          Contact: Kathy Ellington          Phone: (510) 486-5711          FAX: (510) 486-4089          e-mail: kathy%gundog@lbl.gov</p>
<p><b>Help Desk – Bruce Birdsall</b>          Call or fax our DOE-2 expert, Bruce Birdsall, if you have a question about using DOE-2. If you need to fax an example of your problem to Bruce, please be sure to telephone him prior to sending the fax. This is a free service provided by the Simulation Research Group at Lawrence Berkeley National Laboratory.</p>	<p>Bruce Birdsall          Ph/Fx: (510) 829-8459          Monday through Friday          10 a.m. to 3 p.m. Pacific Time</p>
<p><b>Training</b>          DOE-2 courses for beginning and advanced users.           DOE-2 training for small groups and individuals.</p>	<p>Energy Simulation Specialists          64 East Broadway, Suite 230          Tempe, AZ 85282          Contact: Marlin Addison          Phone: (602) 967-5278           Gary H. Michaels, P.E.          1512 Crain Street          Evanston, IL 60202          Phone: (708) 869-5859</p>
<p><b>Instructional DOE-2 Video and Manual</b>          Takes you step-by-step in DOE-2.1D input preparation and output interpretation.</p>	<p>JCEM/U. Colorado          Campus Box 428          Boulder, CO 80309-0428          Contact: Prof. Jan Kreider          Phone: (303) 492-3915</p>
<p><b>PsyChart, Version 1.4</b>          PsyChart, an ASHRAE-style graphical psychrometric program, displays the psychrometric chart and allows you to carry out all operations and analysis usually done using printed psychrometric charts. Both English and metric engineering units are supported.          Hardware requirements: IBM PC/XT/AT, PS2 or compatible, 500K byte RAM, EGA/VGA Graphics adaptor and monitor. For hard copy, IBM compatible graphics printer or AutoCAD software and compatible printer. MS or PC DOS or later. Hard disk recommended.          Price: PsyChart program and user manual \$295. PsyChart Demo Package (limited-range program diskette and user manual) \$35. Add \$3.00 shipping and California state tax if applicable.          [See <i>User News</i> Vol.16, No.2, p. 28]</p>	<p>Ayres Sowell Associates, Inc.          P.O. Box 939          Placentia, CA 92670          Phone: (714) 773-4092          FAX: (714) 993-1421</p>

## R E S O U R C E S (continued)

### Weather Data

Comprehensive collection of weather files including the latest TRY, TMY and CTZ libraries from NCDC. All files can be used on all PC versions of DOE-2. Includes original source data and pre-formatted packed versions on a single IBM format CD. For Canadian users, the CD contains five weather files representing the five climate regions established by the Canadian energy codes. Individual sites available.

### European Weather Files

Jenny Lathum or Martyn Dodd  
EnergySoft  
100 Galli Drive, Suite 1  
Novato, CA 94949  
Phone: (800) 4 NRG SFT  
or (800) 467-4738  
Fax: (415) 883-5970

TMY (Typical Meteorological Year)

TRY (Test Reference Year)

Andre Dewint  
Alpha Pi, s.a.  
rue de Livourne 103/12  
B-1050 BRUXELLES  
Belgium  
Phone: 32-2-649-8359  
FAX: 32-2-649-9437

National Climatic Data Center  
151 Patton Avenue, #120  
Asheville, North Carolina 28801  
Phone: (704) 271-4871 order desk  
Phone: (704) 271-4800 main number  
Fax: (704) 271-4876

CTZ (California Thermal Climate Zones)

California Energy Commission  
Bruce Maeda, MS-25  
1516-9th Street  
Sacramento, CA 95814-5512  
1-800-772-3300 Energy Hotline

WYEC (Weather Year for Energy Calculation)

ASHRAE  
1791 Tullie Circle N.E.  
Atlanta, GA 30329  
(404)636-8400 / Fax: (404)321-5478

Canadian Weather Files in WYEC2 Format

Dr. Didier Thevenard  
Watsun Simulation Laboratory  
University of Waterloo  
Waterloo, Ont., Canada N2L 3G1  
Phone: (519) 888-4904  
Fax: (519) 888-6197  
e-mail:  
watsun@helix.watstar.uwaterloo.ca

Contact Mr. Robert Morris  
Phone: (416) 739-4361

The original long-term data sets (up to 40 years of data) from which the CWEC files were derived can also be obtained directly from Environment Canada.

