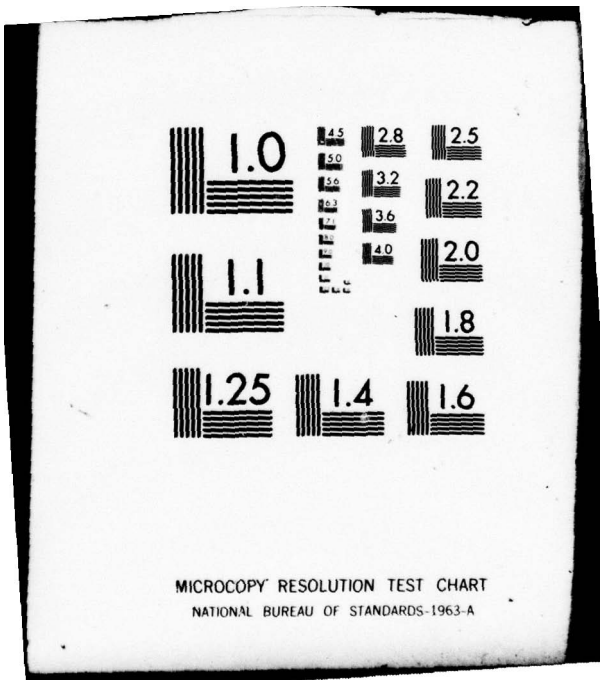
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THE BUILDING LOADS ANALYSIS AND SYSTEM THERMODYNAMICS (BLAST) P--ETC(U)
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| 4. TITLE (and Subtitle): THE BUILDING LOADS ANALYSIS SYSTEM THERMODYNAMICS (BLAST) PROGRAM, VERSION 2.0 USERS MANUAL, VOLUME II (6) | 5. TYPE OF REPORT & PERIOD COVERED |
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energy consumption

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

The Building Loads Analysis and System Thermodynamics (BLAST) program is a comprehensive set of subprograms for predicting energy consumption in buildings. There are three major subprograms: (1) the space load predicting subprogram, which computes hourly space loads in a building or zone based on user input and hourly weather data; (2) the air distribution system simulation subprogram, which uses the computed space load and user inputs describing the building air-handling system to calculate hot water or

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steam, chilled water, and electric energy demands; and (3) the central plant simulation program, which simulates boilers, chillers, onsite power generating equipment and solar energy systems and computes monthly and annual fuel and electrical power consumption and plant life cycle cost. The program is written in Control Data Corporation (CDC) FORTRAN Extended, Version 4, and can be used on CDC 6000/7000 series computers with few or no modifications. Volume I of this report provides detailed user instructions, and Volume II contains a listing of the basic BLAST program library and a BLAST example. The Input Booklet explains each entry on the BLAST input forms and provides a complete input form example for a sample BLAST run.

## FOREWORD

The BLAST program was developed by the U.S. Army Construction Engineering Research Laboratory (CERL) under the sponsorship of the Air Force Engineering and Services Center (AFESC), Tyndall Air Force Base, FL, and the Department of the Army, Office of the Chief of Engineers (OCE), Washington, D.C. After its original release in December 1977, the program was extended and improved under the sponsorship of the General Services Administration, Office of Professional Services. These improvements have led to the release of BLAST Version 2.0. Hence, this Users Manual supersedes the previous BLAST Users Manual (CEEDO-TR-77-35/CERL-TR-E-119) and completely describes the information necessary to use BLAST Version 2.0. The development of this new Users Manual and a companion Input Booklet for BLAST was sponsored by AFESC, under the Investigation Engineering Program (ENE-78IE 042).

Mr. D. Warne was the General Services Administration Technical Monitor, and Mr. F. Beason was the Air Force Technical Monitor. Mr. Douglas C. Hittle was the CERL Principal Investigator. Administrative support was provided by Dr. D. J. Leverenz and Mr. R. G. Donaghy, Chief, Energy and Habitability Division, CERL. Their assistance is gratefully acknowledged.

The substantial revisions to the original BLAST program* (known as BLAST 1.2) leading to BLAST Version 2.0 were accomplished by Mr. Dale Herron, Mr. George Walton, Ms. Linda Lawrie, and Mr. John Cameron. The success of BLAST and the hoped-for success of BLAST Version 2.0 are due in large measure to their special skills and determination.

Ms. M. L. Scala, Ms. Terry James, and Ms. D. P. Mann were consulting editors on this BLAST Users Manual and on its companion document, the BLAST Input Booklet.

All versions of the BLAST program are copyrighted by CERL.

COL J. E. Hays is Commander and Director of CERL, and Dr. L. R. Shaffer is Technical Director.

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*See Hittle, D. C., *BLAST, The Building Loads Analysis and System Thermodynamics Program* CEEDO-TR-77-35/CERL-TR-E-119/ADA048734 (U.S. Army Construction Engineering Research Laboratory [CERL], December 1977).

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Design Day Simulation
One-Year Loads Calculations
One-Year System and Central Plant Simulation

# 1 INTRODUCTION

## Background

The Building Loads Analysis and System Thermodynamics (BLAST) program is a comprehensive set of subprograms for predicting energy consumption and energy system performance and costs in buildings. There are three major subprograms:

1. The space load predicting subprogram computes hourly space loads in a building or zone based on user input and weather data.

2. The air distribution system simulation subprogram uses computed space loads, weather data, and user inputs describing the building air handling system to calculate hot water, steam, gas, chilled water, and electric demand.

3. The central plant simulation subprogram uses weather data, results of the air distribution system simulation, and user input describing the central plant to simulate boilers, chillers, onsite power generating equipment, and solar energy systems, and computes monthly and annual fuel and electrical power consumption.

Volume I of this Users Manual and a companion Input Booklet explain how to prepare input for the BLAST program and help users interpret BLAST program results. Volume II contains reference data, including the BLAST program library.

## Outline of Report

Chapter 2 of this volume contains a printout of the BLAST program library listing each of the library's subsets alphabetically. At the beginning of Chapter 2, information on how the library is keyed to the American Society of Heating, Refrigeration, and Air-Conditioning Engineers (ASHRAE) *Handbook of Fundamentals* is provided.[1] Note that this same printout can be produced by executing the BLAST program (see Volume I).

Chapter 3 provides a listing of the input deck used to create the BLAST library and is a good reference for users wishing to modify the library for their own projects. It provides hundreds of examples of how to define entries to the library.

Chapter 4 provides a complete example of the building simulated to produce the results summarized in Chapter 7 of Volume I. This example is produced to assist users in preparing input decks for the BLAST program.

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[1] *Handbook of Fundamentals* (American Society of Heating, Refrigeration and Air-Conditioning Engineers [ASHRAE], 1977).

# 2 BLAST LIBRARY

This chapter includes the entire current BLAST library. Most entries are from the 1977 edition of the ASHRAE *Handbook of Fundamentals.*

Table 1 lists BLAST library contents. Table 2 shows where data used to create the BLAST library can be found in the ASHRAE *Handbook of Fundamentals.*

The printouts on pages 4 and 39 are the computer run produced in response to the **PRINT LIBRARY** command. Note that the user must not insert *special characters* such as & or @ in library names for materials, walls, roofs, windows, floors, schedules, etc. Instead, the user should insert a slash (/) or hyphen (-), as necessary. Periods are used at the end of words in names, but decimal numbers such as 4.5 or 1.0 cannot be part of a name; e.g., 4 1/2 is used instead of 4.5. As a general rule, names can contain alphabetic characters, integer numbers, slashes, hyphens, and periods.

Table 3 lists keywords reserved for BLAST program language. These keywords *cannot* be used in library names.

**Table 1**
**Library Contents**


| | Page |
|---|---|
| General Schedules | 5- 7 |
| Control Schedules | 7- 8 |
| Materials | 8-24 |
| Walls | 25-33 |
| Roofs | 33-37 |
| Floors | 37-38 |
| Doors | 38 |
| Windows | 39 |

## Table 2
## Library–ASHRAE
## Correspondence

| BLAST Materials Library | | 1977 ASHRAE *Handbook of Fundamentals* | |
|---|---|---|---|
| **Key Name** | **Page** | **Key Name** | **Page** |
| AIRSPACE | 8 | AIR SPACES | 22.12 |
| A-type coded names | 8- 9 | CODED LAYERS | 25.10 |
| BRICK | 9 | MASONRY UNITS | 22.15 |
| BUILDING BOARD | 9-11 | BUILDING BOARD | 22.13-14 |
| BUILDING MEMBRANE | 11 | BUILDING MEMBRANE | 22.14 |
| B-type coded names | 11-12 | CODED LAYERS | 25.10 |
| CLAY TILE | 12 | MASONRY UNITS | 22.15 |
| CONCRETE BLOCK | 12-13 | MASONRY UNITS | 22.16 |
| CONCRETE | 13-15 | MASONRY MATERIALS | 22.15 |
| C-type coded names | 15-16 | CODED LAYERS | 25.10 |
| DIRT | 16 | | |
| DRAPES | 16 | DRAPERIES | 26.32 |
| E-type coded names | 16 | CODED LAYERS | 25.10 |
| FINISH FLOORING | 16-17 | FINISH FLOORING MATERIALS | 22.14 |
| GLASS | 17 | GLASS | 26.27-28 |
| INSULATION | 18-22 | INSULATING MATERIALS | 22.14-15 |
| | | INDUSTRIAL INSULATION | 22.17-18 |
| METAL | 22 | SOLIDS | 37.3 |
| PLASTER | 22 | PLASTERING MATERIALS | 22.16 |
| ROOFING | 22-23 | ROOFING | 22.16 |
| SHADE ROLL | 23 | ROLLER SHADES | 26.31 |
| SIDING | 23-24 | SIDING MATERIALS | 22.16-17 |
| VENETIAN BLINDS | 24 | VENETIAN BLINDS | 26.31 |
| WOOD | 24 | WOODS | 22.17 |
| WALLS LIBRARY | | **Table** | **Page** |
| EXTWALL01 - EXTWALL96 | 25-31 | TABLE 27 | 25.30-32 |
| PARTITION01 - PARTITION30 | 31-33 | TABLE 29 | 25.34-35 |
| ROOFS LIBRARY | | | |
| CEILING31 - CEILING47 | 33-34 | TABLE 29 | 25.34-35 |
| ROOF01 - ROOF36 | 34-37 | TABLE 26 | 25.29 |
| FLOORS LIBRARY | | | |
| FLOOR31 - FLOOR47 | 37-38 | TABLE 29 | 25.34-35 |

## Table 3
## Reserved Keywords

| | | |
|---|---|---|
| ASSIGNMENT | LOCATION | STARTING |
| AT | ORIGIN | TEMPORARY |
| AVAILABLE | PART | USE |
| BEGIN | PERFORMANCE | ( |
| DEFINE | PROJECT | ) |
| DESIGN | RATIOS | ; |
| DIMENSIONS | REDEFINE | : |
| END | SELECTION | , |
| ENERGY | SIDE | = |
| FACING | SIZE | " |

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LOCATION LIBRARY EMPTY.

DESIGN DAYS LIBRARY EMPTY.

GENERAL SCHEDULE LIBRARY

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CONSTANT

HOURLY PROFILE PERCENTAGES

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SUNDAY | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| MONDAY | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| TUESDAY | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| WEDNESDAY | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| THURSDAY | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| FRIDAY | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| SATURDAY | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| HOLIDAY | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

DORMITORY LIGHTING

HOURLY PROFILE PERCENTAGES

| LOCAL TIME / HOUR NUMBER | 0-1 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 6-7 | 7-8 | 8-9 | 9-10 | 10-11 | 11-12 | 12-13 | 13-14 | 14-15 | 15-16 | 16-17 | 17-18 | 18-19 | 19-20 | 20-21 | 21-22 | 22-23 | 23-24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SUNDAY | 100 | 50 | 10 | 10 | 10 | 10 | 10 | 20 | 20 | 20 | 10 | 10 | 30 | 10 | 10 | 10 | 20 | 40 | 60 | 100 | 100 | 100 | 100 | 100 |
| MONDAY | 20 | 10 | 10 | 10 | 10 | 10 | 80 | 50 | 20 | 10 | 10 | 50 | 10 | 10 | 10 | 10 | 50 | 80 | 80 | 100 | 100 | 100 | 100 | 100 |
| TUESDAY | 20 | 10 | 10 | 10 | 10 | 10 | 80 | 50 | 20 | 10 | 10 | 50 | 10 | 10 | 10 | 10 | 50 | 80 | 80 | 100 | 100 | 100 | 100 | 100 |
| WEDNESDAY | 20 | 10 | 10 | 10 | 10 | 10 | 80 | 50 | 20 | 10 | 10 | 50 | 10 | 10 | 10 | 10 | 50 | 80 | 80 | 100 | 100 | 100 | 100 | 100 |
| THURSDAY | 20 | 10 | 10 | 10 | 10 | 10 | 80 | 50 | 20 | 10 | 10 | 50 | 10 | 10 | 10 | 10 | 50 | 80 | 80 | 100 | 100 | 100 | 100 | 100 |
| FRIDAY | 20 | 10 | 10 | 10 | 10 | 10 | 80 | 50 | 20 | 10 | 10 | 50 | 10 | 10 | 10 | 10 | 50 | 80 | 80 | 100 | 100 | 100 | 100 | 100 |
| SATURDAY | 100 | 50 | 10 | 10 | 10 | 10 | 10 | 20 | 20 | 20 | 10 | 10 | 30 | 10 | 10 | 10 | 20 | 40 | 60 | 100 | 100 | 100 | 100 | 100 |
| HOLIDAY | 100 | 50 | 10 | 10 | 10 | 10 | 10 | 20 | 20 | 20 | 10 | 10 | 30 | 10 | 10 | 10 | 20 | 40 | 60 | 100 | 100 | 100 | 100 | 100 |

DORMITORY OCCUPANCY

HOURLY PROFILE PERCENTAGES

| LOCAL TIME / HOUR NUMBER | 0-1 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 6-7 | 7-8 | 8-9 | 9-10 | 10-11 | 11-12 | 12-13 | 13-14 | 14-15 | 15-16 | 16-17 | 17-18 | 18-19 | 19-20 | 20-21 | 21-22 | 22-23 | 23-24 |
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| SUNDAY | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 80 | 80 | 80 | 50 | 50 | 50 | 50 | 80 | 80 | 50 | 50 | 50 | 50 | 80 | 100 |
| MONDAY | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 80 | 50 | 20 | 20 | 80 | 20 | 20 | 20 | 30 | 80 | 80 | 50 | 50 | 50 | 80 | 100 | 100 |
| TUESDAY | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 80 | 50 | 20 | 20 | 80 | 20 | 20 | 20 | 30 | 80 | 80 | 50 | 50 | 50 | 80 | 100 | 100 |
| WEDNESDAY | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 80 | 50 | 20 | 20 | 80 | 20 | 20 | 20 | 30 | 80 | 80 | 50 | 50 | 50 | 80 | 100 | 100 |
| THURSDAY | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 80 | 50 | 20 | 20 | 80 | 20 | 20 | 20 | 30 | 80 | 80 | 50 | 50 | 50 | 80 | 100 | 100 |
| FRIDAY | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 80 | 50 | 20 | 20 | 80 | 20 | 20 | 20 | 30 | 80 | 80 | 50 | 50 | 50 | 80 | 100 | 100 |
| SATURDAY | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 80 | 80 | 80 | 50 | 50 | 50 | 50 | 80 | 80 | 50 | 50 | 50 | 50 | 80 | 100 |
| HOLIDAY | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 80 | 80 | 80 | 50 | 50 | 50 | 50 | 80 | 80 | 50 | 50 | 50 | 50 | 80 | 100 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SUNDAY | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| MONDAY | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| TUESDAY | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| WEDNESDAY | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| THURSDAY | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| FRIDAY | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| SATURDAY | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| HOLIDAY | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 50 | 50 | 50 | 50 | 50 | 50 | 50 |

HOSPITAL LIGHTING

HOURLY PROFILE PERCENTAGES

| LOCAL TIME / HOUR NUMBER | 0-1 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 6-7 | 7-8 | 8-9 | 9-10 | 10-11 | 11-12 | 12-13 | 13-14 | 14-15 | 15-16 | 16-17 | 17-18 | 18-19 | 19-20 | 20-21 | 21-22 | 22-23 | 23-24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SUNDAY | 20 | 20 | 20 | 20 | 50 | 50 | 50 | 70 | 70 | 70 | 70 | 70 | 70 | 70 | 70 | 70 | 70 | 70 | 70 | 70 | 20 | 20 | 20 | 20 |
| MONDAY | 20 | 20 | 20 | 20 | 50 | 50 | 50 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 20 | 20 | 20 | 20 |
| TUESDAY | 20 | 20 | 20 | 20 | 50 | 50 | 50 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 20 | 20 | 20 | 20 |
| WEDNESDAY | 20 | 20 | 20 | 20 | 50 | 50 | 50 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 20 | 20 | 20 | 20 |
| THURSDAY | 20 | 20 | 20 | 20 | 50 | 50 | 50 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 20 | 20 | 20 | 20 |
| FRIDAY | 20 | 20 | 20 | 20 | 50 | 50 | 50 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 20 | 20 | 20 | 20 |
| SATURDAY | 20 | 20 | 20 | 20 | 50 | 50 | 50 | 70 | 70 | 70 | 70 | 70 | 70 | 70 | 70 | 70 | 70 | 70 | 70 | 70 | 20 | 20 | 20 | 20 |
| HOLIDAY | 20 | 20 | 20 | 20 | 50 | 50 | 50 | 70 | 70 | 70 | 70 | 70 | 70 | 70 | 70 | 70 | 70 | 70 | 70 | 70 | 20 | 20 | 20 | 20 |

HOSPITAL OCCUPANCY

HOURLY PROFILE PERCENTAGES

| LOCAL TIME / HOUR NUMBER | 0-1 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 6-7 | 7-8 | 8-9 | 9-10 | 10-11 | 11-12 | 12-13 | 13-14 | 14-15 | 15-16 | 16-17 | 17-18 | 18-19 | 19-20 | 20-21 | 21-22 | 22-23 | 23-24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SUNDAY | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 60 | 60 | 60 | 60 |
| MONDAY | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 80 | 80 | 80 | 60 | 60 | 60 | 60 |
| TUESDAY | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 80 | 80 | 80 | 60 | 60 | 60 | 60 |
| WEDNESDAY | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 80 | 80 | 80 | 60 | 60 | 60 | 60 |
| THURSDAY | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 80 | 80 | 80 | 60 | 60 | 60 | 60 |
| FRIDAY | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 80 | 80 | 80 | 60 | 60 | 60 | 60 |
| SATURDAY | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 60 | 60 | 60 | 60 |
| HOLIDAY | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 60 | 60 | 60 | 60 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SUNDAY | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| MONDAY | 5 | 5 | 5 | 5 | 5 | 5 | 20 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 50 | 5 | 5 | 5 | 5 | 5 | 5 |
| TUESDAY | 5 | 5 | 5 | 5 | 5 | 5 | 20 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 50 | 5 | 5 | 5 | 5 | 5 | 5 |
| WEDNESDAY | 5 | 5 | 5 | 5 | 5 | 5 | 20 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 50 | 5 | 5 | 5 | 5 | 5 | 5 |
| THURSDAY | 5 | 5 | 5 | 5 | 5 | 5 | 20 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 50 | 5 | 5 | 5 | 5 | 5 | 5 |
| FRIDAY | 5 | 5 | 5 | 5 | 5 | 5 | 20 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 50 | 5 | 5 | 5 | 5 | 5 | 5 |
| SATURDAY | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| HOLIDAY | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |

OFFICE OCCUPANCY

HOURLY PROFILE PERCENTAGES

| LOCAL TIME / HOUR NUMBER | 0-1 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 6-7 | 7-8 | 8-9 | 9-10 | 10-11 | 11-12 | 12-13 | 13-14 | 14-15 | 15-16 | 16-17 | 17-18 | 18-19 | 19-20 | 20-21 | 21-22 | 22-23 | 23-24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SUNDAY | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| MONDAY | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 50 | 100 | 100 | 100 | 100 | 50 | 100 | 100 | 100 | 50 | 10 | 0 | 0 | 0 | 0 | 0 | 0 |
| TUESDAY | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 50 | 100 | 100 | 100 | 100 | 50 | 100 | 100 | 100 | 50 | 10 | 0 | 0 | 0 | 0 | 0 | 0 |
| WEDNESDAY | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 50 | 100 | 100 | 100 | 100 | 50 | 100 | 100 | 100 | 50 | 10 | 0 | 0 | 0 | 0 | 0 | 0 |
| THURSDAY | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 50 | 100 | 100 | 100 | 100 | 50 | 100 | 100 | 100 | 50 | 10 | 0 | 0 | 0 | 0 | 0 | 0 |
| FRIDAY | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 50 | 100 | 100 | 100 | 100 | 50 | 100 | 100 | 100 | 50 | 10 | 0 | 0 | 0 | 0 | 0 | 0 |
| SATURDAY | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| HOLIDAY | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

RESIDENCE EQUIPMENT

HOURLY PROFILE PERCENTAGES

| LOCAL TIME / HOUR NUMBER | 0-1 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 6-7 | 7-8 | 8-9 | 9-10 | 10-11 | 11-12 | 12-13 | 13-14 | 14-15 | 15-16 | 16-17 | 17-18 | 18-19 | 19-20 | 20-21 | 21-22 | 22-23 | 23-24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SUNDAY | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 100 | 90 | 80 | 30 | 30 | 30 | 30 | 30 | 30 | 70 | 70 | 70 | 50 | 50 | 50 | 0 | 0 |
| MONDAY | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 100 | 90 | 80 | 30 | 30 | 30 | 30 | 30 | 30 | 70 | 70 | 70 | 50 | 50 | 50 | 0 | 0 |
| TUESDAY | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 100 | 90 | 80 | 30 | 30 | 30 | 30 | 30 | 30 | 70 | 70 | 70 | 50 | 50 | 50 | 0 | 0 |
| WEDNESDAY | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 100 | 90 | 80 | 30 | 30 | 30 | 30 | 30 | 30 | 70 | 70 | 70 | 50 | 50 | 50 | 0 | 0 |
| THURSDAY | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 100 | 90 | 80 | 30 | 30 | 30 | 30 | 30 | 30 | 70 | 70 | 70 | 50 | 50 | 50 | 0 | 0 |
| FRIDAY | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 100 | 90 | 80 | 30 | 30 | 30 | 30 | 30 | 30 | 70 | 70 | 70 | 50 | 50 | 50 | 0 | 0 |
| SATURDAY | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 100 | 90 | 80 | 30 | 30 | 30 | 30 | 30 | 30 | 70 | 70 | 70 | 50 | 50 | 50 | 0 | 0 |
| HOLIDAY | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 100 | 90 | 80 | 30 | 30 | 30 | 30 | 30 | 30 | 70 | 70 | 70 | 50 | 50 | 50 | 0 | 0 |

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GENERAL SCHEDULE LIBRARY

HOURLY PROFILES ARE DISPLAYED AS PERCENTAGES (0 - 100),
BUT ARE INPUT AS FRACTIONS (0.0 - 1.0).

RESIDENCE LIGHTING

HOURLY PROFILE PERCENTAGES

| LOCAL TIME / HOUR NUMBER | 0-1 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 6-7 | 7-8 | 8-9 | 9-10 | 10-11 | 11-12 | 12-13 | 13-14 | 14-15 | 15-16 | 16-17 | 17-18 | 18-19 | 19-20 | 20-21 | 21-22 | 22-23 | 23-24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SUNDAY | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 50 | 50 | 100 | 100 | 100 | 100 | 50 | 30 |
| MONDAY | 10 | 10 | 10 | 10 | 10 | 10 | 20 | 20 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 20 | 50 | 50 | 100 | 100 | 100 | 50 | 30 |
| TUESDAY | 10 | 10 | 10 | 10 | 10 | 10 | 20 | 20 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 20 | 50 | 50 | 100 | 100 | 100 | 50 | 30 |
| WEDNESDAY | 10 | 10 | 10 | 10 | 10 | 10 | 20 | 20 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 20 | 50 | 50 | 100 | 100 | 100 | 50 | 30 |
| THURSDAY | 10 | 10 | 10 | 10 | 10 | 10 | 20 | 20 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 20 | 50 | 50 | 100 | 100 | 100 | 50 | 30 |
| FRIDAY | 10 | 10 | 10 | 10 | 10 | 10 | 20 | 20 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 20 | 50 | 50 | 100 | 100 | 100 | 50 | 30 |
| SATURDAY | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 50 | 50 | 100 | 100 | 100 | 100 | 50 | 30 |
| HOLIDAY | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 50 | 50 | 100 | 100 | 100 | 100 | 50 | 30 |

RESIDENCE OCCUPANCY

HOURLY PROFILE PERCENTAGES

| LOCAL TIME / HOUR NUMBER | 0-1 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 6-7 | 7-8 | 8-9 | 9-10 | 10-11 | 11-12 | 12-13 | 13-14 | 14-15 | 15-16 | 16-17 | 17-18 | 18-19 | 19-20 | 20-21 | 21-22 | 22-23 | 23-24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SUNDAY | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 70 | 70 | 70 | 30 | 30 | 30 | 70 | 100 |
| MONDAY | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 50 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 40 | 70 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| TUESDAY | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 50 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 40 | 70 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| WEDNESDAY | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 50 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 40 | 70 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| THURSDAY | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 50 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 40 | 70 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| FRIDAY | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 50 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 40 | 70 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| SATURDAY | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 70 | 70 | 70 | 30 | 30 | 30 | 70 | 100 |
| HOLIDAY | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 70 | 70 | 70 | 30 | 30 | 30 | 70 | 100 |

STORE LIGHTING

HOURLY PROFILE PERCENTAGES

| LOCAL TIME / HOUR NUMBER | 0-1 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 6-7 | 7-8 | 8-9 | 9-10 | 10-11 | 11-12 | 12-13 | 13-14 | 14-15 | 15-16 | 16-17 | 17-18 | 18-19 | 19-20 | 20-21 | 21-22 | 22-23 | 23-24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SUNDAY | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 50 | 100 | 100 | 100 | 100 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 |
| MONDAY | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 50 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 20 | 20 | 20 | 20 | 20 | 20 |
| TUESDAY | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 50 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 20 | 20 | 20 | 20 | 20 | 20 |
| WEDNESDAY | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 50 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 20 | 20 | 20 | 20 | 20 | 20 |
| THURSDAY | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 50 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 20 | 20 | 20 | 20 | 20 | 20 |
| FRIDAY | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 50 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 20 | 20 | 20 | 20 | 20 | 20 |
| SATURDAY | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 50 | 100 | 100 | 100 | 100 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 |
| HOLIDAY | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 50 | 100 | 100 | 100 | 100 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 |

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GENERAL SCHEDULE LIBRARY

HOURLY PROFILES ARE DISPLAYED AS PERCENTAGES (0 - 100),
BUT ARE INPUT AS FRACTIONS (0.0 - 1.0).

STORE OCCUPANCY

HOURLY PROFILE PERCENTAGES

| LOCAL TIME / HOUR NUMBER | 0-1 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 6-7 | 7-8 | 8-9 | 9-10 | 10-11 | 11-12 | 12-13 | 13-14 | 14-15 | 15-16 | 16-17 | 17-18 | 18-19 | 19-20 | 20-21 | 21-22 | 22-23 | 23-24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SUNDAY | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 80 | 90 | 100 | 100 | 20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| MONDAY | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 100 | 100 | 20 | 0 | 0 | 0 | 0 | 0 | 0 |
| TUESDAY | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 100 | 100 | 20 | 0 | 0 | 0 | 0 | 0 | 0 |
| WEDNESDAY | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 100 | 100 | 20 | 0 | 0 | 0 | 0 | 0 | 0 |
| THURSDAY | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 100 | 100 | 20 | 0 | 0 | 0 | 0 | 0 | 0 |
| FRIDAY | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 100 | 100 | 20 | 0 | 0 | 0 | 0 | 0 | 0 |
| SATURDAY | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 80 | 90 | 100 | 100 | 20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| HOLIDAY | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 80 | 90 | 100 | 100 | 20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

CERL -- B.L.A.S.T. SYSTEM --- VERSION 2.0 20 MAR 79 12.47.06

CONTROL SCHEDULE LIBRARY

TEMPERATURES IN DEGREES F.

DEAD BAND

PROFILE 1 1.0 AT 68.00 0. AT 69.00 -0. AT 78.00 -1.0 AT 78.00

HOURLY PROFILE INDICATORS

| LOCAL TIME / HOUR NUMBER | 0-1 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 6-7 | 7-8 | 8-9 | 9-10 | 10-11 | 11-12 | 12-13 | 13-14 | 14-15 | 15-16 | 16-17 | 17-18 | 18-19 | 19-20 | 20-21 | 21-22 | 22-23 | 23-24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SUNDAY | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| MONDAY | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| TUESDAY | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| WEDNESDAY | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| THURSDAY | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| FRIDAY | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| SATURDAY | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| HOLIDAY | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

HEATING ON FROM 1 JAN THROUGH 31 DEC.
COOLING ON FROM 1 JAN THROUGH 31 DEC.

NIGHT AND WEEKEND SETBACK WITH DUAL THROTTLING RANGES

PROFILE 1 1.0 AT 67.00 0. AT 69.00 -0. AT 77.00 -1.0 AT 79.00
PROFILE 2 1.0 AT 60.00 0. AT 62.00

HOURLY PROFILE INDICATORS

| LOCAL TIME / HOUR NUMBER | 0-1 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 6-7 | 7-8 | 8-9 | 9-10 | 10-11 | 11-12 | 12-13 | 13-14 | 14-15 | 15-16 | 16-17 | 17-18 | 18-19 | 19-20 | 20-21 | 21-22 | 22-23 | 23-24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SUNDAY | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| MONDAY | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| TUESDAY | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| WEDNESDAY | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| THURSDAY | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| FRIDAY | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| SATURDAY | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| HOLIDAY | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |

HEATING ON FROM 1 JAN THROUGH 31 DEC.
COOLING ON FROM 1 JAN THROUGH 31 DEC.

CONTROL SCHEDULE LIBRARY

TEMPERATURES IN DEGREES F.

NIGHT AND WEEKEND SETBACK WITH SINGLE THROTTLING RANGE

PROFILE 1 1.0 AT 73.00 0. AT 75.00 -0. AT 75.00 -1.0 AT 77.00
PROFILE 2 1.0 AT 60.00 0. AT 62.00

HOURLY PROFILE INDICATORS

| LOCAL TIME / HOUR NUMBER | 0-1 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 6-7 | 7-8 | 8-9 | 9-10 | 10-11 | 11-12 | 12-13 | 13-14 | 14-15 | 15-16 | 16-17 | 17-18 | 18-19 | 19-20 | 20-21 | 21-22 | 22-23 | 23-24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SUNDAY | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| MONDAY | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| TUESDAY | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| WEDNESDAY | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| THURSDAY | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| FRIDAY | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| SATURDAY | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| HOLIDAY | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |

HEATING ON FROM 1 JAN THROUGH 31 DEC.
COOLING ON FROM 1 JAN THROUGH 31 DEC.

SINGLE THROTTLING RANGE

PROFILE 1 1.0 AT 73.00 0 AT 75.00 -0. AT 75.00 -1.0 AT 77.00

HOURLY PROFILE INDICATORS

| LOCAL TIME / HOUR NUMBER | 0-1 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 6-7 | 7-8 | 8-9 | 9-10 | 10-11 | 11-12 | 12-13 | 13-14 | 14-15 | 15-16 | 16-17 | 17-18 | 18-19 | 19-20 | 20-21 | 21-22 | 22-23 | 23-24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SUNDAY | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| MONDAY | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| TUESDAY | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| WEDNESDAY | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| THURSDAY | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| FRIDAY | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| SATURDAY | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| HOLIDAY | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

HEATING ON FROM 1 JAN THROUGH 31 DEC.
COOLING ON FROM 1 JAN THROUGH 31 DEC.

CERL -- B.L.A.S.T. SYSTEM --- VERSION 2.0 20 MAR 79 12.47.06

MATERIALS LIBRARY

ENGLISH UNITS

L=THICKNESS (FEET), K=CONDUCTIVITY (BTU'S PER HOUR-FOOT-DEGREE F), D=DENSITY (POUNDS MASS PER CUBIC FOOT)
CP=SPECIFIC HEAT (BTU'S PER POUND MASS-DEGREE F), TABS=THERMAL ABSORTIVITY, ABS=SOLAR ABSORPTIVITY
R=OVERALL RESISTANCE (HOURS-FEET SQUARED-DEGREE F PER BTU), G/A/S=GLASS,AIR OR SHADE INDICATOR
IR=INDEX OF REFRACTION, TRANS=TRANSMITTANCE, REF=REFLECTIVITY
FILMTRANS=TRANSMISSIVITY OF GLASS WITH REFLECTIVE FILM

AIRSPACE - CEILING
AIR R = 1.000

AIRSPACE - HORIZONTAL DOWN
AIR R = 1.230

AIRSPACE - HORIZONTAL UP
AIR R = .900

AIRSPACE - SLOPE DOWN
AIR R = 1.050

AIRSPACE - SLOPE UP
AIR R = .920

AIRSPACE - VERTICAL
AIR R = .970

A1 - 1 IN STUCCO
SMOOTH TABS= .90 ABS= .92
L= .0833 K= .4000 D= 116.0 CP= .200

A2 - 4 IN DENSE FACE BRICK
ROUGH TABS= .90 ABS= .93
L= .3330 K= .7200 D= 130.0 CP= .220

A3 - STEEL SIDING
SMOOTH TABS= .90 ABS= .20
L= .0050 K= 26.0000 D= 480.0 CP= .100

A6 - FINISH
VERY SMOOTH TABS= .90 ABS= .50
L= .0417 K= .2400 D= 78.0 CP= .260

MATERIALS LIBRARY — ENGLISH UNITS

L=THICKNESS (FEET), K=CONDUCTIVITY (BTU'S PER HOUR-FOOT-DEGREE F), D=DENSITY (POUNDS MASS PER CUBIC FOOT)
CP=SPECIFIC HEAT (BTU'S PER POUND MASS-DEGREE F), TABS=THERMAL ABSORTIVITY, ABS=SOLAR ABSORPTIVITY
R=OVERALL RESISTANCE (HOURS-FEET SQUARED-DEGREE F PER BTU), G/A/S=GLASS,AIR OR SHADE INDICATOR
IR=INDEX OF REFRACTION, TRANS=TRANSMITTANCE, REF=REFLECTIVITY
FILMTRANS=TRANSMISSIVITY OF GLASS WITH REFLECTIVE FILM

A7 - 4 IN FACE BRICK
ROUGH TABS= .90 ABS= .93
L= .3330 K= .7700 D= 125.0 CP= .220

BRICK - COMMON 4 IN
ROUGH TABS= .90 ABS= .70
L= .3330 K= .4200 D= 120.0 CP= .200

BRICK - COMMON 8 IN
ROUGH TABS= .90 ABS= .70
L= .6670 K= .4200 D= 120.0 CP= .200

BRICK - FACE 4 IN
ROUGH TABS= .90 ABS= .60
L= .3330 K= .7700 D= 125.0 CP= .220

BUILDING BOARD - ACOUSTIC TILE 1 / 2 IN
MEDIUM SMOOTH TABS= .90 ABS= .70
L= .0417 K= .0334 D= 18.0 CP= .320

BUILDING BOARD - ACOUSTIC TILE 3 / 4 IN
MEDIUM SMOOTH TABS= .90 ABS= .70
L= .0625 K= .0334 D= 18.0 CP= .320

BUILDING BOARD - ASBESTOS CEMENT 1 / 4 IN
MEDIUM ROUGH TABS= .90 ABS= .75
L= .0209 K= .3330 D= 120.0 CP= .200

BUILDING BOARD - ASBESTOS CEMENT 1 / 8 IN
MEDIUM ROUGH TABS= .90 ABS= .75
L= .0104 K= .3330 D= 120.0 CP= .200

BUILDING BOARD - GYPSUM PLASTER 1 / 2 IN
MEDIUM SMOOTH TABS= .90 ABS= .75
L= .0417 K= .0938 D= 80.0 CP= .200

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MATERIALS LIBRARY — ENGLISH UNITS

L=THICKNESS (FEET), K=CONDUCTIVITY (BTU'S PER HOUR-FOOT-DEGREE F), D=DENSITY (POUNDS MASS PER CUBIC FOOT)
CP=SPECIFIC HEAT (BTU'S PER POUND MASS-DEGREE F), TABS=THERMAL ABSORTIVITY, ABS=SOLAR ABSORPTIVITY
R=OVERALL RESISTANCE (HOURS-FEET SQUARED-DEGREE F PER BTU), G/A/S=GLASS,AIR OR SHADE INDICATOR
IR=INDEX OF REFRACTION, TRANS=TRANSMITTANCE, REF=REFLECTIVITY
FILMTRANS=TRANSMISSIVITY OF GLASS WITH REFLECTIVE FILM

BUILDING BOARD - GYPSUM PLASTER 3 / 8 IN
MEDIUM SMOOTH TABS= .90 ABS= .75
L= .0313 K= .0938 D= 80.0 CP= .200

BUILDING BOARD - HARDBOARD HI DENS TEMPERED 1 / 4 IN
SMOOTH TABS= .90 ABS= .70
L= .0209 K= .0833 D= 63.0 CP= .330

BUILDING BOARD - HARDBOARD HI DENS TEMPERED 1 / 8 IN
SMOOTH TABS= .90 ABS= .70
L= .0104 K= .0833 D= 63.0 CP= .330

BUILDING BOARD - HARDBOARD HI DENS 1 / 4 IN
SMOOTH TABS= .90 ABS= .70
L= .0209 K= .0340 D= 55.0 CP= .330

BUILDING BOARD - HARDBOARD HI DENS 1 / 8 IN
SMOOTH TABS= .90 ABS= .70
L= .0104 K= .0340 D= 55.0 CP= .330

BUILDING BOARD - HARDBOARD MED DENS SIDING 7 / 16 IN
SMOOTH TABS= .90 ABS= .70
L= .0365 K= .0820 D= 40.0 CP= .280

BUILDING BOARD - HARDBOARD MED DENS 1 / 8 IN
SMOOTH TABS= .90 ABS= .70
L= .0104 K= .0810 D= 50.0 CP= .310

BUILDING BOARD - HOMOGENEOUS PAPERBOARD 1 / 4 IN
SMOOTH TABS= .90 ABS= .70
L= .0209 K= .0417 D= 30.0 CP= .280

BUILDING BOARD - HOMOGENEOUS PAPERBOARD 1 / 8 IN
SMOOTH TABS= .90 ABS= .70
L= .0104 K= .0417 D= 30.0 CP= .280

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BUILDING BOARD - LAMINATED PAPERBOARD 1 / 4 IN
SMOOTH TABS= .90 ABS= .70
L= .0209 K= .0417 D= 30.0 CP= .280

BUILDING BOARD - LAMINATED PAPERBOARD 1 / 8 IN
SMOOTH TABS= .90 ABS= .70
L= .0104 K= .0417 D= 30.0 CP= .280

BUILDING BOARD - PARTICLE HI DENS 1 / 2 IN
MEDIUM SMOOTH TABS= .90 ABS= .70
L= .0417 K= .0980 D= 62.0 CP= .310

BUILDING BOARD - PARTICLE HI DENS 1 / 4 IN
MEDIUM SMOOTH TABS= .90 ABS= .70
L= .0209 K= .0980 D= 62.0 CP= .310

BUILDING BOARD - PARTICLE HI DENS 1 / 8 IN
MEDIUM SMOOTH TABS= .90 ABS= .70
L= .0104 K= .0980 D= 62.0 CP= .310

BUILDING BOARD - PARTICLE LO DENS 1 / 2 IN
MEDIUM SMOOTH TABS= .90 ABS= .70
L= .0417 K= .0450 D= 37.0 CP= .310

BUILDING BOARD - PARTICLE LO DENS 1 / 4 IN
MEDIUM SMOOTH TABS= .90 ABS= .70
L= .0209 K= .0450 D= 37.0 CP= .310

BUILDING BOARD - PARTICLE LO DENS 1 / 8 IN
MEDIUM SMOOTH TABS= .90 ABS= .70
L= .0104 K= .0450 D= 37.0 CP= .310

BUILDING BOARD - PARTICLE MED DENS 1 / 2 IN
MEDIUM SMOOTH TABS= .90 ABS= .70
L= .0417 K= .0780 D= 50.0 CP= .310

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BUILDING BOARD - PARTICLE MED DENS 1 / 4 IN
MEDIUM SMOOTH TABS= .90 ABS= .70
L= .0209 K= .0780 D= 50.0 CP= .310

BUILDING BOARD - PARTICLE MED DENS 1 / 8 IN
MEDIUM SMOOTH TABS= .90 ABS= .70
L= .0104 K= .0780 D= 50.0 CP= .310

BUILDING BOARD - PARTICLE UNDERLAY 5 / 8 IN
MEDIUM ROUGH TABS= .90 ABS= .70
L= .0521 K= .0540 D= 40.0 CP= .290

BUILDING BOARD - PLYWOOD 1 / 2 IN
MEDIUM SMOOTH TABS= .90 ABS= .78
L= .0417 K= .0670 D= 34.0 CP= .290

BUILDING BOARD - PLYWOOD 1 / 4 IN
MEDIUM SMOOTH TABS= .90 ABS= .78
L= .0209 K= .0670 D= 34.0 CP= .290

BUILDING BOARD - PLYWOOD 3 / 4 IN
MEDIUM SMOOTH TABS= .90 ABS= .78
L= .0625 K= .0670 D= 34.0 CP= .290

BUILDING BOARD - PLYWOOD 3 / 8 IN
MEDIUM SMOOTH TABS= .90 ABS= .78
L= .0313 K= .0670 D= 34.0 CP= .290

BUILDING BOARD - SHEATHING INT DENS. 1 / 2 IN
MEDIUM ROUGH TABS= .90 ABS= .70
L= .0417 K= .0340 D= 22.0 CP= .310

BUILDING BOARD - SHEATHING NAIL BASE 1 / 2 IN
MEDIUM ROUGH TABS= .90 ABS= .70
L= .0417 K= .0367 D= 25.0 CP= .310

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*****************************************************************************************************************************************

BUILDING BOARD - SHEATHING REG. DENS. 1 / 2 IN
                 MEDIUM ROUGH          TABS=   .90 ABS=   .70
                 L=    .0417 K=   .0320 D=   18.0 CP=   .310

BUILDING BOARD - SHEATHING REG. DENS. 25 / 32 IN
                 MEDIUM ROUGH          TABS=   .90 ABS=   .70
                 L=    .0651 K=   .0320 D=   18.0 CP=   .310

BUILDING BOARD - SHINGLE BACKER 3 / 8 IN
                 MEDIUM SMOOTH         TABS=   .90 ABS=   .70
                 L=    .0313 K=   .0334 D=   18.0 CP=   .310

BUILDING BOARD - SHINGLE BACKER 5 / 16 IN
                 MEDIUM SMOOTH         TABS=   .90 ABS=   .70
                 L=    .0261 K=   .0334 D=   18.0 CP=   .310

BUILDING BOARD - SOUND DEAD 1 , 2 IN
                 MEDIUM ROUGH          TABS=   .90 ABS=   .75
                 L=    .0417 K=   .0301 D=   15.0 CP=   .300

BUILDING BOARD - WOOD SUBFLOOR 3 / 4 IN
                 MEDIUM ROUGH          TABS=   .90 ABS=   .78
                 L=    .0625 K=   .0670 D=   34.0 CP=   .340

BUILDING MEMBRANE - MOPPED FELT
                 ROUGH                 TABS=   .90 ABS=   .75
                 R =   .120

BUILDING MEMBRANE - PERMIABLE FELT
                 ROUGH                 TABS=   .90 ABS=   .75
                 R =   .060

BUILDING MEMBRANE - PLASTIC FILM
                 ROUGH                 TABS=   .90 ABS=   .75
                 R =   .000
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*****************************************************************************************************************************************

B1 - AIRSPACE RESISTANCE
        AIR      R =   .910

B10 - 2 IN WOOD
                 MEDIUM SMOOTH         TABS=   .90 ABS=   .78
                 L=    .1670 K=   .0700 D=   37.0 CP=   .600

B11 - 3 IN WOOD
                 MEDIUM SMOOTH         TABS=   .90 ABS=   .78
                 L=    .2500 K=   .0700 D=   37.0 CP=   .600

B12 - 3 IN DENSE INSULATION
                 VERY ROUGH            TABS=   .90 ABS=   .50
                 L=    .2500 K=   .0250 D=    5.7 CP=   .200

B2 - 1 IN INSULATION
                 VERY ROUGH            TABS=   .90 ABS=   .50
                 L=    .0830 K=   .0250 D=    2.0 CP=   .200

B3 - 2 IN INSULATION
                 VERY ROUGH            TABS=   .90 ABS=   .50
                 L=    .1670 K=   .0250 D=    2.0 CP=   .200

B4 - 3 IN INSULATION
                 VERY ROUGH            TABS=   .90 ABS=   .50
                 L=    .2500 K=   .0250 D=    2.0 CP=   .200

B5 - 1 IN DENSE INSULATION
                 VERY ROUGH            TABS=   .90 ABS=   .50
                 L=    .0833 K=   .0250 D=    5.7 CP=   .200

B6 - 2 IN DENSE INSULATION
                 VERY ROUGH            TABS=   .90 ABS=   .50
                 L=    .1670 K=   .0250 D=    5.7 CP=   .200
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*****************************************************************************************************************************

B7 - 1 IN WOOD
                    MEDIUM SMOOTH          TABS=   .90 ABS=   .78
                    L=    .0833 K=    0700 D=   37.0 CP=   .600

B8 - 2 1 / 2 IN WOOD
                    MEDIUM SMOOTH          TABS=   .90 ABS=   .78
                    L=    .2083 K=   .0700 D=   37.0 CP=   .600

B9 - 4 IN WOOD
                    MEDIUM SMOOTH          TABS=   .90 ABS=   .78
                    L=    .3330 K=   .0700 D=   37.0 CP=   .600

CLAY TILE 1 CELL - 3 IN
                    SMOOTH                 TABS=   .90 ABS=   .63
                    L=    .2500 K=   .3100 D=   70.0 CP=   .200

CLAY TILE 1 CELL - 4 IN
                    SMOOTH                 TABS=   .90 ABS=   .63
                    L=    .3330 K=   .3000 D=   70.0 CP=   .200

CLAY TILE 2 CELL - 10 IN
                    SMOOTH                 TABS=   .90 ABS=   .63
                    L=    .8330 K=   .3700 D=   70.0 CP=   .200

CLAY TILE 2 CELL - 6 IN
                    SMOOTH                 TABS=   .90 ABS=   .63
                    L=    .5000 K=   .3300 D=   70.0 CP=   .200

CLAY TILE 2 CELL - 8 IN
                    SMOOTH                 TABS=   .90 ABS=   .63
                    L=    .6670 K=   .3500 D=   70.0 CP=   .200

CLAY TILE 3 CELL - 12 IN
                    SMOOTH                 TABS=   .90 ABS=   .63
                    L=   1.0000 K=   .4000 D=   70.0 CP=   .200
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*****************************************************************************************************************************

CONCRETE BLOCK - GYPSUM PART. TILE SOLID 3 IN
                    MEDIUM SMOOTH          TABS=   .90 ABS=   .75
                    L=    .2500 K=   .1970 D=  100.0 CP=   .200

CONCRETE BLOCK - GYPSUM PART. TILE 3 CELL 4 IN
                    MEDIUM SMOOTH          TABS=   .90 ABS=   .75
                    L=    .3330 K=   .2000 D=   30.0 CP=   .200

CONCRETE BLOCK - GYPSUM PART. TILE 4 CELL 3 IN
                    MEDIUM SMOOTH          TABS=   .90 ABS=   .75
                    L=    .2500 K=   .1850 D=   30.0 CP=   .200

CONCRETE BLOCK - STONE LIME SAND 4 IN
                    MEDIUM ROUGH           TABS=   .90 ABS=   .80
                    L=    .3330 K=  1.0400 D=   55.0 CP=   .400

CONCRETE BLOCK - 2 CR LWA FC 8 IN
                    MEDIUM ROUGH           TABS=   .90 ABS=   .70
                    L=    .6670 K=   .1320 D=   61.0 CP=   .200

CONCRETE BLOCK - 2 CR LWA 8 IN
                    MEDIUM ROUGH           TABS=   .90 ABS=   .70
                    L=    .6670 K=   .3040 D=   61.0 CP=   .200

CONCRETE BLOCK - 2 CR SGA FC 8 IN
                    MEDIUM ROUGH           TABS=   .90 ABS=   .70
                    L=    .6670 K=   .3430 D=   61.0 CP=   .200

CONCRETE BLOCK - 2 CR SGA 8 IN
                    MEDIUM ROUGH           TABS=   .90 ABS=   .70
                    L=    .6670 K=   .6340 D=   61.0 CP=   .200

CONCRETE BLOCK - 3 CC CA 12 IN
                    MEDIUM ROUGH           TABS=   .90 ABS=   .70
                    L=   1.0000 K=   .5300 D=   36.0 CP=   .200
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***********************************************************************************************************************************

CONCRETE BLOCK - 3 CO CA 3 IN
                   MEDIUM ROUGH          TABS=  .90 ABS=  .70
                   L=   .2500 K=   .2900 D=  38.0 CP=  .200

CONCRETE BLOCK - 3 CO CA 4 IN
                   MEDIUM ROUGH          TABS=  .90 ABS=  .70
                   L=   .3330 K=   .3000 D=  38.0 CP=  .200

CONCRETE BLOCK - 3 CO CA 8 IN
                   MEDIUM ROUGH          TABS=  .90 ABS=  .70
                   L=   .6670 K=   .3900 D=  38.0 CP=  .200

CONCRETE BLOCK - 3 CO LW AGG 12 IN
                   MEDIUM ROUGH          TABS=  .90 ABS=  .70
                   L=  1.0000 K=   .4400 D=  38.0 CP=  .200

CONCRETE BLOCK - 3 CO LW AGG 3 IN
                   MEDIUM ROUGH          TABS=  .90 ABS=  .70
                   L=   .2500 K=   .1980 D=  38.0 CP=  .200

CONCRETE BLOCK - 3 CO LW AGG 4 IN
                   MEDIUM ROUGH          TABS=  .90 ABS=  .70
                   L=   .3330 K=   .2230 D=  38.0 CP=  .200

CONCRETE BLOCK - 3 CO LW AGG 8 IN
                   MEDIUM ROUGH          TABS=  .90 ABS=  .70
                   L=   .6670 K=   .3300 D=  38.0 CP=  .200

CONCRETE BLOCK - 3 CO SGA 12 IN
                   MEDIUM ROUGH          TABS=  .90 ABS=  .70
                   L=  1.0000 K=   .7800 D=  61.0 CP=  .200

CONCRETE BLOCK - 3 CO SGA 4 IN
                   MEDIUM ROUGH          TABS=  .90 ABS=  .70
                   L=   .3330 K=   .4600 D=  61.0 CP=  .200
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CONCRETE BLOCK - 3 CO SGA 8 IN
                   MEDIUM ROUGH          TABS=  .90 ABS=  .70
                   L=   .6670 K=   .8900 D=  61.0 CP=  .200

CONCRETE BLOCK - 3 CR LWA FC 12 IN
                   MEDIUM ROUGH          TABS=  .90 ABS=  .70
                   L=  1.0000 K=   .1700 D=  61.0 CP=  .200

CONCRETE BLOCK - 3 CR LWA FC 6 IN
                   MEDIUM ROUGH          TABS=  .90 ABS=  .70
                   L=   .5000 K=   .1650 D=  61.0 CP=  .200

CONCRETE BLOCK - 3 CR LWA 12 IN
                   MEDIUM ROUGH          TABS=  .90 ABS=  .70
                   L=  1.0000 K=   .4000 D=  61.0 CP=  .200

CONCRETE BLOCK - 3 CR LWA 6 IN
                   MEDIUM ROUGH          TABS=  .90 ABS=  .70
                   L=   .5000 K=   .3050 D=  61.0 CP=  .200

CONCRETE - CEMENT MORTAR 1 / 2 IN
                   MEDIUM ROUGH          TABS=  .90 ABS=  .94
                   L=   .0417 K=   .4160 D= 116.0 CP=  .200

CONCRETE - DRIED SAND AND GRAVEL 2 IN
                   MEDIUM ROUGH          TABS=  .90 ABS=  .60
                   L=   .1670 K=   .7500 D= 140.0 CP=  .200

CONCRETE - DRIED SAND AND GRAVEL 4 IN
                   MEDIUM ROUGH          TABS=  .90 ABS=  .60
                   L=   .3330 K=   .7500 D= 140.0 CP=  .200

CONCRETE - DRIED SAND AND GRAVEL 6 IN
                   MEDIUM ROUGH          TABS=  .90 ABS=  .60
                   L=   .5000 K=   .7500 D= 140.0 CP=  .200
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CONCRETE - DRIED SAND AND GRAVEL 8 IN
MEDIUM ROUGH TABS= .90 ABS= .60
L= .6670 K= .7500 D= 140.0 CP= .200

CONCRETE - GYPSUM FIBER 2 IN
MEDIUM ROUGH TABS= .90 ABS= .65
L= .1670 K= .1380 D= 81.0 CP= .200

CONCRETE - GYPSUM FIBER 4 IN
MEDIUM ROUGH TABS= .90 ABS= .65
L= .3330 K= .1380 D= 81.0 CP= .200

CONCRETE - GYPSUM FIBER 6 IN
MEDIUM ROUGH TABS= .90 ABS= .65
L= .5000 K= .1380 D= 81.0 CP= .200

CONCRETE - GYPSUM FIBER 8 IN
MEDIUM ROUGH TABS= .90 ABS= .65
L= .6670 K= .1380 D= 81.0 CP= .200

CONCRETE - PERLITE 20 LB / CU FT 4 IN
MEDIUM ROUGH TABS= .90 ABS= .65
L= .3330 K= .0417 D= 20.0 CP= .200

CONCRETE - PERLITE 30 LB / CU FT 4 IN
MEDIUM ROUGH TABS= .90 ABS= .65
L= .3330 K= .0592 D= 30.0 CP= .200

CONCRETE - PERLITE 40 LB / CU FT 4 IN
MEDIUM ROUGH TABS= .90 ABS= .65
L= .3330 K= .0775 D= 40.0 CP= .200

CONCRETE - SAND AND GRAVEL 2 IN
MEDIUM ROUGH TABS= .90 ABS= .60
L= .1670 K= 1.0000 D= 140.0 CP= .200

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CONCRETE - SAND AND GRAVEL 4 IN
MEDIUM ROUGH TABS= .90 ABS= .60
L= .3330 K= 1.0000 D= 140.0 CP= .200

CONCRETE - SAND AND GRAVEL 6 IN
MEDIUM ROUGH TABS= .90 ABS= .60
L= .5000 K= 1.0000 D= 140.0 CP= .200

CONCRETE - SAND AND GRAVEL 8 IN
MEDIUM ROUGH TABS= .90 ABS= .60
L= .6670 K= 1.0000 D= 140.0 CP= .200

CONCRETE - STUCCO 1 / 2 IN
VERY ROUGH TABS= .90 ABS= .73
L= .0417 K= .4160 D= 116.0 CP= .200

CONCRETE - STUCCO 1 / 4 IN
VERY ROUGH TABS= .90 ABS= .73
L= .0209 K= .4160 D= 116.0 CP= .200

CONCRETE - 100 LB / CU FT 4 IN
MEDIUM ROUGH TABS= .90 ABS= .65
L= .3330 K= .3000 D= 100.0 CP= .200

CONCRETE - 120 LB / CU FT 4 IN
MEDIUM ROUGH TABS= .90 ABS= .65
L= .3330 K= .4330 D= 120.0 CP= .200

CONCRETE - 20 LB / CU FT 4 IN
MEDIUM ROUGH TABS= .90 ABS= .65
L= .3330 K= .0580 D= 20.0 CP= .200

CONCRETE - 30 LB / CU FT 4 IN
MEDIUM ROUGH TABS= .90 ABS= .65
L= .3330 K= .0750 D= 30.0 CP= .200

| MATERIALS LIBRARY | ENGLISH UNITS |
|---|---|
| | L=THICKNESS (FEET), K=CONDUCTIVITY (BTU'S PER HOUR-FOOT-DEGREE F), D=DENSITY (POUNDS MASS PER CUBIC FOOT) |
| | CP=SPECIFIC HEAT (BTU'S PER POUND MASS-DEGREE F), TABS=THERMAL ABSORTIVITY, ABS=SOLAR ABSORPTIVITY |
| | R=OVERALL RESISTANCE (HOURS-FEET SQUARED-DEGREE F PER BTU), G/A/S=GLASS,AIR OR SHADE INDICATOR |
| | IR=INDEX OF REFRACTION, TRANS=TRANSMITTANCE, REF=REFLECTIVITY |
| | FILMTRANS=TRANSMISSIVITY OF GLASS WITH REFLECTIVE FILM |

