

APPENDIX F - REFERENCES

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F.1 References

The following references may prove helpful when using ASEAM3.0. Every attempt has been made when writing and documenting the code to have the program and user's manual be self-contained. No additional references are required to execute ASEAM3.0. However, the documents listed in this section may increase your understanding of some of the program algorithms. This manual is a user's manual; it is geared toward teaching you to run ASEAM3.0 and not toward explaining the calculations. Many of the references, listed below, do explain the calculations performed.

1) *ASHRAE 1985 Handbook of Fundamentals; ASHRAE 1989 Handbook of Fundamentals*

Published by: American Society of Heating, Refrigerating, and Air-Conditioning Engineers (1985)

Available from: ASHRAE Publication Sales
 1791 Tullie Circle, NE
 Atlanta, GA 30329
 404/636-8400

These handbooks are essential references. The calculation methodologies for the loads program can, in large part, be found here. (References 4 and 5, below, go into more detail about "bin" and systems/plant calculations though.) All of the cooling load factor, solar heat gain factor, etc. tables used by ASEAM3.0 come from this volume. In addition, many other useful items are to be found here: latitudes and longitudes of cities, U-factor tables for building constructions, etc.

2) *IES Lighting Handbook 1984 Reference Volume*

Available from: Illuminating Engineering Society

This is the general reference handbook for the lighting community. The section on Daylighting (Chapter 7) describes the calculation methodology used by ASEAM3.0 for daylighting analysis. Also, recommended lighting levels for various space types and tasks are given in this volume.

3) *DOE2 Engineers Manual Version 2.1A*

Authors: Energy and Environment Division
 Building Energy Simulation Group

Published by: Lawrence Berkeley Laboratory (1982)
 LBL-11353 DE83004575

Available from: National Technical Information Service
 U.S. Department of Commerce
 Springfield, VA 22161

The DOE2 Engineers Manual is a reference manual for the hourly simulation program, DOE2. Many of the ASEAM3.0 system and plant calculation algorithms are taken directly from DOE2. Included as comments in the ASEAM3.0 code are the

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corresponding equation numbers and pages from the DOE2 Engineers Manual. If you will be examining and/or modifying the systems or plant calculations, this reference will be extremely helpful.

4) *Simplified Energy Analysis Using the Modified Bin Method*

Author: David E. Knebel, Principal Investor

Published by: American Society of Heating, Refrigerating, and Air-Conditioning Engineers (1983) ISBN 0-910110-39-5

Available from: ASHRAE Publication Sales
 1791 Tullie Circle, NE
 Atlanta, GA 30329
 404/636-8400

This book covers the methodology of the modified bin method. The bin method discussed here is an annual method. ASEAM3.0 differs, however, in many of the procedures explained in this book (e.g., systems/plant algorithms, extensions for monthly analysis, peak loads calculations, etc.)

5) *Cooling and Heating Load Calculation Manual*

Authors: Dr. William Rudoy, Project Director
 Joseph F. Cuba, Principal Investigator

Published by: American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (1979)

Available from: ASHRAE Publication Sales
 1791 Tullie Circle, NE
 Atlanta, GA 30329
 404/636-8400

This book describes the ASHRAE algorithms for calculating design heating and cooling loads. Much of the information duplicates that contained in the ASHRAE Handbook of Fundamentals load calculation chapters, however this manual goes into much more detail and contains more examples. If you are interested in the methods used for calculating peak loads, it is suggested that you refer to this book.

The crack length method of calculating infiltration rates for windows and doors is used in ASEAM3.0 and comes from this book. It may also be found in older versions of the ASHRAE Handbook of Fundamentals. The 1985 Handbook of Fundamentals, however, explains a new method of calculating infiltration rates by specific leakage area (which ASEAM3.0 does not use).

6) *Recommended Practice for the Calculation of Daylight Availability*

Author: IES Calculation Procedures Committee

Published by: Journal of IES (July, 1984) pp. 381-392.

