EXPERIMENTAL EVALUATION OF SIMULATED HEAT AND MOISTURE LOADS IN SHELTERS

Office of Civil Defense
Work Unit 1211B

IIT RESEARCH INSTITUTE
Technology Center
Chicago, Illinois 60616

December 1965

"Distribution of this document is unlimited"

EXPERIMENTAL EVALUATION OF SIMULATED HEAT AND MOISTURE LOADS IN SHELTERS

IIT RESEARCH INSTITUTE
Technology Center
Chicago, Illinois 60616

December 1965

Prepared for:

Office of Civil Defense
Department of the Army - OSA
under
Work Unit 1211B
SRI Subcontract No. B-64219-US

IIT RESEARCH INSTITUTE
Technology Center
Chicago, Illinois 60616

SUMMARY OF RESEARCH REPORT

EXPERIMENTAL EVALUATION OF SIMULATED HEAT AND MOISTURE LOADS IN SHELTERS

by

Alexander Goldsmith

Prepared for

Office of Civil Defense
Department of the Army - OSA
under
Work Unit 1211 B
SRI Subcontract No. B-64219-US

December 1965

I. INTRODUCTION

An experimental research program was carried out to obtain data on environmental conditions within a shelter, and on the temperature distribution in the soil surrounding the shelter, under conditions of simulated shelter occupancy. The work was done as a contribution toward the broader objective of devising reliable analytical means for predicting minimum requirements of mechanical equipment necessary for removing heat and moisture in order to sustain human life in fallout shelters. The variables that were investigated include the rate of ventilation using a controlled supply of conditioned air, and the size and shape of the shelter enclosure. Temperatures in the soil surrounding the shelter were essentially uniform at the beginning of each experiment, but the temperature level was subject to seasonal variations. The project was initiated by the Office of Civil Defense under Contract No. OCD-OS-62-227, and was continued under Subcontract No. B-64219-US from the Stanford Research Institute.

2. EXPERIMENTAL SHELTER

The experimental shelter was built inside a large unheated building at Gary, Indiana, with the floor of the shelter 4 ft. above ground level, and was covered completely with a uniform sand. It approximated an idealized heat transfer model of a box of rectangular cross-section, with impermeable walls, that is surrounded by soil in a manner

typical of underground structures. The initial (largest-size) shelter had a floor area of 21 x 21 ft. and was 7 ft. high. It may be visualized as a square array of nine cells with no internal partitions, each cell being a seven-foot cube. It was constructed of bolted steel members and could be altered in size by uncovering part of the shelter, physically removing portions of the structure in units of 7-foot cubes, and recovering the remaining structure with sand. Experiments were conducted on shelters having floor areas of 21 x 21, 21 x 7, and 7 x 7 feet.

3. SIMULATION OF HUMAN OCCUPANCY

Each of the experimental shelters was loaded with individual simulated occupants, at a density of five occupants per cell, which provided approximately 10 ft^2 of floor space per occupant. Each simulator generated heat at a constant rate of 400 Btu/hr (117 watts), and water for simulating perspiration was fed to each unit at a rate which varied as a prescribed function of the dry-bulb temperature inside the shelter. This was done by a metering system that involved an individual pump and water supply for each simulated occupant.

4. THERMOCOUPLE INSTRUMENTATION

Approximately 200 thermocouples were installed for the purpose of recording the variation of temperature with

time inside the shelter, and in the soil surrounding the shelter. The majority of these were embedded in the soil and, since the shelter structure was symmetrical, were concentrated in a typical sector. Thermocouples inside the shelter were used for recording dry-bulb and wet-bulb temperatures of the shelter air at several locations, and of the inside surfaces.

5. TREATMENT AND SUPPLY CONDITIONS OF VENTILATION AIR

For each shelter size, experiments were conducted with no ventilation and with constant ventilation rates of 3, 7, and 15 cfm per occupant. The ventilation air was recirculated but was conditioned externally to a supply condition representative of outdoor air on a severe summer day. This condition was a constant dew-point temperature of 69°F and a dry-bulb temperature that varied sinusoidally between 75°F and 95°F during each 24-hour period. The air-conditioning equipment consisted essentially of a capillary-type air washer yielding nearly saturated air at 69°F, followed by a reheat coil whose output was governed by a programmed controller to provide the variable dry-bulb temperature. At the conclusion of an experiment, cold air was circulated through the shelter to attain a uniform temperature distribution in the shelter and surrounding soil before another run was begun.

6. PERIOD OF TEST

Each experiment was continued uninterrupted for a period of fourteen days, or until the effective temperature

in the occupied space reached 90°F, whichever occurred first. Most tests ran the full two weeks, but several were terminated earlier when the inside temperatures no longer changed significantly. All experiments that involved ventilation were started with the supply air at 85°F (the mid-point) on the rising part of the daily cycle. The shelter was sealed during the entire test period.

7. RESULTS AND CONCLUSIONS

The results of this experimental program, aside from the incidental measurements of the thermal properties of the sand that was used to cover the shelter, are sufficient test data for a complete mapping of the variation of temperature as a function of both position and time for each of the experiments. All the temperature data are tabulated in the report, and environmental temperatures in the shelter are also shown graphically. Certain major effects, however, may be mentioned.

While the floor area per occupant was the same in each of the three shelters, the total surface available for heat transfer (floor, walls, ceiling) increased from around 33 ft^2 per occupant in the largest shelter to nearly 59 ft^2 in the smallest. The effect of total surface area per occupant was very apparent in the experiments with no ventilation. These exhibited temperature rises which were very nearly in inverse proportion to the available surface areas.

The importance of initial soil temperature was shown

by two experiments on the large shelter, both with the same ventilation rate of 3 cfm per occupant. When the initial temperatures were in the upper-sixties, it took only 20 hours to reach an effective temperature of 85°F in the shelter; with initial temperatures in the mid-fifties, it took more than six times longer. All experiments on the small shelter were conducted with initial temperatures below 50°F, and an effective temperature of 85°F was not reached in any of them during the two-week test periods.

All the experiments that involved ventilation showed that conditions in the shelter changed very little after the first week. With a rate of 3 cfm per occupant, the temperature rise during the second week was only of the order of 2 to 3°F, and for higher ventilation rates the rise was even smaller. The daily variation in the temperature of the shelter air was always only a fraction of the variation in the supply air, but the temperature swing increased with increasing ventilation rates.

In real underground structures, permeable walls, and the migration and possible condensation of moisture beyond the shelter walls wound tend to increase the rate of heat transfer.

FOREWORD

Thirteen simulated occupancy tests, utilizing a specially-constructed experimental fallout shelter were carried out by the staff of the IIT Research Institute to determine temperature variations inside the shelter and in the soil surrounding the shelter.

The work was initiated by the Office of Civil Defense in June of 1962 under Contract No. OCD-OS-62-227, and was continued from September 1964 to July 1965 under Subcontract No. B-64219-US from the Stanford Research Institute. The planning and early experiments were conducted under the technical direction of Mr. Frank C. Allen of the Office of Civil Defense, and the technical monitor for the latter phase was Mr. C. A. Grubb of the Stanford Research Institute.

Personnel of the IIT Research Institute who have contributed to this effort include Dr. R. A. Budenholzer H. Liu, C. Groom, A. Longinow, and S. Noreikis.

Respectfully submitted,

A. Goldsmith
Research Engineer

AG/pj

APPROVED:

W. J. Christian, Manager
Heat and Mass Transfer

I. B. Fieldhouse, Assistant Director
Mechanics Research Division

ABSTRACT

An experimental program was carried out to determine the variation of air temperatures in a fallout shelter, and the temperature distribution in the soil surrounding the shelter, under conditions of simulated occupancy with several different rates of ventilation. The results of the experiments are given in this report.

An experimental shelter having a floor area of 21 x 21 ft and a height of 7 ft was built above ground level inside an existing building, and was covered with a uniform sand to represent an underground structure. Thermocouples were located in the sand surrounding the shelter, and within the shelter, for the purpose of recording the variation of temperatures with time. Simulated occupants within the shelter generated heat at a constant rate, and liberated moisture as a prescribed function of the inside temperature. Equipment located outside the shelter was used to ventilate the shelter at constant rates of 0,3,7, and 15 cfm per occupant, using air that has been conditioned to represent outdoor air on a severe summer day.

The original shelter was subsequently reduced in size to floor areas of 21 x 7 ft and 7 x 7 ft, and experiments at the above ventilation rates were repeated for each shelter size. The same population density was maintained in the three shelters, with approximately 10 ft^2 of floor

area per occupant. Most experiments were continued for a two-week period, but some were terminated earlier either when the effective temperature reached 90°F, or conditions in the shelter no longer changed significantly.

TABLE OF CONTENTS

LIST OF ILLUSTRATIONS

LIST OF TABLES

I. INTRODUCTION

An essential element for the habitability of fallout shelters, in addition to the scavenging of carbon dioxide and the supply of sufficient oxygen for breathing, is the elimination of heat and moisture generated by the occupants. For lengthy periods of occupancy under severe summer conditions, in geographical areas covering a great portion of the United States, the removal of metabolic heat is the most critical factor in preserving life, and the minimum equipment requirements for shelters are dictated by heat transfer considerations rather than by any other. For the most severe cases in the southern part of the country, equipment may be required to provide artificial cooling and dehumidification. In other localities, simple ventilation with outdoor air may be sufficient. Depending on the ventilation requirements, electrical, mechanical, or human power may be employed.

If a large-scale national shelter program is considered, differences between these possibilities imply great economic considerations. Were it not for these considerations, it would be safest to assume that the walls of a shelter and the surrounding soil play no part in the heat balance for the occupied space, and to provide for the disposal of the entire heat load by other means. If, on the other hand, the loss of heat through the walls and the surrounding soil is to be considered, it is evident that the equipment requirements would be governed to some extent by the nature of the structure itself and of the soil. Various types of soils differ markedly in their thermal

properties which are, in turn, greatly affected by the moisture content. Similarly, the walls of a shelter structure may vary not only in thickness and thermal properties of the material, but also in their permeability to water vapor that may constitute an effective means for heat transfer. Most important, however, is the fact that in order to utilize the heat-sink capability of the structure and surrounding soil to maintain tolerable conditions within the shelter with the minimum expenditure for mechanical equipment and power, reliable analytical procedures are required for predicting the environment within a shelter for various structures and soils, and for given initial and ambient conditions. Since the phenomena of heat and moisture transfer from such structures are complicated, any proposed analytical procedures must be verified by experiments.

A number of different approaches are possible to the problem of obtaining experimental data on shelter environment for various conditions, and each approach has certain advantages and disadvantages. Among these possibilities are full-scale field tests on underground shelters, similar tests on above-ground shelters, experiments utilizing small-scale one-dimensional or three-dimensional models, or specially-constructed idealized full-scale shelters.

When the present program was planned initially, it was intended to construct an idealized family-size shelter as the largest test unit, and then to proceed to smaller-scale units of one-half and one-quarter size. With such relatively small models, it was further intended to vary the type of

construction (steel of concrete), the geometric configuration (rectangular or semi-cylindrical), and the type of soil. After discussions with technical representatives from the Office of Civil Defense, in light of the increasing emphasis on mass shelters and before construction of an experimental unit began, it was decided to forego alterations of the above parameters for the sake of working with shelters of greater size that would be more representative models of mass shelters. The experimental work done on the latter is the subject of this report, and it is hoped that the test results will be helpful in substantiating current analytical procedures for predicting the thermal environments in underground structures.

The following sections of this report are devoted to detailed descriptions of the experimental shelter, the mechanical equipment that was used for moving and conditioning ventilation air to represent severe summer intake conditions, the simulated occupants within the shelter, and the several types of instrumentation. Subsequent parts of the report include the results that were obtained for simulated occupancy tests utilizing ventilation rates of 0, 3, 7, and 15 cfm per occupant for each of three shelter sizes. These shelters had floor areas of 21 x 21, 21 x 7, and 7 x 7 feet. The effect of initial soil temperature on environmental conditions within the shelter is clearly indicated. Graphical and tabular data are given to show the variation of dry-bulb, wet-bulb, and effective temperature in the shelter as functions of time of occupancy, and extensive temperature data are given to show the temperature distribution in the soil surrounding the shelter.

II DESCRIPTION OF EXPERIMENTAL SHELTER

A. Shelter Structure

The two primary considerations in the design of the fallout shelter were to use a structure of simple and well-defined geometric configuration, and to provide structural versatility that would permit the alteration of its size and shape. This latter consideration, together with the high water level below the surface of the ground at the site, led to a structure which was entirely above ground level. Such construction also permitted using a uniform soil all around the shelter.

The site of the shelter was one of a group of large buildings formerly used as a steel rolling mill, located at the southern end of Lake Michigan in Gary, Indiana. The particular building that housed the shelter is approximately 225 feet long by 70 feet wide, with a height of 30 feet to the lowest members of the roof truss and about 60 feet to the roof. The entire floor area was clear and unobstructed, and the center portion of the floor consisted of a 26-foot-wide concrete driveway. The shelter was located centrally with respect to the building over the concrete driveway, and the base of the soil covering the shelter extended to cover the 70 foot width of the building. The building was unheated.

The experimental shelter was constructed to approximate an idealized heat-transfer model of a box of rectangular cross-section that is surrounded on all sides by a uniform soil. The full-size shelter had a floor area of 21 x 21 feet and a height of 7 feet, as shown schematically in Fig. 1. It may be visualized as a square array of nine cells, each cell being a seven foot cube. The structure rested upon concrete footings (18 x 18 in.) spaced on 7-foot centers, and each footing supported a structural column. The floor of the shelter was 4 feet above the floor of the existing building as indicated in Fig. 1, and the soil cover above the roof of the shelter was 3 feet to represent a mass loading above the occupied space of about 300 pounds per square foot. The soil atop the roof was covered with a 2-inch layer of glass-fiber insulation having a thermal conductivity of approximately 0.30 Btu in/hr ft^2°F.

The entire shelter structure was made of steel, and consisted of structural members and wall, floor, and roof panels of 1/4-inch steel plate. In order to approach the ideal condition of a body having simple boundaries, all outside surfaces of the structure were flat, and there were no protrusions into the soil that could act as thermal fins, except for the concrete footings upon which the structure rested. All joints between adjacent panels were caulked to prevent moisture migration from the occupied space into the soil.

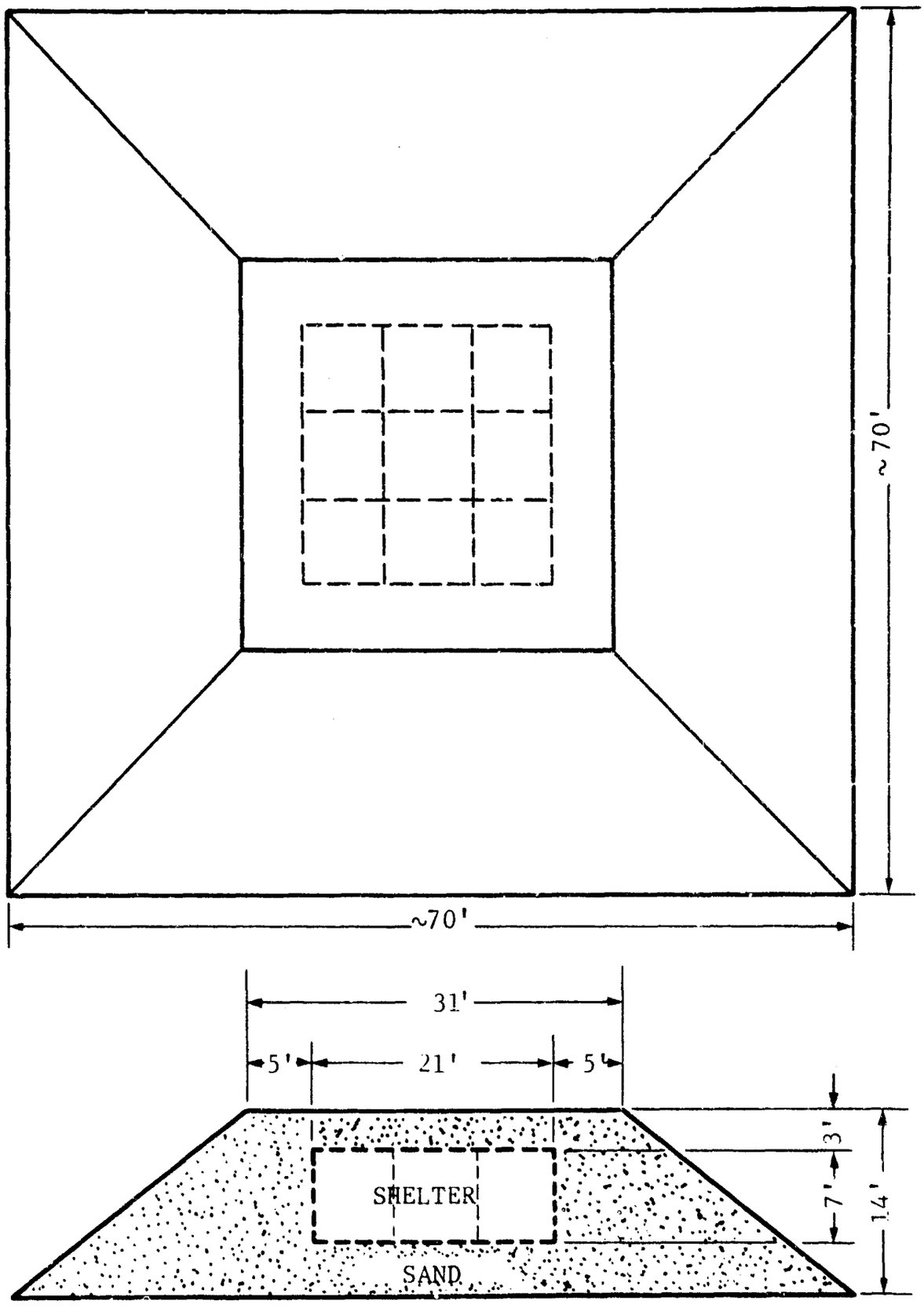


Figure 1. PLAN AND ELEVATION OF SHELTER

Aside from the structural columns and bracing members, there were no partitions between the cells within the shelter.