**\* \* DOE-2 ENERGY CONSULTANTS \* \***

<b>Consulting Engineers</b> Charles Fountain Burns & McDonnell Engineers 8055 E. Tufts Avenue, Suite 330 Denver, CO 80237 (303) 721-9292	<b>Consultant</b> Greg Cunningham Cunningham + Associates 512 Second Street San Francisco, CA (415) 495-2220
<b>Consultant</b> Philip Wemhoff 1512 South McDuff Avenue Jacksonville, FL 32205 (904) 632-7393	<b>Consultant</b> Jeff Hirsch 12185 Presilla Road Camarillo, CA 93012 (805) 532-1045
<b>Consultants</b> Charles Eley, John Kennedy Eley Associates 142 Minna Street San Francisco, CA 94105 (415) 957-1977	<b>Computer-Aided Mechanical Engineering</b> Mike Roberts Roberts Engineering Co. 11946 Pennsylvania Kansas City, MO 64145 (816) 942-8121
<b>Consultant</b> Steven D. Gates, P.E. Building HVAC Design/Performance Modeling 11608 Sandy Bar Court Gold River, CA 95670 (916) 638-7540	<b>Consultant</b> Donald E. Croy CAER Engineers, Inc. 814 Eleventh Street Golden, CO 80401 (303) 279-8136
<b>Mechanical Engineers</b> Chuck Sherman Energy Simulation Specialists 64 East Broadway, Suite 230 Tempe, AZ 85282 (602) 967-5278	<b>Energy Engineering: Commercial &amp; Institutional</b> Michael W. Harrison, P.E. 139 Bluebird Lane Whitehall, MT 59759 (406) 287-5370
<b>Consultants</b> Shiva Subramanya Criterion, Inc. 5331 SW Macadam Ave., Suite 205 Portland, OR 97201 (503) 224-8606	<b>Hourly Calibrated DOE-2 Analysis</b> Jeff S. Haberl Energy Systems Laboratory Texas A&M University College Station, TX 77843-3123 (409) 845-6065
<b>Consultant</b> Martyn C. Dodd Gabel Dodd Associates 100 Galli Drive, Suite 1 Novato, CA 94949 (415) 883-5900	<b>Consulting Engineers</b> Prem N. Mehrotra General Energy Corporation 230 Madison Street Oak Park, IL 60302 (708) 386-6000
<b>Energy Management Specialists</b> Hank Jackson, P.E. P.O. Box 675 Weaverville, NC 28787-0675 (704) 658-0298	<b>Consultant/Building Systems Analysis</b> Robert H. Henninger, P.E. ElectroCom GARD Ltd. 2070 Maple Street Des Plaines, IL 60018-3019 (708) 699-3252