CONCRETE - 40 LB / CU FT 4 IN
MEDIUM ROUGH TABS= .90 ABS= .65
L= .3330 K= .0960 D= 40.0 CP= .200

CONCRETE - 80 LB / CU FT 4 IN
MEDIUM ROUGH TABS= .90 ABS= .65
L= .3330 K= .1420 D= 80.0 CP= .200

CONCRETE - 80 LB / CU FT 4 IN
MEDIUM ROUGH TABS= .90 ABS= .65
L= .3330 K= .2100 D= 80.0 CP= .200

C1 - 4 IN CLAY TILE
SMOOTH TABS= .90 ABS= .82
L= .3330 K= .3300 D= 70.0 CP= .200

C10 - 8 IN HW CONCRETE
MEDIUM ROUGH TABS= .90 ABS= .65
L= .6670 K= 1.0000 D= 140.0 CP= .200

C11 - 12 IN HW CONCRETE
MEDIUM ROUGH TABS= .90 ABS= .65
L= 1.0000 K= 1.0000 D= 140.0 CP= .200

C12 - 2 IN HW CONCRETE
MEDIUM ROUGH TABS= .90 ABS= .65
L= .1670 K= 1.0000 D= 140.0 CP= .200

C13 - 6 IN HW CONCRETE
MEDIUM ROUGH TABS= .90 ABS= .65
L= .5000 K= 1.0000 D= 140.0 CP= .200

C14 - 4 IN LW CONCRETE
MEDIUM ROUGH TABS= .90 ABS= .65
L= .3330 K= .1000 D= 40.0 CP= .200

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C15 - 6 IN LW CONCRETE
MEDIUM ROUGH TABS= .90 ABS= .65
L= .5000 K= .1000 D= 40.0 CP= .200

C16 - 8 IN LW CONCRETE
MEDIUM ROUGH TABS= .90 ABS= .65
L= .6670 K= .1000 D= 40.0 CP= .200

C2 - 4 IN LW CONCRETE BLOCK
MEDIUM ROUGH TABS= .90 ABS= .65
L= .3330 K= .2200 D= 38.0 CP= .200

C3 - 4 IN HW CONCRETE BLOCK
MEDIUM ROUGH TABS= .90 ABS= .65
L= .3330 K= .4700 D= 61.0 CP= .200

C4 - 4 IN COMMON BRICK
ROUGH TABS= .90 ABS= .76
L= .3330 K= .4200 D= 120.0 CP= .200

C5 - 4 IN HW CONCRETE
MEDIUM ROUGH TABS= .90 ABS= .65
L= .3330 K= 1.0000 D= 140.0 CP= .200

C6 - 8 IN CLAY TILE
SMOOTH TABS= .90 ABS= .82
L= .6670 K= .3300 D= 70.0 CP= .200

C. - 8 IN LW CONCRETE BLOCK
ROUGH TABS= .90 ABS= .65
L= .6670 K= .3300 D= 38.0 CP= .200

C8 - 8 IN HW CONCRETE BLOCK
ROUGH TABS= .90 ABS= .65
L= .6670 K= .6000 D= 61.0 CP= .200

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C9 - 8 IN COMMON BRICK
ROUGH TABS= .90 ABS= .72
L= .6870 K= .4200 D= 120.0 CP= .200

DIRT 12 IN
ROUGH TABS= .90 ABS= .70
L= 1.0000 K= .1000 D= 65.0 CP= .200

DRAPES - CLOSE WEAVE DARK
SHADE TRANS= .05 REF= 1.52

DRAPES - CLOSE WEAVE LIGHT
SHADE TRANS= .08 REF= 1.52

DRAPES - CLOSE WEAVE MEDIUM
SHADE TRANS= .08 REF= 1.52

DRAPES - OPEN WEAVE DARK
SHADE TRANS= .70 REF= 1.52

DRAPES - OPEN WEAVE LIGHT
SHADE TRANS= .70 REF= 1.52

DRAPES - OPEN WEAVE MEDIUM
SHADE TRANS= .70 REF= 1.52

DRAPES - SEMI OPEN WEAVE DARK
SHADE TRANS= .48 REF= 1.52

DRAPES - SEMI OPEN WEAVE LIGHT
SHADE TRANS= .48 REF= 1.52

DRAPES - SEMI OPEN WEAVE MEDIUM
SHADE TRANS= .48 REF= 1.52

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E1 - 3 / 4 IN PLASTER OR GYP BOARD
SMOOTH TABS= .90 ABS= .92
L= .0625 K= .4200 D= 100.0 CP= .200

E2 - 1 / 2 IN SLAB OR STONE
ROUGH TABS= .90 ABS= .85
L= .0417 K= .8300 D= 88.0 CP= .400

E3 - 3 / 8 IN FELT AND MEMBRANE
ROUGH TABS= .90 ABS= .75
L= .0313 K= .1100 D= 70.0 CP= .400

E4 - CEILING AIRSPACE
AIR R = 1.000

E5 - ACOUSTIC TILE
MEDIUM SMOOTH TABS= .90 ABS= .32
L= .0625 K= .0350 D= 30.0 CP= .200

FINISH FLOORING - CARPET FIBROUS PAD
ROUGH TABS= .90 ABS= .75
R = 2.080

FINISH FLOORING - CARPET RUBBER PAD
ROUGH TABS= .90 ABS= .75
R = 1.230

FINISH FLOORING - CORK TILE 1 / 8 IN
MEDIUM SMOOTH TABS= .90 ABS= .90
L= .0104 K= .0300 D= 23.0 CP= .300

FINISH FLOORING - TERRAZZO 1 IN
SMOOTH TABS= .90 ABS= .55
L= .0830 K= 1.0400 D= 120.0 CP= .200

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FINISH FLOORING - TILE 1 / 16 IN
SMOOTH TABS= .90 ABS= .90
L= .0052 K= .1030 D= 120.0 CP= .300

FINISH FLOORING - WOOD 3 / 4 IN
ROUGH TABS= .90 ABS= .66
R = .690

GLASS - BRONZE PLATE 1 / 2 IN
VERY SMOOTH TABS= .90 TRANS= .29 FILMTRANS= 0. IR= 1.52
GLASS R = .094

GLASS - BRONZE PLATE 1 / 4 IN
VERY SMOOTH TABS= .90 TRANS= .49 FILMTRANS= 0. IR= 1.52
GLASS R = .047

GLASS - CLEAR PLATE 1 / 2 IN
VERY SMOOTH TABS= .90 TRANS= .71 FILMTRANS= 0. IR= 1.52
GLASS R = .094

GLASS - CLEAR PLATE 1 / 4 IN
VERY SMOOTH TABS= .90 TRANS= .90 FILMTRANS= 0. IR= 1.52
GLASS R = .047

GLASS - CLEAR PLATE 3 / 8 IN
VERY SMOOTH TABS= .90 TRANS= .78 FILMTRANS= 0. IR= 1.52
GLASS R = .071

GLASS - CLEAR SHEET 1 / 8 IN
VERY SMOOTH TABS= .90 TRANS= .87 FILMTRANS= 0. IR= 1.52
GLASS R = .024

GLASS - GREEN SHEET 1 / 4 IN
VERY SMOOTH TABS= .90 TRANS= .78 FILMTRANS= 0. IR= 1.52
GLASS R = .047

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GLASS - GREY PLATE 1 / 2 IN
VERY SMOOTH TABS= .90 TRANS= .21 FILMTRANS= 0. IR= 1.52
GLASS R = .094

GLASS - GREY PLATE 1 / 4 IN
VERY SMOOTH TABS= .90 TRANS= .44 FILMTRANS= 0. IR= 1.52
GLASS R = .047

GLASS - GREY PLATE 3 / 8 IN
VERY SMOOTH TABS= .90 TRANS= .36 FILMTRANS= 0. IR= 1.52
GLASS R = .071

GLASS - GREY SHEET 1 / 4 IN
VERY SMOOTH TABS= .90 TRANS= .87 FILMTRANS= 0. IR= 1.52
GLASS R = .047

GLASS - GREY SHEET 1 / 8 IN
VERY SMOOTH TABS= .90 TRANS= .59 FILMTRANS= 0. IR= 1.52
GLASS R = .024

GLASS - HEAT ABSORBING PLATE 1 / 2 IN
VERY SMOOTH TABS= .90 TRANS= .24 FILMTRANS= 0. IR= 1.52
GLASS R = .094

GLASS - HEAT ABSORBING PLATE 1 / 4 IN
VERY SMOOTH TABS= .90 TRANS= .46 FILMTRANS= 0. IR= 1.52
GLASS R = .047

GLASS - HEAT ABSORBING PLATE 1 / 8 IN
VERY SMOOTH TABS= .90 TRANS= .58 FILMTRANS= 0. IR= 1.52
GLASS R = .024

GLASS - HEAT ABSORBING PLATE 3 / 8 IN
VERY SMOOTH TABS= .90 TRANS= .33 FILMTRANS= 0. IR= 1.52
GLASS R = .071

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INSULATION - ACOUSTICAL TILE WET FELTED 1 / 2 IN
ROUGH TABS= .90 ABS= .70
L= .0417 K= .0310 D= 21.0 CP= .320

INSULATION - ACOUSTICAL TILE WET FELTED 3 / 4 IN
ROUGH TABS= .90 ABS= .70
L= .0625 K= .0310 D= 21.0 CP= .320

INSULATION - ACOUSTICAL TILE WET MOLDED 1 / 2 IN
ROUGH TABS= .90 ABS= .70
L= .0417 K= .0350 D= 23.0 CP= .320

INSULATION - ACOUSTICAL TILE WET MOLDED 3 / 4 IN
ROUGH TABS= .90 ABS= .70
L= .0625 K= .0350 D= 23.0 CP= .320

INSULATION - ACOUSTICAL TILE WOOD FIBER 1 / 2 IN
ROUGH TABS= .90 ABS= .70
L= .0417 K= .0334 D= 25.0 CP= .300

INSULATION - ACOUSTICAL TILE WOOD FIBER 3 / 4 IN
ROUGH TABS= .90 ABS= .70
L= .0625 K= .0334 D= 25.0 CP= .300

INSULATION - CELLULAR GLASS 1 IN
VERY ROUGH TABS= .90 ABS= .50
L= .0830 K= .0334 D= 9.0 CP= .240

INSULATION - CELLULAR GLASS 2 IN
VERY ROUGH TABS= .90 ABS= .50
L= .1670 K= .0334 D= 9.0 CP= .240

INSULATION - CELLULAR GLASS 3 IN
VERY ROUGH TABS= .90 ABS= .50
L= .2500 K= .0334 D= 9.0 CP= .240

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INSULATION - CELLULOSE FILL 1 IN
ROUGH TABS= .90 ABS= .75
R = 3.700

INSULATION - CELLULOSE FILL 2 IN
ROUGH TABS= .90 ABS= .75
R = 7.200

INSULATION - CELLULOSE FILL 4 IN
ROUGH TABS= .90 ABS= .75
R = 14.400

INSULATION - CELLULOSE FILL 6 IN
ROUGH TABS= .90 ABS= .75
R = 21.600

INSULATION - EXPANDED EXT POLYSTYRENE R12 1 IN
ROUGH TABS= .90 ABS= .50
L= .0830 K= .0160 D= 3.5 CP= .290

INSULATION - EXPANDED EXT POLYSTYRENE R12 2 IN
ROUGH TABS= .90 ABS= .50
L= .1670 K= .0160 D= 3.5 CP= .290

INSULATION - EXPANDED EXT POLYSTYRENE R12 3 IN
ROUGH TABS= .90 ABS= .50
L= .2500 K= .0160 D= 3.5 CP= .290

INSULATION - EXPANDED EXT POLYSTYRENE 1 IN
ROUGH TABS= .90 ABS= .50
L= .0830 K= .0208 D= 1.8 CP= .290

INSULATION - EXPANDED EXT POLYSTYRENE 2 IN
ROUGH TABS= .90 ABS= .50
L= .1670 K= .0208 D= 1.8 CP= .290

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*****************************************************************  E N G L I S H   U N I T S  *****************************************************************
*                    *   L=THICKNESS (FEET), K=CONDUCTIVITY (BTU'S PER HOUR-FOOT-DEGREE F), D=DENSITY (POUNDS MASS PER CUBIC FOOT)                                 *
* M A T E R I A L S  *     CP=SPECIFIC HEAT (BTU'S PER POUND MASS-DEGREE F), TABS=THERMAL ABSORTIVITY, ABS=SOLAR ABSORPTIVITY                                      *
*   L I B R A R Y    *       R=OVERALL RESISTANCE (HOURS-FEET SQUARED-DEGREE F PER BTU), G/A/S=GLASS,AIR OR SHADE INDICATOR                                        *
*                    *                 IR=INDEX OF REFRACTION, TRANS=TRANSMITTANCE, REF=REFLECTIVITY                                                           *
*                    *                   FILMTRANS=TRANSMISSIVITY OF GLASS WITH REFLECTIVE FILM                                                                *
*****************************************************************************************************************************************************

INSULATION - EXPANDED EXT POLYSTYRENE 3 IN
             ROUGH                          TABS=   .90 ABS=   .50
             L=   .2500 K=   .0208 D=   1.6 CP=   .290

INSULATION - EXPANDED POLYSTYRENE BEADS 1 IN
             VERY ROUGH                     TABS=   .90 ABS=   .50
             L=   .0830 K=   .0230 D=   1.0 CP=   .290

INSULATION - EXPANDED POLYSTYRENE BEADS 2 IN
             VERY ROUGH                     TABS=   .90 ABS=   .50
             L=   .1670 K=   .0230 D=   1.0 CP=   .290

INSULATION - EXPANDED POLYSTYRENE BEADS 3 IN
             VERY ROUGH                     TABS=   .90 ABS=   .50
             L=   .2500 K=   .0230 D=   1.0 CP=   .290

INSULATION - EXPANDED POLYURETHANE R11 1 IN
             VERY ROUGH                     TABS=   .90 ABS=   .50
             L=   .0830 K=   .0130 D=   2.0 CP=   .360

INSULATION - EXPANDED POLYURETHANE R11 2 IN
             VERY ROUGH                     TABS=   .90 ABS=   .50
             L=   .1670 K=   .0130 D=   2.0 CP=   .360

INSULATION - EXPANDED POLYURETHANE R11 3 IN
             VERY ROUGH                     TABS=   .90 ABS=   .50
             L=   .2500 K=   .0130 D=   2.0 CP=   .360

INSULATION - EXPANDED RUBBER 1 IN
             ROUGH                          TABS=   .90 ABS=   .60
             L=   .0830 K=   .0180 D=   4.5 CP=   .200

INSULATION - EXPANDED RUBBER 2 IN
             ROUGH                          TABS=   .90 ABS=   .60
             L=   .1670 K=   .0180 D=   4.5 CP=   .200
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* M A T E R I A L S  *     CP=SPECIFIC HEAT (BTU'S PER POUND MASS-DEGREE F), TABS=THERMAL ABSORTIVITY, ABS=SOLAR ABSORPTIVITY                                      *
*   L I B R A R Y    *       R=OVERALL RESISTANCE (HOURS-FEET SQUARED-DEGREE F PER BTU), G/A/S=GLASS,AIR OR SHADE INDICATOR                                        *
*                    *                 IR=INDEX OF REFRACTION, TRANS=TRANSMITTANCE, REF=REFLECTIVITY                                                           *
*                    *                   FILMTRANS=TRANSMISSIVITY OF GLASS WITH REFLECTIVE FILM                                                                *
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INSULATION - EXPANDED RUBBER 3 IN
             ROUGH                          TABS=   .90 ABS=   .60
             L=   .2500 K=   .0180 D=   4.5 CP=   .200

INSULATION - GLASS FIBER BONDED 1 IN
             VERY ROUGH                     TABS=   .90 ABS=   .50
             L=   .0830 K=   .0208 D=   6.0 CP=   .190

INSULATION - GLASS FIBER BONDED 2 IN
             VERY ROUGH                     TABS=   .90 ABS=   .50
             L=   .1670 K=   .0208 D=   6.0 CP=   .190

INSULATION - GLASS FIBER BONDED 3 IN
             VERY ROUGH                     TABS=   .90 ABS=   .50
             L=   .2500 K=   .0208 D=   6.0 CP=   .190

INSULATION - INSULATING ROOF DECK 1 / 6 IN
             MEDIUM SMOOTH                  TABS=   .90 ABS=   .78
             L=   .1250 K=   .0270 D=  30.0 CP=   .300

INSULATION - INSULATING ROOF DECK 2 IN
             MEDIUM SMOOTH                  TABS=   .90 ABS=   .78
             L=   .1670 K=   .0270 D=  30.0 CP=   .300

INSULATION - INSULATING ROOF DECK 3 IN
             MEDIUM SMOOTH                  TABS=   .90 ABS=   .78
             L=   .2500 K=   0270 D=   30.0 CP=   .300

INSULATION - INTERIOR PLANKING 1 / 2 IN
             MEDIUM SMOOTH                  TABS=   .90 ABS=   .70
             L=   .0417 K=   .0240 D=  18.0 CP=   .320

INSULATION - MINERAL FIBER FIBROUS 2 IN
             ROUGH                          TABS=   .90 ABS=   .75
             R =  7.000
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INSULATION - MINERAL FIBER FIBROUS 3 IN
ROUGH TABS= .90 ABS= .75
R = 11.000

INSULATION - MINERAL FIBER FIBROUS 6 IN
ROUGH TABS= .90 ABS= .75
R = 19.000

INSULATION - MINERAL FIBER FILL 3 IN
ROUGH TABS= .90 ABS= .75
R = 9.000

INSULATION - MINERAL FIBER FILL 4 1 / 2 IN
ROUGH TABS= .90 ABS= .75
R = 13.000

INSULATION - MINERAL FIBER FILL 6 1 / 4 IN
ROUGH TABS= .90 ABS= .75
R = 19.000

INSULATION - MINERAL FIBER FILL 7 1 / 4 IN
ROUGH TABS= .90 ABS= .75
R = 24.000

INSULATION - MINERAL FIBER RESIN BOND 1 IN
VERY ROUGH TABS= .90 ABS= .60
L= .0830 K= .0270 D= 15.0 CP= .170

INSULATION - MINERAL FIBER RESIN BOND 2 IN
VERY ROUGH TABS= .90 ABS= .60
L= .1670 K= .0270 D= 15.0 CP= .170

INSULATION - MINERAL FIBER RESIN BOND 3 IN
VERY ROUGH TABS= .90 ABS= .60
L= .2500 K= .0270 D= 15.0 CP= .170

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INSULATION - MINERAL FIBERBP. WET FELTED 1 IN
ROUGH TABS= .90 ABS= .60
L= .0830 K= .0280 D= 16.0 CP= .320

INSULATION - PERLITE FILL 1 IN
ROUGH TABS= .90 ABS= .75
R = 2.700

INSULATION - PERLITE FILL 2 IN
ROUGH TABS= .90 ABS= .75
R = 5.400

INSULATION - PERLITE FILL 4 IN
ROUGH TABS= .90 ABS= .75
R = 10.800

INSULATION - PERLITE FILL 6 IN
ROUGH TABS= .90 ABS= .75
R = 16.200

INSULATION - PREFORMED ROOF INSULATION 1 IN
ROUGH TABS= .90 ABS= .75
R = 2.780

INSULATION - PREFORMED ROOF INSULATION 1 1 / 2 IN
ROUGH TABS= .90 ABS= .75
R = 4.170

INSULATION - PREFORMED ROOF INSULATION 1 / 2 IN
ROUGH TABS= .90 ABS= .75
R = 1.390

INSULATION - PREFORMED ROOF INSULATION 2 IN
ROUGH TABS= .90 ABS= .75
R = 5.560

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R=OVERALL RESISTANCE (HOURS-FEET SQUARED-DEGREE F PER BTU), G/A/S=GLASS,AIR OR SHADE INDICATOR
IR=INDEX OF REFRACTION, TRANS=TRANSMITTANCE, REF=REFLECTIVITY
FILMTRANS=TRANSMISSIVITY OF GLASS WITH REFLECTIVE FILM

INSULATION - PREFORMED ROOF INSULATION 2 1 / 2 IN
ROUGH TABS= .90 ABS= .75
R = 6.670

INSULATION - PREFORMED ROOF INSULATION 3 IN
ROUGH TABS= .90 ABS= .75
R = 8.330

INSULATION - SAWDUST 1 IN
ROUGH TABS= .90 ABS= .75
R = 2.220

INSULATION - SAWDUST 2 IN
ROUGH TABS= .90 ABS= .75
R = 4.440

INSULATION - SAWDUST 4 IN
ROUGH TABS= .90 ABS= .75
R = 8.880

INSULATION - SAWDUST 6 IN
ROUGH TABS= .90 ABS= .75
R = 13.320

INSULATION - SILICA AEROGEL 1 IN
ROUGH TABS= .90 ABS= .75
R = 5.880

INSULATION - SILICA AEROGEL 2 IN
ROUGH TABS= .90 ABS= .75
R = 11.760

INSULATION - SILICA AEROGEL 4 IN
ROUGH TABS= .90 ABS= .75
R = 23.520

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ENGLISH UNITS

MATERIALS LIBRARY

L=THICKNESS (FEET), K=CONDUCTIVITY (BTU'S PER HOUR-FOOT-DEGREE F), D=DENSITY (POUNDS MASS PER CUBIC FOOT)
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INSULATION - SILICA AEROGEL 6 IN
ROUGH TABS= .90 ABS= .75
R = 35.280

INSULATION - VERMICULITE 1 IN
ROUGH TABS= .90 ABS= .75
R = 2.130

INSULATION - VERMICULITE 2 IN
ROUGH TABS= .90 ABS= .75
R = 4.260

INSULATION - VERMICULITE 4 IN
ROUGH TABS= .90 ABS= .75
R = 8.520

INSULATION - VERMICULITE 6 IN
ROUGH TABS= .90 ABS= .75
R = 12.780

INSULATION - WOOD FIBER FILL 1 IN
ROUGH TABS= .90 ABS= .75
R = 3.330

INSULATION - WOOD FIBER FILL 2 IN
ROUGH TABS= .90 ABS= .75
R = 6.660

INSULATION - WOOD FIBER FILL 4 IN
ROUGH TABS= .90 ABS= .75
R = 13.320

INSULATION - WOOD FIBER FILL 6 IN
ROUGH TABS= .90 ABS= .75
R = 19.980

MATERIALS LIBRARY — ENGLISH UNITS

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CP=SPECIFIC HEAT (BTU'S PER POUND MASS-DEGREE F), TABS=THERMAL ABSORTIVITY, ABS=SOLAR ABSORPTIVITY
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FILMTRANS=TRANSMISSIVITY OF GLASS WITH REFLECTIVE FILM

INSULATION - WOOD SHREDDED BOARD 1 / 2 IN
MEDIUM SMOOTH TABS= .90 ABS= .70
L= .0417 K= .0600 D= 22.0 CP= .300

INSULATION - WOOD SHREDDED BOARD 3 / 4 IN
MEDIUM SMOOTH TABS= .90 ABS= .70
L= .0625 K= .0600 D= 22.0 CP= .300

METAL - AGED COPPER 1 / 16 IN
SMOOTH TABS= .90 ABS= .20
L= .0052 K= 227.000 D= 556.0 CP= .090

METAL - BARE ALUMINUM 1 / 16 IN
SMOOTH TABS= .90 ABS= .20
L= .0052 K= 128.000 D= 171.0 CP= .214

METAL - GALVANIZED STEEL 1 / 16 IN
SMOOTH TABS= .90 ABS= .23
L= .0052 K= 26.2000 D= 489.0 CP= .120

PLASTER - CEMENT SA 3 / 4 IN
SMOOTH TABS= .90 ABS= .70
L= .0625 K= .4170 D= 116.0 CP= .200

PLASTER - CEMENT SA 3 / 8 IN
SMOOTH TABS= .90 ABS= .70
L= .0313 K= .4170 D= 116.0 CP= .200

PLASTER - GYPSUM LWA ML 3 / 4 IN
SMOOTH TABS= .90 ABS= .70
L= .0625 K= .1330 D= 45.0 CP= .200

PLASTER - GYPSUM LWA 1 / 2 IN
SMOOTH TABS= .90 ABS= .70
L= .0417 K= .1300 D= 45.0 CP= .200

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MATERIALS LIBRARY — ENGLISH UNITS

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PLASTER - GYPSUM LWA 5 / 8 IN
SMOOTH TABS= .90 ABS= .70
L= .0521 K= .1300 D= 45.0 CP= .200

PLASTER - GYPSUM PERLITE 1 / 2 IN
SMOOTH TABS= .90 ABS= .70
L= .0417 K= .1250 D= 45.0 CP= .200

PLASTER - GYPSUM SA ML 3 / 4 IN
SMOOTH TABS= .90 ABS= .70
L= .0625 K= .4670 D= 105.0 CP= .200

PLASTER - GYPSUM SA 1 / 2 IN
SMOOTH TABS= .90 ABS= .70
L= .0417 K= .4670 D= 105.0 CP= .200

PLASTER - GYPSUM SA 5 / 8 IN
SMOOTH TABS= .90 ABS= .70
L= .0521 K= .4670 D= 105.0 CP= .200

PLASTER - GYPSUM VA 1 / 2 IN
SMOOTH TABS= .90 ABS= .70
L= .0417 K= .1429 D= 45.0 CP= .200

ROOFING - ASB CEM SHINGLES
VERY ROUGH TABS= .90 ABS= .70
L= .0104 K= .0490 D= 120.0 CP= .200

ROOFING - ASPHALT ROLL
VERY ROUGH TABS= .90 ABS= .80
L= .0104 K= .0670 D= 70.0 CP= .200

ROOFING - ASPHALT SHINGLES
VERY ROUGH TABS= .90 ABS= .70
L= .0104 K= .0830 D= 70.0 CP= .200

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*****************************************************************  E N G L I S H  U N I T S  *****************************************
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*   L I B R A R Y    *       R=OVERALL RESISTANCE (HOURS-FEET SQUARED-DEGREE F PER BTU), G/A/S=GLASS,AIR OR SHADE INDICATOR        *
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*****************************************************************************************************************************

ROOFING - BUILT UP ROOFING - 3 / 8 IN
                  VERY ROUGH                TABS= .90 ABS= .70
                  L= .0313 K= .0940 D= 70.0 CP= .350

ROOFING - SLATE 1 / 2 IN
                  VERY ROUGH                TABS= .90 ABS= .90
                  L= .0417 K= .8330 D= 98.0 CP= .400

ROOFING - WOOD SHINGLES
                  VERY ROUGH                TABS= .90 ABS= .78
                  L= .0625 K= .0900 D= 48.0 CP= .300

SHADE ROLL - LIGHT OPAQUE
                  SHADE                     TRANS= .05 REF= 1.52

SHADE ROLL - LIGHT TRANSLUCENT
                  SHADE                     TRANS= .40 REF= 1.52

SHADE ROLL - MEDIUM OPAQUE
                  SHADE                     TRANS= .05 REF= 1.52

SHADE ROLL - MEDIUM TRANSLUCENT
                  SHADE                     TRANS= .30 REF= 1.52

SIDING - ASB CEM  1 / 4 IN
                  VERY ROUGH                TABS= .90 ABS= .70
                  L= .0209 K= .0990 D= 120.0 CP= .200

SIDING - ASPHALT INS 1 / 2 IN
                  VERY ROUGH                TABS= .90 ABS= .90
                  L= .0417 K= .0290 D= 70.0 CP= .200

SIDING - ASPHALT ROLL
                  VERY ROUGH                TABS= .90 ABS= .90
                  L= .0104 K= .0670 D= 70.0 CP= .200
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*****************************************************************************************************************************

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SIDING - INS BRD FB 3 / 8 IN
                  SMOOTH                    TABS= .90 ABS= .50
                  L= .0313 K= .0110 D= 60.0 CP= .310

SIDING - INS BRD 3 / 8 IN
                  SMOOTH                    TABS= .90 ABS= .50
                  L= .0313 K= .0170 D= 60.0 CP= .310

SIDING - METAL HOLLOW BACKED
                  SMOOTH                    TABS= .90 ABS= .50
                  L= .0050 K= 26.0000 D= 480.0 CP= .100

SIDING - PLYWOOD LAPPED 3 / 8 IN
                  VERY ROUGH                TABS= .90 ABS= .78
                  L= .0313 K= .0700 D= 37.0 CP= .290

SIDING - WD SHINGLES 16 X7 1 / 2 EXP 3 / 4 IN
                  VERY ROUGH                TABS= .90 ABS= .78
                  L= .1247 K= .0700 D= 37.0 CP= .300

SIDING - WOOD BEVEL LAPPED 1 / 2 IN
                  VERY ROUGH                TABS= .90 ABS= .78
                  L= .0417 K= .0600 D= 37.0 CP= .310

SIDING - WOOD BEVEL LAPPED 3 / 4 IN
                  VERY ROUGH                TABS= .90 ABS= .78
                  L= .0625 K= .0600 D= 37.0 CP= .310

SIDING - WOOD DROP 1 IN
                  VERY ROUGH                TABS= .90 ABS= .78
                  L= .0830 K= .0700 D= 37.0 CP= .310

SIDING - WOOD SHINGLES DBL 16 X12 EXP
                  VERY ROUGH                TABS= .90 ABS= .78
                  L= .2500 K= .0700 D= 37.0 CP= .300
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*************************************************************************************************************************************

SIDING - WOOD SHINGLES INS 5 / 16 IN
                  VERY ROUGH          TABS= .90 ABS= .78
                  L= .0521 K= .0450 D= 37.0 CP= .300

VENETIAN BLINDS - LIGHT
        SHADE                         TRANS= .65 REF= 1.52

VENETIAN BLINDS - MEDIUM
        SHADE                         TRANS= .60 REF= 1.52

WOOD - HARDWOOD 1 1 / 2 IN
                  MEDIUM SMOOTH       TABS= .90 ABS= .78
                  L= .1247 K= .0920 D= 45.0 CP= .300

WOOD - HARDWOOD 1 / 8 IN
                  MEDIUM SMOOTH       TABS= .90 ABS= .78
                  L= .0104 K= .0920 D= 45.0 CP= .300

WOOD - HARDWOOD 2 1 / 2 IN
                  MEDIUM SMOOTH       TABS= .90 ABS= .78
                  L= .2087 K= .0920 D= 45.0 CP= .300

WOOD - HARDWOOD 3 1 / 2 IN
                  MEDIUM SMOOTH       TABS= .90 ABS= .78
                  L= .2917 K= .0920 D= 45.0 CP= .300

WOOD - HARDWOOD 3 / 4 IN
                  MEDIUM SMOOTH       TABS= .90 ABS= .78
                  L= .0625 K= .0920 D= 45.0 CP= .300

WOOD - SOFTWOOD 1 1 / 2 IN
                  MEDIUM SMOOTH       TABS= .90 ABS= .78
                  L= .1247 K= .0678 D= 32.0 CP= .330

WOOD - SOFTWOOD 2 1 / 2 IN
                  MEDIUM SMOOTH       TABS= .90 ABS= .78
                  L= .2087 K= .0678 D= 32.0 CP= .330
```

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*********************************************************** E N G L I S H  U N I T S ***********************************************
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*                    *                IR=INDEX OF REFRACTION, TRANS=TRANSMITTANCE, REF=REFLECTIVITY                              *
*                    *                  FILMTRANS=TRANSMISSIVITY OF GLASS WITH REFLECTIVE FILM                                   *
*************************************************************************************************************************************
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```
WOOD - SOFTWOOD 3 1 / 2 IN
                  MEDIUM SMOOTH       TABS= .90 ABS= .78
                  L= .2917 K= .0678 D= 32.0 CP= .330

WOOD - SOFTWOOD 3 / 4 IN
                  MEDIUM SMOOTH       TABS= .90 ABS= .78
                  L= .0625 K= .0678 D= 32.0 CP= .330
```

WALLS LIBRARY — MATERIALS LISTED FROM OUTSIDE TO INSIDE

EXTWALL01
A2 - 4 IN DENSE FACE BRICK
B3 - 2 IN INSULATION
C2 - 4 IN LW CONCRETE BLOCK
E1 - 3 / 4 IN PLASTER OR GYP BOARD

EXTWALL02
C14 - 4 IN LW CONCRETE
E1 - 3 / 4 IN PLASTER OR GYP BOARD

EXTWALL03
A2 - 4 IN DENSE FACE BRICK
B1 - AIRSPACE RESISTANCE
C9 - 8 IN COMMON BRICK
E1 - 3 / 4 IN PLASTER OR GYP BOARD

EXTWALL04
A2 - 4 IN DENSE FACE BRICK
B1 - AIRSPACE RESISTANCE
C8 - 8 IN HW CONCRETE BLOCK
E1 - 3 / 4 IN PLASTER OR GYP BOARD

EXTWALL05
A2 - 4 IN DENSE FACE BRICK
B1 - AIRSPACE RESISTANCE
C7 - 8 IN LW CONCRETE BLOCK
E1 - 3 / 4 IN PLASTER OR GYP BOARD

EXTWALL06
A2 - 4 IN DENSE FACE BRICK
B1 - AIRSPACE RESISTANCE
C6 - 8 IN CLAY TILE
E1 - 3 / 4 IN PLASTER OR GYP BOARD

EXTWALL07
A2 - 4 IN DENSE FACE BRICK
B1 - AIRSPACE RESISTANCE
C12 - 2 IN HW CONCRETE
E1 - 3 / 4 IN PLASTER OR GYP BOARD

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WALLS LIBRARY — MATERIALS LISTED FROM OUTSIDE TO INSIDE

EXTWALL08
A2 - 4 IN DENSE FACE BRICK
B1 - AIRSPACE RESISTANCE
C4 - 4 IN COMMON BRICK
E1 - 3 / 4 IN PLASTER OR GYP BOARD

EXTWALL09
A2 - 4 IN DENSE FACE BRICK
B1 - AIRSPACE RESISTANCE
C3 - 4 IN HW CONCRETE BLOCK
E1 - 3 / 4 IN PLASTER OR GYP BOARD

EXTWALL10
A2 - 4 IN DENSE FACE BRICK
B1 - AIRSPACE RESISTANCE
C2 - 4 IN LW CONCRETE BLOCK
E1 - 3 / 4 IN PLASTER OR GYP BOARD

EXTWALL11
A1 - 1 IN STUCCO
C11 - 12 IN HW CONCRETE
E1 - 3 / 4 IN PLASTER OR GYP BOARD

EXTWALL12
A1 - 1 IN STUCCO
C10 - 8 IN HW CONCRETE
B6 - 2 IN DENSE INSULATION
E1 - 3 / 4 IN PLASTER OR GYP BOARD

EXTWALL13
A1 - 1 IN STUCCO
C10 - 8 IN HW CONCRETE
B5 - 1 IN DENSE INSULATION
E1 - 3 / 4 IN PLASTER OR GYP BOARD

EXTWALL14
A1 - 1 IN STUCCO
C10 - 8 IN HW CONCRETE
B1 - AIRSPACE RESISTANCE
E1 - 3 / 4 IN PLASTER OR GYP BOARD

WALLS LIBRARY

MATERIALS LISTED FROM OUTSIDE TO INSIDE

EXTWALL15
A1 - 1 IN STUCCO
C10 - 8 IN HW CONCRETE
E1 - 3 / 4 IN PLASTER OR GYP BOARD

EXTWALL16
A2 - 4 IN DENSE FACE BRICK
C9 - 8 IN COMMON BRICK
B2 - 1 IN INSULATION
E1 - 3 / 4 IN PLASTER OR GYP BOARD

EXTWALL17
A2 - 4 IN DENSE FACE BRICK
C9 - 8 IN COMMON BRICK
B1 - AIRSPACE RESISTANCE
E1 - 3 / 4 IN PLASTER OR GYP BOARD

EXTWALL18
A7 - 4 IN FACE BRICK
B1 - AIRSPACE RESISTANCE
C14 - 4 IN LW CONCRETE

EXTWALL19
A6 - FINISH
B4 - 3 IN INSULATION
A6 - FINISH

EXTWALL20
A7 - 4 IN FACE BRICK
B1 - AIRSPACE RESISTANCE
A2 - 4 IN DENSE FACE BRICK

EXTWALL21
A7 - 4 IN FACE BRICK
C7 - 8 IN LW CONCRETE BLOCK
A6 - FINISH

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WALLS LIBRARY

MATERIALS LISTED FROM OUTSIDE TO INSIDE

EXTWALL22
A7 - 4 IN FACE BRICK
B1 - AIRSPACE RESISTANCE
C3 - 4 IN HW CONCRETE BLOCK
A6 - FINISH

EXTWALL23
A7 - 4 IN FACE BRICK
B1 - AIRSPACE RESISTANCE
C8 - 8 IN HW CONCRETE BLOCK
A6 - FINISH

EXTWALL24
A7 - 4 IN FACE BRICK
B1 - AIRSPACE RESISTANCE
C15 - 6 IN LW CONCRETE
A6 - FINISH

EXTWALL25
A7 - 4 IN FACE BRICK
B6 - 2 IN DENSE INSULATION
A6 - FINISH

EXTWALL26
A6 - FINISH
B6 - 2 IN DENSE INSULATION
A6 - FINISH

EXTWALL27
A3 - STEEL SIDING
B12 - 3 IN DENSE INSULATION
A3 - STEEL SIDING

EXTWALL28
A3 - STEEL SIDING
B6 - 2 IN DENSE INSULATION
A3 - STEEL SIDING

EXTWALL29
A3 - STEEL SIDING
B5 - 1 IN DENSE INSULATION
A3 - STEEL SIDING

WALLS LIBRARY — MATERIALS LISTED FROM OUTSIDE TO INSIDE

EXTWALL30
A3 - STEEL SIDING
B6 - 2 IN DENSE INSULATION
C11 - 12 IN HW CONCRETE
A6 - FINISH

EXTWALL31
A3 - STEEL SIDING
B6 - 2 IN DENSE INSULATION
C10 - 8 IN HW CONCRETE
A6 - FINISH

EXTWALL32
A3 - STEEL SIDING
B6 - 2 IN DENSE INSULATION
C5 - 4 IN HW CONCRETE
A6 - FINISH

EXTWALL33
C11 - 12 IN HW CONCRETE
B6 - 2 IN DENSE INSULATION
A6 - FINISH

EXTWALL34
C10 - 8 IN HW CONCRETE
B6 - 2 IN DENSE INSULATION
A6 - FINISH

EXTWALL35
C5 - 4 IN HW CONCRETE
B6 - 2 IN DENSE INSULATION
A6 - FINISH

EXTWALL36
A1 - 1 IN STUCCO
B1 - AIRSPACE RESISTANCE
B4 - 3 IN INSULATION
E1 - 3 / 4 IN PLASTER OR GYP BOARD

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WALLS LIBRARY — MATERIALS LISTED FROM OUTSIDE TO INSIDE

EXTWALL37
A1 - 1 IN STUCCO
B1 - AIRSPACE RESISTANCE
B3 - 2 IN INSULATION
E1 - 3 / 4 IN PLASTER OR GYP BOARD

EXTWALL38
A1 - 1 IN STUCCO
B1 - AIRSPACE RESISTANCE
B2 - 1" IN INSULATION
E1 - 3 / 4 IN PLASTER OR GYP BOARD

EXTWALL39
A1 - 1 IN STUCCO
B1 - AIRSPACE RESISTANCE
E1 - 3 / 4 IN PLASTER OR GYP BOARD

EXTWALL40
A1 - 1 IN STUCCO
B3 - 2 IN INSULATION
C11 - 12 IN HW CONCRETE
E1 - 3 / 4 IN PLASTER OR GYP BOARD

EXTWALL41
A1 - 1 IN STUCCO
B3 - 2 IN INSULATION
C10 - 8 IN HW CONCRETE
E1 - 3 / 4 IN PLASTER OR GYP BOARD

EXTWALL42
A1 - 1 IN STUCCO
B3 - 2 IN INSULATION
C9 - 8 IN COMMON BRICK
E1 - 3 / 4 IN PLASTER OR GYP BOARD

EXTWALL43
A1 - 1 IN STUCCO
B3 - 2 IN INSULATION
C8 - 8 IN HW CONCRETE BLOCK
E1 - 3 / 4 IN PLASTER OR GYP BOARD

WALLS LIBRARY — MATERIALS LISTED FROM OUTSIDE TO INSIDE

EXTWALL44
A1 - 1 IN STUCCO
B3 - 2 IN INSULATION
C7 - 8 IN LW CONCRETE BLOCK
E1 - 3 / 4 IN PLASTER OR GYP BOARD

EXTWALL45
A1 - 1 IN STUCCO
B3 - 2 IN INSULATION
C6 - 8 IN CLAY TILE
E1 - 3 / 4 IN PLASTER OR GYP BOARD

EXTWALL46
A1 - 1 IN STUCCO
B3 - 2 IN INSULATION
C5 - 4 IN HW CONCRETE
E1 - 3 / 4 IN PLASTER OR GYP BOARD

EXTWALL47
A1 - 1 IN STUCCO
B3 - 2 IN INSULATION
C4 - 4 IN COMMON BRICK
E1 - 3 / 4 IN PLASTER OR GYP BOARD

EXTWALL48
A1 - 1 IN STUCCO
B3 - 2 IN INSULATION
C3 - 4 IN HW CONCRETE BLOCK
E1 - 3 / 4 IN PLASTER OR GYP BOARD

EXTWALL49
A1 - 1 IN STUCCO
B3 - 2 IN INSULATION
C2 - 4 IN LW CONCRETE BLOCK
E1 - 3 / 4 IN PLASTER OR GYP BOARD

EXTWALL50
A1 - 1 IN STUCCO
B3 - 2 IN INSULATION
C1 - 4 IN CLAY TILE
E1 - 3 / 4 IN PLASTER OR GYP BOARD

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WALLS LIBRARY — MATERIALS LISTED FROM OUTSIDE TO INSIDE

EXTWALL51
A2 - 4 IN DENSE FACE BRICK
B3 - 2 IN INSULATION
C11 - 12 IN HW CONCRETE
E1 - 3 / 4 IN PLASTER OR GYP BOARD

EXTWALL52
A2 - 4 IN DENSE FACE BRICK
B3 - 2 IN INSULATION
C10 - 8 IN HW CONCRETE
E1 - 3 / 4 IN PLASTER OR GYP BOARD

EXTWALL53
A2 - 4 IN DENSE FACE BRICK
B3 - 2 IN INSULATION
C9 - 8 IN COMMON BRICK
E1 - 3 / 4 IN PLASTER OR GYP BOARD

EXTWALL54
A2 - 4 IN DENSE FACE BRICK
B1 - AIRSPACE RESISTANCE
C11 - 12 IN HW CONCRETE
E1 - 3 / 4 IN PLASTER OR GYP BOARD

EXTWALL55
A2 - 4 IN DENSE FACE BRICK
B1 - AIRSPACE RESISTANCE
C10 - 8 IN HW CONCRETE
E1 - 3 / 4 IN PLASTER OR GYP BOARD

EXTWALL56
A2 - 4 IN DENSE FACE BRICK
B3 - 2 IN INSULATION
C8 - 8 IN HW CONCRETE BLOCK
E1 - 3 / 4 IN PLASTER OR GYP BOARD

EXTWALL57
A2 - 4 IN DENSE FACE BRICK
B3 - 2 IN INSULATION
C7 - 8 IN LW CONCRETE BLOCK
E1 - 3 / 4 IN PLASTER OR GYP BOARD

WALLS LIBRARY

MATERIALS LISTED FROM OUTSIDE TO INSIDE

EXTWALL58
A2 - 4 IN DENSE FACE BRICK
B3 - 2 IN INSULATION
C6 - 8 IN CLAY TILE
E1 - 3 / 4 IN PLASTER OR GYP BOARD

EXTWALL59
A2 - 4 IN DENSE FACE BRICK
B3 - 2 IN INSULATION
C5 - 4 IN HW CONCRETE
E1 - 3 / 4 IN PLASTER OR GYP BOARD

EXTWALL60
A2 - 4 IN DENSE FACE BRICK
B3 - 2 IN INSULATION
C4 - 4 IN COMMON BRICK
E1 - 3 / 4 IN PLASTER OR GYP BOARD

EXTWALL61
A2 - 4 IN DENSE FACE BRICK
B2 - 1 IN INSULATION
C3 - 4 IN HW CONCRETE BLOCK
E1 - 3 / 4 IN PLASTER OR GYP BOARD

EXTWALL62
A2 - 4 IN DENSE FACE BRICK
C9 - 8 IN COMMON BRICK
E1 - 3 / 4 IN PLASTER OR GYP BOARD

EXTWALL63
A1 - 1 IN STUCCO
C8 - 8 IN HW CONCRETE BLOCK
B2 - 1 IN INSULATION
E1 - 3 / 4 IN PLASTER OR GYP BOARD

EXTWALL64
A1 - 1 IN STUCCO
C8 - 8 IN HW CONCRETE BLOCK
E1 - 3 / 4 IN PLASTER OR GYP BOARD

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WALLS LIBRARY

MATERIALS LISTED FROM OUTSIDE TO INSIDE

EXTWALL65
A1 - 1 IN STUCCO
C7 - 8 IN LW CONCRETE BLOCK
B2 - 1 IN INSULATION
E1 - 3 / 4 IN PLASTER OR GYP BOARD

EXTWALL66
A1 - 1 IN STUCCO
C7 - 8 IN LW CONCRETE BLOCK
E1 - 3 / 4 IN PLASTER OR GYP BOARD

EXTWALL67
A2 - 4 IN DENSE FACE BRICK
C6 - 8 IN CLAY TILE
B2 - 1 IN INSULATION
E1 - 3 / 4 IN PLASTER OR GYP BOARD

EXTWALL68
A2 - 4 IN DENSE FACE BRICK
C6 - 8 IN CLAY TILE
B1 - AIRSPACE RESISTANCE
E1 - 3 / 4 IN PLASTER OR GYP BOARD

EXTWALL69
A2 - 4 IN DENSE FACE BRICK
C6 - 8 IN CLAY TILE
E1 - 3 / 4 IN PLASTER OR GYP BOARD

EXTWALL70
A1 - 1 IN STUCCO
C6 - 8 IN CLAY TILE
B2 - 1 IN INSULATION
E1 - 3 / 4 IN PLASTER OR GYP BOARD

EXTWALL71
A1 - 1 IN STUCCO
C6 - 8 IN CLAY TILE
B1 - AIRSPACE RESISTANCE
E1 - 3 / 4 IN PLASTER OR GYP BOARD

WALLS LIBRARY — MATERIALS LISTED FROM OUTSIDE TO INSIDE

```
EXTWALL72
    A1 - 1 IN STUCCO
    C6 - 8 IN CLAY TILE
    E1 - 3 / 4 IN PLASTER OR GYP BOARD

EXTWALL73
    A1 - 1 IN STUCCO
    C5 - 4 IN HW CONCRETE
    B3 - 2 IN INSULATION
    E1 - 3 / 4 IN PLASTER OR GYP BOARD

EXTWALL74
    A1 - 1 IN STUCCO
    C5 - 4 IN HW CONCRETE
    B2 - 1 IN INSULATION
    E1 - 3 / 4 IN PLASTER OR GYP BOARD

EXTWALL75
    A1 - 1 IN STUCCO
    C5 - 4 IN HW CONCRETE
    B1 - AIRSPACE RESISTANCE
    E1 - 3 / 4 IN PLASTER OR GYP BOARD

EXTWALL76
    A1 - 1 IN STUCCO
    C5 - 4 IN HW CONCRETE
    E1 - 3 / 4 IN PLASTER OR GYP BOARD

EXTWALL77
    A2 - 4 IN DENSE FACE BRICK
    C4 - 4 IN COMMON BRICK
    B2 - 1 IN INSULATION
    E1 - 3 / 4 IN PLASTER OR GYP BOARD

EXTWALL78
    A2 - 4 IN DENSE FACE BRICK
    C4 - 4 IN COMMON BRICK
    B1 - AIRSPACE RESISTANCE
    E1 - 3 / 4 IN PLASTER OR GYP BOARD
```

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WALLS LIBRARY — MATERIALS LISTED FROM OUTSIDE TO INSIDE

```
EXTWALL79
    A2 - 4 IN DENSE FACE BRICK
    C4 - 4 IN COMMON BRICK
    E1 - 3 / 4 IN PLASTER OR GYP BOARD

EXTWALL80
    A1 - 1 IN STUCCO
    C4 - 4 IN COMMON BRICK
    E1 - 3 / 4 IN PLASTER OR GYP BOARD

EXTWALL81
    A1 - 1 IN STUCCO
    C3 - 4 IN HW CONCRETE BLOCK
    E1 - 3 / 4 IN PLASTER OR GYP BOARD

EXTWALL82
    A2 - 4 IN DENSE FACE BRICK
    C2 - 4 IN LW CONCRETE BLOCK
    B2 - 1 IN INSULATION
    E1 - 3 / 4 IN PLASTER OR GYP BOARD

EXTWALL83
    A2 - 4 IN DENSE FACE BRICK
    C2 - 4 IN LW CONCRETE BLOCK
    B1 - AIRSPACE RESISTANCE
    E1 - 3 / 4 IN PLASTER OR GYP BOARD

EXTWALL84
    A2 - 4 IN DENSE FACE BRICK
    C2 - 4 IN LW CONCRETE BLOCK
    E1 - 3 / 4 IN PLASTER OR GYP BOARD

EXTWALL85
    A1 - 1 IN STUCCO
    C2 - 4 IN LW CONCRETE BLOCK
    B2 - 1 IN INSULATION
    E1 - 3 / 4 IN PLASTER OR GYP BOARD
```

WALLS LIBRARY — MATERIALS LISTED FROM OUTSIDE TO INSIDE

EXTWALL86
A1 - 1 IN STUCCO
C2 - 4 IN LW CONCRETE BLOCK
B1 - AIRSPACE RESISTANCE
E1 - 3 / 4 IN PLASTER OR GYP BOARD

EXTWALL87
A1 - 1 IN STUCCO
C2 - 4 IN LW CONCRETE BLOCK
E1 - 3 / 4 IN PLASTER OR GYP BOARD

EXTWALL88
A2 - 4 IN DENSE FACE BRICK
C1 - 4 IN CLAY TILE
B2 - 1 IN INSULATION
E1 - 3 / 4 IN PLASTER OR GYP BOARD

EXTWALL89
A2 - 4 IN DENSE FACE BRICK
C1 - 4 IN CLAY TILE
B1 - AIRSPACE RESISTANCE
E1 - 3 / 4 IN PLASTER OR GYP BOARD

EXTWALL90
A2 - 4 IN DENSE FACE BRICK
C1 - 4 IN CLAY TILE
E1 - 3 / 4 IN PLASTER OR GYP BOARD

EXTWALL91
A1 - 1 IN STUCCO
C1 - 4 IN CLAY TILE
B2 - 1 IN INSULATION
E1 - 3 / 4 IN PLASTER OR GYP BOARD

EXTWALL92
A1 - 1 IN STUCCO
C1 - 4 IN CLAY TILE
B1 - AIRSPACE RESISTANCE
E1 - 3 / 4 IN PLASTER OR GYP BOARD

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WALLS LIBRARY — MATERIALS LISTED FROM OUTSIDE TO INSIDE

EXTWALL93
A1 - 1 IN STUCCO
C1 - 4 IN CLAY TILE
E1 - 3 / 4 IN PLASTER OR GYP BOARD

EXTWALL94
A3 - STEEL SIDING
B2 - 1 IN INSULATION
B1 - AIRSPACE RESISTANCE
A3 - STEEL SIDING

EXTWALL95
A3 - STEEL SIDING
B3 - 2 IN INSULATION
B1 - AIRSPACE RESISTANCE
A3 - STEEL SIDING

EXTWALL96
A3 - STEEL SIDING
B4 - 3 IN INSULATION
B1 - AIRSPACE RESISTANCE
A3 - STEEL SIDING

PARTITION01
E1 - 3 / 4 IN PLASTER OR GYP BOARD
C1 - 4 IN CLAY TILE
E1 - 3 / 4 IN PLASTER OR GYP BOARD

PARTITION02
E1 - 3 / 4 IN PLASTER OR GYP BOARD
C2 - 4 IN LW CONCRETE BLOCK
E1 - 3 / 4 IN PLASTER OR GYP BOARD

PARTITION03
E1 - 3 / 4 IN PLASTER OR GYP BOARD
C3 - 4 IN HW CONCRETE BLOCK
E1 - 3 / 4 IN PLASTER OR GYP BOARD

WALLS LIBRARY

MATERIALS LISTED FROM OUTSIDE TO INSIDE

PARTITION04
E1 - 3 / 4 IN PLASTER OR GYP BOARD
C4 - 4 IN COMMON BRICK
E1 - 3 / 4 IN PLASTER OR GYP BOARD

PARTITION05
E1 - 3 / 4 IN PLASTER OR GYP BOARD
C5 - 4 IN HW CONCRETE
E1 - 3 / 4 IN PLASTER OR GYP BOARD

PARTITION06
E1 - 3 / 4 IN PLASTER OR GYP BOARD
C6 - 8 IN CLAY TILE
E1 - 3 / 4 IN PLASTER OR GYP BOARD

PARTITION07
E1 - 3 / 4 IN PLASTER OR GYP BOARD
C7 - 8 IN LW CONCRETE BLOCK
E1 - 3 / 4 IN PLASTER OR GYP BOARD

PARTITION08
E1 - 3 / 4 IN PLASTER OR GYP BOARD
C8 - 8 IN HW CONCRETE BLOCK
E1 - 3 / 4 IN PLASTER OR GYP BOARD

PARTITION09
E1 - 3 / 4 IN PLASTER OR GYP BOARD
C9 - 8 IN COMMON BRICK
E1 - 3 / 4 IN PLASTER OR GYP BOARD

PARTITION10
E1 - 3 / 4 IN PLASTER OR GYP BOARD
C10 - 8 IN HW CONCRETE
E1 - 3 / 4 IN PLASTER OR GYP BOARD

PARTITION11
E1 - 3 / 4 IN PLASTER OR GYP BOARD
C11 - 12 IN HW CONCRETE
E1 - 3 / 4 IN PLASTER OR GYP BOARD

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WALLS LIBRARY

MATERIALS LISTED FROM OUTSIDE TO INSIDE

PARTITION12
C1 - 4 IN CLAY TILE

PARTITION13
C2 - 4 IN LW CONCRETE BLOCK

PARTITION14
C3 - 4 IN HW CONCRETE BLOCK

PARTITION15
C4 - 4 IN COMMON BRICK

PARTITION16
C5 - 4 IN HW CONCRETE

PARTITION17
C6 - 8 IN CLAY TILE

PARTITION18
C7 - 8 IN LW CONCRETE BLOCK

PARTITION19
C8 - 8 IN HW CONCRETE BLOCK

PARTITION20
C9 - 8 IN COMMON BRICK

PARTITION21
C10 - 8 IN HW CONCRETE

PARTITION22
C11 - 12 IN HW CONCRETE

PARTITION23
E1 - 3 / 4 IN PLASTER OR GYP BOARD
B1 - AIRSPACE RESISTANCE
E1 - 3 / 4 IN PLASTER OR GYP BOARD

WALLS LIBRARY — MATERIALS LISTED FROM OUTSIDE TO INSIDE

```
PARTITION24
    B7 - 1 IN WOOD

PARTITION25
    B10 - 2 IN WOOD

PARTITION26
    B11 - 3 IN WOOD

PARTITION27
    B9 - 4 IN WOOD

PARTITION28
    B7 - 1 IN WOOD
    B1 - AIRSPACE RESISTANCE
    B7 - 1 IN WOOD

PARTITION29
    B10 - 2 IN WOOD
    B1 - AIRSPACE RESISTANCE
    B10 - 2 IN WOOD

PARTITION30
    B11 - 3 IN WOOD
    B1 - AIRSPACE RESISTANCE
    B11 - 3 IN WOOD
```