This article describes the calculation of daylight availability. Some of these algorithms are used by ASEAM3.0 in generating the solar data files. (Note: this data

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is quite similar to that found in the IES Reference Handbook and the booklet "How to Predict Interior Daylight Illumination". However, where the latter two references use tables of values and interpolate within them, this article provides equations for use in calculating values.)

7) *How to Predict Interior Daylight Illumination*

Published by: Libby-Owens-Ford Company (1976)

This booklet describes the methodology used by ASEAM3.0 for calculating daylight availability in a room. The methodology is the same as that in the IES Lighting Handbook 1984 Reference Volume, but contains more detailed and somewhat less technical descriptions and examples.

8) *Controlite 1.0 Lighting Control systems and Daylighting Analysis Program: User's Manual*

Author: Lighting Technologies, Boulder, CO

Published by: Lawrence Berkeley Laboratory (January, 1985)
LBL-17444 EEB-L 84-02 L-84

Available from: Lighting Systems Research
Lawrence Berkeley Laboratory
University of California
Berkeley, CA 94720

The User's Manual and diskettes for Controlite should be used if you want to take advantage of ASEAM3.0's capability of using Controlite output files for the daylighting analysis. Controlite uses much more sophisticated algorithms than ASEAM3.0 for calculating the contribution of daylighting. You must first run Controlite and then specify the output filename for ASEAM3.0 to use in its calculations. You must use Controlite version 1.0.

9) *Bindata Users Guide for Microcomputers* ASHRAE Research Project 385-RP

Author: Larry O. Degelman

Published by: American Society of Heating, Ventilating, and Air-Conditioning Engineers, Inc. (1979)

Available from: ASHRAE Publication Sales
1791 Tullie Circle, NE
Atlanta, GA 30329
404/636-8400

This manual describes the use of ASHRAE bin weather data and programs. The bin data in these files were converted for use by ASEAM3.0, and are included in the set of bin weather diskettes you have received. These diskettes can be ordered from ASHRAE at the above address. The bin format is six four-hour blocks. See Appendix A for a listing of these stations.

10) *Weather Data for Simplified Energy Calculation Methods (4 volumes)*

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Authors: A.R. Olsen, S. Moreno, J. Deringer, and C.R. Watson

Published by: Battelle Pacific Northwest Laboratory (August, 1984)
PNL-5143 UC-95d

Available from: National Technical Information Service
United States Department of Commerce
5285 Port Royal Road
Springfield, VA 22161

This four-volume set contains bin weather data in eight three-hour bin format for many locations in the U.S. If the site you need is not included in the weather library provided, you can enter the bin data from these volumes into the ASEAM3.0 Weather Input Program to create weather files for use with ASEAM3.0. See Appendix A for a listing of these stations.

11) Engineering Weather Data

Published by: Departments of the Air Force, the Army, and the Navy (July, 1978) AFM 88-29

Available from: Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402

This book contains bin data in three eight-hour block format for many locations in the U.S. and also a few abroad. This volume has many more stations than either of the above two volumes (See Appendix A). You may enter this bin data with the ASEAM3.0 Weather Input Program to create weather files for use with ASEAM3.0.

12) The NIST "Building Life-Cycle Cost" (BLCC) Program (Version 3.0) User's Guide and Reference Manual

Author: Stephen R. Petersen

Available from: National Technical Information Service
5285 Port Royal Road
Springfield, VA 22161
(703) 487-4650

This book describes the BLCC Life-Cycle Cost Program. The documentation for the BLCC computer program is also stored in ASCII format on the distribution diskettes.

13) Architect's and Engineer's Guide to Energy Conservation in Existing Buildings Volume 1 - Energy Use Assessment and Simulation Methods Volume 2 - Energy Conservation Opportunities

Author: Pacific Northwest Laboratory
Richland, Washington 99352

Available from: National Technical Information Service

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Springfield, VA 22161
(703) 487-4650

The second volume in this set describes how to model various ECO's using ASEAM2.1.