\* \* DOE-2 ENERGY CONSULTANTS (continued) \* \*

Consulting Engineers/Computer Simulation Sciences Robert E. Gibeault A-TEC 5515 River Avenue, Suite 301 Newport Beach, CA 92663 (714) 548-6836	Energy Consultants Gene Tsai Acrosoft International, Inc. 3435 S. Yosemite, Suite 220 Denver, CO 80231 (303) 696-6888
Consulting Engineers Susan Reilly Enermodal Engineering 1554 Emerson Street Denver, CO 80218 (303) 861-2070	Technical Real World Analysis David J. Schwed Romero Management Associates 1805 West Avenue K, #202 Lancaster, CA 93534 (805) 940-0540
Energy Codes - DSM Doug Mahone The Heshong Mahone Group 4610 Paula Way Fair Oaks, CA 95628 (916) 962-7001	Consulting Engineers Gregory Banken, P.E. Q-Metrics, Inc. P.O. Box 3016 Woodinville, WA 98072 (205) 915-8590
Energy/DSM-Consultants Adrian Tuluca Steven Winter Associates 50 Washington Street Norwalk, CT 06854 (203) 852-0110	Consulting Energy Engineers Gary H. Michaels, P.E. 1512 Crain Street Evanston, IL 60202 (708) 869-5859
Consultant/Building Systems Engineering Ellen Franconi 1504 Grant Street Berkeley, CA 94703 (510) 559-8340	Consulting Engineer Robert Mowris, P.E. 606 Pelton Avenue Santa Cruz, CA 95060 (408) 454-0606
Consultant Engineers David A. Cohen Architectural Energy Corporation 2540 Frontier Avenue, #201 Boulder, CO 80301 (303) 444-4149	Modeling Specialist Norm Weaver Interweaver Consulting P.O. Box 775444 Steamboat Springs, CO 80477 (970) 870-1710
Energy Engineering and Analysis Leo Rainer Davis Energy Group, Inc. 123 C Street Davis, CA 95616 (916) 753-1100	Large Facility Modeling George Marton Consulting Engineer 1129 Keith Avenue Berkeley, CA 94708 (510) 841-8083
Consulting Engineers Chandra Shinde, P.E. ENVIRODESIGN GROUP 385 S. Lemon Ave., E-266 Walnut, CA 91789 (909) 598-1980	Space Available

\* DOE-2 ENERGY CONSULTANTS - INTERNATIONAL \*

Mainframe DOE-2 for European Users Joerg Tscherry EMPA, Section 175 8600 Dubendorf Switzerland	Energy Consultant Philip Schluchter Institut fur Bauphysik Klein Urs Graf-Strasse 1 CH4052 Basel Switzerland
Consultant Werner Gygli Informatik Energietechnik Weiherweg 19 CH-8604 Volketswil Switzerland	Consultant, Distributor for FTI-DOEv2.1E Andre Dewint rue de Livourne 103/12 B-1050 BRUXELLES Belgium
Consultant Curt Hepting, P.Eng. EnerSys Analytics 3990 Lynn Valley Road North Vancouver, B.C. V7K 2S9 Canada	DOE-2 Simulation Specialist Rene' Meldem gb consult ag 30-A, Chemin de la Fauvette P.O. Box 106 CH-1012 Lausanne Switzerland

## State of California - 1995 Energy Efficiency Standards

The 1995 Building Energy Efficiency Standards are available free of charge from the California Energy Commission. The new standards went into effect on July 1, 1995. Changes to the Standards reflect the 1994 Uniform Building Code and the 1994 Uniform Mechanical Code.

Also available from the CEC are Residential and Non-Residential Compliance Manuals. These manuals provide an interpretation and explanation of the Standards.

If you have compliance questions you may call the CEC Energy Hotline at (916) 654-5106 or toll-free in California at (800) 772-3300 from 8 a.m. to 12 p.m. and 1:00 p.m. to 3:00 p.m.

Here's how to order the manuals. Send a check for all manuals and a self-addressed mailing label for each manual to:

California Energy Commission  
Attn: Publications MS-13  
P.O. Box 944295  
Sacramento, CA 94244-2950

	Order No.	Cost
1995 Standards	P400-95-001	[free of charge]
Residential Compliance Manual	P400-95-002	\$35.00
Non-Residential Compliance Manual	P400-95-005	\$30.00

*If bees stay at home,  
rain will soon come,  
If they fly away,  
fine will be the day.*

Bees use the sun to navigate by, so if it's overcast bees will usually be found flying close to home. On the other hand, if it's a clear day, you'll find them busily out and about gathering food.