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ROOFS LIBRARY — MATERIALS LISTED FROM OUTSIDE TO INSIDE

```
CEILING31
    C12 - 2 IN HW CONCRETE

CEILING32
    C5 - 4 IN HW CONCRETE

CEILING33
    C2 - 4 IN LW CONCRETE BLOCK

CEILING34
    C10 - 8 IN HW CONCRETE

CEILING35
    C7 - 8 IN LW CONCRETE BLOCK

CEILING38
    C12 - 2 IN HW CONCRETE
    E4 - CEILING AIRSPACE
    E5 - ACOUSTIC TILE

CEILING39
    C5 - 4 IN HW CONCRETE
    E4 - CEILING AIRSPACE
    E5 - ACOUSTIC TILE

CEILING40
    C2 - 4 IN LW CONCRETE BLOCK
    E4 - CEILING AIRSPACE
    E5 - ACOUSTIC TILE

CEILING41
    C10 - 8 IN HW CONCRETE
    E4 - CEILING AIRSPACE
    E5 - ACOUSTIC TILE

CEILING42
    C7 - 8 IN LW CONCRETE BLOCK
    E4 - CEILING AIRSPACE
    E5 - ACOUSTIC TILE
```

ROOFS LIBRARY

MATERIALS LISTED FROM OUTSIDE TO INSIDE

CEILING43
B10 - 2 IN WOOD
E4 - CEILING AIRSPACE
E5 - ACOUSTIC TILE

CEILING44
B11 - 3 IN WOOD
E4 - CEILING AIRSPACE
E5 - ACOUSTIC TILE

CEILING45
C11 - 12 IN HW CONCRETE
E4 - CEILING AIRSPACE
E5 - ACOUSTIC TILE

CEILING46
B9 - 4 IN WOOD
E4 - CEILING AIRSPACE
E5 - ACOUSTIC TILE

CEILING47
A3 - STEEL SIDING
E4 - CEILING AIRSPACE
E5 - ACOUSTIC TILE

ROOF01
C12 - 2 IN HW CONCRETE
B1 - AIRSPACE RESISTANCE
B6 - 2 IN DENSE INSULATION
E2 - 1 / 2 IN SLAG OR STONE
E3 - 3 / 8 IN FELT AND MEMBRANE
C5 - 4 IN HW CONCRETE
E4 - CEILING AIRSPACE
E5 - ACOUSTIC TILE

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ROOFS LIBRARY

MATERIALS LISTED FROM OUTSIDE TO INSIDE

ROOF02
E2 - 1 / 2 IN SLAG OR STONE
E3 - 3 / 8 IN FELT AND MEMBRANE
B6 - 2 IN DENSE INSULATION
G9 - 4 IN WOOD
E4 - CEILING AIRSPACE
E5 - ACOUSTIC TILE

ROOF03
E2 - 1 / 2 IN SLAG OR STONE
E3 - 3 / 8 IN FELT AND MEMBRANE
B6 - 2 IN DENSE INSULATION
B8 - 2 1 / 2 IN WOOD
E4 - CEILING AIRSPACE
E5 - ACOUSTIC TILE

ROOF04
E2 - 1 / 2 IN SLAG OR STONE
E3 - 3 / 8 IN FELT AND MEMBRANE
B6 - 2 IN DENSE INSULATION
B7 - 1 IN WOOD
E4 - CEILING AIRSPACE
E5 - ACOUSTIC TILE

ROOF05
E2 - 1 / 2 IN SLAG OR STONE
E3 - 3 / 8 IN FELT AND MEMBRANE
B5 - 1 IN DENSE INSULATION
B9 - 4 IN WOOD
E4 - CEILING AIRSPACE
E5 - ACOUSTIC TILE

ROOF06
E2 - 1 / 2 IN SLAG OR STONE
E3 - 3 / 8 IN FELT AND MEMBRANE
B5 - 1 IN DENSE INSULATION
B8 - 2 1 / 2 IN WOOD
E4 - CEILING AIRSPACE
E5 - ACOUSTIC TILE

ROOFS LIBRARY — MATERIALS LISTED FROM OUTSIDE TO INSIDE

ROOF07
- E2 - 1 / 2 IN SLAG OR STONE
- E3 - 3 / 8 IN FELT AND MEMBRANE
- B5 - 1 IN DENSE INSULATION
- B7 - 1 IN WOOD
- E4 - CEILING AIRSPACE
- E5 - ACOUSTIC TILE

ROOF08
- E2 - 1 / 2 IN SLAG OR STONE
- E3 - 3 / 8 IN FELT AND MEMBRANE
- C16 - 8 IN LW CONCRETE
- E4 - CEILING AIRSPACE
- E5 - ACOUSTIC TILE

ROOF09
- E2 - 1 / 2 IN SLAG OR STONE
- E3 - 3 / 8 IN FELT AND MEMBRANE
- C15 - 6 IN LW CONCRETE
- E4 - CEILING AIRSPACE
- E5 - ACOUSTIC TILE

ROOF10
- E2 - 1 / 2 IN SLAG OR STONE
- E3 - 3 / 8 IN FELT AND MEMBRANE
- C14 - 4 IN LW CONCRETE
- E4 - CEILING AIRSPACE
- E5 - ACOUSTIC TILE

ROOF11
- E2 - 1 / 2 IN SLAG OR STONE
- E3 - 3 / 8 IN FELT AND MEMBRANE
- B6 - 2 IN DENSE INSULATION
- C13 - 6 IN HW CONCRETE
- E4 - CEILING AIRSPACE
- E5 - ACOUSTIC TILE

ROOF12
- E2 - 1 / 2 IN SLAG OR STONE
- E3 - 3 / 8 IN FELT AND MEMBRANE
- B6 - 2 IN DENSE INSULATION
- C5 - 4 IN HW CONCRETE
- E4 - CEILING AIRSPACE
- E5 - ACOUSTIC TILE

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ROOFS LIBRARY — MATERIALS LISTED FROM OUTSIDE TO INSIDE

ROOF13
- E2 - 1 / 2 IN SLAG OR STONE
- E3 - 3 / 8 IN FELT AND MEMBRANE
- B6 - 2 IN DENSE INSULATION
- C12 - 2 IN HW CONCRETE
- E4 - CEILING AIRSPACE
- E5 - ACOUSTIC TILE

ROOF14
- E2 - 1 / 2 IN SLAG OR STONE
- E3 - 3 / 8 IN FELT AND MEMBRANE
- B5 - 1 IN DENSE INSULATION
- C13 - 6 IN HW CONCRETE
- E4 - CEILING AIRSPACE
- E5 - ACOUSTIC TILE

ROOF15
- E2 - 1 / 2 IN SLAG OR STONE
- E3 - 3 / 8 IN FELT AND MEMBRANE
- B5 - 1 IN DENSE INSULATION
- C5 - 4 IN HW CONCRETE
- E4 - CEILING AIRSPACE
- E5 - ACOUSTIC TILE

ROOF16
- E2 - 1 / 2 IN SLAG OR STONE
- E3 - 3 / 8 IN FELT AND MEMBRANE
- B5 - 1 IN DENSE INSULATION
- C12 - 2 IN HW CONCRETE
- E4 - CEILING AIRSPACE
- E5 - ACOUSTIC TILE

ROOF17
- E2 - 1 / 2 IN SLAG OR STONE
- E3 - 3 / 8 IN FELT AND MEMBRANE
- B6 - 2 IN DENSE INSULATION
- A3 - STEEL SIDING
- E4 - CEILING AIRSPACE
- E5 - ACOUSTIC TILE

ROOFS LIBRARY — MATERIALS LISTED FROM OUTSIDE TO INSIDE

ROOF18
E2 - 1 / 2 IN SLAG OR STONE
E3 - 3 / 8 IN FELT AND MEMBRANE
B5 - 1 IN DENSE INSULATION
A3 - STEEL SIDING
E4 - CEILING AIRSPACE
E5 - ACOUSTIC TILE

ROOF19
C12 - 2 IN HW CONCRETE
B1 - AIRSPACE RESISTANCE
B6 - 2 IN DENSE INSULATION
E2 - 1 / 2 IN SLAG OR STONE
E3 - 3 / 8 IN FELT AND MEMBRANE
C5 - 4 IN HW CONCRETE

ROOF20
E2 - 1 / 2 IN SLAG OR STONE
E3 - 3 / 8 IN FELT AND MEMBRANE
B6 - 2 IN DENSE INSULATION
B9 - 4 IN WOOD

ROOF21
E2 - 1 / 2 IN SLAG OR STONE
E3 - 3 / 8 IN FELT AND MEMBRANE
B6 - 2 IN DENSE INSULATION
B8 - 2 1 / 2 IN WOOD

ROOF22
E2 - 1 / 2 IN SLAG OR STONE
E3 - 3 / 8 IN FELT AND MEMBRANE
B6 - 2 IN DENSE INSULATION
B7 - 1 IN WOOD

ROOF23
E2 - 1 / 2 IN SLAG OR STONE
E3 - 3 / 8 IN FELT AND MEMBRANE
B5 - 1 IN DENSE INSULATION
B9 - 4 IN WOOD

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ROOFS LIBRARY — MATERIALS LISTED FROM OUTSIDE TO INSIDE

ROOF24
E2 - 1 / 2 IN SLAG OR STONE
E3 - 3 / 8 IN FELT AND MEMBRANE
B5 - 1 IN DENSE INSULATION
B8 - 2 1 / 2 IN WOOD

ROOF25
E2 - 1 / 2 IN SLAG OR STONE
E3 - 3 / 8 IN FELT AND MEMBRANE
B5 - 1 IN DENSE INSULATION
B7 - 1 IN WOOD

ROOF26
E2 - 1 / 2 IN SLAG OR STONE
E3 - 3 / 8 IN FELT AND MEMBRANE
C16 - 8 IN LW CONCRETE

ROOF27
E2 - 1 / 2 IN SLAG OR STONE
E3 - 3 / 8 IN FELT AND MEMBRANE C15 - 6 IN LW CONCRETE

ROOF28
E2 - 1 / 2 IN SLAG OR STONE
E3 - 3 / 8 IN FELT AND MEMBRANE
C14 - 4 IN LW CONCRETE

ROOF29
E2 - 1 / 2 IN SLAG OR STONE
E3 - 3 / 8 IN FELT AND MEMBRANE
B6 - 2 IN DENSE INSULATION
C13 - 6 IN HW CONCRETE

ROOF30
E2 - 1 / 2 IN SLAG OR STONE
E3 - 3 / 8 IN FELT AND MEMBRANE
B6 - 2 IN DENSE INSULATION
C8 - 4 IN HW CONCRETE

ROOFS LIBRARY — MATERIALS LISTED FROM OUTSIDE TO INSIDE

ROOF31
- E2 - 1 / 2 IN SLAG OR STONE
- E3 - 3 / 8 IN FELT AND MEMBRANE
- B6 - 2 IN DENSE INSULATION
- C12 - 2 IN HW CONCRETE

ROOF32
- E2 - 1 / 2 IN SLAG OR STONE
- E3 - 3 / 8 IN FELT AND MEMBRANE
- B5 - 1 IN DENSE INSULATION
- C13 - 6 IN HW CONCRETE

ROOF33
- E2 - 1 / 2 IN SLAG OR STONE
- E3 - 3 / 8 IN FELT AND MEMBRANE
- B5 - 1 IN DENSE INSULATION
- C5 - 4 IN HW CONCRETE

ROOF34
- E2 - 1 / 2 IN SLAG OR STONE
- E3 - 3 / 8 IN FELT AND MEMBRANE
- B5 - 1 IN DENSE INSULATION
- C12 - 2 IN HW CONCRETE

ROOF35
- E2 - 1 / 2 IN SLAG OR STONE
- E3 - 3 / 8 IN FELT AND MEMBRANE
- B6 - 2 IN DENSE INSULATION
- A3 - STEEL SIDING

ROOF36
- E2 - 1 / 2 IN SLAG OR STONE
- E3 - 3 / 8 IN FELT AND MEMBRANE
- B5 - 1 IN DENSE INSULATION
- A3 - STEEL SIDING

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FLOORS LIBRARY — MATERIALS LISTED FROM OUTSIDE TO INSIDE

FLOOR SLAB 4 IN
- DIRT 12 IN
- C5 - 4 IN HW CONCRETE

FLOOR SLAB 8 IN
- DIRT 12 IN
- C10 - 8 IN HW CONCRETE

FLOOR31
- C12 - 2 IN HW CONCRETE

FLOOR32
- C5 - 4 IN HW CONCRETE

FLOOR33
- C2 - 4 IN LW CONCRETE BLOCK

FLOOR34
- C10 - 8 IN HW CONCRETE

FLOOR35
- C7 - 8 IN LW CONCRETE BLOCK

FLOOR36
- B10 - 2 IN WOOD

FLOOR37
- B11 - 3 IN WOOD

FLOOR38
- E5 - ACOUSTIC TILE
- E4 - CEILING AIRSPACE
- C12 - 2 IN HW CONCRETE

FLOOR39
- E5 - ACOUSTIC TILE
- E4 - CEILING AIRSPACE
- C5 - 4 IN HW CONCRETE

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FLOORS LIBRARY — MATERIALS LISTED FROM OUTSIDE TO INSIDE

FLOOR40
E5 - ACOUSTIC TILE
E4 - CEILING AIRSPACE
C2 - 4 IN LW CONCRETE BLOCK

FLOOR41
E5 - ACOUSTIC TILE
E4 - CEILING AIRSPACE
C10 - 8 IN HW CONCRETE

FLOOR42
E5 - ACOUSTIC TILE
E4 - CEILING AIRSPACE
C7 - 8 IN LW CONCRETE BLOCK

FLOOR43
E5 - ACOUSTIC TILE
E4 - CEILING AIRSPACE
B10 - 2 IN WOOD

FLOOR44
E5 - ACOUSTIC TILE
E4 - CEILING AIRSPACE
B11 - 3 IN WOOD

FLOOR45
E5 - ACOUSTIC TILE
E4 - CEILING AIRSPACE
C11 - 12 IN HW CONCRETE

FLOOR46
E5 - ACOUSTIC TILE
E4 - CEILING AIRSPACE
B9 - 4 IN WOOD

FLOOR47
E5 - ACOUSTIC TILE
E4 - CEILING AIRSPACE
A3 - STEEL SIDING

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DOORS LIBRARY — MATERIALS LISTED FROM OUTSIDE TO INSIDE

ALUMINUM DOOR
A3 - STEEL SIDING
B1 - AIRSPACE RESISTANCE
A3 - STEEL SIDING

GLASS DOOR
GLASS - CLEAR PLATE 1 / 2 IN

HOLLOW WOOD DOOR
WOOD - HARDWOOD - 1 / 8 IN
B1 - AIRSPACE RESISTANCE
WOOD - HARDWOOD - 1 / 8 IN

SLIDING PARTITION
E3 - 3 / 8 IN FELT AND MEMBRANE

SOLID WOOD DOOR
B10 - 2 IN WOOD

WINDOWS LIBRARY

MATERIALS LISTED FROM OUTSIDE TO INSIDE

DOUBLE PANE TINTED WINDOW
GLASS - GREY PLATE 3 / 8 IN
B1 - AIRSPACE RESISTANCE
GLASS - CLEAR PLATE 3 / 8 IN

DOUBLE PANE WINDOW
GLASS - CLEAR SHEET 1 / 8 IN
B1 - AIRSPACE RESISTANCE
GLASS - CLEAR SHEET 1 / 8 IN

DOUBLE PANE WITH BLINDS
GLASS - CLEAR SHEET 1 / 8 IN
B1 - AIRSPACE RESISTANCE
GLASS - CLEAR SHEET 1 / 8 IN
VENETIAN BLINDS - LIGHT

DOUBLE PANE WITH DRAPES
GLASS - CLEAR SHEET 1 / 8 IN
B1 - AIRSPACE RESISTANCE
GLASS - CLEAR SHEET 1 / 8 IN
DRAPES - CLOSE WEAVE MEDIUM

DOUBLE PANE WITH SHADE
GLASS - CLEAR SHEET 1 / 8 IN
B1 - AIRSPACE RESISTANCE
GLASS - CLEAR SHEET 1 / 8 IN
SHADE ROLL - LIGHT OPAQUE

SINGLE PANE HW WINDOW
GLASS - CLEAR PLATE 1 / 4 IN

SINGLE PANE LW WINDOW
GLASS - CLEAR SHEET 1 / 8 IN

SINGLE PANE TINTED WINDOW
GLASS - GREY PLATE 1 / 4 IN

SINGLE PANE WITH BLINDS
GLASS - CLEAR SHEET 1 / 8 IN
VENETIAN BLINDS - LIGHT

CERL -- B.L.A.S.T. SYSTEM --- VERSION 2.0 20 MAR 79 12.47.06

WINDOWS LIBRARY

MATERIALS LISTED FROM OUTSIDE TO INSIDE

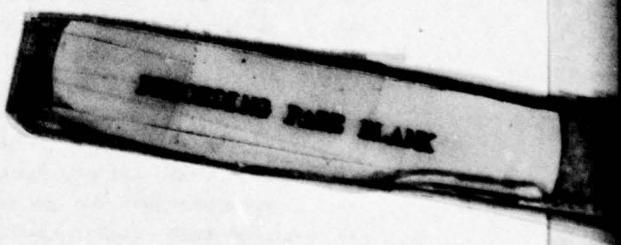
SINGLE PANE WITH DRAPES
GLASS - CLEAR PLATE 1 / 4 IN
DRAPES - CLOSE WEAVE MEDIUM

SINGLE PANE WITH SHADE
GLASS - CLEAR SHEET 1 / 8 IN
SHADE ROLL - LIGHT OPAQUE

# 3 LIBRARY INPUT

The pages that follow show the input deck used to create the BLAST program library. The procedures described in Chapter 3, Volume I of the Users Manual were used to DEFINE the input.

Line numbers are part of BLAST *output* (BLAST echoes user input and adds these numbers). Line numbers are *not* part of the input.



```
CERL -- B.L.A.S.T. SYSTEM --- VERSION 2.0              20 MAR 79      12.47.06

  1  BEGIN INPUT;
  2  RUN CONTROL$ UNITS(IN=ENGLISH,OUT=ENGLISH)
  3        ,PRINT LIBRARY
  4
  5     FINE MATERIALS$
  6     BUILDING BOARD - ASBESTOS CEMENT 1/8 IN=
  7        (L=.0104,K=.333,D=120.,CP=.2,ABS=.75,MEDIUM ROUGH),
  8     BUILDING BOARD - ASBESTOS CEMENT 1/4 IN=
  9        (L=.0209,K=.333,D=120.,CP=.2,ABS=.75,MEDIUM ROUGH),
 10     BUILDING BOARD - GYPSUM PLASTER 3/8 IN =
 11        (L=.0313, K=.0938, D=50., CP=.2, TABS=.9, ABS=.75, R=0, IR=1.52,
 12        TRANS=0., FILMTRANS=0., REF=1., MEDIUM SMOOTH),
 13     BUILDING BOARD - GYPSUM   PLASTER 1/2 IN=
 14        (L=.0417, K=.0938, D=50., CP=.2, TABS=.9, ABS=.75, R=0., IR=1.52,
 15        TRANS=0., FILMTRANS=0., REF=1., MEDIUM SMOOTH),
 16     BUILDING BOARD - PLYWOOD 1/4 IN =
 17        (L= 0209,K=.067,D=34.,CP=.29,ABS=.78,MEDIUM SMOOTH),
 18     BUILDING BOARD - PLYWOOD 3/8 IN =
 19        (L=.0313,K=.067,D=34.,CP=.29,ABS=.78,MEDIUM SMOOTH),
 20     BUILDING BOARD - PLYWOOD 1/2 IN =
 21        (L=.0417,K=.067,D=34.,CP=.29,ABS=.78,MEDIUM SMOOTH),
 22     BUILDING BOARD - PLYWOOD 3/4 IN =
 23        (L=.0625,K=.067,D=34.,CP=.29,ABS=.78,MEDIUM SMOOTH),
 24     BUILDING BOARD - SHEATHING REG.DENS. 1/2 IN =

CERL -- B.L.A.S.T. SYSTEM --- VERSION 2.0              20 MAR 79      12.47.06

 25        (L= 0417,K= 032,D=18.,CP=.31,ABS=.7,MEDIUM ROUGH),
 26     BUILDING BOARD - SHEATHING REG.DENS. 25/32 IN =
 27        (L=.0651,K=.032,D=18.,CP=.31,ABS=.7,MEDIUM ROUGH),
 28     BUILDING BOARD - SHEATHING INT.DENS. 1/2 IN =
 29        (L=.0417,K=.034,D=22.,CP=.31,ABS=.7,MEDIUM ROUGH),
 30     BUILDING BOARD   SHEATHING NAIL BASE 1/2 IN =
 31        (L=.0417,K=.0367,D=25.,CP=.31,ABS=.7,MEDIUM ROUGH),
 32     BUILDING BOARD - SHINGLE BACKER 3/8 IN =
 33        (L=.0313,K=.0334,D=18.,CP= 31,ABS=.7,MEDIUM SMOOTH),
 34     BUILDING BOARD - SHINGLE BACKER 5/16 IN =
 35        (L=.0261,K=.0334,D=18.,CP=.31,ABS=.7,MEDIUM SMOOTH),
 36     BUILDING BOARD - SOUND DEAD 1/2 IN =
 37        (L= 0417,K=.0301,D=15.,CP=.30,ABS=.75,MEDIUM ROUGH),
 38     BUILDING BOARD - ACOUSTIC TILE 1/2 IN =
 39        (L=.0417,K=.0334,D=18.,CP=.32,ABS=.7,MEDIUM SMOOTH),
 40     BUILDING BOARD - ACOUSTIC TILE 3/4 IN =
 41        (L=.0625,K=.0334,D=18.,CP=.32,ABS=.7,MEDIUM SMOOTH),
 42     BUILDING BOARD - LAMINATED PAPERBOARD 1/8 IN =
 43        (L=.0104,K=.0417,D=30.,CP=.28,ABS=.7,SMOOTH),
 44     BUILDING BOARD - LAMINATED PAPERBOARD 1/4 IN =
 45        (L=.0209,K=.0417,D=30.,CP=.28,ABS=.7,SMOOTH),
 46     BUILDING BOARD - HOMOGENEOUS PAPERBOARD 1/8 IN =
 47        (L=.0104,K= 0417,D=30.,CP=.28,ABS=.7,SMOOTH),
 48     BUILDING BOARD - HOMOGENEOUS PAPERBOARD 1/4 IN =
```

```
 49       (L=.0209,K=.0417,D=30.,CP=.28,ABS=.7,SMOOTH),
 50    BUILDING BOARD - HARDBOARD MED DENS SIDING 7/16 IN =
 51       (L=.0365,K=.062,D=40.,CP=.28,ABS=.7,SMOOTH),
 52    BUILDING BOARD - HARDBOARD MED DENS  1/8 IN =
 53       (L=.0104,K=.061,D=50.,CP=.31,ABS=.7,SMOOTH),
 54    BUILDING BOARD - HARDBOARD HI DENS  1/8 IN =
 55       (L=.0104,K=.034,D=55.,CP=.33,ABS=.7 SMOOTH),
 56    BUILDING BOARD - HARDBOARD HI DENS  1/4 IN =
 57       (L=.0209,K=.034,D=55.,CP=.33,ABS=.7,SMOOTH),
 58    BUILDING BOARD - HARDBOARD HI DENS  TEMPERED 1/8 IN=
 59       (L=.0104,K=.0833,D=63.,CP=.33,ABS=.7,SMOOTH),
 60    BUILDING BOARD - HARDBOARD HI DENS  TEMPERED 1/4 IN=
 61       (L=.0209,K=.0833,D=63.,CP=.33,ABS=.7,SMOOTH),
 62    BUILDING BOARD - PARTICLE LO DENS  1/8 IN =
 63       (L=.0104,K=.045,D=37.,CP=.31,ABS=.7,MEDIUM SMOOTH),
 64    BUILDING BOARD - PARTICLE LO DENS  1/4 IN =
 65       (L=.0209,K=.045,D=37 ,CP=.31,ABS=.7,MEDIUM SMOOTH),
 66    BUILDING BOARD - PARTICLE LO DENS  1/2 IN =
 67       (L=.0417,K=.045,D=37.,CP=.31,ABS=.7,MEDIUM SMOOTH),
 68    BUILDING BOARD - PARTICLE MED  DENS  1/8 IN=
 69       (L=.0104,K=.078,D=50.,CP=.31,ABS=.7,MEDIUM SMOOTH),
 70    BUILDING BOARD - PARTICLE MED  DENS  1/4 IN=
 71       (L=.0209,K=.078,D=50.,CP=.31,ABS=.7,MEDIUM SMOOTH),
 72    BUILDING BOARD - PARTICLE MED  DENS  1/2 IN=
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```
 73       (L=.0417,K=.078,D=50.,CP=.31,ABS=.7,MEDIUM SMOOTH),
 74    BUILDING BOARD - PARTICLE HI DENS  1/8 IN =
 75       (L=.0104,K=.098,D=62.,CP=.31,ABS=.7,MEDIUM SMOOTH),
 76    BUILDING BOARD - PARTICLE HI DENS  1/4 IN =
 77       (L=.0209,K=.098,D=62.,CP=.31,ABS=.7,MEDIUM SMOOTH),
 78    BUILDING BOARD - PARTICLE HI DENS  1/2 IN =
 79       (L=.0417,K=.098,D=62.,CP=.31,ABS=.7,MEDIUM SMOOTH),
 80    BUILDING BOARD - PARTICLE UNDERLAY 5/8 IN =
 81       (L=.0521,K=.054,D=40.,CP=.29,ABS=.7,MEDIUM ROUGH),
 82    BUILDING BOARD - WOOD SUBFLOOR 3/4 IN =
 83       (L=.0625,K=.067,D=34.,CP=.34,ABS=.78,MEDIUM ROUGH);
 84  END MATERIALS;
 85  DEFINE MATERIALS%
 86    BUILDING MEMBRANE - PERMIABLE FELT =
 87       (R=.06)
 88    BUILDING MEMBRANE - MOPPED FELT =
 89       (R=.12),
 90    BUILDING MEMBRANE - PLASTIC FILM =
 91       (R=0.0001);
 92  END MATERIALS;
 93  DEFINE MATERIALS%
 94    FINISH FLOORING - CARPET FIBROUS PAD =
 95       (R=2.08),
 96    FINISH FLOORING - CARPET RUBBER PAD =
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```
 97       (R=1.23),
 98     FINISH FLOORING - CORK TILE 1/8 IN =
 99       (L=.0104,K=.038,D=23.,CP=.3,ABS=.8,MEDIUM SMOOTH),
100     FINISH FLOORING - TERRAZZO 1 IN =
101       (L=.083,K=1.04,D=120.,CP=.28,ABS=.65,SMOOTH),
102     FINISH FLOORING - TILE 1/16 IN =
103       (L=.0052,K=.103,D=120.,CP=.3,ABS=.8,SMOOTH),
104     FINISH FLOORING - WOOD 3/4 IN =
105       (L= 0625,ABS=.65,R=.68),
106     DIRT 12 IN =
107        (L=1.0,K=0.1,D=68 ,CP=.2,ABS=.7,ROUGH);
108   END MATERIALS;
109   DEFINE MATERIALS:
110     INSULATION - MINERAL FIBER FIBROUS 2 IN =
111       (R=7.),
112     INSULATION - MINERAL FIBER FIBROUS 3 IN =
113       (R=11.),
114     INSULATION - MINERAL FIBER FIBROUS 6 IN =
115       (R=19.),
116     INSULATION - CELLULAR GLASS 1 IN =
117       (L=.083,K=.0334,D=9.,CP=.24,ABS=.9,VERY ROUGH),
118     INSULATION - CELLULAR GLASS 2 IN =
119       (L=.167,K=.0334,D=9.,CP=.24,ABS=.9,VERY ROUGH),
120     INSULATION - CELLULAR GLASS 3 IN =
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121       (L= 25,K=.0334,D=9.,CP=.24,ABS=.9,VERY ROUGH),
122     INSULATION - GLASS FIBER BONDED 1 IN =
123       (L=.083,K=.0208,D=6.,CP=.19,ABS=.9,VERY ROUGH),
124     INSULATION - GLASS FIBER BONDED 2 IN =
125       (L=.167,K=.0208,D=6.,CP=.19,ABS=.9,VERY ROUGH),
126     INSULATION - GLASS FIBER BONDED 3 IN =
127       (L=.25,K=.0208,D=6 ,CP=.19,ABS=.9,VERY ROUGH),
128     INSULATION - EXPANDED RUBBER 1 IN =
129       (L=.083,K=.018,D=4.5,CP=.2,ABS=.6,ROUGH),
130     INSULATION - EXPANDED RUBBER 2 IN =
131       (L=.167,K=.018,D=4.5,CP=.2,ABS=.6,ROUGH),
132     INSULATION - EXPANDED RUBBER 3 IN =
133       (L=.25,K=.018,D=4.5,CP=.2,ABS=.6,ROUGH),
134     INSULATION - EXPANDED EXT  POLYSTYRENE 1 IN =
135       (L=.083,K=.0208,D=1.8,CP=.29,ABS=.5,ROUGH),
136     INSULATION - EXPANDED EXT  POLYSTYRENE 2 IN =
137       (L=.167,K=.0208,D=1.8,CP=.29,ABS=.5,ROUGH),
138     INSULATION - EXPANDED EXT  POLYSTYRENE 3 IN =
139       (L=.25,K=.0208,D=1.8 CP=.29,ABS=.5,ROUGH),
140     INSULATION - EXPANDED EXT  POLYSTYRENE R12 1 IN =
141       (L=.083,K=.016,D=3.5,CP=.29,ABS=.5,ROUGH),
142     INSULATION - EXPANDED EXT  POLYSTYRENE R12 2 IN =
143       (L=.167,K= 016,D=3 5,CP=.29,ABS=.5,ROUGH),
144     INSULATION - EXPANDED EXT  POLYSTYRENE R12 3 IN =
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145       (L=.25,K=.016,D=3.5,CP=.29,ABS=.5,ROUGH),
146     INSULATION - EXPANDED  POLYSTYRENE BEADS 1 IN =
147       (L=.083,K=.023,D=1.,CP=.29,ABS=.5,VERY ROUGH),
148     INSULATION - EXPANDED  POLYSTYRENE BEADS 2 IN =
149       (L=.167,K=.023,D=1.,CP=.29,ABS=.5,VERY ROUGH),
150     INSULATION - EXPANDED  POLYSTYRENE BEADS 3 IN =
151       (L=.25,K=.023,D=1.,CP=.29,ABS=.5,VERY ROUGH),
152     INSULATION - EXPANDED  POLYURETHANE R11 1 IN =
153       (L=.083,K=.013,D=2.,CP=.38,ABS=.5,VERY ROUGH),
154     INSULATION - EXPANDED  POLYURETHANE R11 2 IN =
155       (L=.167,K=.013,D=2.,CP=.38,ABS=.5,VERY ROUGH),
156     INSULATION - EXPANDED  POLYURETHANE R11 3 IN =
157       (L=.25,K=.013,D=2.,CP=.38,ABS=.5,VERY ROUGH),
158     INSULATION - MINERAL FIBER RESIN BOND 1 IN =
159       (L=.083,K=.027,D=15.,CP=.17,ABS=.6,VERY ROUGH),
160     INSULATION - MINERAL FIBER RESIN BOND 2 IN =
161       (L=.167,K=.027,D=15.,CP=.17,ABS=.6,VERY ROUGH),
162     INSULATION - MINERAL FIBER RESIN BOND 3 IN =
163       (L=.25,K=.027,D=15.,CP=.17,ABS=.6,VERY ROUGH),
164     INSULATION - MINERAL FIBERBP. WET FELTED 1 IN =
165       (L=.083,K=.029,D=16.,CP=.32,ABS=.6,ROUGH),
166     INSULATION - ACOUSTICAL TILE WET FELTED 1/2 IN =
167       (L=.0417,K=.031 D=21.,CP=.32,ABS=.7,ROUGH),
168     INSULATION - ACOUSTICAL TILE WET FELTED 3/4 IN =
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169       (L=.0625,K=.031,D=21.,CP=.32,ABS=.7,ROUGH),
170     INSULATION - ACOUSTICAL TILE WET MOLDED 1/2 IN =
171       (L=.0417,K=.035,D=23.,CP=.32,ABS=.7,ROUGH),
172     INSULATION - ACOUSTICAL TILE WET MOLDED 3/4 IN =
173       (L=.0625,K=.035,D=23.,CP=.32,ABS=.7,ROUGH),
174     INSULATION - ACOUSTICAL TILE WOOD FIBER 1/2 IN =
175       (L=.0417,K=.0334,D=25.,CP=.3,ABS=.7,ROUGH),
176     INSULATION - ACOUSTICAL TILE WOOD FIBER 3/4 IN =
177       (L=.0625,K=.0334,D=25.,CP=.3,ABS=.7,ROUGH),
178     INSULATION - INTERIOR PLANKING 1/2 IN =
179       (L=.0417,K=.026,D=15.,CP=.32,ABS=.7,MEDIUM SMOOTH),
180     INSULATION - INSULATING ROOF DECK 1/5 IN=
181       (L=.125,K=.027,D=30.,CP=.3,ABS=.78,MEDIUM SMOOTH),
182     INSULATION - INSULATING ROOF DECK 2 IN =
183       (L=.167,K=.027,D=30.,CP=.3,ABS=.78,MEDIUM SMOOTH),
184     INSULATION - INSULATING ROOF DECK 3 IN =
185       (L=.25,K=.027,D=30.,CP=.3,ABS=.78,MEDIUM SMOOTH),
186     INSULATION - WOOD SHREDDED BOARD 1/2 IN =
187       (L=.0417,K=.05,D=22.,CP=.38,ABS=.78,MEDIUM SMOOTH),
188     INSULATION - WOOD SHREDDED BOARD 3/4 IN =
189       (L=.0625,K=.05,D=22.,CP=.38,ABS=.78,MEDIUM SMOOTH),
190     INSULATION - CELLULOSE FILL 1 IN =
191       (R=3.7),
192     INSULATION - CELLULOSE FILL 2 IN =
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193       (R=7.2),
194     INSULATION - CELLULOSE FILL 4 IN =
195       (R=14.4),
196     INSULATION - CELLULOSE FILL 6 IN=
197       (R=21.6),
198     INSULATION - SAWDUST 1 IN =
199       (R=2.22),
200     INSULATION - SAWDUST 2 IN =
201       (R=4.44),
202     INSULATION - SAWDUST 4 IN =
203       (R=8.88),
204     INSULATION - SAWDUST 6 IN =
205       (R=13.32),
206     INSULATION - WOOD FIBER FILL 1 IN =
207       (R=3.33),
208     INSULATION - WOOD FIBER FILL 2 IN =
209       (R=6.66),
210     INSULATION - WOOD FIBER FILL 4 IN =
211       (R=13.32),
212     INSULATION - WOOD FIBER FILL 6 IN =
213       (R=19.98),
214     INSULATION - PERLITE FILL 1 IN =
215       (R=2.7),
216     INSULATION - PERLITE FILL 2 IN =
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217       (R=5.4),
218     INSULATION - PERLITE FILL 4 IN =
219       (R=10.8),
220     INSULATION - PERLITE FILL 6 IN =
221       (R=16.2),
222     INSULATION - MINERAL FIBER FILL 3 IN =
223       (R=9.),
224     INSULATION - MINERAL FIBER FILL 4 1/2 IN =
225       (R=13.),
226     INSULATION - MINERAL FIBER FILL 6 1/4 IN =
227       (R=19.),
228     INSULATION - MINERAL FIBER FILL 7 1/4 IN =
229       (R=24.),
230     INSULATION - SILICA AEROGEL 1 IN =
231       (R=5.88),
232     INSULATION - SILICA AEROGEL 2 IN =
233       (R=11.76),
234     INSULATION - SILICA AEROGEL 4 IN =
235       (R=23.52),
236     INSULATION - SILICA AEROGEL 6 IN =
237       (R=35.28),
238     INSULATION -  VERMICULITE 1 IN =
239       (R=2.13),
240     INSULATION -  VERMICULITE 2 IN =
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241       (R=4.26),
242    INSULATION -  VERMICULITE 4 IN =
243       (R=8.52)
244    INSULATION -  VERMICULITE 6 IN =
245       (R=12.78),
246    INSULATION - PREFORMED ROOF INSULATION 1/2 IN =
247       (R=1.39),
248    INSULATION - PREFORMED ROOF INSULATION 1 IN =
249       (R=2.78),
250    INSULATION - PREFORMED ROOF INSULATION 1 1/2 IN =
251       (R=4.17),
252    INSULATION - PREFORMED ROOF INSULATION 2 IN =
253       (R=5.56),
254    INSULATION - PREFORMED ROOF INSULATION 2 1/2 IN =
255       (R=6.67),
256    INSULATION - PREFORMED ROOF INSULATION 3 IN =
257       (R=8.33);
258  END MATERIALS;
259  DEFINE MATERIALS%
260    CONCRETE - CEMENT MORTAR 1/2 IN=
261       (L=.0417,K=.416,D=116.,CP=.2,ABS=.54,MEDIUM ROUGH),
262    CONCRETE - GYPSUM FIBER 2 IN =
263       (L=.167,K=.138,D=51.,CP=.2,ABS=.65,MEDIUM ROUGH),
264    CONCRETE - GYPSUM FIBER 4 IN =
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```
265       (L=.333,K=.138,D=51.,CP=.2,ABS=.65,MEDIUM ROUGH),
266    CONCRETE - GYPSUM FIBER 6 IN =
267       (L=.5,K=.138,D=51.,CP=.2,ABS=.65,MEDIUM ROUGH),
268    CONCRETE - GYPSUM FIBER 8 IN =
269       (L=.667,K=.138,D=51.,CP=.2,ABS=.65,MEDIUM ROUGH),
270    CONCRETE - 120 LB/CU FT  4IN =
271       (L=.333,K=.433,D=120.,CP=.2,ABS=.65,MEDIUM ROUGH),
272    CONCRETE - 100 LB/CU FT  4IN =
273       (L=.333,K=.300,D=100.,CP=.2,ABS=.65,MEDIUM ROUGH),
274    CONCRETE -  80 LB/CU FT  4IN =
275       (L=.333,K=.210,D= 80.,CP=.2,ABS=.65,MEDIUM ROUGH),
276    CONCRETE -  60 LB/CU FT  4IN =
277       (L=.333,K=.142,D= 60.,CP=.2,ABS=.65,MEDIUM ROUGH),
278    CONCRETE -  40 LB/CU FT  4IN =
279       (L=.333,K=.096,D= 40.,CP=.2,ABS=.65,MEDIUM ROUGH),
280    CONCRETE -  30 LB/CU FT  4IN =
281       (L=.333,K=.075,D= 30.,CP=.2,ABS=.65,MEDIUM ROUGH),
282    CONCRETE -  20 LB/CU FT  4IN =
283       (L=.333,K=.058,D= 20.,CP=.2,ABS=.65,MEDIUM ROUGH),
284    CONCRETE - PERLITE  40 LB/CU FT  4IN =
285       (L=.333,K=.0775,D=40.,CP=.2,ABS=.65,MEDIUM ROUGH),
286    CONCRETE - PERLITE  30 LB/CU FT  4IN =
287       (L=.333,K=.0592,D=30.,CP=.2,ABS=.65,MEDIUM ROUGH),
288    CONCRETE - PERLITE  20 LB/CU FT  4IN =
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```
289       (L=.333,K=.0417,D=20.,CP=.2,ABS=.65,MEDIUM ROUGH),
290     CONCRETE - DRIED SAND AND GRAVEL 2 IN =
291       (L=.167,K=.75,D=140.,CP=.2,ABS=.6,MEDIUM ROUGH),
292     CONCRETE - DRIED SAND AND GRAVEL 4 IN =
293       (L=.333,K=.75,D=140.,CP=.2,ABS=.6,MEDIUM ROUGH),
294     CONCRETE - DRIED SAND AND GRAVEL 6 IN =
295       (L=.50,K=.75,D=140.,CP=.2,ABS=.6,MEDIUM ROUGH),
296     CONCRETE - DRIED SAND AND GRAVEL 8 IN =
297       (L=.667,K=.75,D=140.,CP=.2,ABS=.6,MEDIUM ROUGH),
298     CONCRETE - SAND AND GRAVEL 2 IN =
299       (L=.167,K=1.0,D=140.,CP=.2,ABS=.6,MEDIUM ROUGH),
300     CONCRETE - SAND AND GRAVEL 4 IN =
301       (L=.333,K=1.0,D=140.,CP=.2,ABS=.6,MEDIUM ROUGH),
302     CONCRETE - SAND AND GRAVEL 6 IN =
303       (L=.50,K=1.0,D=140.,CP=.2,ABS=.6,MEDIUM ROUGH),
304     CONCRETE - SAND AND GRAVEL 8 IN =
305       (L=.667,K=1.0,D=140.,CP=.2,ABS=.6,MEDIUM ROUGH);
306   END MATERIALS;
307   DEFINE MATERIALS%
308     CONCRETE - STUCCO 1/4 IN =
309       (L=.0209,K=.416,D=116.,CP=.2,ABS=.73,VERY ROUGH),
310     CONCRETE - STUCCO 1/2 IN =
311       (L=.0417,K=.416,D=116.,CP=.2,ABS=.73,VERY ROUGH),
312     BRICK - COMMON 4 IN =
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```
313       (L=.333,K=.42,D=120.,CP=.2,ABS=.7,ROUGH),
314     BRICK - COMMON 8 IN =
315       (L=.667,K=.42,D=120.,CP=.2,ABS=.7,ROUGH),
316     BRICK - FACE 4 IN =
317       (L=.333,K=.77,D=125.,CP=.22,ABS=.6,ROUGH)
318     CLAY TILE 1 CELL - 3 IN =
319       (L=.25,K=.31,D=70.,CP=.2,ABS=.63,SMOOTH),
320     CLAY TILE 1 CELL - 4 IN =
321       (L=.333,K=.3,D=70.,CP=.2,ABS=.63,SMOOTH),
322     CLAY TILE 2 CELL - 6 IN =
323       (L=.5,K=.33,D=70.,CP=.2,ABS=.63,SMOOTH),
324     CLAY TILE 2 CELL - 8 IN =
325       (L=.667,K=.35,D=70.,CP=.2,ABS=.63,SMOOTH),
326     CLAY TILE 2 CELL - 10 IN =
327       (L=.833,K=.37,D=70.,CP=.2,ABS=.63,SMOOTH),
328     CLAY TILE 3 CELL - 12 IN =
329       (L=1.,K=.40,D=70.,CP=.2,ABS=.63,SMOOTH),
330     CONCRETE BLOCK - 3CO SGA 4 IN =
331       (L=.333,K=.46,D=61.,CP=.2,ABS=.7,MEDIUM ROUGH),
332     CONCRETE BLOCK - 3CO SGA 8 IN =
333       (L=.667,K=.59,D=61.,CP=.2,ABS=.7,MEDIUM ROUGH),
334     CONCRETE BLOCK - 3CO SGA 12 IN =
335       (L=1.0,K=.76,D=61.,CP=.2,ABS=.7,MEDIUM ROUGH),
336     CONCRETE BLOCK - 3CO CA 3 IN =
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```
337       (L=.55,K=.29,D=38.,CP=.2,ABS=.7,MEDIUM ROUGH),
338     CONCRETE BLOCK - 3CO CA 4 IN =
339       (L=.333,K=.3,D=38.,CP=.2,ABS=.7,MEDIUM ROUGH),
340     CONCRETE BLOCK - 3CO CA 8 IN =
341       (L=.667,K=.39,D=38.,CP=.2,ABS=.7,MEDIUM ROUGH),
342     CONCRETE BLOCK - 3CO CA 12 IN =
343       (L=1.0,K=.53,D=38.,CP=.2,ABS=.7,MEDIUM ROUGH),
344     CONCRETE BLOCK - 3CO LW AGG 3 IN =
345       (L=.25,K=.196,D=38.,CP=.2,ABS=.7,MEDIUM ROUGH),
346     CONCRETE BLOCK - 3CO LW AGG 4 IN=
347       (L= 333,K=.223,D=38.,CP=.2,ABS=.7,MEDIUM ROUGH),
348     CONCRETE BLOCK - 3CO LW AGG 8 IN =
349       (L=.667,K=.33,D=38.,CP=.2,ABS=.7,MEDIUM ROUGH),
350     CONCRETE BLOCK - 3CO LW AGG 12 IN =
351       (L=1.,K=.44,D=38.,CP=.2,ABS=.7,MEDIUM ROUGH),
352     CONCRETE BLOCK - 2CR SGA 8 IN =
353       (L=.667,K=.634,D=61.,CP=.2,ABS=.7,MEDIUM ROUGH),
354     CONCRETE BLOCK - 2CR SGA FC 8 IN =
355       (L=.667,K=.343,D=61.,CP=.2,ABS=.7,MEDIUM ROUGH),
356     CONCRETE BLOCK - 3CR LWA 6 IN =
357       (L=.5,K=.305,D=61.,CP=.2,ABS=.7,MEDIUM ROUGH),
358     CONCRETE BLOCK - 3CR LWA FC 6 IN =
359       (L=.5,K=.165,D=61.,CP=.2,ABS=.7,MEDIUM ROUGH),
360     CONCRETE BLOCK - 2CR LWA 8 IN =
```



```
361       (L=.667,K=.304,D=61.,CP=.2,ABS=.7,MEDIUM ROUGH),
362     CONCRETE BLOCK - 2CR LWA FC 8 IN =
363       (L=.667,K=.132,D=61.,CP=.2,ABS=.7,MEDIUM ROUGH),
364     CONCRETE BLOCK - 3CR LWA 12 IN =
365       (L=1.,K=.40,D=61.,CP=.2,ABS=.7,MEDIUM ROUGH),
366     CONCRETE BLOCK - 3CR LWA FC 12 IN =
367       (L=1.,K=.17,D=61.,CP=.2,ABS=.7,MEDIUM ROUGH),
368     CONCRETE BLOCK - STONE LIME SAND 4 IN =
369       (L=.333,K=1.04,D=55.,CP=.4,ABS=.6,MEDIUM ROUGH),
370     CONCRETE BLOCK - GYPSUM PART.TILE SOLID 3 IN =
371       (L=.25,K=.197,D=100.,CP=.2,ABS=.75,MEDIUM SMOOTH),
372     CONCRETE BLOCK - GYPSUM PART.TILE 4 CELL 3 IN =
373       (L=.25,K=.185,D=30.,CP=.2,ABS=.75,MEDIUM SMOOTH),
374     CONCRETE BLOCK - GYPSUM PART.TILE 3 CELL 4 IN =
375       (L=.333,K=.20,D=30.,CP=.2,ABS=.75,MEDIUM SMOOTH),
376     METAL - BARE ALUMINUM 1/16 IN =
377       (L=.0052,K=128.,D=171.,CP=.214,ABS=.2,SMOOTH),
378     METAL - GALVANIZED STEEL 1/16 IN =
379       (L=.0052,K=26.2,D=489.,CP=.12,ABS=.23,SMOOTH),
380     METAL - AGED COPPER 1/16 IN =
381       (L=.0052,K=227.,D=556.,CP=.09,ABS=.2,SMOOTH);
382   END MATERIALS;
383   DEFINE MATERIALS:
384     PLASTER - CEMENT SA 3/8 IN =
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```
385       (L=.0313,K=.417,D=116.,CP=.2,ABS=.78,SMOOTH),
386    PLASTER - CEMENT SA 3/4 IN =
387       (L=.0625,K=.417,D=116.,CP=.2,ABS=.78,SMOOTH),
388    PLASTER - GYPSUM LWA 1/2 IN =
389       (L=.0417,K=.13,D=45.,CP=.2,ABS=.78,SMOOTH),
390    PLASTER - GYPSUM LWA 5/8 IN =
391       (L=.0521,K=.13,D=45.,CP=.2,ABS=.78,SMOOTH),
392    PLASTER - GYPSUM LWA ML 3/4 IN =
393       (L=.0625,K=.133,D=45.,CP=.2,ABS=.78,SMOOTH),
394    PLASTER - GYPSUM PERLITE 1/2 IN =
395       (L=.0417,K=.125,D=45.,CP=.2,ABS=.78,SMOOTH),
396    PLASTER - GYPSUM SA 1/2 IN =
397       (L=.0417,K=.467,D=105.,CP=.2,ABS=.78,SMOOTH),
398    PLASTER - GYPSUM SA 5/8 IN =
399       (L=.0521,K=.467,D=105.,CP=.2,ABS=.78,SMOOTH),
400    PLASTER - GYPSUM SA ML 3/4 IN =
401       (L=.0625,K=.467,D=105.,CP=.2,ABS=.78,SMOOTH),
402    PLASTER - GYPSUM VA 1/2 IN =
403       (L=.0417,K=.142,D=45.,CP=.2,ABS=.78,SMOOTH);
404  END MATERIALS;
405  DEFINE MATERIALS%
406    ROOFING - ASB CEM SHINGLES =
407       (L= 0104,K=.049,D=120.,CP=.2,ABS=.7,VERY ROUGH),
408    ROOFING - ASPHALT ROLL =
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```
409       (L=.0104,K=.067,D=70.,CP=.2,ABS=.8,VERY ROUGH),
410    ROOFING - ASPHALT SHINGLES =
411       (L=.0104,K=.023,D=70.,CP=.2,ABS=.7,VERY ROUGH),
412    ROOFING - BUILT UP ROOFING - 3/8 IN =
413       (L=.0313,K=.094.D=70.,CP=.35,ABS=.7,VERY ROUGH),
414    ROOFING - SLATE 1/2 IN =
415       (L=.0417,K=.833,D=85.,CP=.4,ABS=.9,VERY ROUGH),
416    ROOFING - WOOD SHINGLES =
417       (L=.0625,K=.066,D=45.,CP=.3,ABS=.78,VERY ROUGH);
418  END MATERIALS;
419  DEFINE MATERIALS%
420    SIDING - WD SHINGLES 16X7 1/2 EXP 3/4 IN =
421       (L=.1247,K=.07,D=37.,CP=.3,ABS=.78,VERY ROUGH),
422    SIDING - WOOD SHINGLES DBL 16X12 EXP =
423       (L=.25,K=.07,D=37.,CP=.3,ABS=.78,VERY ROUGH),
424    SIDING - WOOD SHINGLES INS 5/16 IN =
425       (L=.0521,K=.045,D=37.,CP=.3,ABS=.78,VERY ROUGH),
426    SIDING - ASB CEM. 1/4 IN =
427       (L=.0209,K=.099,D=120.,CP=.2,ABS=.7,VERY ROUGH),
428    SIDING - ASPHALT ROLL =
429       (L=.0104,K=.067,D=70.,CP=.2,ABS=.8,VERY ROUGH),
430    SIDING - ASPHALT INS 1/2 IN =
431       (L=.0417,K=.029,D=70.,CP=.2,ABS=.8,VERY ROUGH),
432    SIDING - WOOD DROP 1 IN =
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433       (L=.083,K=.07,D=37.,CP=.31,ABS=.78,VERY ROUGH),
434     SIDING - WOOD BEVEL LAPPED 1/2 IN=
435       (L=.0417,K=.06,D=37.,CP=.31,ABS=.78,VERY ROUGH),
436     SIDING - WOOD BEVEL LAPPED 3/4 IN=
437       (L=.0625,K=.06,D=37.,CP=.31,ABS=.78,VERY ROUGH),
438     SIDING - PLYWOOD LAPPED 3/8 IN =
439       (L=.0313,K=.07,D=37.,CP=.29,ABS=.78,VERY ROUGH),
440     SIDING - METAL HOLLOW BACKED =
441       (L=.005,K=26.,D=480.,CP=.1,ABS=.5,SMOOTH),
442     SIDING - INS BRD 3/8 IN =
443       (L=.0313,K=.017,D=60.,CP=.31,ABS=.5,SMOOTH),
444     SIDING - INS BRD FB 3/8 IN =
445       (L=.0313,K=.011,D=60.,CP=.31,ABS=.5,SMOOTH);
446   END MATERIALS;
447   DEFINE MATERIALS%
448     WOOD - HARDWOOD 3/4 IN =
449       (L=.0625,K=.092,D=45.,CP=.3,ABS=.78,MEDIUM SMOOTH),
450     WOOD - HARDWOOD 1 1/2 IN =
451       (L=.1247,K=.092,D=45.,CP=.3,ABS=.78,MEDIUM SMOOTH),
452     WOOD - HARDWOOD 2 1/2 IN =
453       (L=.2087,K=.092,D=45.,CP=.3,ABS=.78,MEDIUM SMOOTH),
454     WOOD - HARDWOOD 3 1/2 IN =
455       (L=.2917,K=.092,D=45.,CP=.3,ABS=.78,MEDIUM SMOOTH),
456     WOOD - SOFTWOOD 3/4 IN =
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457       (L=.0625,K=.0675,D=32.,CP=.33,ABS=.78,MEDIUM SMOOTH),
458     WOOD - SOFTWOOD 1 1/2 IN =
459       (L=.1247,K=.0675,D=32.,CP=.33,ABS=.78,MEDIUM SMOOTH),
460     WOOD - SOFTWOOD 2 1/2 IN =
461       (L=.2087,K=.0675,D=32.,CP=.33,ABS=.78,MEDIUM SMOOTH),
462     WOOD - SOFTWOOD 3 1/2 IN =
463       (L=.2917,K=.0675,D=32.,CP=.33,ABS=.78,MEDIUM SMOOTH),
464     WOOD - HARDWOOD 1/8 IN =
465       (L=.0104,K=.092,D=45.,CP=.3,ABS=.78,MEDIUM SMOOTH);
466   END MATERIALS;
467   DEFINE MATERIALS%
468     GLASS - CLEAR SHEET 1/8 IN=
469       (R=.0236,TRANS=.87,VERY SMOOTH,GLASS),
470     GLASS - CLEAR PLATE 1/4 IN=
471       (R=.0472,TRANS=.80,VERY SMOOTH,GLASS),
472     GLASS - CLEAR PLATE 3/8 IN=
473       (R=.0708,TRANS=.75,VERY SMOOTH,GLASS),
474     GLASS - CLEAR PLATE 1/2 IN=
475       (R=.0944,TRANS=.71,VERY SMOOTH,GLASS),
476     GLASS - GREY SHEET 1/8 IN=
477       (R=.0236,TRANS=.59,VERY SMOOTH,GLASS),
478     GLASS - GREY SHEET 1/4 IN=
479       (R=.0472,TRANS=.67,VERY SMOOTH,GLASS),
480     GLASS - GREY PLATE 1/4 IN=
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CERL -- B.L.A.S.T. SYSTEM --- VERSION 2.0          20 MAR 79      12.47.06

481       (R=.0472,TRANS=.44,VERY SMOOTH,GLASS),
482     GLASS - GREY PLATE 3/8 IN=
483       (R=.0708,TRANS=.35,VERY SMOOTH,GLASS),
484     GLASS - GREY PLATE 1/2 IN=
485       (R=.0944,TRANS=.21,VERY SMOOTH,GLASS),
486     GLASS - GREEN SHEET 1/4 IN=
487       (R=.0472,TRANS=.75,VERY SMOOTH,GLASS),
488     GLASS - BRONZE PLATE 1/4 IN=
489       (R=.0472,TRANS=.49,VERY SMOOTH,GLASS),
490     GLASS - BRONZE PLATE 1/2 IN=
491       (R=.0944,TRANS=.25,VERY SMOOTH,GLASS),
492     GLASS - HEAT ABSORBING PLATE 1/8 IN=
493       (R=.0236,TRANS=.58,VERY SMOOTH,GLASS),
494     GLASS - HEAT ABSORBING PLATE 1/4 IN=
495       (R=.0472,TRANS=.46,VERY SMOOTH,GLASS),
496     GLASS - HEAT ABSORBING PLATE 3/8 IN=
497       (R=.0708,TRANS=.33,VERY SMOOTH,GLASS),
498     GLASS - HEAT ABSORBING PLATE 1/2 IN=
499       (R=.0944,TRANS=.24,VERY SMOOTH,GLASS);
500   END MATERIALS;
501   DEFINE MATERIALS(
502     VENETIAN BLINDS-LIGHT =
503       (REF=.25,TRANS=.65,SHADE),
504     VENETIAN BLINDS-MEDIUM =



CERL -- B.L.A.S.T. SYSTEM --- VERSION 2.0          20 MAR 79      12.47.06

505       (REF=.12,TRANS=.60,SHADE),
506     SHADE ROLL - LIGHT TRANSLUCENT =
507       (REF=.45,TRANS=.40,SHADE),
508     SHADE ROLL - MEDIUM TRANSLUCENT =
509       (REF=.25,TRANS=.30,SHADE),
510     SHADE ROLL - LIGHT OPAQUE =
511       (REF=.50,TRANS=.05,SHADE),
512     SHADE ROLL - MEDIUM OPAQUE =
513       (REF=.35,TRANS=.05,SHADE),
514     DRAPES - OPEN WEAVE LIGHT =
515       (REF=.25,TRANS=.70,SHADE),
516     DRAPES - OPEN WEAVE MEDIUM =
517       (REF=.15,TRANS=.70,SHADE),
518     DRAPES - OPEN WEAVE DARK =
519       (REF=.05,TRANS=.70,SHADE),
520     DRAPES - SEMI OPEN WEAVE LIGHT =
521       (REF=.40,TRANS=.45,SHADE),
522     DRAPES - SEMI OPEN WEAVE MEDIUM =
523       (REF=.25,TRANS=.45,SHADE),
524     DRAPES - SEMI OPEN WEAVE DARK =
525       (REF=.15,TRANS=.45,SHADE),
526     DRAPES - CLOSE WEAVE LIGHT =
527       (REF=.55,TRANS=.00,SHADE),
528     DRAPES - CLOSE WEAVE MEDIUM =
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529       (REF=.30,TRANS= 05,SHADE),
530     DRAPES - CLOSE WEAVE DARK =
531       (REF=.10,TRANS=.05,SHADE),
532     AIRSPACE - CEILING =
533       (R=1.0,AIR),
534     AIRSPACE - HORIZONTAL UP =
535       (R=.90,AIR),
536     AIRSPACE - HORIZONTAL DOWN =
537       (R=1.23,AIR),
538     AIRSPACE - VERTICAL =
539       (R=.97,AIR),
540     AIRSPACE - SLOPE UP =
541       (R=.92,AIR),
542     AIRSPACE - SLOPE DOWN =
543       (R=1.05,AIR),
544     A1-1 IN STUCCO =
545       (L=.0833,K=.4, D=116.,CP=.20,ABS=.92,SMOOTH),
546     A2-4 IN DENSE FACE BRICK =
547       (L=.333, K=.72, D=130.,CP=.22,ABS=.93,ROUGH),
548     A3-STEEL SIDING =
549       (L=.005, K=26.0,D=480.,CP=.10,ABS=.20,SMOOTH),
550     A6-FINISH =
551       (L=.0417,K=.24, D=78., CP=.26,ABS=.50,VERY SMOOTH),
552     A7-4 IN FACE BRICK =
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CERL -- B.L.A.S.T. SYSTEM --- VERSION 2.0 20 MAR 79 12.47.06