A major consideration in the design of the shelter structure was to make it readily adaptable to subsequent changes in size and shape. All connections in the structure, both of load-bearing members and of wall panels, were designed in such a manner that one or more cells could be removed completely and the space back-filled with soil so that the remaining structure would be as if it were the only structure built. Only the isolated concrete footings would remain at a distance of at least 7 feet from the remaining shelter, and these would have no influence on the heat transfer from the shelter. Experiments were conducted utilizing three of the possible configurations as shown schematically in Fig 2. The total weights of steel in these three structures were 30,000 lb., 14,0001b., and 6,000 lb., respectively.

Access to the shelter was provided by a 30-inch diameter manhole located in the roof of the cell which constituted the smallest-size shelter. The manhole was provided with a gasket and steel-plate cover to prevent leakage of air during a test. In order to simulate a condition of no entry, and to minimize thermal discontinuities, a 3 x 3 foot box of plywood was set over the manhole to keep out the soil which covered the roof, and the box was filled with sandbags during an experiment.

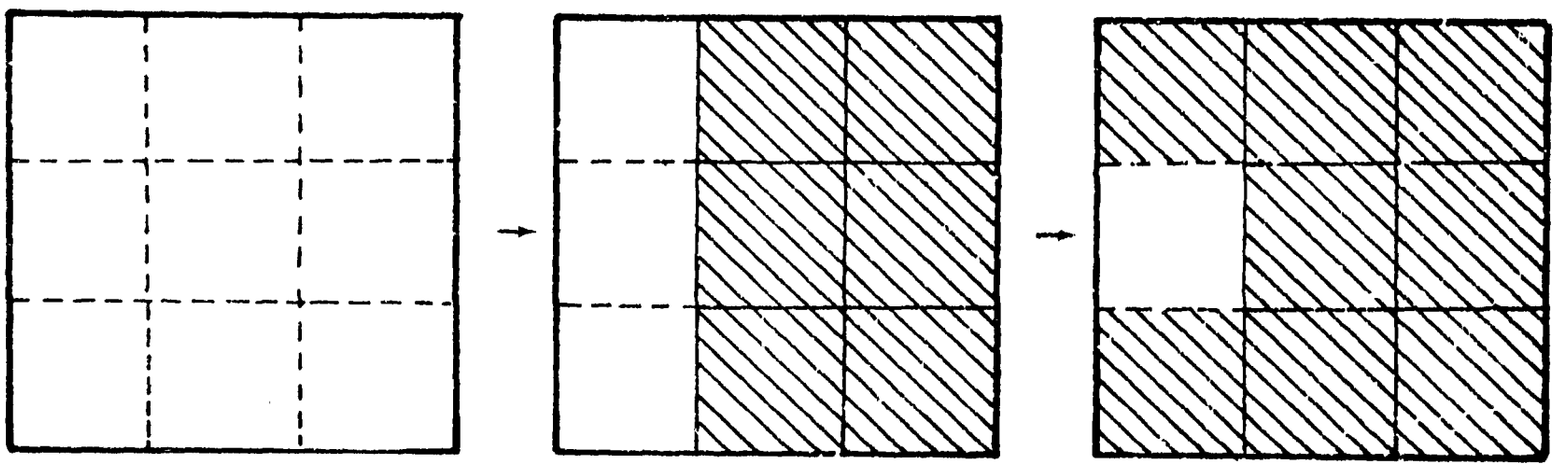


Figure 2. SCHEMATIC REPRESENTATION OF SHELTER CONFIGURATIONS

(dimensions refer to remaining structure, shown unshaded)

The original outside wall of the ultimate one-cell shelter, which was the only wall to remain undisturbed throughout the structural alterations, was provided with the means for connecting 10-inch diameter ducts for the ventilation air, and several thin-wall conduits to carry electric power lines, instrumentation wires, and plastic tubes for feeding water to the simulated occupants within the shelter. A photograph of the shelter during erection of the structural members is shown in Fig. 3, and others of the completed structure are shown in Figs. 4 and 5. The latter clearly shows the relative locations of the utility conduits that connected the shelter to the instrumentation hut in the foreground. A similar photograph of the soil-covered shelter is shown in Fig. 6.

B. Soil Cover

The shelter structure was entirely surrounded by soil, as shown schematically in Fig. 1, and the covering was accomplished in two steps in order to permit the placing of thermocouples in the soil. After thermocouple supports were suspended between the concrete footings, as described below in Section IV-A, the soil below floor level was poured to the extent shown in Fig. 3 to 5. Special care was taken to shape the sand mound before the floor plates of the shelter were laid, to assure that no void spaces would be created subsequently between the floor plates and the soil.

Figure 3. STRUCTURAL SKELETON OF SHELTER

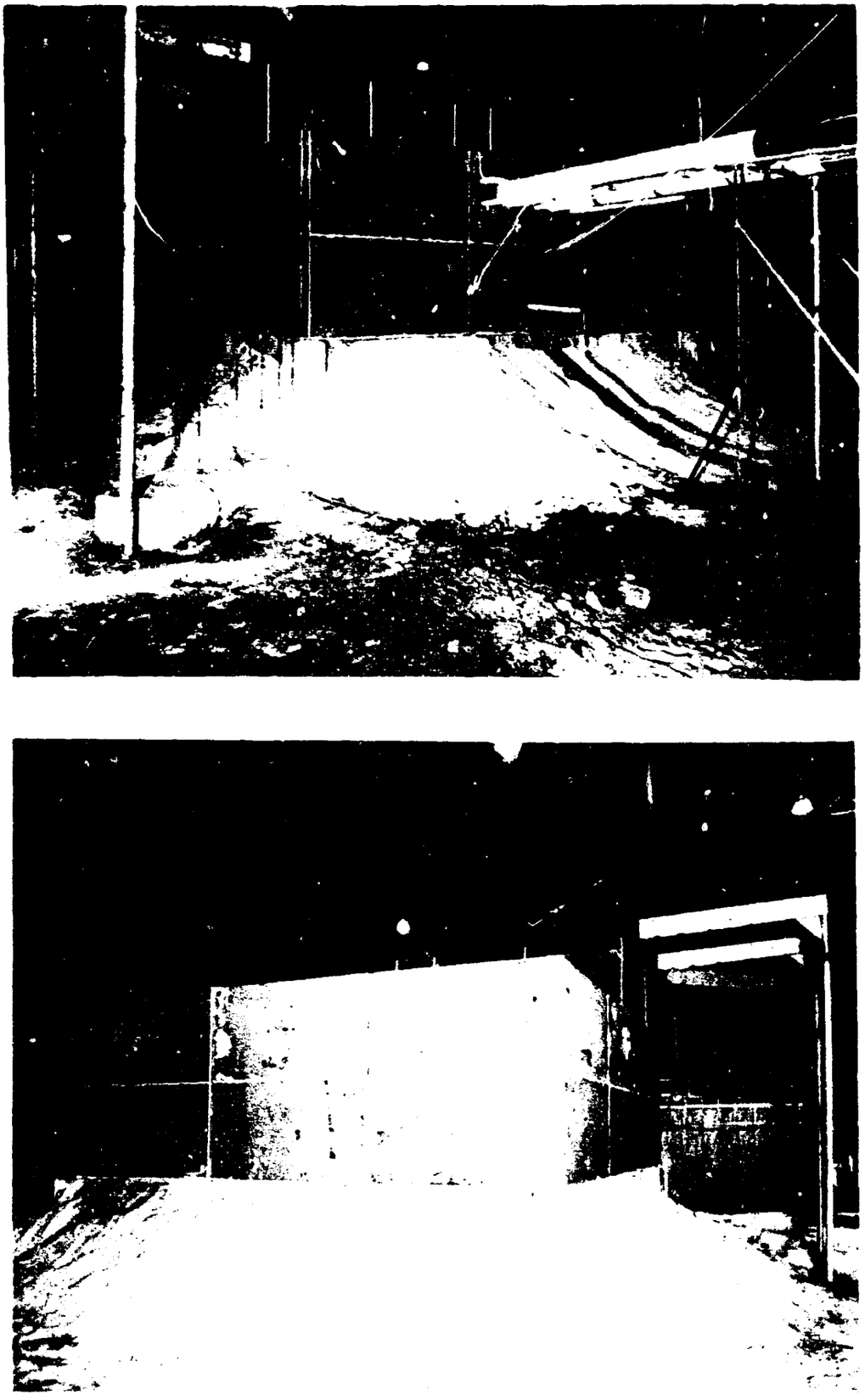


Figure 4. VIEWS OF SHELTER STRUCTURE

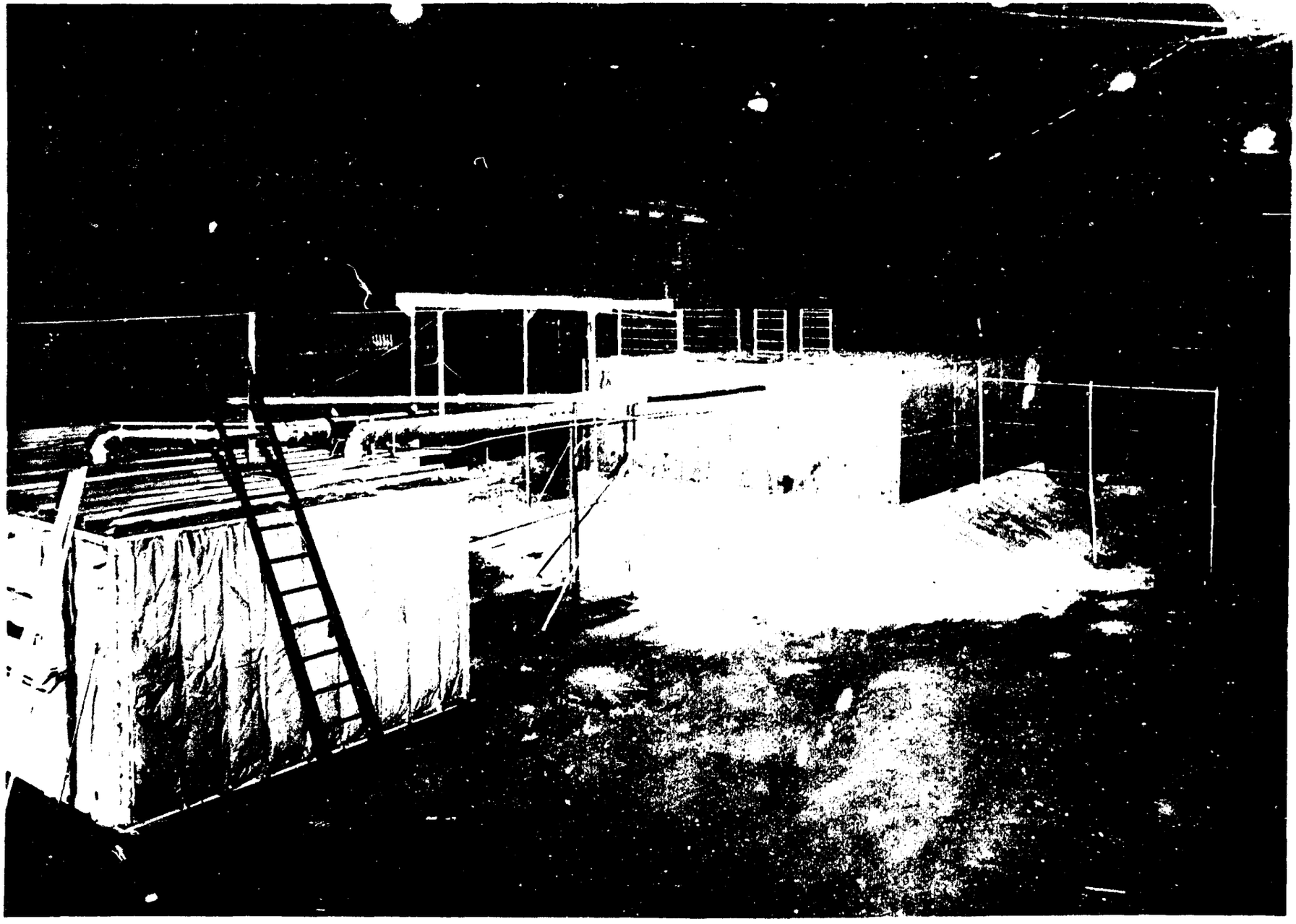


Figure 5. OVER-ALL VIEW OF BARE SHELTER AND INSTRUMENTATION HUT

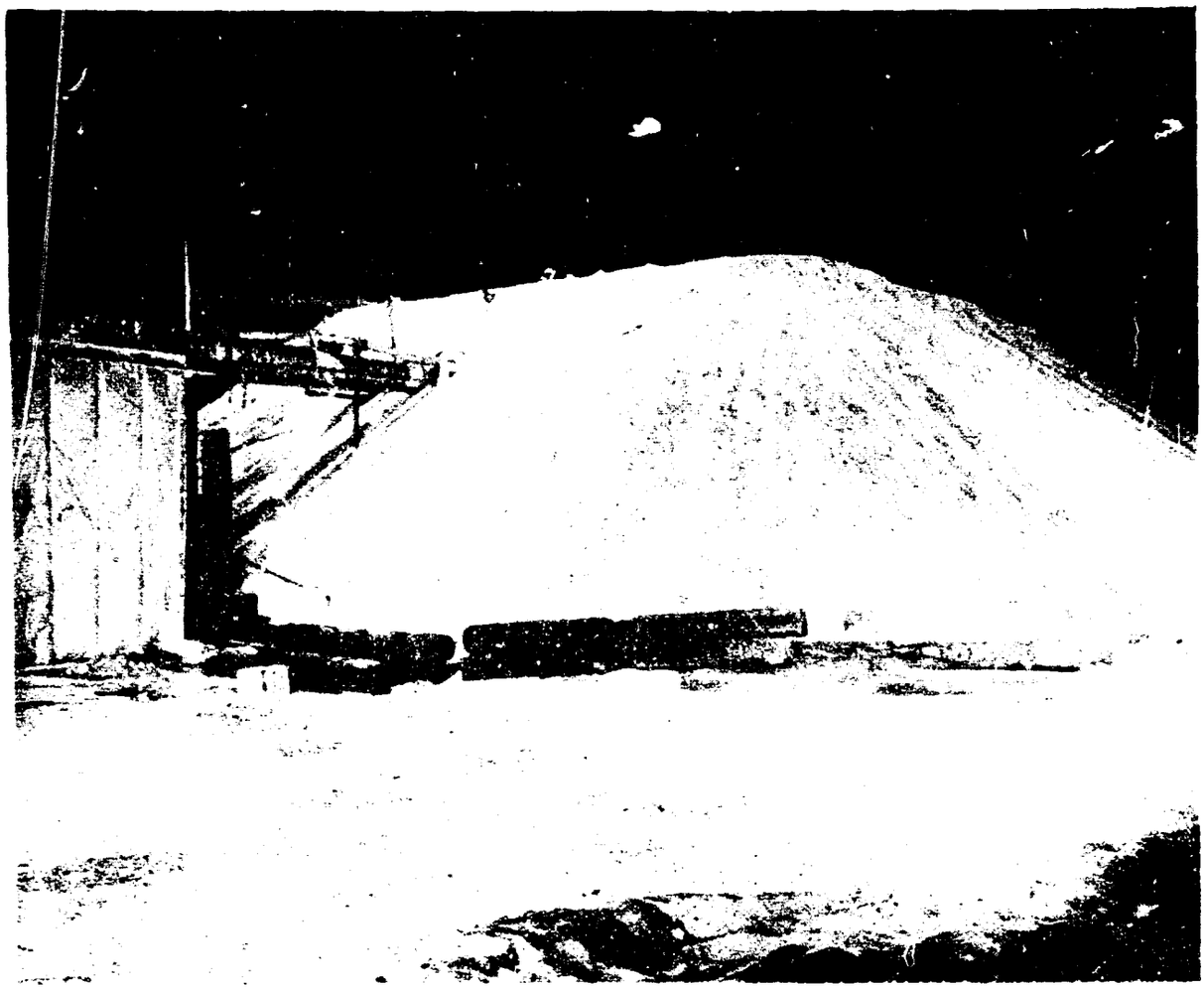


Figure 6. VIEW OF SOIL-COVERED SHELTER

The bulk of the soil to cover the shelter was brought in at a later time, after completion of the structure and instrumentation.

The soil used to cover the shelter was a sand of uniform consistency native to the area of Gary, Indiana. In the as delivered condition, the sand had a moisture content of 5.5% (weight per cent on dry basis). Subsequent checks on the distribution of moisture content as a function of distance from the shelter enclosure were made at the conclusion of each series of experiments, when the shelter underwent structural modification. It was found that the moisture content was less than 0.5% immediately adjacent to the shelter enclosure (within one foot or less), and also at the exposed surface. Through the bulk of the sand, however, the moisture content was fairly stable at around 3.5%.

Measurements were made to determine the thermal conductivity, density, and specific heat of the soil at room temperature. Thermal conductivity was measured at three different moisture contents by means of a guarded hot-plate apparatus (ASTM Desig. C177) using 1-inch thick samples that were sealed in a plastic-sheet envelope to prevent the evaporation of moisture. Although the migration of moisture, even within the test apparatus, is not completely avoidable, this effect was minimized by performing the measurements with a small temperature difference between the hot and cold faces of the sample. No significant changes in apparent conductivity

with time were noted while the samples were in the test apparatus. The conductivity measurements were made at apparent densities corresponding to each moisture content, and the results are shown in Fig. 7.

The density of the moist sand was determined by measuring weight and apparent volume. The latter was taken as the volume occupied by the sand after its container was tapped on a hard surface until no further settling occurred. The variation of apparent density with moisture content is shown in the upper portion of Fig. 7, where the curve represents the average of about 20 measurements that exhibited a scatter of about $\pm 5\%$. It may be mentioned that the slight reduction in the apparent density of the moist sand with increasing moisture content resulted from the fact that the moist sand did not flow freely but tended to be lumpy. When such sand is poured, as when the shelter was covered, it contains a greater volume of void spaces than a dry sand, and thus exhibits a lower apparent density.