## World-Wide Web and Internet Sites for Building Energy Efficiency

Internet - sci.engrg.heat-vent-ac	HVAC discussion group.
Internet - eicbbs.wseo.wa.gov	Washington State Energy Office bulletin board.
Internet - sci.engrg.lighting	Lighting discussion group.
Web - <a href="http://energy.ca.gov/energy/cectext/ETEC.html">http://energy.ca.gov/energy/cectext/ETEC.html</a>	California Energy Commission's Energy Technology and Education Center. See <i>User News</i> , Vol. 16, No. 1, p. 42.
Web - <a href="http://www.hike.te.chiba-u.ac.jp/ikeda/CIE/publ/110-94.html">http://www.hike.te.chiba-u.ac.jp/ikeda/CIE/publ/110-94.html</a>	The International Commission on Illumination - CIE. See <i>User News</i> , Vol. 16, No. 1, p. 44.
Web - <a href="http://www.eren.doe.gov/">http://www.eren.doe.gov/</a>	EREN: Energy Efficiency and Renewable Energy Network of the U.S. Department of Energy. See <i>User News</i> , Vol. 16, No. 1, p. 44.
Web - <a href="http://www.doe.gov/">http://www.doe.gov/</a>	U.S. Department of Energy. See <i>User News</i> , Vol. 15, No. 4, p. 1.
Web - <a href="http://www.whitehouse.gov/">http://www.whitehouse.gov/</a>	The White House home page contains an <i>Interactive Citizens Handbook</i> that lists U.S. Government servers by agency. Use this site as a jumping-off point to explore other Federal agencies]. See <i>User News</i> , Vol. 15, No. 4, p. 1.
Web - <a href="http://www.fedworld.gov/">http://www.fedworld.gov/</a>	FedWorld is the U.S. Government's Federal Information Network home page. It lists web servers, ftp, gopher, and telnet sites and is organized by subject categories.
Web - <a href="http://www.fedworld.gov/ntis/ntishome.html">http://www.fedworld.gov/ntis/ntishome.html</a>	National Technical Information Service (NTIS) is an arm of the U.S. Department of Commerce; it gathers and markets scientific, technical and business-related information and disseminates it electronically, on paper copy, on diskette, or on CD-ROM. NTIS has access to more than two million documents, reports, studies, computer programs, and databases; every week, it adds an average of 1,300 titles. Call (703) 487-4650 for more information.
Web - <a href="http://www.ornl.gov/CADDET/caddet.html">http://www.ornl.gov/CADDET/caddet.html</a>	Center for the Analysis and Dissemination of Demonstrated Energy Technologies (CADDET). An International Energy Agency program responsible for collecting and disseminating information on demonstrated, energy-efficient and renewable energy technologies. See <i>User News</i> , Vol. 16, No. 2, p. 23.
Web - <a href="http://solstice.crest.org/efficiency/aceee/index.html">http://solstice.crest.org/efficiency/aceee/index.html</a>	American Council for an Energy-Efficient Economy (ACEEE); a non-profit organization dedicated to advancing energy efficiency as a means of promoting both economic prosperity and environmental protection. See <i>User News</i> , Vol. 16, No. 2, p. 23.

Customers are the precious things;  
goods are only grass.

\* \* \* Featured Sites This Issue \* \* \*

World-Wide Web and Internet Sites for Building Energy Efficiency

American Council for an Energy-Efficient Economy (ACEEE)  
<http://solstice.crest.org/efficiency/aceee/index.html>

*Exploring the Frontiers of Energy Policy and Energy Efficiency* The American Council for an Energy-Efficient Economy (ACEEE) is a non-profit organization dedicated to advancing energy efficiency as a means of promoting both economic prosperity and environmental protection. ACEEE fulfills its mission by: conducting in-depth technical and policy assessments, advising governments and utilities, working collaboratively with businesses and other organizations, publishing books, conference proceedings and reports, organizing conferences, and informing consumers. Support for ACEEE comes from a wide range of foundations, government organizations, research institutes, utilities, and corporations.