```
553       (L=.333,K=.77,D=125.,CP=.22,ABS=.93,ROUGH),
554     B1-AIRSPACE RESISTANCE =
555       (R=.91,AIR),
556     B2-1 IN INSULATION =
557       (L=.083, K=.025,D=2.0, CP=.2, ABS=.5, VERY ROUGH),
558     B3-2 IN INSULATION =
559       (L=.167, K=.025,D=2.0, CP=.2, ABS=.5, VERY ROUGH),
560     B4-3 IN INSULATION =
561       (L=.25,  K=.025,D=2.0, CP=.2, ABS=.5, VERY ROUGH),
562     B5-1 IN DENSE INSULATION =
563       (L=.0833,K=.025,D=5.7, CP=.2, ABS=.5, VERY ROUGH),
564     B6-2 IN DENSE INSULATION =
565       (L=.167, K= 025,D=5.7, CP=.2, ABS=.5, VERY ROUGH),
566     B7-1 IN WOOD =
567       (L=.0833,K=.07, D=37.0,CP=.6, ABS=.78,MEDIUM SMOOTH),
568     B8-2 1/2 IN WOOD =
569       (L=.2083,K=.07, D=37.0,CP=.6, ABS=.78,MEDIUM SMOOTH),
570     B9-4 IN WOOD =
571       (L=.333, K=.07, D=37.0,CP=.6, ABS=.78,MEDIUM SMOOTH),
572     B10-2 IN WOOD =
573       (L=.167, K=.07, D=37.0,CP=.6, ABS=.78,MEDIUM SMOOTH),
574     B11-3 IN WOOD =
575       (L=.25,  K=.07, D=37.0,CP=.6, ABS=.78,MEDIUM SMOOTH),
576     B12-3 IN DENSE INSULATION =
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577       (L=.25,  K=.025,D=5.7, CP=.2, ABS=.9, VERY ROUGH),
578     C1-4 IN CLAY TILE =
579       (L=.333, K=.33, D=70.0,CP=.2, ABS=.82,SMOOTH),
580     C2-4 IN LW CONCRETE BLOCK =
581       (L=.333, K=.22, D=38., CP=.2, ABS=.65,MEDIUM ROUGH),
582     C3-4 IN HW CONCRETE BLOCK =
583       (L=.333, K=.47, D=61.0,CP=.2, ABS=.65,MEDIUM ROUGH),
584     C4-4 IN COMMON BRICK =
585       (L=.333, K=.42, D=120.,CP=.2, ABS=.76,ROUGH),
586     C5-4 IN HW CONCRETE =
587       (L=.333, K=1.0, D=140.,CP=.2, ABS=.65,MEDIUM ROUGH),
588     C6-8 IN CLAY TILE =
589       (L=.667, K=.33, D=70., CP=.2, ABS=.82,SMOOTH),
590     C7-8 IN LW CONCRETE BLOCK =
591       (L=.667, K=.33, D=38.0,CP=.2, ABS=.65,ROUGH),
592     C8-8 IN HW CONCRETE BLOCK =
593       (L=.667, K=.6,  D=61.0,CP=.2, ABS=.65,ROUGH),
594     C9-8 IN COMMON BRICK =
595       (L=.667, K=.42, D=120.,CP=.2, ABS=.72,ROUGH),
596     C10-8 IN HW CONCRETE =
597       (L=.667, K=1.0, D=140.,CP=.2, ABS=.65,MEDIUM ROUGH),
598     C11-12 IN HW CONCRETE =
599       (L=1.0,  K=1.0, D=140.,CP=.2, ABS=.65,MEDIUM ROUGH),
600     C12-2 IN HW CONCRETE =
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601       (L=.167, K=1.0, D=140.,CP=.2, ABS=.65,MEDIUM ROUGH),
602     C13-6 IN HW CONCRETE =
603       (L=.5,   K=1.0, D=140.,CP=.2, ABS=.65,MEDIUM ROUGH),
604     C14-4 IN LW CONCRETE =
605       (L=.333, K=.1,  D=40., CP=.2, ABS=.65,MEDIUM ROUGH),
606     C15-6 IN LW CONCRETE =
607       (L=.5,   K=.1,  D=40., CP=.2, ABS=.65,MEDIUM ROUGH),
608     C16-8 IN LW CONCRETE =
609       (L=.667, K=.1,  D=40., CP=.2, ABS=.65,MEDIUM ROUGH),
610     E1-3/4 IN PLASTER OR GYP BOARD =
611       (L=.0625,K=.42, D=100.,CP=.2, ABS=.92,SMOOTH),
612     E2-1/2 IN SLAG OR STONE =
613       (L=.0417,K=.83, D=55., CP=.40,ABS=.55,ROUGH),
614     E3-3/8 IN FELT AND MEMBRANE =
615       (L=.0313,K=.11, D=70., CP=.40,ABS=.75,ROUGH),
616     E4-CEILING AIRSPACE =
617       (R=1.0,AIR),
618     E5-ACOUSTIC TILE =
619       (L=.0625,K=.035 D=30., CP=.20,ABS=.32,MEDIUM SMOOTH) ;
620   END MATERIALS:
621   DEFINE WALLS%
622     EXTWALL01=
623         (A2-4 IN DENSE FACE BRICK, B3-2 IN INSULATION,
624          C2-4 IN LW CONCRETE BLOCK,E1-3/4 IN PLASTER OR GYP BOARD),
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625   EXTWALL02=
626       (C14-4 IN LW CONCRETE,E1-3/4 IN PLASTER OR GYP BOARD),
627   EXTWALL03=
628       (A2-4 IN DENSE FACE BRICK, B1-AIRSPACE RESISTANCE,
629       C9-8 IN COMMON BRICK,E1-3/4 IN PLASTER OR GYP BOARD),
630   EXTWALL04=
631       (A2-4 IN DENSE FACE BRICK, B1-AIRSPACE RESISTANCE,
632       C8-8 IN HW CONCRETE BLOCK,E1-3/4 IN PLASTER OR GYP BOARD),
633   EXTWALL05=
634       (A2-4 IN DENSE FACE BRICK, B1-AIRSPACE RESISTANCE,
635       C7-8 IN LW CONCRETE BLOCK,E1-3/4 IN PLASTER OR GYP BOARD),
636   EXTWALL06=
637       (A2-4 IN DENSE FACE BRICK, B1-AIRSPACE RESISTANCE, C6-8 IN CLAY TILE,
638       E1-3/4 IN PLASTER OR GYP BOARD),
639   EXTWALL07=
640       (A2-4 IN DENSE FACE BRICK, B1-AIRSPACE RESISTANCE, C12-2 IN HW CONCRETE,
641       E1-3/4 IN PLASTER OR GYP BOARD),
642   EXTWALL08=
643       (A2-4 IN DENSE FACE BRICK, B1-AIRSPACE RESISTANCE, C4-4 IN COMMON BRICK,
644       E1-3/4 IN PLASTER OR GYP BOARD),
645   EXTWALL09=
646     (A2-4 IN DENSE FACE BRICK,B1-AIRSPACE RESISTANCE,C3-4 IN HW CONCRETE BLOCK,
647      E1-3/4 IN PLASTER OR GYP BOARD),
648   EXTWALL10=
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649     (A2-4 IN DENSE FACE BRICK,B1-AIRSPACE RESISTANCE,C2-4 IN LW CONCRETE BLOCK,
650      E1-3/4 IN PLASTER OR GYP BOARD),
651   EXTWALL11=
652       (A1-1 IN STUCCO, C11-12 IN HW CONCRETE,E1-3/4 IN PLASTER OR GYP BOARD),
653   EXTWALL12=
654       (A1-1 IN STUCCO, C10-8 IN HW CONCRETE,B6-2 IN DENSE INSULATION,
655        E1-3/4 IN PLASTER OR GYP BOARD),
656   EXTWALL13=
657       (A1-1 IN STUCCO, C10-8 IN HW CONCRETE,B5-1 IN DENSE INSULATION,
658        E1-3/4 IN PLASTER OR GYP BOARD),
659   EXTWALL14=
660       (A1-1 IN STUCCO, C10-8 IN HW CONCRETE,B1-AIRSPACE RESISTANCE,
661        E1-3/4 IN PLASTER OR GYP BOARD),
662   EXTWALL15=
663       (A1-1 IN STUCCO, C10-8 IN HW CONCRETE, E1-3/4 IN PLASTER OR GYP BOARD),
664   EXTWALL16=
665       (A2-4 IN DENSE FACE BRICK, C9-8 IN COMMON BRICK, B2-1 IN INSULATION,
666        E1-3/4 IN PLASTER OR GYP BOARD),
667   EXTWALL17=
668       (A2-4 IN DENSE FACE BRICK, C9-8 IN COMMON BRICK, B1-AIRSPACE RESISTANCE,
669        E1-3/4 IN PLASTER OR GYP BOARD),
670   EXTWALL18=
671       (A7-4 IN FACE BRICK, B1-AIRSPACE RESISTANCE, C14-4 IN LW CONCRETE),
672   EXTWALL19=
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673       (A6-FINISH, B4-3 IN INSULATION, A6-FINISH),
674    EXTWALL20*
675       (A7-4 IN FACE BRICK, B1-AIRSPACE RESISTANCE, A2-4 IN DENSE FACE BRICK),
676    EXTWALL21*
677       (A7-4 IN FACE BRICK, C7-8 IN LW CONCRETE BLOCK, A6-FINISH),
678    EXTWALL22*
679       (A7-4 IN FACE BRICK, B1-AIRSPACE RESISTANCE, C3-4 IN HW CONCRETE BLOCK,
680       A6-FINISH),
681    EXTWALL23*
682       (A7-4 IN FACE BRICK, B1-AIRSPACE RESISTANCE, C8-8 IN HW CONCRETE BLOCK,
683       A6-FINISH),
684    EXTWALL24*
685     (A7-4 IN FACE BRICK,B1-AIRSPACE RESISTANCE,C15-6 IN LW CONCRETE,A6-FINISH),
686    EXTWALL25*
687       (A7-4 IN FACE BRICK,B6-2 IN DENSE INSULATION,A6-FINISH),
688    EXTWALL26*
689       (A6-FINISH, B6-2 IN DENSE INSULATION, A6-FINISH),
690    EXTWALL27*
691       (A3-STEEL SIDING, B12-3 IN DENSE INSULATION, A3-STEEL SIDING),
692    EXTWALL28*
693       (A3-STEEL SIDING, B6-2 IN DENSE INSULATION, A3-STEEL SIDING),
694    EXTWALL29*
695       (A3-STEEL SIDING, B5-1 IN DENSE INSULATION, A3-STEEL SIDING),
696    EXTWALL30*
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697     (A3-STEEL SIDING,B6-2 IN DENSE INSULATION,C11-12 IN HW CONCRETE,A6-FINISH),
698    EXTWALL31*
699      (A3-STEEL SIDING,B6-2 IN DENSE INSULATION,C10-8 IN HW CONCRETE,A6-FINISH),
700    EXTWALL32*
701       (A3-STEEL SIDING,B6-2 IN DENSE INSULATION,C5-4 IN HW CONCRETE,A6-FINISH),
702    EXTWALL33*
703       (C11-12 IN HW CONCRETE,B6-2 IN DENSE INSULATION, A6-FINISH),
704    EXTWALL34*
705       (C10-8 IN HW CONCRETE,B6-2 IN DENSE INSULATION, A6-FINISH),
706    EXTWALL35*
707       (C5-4 IN HW CONCRETE, B6-2 IN DENSE INSULATION, A6-FINISH),
708    EXTWALL36*
709       (A1-1 IN STUCCO, B1-AIRSPACE RESISTANCE, B4-3 IN INSULATION,
710        E1-3/4 IN PLASTER OR GYP BOARD),
711    EXTWALL37*
712       (A1-1 IN STUCCO, B1-AIRSPACE RESISTANCE, B3-2 IN INSULATION,
713        E1-3/4 IN PLASTER OR GYP BOARD),
714    EXTWALL38*
715       (A1-1 IN STUCCO, B1-AIRSPACE RESISTANCE, B2-1 IN INSULATION,
716        E1-3/4 IN PLASTER OR GYP BOARD),
717    EXTWALL39*
718       (A1-1 IN STUCCO, B1-AIRSPACE RESISTANCE, E1-3/4 IN PLASTER OR GYP BOARD),
719    EXTWALL40*
720       (A1-1 IN STUCCO, B3-2 IN INSULATION, C11-12 IN HW CONCRETE,
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721         E1-3/4 IN PLASTER OR GYP BOARD),
722     EXTWALL41=
723         (A1-1 IN STUCCO, B3-2 IN INSULATION, C10-8 IN HW CONCRETE,
724          E1-3/4 IN PLASTER OR GYP BOARD),
725     EXTWALL42=
726         (A1-1 IN STUCCO, B3-2 IN INSULATION, C9-8 IN COMMON BRICK,
727          E1-3/4 IN PLASTER OR GYP BOARD),
728     EXTWALL43=
729         (A1-1 IN STUCCO, B3-2 IN INSULATION, C8-8 IN HW CONCRETE BLOCK,
730          E1-3/4 IN PLASTER OR GYP BOARD),
731     EXTWALL44=
732         (A1-1 IN STUCCO, B3-2 IN INSULATION, C7-8 IN LW CONCRETE BLOCK,
733          E1-3/4 IN PLASTER OR GYP BOARD),
734     EXTWALL45=
735         (A1-1 IN STUCCO, B3-2 IN INSULATION, C6-8 IN CLAY TILE,
736          E1-3/4 IN PLASTER OR GYP BOARD),
737     EXTWALL46=
738         (A1-1 IN STUCCO, B3-2 IN INSULATION, C5-4 IN HW CONCRETE,
739          E1-3/4 IN PLASTER OR GYP BOARD),
740     EXTWALL47=
741         (A1-1 IN STUCCO, B3-2 IN INSULATION, C4-4 IN COMMON BRICK,
742          E1-3/4 IN PLASTER OR GYP BOARD),
743     EXTWALL48=
744         (A1-1 IN STUCCO, B3-2 IN INSULATION, C3-4 IN HW CONCRETE BLOCK,
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745         E1-3/4 IN PLASTER OR GYP BOARD),
746     EXTWALL49=
747         (A1-1 IN STUCCO, B3-2 IN INSULATION, C2-4 IN LW CONCRETE BLOCK,
748          E1-3/4 IN PLASTER OR GYP BOARD),
749     EXTWALL50=
750         (A1-1 IN STUCCO, B3-2 IN INSULATION, C1-4 IN CLAY TILE,
751          E1-3/4 IN PLASTER OR GYP BOARD),
752     EXTWALL51=
753         (A2-4 IN DENSE FACE BRICK, B3-2 IN INSULATION, C11-12 IN HW CONCRETE,
754          E1-3/4 IN PLASTER OR GYP BOARD),
755     EXTWALL52=
756         (A2-4 IN DENSE FACE BRICK, B3-2 IN INSULATION, C10-8 IN HW CONCRETE,
757          E1-3/4 IN PLASTER OR GYP BOARD),
758     EXTWALL53=
759         (A2-4 IN DENSE FACE BRICK, B3-2 IN INSULATION, C9-8 IN COMMON BRICK,
760          E1-3/4 IN PLASTER OR GYP BOARD),
761     EXTWALL54=
762         (A2-4 IN DENSE FACE BRICK, B1-AIRSPACE RESISTANCE, C11-12 IN HW CONCRETE,
763          E1-3/4 IN PLASTER OR GYP BOARD),
764     EXTWALL55=
765         (A2-4 IN DENSE FACE BRICK, B1-AIRSPACE RESISTANCE, C10-8 IN HW CONCRETE,
766          E1-3/4 IN PLASTER OR GYP BOARD),
767     EXTWALL56=
768         (A2-4 IN DENSE FACE BRICK, B3-2 IN INSULATION, C8-8 IN HW CONCRETE BLOCK,
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769         E1-3/4 IN PLASTER OR GYP BOARD),
770     EXTWALL57=
771         (A2-4 IN DENSE FACE BRICK, B3-2 IN INSULATION, C7-8 IN LW CONCRETE BLOCK,
772          E1-3/4 IN PLASTER OR GYP BOARD),
773     EXTWALL58=
774         (A2-4 IN DENSE FACE BRICK, B3-2 IN INSULATION, C6-8 IN CLAY TILE,
775          E1-3/4 IN PLASTER OR GYP BOARD),
776     EXTWALL59=
777         (A2-4 IN DENSE FACE BRICK, B3-2 IN INSULATION, C5-4 IN HW CONCRETE,
778          E1-3/4 IN PLASTER OR GYP BOARD),
779     EXTWALL60=
780         (A2-4 IN DENSE FACE BRICK, B3-2 IN INSULATION, C4-4 IN COMMON BRICK,
781          E1-3/4 IN PLASTER OR GYP BOARD),
782     EXTWALL61=
783         (A2-4 IN DENSE FACE BRICK, B2-1 IN INSULATION, C3-4 IN HW CONCRETE BLOCK,
784          E1-3/4 IN PLASTER OR GYP BOARD),
785     EXTWALL62=
786         (A2-4 IN DENSE FACE BRICK, C9-8 IN COMMON BRICK,
787          E1-3/4 IN PLASTER OR GYP BOARD),
788     EXTWALL63=
789         (A1-1 IN STUCCO, C8-8 IN HW CONCRETE BLOCK, B2-1 IN INSULATION,
790          E1-3/4 IN PLASTER OR GYP BOARD),
791     EXTWALL64=
792       (A1-1 IN STUCCO,C8-8 IN HW CONCRETE BLOCK,E1-3/4 IN PLASTER OR GYP BOARD),
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793     EXTWALL65=
794         (A1-1 IN STUCCO, C7-8 IN LW CONCRETE BLOCK, B2-1 IN INSULATION,
795          E1-3/4 IN PLASTER OR GYP BOARD),
796     EXTWALL66=
797       (A1-1 IN STUCCO,C7-8 IN LW CONCRETE BLOCK,E1-3/4 IN PLASTER OR GYP BOARD),
798     EXTWALL67=
799         (A2-4 IN DENSE FACE BRICK, C6-8 IN CLAY TILE, B2-1 IN INSULATION,
800          E1-3/4 IN PLASTER OR GYP BOARD),
801     EXTWALL68=
802         (A2-4 IN DENSE FACE BRICK, C6-8 IN CLAY TILE, B1-AIRSPACE RESISTANCE,
803          E1-3/4 IN PLASTER OR GYP BOARD),
804     EXTWALL69=
805       (A2-4 IN DENSE FACE BRICK,C6-8 IN CLAY TILE,E1-3/4 IN PLASTER OR GYP BOARD),
806     EXTWALL70=
807         (A1-1 IN STUCCO, C6-8 IN CLAY TILE, B2-1 IN INSULATION,
808          E1-3/4 IN PLASTER OR GYP BOARD),
809     EXTWALL71=
810         (A1-1 IN STUCCO, C6-8 IN CLAY TILE, B1-AIRSPACE RESISTANCE,
811          E1-3/4 IN PLASTER OR GYP BOARD),
812     EXTWALL72=
813         (A1-1 IN STUCCO, C6-8 IN CLAY TILE, E1-3/4 IN PLASTER OR GYP BOARD),
814     EXTWALL73=
815         (A1-1 IN STUCCO, C5-4 IN HW CONCRETE, B3-2 IN INSULATION,
816          E1-3/4 IN PLASTER OR GYP BOARD),
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817    EXTWALL74=
818        (A1-1 IN STUCCO, C5-4 IN HW CONCRETE, B2-1 IN INSULATION,
819         E1-3/4 IN PLASTER OR GYP BOARD),
820    EXTWALL75=
821        (A1-1 IN STUCCO, C5-4 IN HW CONCRETE, B1-AIRSPACE RESISTANCE,
822         E1-3/4 IN PLASTER OR GYP BOARD),
823    EXTWALL76=
824        (A1-1 IN STUCCO, C5-4 IN HW CONCRETE, E1-3/4 IN PLASTER OR GYP BOARD),
825    EXTWALL77=
826        (A2-4 IN DENSE FACE BRICK, C4-4 IN COMMON BRICK, B2-1 IN INSULATION,
827         E1-3/4 IN PLASTER OR GYP BOARD),
828    EXTWALL78=
829        (A2-4 IN DENSE FACE BRICK, C4-4 IN COMMON BRICK, B1-AIRSPACE RESISTANCE,
830         E1-3/4 IN PLASTER OR GYP BOARD),
831    EXTWALL79=
832   (A2-4 IN DENSE FACE BRICK,C4-4 IN COMMON BRICK,E1-3/4 IN PLASTER OR GYP BOARD),
833    EXTWALL80=
834        (A1-1 IN STUCCO, C4-4 IN COMMON BRICK, E1-3/4 IN PLASTER OR GYP BOARD),
835    EXTWALL81=
836     (A1-1 IN STUCCO,C3-4 IN HW CONCRETE BLOCK,E1-3/4 IN PLASTER OR GYP BOARD),
837    EXTWALL82=
838        (A2-4 IN DENSE FACE BRICK, C2-4 IN LW CONCRETE BLOCK, B2-1 IN INSULATION,
839         E1-3/4 IN PLASTER OR GYP BOARD),
840    EXTWALL83=


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841      (A2-4 IN DENSE FACE BRICK,C2-4 IN LW CONCRETE BLOCK,B1-AIRSPACE RESISTANCE,
842         E1-3/4 IN PLASTER OR GYP BOARD),
843    EXTWALL84=
844        (A2-4 IN DENSE FACE BRICK, C2-4 IN LW CONCRETE BLOCK,
845         E1-3/4 IN PLASTER OR GYP BOARD),
846    EXTWALL85=
847        (A1-1 IN STUCCO, C2-4 IN LW CONCRETE BLOCK, B2-1 IN INSULATION,
848         E1-3/4 IN PLASTER OR GYP BOARD),
849    EXTWALL86=
850        (A1-1 IN STUCCO, C2-4 IN LW CONCRETE BLOCK, B1-AIRSPACE RESISTANCE,
851         E1-3/4 IN PLASTER OR GYP BOARD),
852    EXTWALL87=
853     (A1-1 IN STUCCO,C2-4 IN LW CONCRETE BLOCK,E1-3/4 IN PLASTER OR GYP BOARD),
854    EXTWALL88=
855        (A2-4 IN DENSE FACE BRICK, C1-4 IN CLAY TILE, B2-1 IN INSULATION,
856         E1-3/4 IN PLASTER OR GYP BOARD),
857    EXTWALL89=
858        (A2-4 IN DENSE FACE BRICK, C1-4 IN CLAY TILE, B1-AIRSPACE RESISTANCE,
859         E1-3/4 IN PLASTER OR GYP BOARD),
860    EXTWALL90=
861     (A2-4 IN DENSE FACE BRICK,C1-4 IN CLAY TILE,E1-3/4 IN PLASTER OR GYP BOARD),
862    EXTWALL91=
863        (A1-1 IN STUCCO, C1-4 IN CLAY TILE, B2-1 IN INSULATION,
864         E1-3/4 IN PLASTER OR GYP BOARD),
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865    EXTWALL92=
866        (A1-1 IN STUCCO, C1-4 IN CLAY TILE, B1-AIRSPACE RESISTANCE,
867         E1-3/4 IN PLASTER OR GYP BOARD),
868    EXTWALL93=
869        (A1-1 IN STUCCO, C1-4 IN CLAY TILE, E1-3/4 IN PLASTER OR GYP BOARD),
870    EXTWALL94=
871     (A3-STEEL SIDING,B2-1 IN INSULATION,B1-AIRSPACE RESISTANCE,A3-STEEL SIDING),
872    EXTWALL95=
873     (A3-STEEL SIDING,B3-2 IN INSULATION,B1-AIRSPACE RESISTANCE,A3-STEEL SIDING),
874    EXTWALL96=
875     (A3-STEEL SIDING,B4-3 IN INSULATION,B1-AIRSPACE RESISTANCE,A3-STEEL SIDING);
876  END WALLS;
877  DEFINE WALLS:
878    PARTITION01=
879        (E1-3/4 IN PLASTER OR GYP BOARD, C1-4 IN CLAY TILE,
880       E1-3/4 IN PLASTER OR GYP BOARD),
881    PARTITION02=
882        (E1-3/4 IN PLASTER OR GYP BOARD, C2-4 IN LW CONCRETE BLOCK,
883       E1-3/4 IN PLASTER OR GYP BOARD),
884    PARTITION03=
885        (E1-3/4 IN PLASTER OR GYP BOARD, C3-4 IN HW CONCRETE BLOCK,
886       E1-3/4 IN PLASTER OR GYP BOARD),
887    PARTITION04=
888        (E1-3/4 IN PLASTER OR GYP BOARD, C4-4 IN COMMON BRICK,

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889       E1-3/4 IN PLASTER OR GYP BOARD),
890    PARTITION05=
891        (E1-3/4 IN PLASTER OR GYP BOARD, C5-4 IN HW CONCRETE,
892       E1-3/4 IN PLASTER OR GYP BOARD),
893    PARTITION06=
894        (E1-3/4 IN PLASTER OR GYP BOARD, C6-8 IN CLAY TILE,
895       E1-3/4 IN PLASTER OR GYP BOARD),
896    PARTITION07=
897        (E1-3/4 IN PLASTER OR GYP BOARD, C7-8 IN LW CONCRETE BLOCK,
898       E1-3/4 IN PLASTER OR GYP BOARD),
899    PARTITION08=
900        (E1-3/4 IN PLASTER OR GYP BOARD, C8-8 IN HW CONCRETE BLOCK,
901         E1-3/4 IN PLASTER OR GYP BOARD),
902    PARTITION09=
903        (E1-3/4 IN PLASTER OR GYP BOARD, C9-8 IN COMMON BRICK,
904       E1-3/4 IN PLASTER OR GYP BOARD),
905    PARTITION10=
906        (E1-3/4 IN PLASTER OR GYP BOARD, C10-8 IN HW CONCRETE,
907       E1-3/4 IN PLASTER OR GYP BOARD),
908    PARTITION11=
909        (E1-3/4 IN PLASTER OR GYP BOARD, C11-12 IN HW CONCRETE,
910       E1-3/4 IN PLASTER OR GYP BOARD),
911    PARTITION12=
912        (C1-4 IN CLAY TILE),
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913   PARTITION13=
914       (C2-4 IN LW CONCRETE BLOCK),
915   PARTITION14=
916       (C3-4 IN HW CONCRETE BLOCK),
917   PARTITION15=
918       (C4-4 IN COMMON BRICK),
919   PARTITION16=
920       (C5-4 IN HW CONCRETE),
921   PARTITION17=
922       (C6-8 IN CLAY TILE),
923   PARTITION18=
924       (C7-8 IN LW CONCRETE BLOCK),
925   PARTITION19=
926       (C8-8 IN HW CONCRETE BLOCK),
927   PARTITION20=
928       (C9-8 IN COMMON BRICK),
929   PARTITION21=
930       (C10-8 IN HW CONCRETE),
931   PARTITION22=
932       (C11-12 IN HW CONCRETE),
933   PARTITION23=
934       (E1-3/4 IN PLASTER OR GYP BOARD, B1-AIRSPACE RESISTANCE,
935      E1-3/4 IN PLASTER OR GYP BOARD),
936   PARTITION24=
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937       (B7-1 IN WOOD),
938   PARTITION25=
939       (B10-2 IN WOOD),
940   PARTITION26=
941       (B11-3 IN WOOD),
942   PARTITION27=
943       (B9-4 IN WOOD),
944   PARTITION28=
945       (B7-1 IN WOOD, B1-AIRSPACE RESISTANCE, B7-1 IN WOOD),
946   PARTITION29=
947       (B10-2 IN WOOD, B1-AIRSPACE RESISTANCE, B10-2 IN WOOD),
948   PARTITION30=
949       (B11-3 IN WOOD, B1-AIRSPACE RESISTANCE, B11-3 IN WOOD) ;
950 END WALLS;
951 DEFINE ROOFSS
952   ROOF01=
953       (C12-2 IN HW CONCRETE, B1-AIRSPACE RESISTANCE, B6-2 IN DENSE INSULATION,
954        E2-1/2 IN SLAG OR STONE, E3-3/8 IN FELT AND MEMBRANE,
955        C5-4 IN HW CONCRETE,
956        E4-CEILING AIRSPACE, E5-ACOUSTIC TILE),
957   ROOF02=
958       (E2-1/2 IN SLAG OR STONE, E3-3/8 IN FELT AND MEMBRANE,
959       B6-2 IN DENSE INSULATION, B9-4 IN WOOD,
960        E4-CEILING AIRSPACE, E5-ACOUSTIC TILE),
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961   ROOF03=
962       (E2-1/2 IN SLAG OR STONE, E3-3/8 IN FELT AND MEMBRANE,
963        B6-2 IN DENSE INSULATION, B8-2 1/2 IN WOOD,
964        E4-CEILING AIRSPACE, E5-ACOUSTIC TILE),
965   ROOF04=
966       (E2-1/2 IN SLAG OR STONE, E3-3/8 IN FELT AND MEMBRANE,
967        B6-2 IN DENSE INSULATION, B7-1 IN WOOD,
968        E4-CEILING AIRSPACE, E5-ACOUSTIC TILE),
969   ROOF05=
970       (E2-1/2 IN SLAG OR STONE, E3-3/8 IN FELT AND MEMBRANE,
971        B5-1 IN DENSE INSULATION, B9-4 IN WOOD,
972        E4-CEILING AIRSPACE, E5-ACOUSTIC TILE),
973   ROOF06=
974       (E2-1/2 IN SLAG OR STONE, E3-3/8 IN FELT AND MEMBRANE,
975        B5-1 IN DENSE INSULATION, B8-2 1/2 IN WOOD,
976        E4-CEILING AIRSPACE, E5-ACOUSTIC TILE),
977   ROOF07=
978       (E2-1/2 IN SLAG OR STONE, E3-3/8 IN FELT AND MEMBRANE,
979        B5-1 IN DENSE INSULATION, B7-1 IN WOOD,
980        E4-CEILING AIRSPACE, E5-ACOUSTIC TILE),
981   ROOF08=
982       (E2-1/2 IN SLAG OR STONE, E3-3/8 IN FELT AND MEMBRANE,
983        C16-8 IN LW CONCRETE,
984        E4-CEILING AIRSPACE, E5-ACOUSTIC TILE),
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985   ROOF09=
986       (E2-1/2 IN SLAG OR STONE, E3-3/8 IN FELT AND MEMBRANE,
987        C15-6 IN LW CONCRETE,
988        E4-CEILING AIRSPACE, E5-ACOUSTIC TILE),
989   ROOF10=
990       (E2-1/2 IN SLAG OR STONE, E3-3/8 IN FELT AND MEMBRANE,
991        C14-4 IN LW CONCRETE,
992        E4-CEILING AIRSPACE, E5-ACOUSTIC TILE),
993   ROOF11=
994       (E2-1/2 IN SLAG OR STONE, E3-3/8 IN FELT AND MEMBRANE,
995        B6-2 IN DENSE INSULATION, C13-6 IN HW CONCRETE,
996        E4-CEILING AIRSPACE, E5-ACOUSTIC TILE),
997   ROOF12=
998       (E2-1/2 IN SLAG OR STONE, E3-3/8 IN FELT AND MEMBRANE,
999        B6-2 IN DENSE INSULATION, C5-4 IN HW CONCRETE,
1000       E4-CEILING AIRSPACE, E5-ACOUSTIC TILE),
1001  ROOF13=
1002      (E2-1/2 IN SLAG OR STONE, E3-3/8 IN FELT AND MEMBRANE,
1003       B6-2 IN DENSE INSULATION, C12-2 IN HW CONCRETE,
1004       E4-CEILING AIRSPACE, E5-ACOUSTIC TILE),
1005  ROOF14=
1006      (E2-1/2 IN SLAG OR STONE, E3-3/8 IN FELT AND MEMBRANE,
1007       B5-1 IN DENSE INSULATION, C13-6 IN HW CONCRETE,
1008       E4-CEILING AIRSPACE, E5-ACOUSTIC TILE),
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1009    ROOF15=
1010        (E2-1/2 IN SLAG OR STONE, E3-3/8 IN FELT AND MEMBRANE,
1011         B5-1 IN DENSE INSULATION, C5-4 IN HW CONCRETE,
1012         E4-CEILING AIRSPACE, E5-ACOUSTIC TILE),
1013    ROOF16=
1014        (E2-1/2 IN SLAG OR STONE, E3-3/8 IN FELT AND MEMBRANE,
1015         B5-1 IN DENSE INSULATION, C12-2 IN HW CONCRETE,
1016         E4-CEILING AIRSPACE, E5-ACOUSTIC TILE),
1017    ROOF17=
1018        (E2-1/2 IN SLAG OR STONE, E3-3/8 IN FELT AND MEMBRANE,
1019         B6-2 IN DENSE INSULATION, A3-STEEL SIDING,
1020         E4-CEILING AIRSPACE, E5-ACOUSTIC TILE),
1021    ROOF18=
1022        (E2-1/2 IN SLAG OR STONE, E3-3/8 IN FELT AND MEMBRANE,
1023         B5-1 IN DENSE INSULATION, A3-STEEL SIDING,
1024         E4-CEILING AIRSPACE, E5-ACOUSTIC TILE),
1025    ROOF19=
1026        (C12-2 IN HW CONCRETE,B1-AIRSPACE RESISTANCE, B6-2 IN DENSE INSULATION,
1027         E2-1/2 IN SLAG OR STONE, E3-3/8 IN FELT AND MEMBRANE,
1028         C5-4 IN HW CONCRETE),
1029    ROOF20=
1030        (E2-1/2 IN SLAG OR STONE, E3-3/8 IN FELT AND MEMBRANE,
1031         B6-2 IN DENSE INSULATION, B9-4 IN WOOD),
1032    ROOF21=
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1033        (E2-1/2 IN SLAG OR STONE, E3-3/8 IN FELT AND MEMBRANE,
1034         B6-2 IN DENSE INSULATION, B8-2 1/2 IN WOOD),
1035    ROOF22=
1036        (E2-1/2 IN SLAG OR STONE, E3-3/8 IN FELT AND MEMBRANE,
1037         B6-2 IN DENSE INSULATION, B7-1 IN WOOD),
1038    ROOF23=
1039        (E2-1/2 IN SLAG OR STONE, E3-3/8 IN FELT AND MEMBRANE,
1040         B5-1 IN DENSE INSULATION, B9-4 IN WOOD),
1041    ROOF24=
1042        (E2-1/2 IN SLAG OR STONE, E3-3/8 IN FELT AND MEMBRANE,
1043          B5-1 IN DENSE INSULATION, B8-2 1/2 IN WOOD),
1044    ROOF25=
1045        (E2-1/2 IN SLAG OR STONE, E3-3/8 IN FELT AND MEMBRANE,
1046         B5-1 IN DENSE INSULATION, B7-1 IN WOOD),
1047    ROOF26=
1048      (E2-1/2 IN SLAG OR STONE,E3-3/8 IN FELT AND MEMBRANE,C16-8 IN LW CONCRETE),
1049    ROOF27=
1050      (E2-1/2 IN SLAG OR STONE,E3-3/8 IN FELT AND MEMBRANE C15-8 IN LW CONCRETE),
1051    ROOF28=
1052      (E2-1/2 IN SLAG OR STONE,E3-3/8 IN FELT AND MEMBRANE,C14-4 IN LW CONCRETE),
1053    ROOF29=
1054        (E2-1/2 IN SLAG OR STONE, E3-3/8 IN FELT AND MEMBRANE,
1055         B6-2 IN DENSE INSULATION,C13-6 IN HW CONCRETE),
1056    ROOF30=
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1057        (E2-1/2 IN SLAG OR STONE, E3-3/8 IN FELT AND MEMBRANE,
1058         B6-2 IN DENSE INSULATION,C5-4 IN HW CONCRETE),
1059    ROOF31*
1060        (E2-1/2 IN SLAG OR STONE, E3-3/8 IN FELT AND MEMBRANE,
1061         B6-2 IN DENSE INSULATION,C12-2 IN HW CONCRETE),
1062    ROOF32*
1063        (E2-1/2 IN SLAG OR STONE, E3-3/8 IN FELT AND MEMBRANE,
1064           B5-1 IN DENSE INSULATION,C13-6 IN HW CONCRETE),
1065    ROOF33*
1066        (E2-1/2 IN SLAG OR STONE, E3-3/8 IN FELT AND MEMBRANE,
1067         B5-1 IN DENSE INSULATION,C5-4 IN HW CONCRETE),
1068    ROOF34*
1069        (E2-1/2 IN SLAG OR STONE, E3-3/8 IN FELT AND MEMBRANE,
1070         B5-1 IN DENSE INSULATION,C12-2 IN HW CONCRETE),
1071    ROOF35*
1072        (E2-1/2 IN SLAG OR STONE, E3-3/8 IN FELT AND MEMBRANE,
1073         B6-2 IN DENSE INSULATION, A3-STEEL SIDING),
1074    ROOF36  *
1075       (E2-1/2 IN SLAG OR STONE, E3-3/8 IN FELT AND MEMBRANE,
1076         B5-1 IN DENSE INSULATION,A3-STEEL SIDING);
1077 END ROOFS;
1078 DEFINE ROOFS2
1079    CEILING38  *
1080        (C12-2 IN HW CONCRETE,E4-CEILING AIRSPACE, E5-ACOUSTIC TILE),
```

```
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1081    CEILING39  *
1082        (C5-4 IN HW CONCRETE, E4-CEILING AIRSPACE, E5-ACOUSTIC TILE),
1083    CEILING40  *
1084        (C2-4 IN LW CONCRETE BLOCK, E4-CEILING AIRSPACE, E5-ACOUSTIC TILE),
1085    CEILING41  *
1086        (C10-8 IN HW CONCRETE,E4-CEILING AIRSPACE, E5-ACOUSTIC TILE),
1087    CEILING42  *
1088        (C7-8 IN LW CONCRETE BLOCK, E4-CEILING AIRSPACE, E5-ACOUSTIC TILE),
1089    CEILING43       *
1090        (B10-2 IN WOOD,E4-CEILING AIRSPACE, E5-ACOUSTIC TILE),
1091    CEILING44    *
1092        (B11-3 IN WOOD, E4-CEILING AIRSPACE, E5-ACOUSTIC TILE),
1093    CEILING45 *
1094        (C11-12 IN HW CONCRETE,E4-CEILING AIRSPACE, E5-ACOUSTIC TILE),
1095    CEILING46*
1096        (B9-4 IN WOOD, E4-CEILING AIRSPACE, E5-ACOUSTIC TILE),
1097    CEILING47   *
1098        (A3-STEEL SIDING, E4-CEILING AIRSPACE, E5-ACOUSTIC TILE) ;
1099    CEILING31     *
1100        (C12-2 IN HW CONCRETE),
1101    CEILING32     *
1102        (C5-4 IN HW CONCRETE),
1103    CEILING33         *
1104        (C2-4 IN LW CONCRETE BLOCK),
```

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CERL -- B.L.A.S.T. SYSTEM --- VERSION 2.0          20 MAR 79      12.47.06

1105     CEILING34        •
1106        (C10-8 IN HW CONCRETE),
1107     CEILING35        •
1108        (C7-8 IN LW CONCRETE BLOCK);
1109  END ROOFS;
1110  DEFINE FLOORS%
1111     FLOOR31•
1112        (C12-2 IN HW CONCRETE),
1113     FLOOR32•
1114        (C5-4 IN HW CONCRETE),
1115     FLOOR33•
1116        (C2-4 IN LW CONCRETE BLOCK),
1117     FLOOR34•
1118        (C10-8 IN HW CONCRETE),
1119     FLOOR35•
1120        (C7-8 IN LW CONCRETE BLOCK),
1121     FLOOR36•
1122        (B10-2 IN WOOD),
1123     FLOOR37•
1124        (B11-3 IN WOOD),
1125     FLOOR38•
1126        (E5-ACOUSTIC TILE, E4-CEILING AIRSPACE, C12-2 IN HW CONCRETE),
1127     FLOOR39•
1128        (E5-ACOUSTIC TILE, E4-CEILING AIRSPACE, C5-4 IN HW CONCRETE),

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1129     FLOOR40•
1130        (E5-ACOUSTIC TILE, E4-CEILING AIRSPACE, C2-4 IN LW CONCRETE BLOCK),
1131     FLOOR41•
1132        (E5-ACOUSTIC TILE, E4-CEILING AIRSPACE, C10-8 IN HW CONCRETE),
1133     FLOOR42•
1134        (E5-ACOUSTIC TILE, E4-CEILING AIRSPACE, C7-8 IN LW CONCRETE BLOCK),
1135     FLOOR43•
1136        (E5-ACOUSTIC TILE, E4-CEILING AIRSPACE, B10-2 IN WOOD),
1137     FLOOR44•
1138        (E5-ACOUSTIC TILE, E4-CEILING AIRSPACE, B11-3 IN WOOD),
1139     FLOOR45•
1140        (E5-ACOUSTIC TILE, E4-CEILING AIRSPACE, C11-12 IN HW CONCRETE),
1141     FLOOR46•
1142        (E5-ACOUSTIC TILE, E4-CEILING AIRSPACE, B9-4 IN WOOD),
1143     FLOOR47•
1144        (E5-ACOUSTIC TILE, E4-CEILING AIRSPACE, A3-STEEL SIDING),
1145      FLOOR SLAB 4 IN •
1146        (DIRT 12 IN, C5-4 IN HW CONCRETE),
1147      FLOOR SLAB 8 IN •
1148        (DIRT 12 IN, C10-8 IN HW CONCRETE);
1149  END FLOORS;
1150  DEFINE DOORS%
1151     SOLID WOOD DOOR •
1152        (B10-2 IN WOOD),
```

```
1153    HOLLOW WOOD DOOR =
1154      (WOOD-HARDWOOD-1/8 IN,B1-AIRSPACE RESISTANCE,WOOD-HARDWOOD-1/8 IN),
1155    ALUMINUM DOOR
1156       (A3-STEEL SIDING, B1-AIRSPACE RESISTANCE, A3-STEEL SIDING),
1157    SLIDING PARTITION =
1158      (E3-3/8 IN FELT AND MEMBRANE),
1159    GLASS DOOR =
1160      (GLASS-CLEAR PLATE 1/2 IN) ;
1161  END DOORS;
1162  DEFINE WINDOWS%
1163    SINGLE PANE LW WINDOW =
1164      (GLASS-CLEAR SHEET 1/8 IN),
1165    SINGLE PANE HW WINDOW =
1166      (GLASS-CLEAR PLATE 1/4 IN),
1167    SINGLE PANE TINTED WINDOW =
1168      (GLASS-GREY PLATE 1/4 IN),
1169    DOUBLE PANE WINDOW =
1170      (GLASS-CLEAR SHEET 1/8 IN,B1-AIRSPACE RESISTANCE,
1171                          GLASS-CLEAR SHEET 1/8 IN),
1172    DOUBLE PANE TINTED WINDOW=
1173      (GLASS-GREY PLATE 3/8 IN,B1-AIRSPACE RESISTANCE,
1174            GLASS-CLEAR PLATE 3/8 IN),
1175    SINGLE PANE WITH DRAPES =
1176      (GLASS-CLEAR PLATE 1/4 IN,DRAPES-CLOSE WEAVE MEDIUM),
```



```
1177    DOUBLE PANE WITH DRAPES=
1178      (GLASS-CLEAR SHEET 1/8 IN,B1-AIRSPACE RESISTANCE,
1179               GLASS-CLEAR SHEET 1/8 IN,   DRAPES-CLOSE WEAVE MEDIUM),
1180    SINGLE PANE WITH BLINDS =
1181      (GLASS-CLEAR SHEET 1/8 IN,VENETIAN BLINDS-LIGHT),
1182    DOUBLE PANE WITH BLINDS=
1183      (GLASS-CLEAR SHEET 1/8 IN,B1-AIRSPACE RESISTANCE,
1184                              GLASS-CLEAR SHEET 1/8 IN,VENETIAN BLINDS-LIGHT),
1185    SINGLE PANE WITH SHADE =
1186      (GLASS-CLEAR SHEET 1/8 IN,SHADE ROLL-LIGHT OPAQUE),
1187    DOUBLE PANE WITH SHADE =
1188      (GLASS-CLEAR SHEET 1/8 IN,B1-AIRSPACE RESISTANCE,
1189         GLASS-CLEAR SHEET 1/8 IN,    SHADE ROLL-LIGHT OPAQUE) ;
1190  END WINDOWS;
1191  DEFINE SCHEDULE (HOSPITAL OCCUPANCY)%
1192    MONDAY THRU FRIDAY = (07 TO 17 - 1., 17 TO 20 - .8, 20 TO 07 - .6),
1193    SATURDAY THRU SUNDAY = (07 TO 20 - .8, 20 TO 07 - .6),
1194    HOLIDAY = SUNDAY;
1195    END;
1196  DEFINE SCHEDULE (HOSPITAL LIGHTING)%
1197    MONDAY THRU FRIDAY = (04 TO 07 - .5, 07 TO 20 - .8, 20 TO 04 - .2 ),
1198    SATURDAY THRU SUNDAY = (04 TO 07 - .5, 07 TO 20 - .7, 20 TO 04 - .2),
1199    HOLIDAY = SUNDAY;
1200    END
```

```
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1201  DEFINE SCHEDULE (HOSPITAL EQUIPMENT)%
1202    MONDAY THRU FRIDAY = (07 TO 17 - 1., 17 TO 07 - .5),
1203    SATURDAY THRU SUNDAY = (07 TO 17 - .6, 17 TO 07 - .5),
1204    HOLIDAY = SUNDAY;
1205    END;
1206  DEFINE SCHEDULE (CONSTANT)%
1207    SUNDAY THRU SATURDAY = (00 TO 24 - 1.),
1208    HOLIDAY = SUNDAY;
1209    END;
1210  DEFINE SCHEDULE (RESIDENCE OCCUPANCY)%
1211    MONDAY THRU FRIDAY = (08 TO 15 - .3, .4, .7, 17 TO 07 - 1., .5),
1212    SATURDAY THRU SUNDAY = (23 TO 09 -1., 09 TO 16 - .3, .7, .7, .7,
1213                            .3, .3, .3, .7),
1214    HOLIDAY = SUNDAY;
1215    END;
1216  DEFINE SCHEDULE (RESIDENCE LIGHTING)%
1217    MONDAY THRU FRIDAY = (00 TO 06 - .1, .2, .2, 08 TO 16 - .1, .2,
1218                          .5, .5, 1., 1., 1., .5, .3),
1219    SATURDAY THRU SUNDAY = (00 TO 16 - .1, .5, .5, 1., 1., 1., 1.,
1220                            .5, .3),
1221    HOLIDAY = SUNDAY;
1222    END;
1223  DEFINE SCHEDULE (RESIDENCE EQUIPMENT)%
1224    SUNDAY THRU SATURDAY = (22 TO 07 - 0., 1., .9, .8, 10 TO 16 - .3,

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1225                            .7, .7, .7, .5, .5, .5),
1226    HOLIDAY = SUNDAY;
1227    END;
1228  DEFINE SCHEDULE (OFFICE OCCUPANCY)%
1229    MONDAY THRU FRIDAY = (18 TO 06 - 0.,.1, .5, 1., 1., 1., 1.,
1230                          .5, 1., 1., 1., .5, .1),
1231    SATURDAY THRU SUNDAY = (00 TO 24 - 0.),
1232    HOLIDAY = SUNDAY;
1233    END;
1234  DEFINE SCHEDULE (OFFICE LIGHTING)%
1235    MONDAY THRU FRIDAY = (18 TO 06 - .05, .2, 07 TO 17 - 1., .5),
1236    SATURDAY THRU SUNDAY = (00 TO 24 - .05),
1237    HOLIDAY = SUNDAY;
1238    END;
1239  DEFINE SCHEDULE (DORMITORY OCCUPANCY)%
1240    MONDAY THRU FRIDAY = (22 TO 07 - 1., .8, .8, .2, .2, .8, .2, .2,
1241                          .2, .3, .8, .8, .8, .8, .8, .8),
1242    SATURDAY THRU SUNDAY = (23 TO 09 - 1., .8, .8, .8, .8, .8, .8, .8,
1243                            .8, .8, .8, .8, .8, .8, .8),
1244    HOLIDAY = SUNDAY;
1245    END;
1246  DEFINE SCHEDULE (DORMITORY LIGHTING)%
1247    MONDAY THRU FRIDAY = (.2, .1, .1, .1, .1, .1, .8, .8, .2, .1, .1, .8,
1248                          .1, .1, .1, .1, .8, .8, .8, 1., 1., 1., 1., 1.),
```

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 CERL -- B.L.A.S.T. SYSTEM --- VERSION 2.0              20 MAR 79      12.47.06

1249    SATURDAY THRU SUNDAY = (1., .5, .1, .1, .1, .1, .1, .2, .2, .2, .1, .1,
1250                            .3, .1, .1, .1, .2, .4, .6, 1., 1., 1., 1., 1.),
1251    HOLIDAY = SUNDAY;
1252    END;
1253  DEFINE SCHEDULE (STORE OCCUPANCY)%
1254    MONDAY THRU FRIDAY = (18 TO 07 - 0., .1, 08 TO 16 - .8, 1., 1., .2),
1255    SATURDAY THRU SUNDAY = (13 TO 07 - 0., .1, .8, .9, 1., 1., .2),
1256    HOLIDAY = SUNDAY;
1257    END;
1258  DEFINE SCHEDULE (STORE LIGHTING)%
1259    MONDAY THRU FRIDAY = (18 TO 07 - .2, .5, 08 TO 18 - 1.),
1260    SATURDAY THRU SUNDAY = (12 TO 07 - .2, .5, 08 TO 12 - 1.),
1261    HOLIDAY = SUNDAY;
1262    END;
1263  DEFINE CONTROLS (NIGHT AND WEEKEND SETBACK WITH DUAL THROTTLING RANGES)%
1264    PROFILES%
1265      HEATANDCOOL = (1. AT 67, 0. AT 69, -0. AT 77, -1. AT 79),
1266      SETBACK = (1. AT 60, 0. AT 62);
1267    SCHEDULES%
1268      MONDAY THRU FRIDAY = (07 TO 17 - HEATANDCOOL, 17 TO 07 - SETBACK),
1269      SATURDAY THRU SUNDAY = (00 TO 24 - SETBACK),
1270      HOLIDAY = SUNDAY;
1271    END;
1272  DEFINE CONTROLS (SINGLE THROTTLING RANGE)%

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1273    PROFILES%
1274      HEATANDCOOL = (1. AT 73, 0. AT 75, -0. AT 75, -1. AT 77);
1275    SCHEDULES%
1276      SUNDAY THRU SATURDAY = (00 TO 24 - HEATANDCOOL),
1277      HOLIDAY = SUNDAY;
1278    END;
1279  DEFINE CONTROLS (NIGHT AND WEEKEND SETBACK WITH SINGLE THROTTLING RANGE)%
1280    PROFILES%
1281      HEATANDCOOL = (1. AT 73, 0. AT 75, -0. AT 75, -1. AT 77),
1282      SETBACK = (1. AT 60, 0. AT 62);
1283    SCHEDULES%
1284      MONDAY THRU FRIDAY = (07 TO 17 - HEATANDCOOL, 17 TO 07 - SETBACK),
1285      SATURDAY THRU SUNDAY = (00 TO 24 - SETBACK),
1286      HOLIDAY = SUNDAY;
1287    END;
1288  DEFINE CONTROLS (DEAD BAND)%
1289    PROFILES%
1290      HEATANDCOOL = (1. AT 68, 0. AT 68, -0. AT 78, -1. AT 78);
1291    SCHEDULES%
1292      SUNDAY THRU SATURDAY = (00 TO 24 - HEATANDCOOL);
1293      HOLIDAY = SUNDAY;
1294    END;
** WARNING   NO LOCATION GIVEN
1295  END INPUT;
```

# 4 BLAST EXAMPLE

The example which follows shows the input and part of the output for the dental clinic simulation described in Chapter 7, Volume I of the Users Manual.

## Design Day Simulation

The following pages show the input deck describing the dental clinic. Design day data are temporarily added to the library (lines 9 and 10) and the required design days are requested on line 65. Results of the design day load calculations shown for zones 1 and 5 are typical of those for the remaining eight zones and the crawl space (not shown).