Specific heat of the dry sand was measured by the so-called "drop-method" or "method of mixtures" using an adiabatic water calorimeter. Wetting of the sample was avoided by enclosing the sand in a water-tight capsule and then correcting the measured results for the heat capacity of the capsule. The specific heat of the dry sand at room temperature was found to be 0.17 Btu/lb°F. Values for moist sand may be evaluated

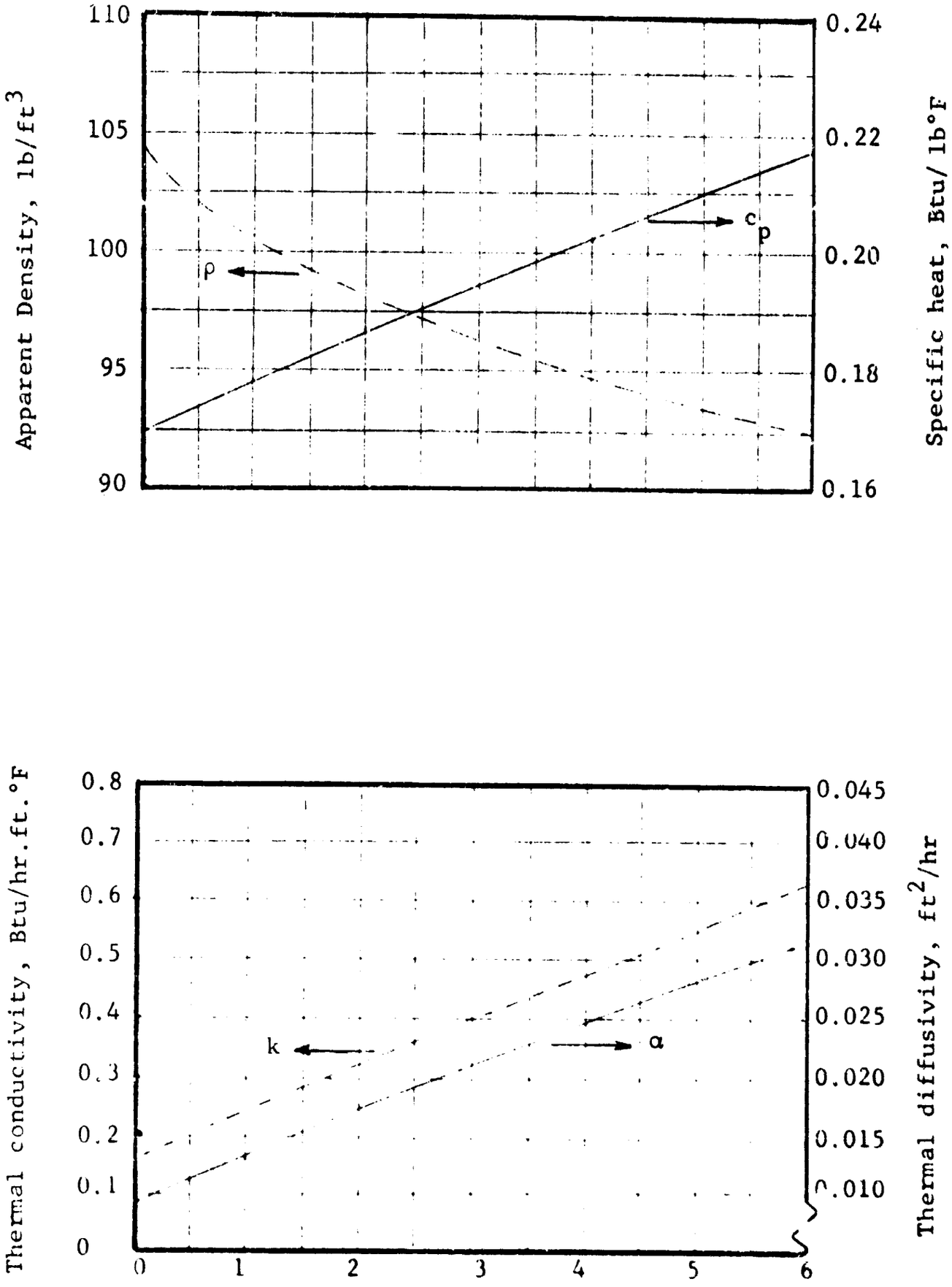


Figure 7. THERMAL PROPERTIES OF MOIST SAND

according to the proportion by weight of the two components by considering a mixture of dry sand and water;[1]* that is:

$$c_{(mixt.)} = \frac{0.17 + r}{1 + r} \qquad (1)$$

where $r = \frac{\text{weight of moisture in sample}}{\text{weight of dry sand in sample}}$

C. Instrumentation Hut

A utility hut for housing the mechanical equipment, meters, and instruments was built within the building that housed the shelter, at a distance of 25 feet from the shelter wall (see Fig. 5 and 6). The hut was 24 x 12 feet and was divided into two 12 x 12 foot rooms. One room contained the air-conditioning equipment and all the controls necessary for its operation; the other contained the apparatus for supplying water to the simulated occupants, the meters, recording instruments, and other equipment required for the operation of the shelter. These will be described in detail later.

III. AIR-CONDITIONING SYSTEM

The air-conditioning system was designed and constructed to serve a double prupose. Its primary function was to provide ventilation air for the shelter, at pre-selected constant rates, in a condition that was to simulate outdoor air on a typical severe summer day. This simulation included the cyclic diurnal

*Superscripts refer to references listed at the end of the report.

variation of the outdoor dry-bulb temperature. Its second function was to cool the shelter and the surrounding sand mass after the conclusion of each simulated-occupancy experiment in order to approach a uniform temperature distribution through the soil before a subsequent experiment was begun. The condition of the supply air that was used to ventilate the shelter during the experiments is described in the following paragraphs, and a description of the mechanical equipment follows.

A. Condition of Ventilation Air Supplied to Shelter

Selection of the condition of the air used for ventilating the shelter was made on the basis of the following considerations: first, to impose air conditions that are typical of an extreme hot and humid summer day; and secondly, to be able to describe time variations in the condition of the supply air in a simple manner.

A brief investigation was conducted of climatological data at several of the warmer population centers in the United States. Some typical data on hot and humid summer conditions that occurred during the year 1961 in Washington, D.C., Dallas, New Orleans, and Atlanta are shown in Fig. 8. These were selected on the basis of high effective temperatures that extended, with relatively small variations, for at least several days. Hence for a continuous 14-day period these conditions may be considered as extreme. It may be noted from Fig. 8 that the highest and lowest dry-bulb temperatures are offset from one another by about 12 hours, while the dew-point

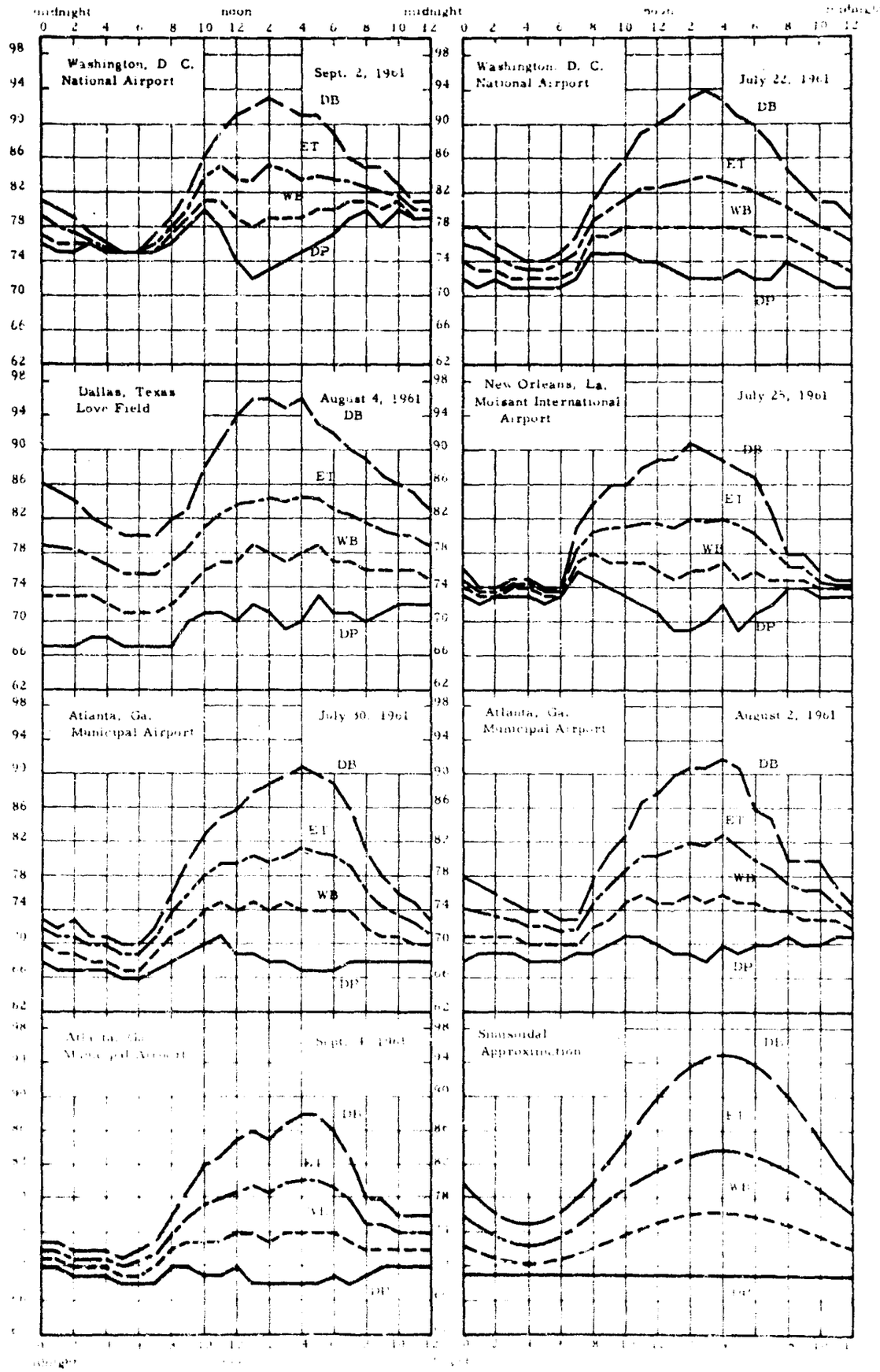


FIG. [illegible] TYPICAL EXTREME SUMMER WEATHER CONDITIONS

Table I

Typical Extreme Summer Weather Conditions

Location	Dry-Bulb Temp. Max.	Min.	24-hr Av.	Effective Temp. Max.	Min.	24-hr Av.	Wet-Bulb Temp. Max.	Min.	24-hr Av.	Dew Point Temp. Max.	Min.	24-hr Av.
Washington, D. C.	93	75	84	87	75	81	81	75	78	80	74	76
Washington, D.C.	94	74	84	84	73	79	78	72	76	75	71	73
Dallas, Texas	99	79	89	84	73	80	79	71	75	73	67	70
New Orleans, La.	92	73	83	82	73	78	78	73	75	76	69	72
Atlanta, Ga.	91	70	80	81	69	75	75	67	71	71	66	68
Atlanta, Ga.	92	73	83	83	71	77	76	70	73	71	68	69
Atlanta, Ga.	88	71	79	80	70	75	74	69	72	70	68	69
Sinusoidal Approx.	95	75	85	84	73	78	76	70	73	69	69	69

temperature varies relatively little throughout the day. Maximum, minimum, and daily average temperatures based on Fig. 8 are summarized in Table I.

On the basis of the above data as a guide, the temperature-humidity cycle that was selected for the ventilation air supplied to the shelter consisted of a sinusoidal variation of the dry-bulb temperature, together with a constant dew-point temperature. The dry-bulb temperature at any time may be represented by the following equation:

$$t_{db} = 85 + 10 \sin \frac{\pi}{12} \tau$$

where t_{db} = dry-bulb temperature, °F

τ = time from start of test, hr.

Thus the dry-bulb temperature of the supply air varied during each 24-hour period between a maximum of 95°F and a minimum of 75°F. The dew-point temperature was maintained constant at 69°F. These conditions of the ventilation air are shown in the lower right corner of Fig. 8.

B. Air-Conditioning Equipment

The air-conditioning equipment was located in the instrumentation hut and consisted of the following basic components:

(a) A package water chiller of nominal 7-ton capacity (Dunham-Bush Model No. PC7.5L)

(b) Storage tanks for hot and chilled water

(c) A capillary-cell air washer (Air and Refrigeration Corp. size 1-1, horizontal)

(d) A circulating water pump (Bell and Gossett No. 81-SEC)

(e) A centrifugal blower driven by a constant-speed motor.

(f) An electric reheat coil in the supply duct (Chromalox No. MT 390A)

(g) Controls

Treatment of the ventilation air to achieve the desired condition of constant dew-point temperature and sinusoidal variation of the dry-bulb temperature was achieved in two steps: The air first passed through the air washer from which it was discharged in the saturated state; then it passed through the reheat coil which served to increase the dry-bulb temperature. The temperature of the spray water in the washer was controlled to maintain the temperature of the saturated air leaving the washer at 69°F, while the rate of heat generation in the reheat coil was modulated to cause the sinusoidal variation in dry-bulb temperature.

The basic water circuit consisted of the chiller, storage tanks for hot and cold water, automatically-controlled mixing valves, and the capillary-type washer. A schematic layout of the air-conditioning system is shown in Fig. 9 and a photograph of the mechanical equipment in Fig. 10. Water in the cold-water tank was maintained at temperatures of 37-42°F

by an immersed "on-off" thermostat which actuated the chiller. The hot water was maintained at around 100°F in a similar manner by a thermostat activating an electric immersion heater. A temperature-sensing element was located in the air stream between the discharge of the washer and the intake of the blower. The signal from this sensor, through an electronic circuit, served to control the settings of motorized water-mixing valves that regulated the temperature of the water reaching the spray nozzles in the washer so as to cause an air discharge temperature of 69°F at the washer exit. The capillary cell in the washer was 20 x 20 x 8-in. thick, and was followed by a 20 x 20 x 2-in. thick glass-mat eliminator. Air and spray water ran concurrently through the washer, and the extent of saturation of the air was such that no discernible difference could be measured bwtween dry-bulb and wet-bulb temperatures at the discharge of the washer, where the sensing element of the control was located.

The major components of the air circuit, also shown in Fig. 9, were the washer, a circulating blower, a reheat coil, and air-distributing ductwork including an orifice section in the return line. The system processed 100 per cent recirculated air. A daily sinusoidal variation in the dry-bulb temperature of the supply air was achieved by modulating the rate of heat generation in the electric reheat coil, which was located immediately downstream of the blower. This was achieved by an automatic control circuit consisting of the following basic components:

(a) A three-function program controller (Chronotrol Model 7410)*

(b) A silicon-controlled rectifier (Series 620 power controller)*

(c) A resistance-wound temperature-sensing element (Model A 2676)*

The resistance-would element was located in the air supply duct at its point of entry into the shelter (see Fig. 9). It was the function of the controller to regulate the power to the reheat coil in such a way that the temperature sensed by this resistance element at any time would correspond to the control set-point at that time. The position of the control set-point at any time was determined by a cam-follower riding on a rotating cam. The latter, in turn, was driven by a clock motor at one revolution per day, and its shape was cut so as to impart the necessary sinusoidal variation to the follower in order to achieve the desired dry-bulb temperature variation.