American Council for an Energy-Efficient Economy  
2140 Shattuck Avenue, Suite 202  
Berkeley, California 94704  
Ph: (510) 549-9914  
Fx: (510) 549-9984  
or  
1001 Connecticut Avenue  
Suite 801  
Washington, D.C. 20036  
Ph: (202) 429-8873  
Fx: (202) 429-2248



Center for the Analysis and Dissemination of Demonstrated Energy Technologies (CADDET)  
<http://www.ornl.gov/CADDET/caddet.html>

CADDET is an International Energy Agency program responsible for collecting and disseminating information on demonstrated, energy-efficient and renewable energy technologies. The program focuses on demonstration projects on full-scale applications of new technologies. By utilizing information from this international information network, you can find out what energy-efficient and renewable energy technologies have worked in other countries and how you can benefit from their application. You can also submit projects on demonstrated energy-saving technologies to be reviewed as potential CADDET products.

There are two branches of CADDET: CADDET Energy Efficiency and CADDET Renewable Energy. Oak Ridge National Laboratory is the U.S. Support Office of CADDET Energy Efficiency and the National Renewable Energy Laboratory is the U.S. Support Office of CADDET Renewable Energy. There are currently 15 member countries participating in CADDET Energy Efficiency and 12 member countries participating in CADDET Renewable Energy. U.S. participation in CADDET is sponsored by the Department of Energy, Office of Technical and Financial Assistance.

For more information about CADDET, please contact the USA National Team:

Ms. Marilyn Brown/Ms. Julia Shaver  
Oak Ridge National Lab  
Energy Division  
P.O. Box 2008  
Oak Ridge, TN 37831-6186  
Ph: 615-576-8152/615-574-6966  
Fx: 615-576-7572/615-574-6972