```
CERL -- B.L.A.S.T. SYSTEM --- VERSION 2.0            10 APR 79      12.05.48

  1  BEGIN INPUT;
  2  RUN CONTROL:  NEW ZONES,
  3                NEW AIR SYSTEMS,
  4                CENTRAL PLANT,
  5                REPORTS(SYSTEM,COIL LOADS,EQUIPMENT PARAMETERS
  6                     ,ZONE,WALLS);
  7  TEMPORARY LOCATION: FT HOOD = (LAT=31,LONG=97.8,TZ=6); END;
  8  TEMPORARY DESIGN DAYS:
  9        FT HOOD WINTER = (HIGH=32,LOW=20,WEEKEND,WB=20,DATE=21JAN),
 10        FT HOOD SUMMER = (HIGH=106,LOW=84,WB=85,DATE=21JUL,PRES=405,
 11                          CLEARNESS=.95,WEEKDAY); END;
 12  TEMPORARY CONTROLS (CLINIC CONTROLS):
 13        PROFILES:
 14          CONSTANT = (1 AT 66, 0 AT 68, -.125 AT 70, -1 AT 140);
 15        SCHEDULES:
 16         MONDAY THRU SUNDAY = (00 TO 24 - CONSTANT),
 17           HOLIDAY = SUNDAY;
 18  END;
 19  TEMPORARY WALLS:
 20        EWALL1 = (BRICK - FACE 4 IN,
 21                  CONCRETE - CEMENT MORTAR 1/2 IN,
 22                  CONCRETE - CEMENT MORTAR 1/2 IN,
 23                  CONCRETE - CEMENT MORTAR 1/2 IN,
 24                  CONCRETE - CEMENT MORTAR 1/2 IN,
```

```
                C3 - 4 IN HW CONCRETE BLOCK,
                B1 - AIRSPACE RESISTANCE,
                BUILDING BOARD - GYPSUM PLASTER 1 / 2 IN),
      PWALL1 = (BUILDING BOARD - GYPSUM PLASTER 1 / 2 IN,
                B1 - AIRSPACE RESISTANCE,
                BUILDING BOARD - GYPSUM PLASTER 1 / 2 IN),
      PWALL2 = (C8 - 8 IN HW CONCRETE BLOCK,
                B1 - AIRSPACE RESISTANCE,
                BUILDING BOARD - GYPSUM PLASTER 1 / 2 IN),
      CPWALL = (A1 - 1 IN STUCCO,
                C10 - 8 IN HW CONCRETE,
                E1 - 3 / 4 IN PLASTER OR GYP BOARD);
END;
TEMPORARY ROOFS:
      ROOF1 = (E2 - 1/ 2 IN SLAG OR STONE,
               E3 - 3/8 IN FELT AND MEMBRANE,
               A3 - STEEL SIDING,
               E4 - CEILING AIRSPACE,
               B4 - 3 IN INSULATION,
               E5 - ACOUSTIC TILE),
      CPCEIL =(FINISH FLOORING - TILE 1/16 IN,
               C10 - 8 IN HW CONCRETE,
               B1 - AIRSPACE RESISTANCE,
               B2 - 1 IN INSULATION);
```

```
49 END;
50 TEMPORARY FLOORS:
51       FLOOR1 = (B2 - 1 IN INSULATION,
52                 B1 - AIRSPACE RESISTANCE,
53                 C10 - 8 IN HW CONCRETE,
54                 FINISH FLOORING - TILE 1/16 IN),
55       CPFLOOR = (DIRT 12 IN);
56 END;
57 TEMPORARY DOORS:
58       WINDOW PANEL = (GLASS - HEAT ABSORBING PLATE 1/ 2 IN,
59                       INSULATION - CELLULAR GLASS 2 IN,
60                       C3 - 4 IN HW CONCRETE BLOCK,
61                       BUILDING BOARD - GYPSUM PLASTER 1 / 2 IN);
62 END;
63 PROJECT = "FT HOOD DENTAL CLINIC";
64 LOCATION= FT HOOD;
65 DESIGN DAYS = FT HOOD WINTER,FT HOOD SUMMER;
66 GROUND TEMPERATURES = (62,61,62,65,68,71,75,75,71,68,65,62);
67 BEGIN BUILDING DESCRIPTION;
68       NORTH AXIS = 0.;
69       DIMENSIONS: HEIGHT1 = 9.;
70 CRAWL SPACE 1000 "CRAWL SPACE";
71       ORIGIN:(0.0,-2.5);
72       NORTH AXIS = 0;
```

```
 73     CRAWL SPACE CEILING:
 74        STARTING AT (0,0,2.5) FACING (180) CPCEIL (92 BY 102);
 75     SLAB ON GRADE FLOOR:
 76        STARTING AT (0,102,0) FACING (180) CPFLOOR (92 BY 102);
 77     BASEMENT WALLS:
 78        STARTING AT (0,0,0) FACING (180) CPWALL (92 BY 2.5),
 79        STARTING AT (92,0,0) FACING (90) CPWALL (102 BY 2.5),
 80        STARTING AT (92,102,0) FACING (0) CPWALL (92 BY 2.5),
 81        STARTING AT (0,102,0) FACING (270) CPWALL (102 BY 2.5);
 82  END ZONE;
 83  ZONE 1 "NORTH LAB":
 84        ORIGIN:(14,83,0);
 85        NORTH AXIS = 0;
 86     EXTERIOR WALLS:
 87        STARTING AT (31,19.5,0) FACING (0) EWALL1 (31 BY HEIGHT1)
 88           WITH WINDOWS OF TYPE SINGLE PANE TINTED WINDOW
 89              (6.66 BY 4.25) AT (10,4)
 90           WITH DOORS OF TYPE WINDOW PANEL
 91              (6.66 BY 4.0) AT (10,0)
 92           WITH WINDOWS OF TYPE SINGLE PANE TINTED WINDOW
 93              (3.33 BY 4.25) AT (27.5,4)
 94           WITH DOORS OF TYPE WINDOW PANEL
 95              (3.33 BY 4.0) AT (27.5,0)
 96           WITH OVERHANGS (50 BY 3) AT (-10,HEIGHT1);
```

```
 97     PARTITIONS:
 98        STARTING AT (31.0,0) FACING (90) PWALL2 (19.5 BY HEIGHT1),
 99        STARTING AT (0.0,0) FACING (180) PWALL1 (31 BY HEIGHT1),
100        STARTING AT (0,19.5,0) FACING (270) PWALL1 (13 BY HEIGHT1);
101     ROOFS:
102        STARTING AT (0.0,HEIGHT1) FACING (180) ROOF1 (31 BY 19.5);
103     FLOOR OVER CRAWL SPACE:
104        STARTING AT (0,19.5,0) FACING (180) FLOOR1 (31 BY 19.5);
105        PEOPLE = 3,OFFICE OCCUPANCY;
106        ELECTRIC EQUIPMENT = 14,OFFICE LIGHTING;
107        LIGHTS = 9,OFFICE LIGHTING;
108        CONTROLS = CLINIC CONTROLS, 104 HEATING, 154.1 COOLING;
109  END ZONE;
110  ZONE 2 "NORTH WEST LAB";
111        ORIGIN:(0,84,0);
112        NORTH AXIS = 0;
113     EXTERIOR WALLS:
114        STARTING AT (0,0,0) FACING (180) EWALL1 (4 BY HEIGHT1)
115           WITH OVERHANGS (7 BY 83) AT (-3,HEIGHT1)
116           WITH WINGS (HEIGHT1 BY 83) AT (4,0),
117        STARTING AT (0,18,0) FACING (270) EWALL1 (18 BY HEIGHT1)
118           WITH OVERHANGS (108 BY 3) AT (-3,HEIGHT1),
119        STARTING AT (14,18,0) FACING (0) EWALL1 (14 BY HEIGHT1)
120           WITH WINDOWS OF TYPE SINGLE PANE TINTED WINDOW
```

```
121              (3.33 BY 4.25) AT (.5,4)
122            WITH DOOR OF TYPE WINDOW PANEL
123              (3.33 BY 4.0) AT (.5,0)
124            WITH OVERHANGS (60 BY 3) AT (-42,HEIGHT1);
125      PARTITIONS:
126         STARTING AT (14.6,5.0) FACING (90) PWALL1 (11.5 BY HEIGHT1),
127         STARTING AT (4.0,0) FACING (180) PWALL1 (10 BY HEIGHT1);
128      ROOFS:
129         STARTING AT (0.0,HEIGHT1) FACING (180) ROOF1 (14 BY 18);
130      FLOOR OVER CRAWL SPACE:
131         STARTING AT (0.18,0) FACING (180) FLOOR1 (14 BY 18);
132      PEOPLE = 1,OFFICE OCCUPANCY;
133      LIGHTS = 2,OFFICE LIGHTING;
134     ELECTRIC EQUIPMENT = 3,OFFICE LIGHTING;
135      CONTROLS = CLINIC CONTROLS, 23.68 HEATING, 35.1 COOLING;
136  END ZONE;
137  ZONE 3 "WEST OPER RMS":
138         ORIGIN:(0,13.0);
139         NORTH AXIS = 0.;
140      EXTERIOR WALLS:
141         STARTING AT (0,81,0) FACING (270) EWALL1 (81 BY HEIGHT1)
142            WITH WINDOWS OF TYPE SINGLE PANE TINTED WINDOW
143               (5 BY 8.9) REVEAL (3.67) AT (.5,0.05)
144            WITH OVERHANGS (87  BY 3) AT (-3,HEIGHT1)
```

```
145           WITH WINDOWS OF TYPE SINGLE PANE TINTED WINDOW
146              (6.66 BY 4.25) AT (13,4)
147           WITH DOORS OF TYPE WINDOW PANEL
148              (6.66 BY 4.0) AT (13,0)
149           WITH WINDOWS OF TYPE SINGLE PANE TINTED WINDOW
150              (6.66 BY 4.25) AT (33,4)
151           WITH DOORS OF TYPE WINDOW PANEL
152              (6.66 BY 4.0) AT (33,0)
153           WITH WINDOWS OF TYPE SINGLE PANE TINTED WINDOW
154              (6.66 BY 4.25) AT (53,4)
155           WITH DOORS OF TYPE WINDOW PANEL
156              (6.66 BY 4.0) AT (53,0);
157     PARTITIONS:
158        STARTING AT (0,0,0) FACING (180) PWALL1 (19 BY HEIGHT1),
159        STARTING AT (19,5,0) FACING (90) PWALL1 (59 BY HEIGHT1),
160        STARTING AT (19,81,0) FACING (0) PWALL1 (19 BY HEIGHT1);
161     ROOFS:
162        STARTING AT (0,0,HEIGHT1) FACING (180) ROOF1 (19 BY 81);
163     FLOOR OVER CRAWL SPACE:
164        STARTING AT (0,81,0) FACING (180) FLOOR1 (19 BY 81);
165     PEOPLE = 12,OFFICE OCCUPANCY;
166     LIGHTS = 9,OFFICE LIGHTING;
167     ELECTRIC EQUIPMENT = 3,OFFICE LIGHTING;
168     CONTROLS = CLINIC CONTROLS, 117 HEATING, 173.7 COOLING;
```

```
169  END ZONE;
170  ZONE 4 "LOCKER RMS":
171        ORIGIN:(18.19,0);
172        NORTH AXIS = 0.;
173     PARTITIONS:
174        STARTING AT (0.0.0) FACING (180) PWALL1 (13 BY HEIGHT1),
175        STARTING AT (13.0.0) FACING (90) PWALL1 (59 BY HEIGHT1),
176        STARTING AT (13.59.0) FACING (0) PWALL1 (13 BY HEIGHT1),
177        STARTING AT (0.59.0) FACING (270) PWALL1 (59 BY HEIGHT1);
178     ROOFS:
179        STARTING AT (0.0,HEIGHT1) FACING (180) ROOF1 (13 BY 59);
180     FLOOR OVER CRAWL SPACE:
181        STARTING AT (0.59.0) FACING (180) FLOOR1 (13 BY 59);
182     PEOPLE = 3.OFFICE OCCUPANCY;
183     LIGHTS = 2.OFFICE LIGHTING;
184     ELECTRIC EQUIPMENT = 1.OFFICE LIGHTING;
185     CONTROLS = CLINIC CONTROLS, 44.4 HEATING, 65.8 COOLING;
186  END ZONE;
187  ZONE 5 "LIBRARY CONF RMS":
188        ORIGIN:(31.47,0);
189        NORTH AXIS = 0;
190     PARTITIONS:
191        STARTING AT (0.0.0) FACING (180) PWALL1 (6 BY HEIGHT1),
192        STARTING AT (6.0.0) FACING (90) PWALL1 (3 BY HEIGHT1),
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193         STARTING AT (6.3,0) FACING (180) PWALL1 (12 BY HEIGHT1),
194         STARTING AT (18,3,0) FACING (90) PWALL1 (29 BY HEIGHT1),
195         STARTING AT (18,36,0) FACING (0) PWALL1 (30 BY HEIGHT1),
196         STARTING AT (-12,36,0) FACING (270) PWALL1 (6 BY HEIGHT1),
197         STARTING AT (-12,30,0) FACING (180) PWALL1 (12 BY HEIGHT1),
198         STARTING AT (0,30,0) FACING (270) PWALL1 (30 BY HEIGHT1);
199      ROOFS:
200         STARTING AT (0,0,HEIGHT1) FACING (180) ROOF1 (6 BY 3),
201         STARTING AT (0,3,HEIGHT1) FACING (180) ROOF1 (18 BY 33),
202         STARTING AT (-12,30,HEIGHT1) FACING (180) ROOF1 (12 BY 6);
203      FLOORS OVER CRAWL SPACE:
204         STARTING AT (0,3,0) FACING (180) FLOOR1 (6 BY 3),
205         STARTING AT (0,36,0) FACING (180) FLOOR1 (18 BY 33),
206         STARTING AT (-12,36,0) FACING (180) FLOOR1 (12 BY 6);
207      PEOPLE = 2.OFFICE OCCUPANCY;
208      LIGHTS = 3.OFFICE LIGHTING;
209      ELECTRIC EQUIPMENT = .5.OFFICE LIGHTING;
210      CONTROLS = CLINIC CONTROLS, 29.3 HEATING, 43.4 COOLING;
211   END ZONE;
212   ZONE 6 "WAITING ROOM":
213         ORIGIN:(19,13,0);
214         NORTH AXIS = 0.;
215      PARTITIONS:
216         STARTING AT (0,0,0) FACING (180) PWALL1 (42 BY HEIGHT1),
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```
217         STARTING AT (42,5.5,0) FACING (0) PWALL1 (12 BY HEIGHT1),
218         STARTING AT (30,5.5,0) FACING (90) PWALL1 (31 BY HEIGHT1),
219         STARTING AT (30,36.5,0) FACING (0) PWALL1 (12 BY HEIGHT1),
220         STARTING AT (18,36.5,0) FACING (270) PWALL1 (3 BY HEIGHT1),
221         STARTING AT (18,33.5,0) FACING (0) PWALL1  (6 BY HEIGHT1),
222         STARTING AT (12,33.5,0) FACING (270) PWALL1 (28 BY HEIGHT1),
223         STARTING AT (12,5.5,0) FACING (0) PWALL1 (12 BY HEIGHT1);
224      ROOFS:
225         STARTING AT (0.0,HEIGHT1) FACING (180) ROOF1 (42 BY 5.5),
226         STARTING AT (12,5.5,HEIGHT1) FACING (180) ROOF1 (18 BY 28),
227         STARTING AT (18,33.5,HEIGHT1) FACING (180) ROOF1 (12 BY 3);
228      FLOORS OVER CRAWL SPACE:
229         STARTING AT (0,5.5,0) FACING (180) FLOOR1 (42 BY 5.5),
230         STARTING AT (12,33.5,0) FACING (180) FLOOR1 (18 BY 28),
231         STARTING AT (18,36.5,0) FACING (180) FLOOR1 (12 BY 3);
232      PEOPLE = 55.OFFICE OCCUPANCY;
233      LIGHTS = 4.1.OFFICE LIGHTING;
234      ELECTRIC EQUIPMENT = .5.OFFICE LIGHTING;
235      CONTROLS = CLINIC CONTROLS, 48.6 HEATING, 72.0 COOLING;
236   END ZONE;
237   ZONE 7 "RECORDS AND SUPPLY";
238         ORIGIN:(49,18.5,0);
239         NORTH AXIS = 0.;
240      PARTITIONS:
```

```
241        STARTING AT (0,0,0) FACING (180) PWALL1 (12 BY HEIGHT1),
242        STARTING AT (12,0,0) FACING (90) PWALL1 (45 BY HEIGHT1),
243        STARTING AT (12,45,0) FACING (180) PWALL1 (6 BY HEIGHT1),
244        STARTING AT (18,45,0) FACING (90) PWALL1 (13 BY HEIGHT1),
245        STARTING AT (18,58,0) FACING (180) PWALL1 (7 BY HEIGHT1),
246        STARTING AT (25,63.5,0) FACING (0) PWALL2 (25 BY HEIGHT1),
247        STARTING AT (0,63.5,0) FACING (270) PWALL1 (63.5 BY HEIGHT1);
248     ROOFS:
249        STARTING AT (0,0,HEIGHT1) FACING (180) ROOF1 (12 BY 63.5),
250        STARTING AT (12,45,HEIGHT1) FACING (180) ROOF1 (6 BY 18.5),
251        STARTING AT (18,58,HEIGHT1) FACING (180) ROOF1 (7 BY 5.5);
252     FLOORS OVER CRAWL SPACE:
253        STARTING AT (0,63.5,0) FACING (180) FLOOR1 (12 BY 63.5),
254        STARTING AT (12,63.5,0) FACING (180) FLOOR1 (6 BY 18.5),
255        STARTING AT (18,63.5,0) FACING (180) FLOOR1 (7 BY 5.5);
256     PEOPLE = 6,OFFICE OCCUPANCY;
257     LIGHTS = 5,OFFICE LIGHTING;
258     ELECTRIC EQUIPMENT = 2,OFFICE LIGHTING;
259     CONTROLS = CLINIC CONTROLS, 51.6 HEATING, 76.4 COOLING;
260  END ZONE;
261  ZONE 8 "XRAY":
262        ORIGIN:(61,13,0);
263        NORTH AXIS = 0.;
264     PARTITIONS:
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265        STARTING AT (0.0.0) FACING (180) PWALL1 (16 BY HEIGHT1),
266        STARTING AT (16.0.0) FACING (90) PWALL1 (69 BY HEIGHT1),
267        STARTING AT (16.69.0) FACING (0) PWALL2 (4 BY HEIGHT1),
268        STARTING AT (12.64.0) FACING (0) PWALL1 (7 BY HEIGHT1),
269        STARTING AT (5.64.0) FACING (270) PWALL1 (14 BY HEIGHT1),
270        STARTING AT (5.50.0) FACING (0) PWALL1 (5 BY HEIGHT1),
271        STARTING AT (0.50.0) FACING (270) PWALL1 (45 BY HEIGHT1);
272     ROOFS:
273        STARTING AT (0.0.HEIGHT1) FACING (180) ROOF1 (16 BY 50),
274        STARTING AT (5.50.HEIGHT1) FACING (180) ROOF1 (11 BY 14),
275        STARTING AT (12.64.HEIGHT1) FACING (180) ROOF1 (4 BY 5);
276     FLOORS OVER CRAWL SPACE:
277        STARTING AT (0.50.0) FACING (180) FLOOR1 (16 BY 50),
278        STARTING AT (5.64.0) FACING (180) FLOOR1 (11 BY 14),
279        STARTING AT (12.69.0) FACING (180) FLOOR1 (4 BY 5);
280     PEOPLE = 7.OFFICE OCCUPANCY;
281     LIGHTS = 9.OFFICE LIGHTING;
282     ELECTRIC EQUIPMENT = 20.OFFICE LIGHTING;
283     CONTROLS = CLINIC CONTROLS, 48.3 HEATING, 71.6 COOLING;
284  END ZONE;
285  ZONE 9 "SOUTH OPER RMS";
286        ORIGIN:(0.0.0);
287        NORTH AXIS = 0.;
288     EXTERIOR WALLS;
```

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289       STARTING AT (0,0,0) FACING (180) EWALL1 (92 BY HEIGHT1)
290          WITH WINDOWS OF TYPE SINGLE PANE TINTED WINDOW
291             (6.66 BY 4.25) AT (9,4)
292          WITH DOORS OF TYPE WINDOW PANEL
293             (6.66 BY 4.0) AT (9,0)
294          WITH WINDOWS OF TYPE SINGLE PANE TINTED WINDOW
295             (6.66 BY 4.25) AT (28,4)
296          WITH DOORS OF TYPE WINDOW PANEL
297             (6.66 BY 4.0) AT (28,0)
298          WITH WINDOWS OF TYPE SINGLE PANE TINTED WINDOW
299             (8 BY 8.9) REVEAL (4) AT (42,.05)
300          WITH OVERHANGS (98 BY 3) AT (-3,HEIGHT1)
301          WITH WINDOWS OF TYPE SINGLE PANE TINTED WINDOW
302             (6.66 BY 4.25) AT (58,4)
303          WITH DOORS OF TYPE WINDOW PANEL
304             (6.66 BY 4.0) AT (58,0)
305          WITH WINDOWS OF TYPE SINGLE PANE TINTED WINDOW
306             (6.66 BY 4.25) AT (78,4)
307          WITH DOORS OF TYPE WINDOW PANEL
308             (6.66 BY 4.0) AT (78,0),
309       STARTING AT (92,0,0) FACING (90) EWALL1 (13.5 BY HEIGHT1)
310          WITH OVERHANGS (100 BY 3) AT (-3,HEIGHT1),
311       STARTING AT (0,13.5,0) FACING (270) EWALL1 (13.5 BY HEIGHT1)
312          WITH OVERHANGS (100 BY 3) AT (-93.5,HEIGHT1);
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313     PARTITIONS:
314        STARTING AT (92,13.5,0) FACING (0) PWALL1 (92 BY HEIGHT1);
315     ROOFS:
316        STARTING AT (0,0,HEIGHT1) FACING (180) ROOF1 (92 BY 13.5);
317     FLOOR OVER CRAWL SPACE:
318        STARTING AT (0,13.5,0) FACING (180) FLOOR1 (92 BY 13.5);
319     PEOPLE = 15,OFFICE OCCUPANCY;
320     LIGHTS = 9,OFFICE LIGHTING;
321     ELECTRIC EQUIPMENT = 4,OFFICE LIGHTING;
322     CONTROLS = CLINIC CONTROLS, 130.9 HEATING, 194.0 COOLING;
323  END ZONE;
324  ZONE 10 "EAST OPER RMS";
325        ORIGIN:(77,13,0);
326        NORTH AXIS = 0.;
327     PARTITIONS:
328        STARTING AT (0,0,0) FACING (180) PWALL1 (15 BY HEIGHT1),
329        STARTING AT (0,70,0) FACING (270) PWALL1 (70 BY HEIGHT1),
330        STARTING AT (15,70,0) FACING (0) PWALL2 (15 BY HEIGHT1);
331     EXTERIOR WALLS:
332        STARTING AT (15,0,0) FACING (90) EWALL1 (70 BY HEIGHT1)
333          WITH WINDOWS OF TYPE SINGLE PANE TINTED WINDOW
334              (6.66 BY 4.25) AT (12,4)
335           WITH DOORS OF TYPE WINDOW PANEL
336              (6.66 BY 4.0) AT (12,0)
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337           WITH WINDOWS OF TYPE SINGLE PANE TINTED WINDOW
338              (6.66 BY 4.25) AT (32,4)
339           WITH DOORS OF TYPE WINDOW PANEL
340              (6.66 BY 4.0) AT (32,0)
341           WITH WINDOWS OF TYPE SINGLE PANE TINTED WINDOW
342              (6.66 BY 4.25) AT (51,4)
343           WITH DOORS OF TYPE WINDOW PANEL
344              (6.66 BY 4.0) AT (51,0)
345           WITH WINDOWS OF TYPE SINGLE PANE TINTED WINDOW
346              (5 BY 8.9) REVEAL (3.67) AT (65,0)
347           WITH OVERHANGS (76 BY 3) AT (-3,HEIGHT1);
348     ROOFS:
349        STARTING AT (0,0,HEIGHT1) FACING (180) ROOF1 (15 BY 70);
350     FLOOR OVER CRAWL SPACE:
351        STARTING AT (0,70,0) FACING (180) FLOOR1 (15 BY 70);
352     PEOPLE = 12.OFFICE OCCUPANCY;
353     LIGHTS = 8.OFFICE LIGHTING;
354     ELECTRIC EQUIPMENT = 3.OFFICE LIGHTING;
355     CONTROLS = CLINIC CONTROLS, 122.7 HEATING, 181.9 COOLING;
356  END ZONE;
357  END BUILDING DESCRIPTION;
358  BEGIN FAN SYSTEM DESCRIPTION;
359  MULTIZONE SYSTEM 1 "BASIC  SYSTEM" SERVING ZONES 1,2,3,4,5,6,7,8,9,10;
360  FOR ZONE 1;
```

```
361         EXHAUST AIR VOLUME = 1000;
362         SUPPLY AIR VOLUME = 1784;
363   END;
364   FOR ZONE 2:
365         SUPPLY AIR VOLUME = 406;
366   END;
367   FOR ZONE 3:
368         SUPPLY AIR VOLUME = 2010;
369   END;
370   FOR ZONE 4:
371         EXHAUST AIR VOLUME = 600;
372         SUPPLY AIR VOLUME = 761;
373   END;
374   FOR ZONE 5:
375         SUPPLY AIR VOLUME = 502;
376   END;
377   FOR ZONE 6:
378         SUPPLY AIR VOLUME = 833;
379   END;
380   FOR ZONE 7:
381         SUPPLY AIR VOLUME = 884;
382   END;
383   FOR ZONE 8:
384         SUPPLY AIR VOLUME = 829;
```

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385  END;
386  FOR ZONE 9:
387         SUPPLY AIR VOLUME = 2245;
388  END;
389  FOR ZONE 10:
390         SUPPLY AIR VOLUME = 2105;
391  END;
392  OTHER SYSTEM PARAMETERS:
393         HOT DECK CONTROL = OUTSIDE AIR CONTROLLED;
394         HOT DECK CONTROL SCHEDULE = (120 AT 10, 80 AT 70);
395         COLD DECK CONTROL = FIXED SET POINT;
396         COLD DECK TEMPERATURE = 55.;
397         MIXED AIR CONTROL = FIXED AMOUNT;
398         OUTSIDE AIR VOLUME = 4114.;
399  END;
400  COOLING COIL DESIGN PARAMETERS:
401         COIL TYPE = CHILLED WATER;
402         ENTERING WATER TEMPERATURE = 45;
403         ENTERING AIR DRY BULB TEMPERATURE = 87.6;
404         ENTERING AIR WET BULB TEMPERATURE = 70.3;
405         LEAVING WATER TEMPERATURE = 55.4;
406         LEAVING AIR DRY BULB TEMPERATURE = 61.;
407         LEAVING AIR WET BULB TEMPERATURE = 59.;
408         WATER VELOCITY = 275.4;
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```
CERL -- B.L.A.S.T. SYSTEM --- VERSION 2.0              10 APR 79      12.05.48

409         WATER VOLUME FLOW RATE = 15.63;
410         AIR FACE VELOCITY = 514.6;
411         AIR VOLUME FLOW RATE = 15760;
412         BAROMETRIC PRESSURE = 405;
413   END;
414   EQUIPMENT SCHEDULES;
415         HEATING CAPACITY ON FROM 01 OCT THRU 31 MAR;
416       SYSTEM OPERATION = CONTINUOUS;
417   END;
418   END SYSTEM;
419   END FAN SYSTEM DESCRIPTION;
420   BEGIN CENTRAL PLANT DESCRIPTION;
421   PLANT 1 "PLANT FOR BASIC  SYSTEM" SERVING SYSTEM 1;
422   EQUIPMENT SELECTION;
423         1 CHILLER OF SIZE 600;
424         1 BOILER OF SIZE 800;
425   END;
426   END PLANT;
427   END CENTRAL PLANT DESCRIPTION;
428   END INPUT;
```



```
CERL -- B.L.A.S.T. SYSTEM --- VERSION 2.0              10 APR 79      12.05.48

REPORTING WILL BE DONE IN UNITS ENGLISH

SIMULATIONS WILL BE ALLOWED FOR TYPES: BUILDINGS  SYSTEMS    T.E. PLANT

NUMBER OF SIMULATIONS TO BE ATTEMPTED    14
```

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    CERL -- B.L.A.S.T. SYSTEM --- VERSION 2.0            10 APR 79      12.05.48

NEW BLDFL AND AMLDFL FILES WILL BE CREATED
     FROM USER INPUT, AS NECESSARY

 * * * * *
 BLDFL FOR
  FT HOOD DENTAL CLINIC


 LOCATION FT HOOD                                  LAT=  31.00000 LONG=  97.80000 TIME ZONE= 6.0
 DATE OF FILE CREATE/UPDATE 10 APR 79 NUMBER OF ENVIRONMENTS  2
 NUMBER OF ZONES 11 WITH ZONE NUMBERS
1000    1    2    3    4    5    6    7    8    9   10


 * * * * *
 AMLDFL FOR
  FT HOOD DENTAL CLINIC


 LOCATION FT HOOD                                  LAT=  31.00000 LONG=  97.80000 TIME ZONE= 6.0
 DATE OF FILE CREATE/UPDATE 10 APR 79 NUMBER OF ENVIRONMENTS  2
 NUMBER OF SYSTEMS  1 WITH SYSTEM NUMBERS
  1


   ENVIRONMENT NUMBER  1 FOR BLDFL  TITLE IS FT HOOD SUMMER
    DESIGN DAY 21 JUL WITH GROUND TEMPERATURE  75.000

   ENVIRONMENT NUMBER  1 FOR AMLDFL TITLE IS FT HOOD SUMMER
    DESIGN DAY 21 JUL WITH GROUND TEMPERATURE  75.000
IN PSYWTP, MONTH=  1 DAY= 21 TDB=0.        TWB=-.667E+01 PB= .101E+06 W=-.522E-03
  W<0 --> SET W FOR A RH=.01
/DEBUG/  PSYWTP  AT LINE   53- TRACE ROUTINE CALLED
                               PSYWTP  CALLED BY SUDDEN  AT LINE  103, FROM    1 LEVELS BACK
                               SUDDEN  CALLED BY IMFILE  AT LINE  368, FROM    2 LEVELS BACK
                               IMFILE  CALLED BY BLAST   AT LINE   61, FROM    3 LEVELS BACK

   ENVIRONMENT NUMBER  2 FOR BLDFL  TITLE IS FT HOOD WINTER
    DESIGN DAY 21 JAN WITH GROUND TEMPERATURE  62.000

   ENVIRONMENT NUMBER  2 FOR AMLDFL TITLE IS FT HOOD WINTER
    DESIGN DAY 21 JAN WITH GROUND TEMPERATURE  62.000
```

CONDUCTIVE PROPERTIES OF HEAT TRANSFER SURFACE

CPCEIL

DESCRIPTION OF CONSTRUCTION

| LAYER | THICKNESS FEET | CONDUCTIVITY BTU/(HR*FT*F) | DENSITY LB/FT**3 | SPECIFIC HEAT BTU/(LB*F) | RESISTANCE HR*FT**2*F/BTU |
|---|---|---|---|---|---|
| FINISH FLOORING - TILE 1 / 16 IN | .0052 | .103 | 120.000 | .300 | 0. |
| C10 - 8 IN HW CONCRETE | .6670 | 1.000 | 140.000 | .200 | 0. |
| B1 - AIRSPACE RESISTANCE | 0. | 0. | 0. | 0. | .910 |
| B2 - 1 IN INSULATION | .0830 | .025 | 2.000 | .200 | 0. |

5 CONDUCTION TRANSFER FUNCTIONS OF ORDER 3

| TIME | INTERNAL | CROSS | EXTERNAL | FLUX |
|---|---|---|---|---|
| 1 | .24325549 | .00058089 | 4.92376469 | 1.04479715 |
| 2 | -.27459802 | .01244356 | -7.64641648 | -.18479115 |
| 3 | .06241409 | .01345817 | 2.96344495 | .00221983 |
| 4 | -.00325577 | .00135497 | -.21420857 | |
| 5 | .00003153 | .00000771 | .00126262 | |

THERMAL CONDUCTANCE = .202 BTU/(HR*FT**2*F)
OUTER THERMAL ABSORPTANCE = .90
OUTER SOLAR ABSORPTANCE = .50
INNER THERMAL ABSORPTANCE = .90
INNER SOLAR ABSORPTANCE = .50
OUTER SURFACE ROUGHNESS: SMOOTH

CONDUCTIVE PROPERTIES OF HEAT TRANSFER SURFACE

CPFLOOR

DESCRIPTION OF CONSTRUCTION

| LAYER | THICKNESS FEET | CONDUCTIVITY BTU/(HR*FT*F) | DENSITY LB/FT**3 | SPECIFIC HEAT BTU/(LB*F) | RESISTANCE HR*FT**2*F/BTU |
|---|---|---|---|---|---|
| DIRT 12 IN | 1.0000 | .100 | 65.000 | .200 | 0. |

10 CONDUCTION TRANSFER FUNCTIONS OF ORDER 5

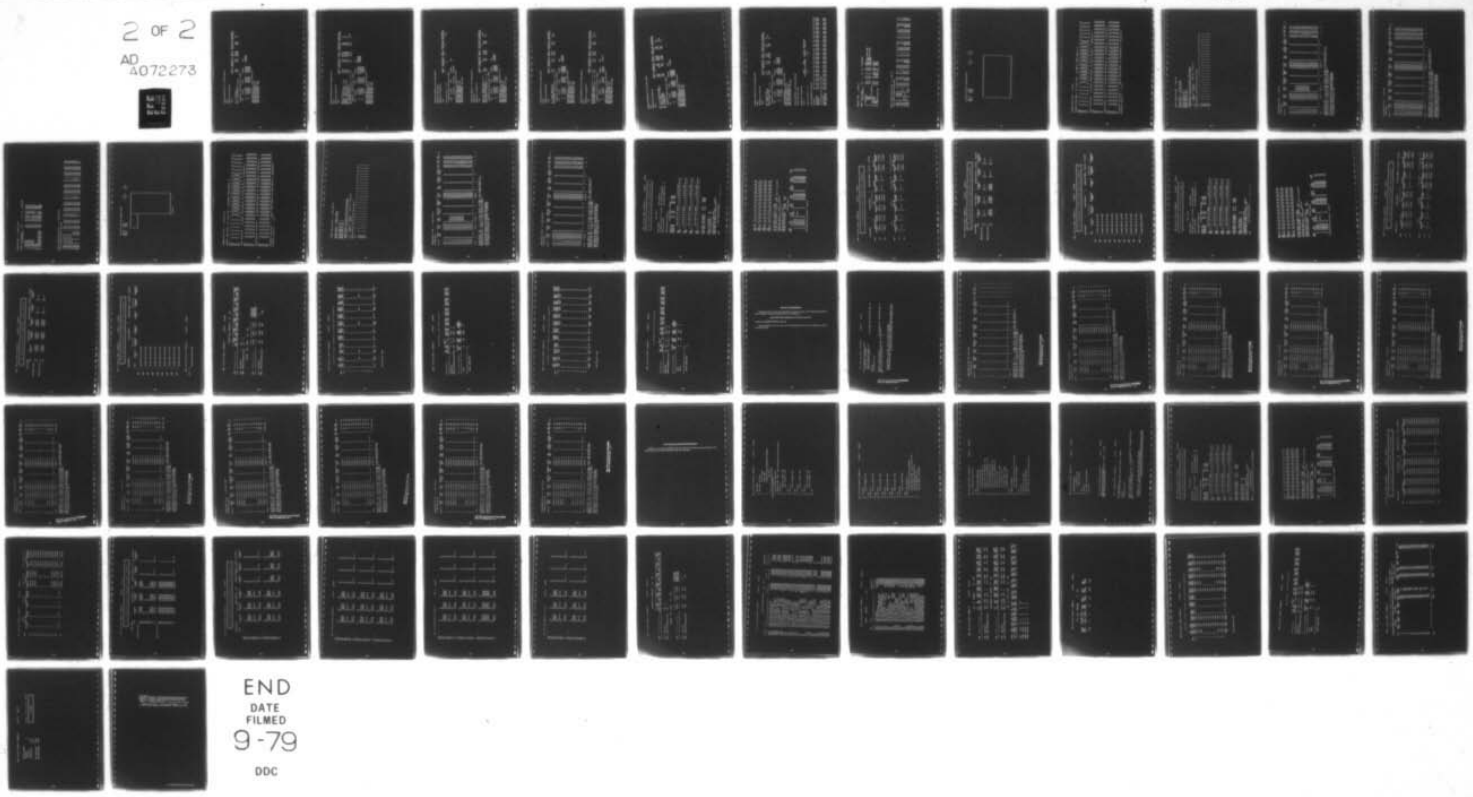
| TIME | INTERNAL | CROSS | EXTERNAL | FLUX |
|---|---|---|---|---|
| 1 | 1.28655020 | .00000000 | 1.28655020 | 2.61660597 |
| 2 | -4.12003859 | .00000001 | -4.12003859 | -2.53859260 |
| 3 | 5.11402233 | .00000355 | 5.11402233 | 1.12308359 |
| 4 | -3.09784036 | .00006373 | -3.09784036 | -.22212957 |
| 5 | .94434413 | .00021242 | .94434413 | .01536594 |
| 6 | -.13266757 | .00020381 | -.13266757 | |
| 7 | .00615509 | .00007081 | .00615509 | |
| 8 | .00003962 | .00001117 | .00003962 | |
| 9 | .00000171 | .00000107 | .00000171 | |
| 10 | .00000010 | .00000008 | .00000010 | |

THERMAL CONDUCTANCE = .100 BTU/(HR*FT**2*F)
OUTER THERMAL ABSORPTANCE = .90
OUTER SOLAR ABSORPTANCE = .70
INNER THERMAL ABSORPTANCE = .90
INNER SOLAR ABSORPTANCE = .70
OUTER SURFACE ROUGHNESS: ROUGH

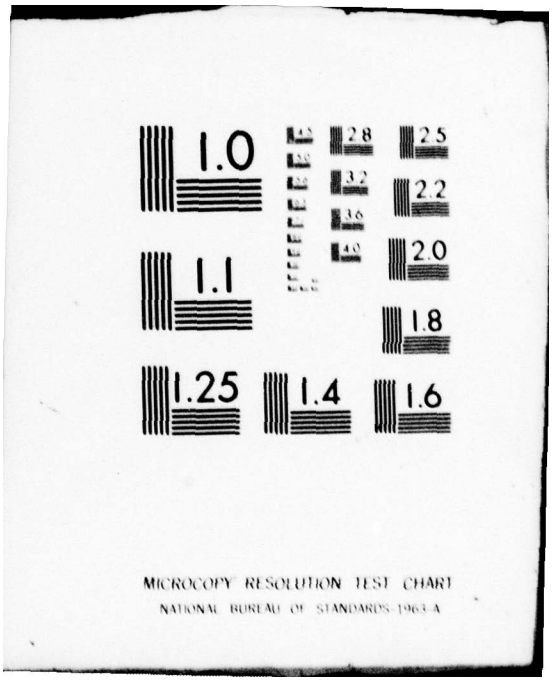
AD-A072 273 CONSTRUCTION ENGINEERING RESEARCH LAB (ARMY) CHAMPAIGN IL F/G 9/2
THE BUILDING LOADS ANALYSIS AND SYSTEM THERMODYNAMICS (BLAST) P--ETC(U)
JUN 79 D C HITTLE

UNCLASSIFIED CERL-TR-E-153-VOL-2 NL

2 OF 2
AD A072273



END
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1.0
1.1
1.25
1.4
1.6
2.8
3.2
3.6
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2.2
2.0
1.8
MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

CONDUCTIVE PROPERTIES OF HEAT TRANSFER SURFACE

CPWALL

DESCRIPTION OF CONSTRUCTION

| LAYER | THICKNESS FEET | CONDUCTIVITY BTU/(HR*FT*F) | DENSITY LB/FT**3 | SPECIFIC HEAT BTU/(LB*F) | RESISTANCE HR*FT**2*F/BTU |
|---|---|---|---|---|---|
| A1 - 1 IN STUCCO | .0833 | .400 | 116.000 | .200 | 0. |
| C10 - 8 IN HW CONCRETE | .6670 | 1.000 | 140.000 | .200 | 0. |
| E1 - 3 / 4 IN PLASTER OR GYP BOARD | .0625 | .420 | 100.000 | .200 | 0. |

5 CONDUCTION TRANSFER FUNCTIONS OF ORDER 2

| TIME | INTERNAL | CROSS | EXTERNAL | FLUX |
|---|---|---|---|---|
| 1 | 4.14659912 | .00246310 | 3.92431510 | .91433022 |
| 2 | -5.72737589 | .08327275 | -5.43787400 | -.14845736 |
| 3 | 1.93969678 | .12169120 | 1.88420264 | |
| 4 | -.12953051 | .02052999 | -.14138846 | |
| 5 | -.00074702 | .00065599 | -.00061564 | |

THERMAL CONDUCTANCE = .977 BTU/(HR*FT**2*F)
OUTER THERMAL ABSORPTANCE = .90
OUTER SOLAR ABSORPTANCE = .92
INNER THERMAL ABSORPTANCE = .90
INNER SOLAR ABSORPTANCE = .92
OUTER SURFACE ROUGHNESS: SMOOTH

CONDUCTIVE PROPERTIES OF HEAT TRANSFER SURFACE

EWALL1

DESCRIPTION OF CONSTRUCTION

| LAYER | THICKNESS FEET | CONDUCTIVITY BTU/(HR*FT*F) | DENSITY LB/FT**3 | SPECIFIC HEAT BTU/(LB*F) | RESISTANCE HR*FT**2*F/BTU |
|---|---|---|---|---|---|
| BRICK - FACE 4 IN | .3330 | .770 | 125.000 | .220 | 0. |
| CONCRETE - CEMENT MORTAR 1 / 2 IN | .0417 | .416 | 116.000 | .200 | 0. |
| CONCRETE - CEMENT MORTAR 1 / 2 IN | .0417 | .416 | 116.000 | .200 | 0. |
| CONCRETE - CEMENT MORTAR 1 / 2 IN | .0417 | .416 | 116.000 | .200 | 0. |
| CONCRETE - CEMENT MORTAR 1 / 2 IN | .0417 | .416 | 116.000 | .200 | 0. |
| C3 - 4 IN HW CONCRETE BLOCK | .3330 | .470 | 61.000 | .200 | 0. |
| B1 - AIRSPACE RESISTANCE | 0. | 0. | 0. | 0. | .910 |
| BUILDING BOARD - GYPSUM PLASTER 1 / 2 IN | .0417 | .094 | 50.000 | .200 | 0. |

6 CONDUCTION TRANSFER FUNCTIONS OF ORDER 3

| TIME | INTERNAL | CROSS | EXTERNAL | FLUX |
|---|---|---|---|---|
| 1 | .92033427 | .00006092 | 5.18872086 | 1.23934950 |
| 2 | -1.54380541 | .00734623 | -9.52793199 | -.38246284 |
| 3 | .80494327 | .02410185 | 5.24629546 | .02213280 |
| 4 | -.14649659 | .00970943 | -.89857256 | |
| 5 | .00678957 | .00054412 | .03320808 | |
| 6 | .00000069 | .00000521 | .00004770 | |

THERMAL CONDUCTANCE = .345 BTU/(HR*FT**2*F)
OUTER THERMAL ABSORPTANCE = .90
OUTER SOLAR ABSORPTANCE = .60
INNER THERMAL ABSORPTANCE = .90
INNER SOLAR ABSORPTANCE = .75
OUTER SURFACE ROUGHNESS: ROUGH

CONDUCTIVE PROPERTIES OF HEAT TRANSFER SURFACE

SINGLE PANE TINTED WINDOW

DESCRIPTION OF CONSTRUCTION

| LAYER | THICKNESS FEET | CONDUCTIVITY BTU/(HR*FT*F) | DENSITY LB/FT**3 | SPECIFIC HEAT BTU/(LB*F) | RESISTANCE HR*FT**2*F/BTU |
|---|---|---|---|---|---|
| GLASS - GREY PLATE 1 / 4 IN | 0. | 0. | 0. | 0. | .047 |

1 CONDUCTION TRANSFER FUNCTIONS OF ORDER 0

| TIME | INTERNAL | CROSS | EXTERNAL | FLUX |
|---|---|---|---|---|
| 1 | 21.18644068 | 21.18644068 | 21.18644068 | |

THERMAL CONDUCTANCE = 21.186 BTU/(HR*FT**2*F)
OUTER THERMAL ABSORPTANCE = .90
OUTER SOLAR ABSORPTANCE = .75
INNER THERMAL ABSORPTANCE = .90
INNER SOLAR ABSORPTANCE = .75
OUTER SURFACE ROUGHNESS: VRY SMOOTH



CONDUCTIVE PROPERTIES OF HEAT TRANSFER SURFACE

WINDOW PANEL

DESCRIPTION OF CONSTRUCTION

| LAYER | THICKNESS FEET | CONDUCTIVITY BTU/(HR*FT*F) | DENSITY LB/FT**3 | SPECIFIC HEAT BTU/(LB*F) | RESISTANCE HR*FT**2*F/BTU |
|---|---|---|---|---|---|
| GLASS - HEAT ABSORBING PLATE 1 / 2 IN | 0. | 0. | 0. | 0. | .094 |
| INSULATION - CELLULAR GLASS 2 IN | .1670 | .033 | 9.000 | .240 | 0. |
| C3 - 4 IN HW CONCRETE BLOCK | .3330 | .470 | 61.000 | .200 | 0. |
| BUILDING BOARD - GYPSUM PLASTER 1 / 2 IN | .0417 | .094 | 50.000 | .200 | 0. |

4 CONDUCTION TRANSFER FUNCTIONS OF ORDER 2

| TIME | INTERNAL | CROSS | EXTERNAL | FLUX |
|---|---|---|---|---|
| 1 | 1.53691486 | .00364769 | .30863368 | .69726599 |
| 2 | -1.73306918 | .03244097 | -.34189933 | -.01580859 |
| 3 | .25017325 | .01449152 | .08559298 | |
| 4 | -.00303040 | .00040571 | -.00133776 | |

THERMAL CONDUCTANCE = .160 BTU/(HR*FT**2*F)
OUTER THERMAL ABSORPTANCE = .90
OUTER SOLAR ABSORPTANCE = .75
INNER THERMAL ABSORPTANCE = .90
INNER SOLAR ABSORPTANCE = .75
OUTER SURFACE ROUGHNESS: VRY SMOOTH

CONDUCTIVE PROPERTIES OF HEAT TRANSFER SURFACE

PWALL2

DESCRIPTION OF CONSTRUCTION

| LAYER | THICKNESS FEET | CONDUCTIVITY BTU/(HR•FT•F) | DENSITY LB/FT••3 | SPECIFIC HEAT BTU/(LB•F) | RESISTANCE HR•FT••2•F/BTU |
|---|---|---|---|---|---|
| C8 - 8 IN HW CONCRETE BLOCK | .6670 | .600 | 61.000 | .200 | 0. |
| B1 - AIRSPACE RESISTANCE | 0. | 0. | 0. | 0. | .910 |
| BUILDING BOARD - GYPSUM PLASTER 1 / 2 IN | .0417 | .094 | 50.000 | .200 | 0. |

4 CONDUCTION TRANSFER FUNCTIONS OF ORDER 2

| TIME | INTERNAL | CROSS | EXTERNAL | FLUX |
|---|---|---|---|---|
| 1 | .93131144 | .00765453 | 3.05285736 | .72571798 |
| 2 | -1.07157488 | .07932507 | -4.00969107 | -.04749497 |
| 3 | .28516544 | .04211004 | 1.12491275 | |
| 4 | -.01442834 | .00137949 | -.03759450 | |

THERMAL CONDUCTANCE = .405 BTU/(HR•FT••2•F)
OUTER THERMAL ABSORPTANCE = .90
OUTER SOLAR ABSORPTANCE = .65
INNER THERMAL ABSORPTANCE = .90
INNER SOLAR ABSORPTANCE = .75
OUTER SURFACE ROUGHNESS: ROUGH



CONDUCTIVE PROPERTIES OF HEAT TRANSFER SURFACE

PWALL1

DESCRIPTION OF CONSTRUCTION

| LAYER | THICKNESS FEET | CONDUCTIVITY BTU/(HR•FT•F) | DENSITY LB/FT••3 | SPECIFIC HEAT BTU/(LB•F) | RESISTANCE HR•FT••2•F/BTU |
|---|---|---|---|---|---|
| BUILDING BOARD - GYPSUM PLASTER 1 / 2 IN | .0417 | .094 | 50.000 | .200 | 0. |
| B1 - AIRSPACE RESISTANCE | 0. | 0. | 0. | 0. | .910 |
| BUILDING BOARD - GYPSUM PLASTER 1 / 2 IN | .0417 | .094 | 50.000 | .200 | 0. |

2 CONDUCTION TRANSFER FUNCTIONS OF ORDER 1

| TIME | INTERNAL | CROSS | EXTERNAL | FLUX |
|---|---|---|---|---|
| 1 | .88675893 | .44975949 | .88675893 | .00000166 |
| 2 | -.33093462 | .08606495 | -.33093462 | |

THERMAL CONDUCTANCE = .556 BTU/(HR•FT••2•F)
OUTER THERMAL ABSORPTANCE = .90
OUTER SOLAR ABSORPTANCE = .75
INNER THERMAL ABSORPTANCE = .90
INNER SOLAR ABSORPTANCE = .75
OUTER SURFACE ROUGHNESS: MED SMOOTH

CONDUCTIVE PROPERTIES OF HEAT TRANSFER SURFACE

ROOF1

DESCRIPTION OF CONSTRUCTION

| LAYER | THICKNESS FEET | CONDUCTIVITY BTU/(HR*FT*F) | DENSITY LB/FT**3 | SPECIFIC HEAT BTU/(LB*F) | RESISTANCE HR*FT**2*F/BTU |
|---|---|---|---|---|---|
| E2 - 1 / 2 IN SLAG OR STONE | .0417 | .830 | 55.000 | .400 | 0. |
| E3 - 3 / 8 IN FELT AND MEMBRANE | .0313 | .110 | 70.000 | .400 | 0. |
| A3 - STEEL SIDING | .0050 | 26.000 | 480.000 | .100 | 0. |
| E4 - CEILING AIRSPACE | 0. | 0. | 0. | 0. | 1.000 |
| M4 - 3 IN INSULATION | .2500 | .025 | 2.000 | .200 | 0. |
| E5 - ACOUSTIC TILE | .0625 | .035 | 30.000 | .200 | 0. |

4 CONDUCTION TRANSFER FUNCTIONS OF ORDER 1

| TIME | INTERNAL | CROSS | EXTERNAL | FLUX |
|---|---|---|---|---|
| 1 | .42037740 | .01998684 | 2.08636089 | .04428510 |
| 2 | -.35257898 | .04826369 | -2.08649506 | |
| 3 | .00503846 | .00453893 | .07266286 | |
| 4 | .00000833 | .00005037 | .00030086 | |

THERMAL CONDUCTANCE = .076 BTU/(HR*FT**2*F)
OUTER THERMAL ABSORPTANCE = .90
OUTER SOLAR ABSORPTANCE = .55
INNER THERMAL ABSORPTANCE = .90
INNER SOLAR ABSORPTANCE = .32
OUTER SURFACE ROUGHNESS: ROUGH

CONDUCTIVE PROPERTIES OF HEAT TRANSFER SURFACE

FLOOR1

DESCRIPTION OF CONSTRUCTION

| LAYER | THICKNESS FEET | CONDUCTIVITY BTU/(HR*FT*F) | DENSITY LB/FT**3 | SPECIFIC HEAT BTU/(LB*F) | RESISTANCE HR*FT**2*F/BTU |
|---|---|---|---|---|---|
| B2 - 1 IN INSULATION | .0830 | .025 | 2.000 | .200 | 0. |
| B1 - AIRSPACE RESISTANCE | 0. | 0. | 0. | 0. | .910 |
| C10 - 8 IN HW CONCRETE | .6670 | 1.000 | 140.000 | .200 | 0. |
| FINISH FLOORING - TILE 1 / 16 IN | .0052 | .103 | 120.000 | .300 | 0. |

5 CONDUCTION TRANSFER FUNCTIONS OF ORDER 3

| TIME | INTERNAL | CROSS | EXTERNAL | FLUX |
|---|---|---|---|---|
| 1 | 4.92376449 | .00058089 | .24325549 | 1.04479715 |
| 2 | -7.64661468 | .01244756 | -.27459802 | -.18479115 |
| 3 | 2.99344495 | .01345817 | .06241409 | .00221983 |
| 4 | -.21420857 | .00135497 | -.00325577 | |
| 5 | .00126762 | .00000771 | .00003153 | |

THERMAL CONDUCTANCE = .202 BTU/(HR*FT**2*F)
OUTER THERMAL ABSORPTANCE = .90
OUTER SOLAR ABSORPTANCE = .50
INNER THERMAL ABSORPTANCE = .90
INNER SOLAR ABSORPTANCE = .50
OUTER SURFACE ROUGHNESS: VERY ROUGH

OPTICAL PROPERTIES OF HEAT TRANSFER CONSTRUCT

SINGLE PANE TINTED WINDOW

DESCRIPTION OF CONSTRUCTION

| LAYER | NORMAL TRANSMITTANCE | NORMAL REFLECTANCE | INDEX OF REFRACTION | TRANSMITTANCE, WITH FILM |
|---|---|---|---|---|
| GLASS - GREY PLATE 1 / 4 IN | .440 | | 1.520 | |

ANGULAR DEPENDENCE OF PROPERTIES:

| COS(THETA): | .0425 | .1250 | .1875 | .2500 | .3125 | .3750 | .4375 | .5000 | .5625 | .6250 | .6875 | .7500 | .8125 | .8750 | .9375 | 1.00 | DIFFUSE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TRANSMITTANCE: | .0395 | .1046 | .1662 | .2178 | .2594 | .2926 | .3193 | .3412 | .3594 | .3749 | .3884 | .4005 | .4114 | .4214 | .4310 | .4400 | .3662 |
| REFLECTANCE: | .7129 | .5197 | .3831 | .2853 | .2151 | .1647 | .1286 | .1029 | .0848 | .0721 | .0635 | .0578 | .0543 | .0523 | .0515 | .0516 | .1045 |
| ABSORPTANCE: | .2477 | .3756 | .4507 | .4969 | .5255 | .5427 | .5521 | .5559 | .5559 | .5530 | .5481 | .5417 | .5343 | .5261 | .5174 | .5084 | .5293 |

FITTED PROPERTIES FOR LOADS CALCULATIONS:

| TRANSMITTANCE: | .0399 | .1040 | .1664 | .2182 | .2592 | .2922 | .3194 | .3416 | .3594 | .3749 | .3884 | .4004 | .4114 | .4214 | .4311 | .4400 | .3662 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OUTER ABSORPTANCE: | .1235 | .1884 | .2251 | .2480 | .2629 | .2717 | .2760 | .2776 | .2780 | .2765 | .2741 | .2708 | .2671 | .2631 | .2587 | .2542 | .2647 |
| INNER ABSORPTANCE: | .1235 | .1884 | .2251 | .2480 | .2629 | .2717 | .2760 | .2776 | .2780 | .2765 | .2741 | .2708 | .2671 | .2631 | .2587 | .2542 | .2647 |

SURFACES OF ZONE 1: NORTH LAB

| NUMBER | TYPE OF SURFACE / TYPE OF SUBSURFACE | AREA | U | AZM | TILT | CONSTRUCTION |
|---|---|---|---|---|---|---|
| 1 | EXTERIOR WALL | 196.6 | .35 | 0. | 90.0 | EWALL1 |
| 2 | WINDOW | 28.3 | 21.19 | 0. | 90.0 | SINGLE PANE TINTED WINDOW |
| 3 | DOOR | 26.6 | .16 | 0. | 90.0 | WINDOW PANEL |
| 4 | WINDOW | 14.2 | 21.19 | 0. | 90.0 | SINGLE PANE TINTED WINDOW |
| 5 | DOOR | 13.3 | .16 | 0. | 90.0 | WINDOW PANEL |
| 6 | SHADOWING SUBSURFACE | | | | | |
| 7 | PARTITION | 175.5 | .41 | 90.0 | 90.0 | PWALL2 |
| 8 | PARTITION | 279.0 | .56 | 180.0 | 90.0 | PWALL1 |
| 9 | PARTITION | 117.0 | .56 | 270.0 | 90.0 | PWALL1 |
| 10 | ROOF | 604.5 | .08 | 180.0 | 0. | ROOF1 |
| 11 | FLOOR OVER CRAWL SPACE | 604.5 | .20 | 180.0 | 180.0 | FLOOR1 |

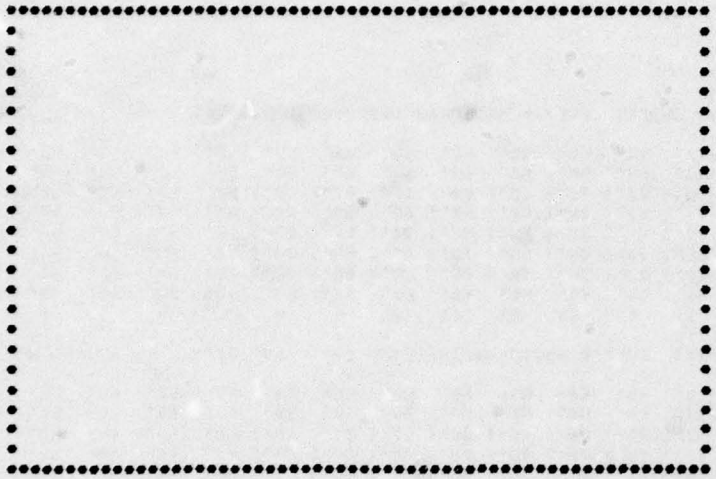
DUMP OF SURFACE VERTICES OF ZONE 1: NORTH LAB

| NS | ORG | DIRECTION COSINES | | | COORDINATES | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | ABS | 0. | 1.000 | 0. | ( 45.0, | 102.5, | 9.0) | ( 45.0, | 102.5, | 0. ) | ( 14.0, | 102.5, | 0. ) | ( 14.0, | 102.5, | 9.0) |
| 2 | REL | 0. | 1.000 | 0. | ( 10.0, | 8.3, | 0. ) | ( 10.0, | 4.0, | 0. ) | ( 16.7, | 4.0, | 0. ) | ( 16.7, | 8.3, | 0. ) |
| 3 | REL | 0. | 1.000 | 0. | ( 10.0, | 4.0, | 0. ) | ( 10.0, | 0. , | 0. ) | ( 16.7, | 0. , | 0. ) | ( 16.7, | 4.0, | 0. ) |
| 4 | REL | 0. | 1.000 | 0. | ( 27.5, | 8.3, | 0. ) | ( 27.5, | 4.0, | 0. ) | ( 30.8, | 4.0, | 0. ) | ( 30.8, | 8.3, | 0. ) |
| 5 | REL | 0. | 1.000 | 0. | ( 27.5, | 4.0, | 0. ) | ( 27.5, | 0. , | 0. ) | ( 30.8, | 0. , | 0. ) | ( 30.8, | 4.0, | 0. ) |
| 6 | REL | 0. | 0. | -1.000 | ( -10.0, | 9.0, | 3.0) | ( -10.0, | 9.0, | 0. ) | ( 40.0, | 9.0, | 0. ) | ( 40.0, | 9.0, | 3.0) |
| 7 | ABS | 1.000 | 0. | 0. | ( 45.0, | 83.0, | 9.0) | ( 45.0, | 83.0, | 0. ) | ( 45.0, | 102.5, | 0. ) | ( 45.0, | 102.5, | 9.0) |
| 8 | ABS | 0. | -1.000 | 0. | ( 14.0, | 83.0, | 9.0) | ( 14.0, | 83.0, | 0. ) | ( 45.0, | 83.0, | 0. ) | ( 45.0, | 83.0, | 9.0) |
| 9 | ABS | -1.000 | 0. | 0. | ( 14.0, | 102.5, | 9.0) | ( 14.0, | 102.5, | 0. ) | ( 14.0, | 89.5, | 0. ) | ( 14.0, | 89.5, | 9.0) |
| 10 | ABS | 0. | 0. | 1.000 | ( 14.0, | 102.5, | 9.0) | ( 14.0, | 83.0, | 9.0) | ( 45.0, | 83.0, | 9.0) | ( 45.0, | 102.5, | 9.0) |
| 11 | ABS | 0. | 0. | -1.000 | ( 14.0, | 83.0, | 0. ) | ( 14.0, | 102.5, | 0. ) | ( 45.0, | 102.5, | 0. ) | ( 45.0, | 83.0, | 0. ) |

PLAN VIEW OF ZONE HEAT TRANSFER SURFACES.