Ventilation air was supplied to the shelter at a constant rate during the entire length of an experiment, and the required rates of air flow covered a wide range. The lowest total flow rate for the one-cell shelter was only 15 cfm, while the highest flow rate for the 9-cell shelter was 675 cfm. Control of the flow rate was achieved by a combination

---

*by Barber-Colman Company

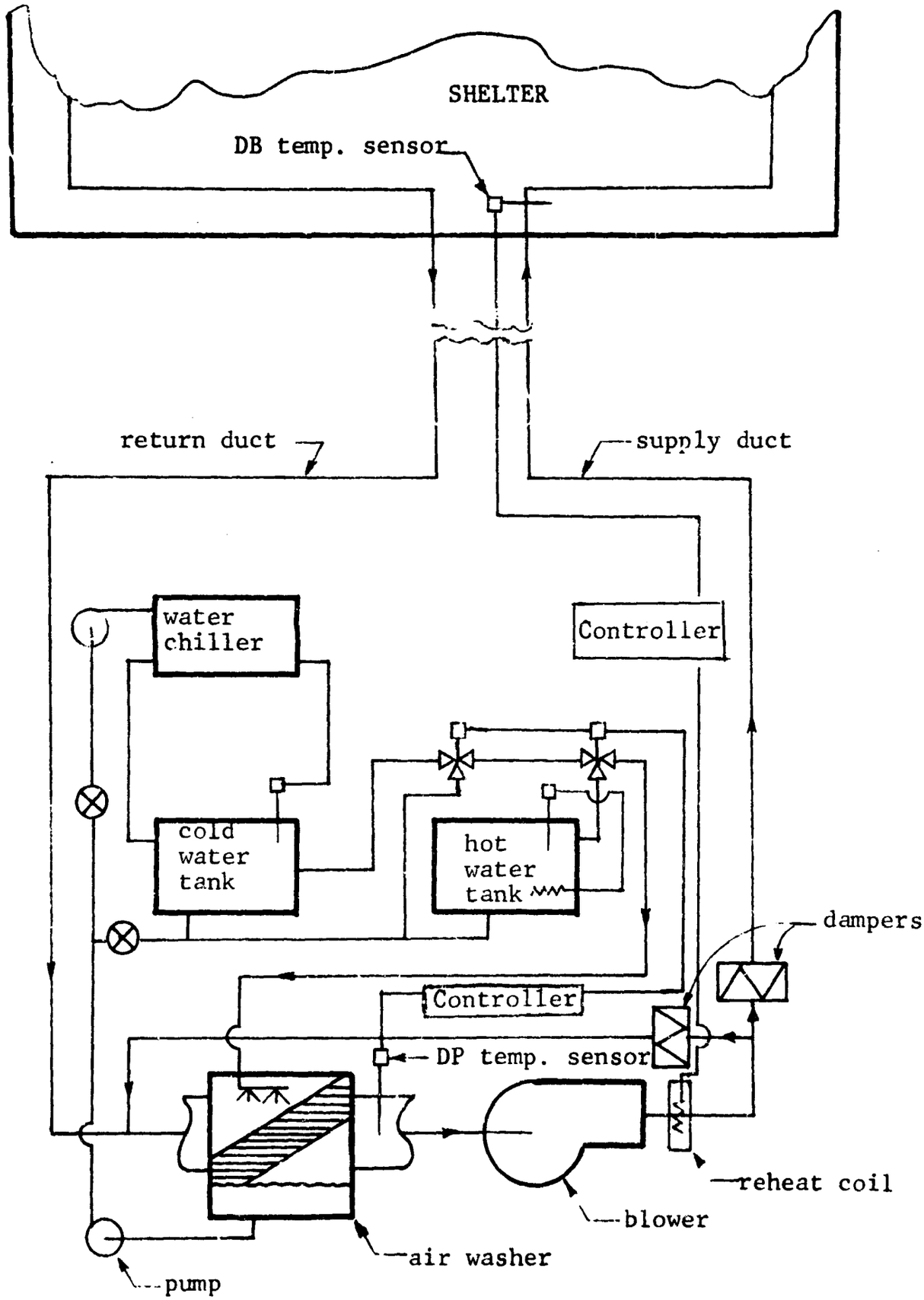
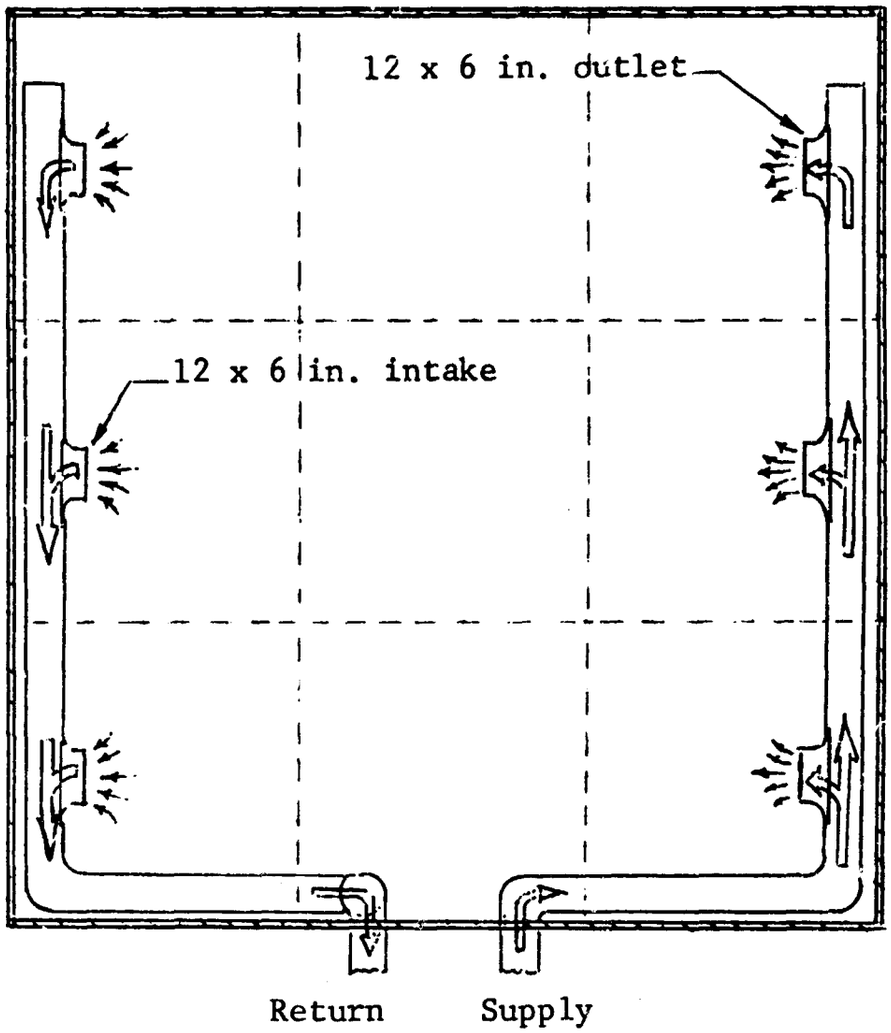


Fig. 9. SCHEMATIC LAYOUT OF AIR-CONDITIONING SYSTEM



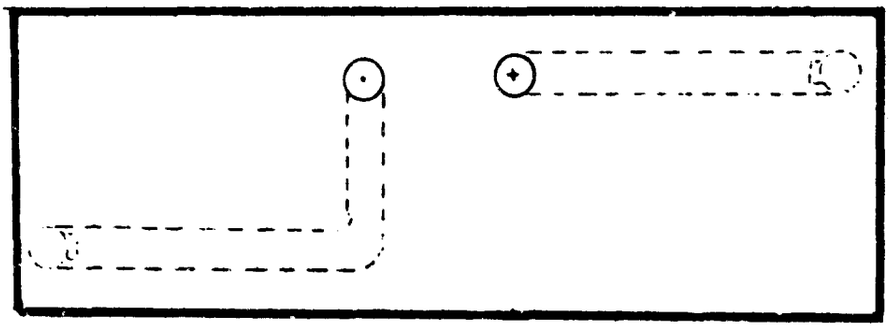


Fig. 9A. SCHEMATIC LAYOUT OF AIR DISTRIBUTION SYSTEM INSIDE SHELTER

Figure 10. PHOTOGRAPH OF AIR-CONDITIONING EQUIPMENT

of two methods: In order to make gross changes, the blower speed was changed by use of different-sized pulleys to connect the blower to the constant-speed motor; accurate settings were then obtained by manipulating dampers in the supply duct and in the bypass duct (see Fig. 9). The rate of flow was measured by a sharp-edged orifice located in a straight run of the return duct.

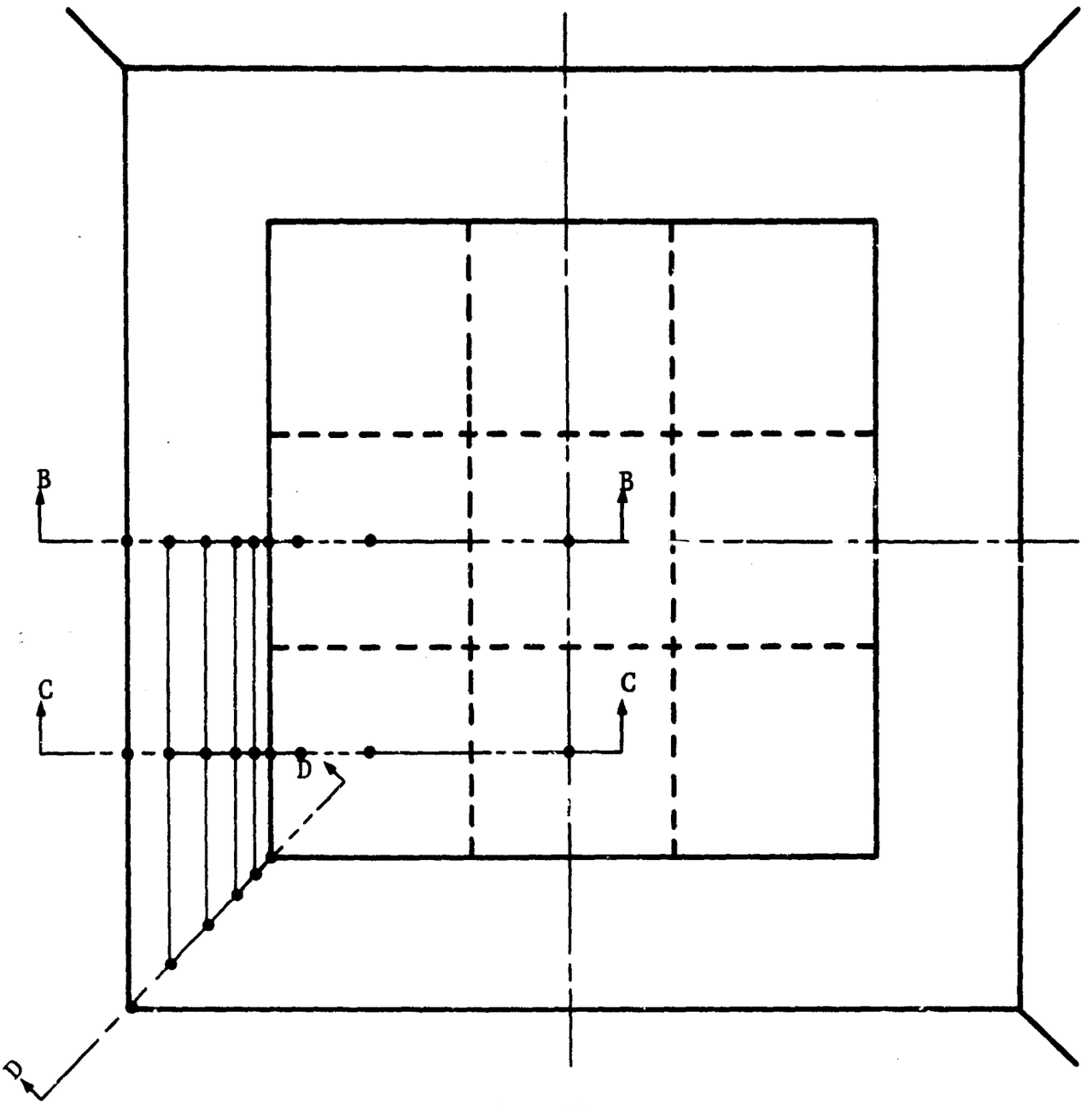
The air distribution system inside the shelter is shown schematically in Fig. 9A. The supply duct ran along one wall at an elevation of about 6 feet, while the return duct ran along the opposite wall at an elevation of about 1 foot. One supply-air outlet and one return-air intake were provided for each row of cells as indicated on the sketch. When the size of the shelter was reduced, there were only a single supply opening and a single return opening.

IV. INSTRUMENTATION AND CONTROL

Data obtained in the course of this experimental program were essentially temperatures, both of the soil surrounding the shelter and of the environment within the shelter, while the shelter was occupied by simulated people and ventilated at fixed rates. A detailed description of the layout of temperature sensors for each of the three shelter configurations is given in the following paragraphs, followed by a description of the device used to measure air conditions inside the shelter, and of the recording instrument.

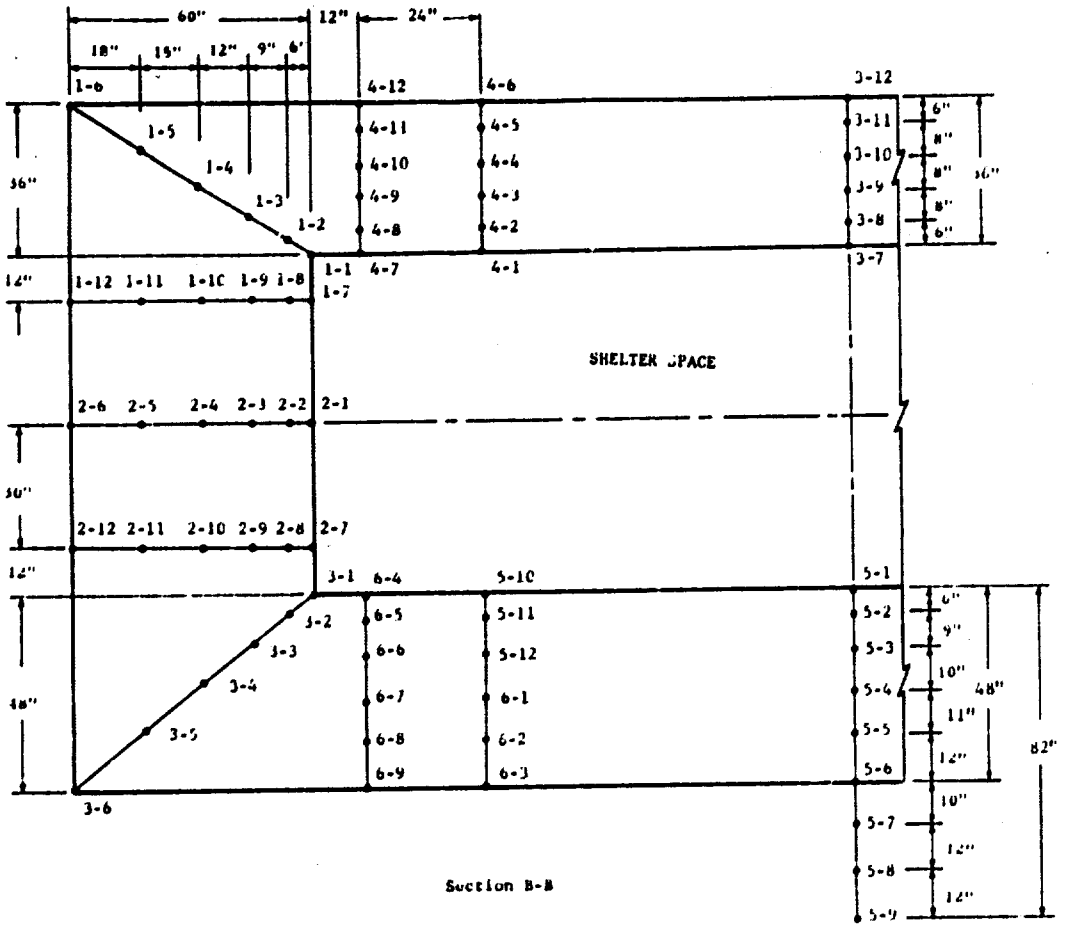
A. Soil Temperatures

A number of thermocouples were distributed in the soil in order to measure the temperature variation with time. Since the shelter structure was symmetrical, it was decided to place all the soil thermocouples in one typical sector, rather than to disperse them around the entire shelter. The location of cross-sectional planes in which thermocouples were placed is indicated in the schematic plan view of the shelter shown in Fig. 11. Planes B-B and C-C are parallel to each other and run along the centerlines of their respective rows of cells. Plane D-D extends diagonally outward through a corner of the shelter. The thermocouple layout is illustrated in detail in the elevation views of these cross-sectional planes, in Figs. 12, 13, and 14. These figures also show the numbering system used to identify the individual thermocouples by cycle and print number as will be explained below. It can be seen that the thermocouples were concentrated in the regions where the isotherms were expected to have the greatest curvature, such as at the joint between the wall and the ceiling, or at the joint between the wall and the floor. The spacing between the adjacent thermocouples in a given row was also nonuniform, with the closer spacing provided near the shelter enclosure where the temperature gradient would be steeper. The distances between adjacent thermocouples are also shown in Figs. 12, 13, and 14.