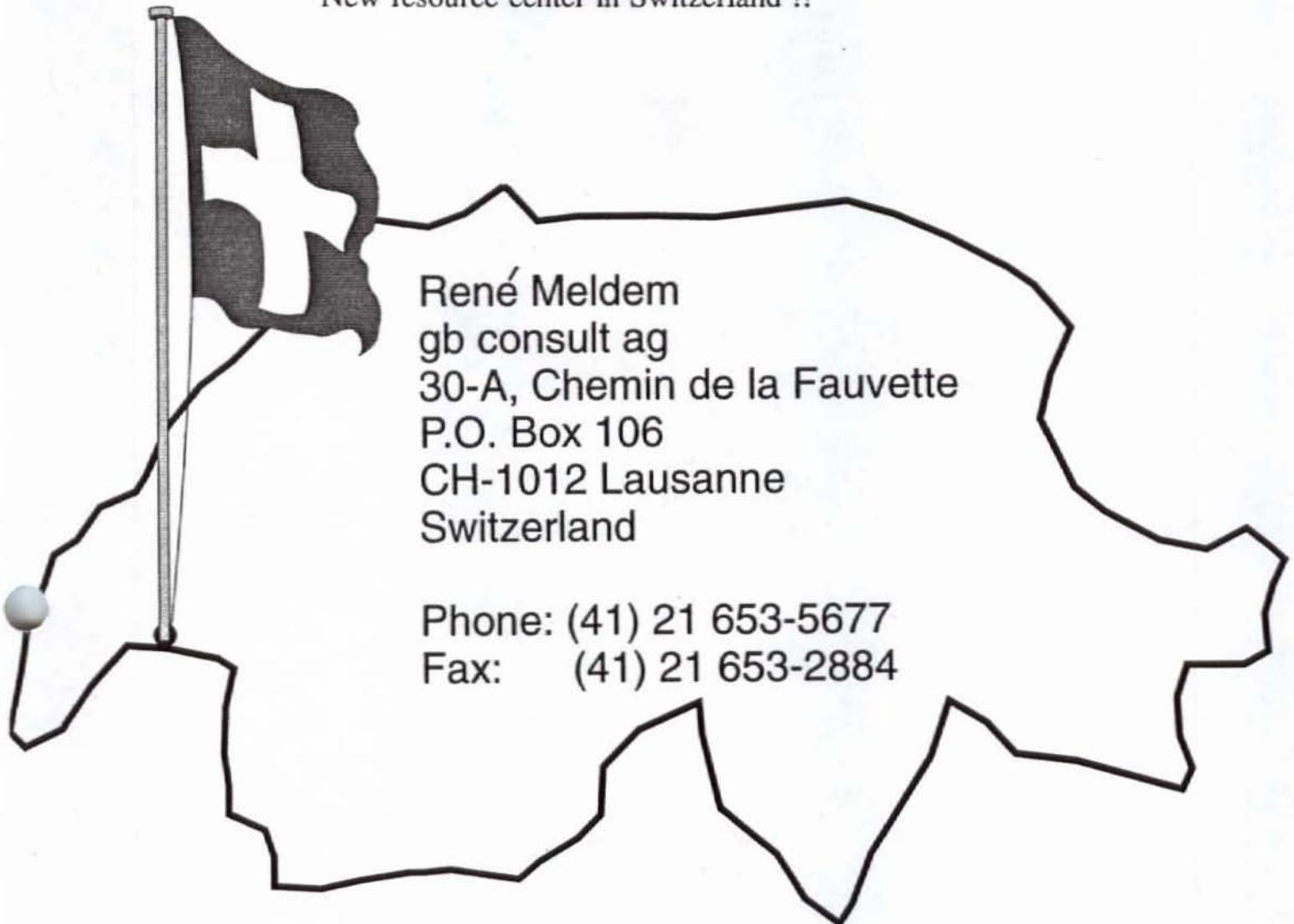
\* \* DOE-2 RESOURCE CENTERS \* \*

The people listed here have agreed to be primary contacts for DOE-2 program users in their respective countries. Each resource center has the latest program documentation, all back issues of the User News, and recent LBNL reports pertaining to DOE-2. In the future, these resource centers will receive copies of all new reports and documentation. Program users can then make arrangements to get photocopies of the new material for a nominal cost. We hope to establish resource centers in other countries; please contact us if you are interested in establishing a center in your area.

<b>South America</b> Prof. Roberto Lamberts Universidade Federal de Santa Catarina Campus Universitario-Trindade Cx. Postal 476 88049 Florianopolis SC BRASIL Telephone: (55)482-31-9272 Fax: (55)482-34-1524 email: ECV1RLR@IBM.UFSC.BR	<b>Australasia</b> Dr. Deo K. Prasad/P. C. Thomas SOLARCH University of New South Wales P.O. Box 1 Kensington, N.S.W. 2033 AUSTRALIA Telephone: (61)-2-697-5783 (P.C. Thomas) Fax: (61) 2-662-4265 or -1378 email: PC.Thomas@unsw.EDU.AU
<b>Portugal, Spain, Italy, and Greece</b> Antonio Rego Teixeira ITIME Azinhaga dos Lameiros a Estrada do Paco do Lumiar 1699 Lisboa Codex PORTUGAL Telephone: (351) 1-716-4096 Fax: (351) 1-716-4305	<b>Singapore, Malaysia, Indonesia, Thailand, and the Philippines</b> WONG Yew Wah, Raymond Nanyang Technological University School of Mechanical and Production Engineering Nanyang Avenue Singapore 2263 REPUBLIC OF SINGAPORE Telephone: (65)799-5543 Fax: (65)791-1859 email: mywwong@ntuvax.ntu.ac.sg
<b>Australia</b> Murray Mason ACADS – BSG 16 High Street Glen Iris VIC. 3146 AUSTRALIA Telephone: (61) 885 6586 Fax: (61) 885 5974 email:	<b>Germany</b> B. Barath or G. Morgenstem BARATH and WAGNER Rudolf-Diesel-Strasse 2, 40670 Meerbusch GERMANY Telephone: (49) 2159 528041 Fax: (49) 2159 528043 email:

\* \* DOE-2 RESOURCE CENTERS - continued \* \*

New resource center in Switzerland !!