MIN X = 14.00
MAX X = 45.00
MIN Y = 93.00
MAX Y = 102.50

```
        +Y              N
         |              |
-X-------+-------+X  W---+---E
         |              |
        -Y              S
```



SCHEDULED LOADS FOR ZONE 1 NORTH LAB

OCCUPANTS: DESIGN NUMBER = 3.0; ACTIVITY LEVEL = .450 1000BTUH; RADIANT FRACTION = .70

| HOUR | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SUN | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| MON | 0. | 0. | 0. | 0. | 0. | 0. | .10 | .50 | 1.00 | 1.00 | 1.00 | 1.00 | .50 | 1.00 | 1.00 | 1.00 | .50 | .10 | 0. | 0. | 0. | 0. | 0. | 0. |
| TUE | 0. | 0. | 0. | 0. | 0. | 0. | .10 | .50 | 1.00 | 1.00 | 1.00 | 1.00 | .50 | 1.00 | 1.00 | 1.00 | .50 | .10 | 0. | 0. | 0. | 0. | 0. | 0. |
| WED | 0. | 0. | 0. | 0. | 0. | 0. | .10 | .50 | 1.00 | 1.00 | 1.00 | 1.00 | .50 | 1.00 | 1.00 | 1.00 | .50 | .10 | 0. | 0. | 0. | 0. | 0. | 0. |
| THU | 0. | 0. | 0. | 0. | 0. | 0. | .10 | .50 | 1.00 | 1.00 | 1.00 | 1.00 | .50 | 1.00 | 1.00 | 1.00 | .50 | .10 | 0. | 0. | 0. | 0. | 0. | 0. |
| FRI | 0. | 0. | 0. | 0. | 0. | 0. | .10 | .50 | 1.00 | 1.00 | 1.00 | 1.00 | .50 | 1.00 | 1.00 | 1.00 | .50 | .10 | 0. | 0. | 0. | 0. | 0. | 0. |
| SAT | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| MOL | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |

LIGHTS: DESIGN OUTPUT = 9.00 1000BTUH; RADIANT FRACTION = .50; RETURN AIR FRACTION =0. ; FRACTION LOST =0.

| HOUR | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SUN | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 |
| MON | .05 | .05 | .05 | .05 | .05 | .05 | .20 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | .50 | .05 | .05 | .05 | .05 | .05 | .05 | .05 |
| TUE | .05 | .05 | .05 | .05 | .05 | .05 | .20 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | .50 | .05 | .05 | .05 | .05 | .05 | .05 | .05 |
| WED | .05 | .05 | .05 | .05 | .05 | .05 | .20 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | .50 | .05 | .05 | .05 | .05 | .05 | .05 | .05 |
| THU | .05 | .05 | .05 | .05 | .05 | .05 | .20 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | .50 | .05 | .05 | .05 | .05 | .05 | .05 | .05 |
| FRI | .05 | .05 | .05 | .05 | .05 | .05 | .20 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | .50 | .05 | .05 | .05 | .05 | .05 | .05 | .05 |
| SAT | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 |
| MOL | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 |

ELECTRIC EQUIPMENT: DESIGN OUTPUT = 14.00 1000BTUH; RADIANT FRACTION = .30; LATENT FRACTION =0. ; FRACTION LOST =0.

| HOUR | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SUN | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 |
| MON | .05 | .05 | .05 | .05 | .05 | .05 | .20 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | .50 | .05 | .05 | .05 | .05 | .05 | .05 | .05 |
| TUE | .05 | .05 | .05 | .05 | .05 | .05 | .20 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | .50 | .05 | .05 | .05 | .05 | .05 | .05 | .05 |
| WED | .05 | .05 | .05 | .05 | .05 | .05 | .20 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | .50 | .05 | .05 | .05 | .05 | .05 | .05 | .05 |
| THU | .05 | .05 | .05 | .05 | .05 | .05 | .20 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | .50 | .05 | .05 | .05 | .05 | .05 | .05 | .05 |
| FRI | .05 | .05 | .05 | .05 | .05 | .05 | .20 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | .50 | .05 | .05 | .05 | .05 | .05 | .05 | .05 |
| SAT | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 |
| MOL | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 |

GAS EQUIPMENT: DESIGN OUTPUT = 0. 1000BTUH; RADIANT FRACTION = .30; LATENT FRACTION =0. ; FRACTION LOST =0.

INFILTRATION: DESIGN FLOW = 0. CFM

CONTROL SCHEDULES FOR ZONE 1 NORTH LAB

HEATING CAPACITY = 1.040E+02 1000BTUH
COOLING CAPACITY = 1.541E+02 1000BTUH

HEATING TURNED ON JAN 1
HEATING TURNED OFF DEC 31
COOLING TURNED ON JAN 1
COOLING TURNED OFF DEC 31

CONTROL PROFILES FROM MAXIMUM HEATING TO MAXIMUM COOLING
PROFILE NUMBER - (TEMPERATURE/FRACTION ON FULL CAPACITY)

1 - 66.00/ 1.00 68.00/ 0. 70.00/ -.13 140.0/-1.00
10 - 32.00/ 0. 32.00/ 0.

CONTROL SCHEDULES: PROFILES FOR EACH HOUR OF EACH DAY

| DAY - | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SUN - | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| MON - | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| TUE - | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| WED - | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| THU - | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| FRI - | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| SAT - | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| HOL - | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

LOADS SUMMARY FOR ZONE 1: NORTH LAB

FT HOOD SUMMER

| MO | DY | HR | HEATING LOAD (BTU) | COOLING LOAD (BTU) | LATENT LOAD (BTU) | RETURN AIR HEAT GAIN (BTU) | BASEBOARD LOAD (BTU) | ELECTRIC LOAD (BTU) | GAS LOAD (BTU) | INFILT HEAT LOSS (BTU) | INFILT HEAT GAIN (BTU) | MAT/ H EX | ODB/ H ON | OWB/ C ON | C EX |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7 | 21 | 1 | 0. | 6.922E+03 | 0. | 0. | 0. | 1.150E+03 | 0. | 0. | 0. | 68.7 | 86.9 | 80.7 | |
| 7 | 21 | 2 | 0. | 6.674E+03 | 0. | 0. | 0. | 1.150E+03 | 0. | 0. | 0. | 68.7 | 85.8 | 80.4 | |
| 7 | 21 | 3 | 0. | 6.446E+03 | 0. | 0. | 0. | 1.150E+03 | 0. | 0. | 0. | 68.7 | 84.9 | 80.2 | |
| 7 | 21 | 4 | 0. | 6.233E+03 | 0. | 0. | 0. | 1.150E+03 | 0. | 0. | 0. | 68.6 | 84.2 | 80.1 | |
| 7 | 21 | 5 | 0. | 6.043E+03 | 0. | 0. | 0. | 1.150E+03 | 0. | 0. | 0. | 68.6 | 84.0 | 80.0 | |
| 7 | 21 | 6 | 0. | 8.242E+03 | 4.513E+01 | 0. | 0. | 4.600E+03 | 0. | 0. | 0. | 68.9 | 84.4 | 80.1 | |
| 7 | 21 | 7 | 0. | 2.052E+04 | 2.424E+02 | 0. | 0. | 2.300E+04 | 0. | 0. | 0. | 70.7 | 85.5 | 80.6 | |
| 7 | 21 | 8 | 0. | 2.146E+04 | 5.019E+02 | 0. | 0. | 2.300E+04 | 0. | 0. | 0. | 71.1 | 87.5 | 80.9 | |
| 7 | 21 | 9 | 0. | 2.201E+04 | 5.135E+02 | 0. | 0. | 2.300E+04 | 0. | 0. | 0. | 71.4 | 90.4 | 81.5 | |
| 7 | 21 | 10 | 0. | 2.249E+04 | 5.208E+02 | 0. | 0. | 2.300E+04 | 0. | 0. | 0. | 71.7 | 93.7 | 82.3 | |
| 7 | 21 | 11 | 0. | 2.294E+04 | 5.272E+02 | 0. | 0. | 2.300E+04 | 0. | 0. | 0. | 71.9 | 97.4 | 83.1 | |
| 7 | 21 | 12 | 0. | 2.322E+04 | 2.666E+02 | 0. | 0. | 2.300E+04 | 0. | 0. | 0. | 72.1 | 100.9 | 83.9 | |
| 7 | 21 | 13 | 0. | 2.372E+04 | 5.371E+02 | 0. | 0. | 2.300E+04 | 0. | 0. | 0. | 72.3 | 103.6 | 84.5 | |
| 7 | 21 | 14 | 0. | 2.407E+04 | 5.440E+02 | 0. | 0. | 2.300E+04 | 0. | 0. | 0. | 72.5 | 105.1 | 84.9 | |
| 7 | 21 | 15 | 0. | 2.433E+04 | 5.486E+02 | 0. | 0. | 2.300E+04 | 0. | 0. | 0. | 72.6 | 106.0 | 85.0 | |
| 7 | 21 | 16 | 0. | 2.436E+04 | 2.761E+02 | 0. | 0. | 2.300E+04 | 0. | 0. | 0. | 72.6 | 105.3 | 84.9 | |
| 7 | 21 | 17 | 0. | 1.901E+04 | 4.948E+01 | 0. | 0. | 1.150E+04 | 0. | 0. | 0. | 72.9 | 103.8 | 84.5 | |
| 7 | 21 | 18 | 0. | 1.029E+04 | 0. | 0. | 0. | 1.150E+03 | 0. | 0. | 0. | 72.1 | 101.4 | 84.0 | |
| 7 | 21 | 19 | 0. | 9.434E+03 | 0. | 0. | 0. | 1.150E+03 | 0. | 0. | 0. | 69.0 | 98.5 | 83.4 | |
| 7 | 21 | 20 | 0. | 8.475E+03 | 0. | 0. | 0. | 1.150E+03 | 0. | 0. | 0. | 68.9 | 95.7 | 82.7 | |
| 7 | 21 | 21 | 0. | 8.197E+03 | 0. | 0. | 0. | 1.150E+03 | 0. | 0. | 0. | 68.9 | 93.2 | 82.2 | |
| 7 | 21 | 22 | 0. | 7.799E+03 | 0. | 0. | 0. | 1.150E+03 | 0. | 0. | 0. | 68.8 | 91.0 | 81.7 | |
| 7 | 21 | 23 | 0. | 7.472E+03 | 0. | 0. | 0. | 1.150E+03 | 0. | 0. | 0. | 68.8 | 89.3 | 81.3 | |
| 7 | 21 | 24 | 0. | 7.185E+03 | 0. | 0. | 0. | 1.150E+03 | 0. | 0. | 0. | 68.7 | 88.0 | 81.0 | |
| FINAL | | | 0. | 3.448E+05 | 4.572E+03 | 0. | 0. | 2.599E+05 | 0. | 0. | 0. | 0 | 0 | 24 | 0 |

MAXIMUM HEATING LOAD = 0. AT HOUR 0 ON DAY 0 OF MONTH 0 WITH A ZONE AIR TEMP OF 0.
MAXIMUM COOLING LOAD = 2.436E+04 AT HOUR 16 ON DAY 21 OF MONTH 7 WITH A ZONE AIR TEMP OF 72.65
MAXIMUM ZONE AIR TEMP = 7.265E+01 AT HOUR 16 ON DAY 21 OF MONTH 7
MINIMUM ZONE AIR TEMP = 6.863E+01 AT HOUR 5 ON DAY 21 OF MONTH 7

INFILTRATION HEAT GAIN/LOSS REFERS TO SENSIBLE PORTION ONLY.
LATENT PORTION IS COMPUTED BY AIR HANDLING SYSTEM SUBPROGRAM.
LOSS = MASS FLOW * SPECIFIC HEAT * (ZONE TEMP - OUTSIDE TEMP)
IT IS INCLUDED IN TOTAL SENSIBLE LOAD.

LOADS SUMMARY FOR ZONE 1: NORTH LAB

FT WOOD WINTER

| MO | DY | HR | HEATING LOAD (BTU) | COOLING LOAD (BTU) | LATENT LOAD (BTU) | RETURN AIR HEAT GAIN (BTU) | BASEBOARD LOAD (BTU) | ELECTRIC LOAD (BTU) | GAS LOAD (BTU) | INFILT HEAT LOSS (BTU) | INFILT HEAT GAIN (BTU) | MAT/ H EX | ODB/ H ON | OWB/ C ON | C EX |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 21 | 1 | 4.461E+03 | 0. | 0. | 0. | 0. | 1.150E+03 | 0. | 0. | 0. | 67.9 | 21.6 | 14.3 | |
| 1 | 21 | 2 | 4.536E+03 | 0. | 0. | 0. | 0. | 1.150E+03 | 0. | 0. | 0. | 67.9 | 21.0 | 13.9 | |
| 1 | 21 | 3 | 4.607E+03 | 0. | 0. | 0. | 0. | 1.150E+03 | 0. | 0. | 0. | 67.9 | 20.5 | 13.5 | |
| 1 | 21 | 4 | 4.672E+03 | 0. | 0. | 0. | 0. | 1.150E+03 | 0. | 0. | 0. | 67.9 | 20.1 | 13.3 | |
| 1 | 21 | 5 | 4.727E+03 | 0. | 0. | 0. | 0. | 1.150E+03 | 0. | 0. | 0. | 67.9 | 20.0 | 13.2 | |
| 1 | 21 | 6 | 4.766E+03 | 0. | 0. | 0. | 0. | 1.150E+03 | 0. | 0. | 0. | 67.9 | 20.2 | 13.4 | |
| 1 | 21 | 7 | 4.785E+03 | 0. | 0. | 0. | 0. | 1.150E+03 | 0. | 0. | 0. | 67.9 | 20.8 | 13.8 | |
| 1 | 21 | 8 | 4.780E+03 | 0. | 0. | 0. | 0. | 1.150E+03 | 0. | 0. | 0. | 67.9 | 21.9 | 14.6 | |
| 1 | 21 | 9 | 4.637E+03 | 0. | 0. | 0. | 0. | 1.150E+03 | 0. | 0. | 0. | 67.9 | 23.5 | 15.7 | |
| 1 | 21 | 10 | 4.408E+03 | 0. | 0. | 0. | 0. | 1.150E+03 | 0. | 0. | 0. | 67.9 | 25.3 | 17.0 | |
| 1 | 21 | 11 | 4.102E+03 | 0. | 0. | 0. | 0. | 1.150E+03 | 0. | 0. | 0. | 67.9 | 27.3 | 18.5 | |
| 1 | 21 | 12 | 3.777E+03 | 0. | 0. | 0. | 0. | 1.150E+03 | 0. | 0. | 0. | 67.9 | 29.2 | 19.8 | |
| 1 | 21 | 13 | 3.493E+03 | 0. | 0. | 0. | 0. | 1.150E+03 | 0. | 0. | 0. | 67.9 | 30.7 | 20.8 | |
| 1 | 21 | 14 | 3.291E+03 | 0. | 0. | 0. | 0. | 1.150E+03 | 0. | 0. | 0. | 67.9 | 31.6 | 21.4 | |
| 1 | 21 | 15 | 3.194E+03 | 0. | 0. | 0. | 0. | 1.150E+03 | 0. | 0. | 0. | 67.9 | 32.0 | 21.7 | |
| 1 | 21 | 16 | 3.205E+03 | 0. | 0. | 0. | 0. | 1.150E+03 | 0. | 0. | 0. | 67.9 | 31.6 | 21.4 | |
| 1 | 21 | 17 | 3.327E+03 | 0. | 0. | 0. | 0. | 1.150E+03 | 0. | 0. | 0. | 67.9 | 30.8 | 20.9 | |
| 1 | 21 | 18 | 3.578E+03 | 0. | 0. | 0. | 0. | 1.150E+03 | 0. | 0. | 0. | 67.9 | 29.5 | 20.0 | |
| 1 | 21 | 19 | 3.814E+03 | 0. | 0. | 0. | 0. | 1.150E+03 | 0. | 0. | 0. | 67.9 | 27.9 | 18.9 | |
| 1 | 21 | 20 | 3.983E+03 | 0. | 0. | 0. | 0. | 1.150E+03 | 0. | 0. | 0. | 67.9 | 26.4 | 17.8 | |
| 1 | 21 | 21 | 4.107E+03 | 0. | 0. | 0. | 0. | 1.150E+03 | 0. | 0. | 0. | 67.9 | 25.0 | 16.9 | |
| 1 | 21 | 22 | 4.210E+03 | 0. | 0. | 0. | 0. | 1.150E+03 | 0. | 0. | 0. | 67.9 | 23.8 | 16.0 | |
| 1 | 21 | 23 | 4.303E+03 | 0. | 0. | 0. | 0. | 1.150E+03 | 0. | 0. | 0. | 67.9 | 22.9 | 15.3 | |
| 1 | 21 | 24 | 4.386E+03 | 0. | 0. | 0. | 0. | 1.150E+03 | 0. | 0. | 0. | 67.9 | 22.2 | 14.8 | |
| FINAL | | | 9.915E+04 | 0. | 0. | 0. | 0. | 2.760E+04 | 0. | 0. | 0. | 0 | 24 | 0 | 0 |

MAXIMUM HEATING LOAD = 4.785E+03 AT HOUR 7 ON DAY 21 OF MONTH 1 WITH A ZONE AIR TEMP OF 67.91
MAXIMUM COOLING LOAD = 0. AT HOUR 0 ON DAY 0 OF MONTH 0 WITH A ZONE AIR TEMP OF 0.
MAXIMUM ZONE AIR TEMP = 6.794E+01 AT HOUR 15 ON DAY 21 OF MONTH 1
MINIMUM ZONE AIR TEMP = 6.791E+01 AT HOUR 7 ON DAY 21 OF MONTH 1

INFILTRATION HEAT GAIN/LOSS REFERS TO SENSIBLE PORTION ONLY.
LATENT PORTION IS COMPUTED BY AIR HANDLING SYSTEM SUBPROGRAM.
LOSS = MASS FLOW * SPECIFIC HEAT * (ZONE TEMP - OUTSIDE TEMP)
IT IS INCLUDED IN TOTAL SENSIBLE LOAD.

SURFACES OF ZONE 5: LIBRARY CONF RMS

| NUMBER | TYPE OF SURFACE / TYPE OF SUBSURFACE | AREA | U | AZM | TILT | CONSTRUCTION |
|---|---|---|---|---|---|---|
| 1 | PARTITION | 54.0 | .56 | 180.0 | 90.0 | PWALL1 |
| 2 | PARTITION | 27.0 | .56 | 90.0 | 90.0 | PWALL1 |
| 3 | PARTITION | 108.0 | .56 | 180.0 | 90.0 | PWALL1 |
| 4 | PARTITION | 261.0 | .56 | 90.0 | 90.0 | PWALL1 |
| 5 | PARTITION | 270.0 | .56 | 0. | 90.0 | PWALL1 |
| 6 | PARTITION | 54.0 | .56 | 270.0 | 90.0 | PWALL1 |
| 7 | PARTITION | 108.0 | .56 | 180.0 | 90.0 | PWALL1 |
| 8 | PARTITION | 270.0 | .56 | 270.0 | 90.0 | PWALL1 |
| 9 | ROOF | 18.0 | .08 | 180.0 | 0. | ROOF1 |
| 10 | ROOF | 594.0 | .08 | 180.0 | 0. | ROOF1 |
| 11 | ROOF | 72.0 | .08 | 180.0 | 0. | ROOF1 |
| 12 | FLOOR OVER CRAWL SPACE | 18.0 | .20 | 180.0 | 180.0 | FLOOR1 |
| 13 | FLOOR OVER CRAWL SPACE | 594.0 | .20 | 180.0 | 180.0 | FLOOR1 |
| 14 | FLOOR OVER CRAWL SPACE | 72.0 | .20 | 180.0 | 180.0 | FLOOR1 |

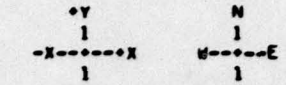


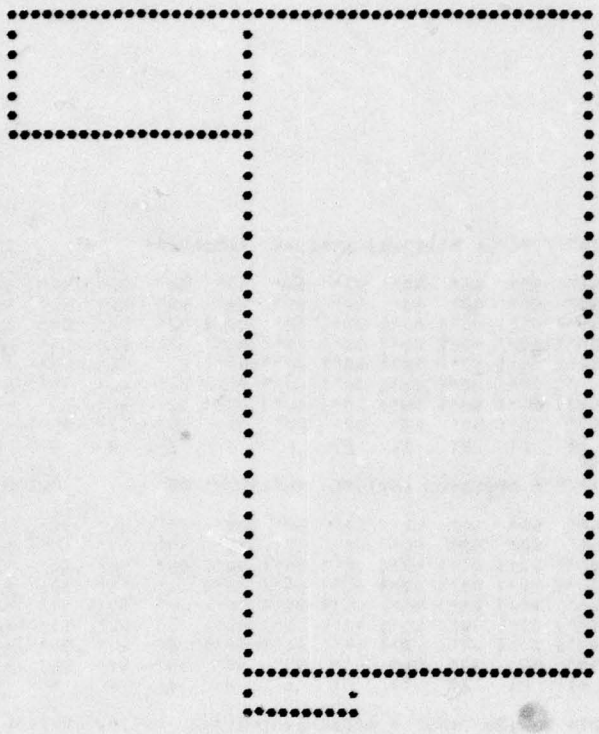
DUMP OF SURFACE VERTICES OF ZONE 5: LIBRARY CONF RMS

| NS | ORG | DIRECTION COSINES | | | COORDINATES | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | ABS | 0. | -1.000 | 0. | ( 31.0, | 47.0, | 9.0) | ( 31.0, | 47.0, | 0. ) | ( 37.0, | 47.0, | 0. ) | ( 37.0, | 47.0, | 9.0) |
| 2 | ABS | 1.000 | 0. | 0. | ( 37.0, | 47.0, | 9.0) | ( 37.0, | 47.0, | 0. ) | ( 37.0, | 50.0, | 0. ) | ( 37.0, | 50.0, | 9.0) |
| 3 | ABS | 0. | -1.000 | 0. | ( 37.0, | 50.0, | 9.0) | ( 37.0, | 50.0, | 0. ) | ( 49.0, | 50.0, | 0. ) | ( 49.0, | 50.0, | 9.0) |
| 4 | ABS | 1.000 | 0. | 0. | ( 49.0, | 50.0, | 9.0) | ( 49.0, | 50.0, | 0. ) | ( 49.0, | 79.0, | 0. ) | ( 49.0, | 79.0, | 9.0) |
| 5 | ABS | 0. | 1.000 | 0. | ( 49.0, | 83.0, | 9.0) | ( 49.0, | 83.0, | 0. ) | ( 19.0, | 83.0, | 0. ) | ( 19.0, | 83.0, | 9.0) |
| 6 | ABS | -1.000 | 0. | 0. | ( 19.0, | 83.0, | 9.0) | ( 19.0, | 83.0, | 0. ) | ( 19.0, | 77.0, | 0. ) | ( 19.0, | 77.0, | 9.0) |
| 7 | ABS | 0. | -1.000 | 0. | ( 19.0, | 77.0, | 9.0) | ( 19.0, | 77.0, | 0. ) | ( 31.0, | 77.0, | 0. ) | ( 31.0, | 77.0, | 9.0) |
| 8 | ABS | -1.000 | 0. | 0. | ( 31.0, | 77.0, | 9.0) | ( 31.0, | 77.0, | 0. ) | ( 31.0, | 47.0, | 0. ) | ( 31.0, | 47.0, | 9.0) |
| 9 | ABS | 0. | 0. | 1.000 | ( 31.0, | 50.0, | 9.0) | ( 31.0, | 47.0, | 9.0) | ( 37.0, | 47.0, | 9.0) | ( 37.0, | 50.0, | 9.0) |
| 10 | ABS | 0. | 0. | 1.000 | ( 31.0, | 83.0, | 9.0) | ( 31.0, | 50.0, | 9.0) | ( 49.0, | 50.0, | 9.0) | ( 49.0, | 83.0, | 9.0) |
| 11 | ABS | 0. | 0. | 1.000 | ( 19.0, | 83.0, | 9.0) | ( 19.0, | 77.0, | 9.0) | ( 31.0, | 77.0, | 9.0) | ( 31.0, | 83.0, | 9.0) |
| 12 | ABS | 0. | 0. | -1.000 | ( 31.0, | 47.0, | 0. ) | ( 31.0, | 50.0, | 0. ) | ( 37.0, | 50.0, | 0. ) | ( 37.0, | 47.0, | 0. ) |
| 13 | ABS | 0. | 0. | -1.000 | ( 31.0, | 50.0, | 0. ) | ( 31.0, | 83.0, | 0. ) | ( 49.0, | 83.0, | 0. ) | ( 49.0, | 50.0, | 0. ) |
| 14 | ABS | 0. | 0. | -1.000 | ( 19.0, | 77.0, | 0. ) | ( 19.0, | 83.0, | 0. ) | ( 31.0, | 83.0, | 0. ) | ( 31.0, | 77.0, | 0. ) |

PLAN VIEW OF ZONE HEAT TRANSFER SURFACES.

MIN X = 19.00
MAX X = 49.00
MIN Y = 47.00
MAX Y = 83.00



SCHEDULED LOADS FOR ZONE 5 LIBRARY CONF RMS

OCCUPANTS: DESIGN NUMBER = 2.0; ACTIVITY LEVEL = .450 1000BTUH; RADIANT FRACTION = .70

| HOUR | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SUN | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| MON | 0. | 0. | 0. | 0. | 0. | 0. | .10 | .50 | 1.00 | 1.00 | 1.00 | 1.00 | .50 | 1.00 | 1.00 | 1.00 | .50 | .10 | 0. | 0. | 0. | 0. | 0. | 0. |
| TUE | 0. | 0. | 0. | 0. | 0. | 0. | .10 | .50 | 1.00 | 1.00 | 1.00 | 1.00 | .50 | 1.00 | 1.00 | 1.00 | .50 | .10 | 0. | 0. | 0. | 0. | 0. | 0. |
| WED | 0. | 0. | 0. | 0. | 0. | 0. | .10 | .50 | 1.00 | 1.00 | 1.00 | 1.00 | .50 | 1.00 | 1.00 | 1.00 | .50 | .10 | 0. | 0. | 0. | 0. | 0. | 0. |
| THU | 0. | 0. | 0. | 0. | 0. | 0. | .10 | .50 | 1.00 | 1.00 | 1.00 | 1.00 | .50 | 1.00 | 1.00 | 1.00 | .50 | .10 | 0. | 0. | 0. | 0. | 0. | 0. |
| FRI | 0. | 0. | 0. | 0. | 0. | 0. | .10 | .50 | 1.00 | 1.00 | 1.00 | 1.00 | .50 | 1.00 | 1.00 | 1.00 | .50 | .10 | 0. | 0. | 0. | 0. | 0. | 0. |
| SAT | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| HOL | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |

LIGHTS: DESIGN OUTPUT = 3.00 1000BTUH; RADIANT FRACTION = .50; RETURN AIR FRACTION =0. ; FRACTION LOST =0.

| HOUR | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SUN | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 |
| MON | .05 | .05 | .05 | .05 | .05 | .05 | .20 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | .50 | .05 | .05 | .05 | .05 | .05 | .05 |
| TUE | .05 | .05 | .05 | .05 | .05 | .05 | .20 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | .50 | .05 | .05 | .05 | .05 | .05 | .05 |
| WED | .05 | .05 | .05 | .05 | .05 | .05 | .20 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | .50 | .05 | .05 | .05 | .05 | .05 | .05 |
| THU | .05 | .05 | .05 | .05 | .05 | .05 | .20 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | .50 | .05 | .05 | .05 | .05 | .05 | .05 |
| FRI | .05 | .05 | .05 | .05 | .05 | .05 | .20 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | .50 | .05 | .05 | .05 | .05 | .05 | .05 |
| SAT | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 |
| HOL | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 |

ELECTRIC EQUIPMENT: DESIGN OUTPUT = .50 1000BTUH; RADIANT FRACTION = .30; LATENT FRACTION =0. ; FRACTION LOST =0.

| HOUR | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SUN | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 |
| MON | .05 | .05 | .05 | .05 | .05 | .05 | .20 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | .50 | .05 | .05 | .05 | .05 | .05 | .05 |
| TUE | .05 | .05 | .05 | .05 | .05 | .05 | .20 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | .50 | .05 | .05 | .05 | .05 | .05 | .05 |
| WED | .05 | .05 | .05 | .05 | .05 | .05 | .20 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | .50 | .05 | .05 | .05 | .05 | .05 | .05 |
| THU | .05 | .05 | .05 | .05 | .05 | .05 | .20 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | .50 | .05 | .05 | .05 | .05 | .05 | .05 |
| FRI | .05 | .05 | .05 | .05 | .05 | .05 | .20 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | .50 | .05 | .05 | .05 | .05 | .05 | .05 |
| SAT | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 |
| HOL | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 | .05 |

GAS EQUIPMENT: DESIGN OUTPUT = 0. 1000BTUH; RADIANT FRACTION = .30; LATENT FRACTION =0. ; FRACTION LOST =0.

INFILTRATION: DESIGN FLOW = 0. CFM

CONTROL SCHEDULES FOR ZONE  5  LIBRARY CONF RMS

HEATING CAPACITY =  2.930E+01 1000BTUH
COOLING CAPACITY =  4.340E+01 1000BTUH

HEATING TURNED ON  JAN  1
HEATING TURNED OFF DEC 31
COOLING TURNED ON  JAN  1
COOLING TURNED OFF DEC 31

CONTROL PROFILES FROM MAXIMUM HEATING TO MAXIMUM COOLING
 PROFILE NUMBER - (TEMPERATURE/FRACTION ON FULL CAPACITY)

  1 -  66.00/ 1.00  68.00/ 0.  70.00/ -.13  140.0/-1.00
 10 -  32.00/ 0.  32.00/ 0.

CONTROL SCHEDULES:  PROFILES FOR EACH HOUR OF EACH DAY

| DAY - | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SUN - | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| MON - | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| TUE - | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| WED - | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| THU - | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| FRI - | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| SAT - | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| HOL - | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

LOADS SUMMARY FOR ZONE 5: LIBRARY CONF RMS

FT MOOD SUMMER

| MO DY HR | HEATING LOAD (BTU) | COOLING LOAD (BTU) | LATENT LOAD (BTU) | RETURN AIR HEAT GAIN (BTU) | BASEBOARD LOAD (BTU) | ELECTRIC LOAD (BTU) | GAS LOAD (BTU) | INFILT HEAT LOSS (BTU) | INFILT HEAT GAIN (BTU) | MAT/ M EX | ODB/ M ON | OWB/ C ON | C EX |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7 21 1 | 0. | 2.537E+03 | 0. | 0. | 0. | 1.750E+02 | 0. | 0. | 0. | 68.9 | 86.9 | 80.7 | |
| 7 21 2 | 0. | 2.462E+03 | 0. | 0. | 0. | 1.750E+02 | 0. | 0. | 0. | 68.9 | 85.9 | 80.4 | |
| 7 21 3 | 0. | 2.395E+03 | 0. | 0. | 0. | 1.750E+02 | 0. | 0. | 0. | 68.9 | 84.9 | 80.2 | |
| 7 21 4 | 0. | 2.334E+03 | 0. | 0. | 0. | 1.750E+02 | 0. | 0. | 0. | 68.9 | 84.2 | 80.1 | |
| 7 21 5 | 0. | 2.279E+03 | 0. | 0. | 0. | 1.750E+02 | 0. | 0. | 0. | 68.8 | 84.0 | 80.0 | |
| 7 21 6 | 0. | 2.534E+03 | 3.043E+01 | 0. | 0. | 7.000E+02 | 0. | 0. | 0. | 68.9 | 84.4 | 80.1 | |
| 7 21 7 | 0. | 4.122E+03 | 1.529E+02 | 0. | 0. | 3.500E+03 | 0. | 0. | 0. | 69.5 | 85.5 | 80.4 | |
| 7 21 8 | 0. | 4.511E+03 | 3.153E+02 | 0. | 0. | 3.500E+03 | 0. | 0. | 0. | 69.7 | 87.5 | 80.9 | |
| 7 21 9 | 0. | 4.754E+03 | 3.176E+02 | 0. | 0. | 3.500E+03 | 0. | 0. | 0. | 69.8 | 90.4 | 81.5 | |
| 7 21 10 | 0. | 4.997E+03 | 3.191E+02 | 0. | 0. | 3.500E+03 | 0. | 0. | 0. | 69.8 | 93.7 | 82.3 | |
| 7 21 11 | 0. | 5.238E+03 | 3.206E+02 | 0. | 0. | 3.500E+03 | 0. | 0. | 0. | 69.9 | 97.4 | 83.1 | |
| 7 21 12 | 0. | 5.357E+03 | 1.610E+02 | 0. | 0. | 3.500E+03 | 0. | 0. | 0. | 70.0 | 100.9 | 83.9 | |
| 7 21 13 | 0. | 5.548E+03 | 3.232E+02 | 0. | 0. | 3.500E+03 | 0. | 0. | 0. | 70.2 | 103.6 | 84.5 | |
| 7 21 14 | 0. | 5.656E+03 | 3.270E+02 | 0. | 0. | 3.500E+03 | 0. | 0. | 0. | 70.4 | 105.3 | 84.9 | |
| 7 21 15 | 0. | 5.739E+03 | 3.303E+02 | 0. | 0. | 3.500E+03 | 0. | 0. | 0. | 70.6 | 106.0 | 85.0 | |
| 7 21 16 | 0. | 5.731E+03 | 1.464E+02 | 0. | 0. | 3.500E+03 | 0. | 0. | 0. | 70.6 | 105.3 | 84.9 | |
| 7 21 17 | 0. | 5.001E+03 | 3.232E+01 | 0. | 0. | 1.750E+03 | 0. | 0. | 0. | 69.8 | 103.8 | 84.5 | |
| 7 21 18 | 0. | 3.896E+03 | 0. | 0. | 0. | 1.750E+02 | 0. | 0. | 0. | 69.4 | 101.4 | 84.0 | |
| 7 21 19 | 0. | 3.555E+03 | 0. | 0. | 0. | 1.750E+02 | 0. | 0. | 0. | 69.3 | 98.5 | 83.4 | |
| 7 21 20 | 0. | 3.277E+03 | 0. | 0. | 0. | 1.750E+02 | 0. | 0. | 0. | 69.2 | 95.7 | 82.7 | |
| 7 21 21 | 0. | 3.044E+03 | 0. | 0. | 0. | 1.750E+02 | 0. | 0. | 0. | 69.1 | 93.2 | 82.2 | |
| 7 21 22 | 0. | 2.867E+03 | 0. | 0. | 0. | 1.750E+02 | 0. | 0. | 0. | 69.1 | 91.0 | 81.7 | |
| 7 21 23 | 0. | 2.731E+03 | 0. | 0. | 0. | 1.750E+02 | 0. | 0. | 0. | 69.0 | 89.3 | 81.3 | |
| 7 21 24 | 0. | 2.625E+03 | 0. | 0. | 0. | 1.750E+02 | 0. | 0. | 0. | 69.0 | 88.0 | 81.0 | |
| FINAL | 0. | 9.319E+04 | 2.796E+03 | 0. | 0. | 3.955E+04 | 0. | 0. | 0. | 0 | 0 | 24 | 0 |

MAXIMUM HEATING LOAD = 0. AT HOUR 0 ON DAY 0 OF MONTH 0 WITH A ZONE AIR TEMP OF 0.
MAXIMUM COOLING LOAD = 5.734E+03 AT HOUR 15 ON DAY 21 OF MONTH 7 WITH A ZONE AIR TEMP OF 70.58
MAXIMUM ZONE AIR TEMP = 7.058E+01 AT HOUR 15 ON DAY 21 OF MONTH 7
MINIMUM ZONE AIR TEMP = 6.844E+01 AT HOUR 5 ON DAY 21 OF MONTH 7

INFILTRATION HEAT GAIN/LOSS REFERS TO SENSIBLE PORTION ONLY.
LATENT PORTION IS COMPUTED BY AIR HANDLING SYSTEM SUBPROGRAM.
LOSS = MASS FLOW * SPECIFIC HEAT * (ZONE TEMP - OUTSIDE TEMP)
IT IS INCLUDED IN TOTAL SENSIBLE LOAD.

LOADS SUMMARY FOR ZONE 5: LIBRARY CONF RMS

FT HOOD WINTER

| MO | DY | HR | HEATING LOAD (BTU) | COOLING LOAD (BTU) | LATENT LOAD (BTU) | RETURN AIR HEAT GAIN (BTU) | BASEBOARD LOAD (BTU) | ELECTRIC LOAD (BTU) | GAS LOAD (BTU) | INFILT HEAT LOSS (BTU) | INFILT HEAT GAIN (BTU) | MAT/ H EX | ODB/ H ON | OWB/ C ON | C EX |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 21 | 1 | 2.055E+03 | 0. | 0. | 0. | 0. | 1.750E+02 | 0. | 0. | 0. | 67.9 | 21.6 | 14.3 | |
| 1 | 21 | 2 | 2.085E+03 | 0. | 0. | 0. | 0. | 1.750E+02 | 0. | 0. | 0. | 67.9 | 21.0 | 13.9 | |
| 1 | 21 | 3 | 2.111E+03 | 0. | 0. | 0. | 0. | 1.750E+02 | 0. | 0. | 0. | 67.9 | 20.5 | 13.5 | |
| 1 | 21 | 4 | 2.133E+03 | 0. | 0. | 0. | 0. | 1.750E+02 | 0. | 0. | 0. | 67.9 | 20.1 | 13.3 | |
| 1 | 21 | 5 | 2.152E+03 | 0. | 0. | 0. | 0. | 1.750E+02 | 0. | 0. | 0. | 67.9 | 20.0 | 13.2 | |
| 1 | 21 | 6 | 2.164E+03 | 0. | 0. | 0. | 0. | 1.750E+02 | 0. | 0. | 0. | 67.9 | 20.2 | 13.4 | |
| 1 | 21 | 7 | 2.167E+03 | 0. | 0. | 0. | 0. | 1.750E+02 | 0. | 0. | 0. | 67.9 | 20.4 | 13.8 | |
| 1 | 21 | 8 | 2.159E+03 | 0. | 0. | 0. | 0. | 1.750E+02 | 0. | 0. | 0. | 67.9 | 21.9 | 14.6 | |
| 1 | 21 | 9 | 2.114E+03 | 0. | 0. | 0. | 0. | 1.750E+02 | 0. | 0. | 0. | 67.9 | 23.5 | 15.7 | |
| 1 | 21 | 10 | 1.974E+03 | 0. | 0. | 0. | 0. | 1.750E+02 | 0. | 0. | 0. | 67.9 | 25.3 | 17.0 | |
| 1 | 21 | 11 | 1.756E+03 | 0. | 0. | 0. | 0. | 1.750E+02 | 0. | 0. | 0. | 67.9 | 27.3 | 18.5 | |
| 1 | 21 | 12 | 1.511E+03 | 0. | 0. | 0. | 0. | 1.750E+02 | 0. | 0. | 0. | 67.9 | 29.2 | 19.8 | |
| 1 | 21 | 13 | 1.293E+03 | 0. | 0. | 0. | 0. | 1.750E+02 | 0. | 0. | 0. | 67.9 | 30.7 | 20.8 | |
| 1 | 21 | 14 | 1.137E+03 | 0. | 0. | 0. | 0. | 1.750E+02 | 0. | 0. | 0. | 67.9 | 31.6 | 21.4 | |
| 1 | 21 | 15 | 1.042E+03 | 0. | 0. | 0. | 0. | 1.750E+02 | 0. | 0. | 0. | 67.9 | 32.0 | 21.7 | |
| 1 | 21 | 16 | 1.078E+03 | 0. | 0. | 0. | 0. | 1.750E+02 | 0. | 0. | 0. | 67.9 | 31.6 | 21.4 | |
| 1 | 21 | 17 | 1.188E+03 | 0. | 0. | 0. | 0. | 1.750E+02 | 0. | 0. | 0. | 67.9 | 30.8 | 20.9 | |
| 1 | 21 | 18 | 1.377E+03 | 0. | 0. | 0. | 0. | 1.750E+02 | 0. | 0. | 0. | 67.9 | 29.5 | 20.0 | |
| 1 | 21 | 19 | 1.594E+03 | 0. | 0. | 0. | 0. | 1.750E+02 | 0. | 0. | 0. | 67.9 | 27.9 | 18.9 | |
| 1 | 21 | 20 | 1.751E+03 | 0. | 0. | 0. | 0. | 1.750E+02 | 0. | 0. | 0. | 67.9 | 26.4 | 17.8 | |
| 1 | 21 | 21 | 1.854E+03 | 0. | 0. | 0. | 0. | 1.750E+02 | 0. | 0. | 0. | 67.9 | 25.0 | 16.9 | |
| 1 | 21 | 22 | 1.925E+03 | 0. | 0. | 0. | 0. | 1.750E+02 | 0. | 0. | 0. | 67.9 | 23.8 | 16.0 | |
| 1 | 21 | 23 | 1.979E+03 | 0. | 0. | 0. | 0. | 1.750E+02 | 0. | 0. | 0. | 67.9 | 22.9 | 15.3 | |
| 1 | 21 | 24 | 2.023E+03 | 0. | 0. | 0. | 0. | 1.750E+02 | 0. | 0. | 0. | 67.9 | 22.2 | 14.8 | |
| FINAL | | | 4.264E+04 | 0. | 0. | 0. | 0. | 4.200E+03 | 0. | 0. | 0. | 0 | 24 | 0 | 0 |

MAXIMUM HEATING LOAD = 2.167E+03 AT HOUR 7 ON DAY 21 OF MONTH 1 WITH A ZONE AIR TEMP OF 67.85
MAXIMUM COOLING LOAD = 0. AT HOUR 0 ON DAY 0 OF MONTH 0 WITH A ZONE AIR TEMP OF 0.
MAXIMUM ZONE AIR TEMP = 6.793E+01 AT HOUR 15 ON DAY 21 OF MONTH 1
MINIMUM ZONE AIR TEMP = 6.785E+01 AT HOUR 7 ON DAY 21 OF MONTH 1

INFILTRATION HEAT GAIN/LOSS REFERS TO SENSIBLE PORTION ONLY.
LATENT PORTION IS COMPUTED BY AIR HANDLING SYSTEM SUBPROGRAM.
LOSS = MASS FLOW * SPECIFIC HEAT * (ZONE TEMP - OUTSIDE TEMP)
IT IS INCLUDED IN TOTAL SENSIBLE LOAD.

# AIR HANDLING SYSTEM DESCRIPTION

## BASIC SYSTEM

SYSTEM NUMBER = 1 SYSTEM LOCATION = 0

SIM. PERIOD = 21JUL1979 - 21JUL1979 NO. OF DAYS IN SIMULATION = 1

TYPE SYS = MULTIZONE NO. DISTINCT ZONES ON SYS. = 10

SYSTEM OPERATION = CONTINUOUS

SEASONAL COMPONENT SCHEDULES

| | | |
|---|---|---|
| PREHEAT COIL | ON - 1JAN | OFF - 31DEC |
| HEATING COIL | ON - 1OCT | OFF - 31MAR |
| COOLING COIL | ON - 1JAN | OFF - 31DEC |
| HEATREC COIL | ON - 0JAN | OFF - 0JAN |

DAILY PREHEAT COIL SCHEDULE T = ON , F = OFF

| HOUR | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WKDAY | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T |
| WKEND | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T |

DAILY HEATING COIL SCHEDULE T = ON , F = OFF

| HOUR | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WKDAY | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T |
| WKEND | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T |

DAILY COOLING COIL SCHEDULE T = ON , F = OFF

| HOUR | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WKDAY | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T |
| WKEND | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T |

DAILY HEATREC COIL SCHEDULE T = ON , F = OFF

| HOUR | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WKDAY | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T |
| WKEND | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T |

TOTAL SUPPLY FAN PRESSURE = 2.48914 IN-H20
TOTAL RETURN FAN PRESSURE = 0. IN-H20
TOTAL EXHAUST FAN PRESSURE = 1.00369 IN-H20

SUPPLY FAN EFFICIENCY = .70
RETURN FAN EFFICIENCY = .70
EXHAUST FAN EFFICIENCY = .70

MIXED AIR CONTROL = FIXED AMOUNT
FIXED OUTSIDE AIR VOLUME = 4.114E+03 FT**3/MIN
DESIRED MIXED AIR TEMPERATURE = COLD DECK TEMP

DAILY VENTIALTION PROFILES

| HOUR | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WKDAY MIN | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| WKDAY MAX | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

| HOUR | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WKDAY MIN | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| WKDAY MAX | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

| HOUR | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WKEND MIN | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| WKEND MAX | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

| HOUR | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WKEND MIN | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| WKEND MAX | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

HOT DECK CONTROL = OUTSIDE AIR CONTROL
HOT DECK THROTTLING RANGE = 7.20000 DEG. F
HOT DECK CONTROL SCHEDULE = (120.00 AT 10.00 , 80.00 AT 70.00) DEG. F

HEATING COIL CAPACITY = .341E+07 1000BTU/HR
HEATING COIL ENERGY SUPPLY = HOT WATER

COLD DEC CONTROL = FIXED SET POINT
COLD DEC THROTTLING RANGE = 7.20000 DEG. F
COLD DEC FIXED TEMPERATURE = 55.00000 DEG. F

ZONE DATA SUMMARY

| ZONE NUMBER | ZONE SUPPLY AIR VOL | ZONE EXHAUST AIR VOL | ZONE REHEAT CAPCTY | ZONE REHEAT ENERGY | ZONE TSTAT BB CAPCTY | ZONE TSTAT BB ENERGY | ZONE MULT |
|---|---|---|---|---|---|---|---|
| 1 | 1.784E+03 | 1.000E+03 | 0. | HOT WATER | 0. | HOT WATER | 1.0 |
| 2 | 4.060E+02 | 0. | 0. | HOT WATER | 0. | HOT WATER | 1.0 |
| 3 | 2.010E+03 | 0. | 0. | HOT WATER | 0. | HOT WATER | 1.0 |
| 4 | 7.610E+02 | 6.000E+02 | 0. | HOT WATER | 0. | HOT WATER | 1.0 |
| 5 | 5.020E+02 | 0. | 0. | HOT WATER | 0. | HOT WATER | 1.0 |
| 6 | 8.330E+02 | 0. | 0. | HOT WATER | 0. | HOT WATER | 1.0 |
| 7 | 8.840E+02 | 0. | 0. | HOT WATER | 0. | HOT WATER | 1.0 |
| 8 | 8.290E+02 | 0. | 0. | HOT WATER | 0. | HOT WATER | 1.0 |
| 9 | 2.245E+03 | 0. | 0. | HOT WATER | 0. | HOT WATER | 1.0 |
| 10 | 2.105E+03 | 0. | 0. | HOT WATER | 0. | HOT WATER | 1.0 |

TOTAL DESIGN SUPPLY AIR VOLUME = 1.236E+04

CERL -- B.L.A.S.T. SYSTEM --- VERSION 2.0 18 APR 79 12.05.48

# AIR HANDLING SYSTEM ENERGY USE SUMMARY

SYSTEM NUMBER = 1 SYSTEM LOCATION = 0 SIMULATION PERIOD = 7/21/1979 - 7/21/1979

## ELECTRICITY

| MONTH | BUILDING LIGHTS CONSUMPTION (BTU) | BUILDING LIGHTS PEAK DEMAND (BTU/HR) | FANS CONSUMPTION (BTU) | FANS PEAK DEMAND (BTU/HR) | HEATING CONSUMPTION (BTU) | HEATING PEAK DEMAND (BTU/HR) | TOTAL USE CONSUMPTION (BTU) | TOTAL USE PEAK DEMAND (BTU/HR) |
|---|---|---|---|---|---|---|---|---|
| JUL | 1.255E+06 | 1.111E+05 | 5.522E+05 | 2.301E+04 | 0. | 0. | 1.808E+06 | 1.341E+05 |
| ANN | 1.255E+06 | 1.111E+05 | 5.522E+05 | 2.301E+04 | 0. | 0. | 1.808E+06 | 1.341E+05 |

| MONTH | GAS TOTAL USE CONSUMPTION (BTU) | GAS TOTAL USE PEAK DEMAND (BTU/HR) | STEAM TOTAL USE CONSUMPTION (BTU) | STEAM TOTAL USE PEAK DEMAND (BTU/HR) | HOT WATER TOTAL USE CONSUMPTION (BTU) | HOT WATER TOTAL USE PEAK DEMAND (BTU/HR) | CHILLED WATER TOTAL USE CONSUMPTION (BTU) | CHILLED WATER TOTAL USE PEAK DEMAND (BTU/HR) |
|---|---|---|---|---|---|---|---|---|
| JUL | 0. | 0. | 0. | 0. | 0. | 0. | 8.382E+06 | 5.174E+05 |
| ANN | 0. | 0. | 0. | 0. | 0. | 0. | 8.382E+06 | 5.174E+05 |

CERL -- B.L.A.S.T. SYSTEM --- VERSION 2.0 10 APR 79 12.05.48

## AIR HANDLING SYSTEM COMPONENT LOAD SUMMARY

SYSTEM NUMBER= 1 SYSTEM LOCATION = 0 SIMULATION PERIOD = 7/21/1979 - 7/21/1979

| | MONTH | CONSUMPTION (BTU) | PEAK DEMAND (BTU/HR) | HRS CNSMPTN (HOURS) | PK CAP EXCD (BTU/HR) | HRS CAP EXCD (HOURS) |
|---|---|---|---|---|---|---|
| HEATING COIL LOADS | | | | | | |
| | JUL | 0. | 0. | 0. | 0. | 0. |
| | ANN | 0. | 0. | 0. | 0. | 0. |
| COOLING COIL LOADS | | | | | | |
| | JUL | 8.382E+06 | 5.174E+05 | 2.400E+01 | 0. | 0. |
| | ANN | 8.382E+06 | 5.174E+05 | 2.400E+01 | 0. | 0. |

CERL -- B.L.A.S.T. SYSTEM --- VERSION 2.0 10 APR 79 12.09.48

## AIR HANDLING SYSTEM LOADS NOT MET SUMMARY

SYSTEM NUMBER= 1 SYSTEM LOCATION = 0 SIMULATION PERIOD = 7/21/1979 - 7/21/1979

| | | HEATING | | | COOLING | | |
|---|---|---|---|---|---|---|---|
| | MONTH | LOAD NOT MET (BTU) | PEAK NOT MET (BTU/HR) | HOURS NOT MET (HOURS) | LOAD NOT MET (BTU) | PEAK NOT MET (BTU/HR) | HOURS NOT MET (HOURS) |
| ZONE 1 | | | | | | | |
| | NO UNMET LOADS FOR THIS ZONE | | | | | | |
| ZONE 2 | | | | | | | |
| | NO UNMET LOADS FOR THIS ZONE | | | | | | |
| ZONE 3 | | | | | | | |
| | NO UNMET LOADS FOR THIS ZONE | | | | | | |
| ZONE 4 | | | | | | | |
| | NO UNMET LOADS FOR THIS ZONE | | | | | | |
| ZONE 5 | | | | | | | |
| | NO UNMET LOADS FOR THIS ZONE | | | | | | |
| ZONE 6 | | | | | | | |
| | NO UNMET LOADS FOR THIS ZONE | | | | | | |
| ZONE 7 | | | | | | | |
| | NO UNMET LOADS FOR THIS ZONE | | | | | | |
| ZONE 8 | | | | | | | |
| | NO UNMET LOADS FOR THIS ZONE | | | | | | |
| ZONE 9 | | | | | | | |
| | NO UNMET LOADS FOR THIS ZONE | | | | | | |
| ZONE 10 | | | | | | | |
| | NO UNMET LOADS FOR THIS ZONE | | | | | | |

CERL -- B.L.A.S.T. SYSTEM --- VERSION 2.0 10 APR 79 12.05.48

# AIR HANDLING SYSTEM DESCRIPTION

## BASIC SYSTEM

SYSTEM NUMBER = 1 SYSTEM LOCATION = 0

SIM. PERIOD = 21JAN1979 - 21JAN1979 NO. OF DAYS IN SIMULATION = 1

TYPE SYS = MULTIZONE NO. DISTINCT ZONES ON SYS. = 10

SYSTEM OPERATION = CONTINUOUS

SEASONAL COMPONENT SCHEDULES

| | | |
|---|---|---|
| PREHEAT COIL | ON - 1JAN | OFF - 31DEC |
| HEATING COIL | ON - 1OCT | OFF - 31MAR |
| COOLING COIL | ON - 1JAN | OFF - 31DEC |
| HEATREC COIL | ON - 0JAN | OFF - 0JAN |