Plan View

Figure 11. LOCATION OF CROSS-SECTIONAL PLANES IN WHICH THERMOCOUPLES WERE PLACED



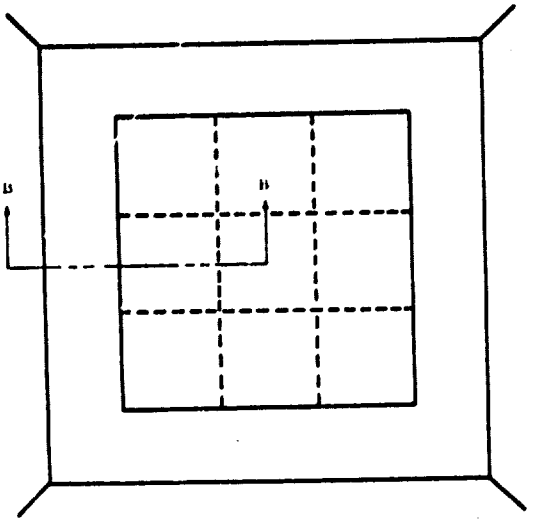


Figure 12. LAYOUT AND IDENTIFICATION OF THERMOCOUPLES IN PLANE B-B

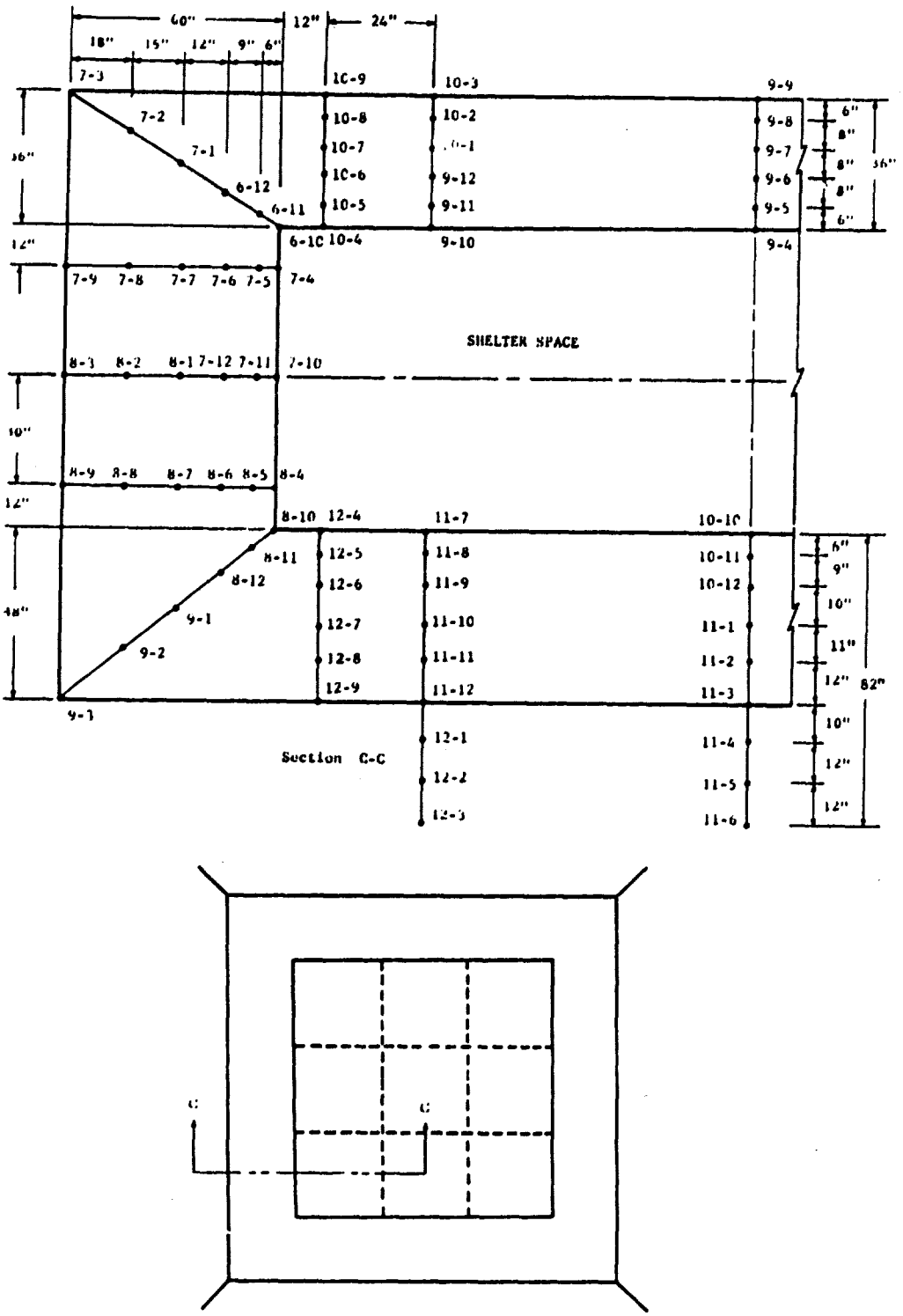
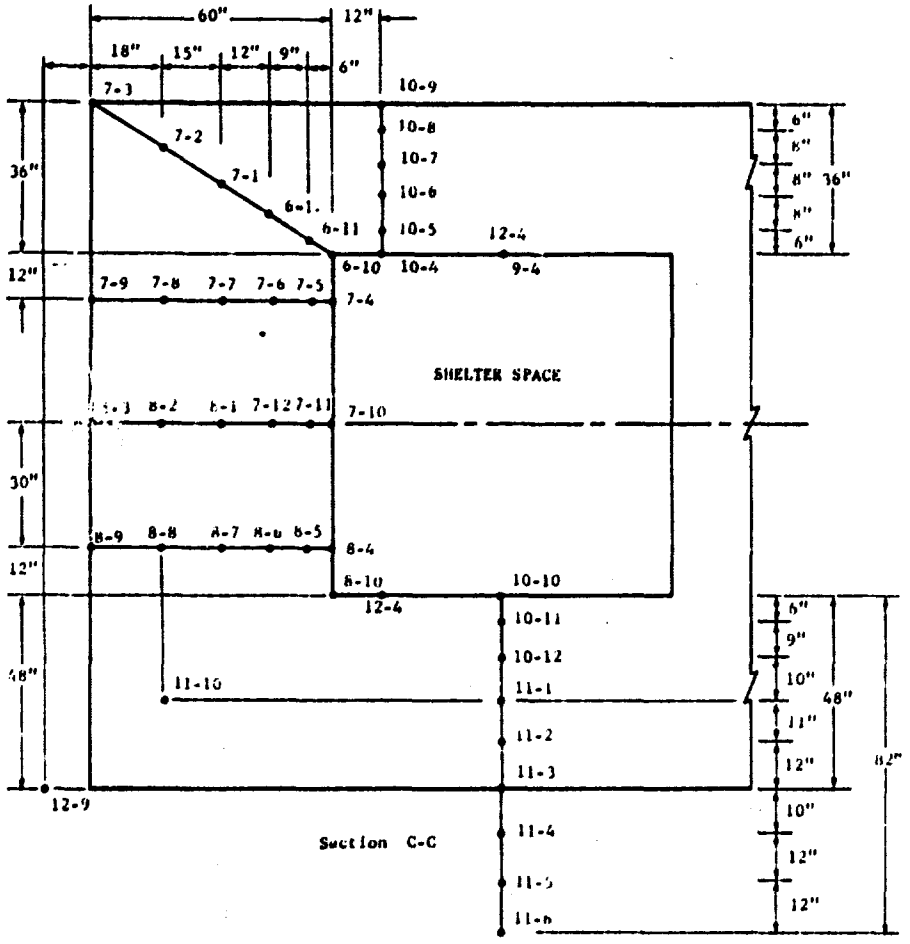


Fig. 11. LAYOUT AND IDENTIFICATION OF THERMOCOUPLES IN PLANE C-C



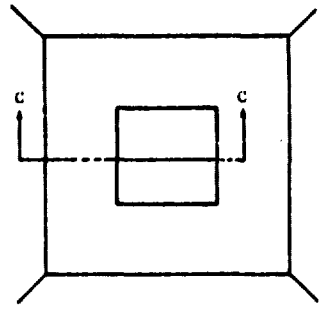


Fig. 11A. LAYOUT AND IDENTIFICATION OF THERMOCOUPLES IN PLANE C-C
(for small shelter)

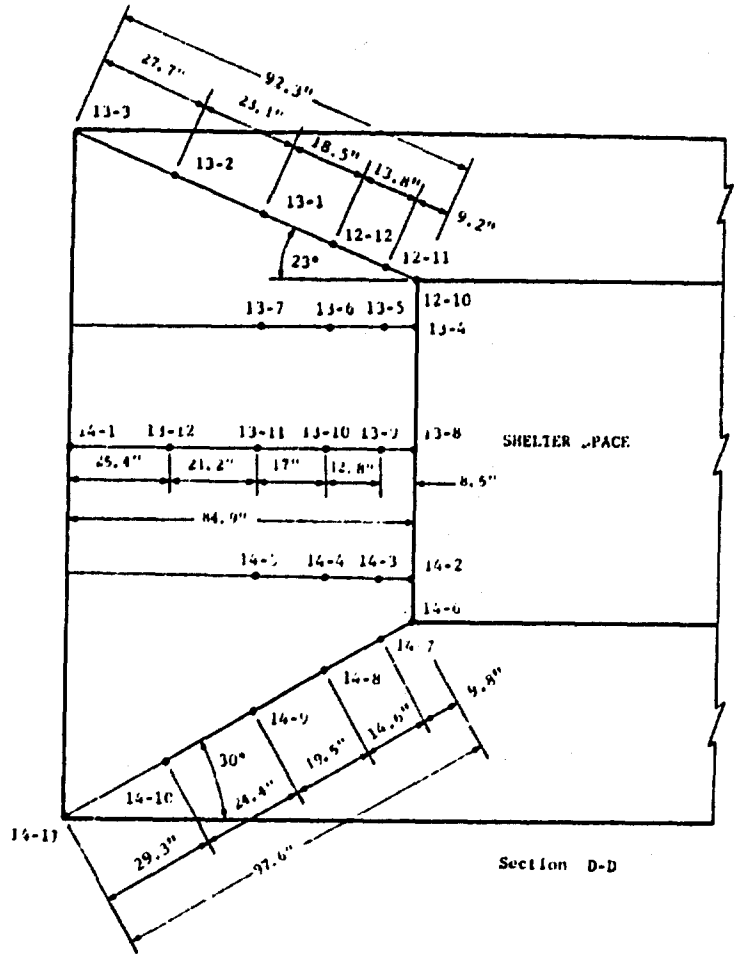
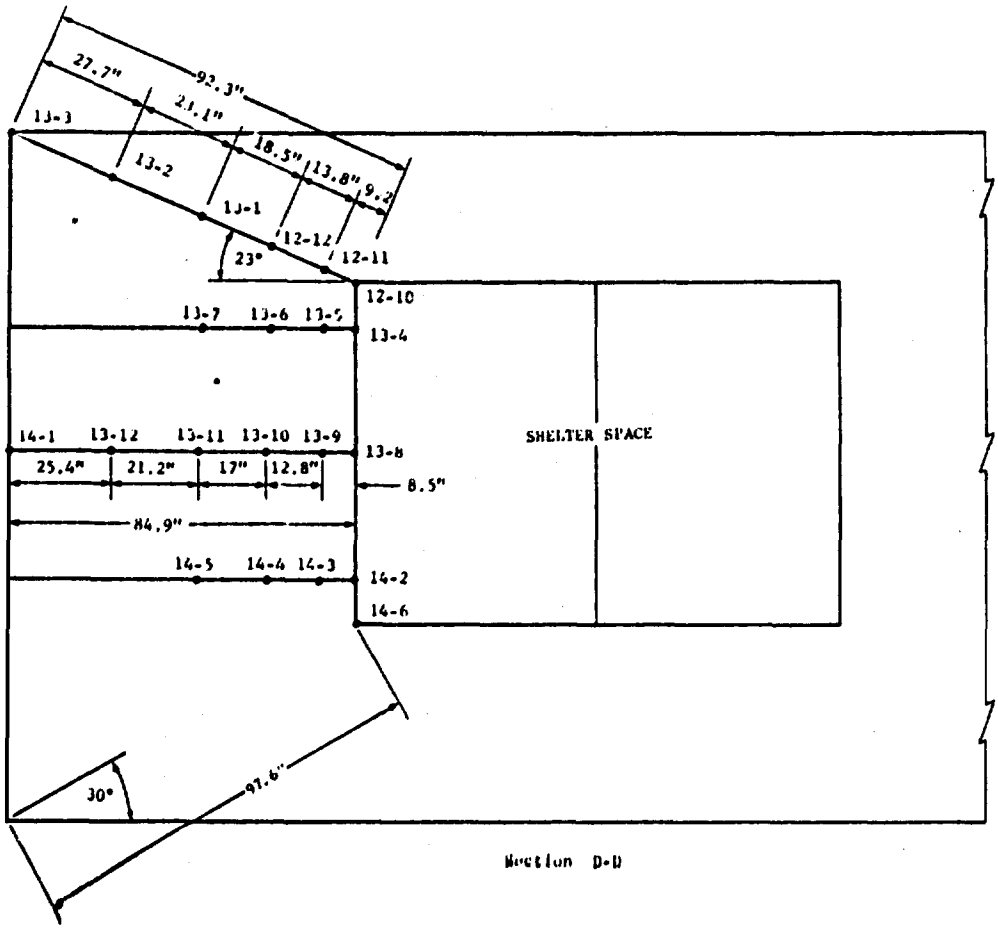


Fig. 14. LAYOUT AND IDENTIFICATION OF THERMOCOUPLES IN PLANE D-D



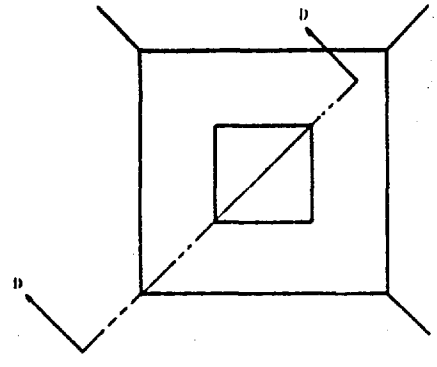


FIG. 14A. LAYOUT AND IDENTIFICATION OF THERMOCOUPLES IN PLANE D-D (for small shelter)

With regard to the layout and identification of thermocouples in the soil, it should be noted that as the shelter size was reduced from a 9-cell structure to a 3-cell structure, all thermocouples in planes C-C and D-D remained unaltered, while those in plane B-B were discarded. Thus Fig. 13 and 14 are equally applicable to both the large-sized and medium-sized shelters.

As the shelter was further reduced to a single cell, an attempt was made to retain the same numbering system as if the grid of thermocouples in the soil had moved with the wall. That is, a thermocouple located at a given distance from the shelter wall retained the same identifying number for each of the three structures. Thermocouples beneath the floor of the shelter, however, were not accessible during the structural modifications, and these remained in their original locations. To clarify this arrangement, the layout and identification of soil thermocouples for the small shelter is given separately in Figs. 13a and 14a. The similarity between these and the corresponding diagrams for the larger structures (Figs. 13 and 14) is readily apparent.

In the placement of thermocouples in the soil, precautions were taken to minimize the discontinuities introduced by the presence of the thermocouples, and to reduce conduction errors by running the wires from the measuring junction along lines of nearly-constant temperature. The thermocouple supports selected for this application consisted of stainless-steel

straps, 3/8-in. wide by 0.015-in. thick, similar to the strapping commonly used for packaging or crating. Such a strap has a small cross-sectional area, and therefore the amount of heat conducted along the strap is small. The surface area of the strap in contact with the soil, however, is relatively large and therefore the strap would come to thermal equilibrium with the local sand environment much more readily than would a rod or cable of the same cross-sectional area.

For locating thermocouples in the soil below the floor of the shelter, the steel straps were suspended horizontally by stretching them between fixed anchors cast in the concrete footings. The straps were secured under a tensile force of several hundred pounds, which was sufficient to eliminate the effect of sag. A typical group of straps is shown in Fig. 15 and a close-up in Fig. 16. The latter shows the temperature sensors, which consisted of copper disks of 3/4-in. diameter, to which the thermocouple wires were soft-soldered. The wires ran along a strap to the nearest footing where they were merged into cables that could be protected more easily from physical damage in passing through the sand.

At two locations (see Figs. 12 and 13), thermocouples were placed at depths of more than 4 feet from the floor of the shelter, and thus below the level of the concrete floor of the building housing the shelter. These thermocouples were attached to copper bands or sleeves spaced at given axial distances on wooden rods, and the rods were driven into the soil through holes drilled through the concrete and soil.

Figure 15. THERMOCOUPLE SUPPORT STRAPS BENEATH FLOOR OF SHELTER

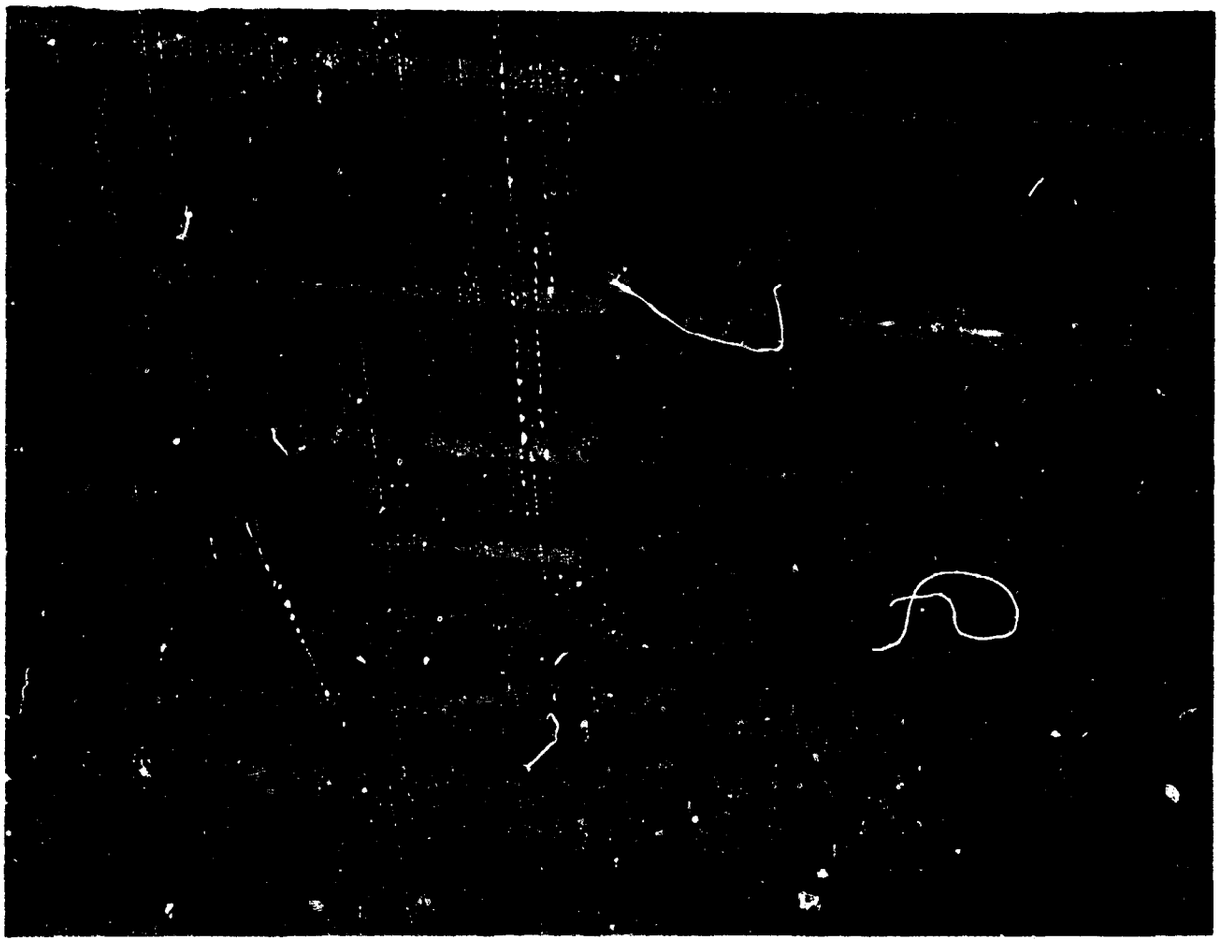


Figure 16. CLOSE-UP OF HORIZONTAL THERMOCOUPLE SUPPORT STRAPS

Thermocouples for measuring temperatures in the soil outside the shelter wall were also supported by stainless-steel straps, but the straps ran vertically. They were stretched between concrete blocks that were cast at ground level, and cantilever beams that extended from solumns set at some distance from the shelter wall. The columns in turn, were tied to structural members of the existing building to prevent excessive bending or buckling when the straps were tightened. The columns and cantilever beams can be seen in Fig. 4. Thermocouples in the soil above the roof of the shelter were attached to wooden dowel-rods that were supported at the desired elevations by vertical stands. The stands were also of wood, and far enough from the thermocouples so as not to introduce conduction errors. All thermocouples consisted of 24-gage (0.020-in. dia.) copper-Constantan wires covered with polyvinyl insulation on each wire.