René Meldem  
gb consult ag  
30-A, Chemin de la Fauvette  
P.O. Box 106  
CH-1012 Lausanne  
Switzerland

Phone: (41) 21 653-5677  
Fax: (41) 21 653-2884

**DOE-2 COMPUTER PROGRAM  
DOCUMENTATION  
ORDER FORM**

**FAX THIS PAGE TO KINKO'S COPY CENTER (510) 644-9704**

Dani Aalfs  
Kinko's Copy Center  
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Berkeley, CA 94710  
USA

Date of Order \_\_\_\_\_

Phone (510) 204-0781  
Fax: (510) 644-9704

Please ship me \_\_\_\_ set(s) of DOE-2.1E update documentation. The set includes BDL Summary, DOE-2 Supplement, and Sample Run Book. Cost of all three manuals is \$125.00 US, includes local tax, shipping, and handling. For foreign orders, please fax Ms. Dani Aalfs to ascertain extra shipping costs.

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## \* \* DOE-2 PROGRAM DOCUMENTATION \* \*

DOE-2 documentation is available from several sources. The National Technical Information Service offers a complete set of DOE-2 manuals, available for purchase separately. Kinko's Copy Center of Berkeley offers the DOE-2.1E updated documentation (BDL Summary, Sample Run Book, and Supplement) as a set; their price includes shipping within the U.S. [see the facing page for a faxable order form to Kinko's]. The Energy Science Technology Software Center at Oak Ridge, TN, offers the DOE-2.1E updated documentation at no charge but only when you purchase the mainframe or workstation version of DOE-2. And finally, many of the PC vendors of DOE-2 offer some or all of the documentation when you buy their version of DOE-2.

National Technical Information Service DOE-2 Program Documentation		
Document	Order Number	Price
DOE-2 Basics Manual (2.1E)	DE-940-13165	44.50
BDL Summary (2.1E)	DE-940-11217	27.00
Sample Run Book (2.1E)	DE-940-11216	91.00
Reference Manual (2.1A)	LBL-8706, Rev.2	126.00
Supplement (2.1E)	DE-940-11218	91.00
Engineers Manual (2.1A) [algorithm descriptions]	DE-830-04575	52.00

**Order from:**

National Technical Information Service      Phone (703) 487-4650  
5285 Port Royal Road      FAX (703) 321-8547  
Springfield, VA 22161

# PsyChart: A Graphical Psychrometric Program

Ayres Sowell Associates, Inc.  
P.O. Box 939  
Placentia, CA 92670  
Phone: (714) 773-4092  
Fax: (714) 993-1421

**Price:**  
PsyChart program and user manual \$295.  
PsyChart Demo Package (limited-range program diskette and user manual) \$35.  
For any order, add \$3.00 shipping plus state tax if shipment is within California.

## PsyChart, Version 1.4

After 10 years, PsyChart remains the only true, ASHRAE-style, graphical psychrometric program on the market. An interactive program, PsyChart displays the psychrometric chart and allows you to carry out all operations and analysis usually done using printed psychrometric charts. Both English and metric engineering units are supported. PsyChart quickly displays numerical values for all properties at any selected point without interpolation. These points can be labeled for future reference and reports of their properties can be displayed or printed. Additionally, PsyChart allows psychrometric processes to be analyzed. The lines (which may have different colors) for all standard psychrometric processes, such as heating, cooling, humidification, mixing, and so on, are displayed on the chart with simple user commands. Once the points and processes are displayed, reports giving heating rates, cooling rates, air quantity, and water removal or addition rates can be displayed on the screen or disposed to a printer. Although the initial PsyChart display is the standard ASHRAE sea level chart, it can be changed to show a chart for any elevation or pressure and for any range of drybulb temperatures; another feature allows the display or omission of the property lines.

### Hardware requirements:

IBM PC/XT/AT, PS2 or compatible. 500K byte RAM, EGA/VGA Graphics adaptor and monitor. For hard copy, IBM compatible graphics printer or AutoCAD software and compatible printer. MS or PC DOS or later. Hard disk recommended.

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