DAILY PREHEAT COIL SCHEDULE T = ON , F = OFF

| HOUR | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WKDAY | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T |
| WKEND | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T |

DAILY HEATING COIL SCHEDULE T = ON , F = OFF

| HOUR | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WKDAY | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T |
| WKEND | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T |

DAILY COOLING COIL SCHEDULE T = ON , F = OFF

| HOUR | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WKDAY | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T |
| WKEND | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T |

DAILY HEATREC COIL SCHEDULE T = ON , F = OFF

| HOUR | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WKDAY | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T |
| WKEND | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T |

TOTAL SUPPLY FAN PRESSURE = 2.48914 IN-H20
TOTAL RETURN FAN PRESSURE = 0. IN-H20
TOTAL EXHAUST FAN PRESSURE = 1.00369 IN-H20

SUPPLY FAN EFFICIENCY = .70
RETURN FAN EFFICIENCY = .70
EXHAUST FAN EFFICIENCY = .70

MIXED AIR CONTROL = FIXED AMOUNT
FIXED OUTSIDE AIR VOLUME = 4.114E+03 FT**3/MIN
DESIRED MIXED AIR TEMPERATURE = COLD DECK TEMP

DAILY VENTIALTION PROFILES

| HOUR | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WKDAY MIN | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| WKDAY MAX | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

| HOUR | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WKDAY MIN | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| WKDAY MAX | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

| HOUR | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WKEND MIN | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| WKEND MAX | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

| HOUR | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WKEND MIN | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| WKEND MAX | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

HOT DECK CONTROL = OUTSIDE AIR CONTROL
HOT DECK THROTTLING RANGE = 7.20000 DEG. F
HOT DECK CONTROL SCHEDULE = (120.00 AT 10.00 , 80.00 AT 70.00) DEG. F

HEATING COIL CAPACITY = .341E+07 1000BTU/HR
HEATING COIL ENERGY SUPPLY = HOT WATER

COLD DEC CONTROL = FIXED SET POINT
COLD DEC THROTTLING RANGE = 7.20000 DEG. F
COLD DEC FIXED TEMPERATURE = 55.00000 DEG. F

ZONE DATA SUMMARY

| ZONE NUMBER | ZONE SUPPLY AIR VOL | ZONE EXHAUST AIR VOL | ZONE REHEAT CAPCTY | ZONE REHEAT ENERGY | ZONE TSTAT BB CAPCTY | ZONE TSTAT BB ENERGY | ZONE MULT |
|---|---|---|---|---|---|---|---|
| 1 | 1.784E+03 | 1.000E+03 | 0. | HOT WATER | 0. | HOT WATER | 1.0 |
| 2 | 4.060E+02 | 0. | 0. | HOT WATER | 0. | HOT WATER | 1.0 |
| 3 | 2.010E+03 | 0. | 0. | HOT WATER | 0. | HOT WATER | 1.0 |
| 4 | 7.610E+02 | 6.000E+02 | 0. | HOT WATER | 0. | HOT WATER | 1.0 |
| 5 | 5.020E+02 | 0. | 0. | HOT WATER | 0. | HOT WATER | 1.0 |
| 6 | 9.330E+02 | 0. | 0. | HOT WATER | 0. | HOT WATER | 1.0 |
| 7 | 8.840E+02 | 0. | 0. | HOT WATER | 0. | HOT WATER | 1.0 |
| 8 | 5.290E+02 | 0. | 0. | HOT WATER | 0. | HOT WATER | 1.0 |
| 9 | 2.245E+03 | 0. | 0. | HOT WATER | 0. | HOT WATER | 1.0 |
| 10 | 2.105E+03 | 0. | 0. | HOT WATER | 0. | HOT WATER | 1.0 |

TOTAL DESIGN SUPPLY AIR VOLUME = 1.236E+04

CERL -- B.L.A.S.T. SYSTEM --- VERSION 2.0 10 APR 79 12.05.58

**********
**
** AIR HANDLING SYSTEM ENERGY USE SUMMARY **
**
**********

SYSTEM NUMBER = 1 SYSTEM LOCATION = 0 SIMULATION PERIOD = 1/21/1979 - 1/21/1979

ELECTRICITY

| MONTH | BUILDING LIGHTS CONSUMPTION (BTU) | BUILDING LIGHTS PEAK DEMAND (BTU/HR) | FANS CONSUMPTION (BTU) | FANS PEAK DEMAND (BTU/HR) | HEATING CONSUMPTION (BTU) | HEATING PEAK DEMAND (BTU/HR) | TOTAL USE CONSUMPTION (BTU) | TOTAL USE PEAK DEMAND (BTU/HR) |
|---|---|---|---|---|---|---|---|---|
| JAN | 1.333E+05 | 5.555E+03 | 5.522E+05 | 2.301E+04 | 0. | 0. | 6.855E+05 | 2.856E+04 |
| ANN | 1.333E+05 | 5.555E+03 | 5.522E+05 | 2.301E+04 | 0. | 0. | 6.855E+05 | 2.856E+04 |

| MONTH | GAS CONSUMPTION (BTU) | GAS PEAK DEMAND (BTU/HR) | STEAM CONSUMPTION (BTU) | STEAM PEAK DEMAND (BTU/HR) | HOT WATER CONSUMPTION (BTU) | HOT WATER PEAK DEMAND (BTU/HR) | CHILLED WATER CONSUMPTION (BTU) | CHILLED WATER PEAK DEMAND (BTU/HR) |
|---|---|---|---|---|---|---|---|---|
| JAN | 0. | 0. | 0. | 0. | 6.760E+06 | 3.001E+05 | 1.401E+06 | 7.872E+04 |
| ANN | 0. | 0. | 0. | 0. | 6.760E+06 | 3.001E+05 | 1.401E+06 | 7.872E+04 |

CERL -- B.L.A.S.T. SYSTEM --- VERSION 2.0 10 APR 79 12.05.48

## AIR HANDLING SYSTEM COMPONENT LOAD SUMMARY

SYSTEM NUMBER= 1 SYSTEM LOCATION = 0 SIMULATION PERIOD = 1/21/1979 - 1/21/1979

| | MONTH | CONSUMPTION (BTU) | PEAK DEMAND (BTU/HR) | HRS CNSMPTN (HOURS) | PK CAP EXCD (BTU/HR) | HRS CAP EXCD (HOURS) |
|---|---|---|---|---|---|---|
| HEATING COIL LOADS | | | | | | |
| | JAN | 6.760E+06 | 3.001E+05 | 2.400E+01 | 0. | 0. |
| | ANN | 6.760E+06 | 3.001E+05 | 2.400E+01 | 0. | 0. |
| COOLING COIL LOADS | | | | | | |
| | JAN | 1.401E+06 | 7.872E+04 | 2.400E+01 | 0. | 0. |
| | ANN | 1.401E+06 | 7.872E+04 | 2.400E+01 | 0. | 0. |

CERL -- B.L.A.S.T. SYSTEM --- VERSION 2.0 10 APR 79 12.05.48

## AIR HANDLING SYSTEM LOADS NOT MET SUMMARY

SYSTEM NUMBER= 1 SYSTEM LOCATION = 0 SIMULATION PERIOD = 1/21/1979 - 1/21/1979

| | | HEATING | | | COOLING | | |
|---|---|---|---|---|---|---|---|
| | MONTH | LOAD NOT MET (BTU) | PEAK NOT MET (BTU/HR) | HOURS NOT MET (HOURS) | LOAD NOT MET (BTU) | PEAK NOT MET (BTU/HR) | HOURS NOT MET (HOURS) |
| ZONE 1 | | | | | | | |
| | NO UNMET LOADS FOR THIS ZONE | | | | | | |
| ZONE 2 | | | | | | | |
| | NO UNMET LOADS FOR THIS ZONE | | | | | | |
| ZONE 3 | | | | | | | |
| | NO UNMET LOADS FOR THIS ZONE | | | | | | |
| ZONE 4 | | | | | | | |
| | NO UNMET LOADS FOR THIS ZONE | | | | | | |
| ZONE 5 | | | | | | | |
| | NO UNMET LOADS FOR THIS ZONE | | | | | | |
| ZONE 6 | | | | | | | |
| | NO UNMET LOADS FOR THIS ZONE | | | | | | |
| ZONE 7 | | | | | | | |
| | NO UNMET LOADS FOR THIS ZONE | | | | | | |
| ZONE 8 | | | | | | | |
| | NO UNMET LOADS FOR THIS ZONE | | | | | | |
| ZONE 9 | | | | | | | |
| | NO UNMET LOADS FOR THIS ZONE | | | | | | |

CERL -- B.L.A.S.T. SYSTEM --- VERSION 2.0 10 APR 79 12.05.48

ZONE 10

NO UNMET LOADS FOR THIS ZONE

## EQUIPMENT SIZE & AVAILABILITY (ES) DATA

| CODE | EQUIPMENT | SIZE (KBTUH) | NUMBER INSTD | NUMBER AVAIL | SIZE (KBTUH) | NUMBER INSTD | NUMBER AVAIL | SIZE (KBTUH) | NUMBER INSTD | NUMBER AVAIL | SIZE (KBTUH) | NUMBER INSTD | NUMBER AVAIL | SIZE (KBTUH) | NUMBER INSTD | NUMBER AVAIL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| STMB | STEAM BOILER | 800. | 1 | 1 | | | | | | | | | | | | |
| COMPH | HERMETIC COMPRESSION CHILLER | 600. | 1 | 1 | | | | | | | | | | | | |

## EQUIPMENT LOAD RATIOS (ER) DATA

| CODE | EQUIPMENT | PART LOAD RATIOS MINIMUM | PART LOAD RATIOS MAXIMUM | PART LOAD RATIOS OPTIMUM | ELECTRIC INPUT TO NOMINAL CAPACITY RATIO (DIMENSIONLESS) |
|---|---|---|---|---|---|
| STMB | STEAM BOILER | .0100 | 1.0000 | .8700 | 0. |
| COMPH | HERMETIC COMPRESSION CHILLER | .1000 | 1.0500 | .6500 | .2275 |

CERL -- B.L.A.S.T. SYSTEM --- VERSION 2.0 10 APR 79 12.05.48

## CENTRAL PLANT ENERGY UTILIZATION SUMMARY

| MONTH | TOTAL HEAT ENERGY (GBTU) | TOTAL ELECTR ENERGY (GBTU) | COOLING ENERGY (GBTU) | RCVRED ENERGY (GBTU) | WASTED RCVRABL ENERGY (GBTU) | HEAT EN INPUT COOLING (GBTU) | ELEC EN INPUT COOLING (GBTU) | ENERGY INPUT HEATING (GBTU) | ENERGY INPUT ELECTRC (GBTU) | TOTAL FUEL INPUT (GBTU) | TOTAL ENERGY INPUT (GBTU) | AVERAGE PLANT EFFIC (PERCT) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | -0. |
| 2 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | -0. |
| 3 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | -0. |
| 4 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | -0. |
| 5 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | -0. |
| 6 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | -0. |
| 7 | 0. | .0040 | .0084 | 0. | 0. | 0. | .0055 | 0. | .0133 | 0. | .0133 | 30. |
| 8 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | -0. |
| 9 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | -0. |
| 10 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | -0. |
| 11 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | -0. |
| 12 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | -0. |
| | 0. | .0040 | .0084 | 0. | 0. | 0. | .0055 | 0. | .0133 | 0. | .0133 | 3. |

PLANT FOR BASIC SYSTEM

# EQUIPMENT USE STATISTICS

| EQUIPMENT | AVG OPER RATIO | MAX LOAD (KBTUH) | MON | DAY | HR | SIZE (KBTUH) | OPER HRS | SIZE (KBTUH) | OPER HRS | SIZE (KBTUH) | OPER HRS | SIZE (KBTUH) | OPER HRS | SIZE (KBTUH) | OPER HRS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| STEAM BOILER | 0. | 0. | 0 | 0 | 0 | 800.0 | 0 | | | | | | | | |
| HERMETIC COMPRESSION CHILLER | .582 | 517.4 | 7 | 21 | 15 | 600.0 | 24 | | | | | | | | |

| UTILITY, ENERGY | 1YR UNADJ COST ($) | 1-YEAR USAGE (GBTU) | PEAK USAGE (KBTUH) | COST ESCALATION FACTOR |
|---|---|---|---|---|
| ELECT | .7 | .004 | 266.0 | 0. |
| UTILITY, ENERGY TOTAL | .7 | | | |

CERL -- B.L.A.S.T. SYSTEM --- VERSION 2.0 10 APR 79 12.05.48

## CENTRAL PLANT ENERGY UTILIZATION SUMMARY

| MONTH | TOTAL HEAT ENERGY (GBTU) | TOTAL ELECTR ENERGY (GBTU) | COOLING ENERGY (GBTU) | RCVRED ENERGY (GBTU) | WASTED RCVRABL ENERGY (GBTU) | HEAT EN INPUT COOLING (GBTU) | ELEC EN INPUT COOLING (GBTU) | ENERGY INPUT HEATING (GBTU) | ENERGY INPUT ELECTRC (GBTU) | TOTAL FUEL INPUT (GBTU) | TOTAL ENERGY INPUT (GBTU) | AVERAGE PLANT EFFIC (PERCT) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | .0068 | .0018 | .0014 | 0. | 0. | 0. | .0022 | .0109 | .0059 | .0109 | .0167 | 51. |
| 2 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | -0. |
| 3 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | -0. |
| 4 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | -0. |
| 5 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | -0. |
| 6 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | -0. |
| 7 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | -0. |
| 8 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | -0. |
| 9 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | -0. |
| 10 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | -0. |
| 11 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | -0. |
| 12 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | -0. |
| | .0068 | .0018 | .0014 | 0. | 0. | 0. | .0022 | .0109 | .0059 | .0109 | .0167 | 4. |

PLANT FOR BASIC SYSTEM

# EQUIPMENT USE STATISTICS

| EQUIPMENT | AVG OPER RATIO | MAX LOAD (KBTUH) | MON | DAY | HR | SIZE (KBTUH) | OPER HRS | SIZE (KBTUH) | OPER HRS | SIZE (KBTUH) | OPER HRS | SIZE (KBTUH) | OPER HRS | SIZE (KBTUH) | OPER HRS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| STEAM BOILER | .352 | 300.1 | 1 | 21 | 6 | 800.0 | 24 | | | | | | | | |
| HERMETIC COMPRESSION CHILLER | .097 | 78.7 | 1 | 21 | 15 | 600.0 | 24 | | | | | | | | |

| UTILITY, ENERGY | 1YR UNADJ COST (K$) | 1-YEAR USAGE (GBTU) | PEAK USAGE (KBTUH) | COST ESCALATION FACTOR |
|---|---|---|---|---|
| ELECT | .6 | .002 | 74.6 | 0. |
| BOILER | .0 | .011 | 476.4 | 0. |
| UTILITY, ENERGY TOTAL | .6 | | | |

### One-Year Loads Calculations

The input deck for 1-year load calculations is the same as that of the design day calculations and is not shown. The only change in input was the addition of:

```
WEATHER TAPE FROM Ø1 JAN 75 THRU 31 DEC 75;
```

in place of the **DESIGN DAYS** specification.

Output produced from the 1-year run which duplicates output from the design day calculations is not shown.

```
    CERL -- B.L.A.S.T. SYSTEM --- VERSION 2.0              10 APR 79      14.03.13

NEW BLDFL AND AMLDFL FILES WILL BE CREATED
     FROM USER INPUT, AS NECESSARY

    LOCATION TAKEN FROM ATTACHED #THWFL
    TITLE= FT WORTH TRY TAPE RUN                    LAT= 32.80000 LONG= 97.00000 TIME ZONE= 6.0

 * * * * *
 BLDFL FOR
  FT HOOD DENTAL CLINIC


  LOCATION FT WORTH TRY TAPE RUN                    LAT=  32.80000 LONG=  97.00000 TIME ZONE= 6.0
  DATE OF FILE CREATE/UPDATE 10 APR 79 NUMBER OF ENVIRONMENTS  1
  NUMBER OF ZONES 11 WITH ZONE NUMBERS
1000    1    2    3    4    5    6    7    8    9   10


   ENVIRONMENT NUMBER  1 FOR BLDFL  TITLE IS FT WORTH TRY TAPE RUN
    WEATHER STATION   3937 START DATE OF  1 JAN 1975 NO. OF DAYS 365
    WITH GROUND TEMPERATURES  JAN =62.00 FEB =61.00 MAR =62.00 APR =65.00 MAY =68.00 JUN =71.00
                              JUL =75.00 AUG =75.00 SEP =71.00 OCT =68.00 NOV =65.00 DEC =67.00
```

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LOADS SUMMARY FOR ZONE 1000: CRAWL SPACE

FT WORTH TRY TAPE RUN

| MO DY HR | HEATING LOAD (BTU) | COOLING LOAD (BTU) | LATENT LOAD (BTU) | RETURN AIR HEAT GAIN (BTU) | BASEBOARD LOAD (BTU) | ELECTRIC LOAD (BTU) | GAS LOAD (BTU) | INFILT HEAT LOSS (BTU) | INFILT HEAT GAIN (BTU) | MAT/ H EX | ODB/ H ON | OWB/ C ON | C EX |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0 | 0 | 0 | 0 |
| 2 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0 | 0 | 0 | 0 |
| 3 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0 | 0 | 0 | 0 |
| 4 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0 | 0 | 0 | 0 |
| 5 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0 | 0 | 0 | 0 |
| 6 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0 | 0 | 0 | 0 |
| 7 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0 | 0 | 0 | 0 |
| 8 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0 | 0 | 0 | 0 |
| 9 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0 | 0 | 0 | 0 |
| 10 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0 | 0 | 0 | 0 |
| 11 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0 | 0 | 0 | 0 |
| 12 | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0 | 0 | 0 | 0 |
| FINAL | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0 | 0 | 0 | 0 |

MAXIMUM HEATING LOAD = 0. AT HOUR 0 ON DAY 0 OF MONTH 0 WITH A ZONE AIR TEMP OF 0.
MAXIMUM COOLING LOAD = 0. AT HOUR 0 ON DAY 0 OF MONTH 0 WITH A ZONE AIR TEMP OF 0.
MAXIMUM ZONE AIR TEMP = 7.667E+01 AT HOUR 7 ON DAY 23 OF MONTH 7
MINIMUM ZONE AIR TEMP = 6.411E+01 AT HOUR 14 ON DAY 13 OF MONTH 2

INFILTRATION HEAT GAIN/LOSS REFERS TO SENSIBLE PORTION ONLY.
LATENT PORTION IS COMPUTED BY AIR HANDLING SYSTEM SUBPROGRAM.
LOSS = MASS FLOW * SPECIFIC HEAT * (ZONE TEMP - OUTSIDE TEMP)
IT IS INCLUDED IN TOTAL SENSIBLE LOAD.



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LOADS SUMMARY FOR ZONE 1: NORTH LAB

FT MONTH TRY TAPE RUN

| MO DY HR | HEATING LOAD (BTU) | COOLING LOAD (BTU) | LATENT LOAD (BTU) | RETURN AIR HEAT GAIN (BTU) | BASEBOARD LOAD (BTU) | ELECTRIC LOAD (BTU) | GAS LOAD (BTU) | INFILT HEAT LOSS (BTU) | INFILT HEAT GAIN (BTU) | MAT/ H EX | ODB/ H ON | OWB/ C ON | C EX |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 4.730E+05 | 4.044E+06 | 8.839E+04 | 0. | 0. | 5.966E+06 | 0. | 0. | 0. | 0 | 328 | 416 | 0 |
| 2 | 5.415E+05 | 3.453E+06 | 7.625E+04 | 0. | 0. | 5.186E+06 | 0. | 0. | 0. | 0 | 332 | 340 | 0 |
| 3 | 2.551E+05 | 4.332E+06 | 8.441E+04 | 0. | 0. | 5.734E+06 | 0. | 0. | 0. | 0 | 241 | 503 | 0 |
| 4 | 1.531E+04 | 5.514E+06 | 8.914E+04 | 0. | 0. | 5.939E+06 | 0. | 0. | 0. | 0 | 41 | 679 | 0 |
| 5 | 0. | 6.400E+06 | 8.559E+04 | 0. | 0. | 5.734E+06 | 0. | 0. | 0. | 0 | 0 | 744 | 0 |
| 6 | 0. | 7.157E+06 | 8.591E+04 | 0. | 0. | 5.706E+06 | 0. | 0. | 0. | 0 | 0 | 720 | 0 |
| 7 | 0. | 7.462E+06 | 9.026E+04 | 0. | 0. | 5.966E+06 | 0. | 0. | 0. | 0 | 0 | 744 | 0 |
| 8 | 0. | 7.421E+06 | 8.516E+04 | 0. | 0. | 5.734E+06 | 0. | 0. | 0. | 0 | 0 | 744 | 0 |
| 9 | 0. | 6.806E+06 | 8.571E+04 | 0. | 0. | 5.706E+06 | 0. | 0. | 0. | 0 | 0 | 720 | 0 |
| 10 | 1.229E+03 | 5.411E+06 | 8.534E+04 | 0. | 0. | 5.734E+06 | 0. | 0. | 0. | 0 | 8 | 736 | 0 |
| 11 | 1.78HE+05 | 4.282E+06 | 7.647E+04 | 0. | 0. | 5.242E+06 | 0. | 0. | 0. | 0 | 153 | 567 | 0 |
| 12 | 4.275E+05 | 4.095E+06 | 8.434E+04 | 0. | 0. | 5.966E+06 | 0. | 0. | 0. | 0 | 319 | 425 | 0 |
| FINAL | 1.912E+06 | 6.761E+07 | 1.022E+06 | 0. | 0. | 6.861E+07 | 0. | 0. | 0. | 0 | 1422 | 7338 | 0 |

MAXIMUM HEATING LOAD = 4.267E+03 AT HOUR 6 ON DAY 13 OF MONTH 1 WITH A ZONE AIR TEMP OF 67.92
MAXIMUM COOLING LOAD = 2.495E+04 AT HOUR 16 ON DAY 22 OF MONTH 7 WITH A ZONE AIR TEMP OF 69.72
MAXIMUM ZONE AIR TEMP = 6.972E+01 AT HOUR 16 ON DAY 22 OF MONTH 7
MINIMUM ZONE AIR TEMP = 6.742E+01 AT HOUR 6 ON DAY 13 OF MONTH 1

INFILTRATION HEAT GAIN/LOSS REFERS TO SENSIBLE PORTION ONLY.
LATENT PORTION IS COMPUTED BY AIR HANDLING SYSTEM SUBPROGRAM.
LOSS = MASS FLO. * SPECIFIC HEAT * (ZONE TEMP - OUTSIDE TEMP)
IT IS INCLUDED IN TOTAL SENSIBLE LOAD.



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LOADS SUMMARY FOR ZONE 2: MONTH WEST LAB

FT MONTH TRY TAPE RUN

| MO DY HR | HEATING LOAD (BTU) | COOLING LOAD (BTU) | LATENT LOAD (BTU) | RETURN AIR HEAT GAIN (BTU) | BASEBOARD LOAD (BTU) | ELECTRIC LOAD (BTU) | GAS LOAD (BTU) | INFILT HEAT LOSS (BTU) | INFILT HEAT GAIN (BTU) | MAT/ M EX | OOB/ M ON | OWR/ C ON | C EX |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 7.174E+05 | 5.707E+05 | 2.794E+04 | 0. | 0. | 1.297E+06 | 0. | 0. | 0. | 0 | 473 | 271 | 0 |
| 2 | 7.524E+05 | 4.401E+05 | 2.412E+04 | 0. | 0. | 1.128E+06 | 0. | 0. | 0. | 0 | 445 | 226 | 0 |
| 3 | 4.747E+05 | 7.447E+05 | 2.670E+04 | 0. | 0. | 1.246E+06 | 0. | 0. | 0. | 0 | 380 | 364 | 0 |
| 4 | 1.043E+05 | 1.271E+06 | 2.302E+04 | 0. | 0. | 1.291E+06 | 0. | 0. | 0. | 0 | 190 | 530 | 0 |
| 5 | 0. | 1.[illegible]E+06 | 2.479E+04 | 0. | 0. | 1.246E+06 | 0. | 0. | 0. | 0 | 0 | 744 | 0 |
| 6 | 0. | 2.417E+06 | 2.482E+04 | 0. | 0. | 1.240E+06 | 0. | 0. | 0. | 0 | 0 | 720 | 0 |
| 7 | 0. | 2.418E+06 | 2.412E+04 | 0. | 0. | 1.297E+06 | 0. | 0. | 0. | 0 | 0 | 744 | 0 |
| 8 | 0. | 2.418E+06 | 2.484E+04 | 0. | 0. | 1.246E+06 | 0. | 0. | 0. | 0 | 0 | 744 | 0 |
| 9 | 5.594E+02 | 2.041E+06 | 2.440E+04 | 0. | 0. | 1.240E+06 | 0. | 0. | 0. | 0 | 4 | 716 | 0 |
| 10 | 2.251E+04 | 1.[illegible]E+06 | 2.477E+04 | 0. | 0. | 1.246E+06 | 0. | 0. | 0. | 0 | 72 | 672 | 0 |
| 11 | 3.194E+05 | 4.250E+05 | 2.416E+04 | 0. | 0. | 1.139E+06 | 0. | 0. | 0. | 0 | 271 | 449 | 0 |
| 12 | 6.647E+05 | 5.449E+05 | 2.794E+04 | 0. | 0. | 1.297E+06 | 0. | 0. | 0. | 0 | 440 | 304 | 0 |
| FINAL | 3.042E+06 | 1.765E+07 | 3.210E+05 | 0. | 0. | 1.492E+07 | 0. | 0. | 0. | 0 | 2276 | 6484 | 0 |

MAXIMUM HEATING LOAD = 3.[illegible]E+03 AT HOUR 6 ON DAY 13 OF MONTH 1 WITH A ZONE AIR TEMP OF 67.70
MAXIMUM COOLING LOAD = 7.551E+03 AT HOUR 16 ON DAY 22 OF MONTH 7 WITH A ZONE AIR TEMP OF 68.23
MAXIMUM ZONE AIR TEMP = 6.[illegible]E+01 AT HOUR 16 ON DAY 22 OF MONTH 7
MINIMUM ZONE AIR TEMP = 6.770E+01 AT HOUR 6 ON DAY 13 OF MONTH 1

INFILTRATION HEAT GAIN/LOSS SEEMS TO SENSIBLE PORTION ONLY.
LATENT PORTION IS COMPUTED BY AIR HANDLING SYSTEM SUBPROGRAM.
LOSS = MASS FLOW * SPECIFIC HEAT * (ZONE TEMP - OUTSIDE TEMP)
IT IS INCLUDED IN TOTAL SENSIBLE LOAD.

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LOADS SUMMARY FOR ZONE 3: WEST OPEN RMS

FT WORTH TRY TAPE RUN

| MO DY HR | HEATING LOAD (BTU) | COOLING LOAD (BTU) | LATENT LOAD (BTU) | RETURN AIR HEAT GAIN (BTU) | BASEBOARD LOAD (BTU) | ELECTRIC LOAD (BTU) | GAS LOAD (BTU) | INFILT HEAT LOSS (BTU) | INFILT HEAT GAIN (BTU) | MAT/ H EX | ODB/ H ON | OWB/ C ON | C EX |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2.497E+06 | 1.244E+06 | 3.342E+05 | 0. | 0. | 3.113E+06 | 0. | 0. | 0. | 0 | 485 | 259 | 0 |
| 2 | 2.84ME+06 | 9.952E+05 | 2.424E+05 | 0. | 0. | 2.706E+06 | 0. | 0. | 0. | 0 | 463 | 209 | 0 |
| 3 | 1.778E+06 | 1.967E+06 | 3.259E+05 | 0. | 0. | 2.992E+06 | 0. | 0. | 0. | 0 | 382 | 362 | 0 |
| 4 | 3.627E+05 | 3.923E+06 | 3.460E+05 | 0. | 0. | 3.09BE+06 | 0. | 0. | 0. | 0 | 179 | 541 | 0 |
| 5 | 0. | 6.271E+06 | 3.743E+05 | 0. | 0. | 2.992E+06 | 0. | 0. | 0. | 0 | 0 | 744 | 0 |
| 6 | 0. | 6.354E+06 | 3.773E+05 | 0. | 0. | 2.977E+06 | 0. | 0. | 0. | 0 | 0 | 720 | 0 |
| 7 | 0. | 9.855E+06 | 3.554E+05 | 0. | 0. | 3.113E+06 | 0. | 0. | 0. | 0 | 0 | 744 | 0 |
| 8 | 0. | 9.487E+06 | 3.743E+05 | 0. | 0. | 2.992E+06 | 0. | 0. | 0. | 0 | 0 | 744 | 0 |
| 9 | 2.164E+03 | 6.472E+06 | 3.755E+05 | 0. | 0. | 2.977E+06 | 0. | 0. | 0. | 0 | 4 | 716 | 0 |
| 10 | 7.071E+04 | 5.254E+06 | 3.326E+05 | 0. | 0. | 2.992E+06 | 0. | 0. | 0. | 0 | 56 | 688 | 0 |
| 11 | 1.147E+06 | 2.343E+06 | 2.45ME+05 | 0. | 0. | 2.735E+06 | 0. | 0. | 0. | 0 | 277 | 443 | 0 |
| 12 | 2.554E+06 | 1.233E+06 | 3.3MBE+05 | 0. | 0. | 3.113E+06 | 0. | 0. | 0. | 0 | 468 | 276 | 0 |
| FINAL | 1.144E+07 | 5.434E+07 | 3.972E+06 | 0. | 0. | 3.580E+07 | 0. | 0. | 0. | 0 | 2314 | 6446 | 0 |

MAXIMUM HEATING LOAD = 1.34?E+04 AT HOUR 6 ON DAY 13 OF MONTH 1 WITH A ZONE AIR TEMP OF 67.77
MAXIMUM COOLING LOAD = 2.A10E+04 AT HOUR 17 ON DAY 21 OF MONTH 7 WITH A ZONE AIR TEMP OF 69.58
MAXIMUM ZONE AIR TEMP = 6.95MF+01 AT HOUR 17 ON DAY 21 OF MONTH 7
MINIMUM ZONE AIR TEMP = 6.777F+01 AT HOUR 6 ON DAY 13 OF MONTH 1

INFILTRATION HEAT GAIN/LOSS REFERS TO SENSIBLE PORTION ONLY.
LATENT PORTION IS COMPUTED BY AIR HANDLING SYSTEM SUBPROGRAM.
LOSS = MASS FLOW * SPECIFIC HEAT * (ZONE TEMP - OUTSIDE TEMP)
IT IS INCLUDED IN TOTAL SENSIBLE LOAD.



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LOADS SUMMARY FOR ZONE 4: LOCKER RMS

FT WORTH TRY TAPE RUN

| MO DY HR | HEATING LOAD (BTU) | COOLING LOAD (BTU) | LATENT LOAD (BTU) | RETURN AIR HEAT GAIN (BTU) | BASEBOARD LOAD (BTU) | ELECTRIC LOAD (BTU) | GAS LOAD (BTU) | INFILT HEAT LOSS (BTU) | INFILT HEAT GAIN (BTU) | MAT/ H EX | ODB/ H ON | OWB/ C ON | C EX |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 5.118E+05 | 4.172E+05 | 8.473E+04 | 0. | 0. | 7.782E+05 | 0. | 0. | 0. | 0 | 477 | 267 | 0 |
| 2 | 5.562E+05 | 3.421E+05 | 7.311E+04 | 0. | 0. | 6.765E+05 | 0. | 0. | 0. | 0 | 452 | 220 | 0 |
| 3 | 3.555E+05 | 4.920E+05 | 8.110E+04 | 0. | 0. | 7.479E+05 | 0. | 0. | 0. | 0 | 421 | 323 | 0 |
| 4 | 7.927E+04 | 8.480E+05 | 8.555E+04 | 0. | 0. | 7.746E+05 | 0. | 0. | 0. | 0 | 201 | 519 | 0 |
| 5 | 1.515E+02 | 1.373E+06 | 8.226E+04 | 0. | 0. | 7.479E+05 | 0. | 0. | 0. | 0 | 2 | 742 | 0 |
| 6 | 0. | 1.[illegible]E+06 | 8.273E+04 | 0. | 0. | 7.443E+05 | 0. | 0. | 0. | 0 | 0 | 720 | 0 |
| 7 | 0. | 2.335E+06 | 8.713E+04 | 0. | 0. | 7.782E+05 | 0. | 0. | 0. | 0 | 0 | 744 | 0 |
| 8 | 0. | 2.342E+06 | 8.31ME+04 | 0. | 0. | 7.479E+05 | 0. | 0. | 0. | 0 | 0 | 744 | 0 |
| 9 | 0. | 1.445E+06 | 8.256E+04 | 0. | 0. | 7.443E+05 | 0. | 0. | 0. | 0 | 0 | 720 | 0 |
| 10 | 9.24ME+03 | 1.193E+06 | 8.206E+04 | 0. | 0. | 7.479E+05 | 0. | 0. | 0. | 0 | 51 | 693 | 0 |
| 11 | 1.983E+05 | 5.937E+05 | 7.359E+04 | 0. | 0. | 6.837E+05 | 0. | 0. | 0. | 0 | 286 | 434 | 0 |
| 12 | 4.796E+05 | 4.149E+05 | 8.472E+04 | 0. | 0. | 7.782E+05 | 0. | 0. | 0. | 0 | 477 | 267 | 0 |
| FINAL | 2.189E+06 | 1.346E+07 | 9.927E+05 | 0. | 0. | 8.950E+06 | 0. | 0. | 0. | 0 | 2367 | 6393 | 0 |

MAXIMUM HEATING LOAD = 2.385E+03 AT HOUR 6 ON DAY 13 OF MONTH 1 WITH A ZONE AIR TEMP OF 67.89
MAXIMUM COOLING LOAD = 5.521E+03 AT HOUR 15 ON DAY 22 OF MONTH 7 WITH A ZONE AIR TEMP OF 69.09
MAXIMUM ZONE AIR TEMP = 5.999E+01 AT HOUR 15 ON DAY 22 OF MONTH 7
MINIMUM ZONE AIR TEMP = 4.744E+01 AT HOUR 6 ON DAY 13 OF MONTH 1

INFILTRATION HEAT GAIN/LOSS REFERS TO SENSIBLE PORTION ONLY.
LATENT PORTION IS COMPUTED BY AIR HANDLING SYSTEM SUBPROGRAM.
LOSS = MASS FLOW * SPECIFIC HEAT * (ZONE TEMP - OUTSIDE TEMP)
IT IS INCLUDED IN TOTAL SENSIBLE LOAD.



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LOADS SUMMARY FOR ZONE 5: LIBRARY CONF RMS

FT WORTH TRY TAPE RUN

| MO DY HR | HEATING LOAD (BTU) | COOLING LOAD (BTU) | LATENT LOAD (BTU) | RETURN AIR HEAT GAIN (BTU) | BASEBOARD LOAD (BTU) | ELECTRIC LOAD (BTU) | GAS LOAD (BTU) | INFILT HEAT LOSS (BTU) | INFILT HEAT GAIN (BTU) | MAT/ H EX | ODB/ H ON | OWB/ C ON | C EX |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 4.029E+05 | 4.870E+05 | 5.708E+04 | 0. | 0. | 9.079E+05 | 0. | 0. | 0. | 0 | 460 | 284 | 0 |
| 2 | 4.442E+05 | 4.037E+05 | 4.924E+04 | 0. | 0. | 7.892E+05 | 0. | 0. | 0. | 0 | 441 | 231 | 0 |
| 3 | 2.728E+05 | 5.531E+05 | 5.468E+04 | 0. | 0. | 8.725E+05 | 0. | 0. | 0. | 0 | 388 | 356 | 0 |
| 4 | 5.239E+04 | 9.047E+05 | 5.779E+04 | 0. | 0. | 9.037E+05 | 0. | 0. | 0. | 0 | 166 | 554 | 0 |
| 5 | 0. | 1.356E+06 | 5.569E+04 | 0. | 0. | 8.725E+05 | 0. | 0. | 0. | 0 | 0 | 744 | 0 |
| 6 | 0. | 1.744E+06 | 5.409E+04 | 0. | 0. | 8.683E+05 | 0. | 0. | 0. | 0 | 0 | 720 | 0 |
| 7 | 0. | 2.196E+06 | 5.917E+04 | 0. | 0. | 9.079E+05 | 0. | 0. | 0. | 0 | 0 | 744 | 0 |
| 8 | 0. | 2.194E+06 | 5.649E+04 | 0. | 0. | 8.725E+05 | 0. | 0. | 0. | 0 | 0 | 744 | 0 |
| 9 | 0. | 1.548E+06 | 5.595E+04 | 0. | 0. | 8.683E+05 | 0. | 0. | 0. | 0 | 0 | 720 | 0 |
| 10 | 4.934E+04 | 1.146E+06 | 5.551E+04 | 0. | 0. | 8.725E+05 | 0. | 0. | 0. | 0 | 36 | 708 | 0 |
| 11 | 1.474E+05 | 5.416E+05 | 4.985E+04 | 0. | 0. | 7.976E+05 | 0. | 0. | 0. | 0 | 251 | 469 | 0 |
| 12 | 3.737E+05 | 4.871E+05 | 5.707E+04 | 0. | 0. | 9.079E+05 | 0. | 0. | 0. | 0 | 453 | 291 | 0 |
| FINAL | 1.699E+06 | 1.377E+07 | 6.644E+05 | 0. | 0. | 1.044E+07 | 0. | 0. | 0. | 0 | 2195 | 6565 | 0 |

MAXIMUM HEATING LOAD = 2.039E+03 AT HOUR 6 ON DAY 13 OF MONTH 1 WITH A ZONE AIR TEMP OF 67.86
MAXIMUM COOLING LOAD = 5.143E+03 AT HOUR 16 ON DAY 22 OF MONTH 7 WITH A ZONE AIR TEMP OF 69.54
MAXIMUM ZONE AIR TEMP = 6.934E+01 AT HOUR 16 ON DAY 22 OF MONTH 7
MINIMUM ZONE AIR TEMP = 6.786E+01 AT HOUR 6 ON DAY 13 OF MONTH 1

INFILTRATION HEAT GAIN/LOSS REFERS TO SENSIBLE PORTION ONLY.
LATENT PORTION IS COMPUTED BY AIR HANDLING SYSTEM SUBPROGRAM.
LOSS = MASS FLOW * SPECIFIC HEAT * (ZONE TEMP - OUTSIDE TEMP)
IT IS INCLUDED IN TOTAL SENSIBLE LOAD.



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LOADS SUMMARY FOR ZONE 4: WAITING ROOM

FT MONTH TRY TAPE RUN

| MO DY HR | HEATING LOAD (BTU) | COOLING LOAD (BTU) | LATENT LOAD (BTU) | RETURN AIR HEAT GAIN (BTU) | BASEBOARD LOAD (BTU) | ELECTRIC LOAD (BTU) | GAS LOAD (BTU) | INFILT HEAT LOSS (BTU) | INFILT HEAT GAIN (BTU) | MAT/ H EX | ODB/ H ON | OWB/ C ON | C EX |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2.067E+05 | 3.036E+06 | 1.448E+06 | 0. | 0. | 1.193E+06 | 0. | 0. | 0. | 0 | 238 | 461 | 45 |
| 2 | 2.449E+05 | 2.570E+06 | 1.440E+06 | 0. | 0. | 1.037E+06 | 0. | 0. | 0. | 0 | 267 | 369 | 36 |
| 3 | 1.140E+05 | 3.058E+06 | 1.400E+06 | 0. | 0. | 1.147E+06 | 0. | 0. | 0. | 0 | 185 | 498 | 61 |
| 4 | 1.113E+04 | 3.434E+06 | 1.705E+06 | 0. | 0. | 1.184E+06 | 0. | 0. | 0. | 0 | 51 | 563 | 106 |
| 5 | 0. | 4.049E+06 | 1.672E+06 | 0. | 0. | 1.147E+06 | 0. | 0. | 0. | 0 | 0 | 612 | 132 |
| 6 | 0. | 4.473E+06 | 1.719E+06 | 0. | 0. | 1.141E+06 | 0. | 0. | 0. | 0 | 0 | 562 | 159 |
| 7 | 0. | 5.018E+06 | 1.959E+06 | 0. | 0. | 1.193E+06 | 0. | 0. | 0. | 0 | 0 | 554 | 190 |
| 8 | 0. | 4.937E+06 | 1.780E+06 | 0. | 0. | 1.147E+06 | 0. | 0. | 0. | 0 | 0 | 564 | 180 |
| 9 | 0. | 4.275E+06 | 1.704E+06 | 0. | 0. | 1.141E+06 | 0. | 0. | 0. | 0 | 0 | 574 | 146 |
| 10 | 2.455E+02 | 3.918E+06 | 1.456E+06 | 0. | 0. | 1.147E+06 | 0. | 0. | 0. | 0 | 4 | 618 | 122 |
| 11 | 5.569E+06 | 3.013E+06 | 1.459E+06 | 0. | 0. | 1.048E+06 | 0. | 0. | 0. | 0 | 115 | 532 | 73 |
| 12 | 1.593E+05 | 3.019E+06 | 1.449E+06 | 0. | 0. | 1.193E+06 | 0. | 0. | 0. | 0 | 229 | 449 | 46 |
| FINAL | 7.93[illegible]E+05 | 4.509E+07 | 1.943E+07 | 0. | 0. | 1.372E+07 | 0. | 0. | 0. | 0 | 1849 | 6376 | 1295 |

MAXIMUM HEATING LOAD = 2.202E+03 AT HOUR 6 ON DAY 13 OF MONTH 1 WITH A ZONE AIR TEMP OF 67.91
MAXIMUM COOLING LOAD = 1.400E+06 AT HOUR 16 ON DAY 3 OF MONTH 1 WITH A ZONE AIR TEMP OF 70.05
MAXIMUM ZONE AIR TEMP = 7.547E+01 AT HOUR 16 ON DAY 6 OF MONTH 8
MINIMUM ZONE AIR TEMP = 6.741E+01 AT HOUR 6 ON DAY 13 OF MONTH 1

INFILTRATION HEAT GAIN/LOSS REFERS TO SENSIBLE PORTION ONLY.
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LOSS = MASS FLOW * SPECIFIC HEAT * (ZONE TEMP - OUTSIDE TEMP)
IT IS INCLUDED IN TOTAL SENSIBLE LOAD.

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LOADS SUMMARY FOR ZONE 7: RECORDS AND SUPPLY

FT WORTH TRY TAPE RUN

| MO DY HR | HEATING LOAD (BTU) | COOLING LOAD (BTU) | LATENT LOAD (BTU) | RETURN AIR HEAT GAIN (BTU) | BASEBOARD LOAD (BTU) | ELECTRIC LOAD (BTU) | GAS LOAD (BTU) | INFILT HEAT LOSS (BTU) | INFILT HEAT GAIN (BTU) | MAT/ H EX | OOB/ H ON | OWB/ C ON | C EX |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 4.191E+05 | 1.244E+06 | 1.732E+05 | 0. | 0. | 1.816E+06 | 0. | 0. | 0. | 0 | 411 | 333 | 0 |
| 2 | 4.785E+05 | 1.042E+06 | 1.494E+05 | 0. | 0. | 1.578E+06 | 0. | 0. | 0. | 0 | 404 | 268 | 0 |
| 3 | 2.690E+05 | 1.335E+06 | 1.457E+05 | 0. | 0. | 1.745E+06 | 0. | 0. | 0. | 0 | 327 | 417 | 0 |
| 4 | 3.539E+04 | 1.909E+06 | 1.749E+05 | 0. | 0. | 1.807E+06 | 0. | 0. | 0. | 0 | 110 | 610 | 0 |
| 5 | 0. | 2.530E+06 | 1.642E+05 | 0. | 0. | 1.745E+06 | 0. | 0. | 0. | 0 | 0 | 744 | 0 |
| 6 | 0. | 3.074E+06 | 1.691E+05 | 0. | 0. | 1.737E+06 | 0. | 0. | 0. | 0 | 0 | 720 | 0 |
| 7 | 0. | 3.690E+06 | 1.781E+05 | 0. | 0. | 1.816E+06 | 0. | 0. | 0. | 0 | 0 | 744 | 0 |
| 8 | 0. | 3.670E+06 | 1.700E+05 | 0. | 0. | 1.745E+06 | 0. | 0. | 0. | 0 | 0 | 744 | 0 |
| 9 | 0. | 2.837E+06 | 1.688E+05 | 0. | 0. | 1.737E+06 | 0. | 0. | 0. | 0 | 0 | 720 | 0 |
| 10 | 2.412E+03 | 2.307E+06 | 1.678E+05 | 0. | 0. | 1.745E+06 | 0. | 0. | 0. | 0 | 16 | 728 | 0 |
| 11 | 1.385E+05 | 1.442E+06 | 1.504E+05 | 0. | 0. | 1.595E+06 | 0. | 0. | 0. | 0 | 206 | 514 | 0 |
| 12 | 3.836E+05 | 1.267E+06 | 1.731E+05 | 0. | 0. | 1.816E+06 | 0. | 0. | 0. | 0 | 392 | 352 | 0 |
| FINAL | 1.727E+06 | 2.633E+07 | 2.009E+06 | 0. | 0. | 2.088E+07 | 0. | 0. | 0. | 0 | 1866 | 6894 | 0 |

MAXIMUM HEATING LOAD = 2.815E+03 AT HOUR 6 ON DAY 13 OF MONTH 1 WITH A ZONE AIR TEMP OF 67.90
MAXIMUM COOLING LOAD = 1.094E+04 AT HOUR 16 ON DAY 22 OF MONTH 7 WITH A ZONE AIR TEMP OF 69.56
MAXIMUM ZONE AIR TEMP = 6.955E+01 AT HOUR 16 ON DAY 22 OF MONTH 7
MINIMUM ZONE AIR TEMP = 6.790E+01 AT HOUR 6 ON DAY 13 OF MONTH 1

INFILTRATION HEAT GAIN/LOSS REFERS TO SENSIBLE PORTION ONLY.
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LOADS SUMMARY FOR ZONE #1 AWAY

FT WORTH TRY TAPE JOB

| NO DY HR | HEATING LOAD (BTU) | COOLING LOAD (BTU) | LATENT LOAD (BTU) | RETURN AIR HEAT GAIN (BTU) | BASEBOARD LOAD (BTU) | ELECTRIC LOAD (BTU) | GAS LOAD (BTU) | INFILT HEAT LOSS (BTU) | INFILT HEAT GAIN (BTU) | MAT/ M EX | ODB/ M ON | OWB/ C ON | C EX |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 4.803E+04 | 5.237E+06 | 4.196E+05 | 0. | 0. | 7.523E+06 | 0. | 0. | 0. | 0 | 78 | 423 | 243 |
| 2 | 4.701E+04 | 4.477E+06 | 3.587E+05 | 0. | 0. | 6.539E+06 | 0. | 0. | 0. | 0 | 89 | 371 | 212 |
| 3 | 4.252E+03 | 5.356E+06 | 4.117E+05 | 0. | 0. | 7.230E+06 | 0. | 0. | 0. | 0 | 22 | 485 | 237 |
| 4 | 0. | 4.148E+06 | 4.424E+05 | 0. | 0. | 7.488E+06 | 0. | 0. | 0. | 0 | 0 | 457 | 263 |
| 5 | 0. | 3.717E+06 | 4.671E+05 | 0. | 0. | 7.230E+06 | 0. | 0. | 0. | 0 | 0 | 481 | 263 |
| 6 | 0. | 7.049E+06 | 4.794E+05 | 0. | 0. | 7.195E+06 | 0. | 0. | 0. | 0 | 0 | 443 | 277 |
| 7 | 0. | 7.777E+06 | 5.143E+05 | 0. | 0. | 7.523E+06 | 0. | 0. | 0. | 0 | 0 | 435 | 309 |
| 8 | 0. | 7.747E+06 | 4.924E+05 | 0. | 0. | 7.230E+06 | 0. | 0. | 0. | 0 | 0 | 446 | 298 |
| 9 | 0. | 6.719E+06 | 4.726E+05 | 0. | 0. | 7.195E+06 | 0. | 0. | 0. | 0 | 0 | 448 | 272 |
| 10 | 0. | 6.446E+06 | 4.573E+05 | 0. | 0. | 7.230E+06 | 0. | 0. | 0. | 0 | 0 | 486 | 258 |
| 11 | 5.600E+02 | 5.243E+06 | 3.923E+05 | 0. | 0. | 6.609E+06 | 0. | 0. | 0. | 0 | 6 | 493 | 221 |
| 12 | 1.040E+04 | 5.253E+06 | 4.194E+05 | 0. | 0. | 7.523E+06 | 0. | 0. | 0. | 0 | 38 | 459 | 247 |
| FINAL | 1.103E+05 | 7.440E+07 | 5.335E+06 | 0. | 0. | 8.651E+07 | 0. | 0. | 0. | 0 | 233 | 5427 | 3100 |

MAXIMUM HEATING LOAD = 1.504E+03 AT HOUR 6 ON DAY 13 OF MONTH 1 WITH A ZONE AIR TEMP OF 67.94
MAXIMUM COOLING LOAD = 1.400E+04 AT HOUR 8 ON DAY 2 OF MONTH 1 WITH A ZONE AIR TEMP OF 77.60
MAXIMUM ZONE AIR TEMP = 1.046E+02 AT HOUR 17 ON DAY 8 OF MONTH 8
MINIMUM ZONE AIR TEMP = 6.794E+01 AT HOUR 6 ON DAY 13 OF MONTH 1

INFILTRATION HEAT GAIN/LOSS REFERS TO SENSIBLE PORTION ONLY.
LATENT PORTION IS COMPUTED BY AIR HANDLING SYSTEM SUBPROGRAM.
LOSS = MASS FLOW * SPECIFIC HEAT * (ZONE TEMP - OUTSIDE TEMP)
IT IS INCLUDED IN TOTAL SENSIBLE LOAD.

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LOADS SUMMARY FOR ZONE 6: SOUTH OPER RMS

FT WORTH TRY TAPE RUN

| MO DY HR | HEATING LOAD (BTU) | COOLING LOAD (BTU) | LATENT LOAD (BTU) | RETURN AIR HEAT GAIN (BTU) | BASEBOARD LOAD (BTU) | ELECTRIC LOAD (BTU) | GAS LOAD (BTU) | INFILT HEAT LOSS (BTU) | INFILT HEAT GAIN (BTU) | MAT/ M EX | OOB/ M ON | OUB/ C ON | C EX |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2.947E+05 | 1.751E+06 | 4.253E+05 | 0. | 0. | 3.372E+06 | 0. | 0. | 0. | 0 | 466 | 278 | 0 |
| 2 | 3.373E+06 | 1.227E+06 | 3.461E+05 | 0. | 0. | 2.931E+06 | 0. | 0. | 0. | 0 | 461 | 211 | 0 |
| 3 | 2.131E+06 | 2.197E+06 | 4.074E+05 | 0. | 0. | 3.241E+06 | 0. | 0. | 0. | 0 | 387 | 357 | 0 |
| 4 | 5.198E+05 | 4.296E+06 | 4.325E+05 | 0. | 0. | 3.357E+06 | 0. | 0. | 0. | 0 | 201 | 519 | 0 |
| 5 | 6.580E+02 | 6.455E+06 | 4.140E+05 | 0. | 0. | 3.241E+06 | 0. | 0. | 0. | 0 | 2 | 742 | 0 |
| 6 | 0. | 9.238E+06 | 4.218E+05 | 0. | 0. | 3.225E+06 | 0. | 0. | 0. | 0 | 0 | 720 | 0 |
| 7 | 0. | 1.091E+07 | 4.446E+05 | 0. | 0. | 3.372E+06 | 0. | 0. | 0. | 0 | 0 | 744 | 0 |
| 8 | 0. | 1.097E+07 | 4.243E+05 | 0. | 0. | 3.241E+06 | 0. | 0. | 0. | 0 | 0 | 744 | 0 |
| 9 | 7.448E+03 | 7.717E+06 | 4.197E+05 | 0. | 0. | 3.225E+06 | 0. | 0. | 0. | 0 | 10 | 710 | 0 |
| 10 | 9.115E+04 | 6.146E+06 | 4.164E+05 | 0. | 0. | 3.241E+06 | 0. | 0. | 0. | 0 | 70 | 674 | 0 |
| 11 | 1.217E+06 | 3.201E+06 | 3.714E+05 | 0. | 0. | 2.963E+06 | 0. | 0. | 0. | 0 | 259 | 461 | 0 |
| 12 | 2.427E+06 | 1.748E+06 | 4.252E+05 | 0. | 0. | 3.372E+06 | 0. | 0. | 0. | 0 | 444 | 300 | 0 |
| FINAL | 1.311E+07 | 6.627E+07 | 4.974E+06 | 0. | 0. | 3.87AE+07 | 0. | 0. | 0. | 0 | 2300 | 6460 | 0 |

MAXIMUM HEATING LOAD = 1.634E+04 AT HOUR 6 ON DAY 13 OF MONTH 1 WITH A ZONE AIR TEMP OF 67.75
MAXIMUM COOLING LOAD = 2.451E+04 AT HOUR 14 ON DAY 22 OF MONTH 7 WITH A ZONE AIR TEMP OF 69.55
MAXIMUM ZONE AIR TEMP = 6.955E+01 AT HOUR 16 ON DAY 22 OF MONTH 7
MINIMUM ZONE AIR TEMP = 6.775E+01 AT HOUR 4 ON DAY 13 OF MONTH 1

INFILTRATION HEAT GAIN/LOSS REFERS TO SENSIBLE PORTION ONLY.
LATENT PORTION IS COMPUTED BY AIR HANDLING SYSTEM SUBPROGRAM.
LOSS = MASS FLOW * SPECIFIC HEAT * (ZONE TEMP - OUTSIDE TEMP)
IT IS INCLUDED IN TOTAL SENSIBLE LOAD.



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LOADS SUMMARY FOR ZONE 10: EAST OPEN RMS

FT WORTH TRY TAPE RUN

| MO DY HR | HEATING LOAD (BTU) | COOLING LOAD (BTU) | LATENT LOAD (BTU) | RETURN AIR HEAT GAIN (BTU) | BASEBOARD LOAD (BTU) | ELECTRIC LOAD (BTU) | GAS LOAD (BTU) | INFILT HEAT LOSS (BTU) | INFILT HEAT GAIN (BTU) | MAT/ M EX | ODB/ M ON | OWB/ C ON | C EX |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2.170E+06 | 1.409E+06 | 3.398E+05 | 0. | 0. | 2.853E+06 | 0. | 0. | 0. | 0 | 477 | 267 | 0 |
| 2 | 2.329E+06 | 1.193E+06 | 2.933E+05 | 0. | 0. | 2.480E+06 | 0. | 0. | 0. | 0 | 446 | 226 | 0 |
| 3 | 1.410E+06 | 2.003E+06 | 3.262E+05 | 0. | 0. | 2.742E+06 | 0. | 0. | 0. | 0 | 374 | 370 | 0 |
| 4 | 2.997E+05 | 3.674E+06 | 3.456E+05 | 0. | 0. | 2.840E+06 | 0. | 0. | 0. | 0 | 177 | 543 | 0 |
| 5 | 2.696E+02 | 5.704E+06 | 3.335E+05 | 0. | 0. | 2.742E+06 | 0. | 0. | 0. | 0 | 1 | 743 | 0 |
| 6 | 0. | 7.304E+06 | 3.355E+05 | 0. | 0. | 2.729E+06 | 0. | 0. | 0. | 0 | 0 | 720 | 0 |
| 7 | 0. | 8.693E+06 | 3.534E+05 | 0. | 0. | 2.853E+06 | 0. | 0. | 0. | 0 | 0 | 744 | 0 |
| 8 | 0. | 8.690E+06 | 3.373E+05 | 0. | 0. | 2.742E+06 | 0. | 0. | 0. | 0 | 0 | 744 | 0 |
| 9 | 3.013E+03 | 6.272E+06 | 3.346E+05 | 0. | 0. | 2.729E+06 | 0. | 0. | 0. | 0 | 6 | 714 | 0 |
| 10 | 5.913E+04 | 4.741E+06 | 3.314E+05 | 0. | 0. | 2.742E+06 | 0. | 0. | 0. | 0 | 57 | 687 | 0 |
| 11 | 9.851E+05 | 2.308E+06 | 2.961E+05 | 0. | 0. | 2.507E+06 | 0. | 0. | 0. | 0 | 272 | 448 | 0 |
| 12 | 2.051E+06 | 1.349E+06 | 3.396E+05 | 0. | 0. | 2.853E+06 | 0. | 0. | 0. | 0 | 445 | 299 | 0 |
| FINAL | 9.287E+06 | 5.335E+07 | 3.967E+06 | 0. | 0. | 3.282E+07 | 0. | 0. | 0. | 0 | 2255 | 6505 | 0 |

MAXIMUM HEATING LOAD = 1.120E+06 AT HOUR 6 ON DAY 13 OF MONTH 1 WITH A ZONE AIR TEMP OF 67.82
MAXIMUM COOLING LOAD = 2.330E+06 AT HOUR 16 ON DAY 22 OF MONTH 7 WITH A ZONE AIR TEMP OF 69.37
MAXIMUM ZONE AIR TEMP = 6.937E+01 AT HOUR 16 ON DAY 22 OF MONTH 7
MINIMUM ZONE AIR TEMP = 6.742E+01 AT HOUR 6 ON DAY 13 OF MONTH 1

INFILTRATION HEAT GAIN/LOSS REFERS TO SENSIBLE PORTION ONLY.
LATENT PORTION IS COMPUTED BY AIR HANDLING SYSTEM SUBPROGRAM.
LOSS = MASS FLOW * SPECIFIC HEAT * (ZONE TEMP - OUTSIDE TEMP)
IT IS INCLUDED IN TOTAL SENSIBLE LOAD.