B. Temperatures Inside Shelter

1. Surface Temperatures

The layout and identification of thermocouples used to measure inside surface temperatures are also indicated in Figs. 12, 13, and 14. These thermocouples were attached to the surfaces of the steel shelter enclosure by spot-welding each wire of a pair individually to the surface, with the two welds about 1/8-in. apart. The leads from all thermocouples originating inside the shelter were brought to the instrumentation hut via a conduit running through the sand.

2. Air Temperatures

The condition of the air entering and leaving the shelter, and that of the air within the shelter, was determined by measuring dry-bulb and wet-bulb temperatures using thermocouple sensors. Samples of the supply and return air were taken directly from the respective ducts, where the ducts entered and left the shelter. Within the shelter, measurements were made at several locations as follows:

a. In the middle of the shelter, at elevations of 1, 3-1/2, and 6 feet.

b. Near the middle of one wall at an elevation of 3-1/2 ft.

c. Near one corner of the shelter at an elevation of 3-1/2 ft.

The latter two locations were above the return air outlets.

Air movement within the shelter, and even in the supply and return ducts, was insufficient to permit accurate readings of wet-bulb temperatures unless the air velocity over the sensing elements was increased artificially. To do this, a compact aspirator assembly was designed to provide air velocities in excess of 15 ft. per second. This aspirator is shown in Figs. 17 and 18. It consists of a length of Lucite tubing (1-in. I.D.) connected to the intake of a small centrifugal blower that moved air through the tube at a sufficiently high velocity. The sensing elements for measuring dry and wet-bulb temperatures consisted of copper-Constantan thermocouples located

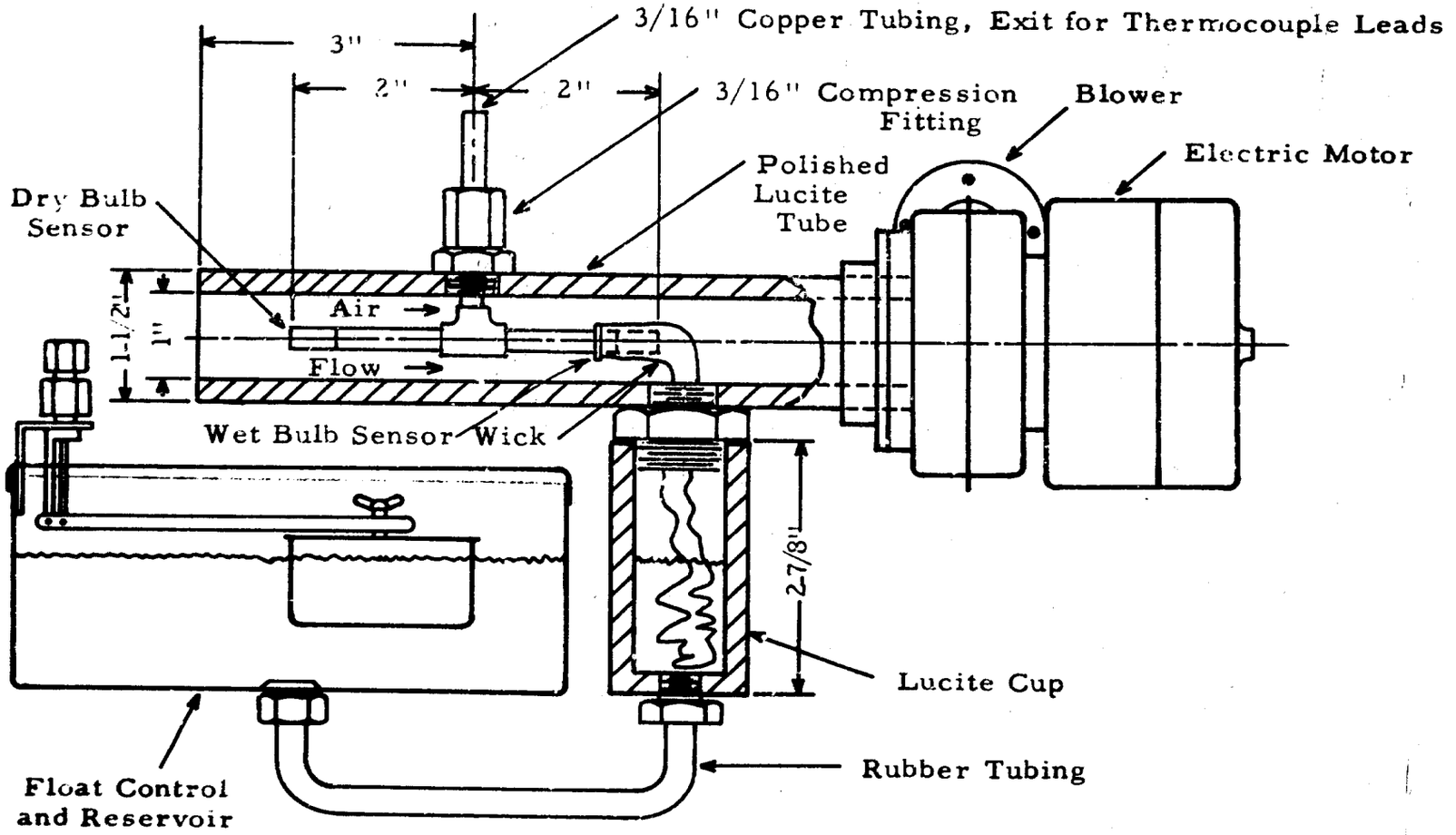


Figure 17. SCHEMATIC DIAGRAM OF ASPIRATOR FOR MEASURING AIR TEMPERATURES

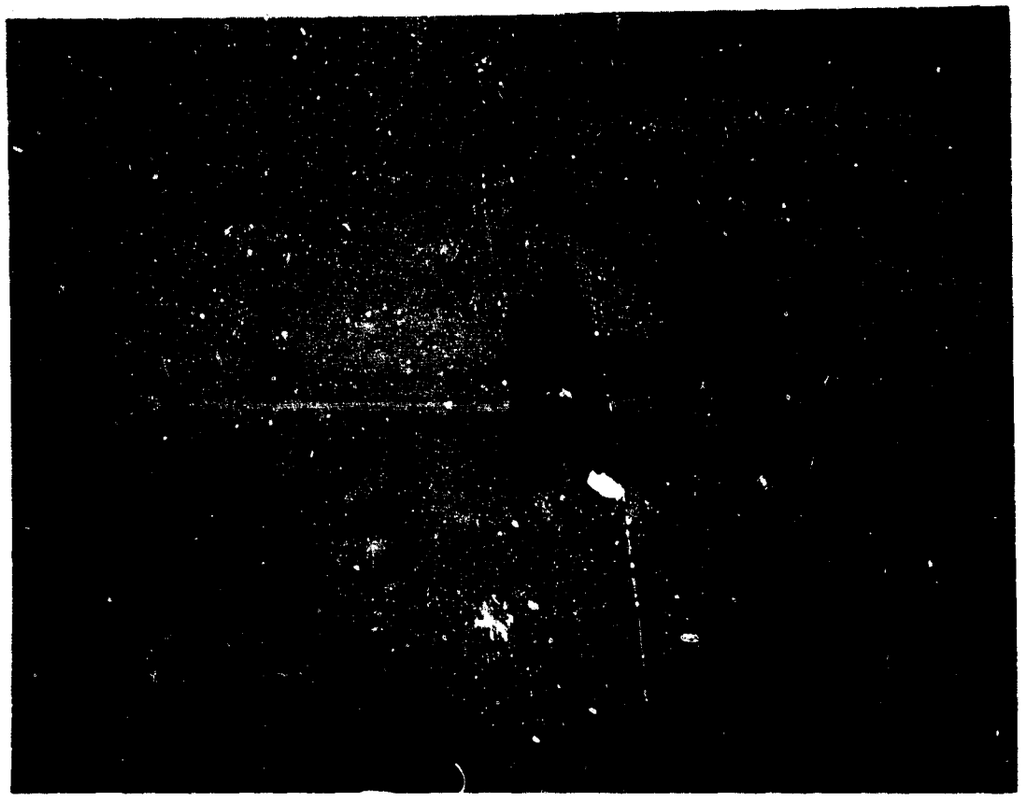


Figure 18. PHOTOGRAPH OF AIR ASPIRATOR

along the axis of the tube, with the dry-bulb sensor in the upstream position, and the wet-bulb sensor downstream relative to the air flow in the tube. The wet-bulb sensor was covered by a wick which extended into a cup of distilled water. The water level in the cup was maintained nearly constant by a directly-connected reservoir containing a float valve. The reservoirs of the several aspirators were filled periodically from a pressurized water supply in the instrumentation hut, from which a single tube ran to a common manifold in the shelter. Thus each of the reservoirs was filled to the level set by the float valves. In order to reduce soiling of the wicks, and the total amount of water evaporated from them, the aspirator blowers were activated for only 15 minutes each hour, and ran simultaneously with the recording instrument. They were on for a sufficiently long period of time prior to readout, however, for the thermocouples to achieve steady-state.

3. Temperatures of Simulated Occupants

Three of the simulated occupants in the shelter (described in Section V-A below) were equipped with thermocouples to measure outer skin temperatures. One of these was located in the center of the shelter and had three thermocouples attached to the outer aluminum shell--one thermocouple near the top, another at mid-height, and the third near the bottom. A second simulated occupant was located near the middle of a wall, and the third near a corner. The latter two were equipped with single thermocouples attached at mid-height. All thermocouples

were attached by spot-welding the individual wires to the outer surface of the aluminum sheet, and the junctions were subsequently covered with cloth covers that served to distribute perspiration moisture.

C. Temperature Recorder

For this application it was not necessary to record all temperatures simultaneously, since the rate at which temperatures changed with time was very small. It was therefore possible to divide the total number of thermocouples into a number of banks, each containing no more thermocouples than could be handled by a single recorder, and then to switch from one bank to another in sequence.

The instrument used was a Leeds and Northrup Speedomax G recorder, with adjustable zero and adjustable range, and capable of accommodating 12 thermocouples. Switching from one bank of thermocouples to another was done automatically by rotary stepping-switches. When the recorder completed its scan of 12 thermocouples, the switches were advanced by one position, thus allowing 12 more thermocouples to be scanned, and this process was repeated until all thermocouples had been scanned. The chart drive and printer mechanism of the recorder were started once every hour by a timer switch, and were stopped after approximately 15 minutes when the last bank of thermocouples had been scanned. The blowers aspirating air over the wet-bulb temperature sensors were operated by the same timer, but since the thermocouples measuring air temperatures

were in the 15th and 16th banks of thermocouples, the aspirators had been operating for about 12 minutes before their thermocouples were scanned. Thus they had ample time to achieve equilibrium, for which only about 3 minutes was sufficient. It may be noted that the hyphenated thermocouple identification numbers shown in Figs. 12 to 14 refer to the respective bank or cycle number and print number.

D. Air Flow Rates

The rate of flow of ventilation air through the shelter was measured by means of sharp-edged orifices in conjunction with an inclined manometer graduated in increments of 0.005 in. of water. In order to cover adequately the wide range of air flows-- from 15 to 675 cfm-- three different orifice plates were used, having orifice diameters of 6.0, 3.0, and 1.6 inches. These orifice plates were housed in one of two replaceable sections of pipe that were provided in the straight run of return duct leading from the shelter to the air-conditioning equipment in the hut. One pipe was of 10-in. diameter and was used with the two larger orifice plates; the other was of 4-in. diameter for use with the small orifice plate. Each replaceable section was 14 ft. long, and consisted of a 10-ft. upstream length and a 4-ft. downstream length, with flanges between them for accommodating the orifice plates. During the cooldown period after each experiment, the orifice plate was removed from the system in order to increase the flow rate of cooling air.

E. Heat Generation

Heat was generated in the shelter at a constant rate during an experiment, and stemmed from two sources. The bulk of the heat was that generated by the simulated occupants, as described in the following section. In addition, a small amount of power was dissipated by lights, and by operation of the several blowers on the air aspirators. The latter were the only intermittent source, and represented only about 17 watts per unit when running.

All electric power to the shelter was supplied through a constant-voltage transformer, and was measured by two kilowatt-hour meters. One meter measured the power dissipated by the simulated occupants, and the other meter measured all other power. In addition, a laboratory-type wattmeter was connected in the circuit with the simulators as a check on the uniformity of power generation.

V. SIMULATION OF HUMAN OCCUPANCY

In selecting the means for artificially supplying the heat and moisture load that would usually be provided by human occupants, a choice had to be made between a mass simulator and individual simulators each representing one average person The latter was chosen for the following reasons Individual units could be distributed over the available floor area in a uniform manner more representative of real occupancy; the surface area of each simulator could be made equal to that of a human being; and, the physical handling of individual units

was easier in a shelter whose only entry was a relatively small hatch. The following paragraphs are devoted to a description of the simulated occupants and the method used for controlling the rate at which water was supplied to them in order to simulate perspiration of the occupants as a function of temperature inside the shelter.

A. Construction of Simulated Occupants

The physical make-up of the simulated occupant was similar to that used by the National Bureau of Standards[2] and others.[6] A photograph of the component parts of a simulator is shown in Fig. 19. It consisted of two concentric, slightly tapered cylinders, made of aluminum sheet, with an over-all height of 52 inches and a base-diameter of 24 inches. The inner cylinder was open at both ends, and was covered with a 1-inch thickness of glass-fiber insulation having an aluminum foil facing on the exposed surface. The outer cylinder was open at the botton, and closed at the top by a conical dome. It was covered with a form-fitting "sweat shirt" made of a flannel cloth that served to distribute the water uniformly over the outer surface. The cloth was selected for its good water-spreading ability, and the covers were washed prior to use in order to avoid subsequent shrinkage.

An electric resistance heater was located near the bottom of the inner cylinder and generated heat at a constant rate of 400 Btu/hr (117 watts), which is typical of the body heat produced by a sedentary person. Natural convection

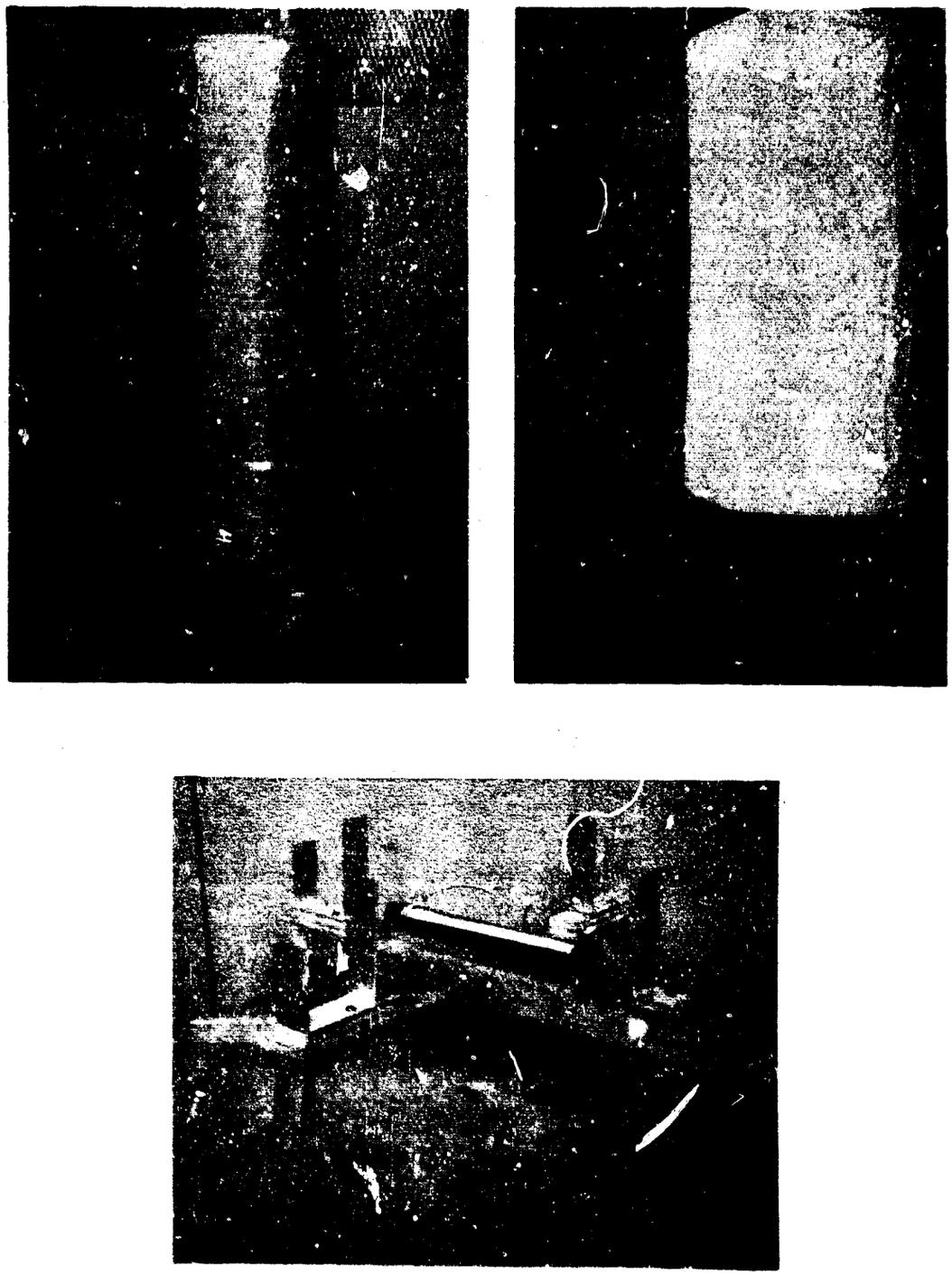


Figure 10. COMPONENTS OF SIMULATED OCCUPANT

caused air circulation upward in the inner cylinder and downward through the annular space between the cylinders as the air cooled while heat was lost and moisture was evaporated from the outer surface. Electric current to the resistance heaters was supplied through a constant-voltage transformer in order to assure a constant rate of heat generation.