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## One-Year System and Central Plant Simulation

Results of 1-year load calculations were used with the fan system and central plant input decks to produce the various reports that follow the input deck.

```
CEML -- B.L.A.S.T. SYSTEM --- VERSION 2.0            10 APR 79      18.40.30

  1  BEGIN INPUT;
  2  RUN CONTROL:  NEW ZONES,
  3                NEW AIR SYSTEMS,
  4                CENTRAL PLANT,
  5                REPORTS(SYSTEM,COIL LOADS,EQUIPMENT PARAMETERS
  6                      ,ZONE,WALLS);
  7  PROJECT = "FT HOOD DENTAL CLINIC";
** WARNING   NO LOCATION GIVEN
  8  BEGIN FAN SYSTEM DESCRIPTION;
  9  MULTIZONE SYSTEM 1 "BASIC  SYSTEM" SERVING ZONES 1,2,3,4,5,6,7,8,9,10;
 10  FOR ZONE 1:
 11        EXHAUST AIR VOLUME = 1000;
 12        SUPPLY AIR VOLUME = 1784;
 13  END;
 14  FOR ZONE 2:
 15        SUPPLY AIR VOLUME = 406;
 16  END;
 17  FOR ZONE 3:
 18        SUPPLY AIR VOLUME = 2010;
 19  END;
 20  FOR ZONE 4:
 21        EXHAUST AIR VOLUME = 600;
 22        SUPPLY AIR VOLUME = 761;
 23  END;
```

```
24  FOR ZONE 5:
25        SUPPLY AIR VOLUME = 502$
26  END$
27  FOR ZONE 6:
28        SUPPLY AIR VOLUME = 433$
29  END$
30  FOR ZONE 7:
31        SUPPLY AIR VOLUME = 884$
32  END$
33  FOR ZONE 8:
34        SUPPLY AIR VOLUME = 829$
35  END$
36  FOR ZONE 9:
37        SUPPLY AIR VOLUME = 2245$
38  END$
39  FOR ZONE 10:
40        SUPPLY AIR VOLUME = 2105$
41  END$
42  OTHER SYSTEM PARAMETERS:
43        HOT DECK CONTROL = OUTSIDE AIR CONTROLLED$
44        HOT DECK CONTROL SCHEDULE = (120 AT 10, 80 AT 70)$
45        COLD DECK CONTROL = FIXED SET POINT$
46        COLD DECK TEMPERATURE = 55.$
47        MIXED AIR CONTROL = FIXED AMOUNT$
```

```
 48        OUTSIDE AIR VOLUME = 4114.;
 49  END;
 50  COOLING COIL DESIGN PARAMETERS:
 51        COIL TYPE = CHILLED WATER;
 52        ENTERING WATER TEMPERATURE = 45;
 53        ENTERING AIR DRY BULB TEMPERATURE = 87.0;
 54        ENTERING AIR WET BULB TEMPERATURE = 70.3;
 55        LEAVING WATER TEMPERATURE = 55.4;
 56        LEAVING AIR DRY BULB TEMPERATURE = 61.;
 57        LEAVING AIR WET BULB TEMPERATURE = 59.;
 58        WATER VELOCITY = 275.4;
 59        WATER VOLUME FLOW RATE = 15.6;
 60        AIR FACE VELOCITY = 514.6;
 61        AIR VOLUME FLOW RATE = 15760;
 62        BAROMETRIC PRESSURE = 405;
 63  END;
 64  EQUIPMENT SCHEDULES:
 65        HEATING CAPACITY ON FROM 01 OCT THRU 31 MAR;
 66       SYSTEM OPERATION = CONTINUOUS;
 67  END;
 68  END SYSTEMS;
 69  END FAN SYSTEM DESCRIPTIONS;
 70  BEGIN CENTRAL PLANT DESCRIPTIONS;
 71  PLANT 1 "PLANT FOR BASIC  SYSTEMM SERVING SYSTEM 1;
```

```
CEML -- B.L.A.S.T. SYSTEM --- VERSION 2.0              10 APR 79      18.40.30

 72  EQUIPMENT SELECTION:
 73         1 CHILLER OF SIZE 600$
 74         1 BOILER OF SIZE 800$
 75  END$
 76  END PLANT$
 77  END CENTRAL PLANT DESCRIPTIONS$
 78  END INPUT$
```

```
CEML -- B.L.A.S.T. SYSTEM --- VERSION 2.0              10 APR 79      18.40.30

REPORTING WILL BE DONE IN UNITS ENGLISH
SIMULATIONS WILL BE ALLOWED FOR TYPES: BUILDINGS  SYSTEMS    T.E. PLANT
NUMBER OF SIMULATIONS TO BE ATTEMPTED     2
```

```
CEML -- B.L.A.S.T. SYSTEM --- VERSION 2.0              10 APR 79      18.40.30

BLDFL FILE ATTACHED
   LOCATION AND ENVIRONMENTS WILL BE COPIED TO AMLDFL IF NECESSARY

 * * * * *
 BLDFL FOR
  FT HOOD DENTAL CLINIC


 LOCATION FT WORTH TMY TAPE RUN                    LAT=  32.80000 LONG=  97.00000 TIME ZONE= 6.0
 DATE OF FILE CREATE/UPDATE 10 APR 79 NUMBER OF ENVIRONMENTS  1
 NUMBER OF ZONES 11 WITH ZONE NUMBERS
1000    1    2    3    4    5    6    7    8    9   10


  ENVIRONMENT NUMBER  1 FOR BLDFL  TITLE IS FT WORTH TMY TAPE RUN
   WEATHER STATION   3937 START DATE OF  1 JAN 1975 NO. OF DAYS 365
   WITH GROUND TEMPERATURES  JAN =62.00 FEB =61.00 MAR =62.00 APR =65.00 MAY =68.00 JUN =71.00
                             JUL =75.00 AUG =75.00 SEP =71.00 OCT =68.00 NOV =65.00 DEC =62.00
```

```
 CEML -- B.L.A.S.T. SYSTEM --- VERSION 2.0              10 APR 79      18.40.30

 ********************************************************************
 *                                                                  *
 *   A I R   H A N D L I N G   S Y S T E M   D E S C R I P T I O N  *
 *                                                                  *
 ********************************************************************


                    BASIC  SYSTEM

SYSTEM NUMBER =          1              SYSTEM LOCATION =       0

SIM. PERIOD =  1JAN1975 - 31DEC1975   NO. OF DAYS IN SIMULATION =  365

TYPE SYS = MULTIZONE                  NO. DISTINCT ZONES ON SYS. =   10


SYSTEM OPERATION = CONTINUOUS

                  SEASONAL COMPONENT SCHEDULES
PREHEAT COIL          ON -  1JAN          OFF - 31DEC
HEATING COIL          ON -  1OCT          OFF - 31MAR
COOLING COIL          ON -  1JAN          OFF - 31DEC
HEATREC COIL          ON -  0JAN          OFF -  0JAN

           DAILY PREHEAT COIL SCHEDULE              T = ON , F = OFF
HOUR   1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
WKDAY  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T
WKEND  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T

           DAILY HEATING COIL SCHEDULE              T = ON , F = OFF
HOUR   1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
WKDAY  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T
WKEND  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T

           DAILY COOLING COIL SCHEDULE              T = ON , F = OFF
HOUR   1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
WKDAY  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T
WKEND  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T

           DAILY HEATREC COIL SCHEDULE              T = ON , F = OFF
HOUR   1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
WKDAY  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T
WKEND  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T  T


TOTAL SUPPLY  FAN PRESSURE =     2.4M914      IN-H2O
TOTAL RETURN  FAN PRESSURE =     0.           IN-H2O
TOTAL EXHAUST FAN PRESSURE =     1.00369      IN-H2O


SUPPLY  FAN EFFICIENCY =     .70
RETURN  FAN EFFICIENCY =     .70
EXHAUST FAN EFFICIENCY =     .70

MIXED AIR CONTROL = FIXED AMOUNT
FIXED OUTSIDE AIR VOLUME =  4.114E+03     FT**3/MIN
DESIRED MIXED AIR TEMPERATURE = COLD DECK TEMP

                  DAILY VENTIALTION PROFILES
HOUR          1    2    3    4    5    6    7    8    9   10   11   12
WKDAY MIN  1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
```

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WKDAY MAX | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

| HOUR | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WKDAY MIN | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| WKDAY MAX | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

| HOUR | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WKEND MIN | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| WKEND MAX | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

| HOUR | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WKEND MIN | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| WKEND MAX | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

HOT DECK CONTROL = OUTSIDE AIR CONTROL
HOT DECK THROTTLING RANGE = 7.20000 DEG. F
HOT DECK CONTROL SCHEDULE = (120.00 AT 10.00 , 80.00 AT 70.00) DEG. F

HEATING COIL CAPACITY = .341E+07 1000BTU/HR
HEATING COIL ENERGY SUPPLY = HOT WATER

COLD DEC CONTROL = FIXED SET POINT
COLD DEC THROTTLING RANGE = 7.20000 DEG. F
COLD DEC FIXED TEMPERATURE = 55.00000 DEG. F

ZONE DATA SUMMARY

| ZONE NUMBER | ZONE SUPPLY AIR VOL | ZONE EXHAUST AIR VOL | ZONE REHEAT CAPCTY | ZONE REHEAT ENERGY | ZONE TSTAT BB CAPCTY | ZONE TSTAT BB ENERGY | ZONE MULT |
|---|---|---|---|---|---|---|---|
| 1 | 1.784E+03 | 1.000E+03 | 0. | HOT WATER | 0. | HOT WATER | 1.0 |
| 2 | 4.060E+02 | 0. | 0. | HOT WATER | 0. | HOT WATER | 1.0 |
| 3 | 2.010E+03 | 0. | 0. | HOT WATER | 0. | HOT WATER | 1.0 |
| 4 | 7.610E+02 | 6.000E+02 | 0. | HOT WATER | 0. | HOT WATER | 1.0 |
| 5 | 5.020E+02 | 0. | 0. | HOT WATER | 0. | HOT WATER | 1.0 |
| 6 | 6.330E+02 | 0. | 0. | HOT WATER | 0. | HOT WATER | 1.0 |
| 7 | 8.840E+02 | 0. | 0. | HOT WATER | 0. | HOT WATER | 1.0 |
| 8 | 8.290E+02 | 0. | 0. | HOT WATER | 0. | HOT WATER | 1.0 |
| 9 | 2.245E+03 | 0. | 0. | HOT WATER | 0. | HOT WATER | 1.0 |
| 10 | 2.105E+03 | 0. | 0. | HOT WATER | 0. | HOT WATER | 1.0 |

TOTAL DESIGN SUPPLY AIR VOLUME = 1.236E+04

CEML -- B.L.A.S.T. SYSTEM --- VERSION 2.0 10 APR 79 16.40.30

## AIR HANDLING SYSTEM ENERGY USE SUMMARY

SYSTEM NUMBER = 1 SYSTEM LOCATION = 3937 SIMULATION PERIOD = 1/ 1/1975 - 12/31/1975

ELECTRICITY

| MONTH | BUILDING LIGHTS CONSUMPTION (BTU) | BUILDING LIGHTS PEAK DEMAND (BTU/HR) | FANS CONSUMPTION (BTU) | FANS PEAK DEMAND (BTU/HR) | HEATING CONSUMPTION (BTU) | HEATING PEAK DEMAND (BTU/HR) | TOTAL USE CONSUMPTION (BTU) | TOTAL USE PEAK DEMAND (BTU/HR) |
|---|---|---|---|---|---|---|---|---|
| JAN | 2.842E+07 | 1.111E+05 | 1.712E+07 | 2.301E+04 | 0. | 0. | 4.554E+07 | 1.341E+05 |
| FEB | 2.505E+07 | 1.111E+05 | 1.546E+07 | 2.301E+04 | 0. | 0. | 4.051E+07 | 1.341E+05 |
| MAR | 2.770E+07 | 1.111E+05 | 1.712E+07 | 2.301E+04 | 0. | 0. | 4.481E+07 | 1.341E+05 |
| APR | 2.869E+07 | 1.111E+05 | 1.657E+07 | 2.301E+04 | 0. | 0. | 4.525E+07 | 1.341E+05 |
| MAY | 2.770E+07 | 1.111E+05 | 1.712E+07 | 2.301E+04 | 0. | 0. | 4.481E+07 | 1.341E+05 |
| JUN | 2.756E+07 | 1.111E+05 | 1.657E+07 | 2.301E+04 | 0. | 0. | 4.413E+07 | 1.341E+05 |
| JUL | 2.842E+07 | 1.111E+05 | 1.712E+07 | 2.301E+04 | 0. | 0. | 4.554E+07 | 1.341E+05 |
| AUG | 2.770E+07 | 1.111E+05 | 1.712E+07 | 2.301E+04 | 0. | 0. | 4.481E+07 | 1.341E+05 |
| SEP | 2.756E+07 | 1.111E+05 | 1.657E+07 | 2.301E+04 | 0. | 0. | 4.413E+07 | 1.341E+05 |
| OCT | 2.770E+07 | 1.111E+05 | 1.712E+07 | 2.301E+04 | 0. | 0. | 4.481E+07 | 1.341E+05 |
| NOV | 2.532E+07 | 1.111E+05 | 1.657E+07 | 2.301E+04 | 0. | 0. | 4.189E+07 | 1.341E+05 |
| DEC | 2.842E+07 | 1.111E+05 | 1.712E+07 | 2.301E+04 | 0. | 0. | 4.554E+07 | 1.341E+05 |
| ANN | 3.314E+08 | 1.111E+05 | 2.015E+08 | 2.301E+04 | 0. | 0. | 5.330E+08 | 1.341E+05 |

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| MONTH | GAS TOTAL USE CONSUMPTION (BTU) | GAS TOTAL USE PEAK DEMAND (BTU/HR) | STEAM TOTAL USE CONSUMPTION (BTU) | STEAM TOTAL USE PEAK DEMAND (BTU/HR) | HOT WATER TOTAL USE CONSUMPTION (BTU) | HOT WATER TOTAL USE PEAK DEMAND (BTU/HR) | CHILLED WATER TOTAL USE CONSUMPTION (BTU) | CHILLED WATER TOTAL USE PEAK DEMAND (BTU/HR) |
|---|---|---|---|---|---|---|---|---|
| JAN | 0. | 0. | 0. | 0. | 1.460E+08 | 2.971E+05 | 1.039E+09 | 3.041E+05 |
| FEB | 0. | 0. | 0. | 0. | 1.369E+08 | 2.811E+05 | 8.749E+07 | 2.587E+05 |
| MAR | 0. | 0. | 0. | 0. | 1.357E+08 | 2.608E+05 | 1.161E+09 | 3.208E+05 |
| APR | 0. | 0. | 0. | 0. | 0. | 0. | 4.223E+07 | 2.695E+05 |
| MAY | 0. | 0. | 0. | 0. | 0. | 0. | 7.264E+07 | 2.477E+05 |
| JUN | 0. | 0. | 0. | 0. | 0. | 0. | 1.116E+08 | 3.433E+05 |
| JUL | 0. | 0. | 0. | 0. | 0. | 0. | 1.342E+08 | 3.776E+05 |
| AUG | 0. | 0. | 0. | 0. | 0. | 0. | 1.364E+08 | 3.694E+05 |
| SEP | 0. | 0. | 0. | 0. | 0. | 0. | 8.525E+07 | 3.332E+05 |
| OCT | 0. | 0. | 0. | 0. | 1.033E+08 | 2.119E+05 | 1.711E+08 | 4.282E+05 |
| NOV | 0. | 0. | 0. | 0. | 1.238E+08 | 2.710E+05 | 1.260E+09 | 3.276E+05 |
| DEC | 0. | 0. | 0. | 0. | 1.453E+08 | 2.824E+05 | 1.048E+08 | 3.298E+05 |
| | --- | --- | --- | --- | --- | --- | --- | --- |
| ANN | 0. | 0. | 0. | 0. | 7.910E+08 | 2.971E+05 | 1.294E+09 | 4.282E+05 |

## AIR HANDLING SYSTEM COMPONENT LOAD SUMMARY

SYSTEM NUMBER= 1 SYSTEM LOCATION = 3937 SIMULATION PERIOD = 1/ 1/1975 - 12/31/1975

| MONTH | CONSUMPTION (BTU) | PEAK DEMAND (BTU/HR) | HRS CNSMPTN (HOURS) | PK CAP EXCD (BTU/HR) | HRS CAP EXCD (HOURS) |
|---|---|---|---|---|---|
| **HEATING COIL LOADS** | | | | | |
| JAN | 1.460E+08 | 2.971E+05 | 7.440E+02 | 0. | 0. |
| FEB | 1.369E+08 | 2.811E+05 | 6.720E+02 | 0. | 0. |
| MAR | 1.357E+08 | 2.608E+05 | 7.440E+02 | 0. | 0. |
| APR | 0. | 0. | 0. | 0. | 0. |
| MAY | 0. | 0. | 0. | 0. | 0. |
| JUN | 0. | 0. | 0. | 0. | 0. |
| JUL | 0. | 0. | 0. | 0. | 0. |
| AUG | 0. | 0. | 0. | 0. | 0. |
| SEP | 0. | 0. | 0. | 0. | 0. |
| OCT | 1.033E+08 | 2.119E+05 | 7.440E+02 | 0. | 0. |
| NOV | 1.238E+08 | 2.710E+05 | 7.200E+02 | 0. | 0. |
| DEC | 1.453E+08 | 2.826E+05 | 7.440E+02 | 0. | 0. |
| ANN | 7.910E+08 | 2.971E+05 | 4.368E+03 | 0. | 0. |
| **COOLING COIL LOADS** | | | | | |
| JAN | 1.039E+08 | 3.091E+05 | 7.440E+02 | 0. | 0. |
| FEB | 8.749E+07 | 2.587E+05 | 6.720E+02 | 0. | 0. |
| MAR | 1.181E+08 | 3.206E+05 | 7.440E+02 | 0. | 0. |
| APR | 4.223E+07 | 2.695E+05 | 6.720E+02 | 0. | 0. |
| MAY | 7.264E+07 | 2.977E+05 | 7.440E+02 | 0. | 0. |
| JUN | 1.116E+08 | 3.433E+05 | 7.200E+02 | 0. | 0. |
| JUL | 1.342E+08 | 3.774E+05 | 7.440E+02 | 0. | 0. |
| AUG | 1.364E+08 | 3.694E+05 | 7.440E+02 | 0. | 0. |
| SEP | 8.525E+07 | 3.332E+05 | 7.120E+02 | 0. | 0. |
| OCT | 1.711E+08 | 4.282E+05 | 7.440E+02 | 0. | 0. |
| NOV | 1.260E+08 | 3.276E+05 | 7.200E+02 | 0. | 0. |
| DEC | 1.048E+08 | 3.298E+05 | 7.440E+02 | 0. | 0. |
| ANN | 1.294E+09 | 4.282E+05 | 8.664E+03 | 0. | 0. |

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## AIR HANDLING SYSTEM LOADS NOT MET SUMMARY

SYSTEM NUMBER= 1 SYSTEM LOCATION = 3937 SIMULATION PERIOD = 1/ 1/1975 - 12/31/1975

| | MONTH | HEATING LOAD NOT MET (BTU) | HEATING PEAK NOT MET (BTU/HR) | HEATING HOURS NOT MET (HOURS) | COOLING LOAD NOT MET (BTU) | COOLING PEAK NOT MET (BTU/HR) | COOLING HOURS NOT MET (HOURS) |
|---|---|---|---|---|---|---|---|
| ZONE | 1 | | | | | | |
| JAN | | 0. | 0. | 0. | 0. | 0. | 0. |
| FEB | | 0. | 0. | 0. | 0. | 0. | 0. |
| MAR | | 0. | 0. | 0. | 0. | 0. | 0. |
| APR | | 1.276E+06 | 2.170E+04 | 2.380E+02 | 0. | 0. | 0. |
| MAY | | 5.561E+04 | 6.240E+03 | 3.200E+01 | 0. | 0. | 0. |
| JUN | | 1.334E+04 | 3.175E+03 | 1.000E+01 | 0. | 0. | 0. |
| JUL | | 0. | 0. | 0. | 0. | 0. | 0. |
| AUG | | 0. | 0. | 0. | 0. | 0. | 0. |
| SEP | | 1.552E+05 | 6.405E+03 | 4.700E+01 | 0. | 0. | 0. |
| OCT | | 0. | 0. | 0. | 0. | 0. | 0. |
| NOV | | 0. | 0. | 0. | 0. | 0. | 0. |
| DEC | | 0. | 0. | 0. | 0. | 0. | 0. |
| ANN | | 1.500E+06 | 2.170E+04 | 3.270E+02 | 0. | 0. | 0. |
| ZONE | 2 | | | | | | |
| JAN | | 0. | 0. | 0. | 0. | 0. | 0. |
| FEB | | 0. | 0. | 0. | 0. | 0. | 0. |
| MAR | | 0. | 0. | 0. | 0. | 0. | 0. |
| APR | | 4.190E+05 | 6.309E+03 | 2.500E+02 | 0. | 0. | 0. |
| MAY | | 1.028E+04 | 1.599E+03 | 2.200E+01 | 0. | 0. | 0. |
| JUN | | 1.169E+03 | 4.384E+02 | 4.000E+00 | 0. | 0. | 0. |
| JUL | | 0. | 0. | 0. | 2.166E+03 | 3.434E+02 | 1.300E+01 |
| AUG | | 0. | 0. | 0. | 5.437E+02 | 9.940E+01 | 8.000E+00 |
| SEP | | 3.668E+04 | 1.862E+03 | 4.500E+01 | 1.526E+01 | 1.526E+01 | 1.000E+00 |
| OCT | | 0. | 0. | 0. | 0. | 0. | 0. |
| NOV | | 0. | 0. | 0. | 0. | 0. | 0. |
| DEC | | 0. | 0. | 0. | 0. | 0. | 0. |
| ANN | | 4.671E+05 | 6.309E+03 | 3.210E+02 | 2.725E+03 | 3.434E+02 | 2.200E+01 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ZONE | 3 | | | | | | |
| JAN | | 0. | 0. | 0. | 0. | 0. | 0. |
| FEB | | 0. | 0. | 0. | 0. | 0. | 0. |
| MAR | | 0. | 0. | 0. | 0. | 0. | 0. |
| APR | | 2.052E+06 | 2.946E+04 | 2.700E+02 | 0. | 0. | 0. |
| MAY | | 8.266E+04 | 8.550E+03 | 3.300E+01 | 0. | 0. | 0. |
| JUN | | 1.160E+04 | 3.309E+03 | 6.000E+00 | 0. | 0. | 0. |
| JUL | | 0. | 0. | 0. | 0. | 0. | 0. |
| AUG | | 0. | 0. | 0. | 0. | 0. | 0. |
| SEP | | 2.085E+05 | 8.998E+03 | 5.100E+01 | 0. | 0. | 0. |
| OCT | | 0. | 0. | 0. | 0. | 0. | 0. |
| NOV | | 0. | 0. | 0. | 0. | 0. | 0. |
| DEC | | 0. | 0. | 0. | 0. | 0. | 0. |
| ANN | | 2.355E+06 | 2.946E+04 | 3.600E+02 | 0. | 0. | 0. |
| ZONE | 4 | | | | | | |
| JAN | | 0. | 0. | 0. | 0. | 0. | 0. |
| FEB | | 0. | 0. | 0. | 0. | 0. | 0. |
| MAR | | 0. | 0. | 0. | 0. | 0. | 0. |
| APR | | 7.497E+05 | 9.935E+03 | 2.640E+02 | 0. | 0. | 0. |
| MAY | | 4.308E+04 | 3.364E+03 | 4.400E+01 | 0. | 0. | 0. |
| JUN | | 8.970E+03 | 1.725E+03 | 1.100E+01 | 0. | 0. | 0. |
| JUL | | 0. | 0. | 0. | 0. | 0. | 0. |
| AUG | | 0. | 0. | 0. | 0. | 0. | 0. |
| SEP | | 6.306E+04 | 3.258E+03 | 6.100E+01 | 0. | 0. | 0. |
| OCT | | 0. | 0. | 0. | 0. | 0. | 0. |
| NOV | | 0. | 0. | 0. | 0. | 0. | 0. |
| DEC | | 0. | 0. | 0. | 0. | 0. | 0. |
| ANN | | 8.843E+05 | 9.935E+03 | 4.020E+02 | 0. | 0. | 0. |
| ZONE | 5 | | | | | | |
| JAN | | 0. | 0. | 0. | 0. | 0. | 0. |
| FEB | | 0. | 0. | 0. | 0. | 0. | 0. |
| MAR | | 0. | 0. | 0. | 0. | 0. | 0. |
| APR | | 4.687E+05 | 6.712E+03 | 2.640E+02 | 0. | 0. | 0. |
| MAY | | 2.200E+04 | 2.114E+03 | 3.600E+01 | 0. | 0. | 0. |
| JUN | | 4.702E+03 | 1.043E+03 | 1.000E+01 | 0. | 0. | 0. |
| JUL | | 0. | 0. | 0. | 0. | 0. | 0. |
| AUG | | 0. | 0. | 0. | 0. | 0. | 0. |
| SEP | | 4.432E+04 | 1.944E+03 | 4.500E+01 | 0. | 0. | 0. |
| OCT | | 0. | 0. | 0. | 0. | 0. | 0. |
| NOV | | 0. | 0. | 0. | 0. | 0. | 0. |
| DEC | | 0. | 0. | 0. | 0. | 0. | 0. |
| ANN | | 5.397E+05 | 6.712E+03 | 3.600E+02 | 0. | 0. | 0. |

| | | | | | | |
|---|---|---|---|---|---|---|
| ZONE 6 | | | | | | |
| JAN | 0. | 0. | 0. | 0. | 0. | 0. |
| FEB | 0. | 0. | 0. | 0. | 0. | 0. |
| MAR | 0. | 0. | 0. | 0. | 0. | 0. |
| APR | 5.267E+05 | 9.473E+03 | 2.140E+02 | 0. | 0. | 0. |
| MAY | 1.475E+04 | 2.417E+03 | 2.500E+01 | 0. | 0. | 0. |
| JUN | 6.994E+03 | 1.546E+03 | 1.000E+01 | 0. | 0. | 0. |
| JUL | 0. | 0. | 0. | 0. | 0. | 0. |
| AUG | 0. | 0. | 0. | 0. | 0. | 0. |
| SEP | 4.584E+04 | 3.039E+03 | 3.600E+01 | 0. | 0. | 0. |
| OCT | 0. | 0. | 0. | 0. | 0. | 0. |
| NOV | 0. | 0. | 0. | 0. | 0. | 0. |
| DEC | 0. | 0. | 0. | 0. | 0. | 0. |
| ANN | 5.963E+05 | 9.473E+03 | 2.850E+02 | 0. | 0. | 0. |
| ZONE 7 | | | | | | |
| JAN | 0. | 0. | 0. | 0. | 0. | 0. |
| FEB | 0. | 0. | 0. | 0. | 0. | 0. |
| MAR | 0. | 0. | 0. | 0. | 0. | 0. |
| APR | 7.272E+05 | 1.117E+04 | 2.510E+02 | 0. | 0. | 0. |
| MAY | 3.464E+04 | 3.469E+03 | 3.500E+01 | 0. | 0. | 0. |
| JUN | 8.208E+03 | 1.776E+03 | 1.000E+01 | 0. | 0. | 0. |
| JUL | 0. | 0. | 0. | 0. | 0. | 0. |
| AUG | 0. | 0. | 0. | 0. | 0. | 0. |
| SEP | 7.426E+04 | 3.360E+03 | 4.500E+01 | 0. | 0. | 0. |
| OCT | 0. | 0. | 0. | 0. | 0. | 0. |
| NOV | 0. | 0. | 0. | 0. | 0. | 0. |
| DEC | 0. | 0. | 0. | 0. | 0. | 0. |
| ANN | 8.443E+05 | 1.117E+04 | 3.410E+02 | 0. | 0. | 0. |
| ZONE 8 | | | | | | |
| JAN | 0. | 0. | 0. | 0. | 0. | 0. |
| FEB | 0. | 0. | 0. | 0. | 0. | 0. |
| MAR | 0. | 0. | 0. | 0. | 0. | 0. |
| APR | 9.303E+05 | 1.026E+04 | 2.680E+02 | 0. | 0. | 0. |
| MAY | 6.092E+05 | 9.064E+03 | 1.530E+02 | 0. | 0. | 0. |
| JUN | 3.956E+05 | 7.575E+03 | 1.380E+02 | 0. | 0. | 0. |
| JUL | 5.011E+05 | 9.646E+03 | 1.440E+02 | 0. | 0. | 0. |
| AUG | 4.123E+05 | 9.337E+03 | 1.370E+02 | 0. | 0. | 0. |
| SEP | 4.438E+05 | 1.024E+04 | 1.600E+02 | 0. | 0. | 0. |
| OCT | 0. | 0. | 0. | 0. | 0. | 0. |
| NOV | 0. | 0. | 0. | 0. | 0. | 0. |
| DEC | 0. | 0. | 0. | 0. | 0. | 0. |
| ANN | 3.332E+06 | 1.026E+04 | 1.000E+03 | 0. | 0. | 0. |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ZONE | 9 | | | | | | |
| JAN | | 0. | 0. | 0. | 0. | 0. | 0. |
| FEB | | 0. | 0. | 0. | 0. | 0. | 0. |
| MAR | | 0. | 0. | 0. | 0. | 0. | 0. |
| APR | | 2.453E+06 | 3.429E+04 | 2.730E+02 | 0. | 0. | 0. |
| MAY | | 1.055E+05 | 1.015E+04 | 3.500E+01 | 0. | 0. | 0. |
| JUN | | 1.838E+04 | 4.516E+03 | 8.000E+00 | 0. | 0. | 0. |
| JUL | | 0. | 0. | 0. | 0. | 0. | 0. |
| AUG | | 0. | 0. | 0. | 0. | 0. | 0. |
| SEP | | 2.675E+05 | 1.115E+04 | 5.400E+01 | 0. | 0. | 0. |
| OCT | | 0. | 0. | 0. | 0. | 0. | 0. |
| NOV | | 0. | 0. | 0. | 0. | 0. | 0. |
| DEC | | 0. | 0. | 0. | 0. | 0. | 0. |
| ANN | | 2.844E+06 | 3.429E+04 | 3.740E+02 | 0. | 0. | 0. |
| ZONE | 10 | | | | | | |
| JAN | | 0. | 0. | 0. | 0. | 0. | 0. |
| FEB | | 0. | 0. | 0. | 0. | 0. | 0. |
| MAR | | 0. | 0. | 0. | 0. | 0. | 0. |
| APR | | 2.082E+06 | 2.989E+04 | 2.690E+02 | 0. | 0. | 0. |
| MAY | | 9.429E+04 | 9.218E+03 | 3.500E+01 | 0. | 0. | 0. |
| JUN | | 1.516E+04 | 4.192E+03 | 9.000E+00 | 0. | 0. | 0. |
| JUL | | 0. | 0. | 0. | 0. | 0. | 0. |
| AUG | | 0. | 0. | 0. | 0. | 0. | 0. |
| SEP | | 2.446E+05 | 9.882E+03 | 5.900E+01 | 0. | 0. | 0. |
| OCT | | 0. | 0. | 0. | 0. | 0. | 0. |
| NOV | | 0. | 0. | 0. | 0. | 0. | 0. |
| DEC | | 0. | 0. | 0. | 0. | 0. | 0. |
| ANN | | 2.435E+06 | 2.989E+04 | 3.720E+02 | 0. | 0. | 0. |

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EQUIPMENT SIZE + AVAILABILITY (ES) DATA

| CODE | E Q U I P M E N T | SIZE (KBTUH) | NUMBER INSTD AVAIL | SIZE (KBTUH) | NUMBER INSTD AVAIL | SIZE (KBTUH) | NUMBER INSTD AVAIL | SIZE (KBTUH) | NUMBER INSTD AVAIL | SIZE (KBTUH) | NUMBER INSTD AVAIL | SIZE (KBTUH) | NUMBER INSTD AVAIL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| STMB | STEAM BOILER | 800. | 1 1 | | | | | | | | | | |
| COMPH | HERMETIC COMPRESSION CHILLER | 600. | 1 1 | | | | | | | | | | |

EQUIPMENT LOAD RATIOS (ER) DATA

| CODE | E Q U I P M E N T | PART LOAD RATIOS MINIMUM | MAXIMUM | OPTIMUM | ELECTRIC INPUT TO NOMINAL CAPACITY RATIO (DIMENSIONLESS) |
|---|---|---|---|---|---|
| STMB | STEAM BOILER | .0100 | 1.0000 | .8700 | 0. |
| COMPH | HERMETIC COMPRESSION CHILLER | .1000 | 1.0500 | .6500 | .2275 |

EQUIPMENT PERFORMANCE COEFFS (EP) DATA VALUE(ENGLISH)

| CODE | NAME | COEFF 1 | COEFF 2 | COEFF 3 |
|---|---|---|---|---|
| CAVL1A | CAPACITY RATIO VS GEN TEMP (1S ABSOR | 1.00000000 | -.01411111 | 0. |
| HENIA | ENERGY I/O COEF (1-STG ABS CHILR) | .19100000 | .91000000 | .38800000 |
| HEN2A | ENERGY I/O COEF (2-STG ABS CHILR) | .11067000 | .67212000 | .21212000 |
| HEN2AE | ENERGY I/O COEF (2-STG ABS CHILR W ECON) | .12917000 | .36902000 | .51136000 |
| HCAVHP | AVAILABLE CAPACITY RATIO (HEAT PUMP) | 1.00600000 | -.00588889 | 0. |
| HPOWIC | ENERGY I/O COEFF (HERMETIC COMPR CHILR) | .16017000 | .31644000 | .51864000 |
| HPOW2C | ENERGY I/O COEFF (OPEN CENT COMPR CHILR) | .23900000 | -.04045000 | .79545000 |
| HPOW3C | ENERGY I/O COEFF (RECIPROC COMPR CHILR) | .14490000 | .95600000 | -.11164000 |
| HCAVDH | AVAILABLE CAPACITY RATIO (DBL BUNDLE) | 1.00600000 | -.00588889 | 0. |
| HPOWDH | ENERGY I/O COEFF (DBL BUNDLE) | .16017000 | .31644000 | .51864000 |
| ADJTDH | CONDENST COOLNG WTR TEMP ADJ(DBL BUNDLE) | 95.00000000 | 1.19000000 | 43.98800000 |
| ADJEDH | ENERGY RATIO ADJSMNT FACTOR (DBL BUNDLE) | 3.15800000 | -3.31300000 | 1.15600000 |
| HELU | POWER OUT / FUEL INPUT COEFF (DIESEL) | .04735000 | .63100000 | -.41650000 |
| HJACD | JACKET HEAT/ FUEL INPUT COEFF (DIESEL) | .39220000 | -.43670000 | .27736000 |
| HLUBD | LUBE HEAT / FUEL INPUT COEFF (DIESEL) | .08830000 | -.13710000 | .08040000 |
| HEXD | EXHAUST HEAT/FUEL INPUT COEFF (DIESEL) | .31440000 | -.13530000 | .04726000 |
| TEXD | EXHAUST TEMP COEFF (DIESEL) | 344.01111111 | 18.51833333 | 0. |
| FUEL1G | FUEL I/O COEFF 1-3 (GAS TURBINE) | 9.41000000 | -9.48000000 | 4.32000000 |
| FUEL2G | FUEL I/O COEFF 4-6 (GAS TURBINE) | 1.00440000 | -.00259200 | 0. |
| SOLAH | COLLECTOR PERFORMANCE COEFF (SOLAR) | .81300000 | -.00205740 | 0. |
| FEXG | EXHAUST FLOW COEFF (GAS TURBINE) | 15.63739955 | -.09914400 | -.00030000 |
| TEX1G | EXHAUST TEMP COEFF 1-3 (GAS TURBINE) | 243.02404136 | 95.06172839 | 24.69135802 |
| TEX2G | EXHAUST TEMP COEFF 4-6 (GAS TURBINE) | 1.00560000 | .00583200 | 0. |
| ELUBG | LUBE OIL COEFF (GAS TURBINE) | .22300000 | -.40000000 | .22800000 |
| HF1 | RATING FACTOR TEMP COEFF 1- 3 (TOWER) | 191.81550000 | -2.16287800 | .00594414 |
| HF2 | RATING FACTOR TEMP COEFF 4- 6 (TOWER) | 230.53950000 | -2.68801200 | .00074407 |
| HF3 | RATING FACTOR TEMP COEFF 7- 9 (TOWER) | 126.23490000 | -1.45260000 | .00040123 |
| HF4 | RATING FACTOR TEMP COEFF 10-12 (TOWER) | 131.58000000 | -1.54134000 | .00043201 |
| HF5 | RATING FACTOR TEMP COEFF 13-15 (TOWER) | 86.73600000 | -1.00152000 | .00027645 |
| HF6 | RATING FACTOR TEMP COEFF 16-18 (TOWER) | 70.12800000 | -.80937000 | .00022401 |
| HFUELH | ENERGY I/O COEFF (STEAM BOILER) | .60000000 | .88888889 | -.49382716 |
| ADJTHP | CNDNSR COOLN WTR TMP (HEAT PUMP | 95.00000000 | 1.19000000 | 43.98800000 |
| ADJEHP | ENERGY RATIO ADJSMNTFCTR (HEAT PUMP) | 3.15800000 | -3.31300000 | 1.15600000 |
| HPOWHP | ENERGY I/O COEFF (HEAT PUMP) | .16017000 | .31644000 | .51864000 |
| HFSTUR | STEAM FLOW COEFF (STEAM TURBINE) | 1.00000000 | 0. | 0. |
| UACD | STACK U-FACTOR * AREA COEFF (DIESEL) | .03065547 | .90000000 | 0. |
| UACG | STACK U-FACTOR * AREA COEFF (GAS TURB) | .05178827 | .90000000 | 0. |
| RFR | RATING FACTOR RANGE COEFF (TOWER) | 0. | .32400000 | 0. |
| HPUMP | HEATING PUMP POWER COEFFICIENTS | 1.00000000 | 0. | 0. |
| CPUMP | COOLING PUMP POWER COEFFICIENTS | 1.00000000 | 0. | 0. |
| TPUMP | C TOWER PUMP POWER COEFFICIENTS | 1.00000000 | 0. | 0. |
| ADJTIC | COND COOL WTR T ADJ (HRMTC COMPR CHILR) | 95.00000000 | 1.19000000 | 43.98800000 |
| HCAVIC | AVAIL CAPCTY RATIO (HRMTC COMPR CHILR) | 1.00600000 | -.00588889 | 0. |
| ADJEIC | ENGY RATIO ADJSTMNT (HRMTC COMPR CHILR) | 3.15800000 | -3.31300000 | 1.15600000 |
| ADJT2C | COND COOL WTR T ADJ (OPN CENT CMPR CHLR) | 95.00000000 | 1.19000000 | 43.98800000 |
| HCAV2C | AVAIL CAPCTY RATIO (OPN CENT CMPR CHLR) | 1.00600000 | -.00588889 | 0. |
| ADJE2C | ENGY RATIO ADJSTMNT (OPN CENT CMPR CHLR) | 3.15800000 | -3.31300000 | 1.15600000 |
| ADJT3C | COND COOL WTR T ADJ (RECIP COMPR CHILR) | 95.00000000 | 1.19000000 | 43.98800000 |
| HCAV3C | AVAIL CAPCTY RATIO (RECIP COMPR CHILR) | 1.00600000 | -.00588889 | 0. |
| ADJE3C | ENGY RATIO ADJSTMNT (RECIP COMPR CHILR) | 3.15800000 | -3.31300000 | 1.15600000 |

SPECIAL PARAMETERS (S ) DATA

| CODE | NAME | VALUE(ENGLISH) |
|---|---|---|
| STEAM | STEAM ENTHALPY | 1160.67852447 |
| TSATUR | STEAM SATURATION TEMP | 241.53023725 |
| HFLASH | BOILER FLASH WATER/STEAM FEED (HEATREC) | .07100000 |
| PELCL | ELECT INP. TO CIRC. PUMP/COOLING LOAD | .01800000 |
| PELHT | ELECT INP. TO CIRC. PUMP/HEATING LOAD | .00600000 |
| PELTWR | ELEC INP TO TOWER/TOWER COOL LOAD(TOWER) | .01300000 |
| TOWOPR | TOWER OPERATION TYPE (TOWER) | 2.00000000 |
| RWCHP | TOWER WATER/HEAT PUMP CAPAC (TOWER) | 124.82266667 |
| TWMAKE | MAKE UP WATER TEMP (HEATREC) | 55.00400000 |
| TCOOL | CHILLED WATER TEMP | 44.00600000 |
| MXTMPT | MAXIMUM SOLAR TANK TEMP (SOLAR) | 212.00000000 |
| TTOWM | MIN LEAVE TOWER WATER TEMP (TOWER) | 60.00800000 |
| TCW | LEAVING CONDENSER WATER TEMP | 110.00000000 |
| TMINH | MIN TANK TEMP FOR HEATING (SOLUSE) | 100.00400000 |
| TMINC | MIN TANK TEMP FOR COOLING (SOLUSE) | 179.99600000 |
| TLEAVE | BOILER STACK LEAVING TEMP (BOILER) | 550.04000000 |
| RAVRMDB | AVAILABL RECVRBL HT RATIO (DBUNDLE) | .95000000 |
| RAVRHMP | AVAILABL RECVRLB HT RATIO (HTPUMP) | .95000000 |
| RMXRWD | MAX EXH FLOW / KW OUTPUT (DIESEL) | 1.46440000 |
| TMINHP | MIN TANK TEMP FOR HT PUMP (SOLUSE) | 79.88000000 |
| RMXRWG | MAX EXH FLOW / KW OUTPUT (GASTURH) | 11.71520000 |
| RWCA | TOWER WATER/ABSOR CHILR CAPAC (TOWER) | 124.82266667 |
| RWCC | TOWER WATER/COMPR CHILR CAPAC (TOWER) | 124.82266667 |
| RWCDR | TOWER WATER/DBUND CHILR CAPAC (TOWER) | 124.82266667 |
| SWATR | AIR-FUEL STOICH RATIO (BOILER) | 17.00000000 |
| HFUELH | HEAT CONTENT OF FUEL (BOILER) | 20013.38432122 |
| RHFLASH | RECOVD HEAT/FLASH STEAM ENERGY (HEATREC) | .50000000 |
| PSTEAM | STEAM PRESSURE | 284.40995335 |
| PSTMTUR | ENTERING STEAM PRESS. (STEAM TURBINE) | 6920.17066743 |
| TSTMTUR | ENTERING STEAM TEMP (STEAM TURBINE) | 572.00000000 |
| PEXSTUR | NOM EXH STEAM PRESS . STEAM TURBINE | 284.40995335 |
| RPMNOM | NOM SPEED . RPM (STEAM TURBINE) | 3600.00000000 |
| RWSTUR | CONDENSATE/ENTERING STEAM(STEAM TURBINE) | .97000000 |
| TOTEFF | TOT EFFIC OF UTIL ELEC GENERATION(EFFIC) | .30000000 |
| TILT | SOLAR COLECTOR TILT ANGLE (SOLR H/C SYS) | 40.00000000 |
| AZMUTH | COLLECTOR ARRAY AZMUTH ANGLE (SOL H/C) | 180.00000000 |
| TNKCAP | STORAGE TANK CAP/COL. AREA (SOLAR H/C) | 10.24080718 |
| TNKTEM | INITIAL TANK TEMPERATURE (SOLAR H/C) | 140.00000000 |
| FLOWPT | MASS FLOW/COLLECTOR AREA (SOLAR H/C) | 9.21672646 |
| HTAEFF | TANK-COLLECTOR HT EXCGR EFFECTIVENESS | .90000000 |

COST OF EQUIPMENT (CE) DATA

| CODE | E Q U I P M E N T | SIZE (KBTUH) | UNIT COST (K$) | INSTALD COST FACTOR | CONSUM-ABLES ($/HR) | MAINTA-NANCE (HR/YR) | EQPMT LIFE (HRS) | HRS TO MINOR OVHAUL | MINOR OVHAUL COST ($) | HRS TO MAJOR OVHAUL | MAJOR OVHAUL COST ($) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| STMB | STEAM BOILER | 800.0 | 21.808 | 1.400 | 0. | 411.5 | 135239. | 6762. | 145. | 33810. | 1817. |
| COMPH | HERMETIC COMPRESSION CHILLER | 600.0 | 13.431 | 1.200 | 0. | 274.6 | 74108. | 14822. | 672. | 37054. | 2015. |

COST REFERENCE FOR EQUIPMENT (CR) DATA

| CODE | E Q U I P M E N T | SIZE (KBTUH) | UNIT COST (K$) | INSTALD COST FACTOR | CONSUM-ABLES ($/HR) | MAINTA-NANCE (HR/YR) | EQPMT LIFE (HRS) | HRS TO MINOR OVHAUL | MINOR OVHAUL COST ($) | HRS TO MAJOR OVHAUL | MAJOR OVHAUL COST ($) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| STMB | STEAM BOILER | 40027.3 | 300.000 | 1.400 | 0. | 900.0 | 200000. | 10000. | 2000. | 50000. | 25000. |
| COMPH | HERMETIC COMPRESSION CHILLER | 12008.5 | 100.000 | 1.200 | 0. | 500.0 | 100000. | 20000. | 5000. | 50000. | 15000. |

COST OF UTILITY , ENERGY (CU) DATA

| ENERGY SOURCE | ENERGY /UNIT (1000BTU) /UNIT | UNIFRM COST /UNIT ($) | COST ESCAL-ATION FACTOR | MIN PK LOAD CHARGE ($) | MIN PK LOAD (UNITS) | PK LOAD UNIT COST ($/UNIT) | BLOCK MULT (UNITS) | COST/ UNIT ($) | BLOCK MULT (UNITS) | COST/ UNIT ($) | BLOCK MULT (UNITS) | COST/ UNIT ($) | BLOCK MULT (UNITS) | COST/ UNIT ($) | BLOCK MULT (UNITS) | COST/ UNIT ($) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ELECT | 3.414 | .04 | 0. | 0. | 50. | 1.00 | | | | | | | | | | |
| DIESEL | 130.090 | .40 | 0. | 0. | 0. | 0. | | | | | | | | | | |
| GASTUR | 1000.427 | 1.50 | 0. | 0. | 0. | 0. | | | | | | | | | | |
| BOILER | 1000.427 | 1.50 | 0. | 0. | 0. | 0. | | | | | | | | | | |

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LIFE CYCLE PARAMETERS (L ) DATA

| INTEREST RATE (PCT) | INFLATION RATES | | PAYMENT TIME (YEARS) | PROJECT LIFE (YEARS) | LABOR COST ($/HR) | SITE COST FACTOR |
|---|---|---|---|---|---|---|
| | LABOR | MATERIAL | | | | |
| 10.00 | 0. | 0. | .50 | 25. | 20.00 | 1.000 |

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## CENTRAL PLANT ENERGY UTILIZATION SUMMARY

| MONTH | TOTAL HEAT ENERGY (GBTU) | TOTAL ELECTR ENERGY (GBTU) | COOLING ENERGY (GBTU) | RCVRED ENERGY (GBTU) | WASTED RCVRABL ENERGY (GBTU) | HEAT EN INPUT COOLING (GBTU) | ELEC EN INPUT COOLING (GBTU) | ENERGY INPUT HEATING (GBTU) | ENERGY INPUT ELECTRC (GBTU) | TOTAL FUEL INPUT (GBTU) | TOTAL ENERGY INPUT (GBTU) | AVERAGE PLANT EFFIC (PERCT) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | .1487 | .0863 | .1068 | 0. | 0. | 0. | .0848 | .2567 | .2876 | .2567 | .5443 | 43. |
| 2 | .1393 | .0761 | .0900 | 0. | 0. | 0. | .0743 | .2389 | .2536 | .2389 | .4925 | 44. |
| 3 | .1382 | .0871 | .1209 | 0. | 0. | 0. | .0899 | .2421 | .2903 | .2421 | .5324 | 42. |
| 4 | 0. | .0722 | .0422 | 0. | 0. | 0. | .0621 | 0. | .2408 | 0. | .2408 | 30. |
| 5 | 0. | .0786 | .0726 | 0. | 0. | 0. | .0778 | 0. | .2620 | 0. | .2620 | 30. |
| 6 | 0. | .0821 | .1116 | 0. | 0. | 0. | .0891 | 0. | .2737 | 0. | .2737 | 30. |
| 7 | 0. | .0878 | .1342 | 0. | 0. | 0. | .0991 | 0. | .2927 | 0. | .2927 | 30. |
| 8 | 0. | .0870 | .1364 | 0. | 0. | 0. | .0999 | 0. | .2900 | 0. | .2900 | 30. |
| 9 | 0. | .0788 | .0852 | 0. | 0. | 0. | .0807 | 0. | .2626 | 0. | .2626 | 30. |
| 10 | .1049 | .0953 | .1729 | 0. | 0. | 0. | .1123 | .1929 | .3176 | .1929 | .5105 | 39. |
| 11 | .1217 | .0814 | .1247 | 0. | 0. | 0. | .0890 | .2153 | .2714 | .2153 | .4866 | 42. |
| 12 | .1479 | .0865 | .1077 | 0. | 0. | 0. | .0853 | .2554 | .2883 | .2554 | .5437 | 43. |
| | .8007 | .9991 | 1.3052 | 0. | 0. | 0. | 1.0444 | 1.4012 | 3.3304 | 1.4012 | 4.7316 | 36. |

PLANT FOR BASIC SYSTEM

# EQUIPMENT USE STATISTICS

| EQUIPMENT | AVG OPER RATIO | MAX LOAD (KBTUH) | MON | DAY | HR | SIZE (KBTUH) | OPER HRS | SIZE (KBTUH) | OPER HRS | SIZE (KBTUH) | OPER HRS | SIZE (KBTUH) | OPER HRS | SIZE (KBTUH) | OPER HRS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| STEAM BOILER | .230 | 298.9 | 1 | 13 | 6 | 800.0 | 4344 | | | | | | | | |
| HERMETIC COMPRESSION CHILLER | .252 | 428.2 | 10 | 10 | 14 | 600.0 | 8760 | | | | | | | | |

| UTILITY, ENERGY | 1YR UNADJ COST (K$) | 1-YEAR USAGE (GBTU) | PEAK USAGE (KBTUH) | COST ESCALATION FACTOR |
|---|---|---|---|---|
| ELECT | 12.5 | .999 | 242.5 | 0. |
| BOILER | 2.1 | 1.401 | 476.5 | 0. |
| UTILITY, ENERGY TOTAL | 14.6 | | | |

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## L I F E C Y C L E C O S T S U M M A R Y

(ALL COSTS IN DOLLARS)

***ADJUSTED PRESENT WORTH OF ANNUAL AND PERIODICALLY RECURRING COSTS (ADJUSTMENT FACTOR = 1.000)***

| YEAR | BUILDING | | FAN SYSTEM | | CENTRAL PLANT | | FUEL AND UTILITIES | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | ANNUAL COSTS | PERIODIC COSTS | ANNUAL COSTS | PERIODIC COSTS | ANNUAL COSTS | PERIODIC COSTS | ELECTRIC POWER | BOILER FUEL | DIESEL FUEL | GAS TURBINE FUEL | TOTAL |
| 1 | | | | | 13083 | | 12343 | 2081 | | | 27507 |
| 2 | | | | | 11894 | 708 | 12006 | 2043 | | | 26651 |
| 3 | | | | | 10413 | | 11478 | 2006 | | | 24497 |
| 4 | | | | | 9830 | 585 | 11360 | 1970 | | | 23745 |
| 5 | | | | | 8936 | 1405 | 11050 | 1934 | | | 23325 |
| 6 | | | | | 8124 | 397 | 10749 | 1899 | | | 21169 |
| 7 | | | | | 7385 | 439 | 10456 | 1864 | | | 20144 |
| 8 | | | | | 6714 | 960 | 10170 | 1830 | | | 19674 |
| 9 | | | | | 6103 | 7168 | 9893 | 1797 | | | 24961 |
| 10 | | | | | 5548 | 58 | 9623 | 1764 | | | 16993 |
| 11 | | | | | 5044 | 299 | 9361 | 1732 | | | 16436 |
| 12 | | | | | 4585 | | 9105 | 1701 | | | 15391 |
| 13 | | | | | 4168 | 860 | 8857 | 1670 | | | 15555 |
| 14 | | | | | 3789 | 185 | 8616 | 1639 | | | 14229 |
| 15 | | | | | 3445 | 36 | 8381 | 1610 | | | 13472 |
| 16 | | | | | 3132 | 600 | 8152 | 1580 | | | 13444 |
| 17 | | | | | 2847 | | 7930 | 1552 | | | 12329 |
| 18 | | | | | 2588 | 2507 | 7713 | 1523 | | | 14331 |
| 19 | | | | | 2353 | 139 | 7503 | 1496 | | | 11491 |
| 20 | | | | | 2139 | | 7298 | 1468 | | | 10905 |
| 21 | | | | | 1944 | 115 | 7099 | 1442 | | | 10600 |
| 22 | | | | | 1768 | 199 | 6906 | 1416 | | | 10289 |
| 23 | | | | | 1607 | 78 | 6717 | 1390 | | | 9792 |
| 24 | | | | | 1461 | 33 | 6534 | 1365 | | | 9393 |
| 25 | | | | | 1328 | | 6356 | 1340 | | | 9024 |
| TOTAL | | | | | 130628 | 16771 | 225856 | 42112 | | | 415367 |

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***CAPITAL COSTS***

| | |
|---|---|
| BUILDING | 0. |
| FAN SYSTEM | 0. |
| CENTRAL PLANT | 46648. |
| TOTAL CAPITAL COST | 46648. |
| TOTAL ANN./PERIODIC | 415367 |

TOTAL LIFE CYCLE COST

*** $ 462015. ***

Nittle, Douglas C
The Building Loads Analysis System Thermodynamics (BLAST) program, version 2.0: users manual. -- Champaign, IL : Construction Engineering Research Laboratory ; Springfield, VA : available from National Technical Information Service, 1979.
160 p ; 27 cm. (Technical report ; E-153)
Contents. v. 1, BLAST user instructions. v. 2, BLAST program library and example.

1. BLAST (computer program). 2. Buildings-energy consumption. I. Series: U.S. Army Construction Engineering Research Laboratory. Technical report ; E-153.

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