The heater in each simulator consisted of an adjustable wire resistor wound on a ceramic core 10-1/2 in. long by 1-1/8 in. diameter.* These resistors were adjusted to the proper setting in the following manner: A resistor was placed in an enclosure where the air temperature was around 90°F. With a constant-voltage supply, the resistance was adjusted until it generated 117 watts, as measured with a wattmeter in the steady state. After the resistor cooled to room temperature, its resistance was measured with a Wheatstone bridge, and all the other resistors were adjusted to the same resistance at room temperature. A subsequent check on two randomly-selected samples at operating temperature showed a rate of heat generation within one percent of the desired value.

A view of the interior of the 21 x 21 ft. shelter is shown in Fig. 20, where some of the 45 simulated occupants can be seen. Water to each unit was supplied via a plastic tube that was taped to a thin rod that extended vertically from the apex of the simulator. Water from the tube dripped

*identified as "Dividohm" 10-1/2 P46D, 125 ohms, Ohmite Manufacturing Company.

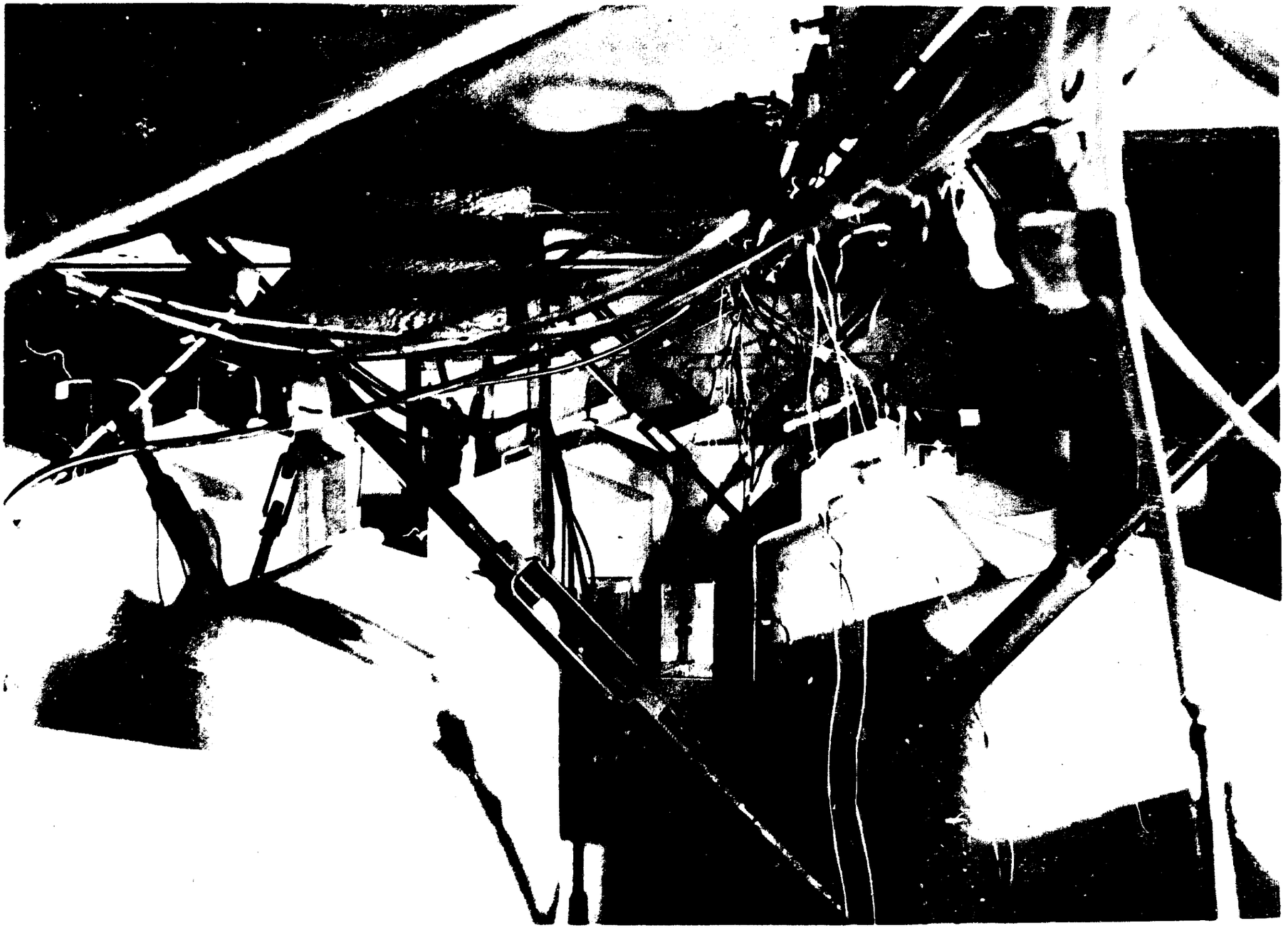


Figure 20. VIEW OF INTERIOR OF SHELTER

onto a pad of absorbent cotton that served to distribute the water in all directions.

B. Control of Moisture Supply to Simulated Occupants

The major regulatory mechanism whereby the human body controls its temperature in an abnormally warm environment is its ability to excrete perspiration which absorbs latent heat on being vaporized from the skin. The rate at which perspiration is generated by an average sedentary man varies greatly with the dry-bulb temperature of the environment as shown in Fig. 21.[3] The values given in this figure are those excreted by the human body, and are not necessarily those evaporated from it. The amount evaporated would depend on humidity conditions of the environment and the rate of air flow over the skin. In order to provide moisture simulation of the human body, it was therefore necessary to provide automatic means for supplying water to the simulated occupants in the shelter at varying rates in accordance with the functional relationship shown in Fig. 21.

1. Pumping System

The system that was devised to meter water to the simulated occupants involved the use of a separate pump to feed each occupant. Upon receipt of a prescribed electrical signal, the pump-actuating device would cause each pump to undergo one cycle, and thereby to deliver a fixed quantity of water to each occupant. The pumps selected for this application were positive-displacement units used on automotive

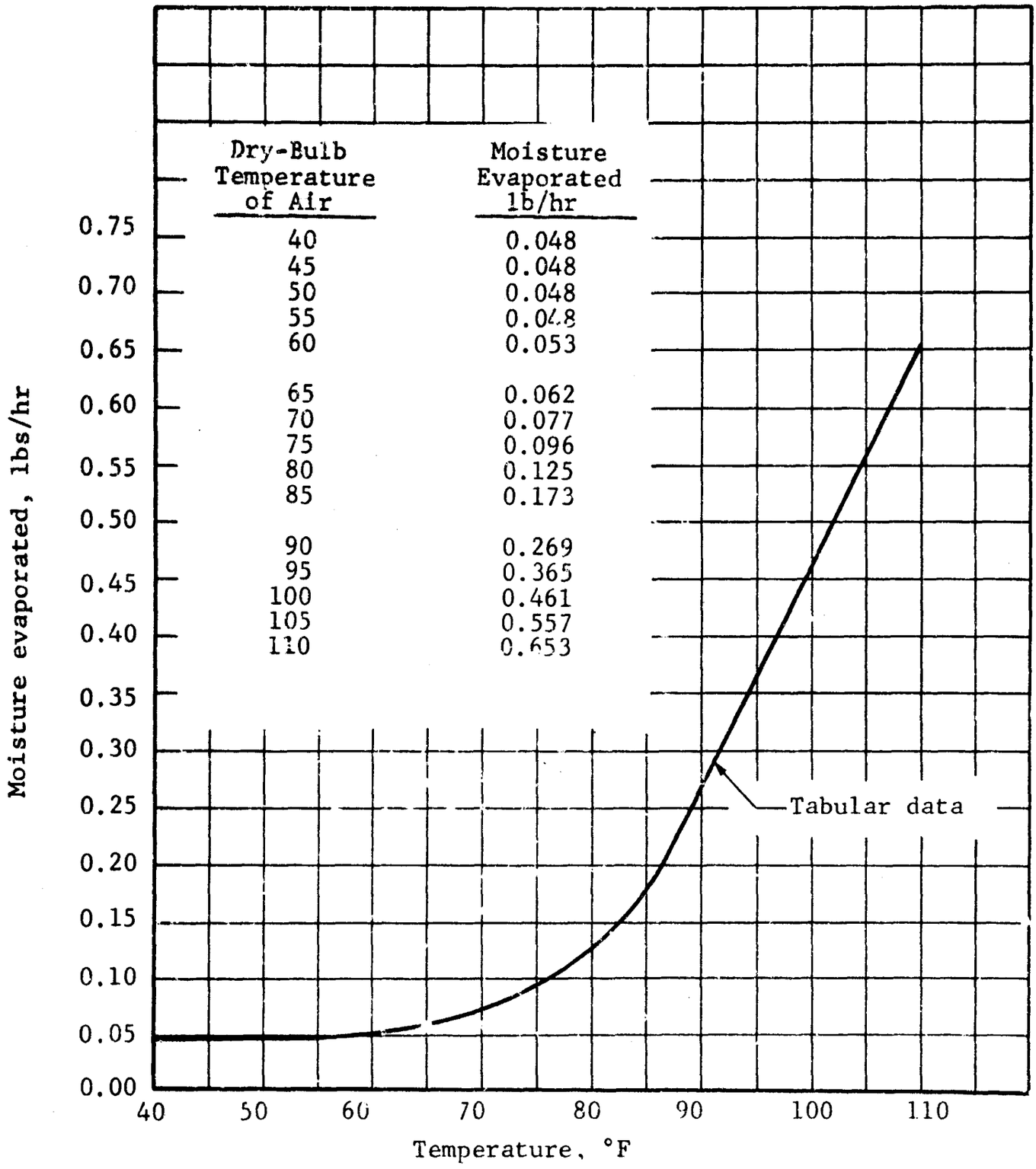


Fig. 21. VARIATION OF PERSPIRATION RATE WITH DRY-BULB TEMPERATURE OF ENVIRONMENT

windshield washers. Preliminary laboratory tests showed these pumps to be reliable and to have reproducible characteristics. In-place calibration of the individual pumps was accomplished by adjusting the stroke length so that each pump delivered the same amount of water (1.25 cc) per stroke. In use it was later found that occasional recalibration was required, probably as a result of changing physical characteristics of the rubber bellows in the pumps.

The pumps were mounted on standard relay-rack panels--seven panels with seven pumps per panel. Each pump was fed from a separate one-gallon bottle, and the discharge from each pump was led to an individual simulated occupant in the shelter via a plastic tube. The bundle of tubes from the pumps, together with one to feed the wicks of the wet-bulb thermocouples, ran from the instrumentation hut to the shelter, through the sand pile, in a 4-inch insulated conduit. A view of the interior of the instrument hut is shown in Fig. 22. This photograph shows, from right to left, the water still and storage drum below it; the bottles supplying the pumps; the rack of pumps with discharge tubes entering the conduit at the ceiling; the rack containing the electronics for controlling the pumping rate, the terminal board for all the thermocouples, and the temperature recorder; and at the far left on the wall, the manometer for air-flow measurement, and one of the kilowatt-hour meters.

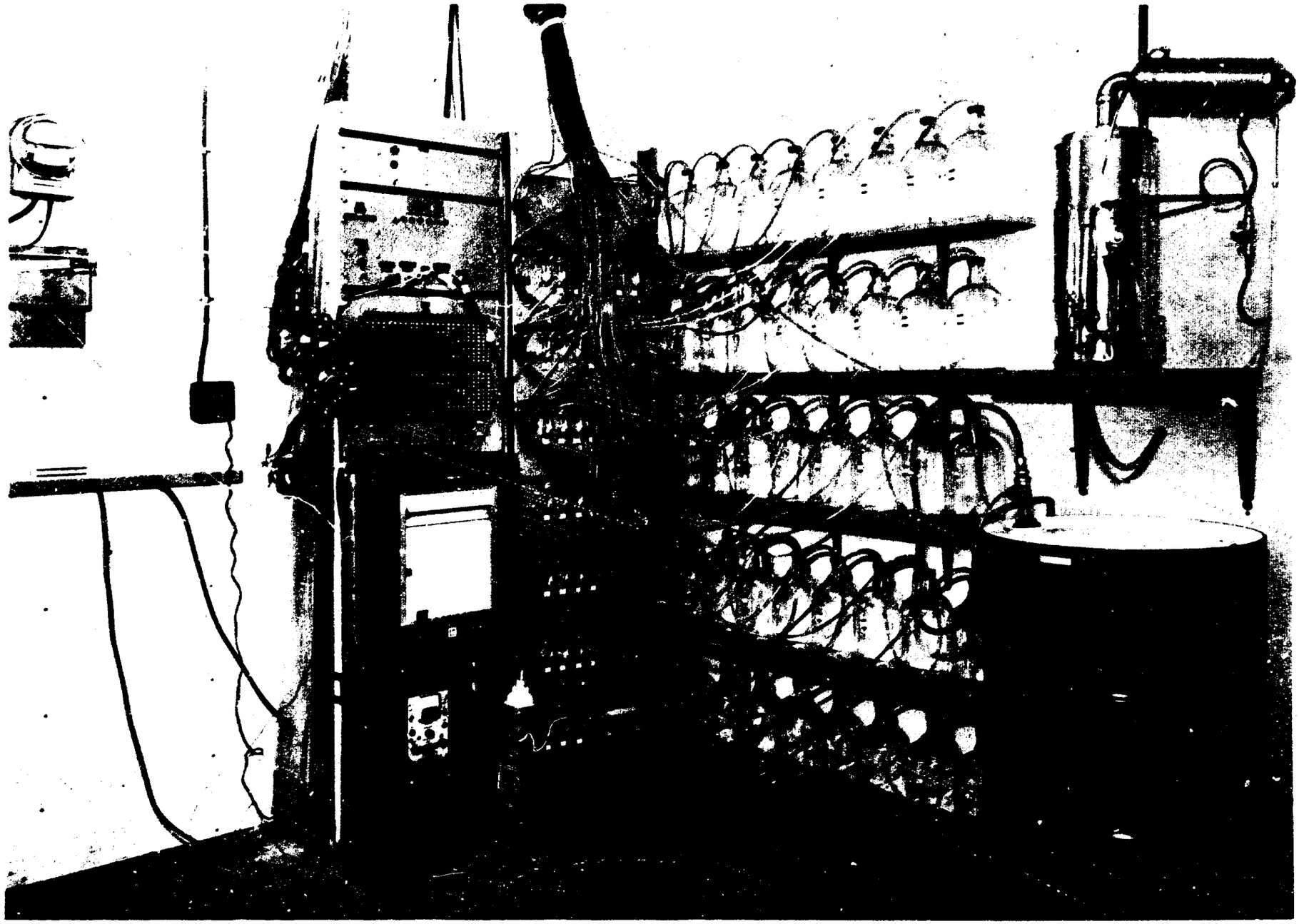


Figure 22. INTERIOR OF INSTRUMENTATION ROOM

Each group of seven pumps on a panel was driven by a single electric motor through a geared drive, as can be seen in Fig. 23, which shows the rear of the pump rack. Upon receipt of a pulse signal from the sweat-rate control, the electric motor was started and ran until the driver gear completed one revolution, which corresponded to one stroke of the pumps; then it stopped. One such cycle took nearly 8.6 seconds (7-RPM motor), so that loading of the pumps was not excessive even though the water was moved through approximately 40 feet of 3/16-in. I.D. tubing.

2. Control of Pumping Rate

In order to simulate properly the rate of moisture generation by the simulated occupants, the frequency of the pump strokes had to be made to depend on the dry-bulb temperature in the shelter in accordance with the relationship shown in Fig. 21. The control system that was used for this purpose is illustrated diagrammatically in Fig. 24. The primary sensing element was an ordinary thermocouple, measuring dry-bulb air temperature in the center of the shelter, that was connected to a single-point temperature recorder located in the instrument hut. The recorder was modified by replacing the printing mechanism that usually rides on the carriage of the instrument with an electric contact that was able to slide along a copper-clad epoxy board. The latter was etched to provide 42 separate contact points in the nearly 9-in. length traversed by the moving contact, and each contact on the board was connected

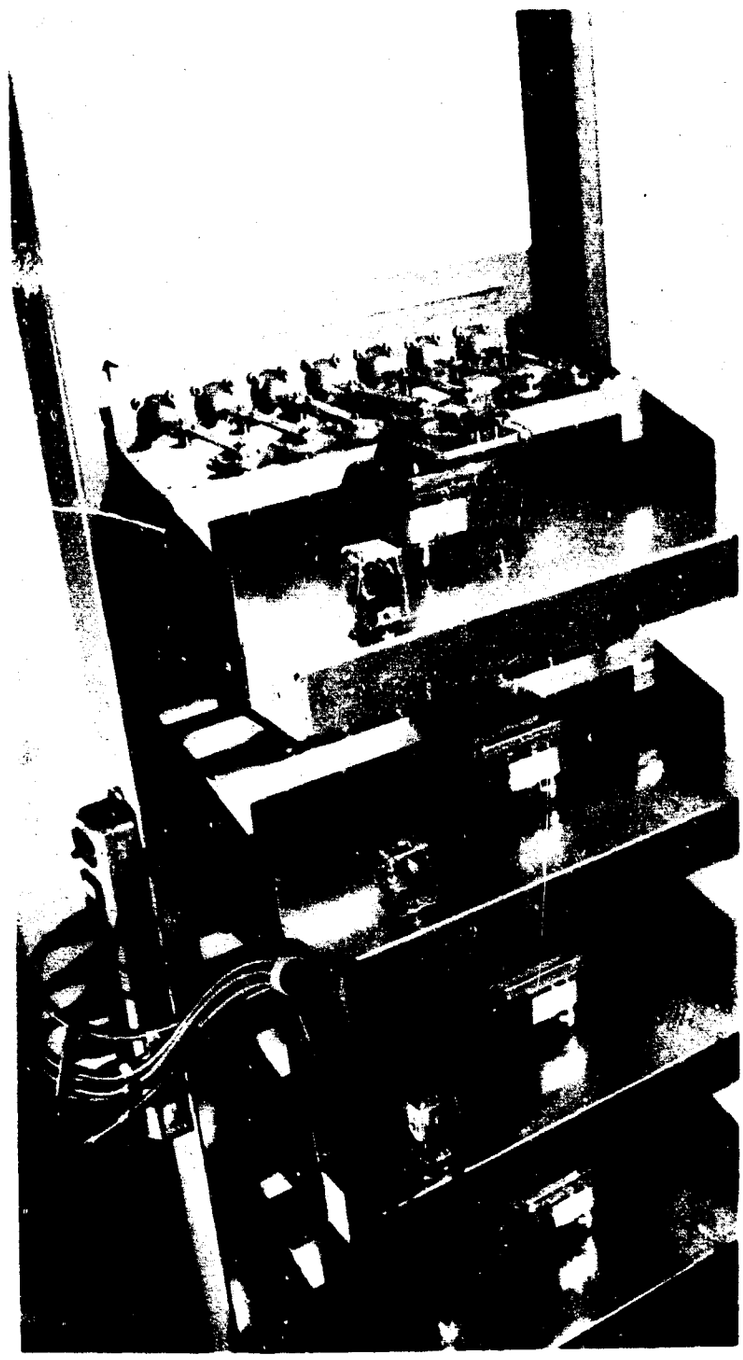


Figure 23. VIEW OF REAR OF PUMP RACK

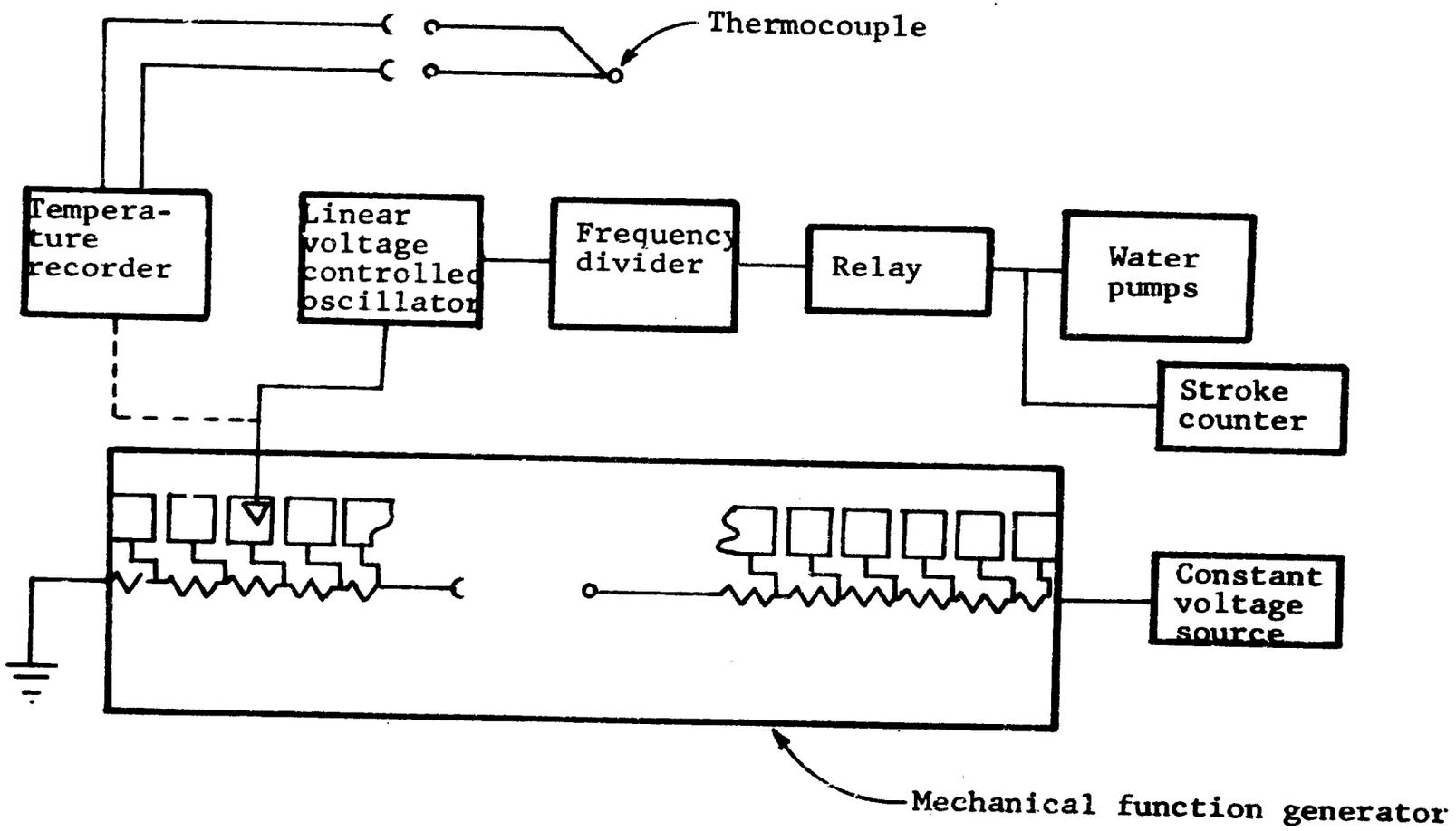


Figure 24. SCHEMATIC LAYOUT OF SYSTEM FOR CONTROL OF PUMPING RATE

by wire to a corresponding terminal spaced along wire-wound resistors connected in series. Thus, in effect, the position of the carriage on the temperature recorder, which reflected the dry-bulb temperature in the shelter, determined the resistance in the circuit and consequently the voltage reaching the oscillator. In this manner, the desired variation of pump strokes with temperature was approximated as a step-function consisting of 42 steps. The intervals for these steps were selected in such a way that the maximum deviation of a step from the nominal curve was 2.5% for temperatures above 85°F, and 5% for the lower temperatures where the total water requirements are rather low.

As indicated in Fig. 24, the position of the moving contact determined the voltage that reached the linear voltage-controlled oscillator and thus governed the frequency of the oscillator. This frequency was then reduced by the frequency divider to a level necessary for the proper functioning of the pumps and to obtain the desired delivery rate of the water. A counter was added as a check on the integrated number of pump strokes. Operation of the system could be checked readily by timing the interval between consecutive pump strokes and comparing it with the prescribed time interval for the then-current dry-bulb temperature in the shelter. Since the function generator consisted of permanently-set resistors, the only adjustments required were periodic calibrations of the zero and range settings on the recorder.

VI. TEST PROCEDURE

Four experimental runs were carried out with each of the three shelter configurations, utilizing constant ventilation rates of 0, 3, 7, and 15 cfm per occupant in the shelter. With the large 21 x 21 ft. shelter, the experiment with 3 cfm per occupant was repeated for considerably different initial temperatures of the soil around the shelter. Each test was terminated when any one of the following three conditions was reached: (a) the effective temperature in the shelter reached 90°F, or (b) conditions in the shelter no longer changed significantly from one day to the next, or (c) a period of two full weeks was reached. Thus most of the experiments were continued for the full two-week period, and the procedure for all experiments was the same.

The simulated occupants were uniformly distributed over the floor area of the shelter, with 5 units per cell, and an experiment was begun only when the temperature distribution through the soil was fairly uniform. The desired ventilation rate was set by selecting the most suitable blower speed, and by manipulating the control dampers in the supply duct and in the bypass duct. Immediately before the beginning of an experiment, the wicks covering the wet-bulb tehrmocouple sensors were manually saturated with water to assure that they would continue to stay wet by capillary action, and the aspirating blowers were checked for proper operation. Then the manhole entry to the shelter was sealed and covered with sandbags. A

reading of all temperatures was taken just rpior to the start of an experiment to establish the initial conditions. The supply of ventilation air was then begun simultaneously with the beginning of heat generation by the occupants, and the supply of perspiration moisture to them. Heat was generated at a constant rate of 117 watts per occupant throughout an experiment, and the rate of moisture supplied was varied automatically in response to the dry-bulb temperature in the shelter, as described in the previous section.

All experiments that involved ventilation were begun with dry-bulb temperature of the supply air at 85°F, which was the mid-point of the diurnal variation, on the rising portion of the sine curve. This was accomplished simply by setting the cam on the temperature controller to the proper position at time zero. In those experiments that did not involve ventilation, the air supply and return openings inside the shelter were covered and sealed with tape.

The shelter was entered only twice during an ordinary two-week experiment for the purpose of replacing wicks on the wet-bulb sensors, since it was found that even a relatively small amount of soiling reduced the capillarity of the cloth and thus tended to cause higher wet-bulb readings. Other aspects of the operation were monitored in the instrumentation hut. These included regular periodic calibrations of the temperature recorder, and of the recorder that served to control the supply of moisture to the occupants, as well as observation

of the action of the water pumps as exhibited by the rate at which the water level dropped in the bottles. Regular checks were also made to maintain the dew-point temperature of the supply air, and to adhere to the sinusoidal variation of its dry-bulb temperature. The ventilation rate was maintained constant by observing the inclined manometer.

Immediately upon the completion of an experimental run, the orifice plate was removed from the duct, the fan speed was increased, and the temperature of the spray water in the air washer was reduced to the lowest level, which was around 40°F, in order to cool the mass of the shelter structure and of the sand in preparation for the following test. This ventilation with cold air was maintained uninterrupted for a number of days--at times more than a week--to subcool the inner portion of the soil mass below the final equilibrium temperature. Then the ventilation was stopped, and the shelter was left idle for a nearly equal period of time for temperatures in the sand mass to stabilize. In this manner it was possible to achieve a fairly uniform temperature distribution through the soil for considerable distance from the shelter enclosure. This provided a uniform initial temperature distribution for the subsequent experiment, as can be seen from the tabulated temperature data at time zero.

VII. PRESENTATION AND DISCUSSION OF TEST DATA

All the results acquired in the course of this experimental program, aside from the incidental measurements of the thermal properties of the soil that were described in Section II

above, consisted of temperature data. Sufficient data are presented here to permit a complete mapping of the variation of temperatures as a function of both position and time for each of the experimental runs that were made. In the presentation of these data, a distinction will be made between the temperature variation in the soil surrounding the shelter, and temperatures occurring within the shelter enclosure. The former changed relatively slowly with time, while the latter responded more rapidly and reflected the effect of the imposed sinusoidal variation in the temperature of the ventilation air. Therefore air temperatures, and temperatures of the inside surfaces of the shelter enclosure, will be tabulated at more frequent time intervals that those in the soil.

The rate at which heat was generated within the shelter, although intended to be the same throughout all the experiments, showed a slight variation. Actual measurements for each experimental run are given in Table II. These were derived from the initial and final readings of two kilowatt-hour meters.

A. Graphs of Temperature versus Time for Shelter Air

Although all measured temperature data are tabulated in tables that follow, the variations of the air condition within the shelter are of greatest interest and these are also shown graphically in Figs. 25 to 5[illegible]. These figures are arranged in the order of increasing ventilation rates for each shelter size, with the data for the smallest shelter being given first.

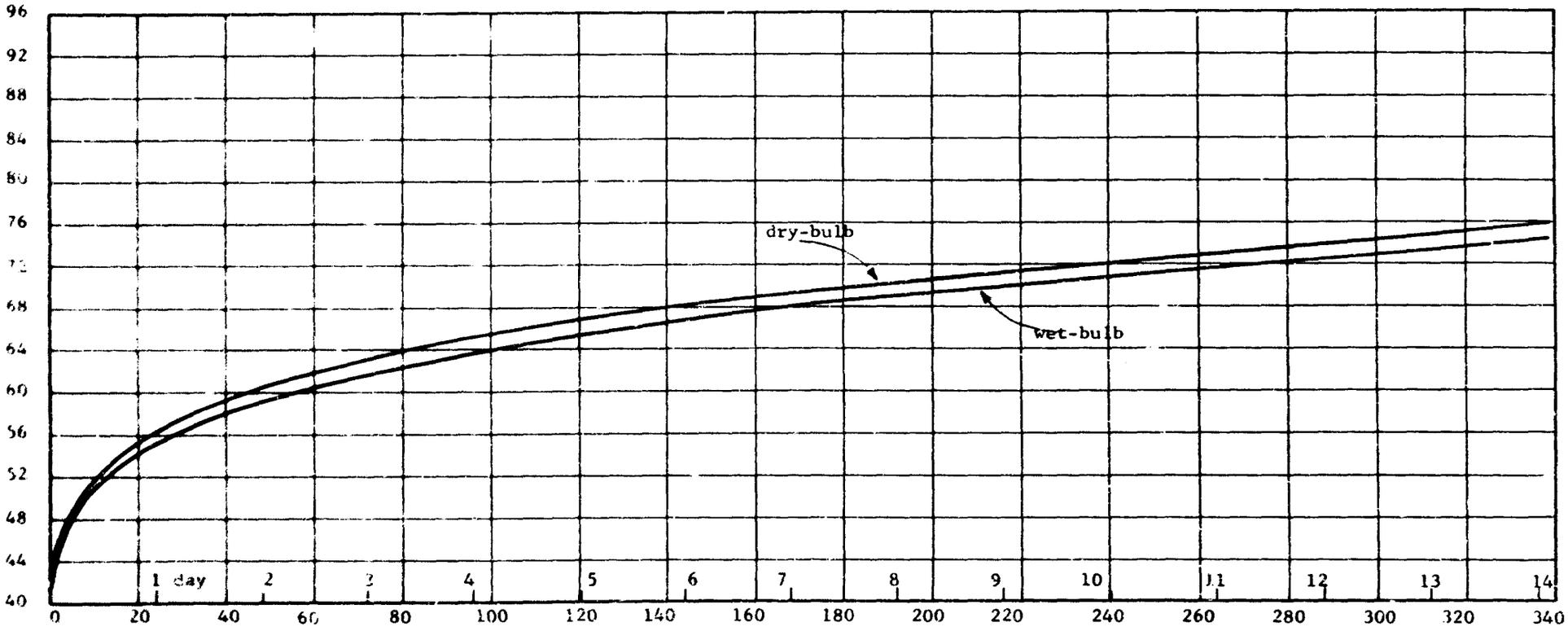


Fig. 25. VARIATION OF SHELTER AIR TEMPERATURES WITH TIME

7 x 7 x 7 ft. shelter; 5 occupants; no ventilation

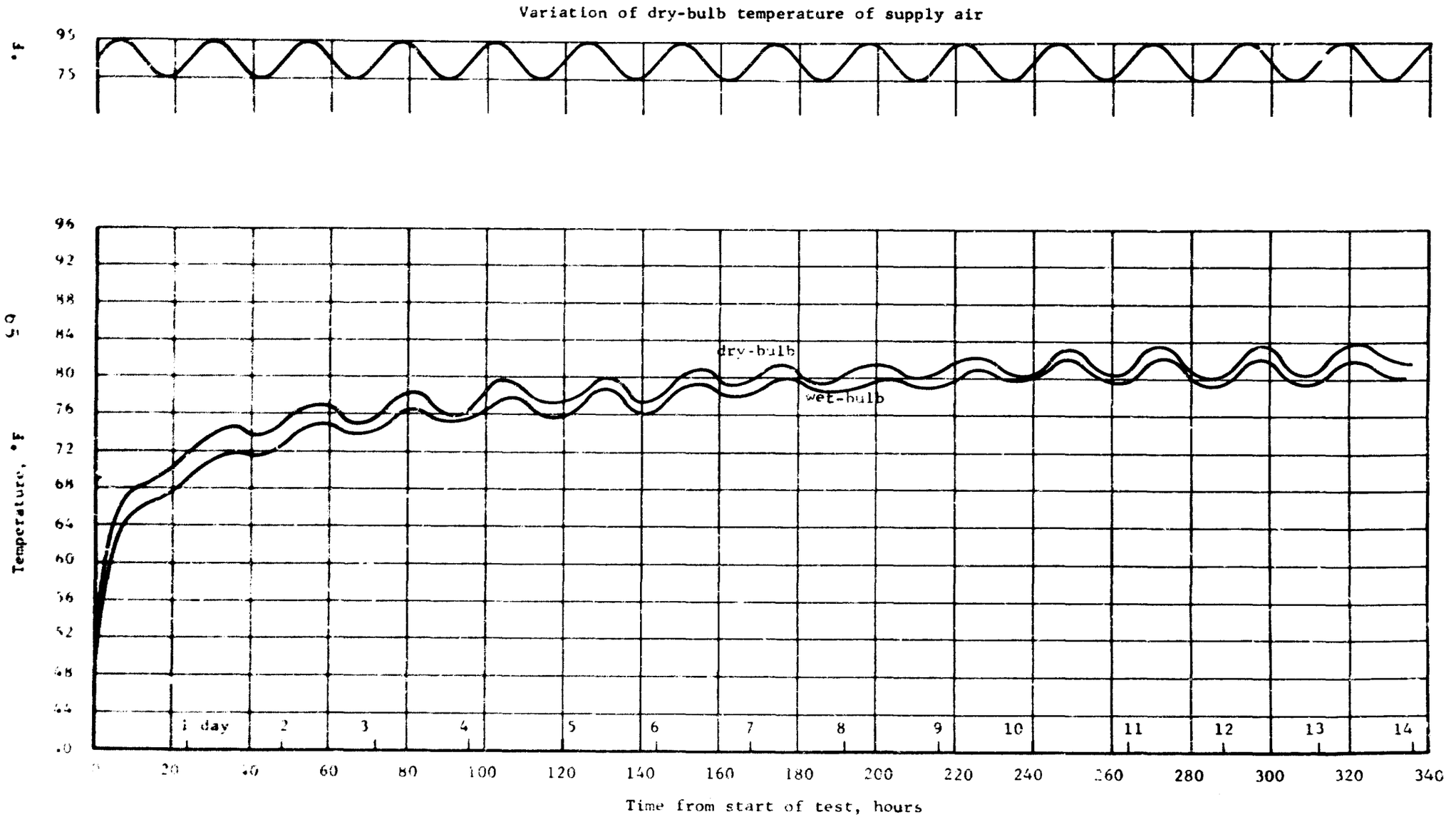


Fig. 26. VARIATION OF SHELTER AIR TEMPERATURES WITH TIME

7 x 7 x 7 ft. shelter; 5 occupants; 3 cfm occupant

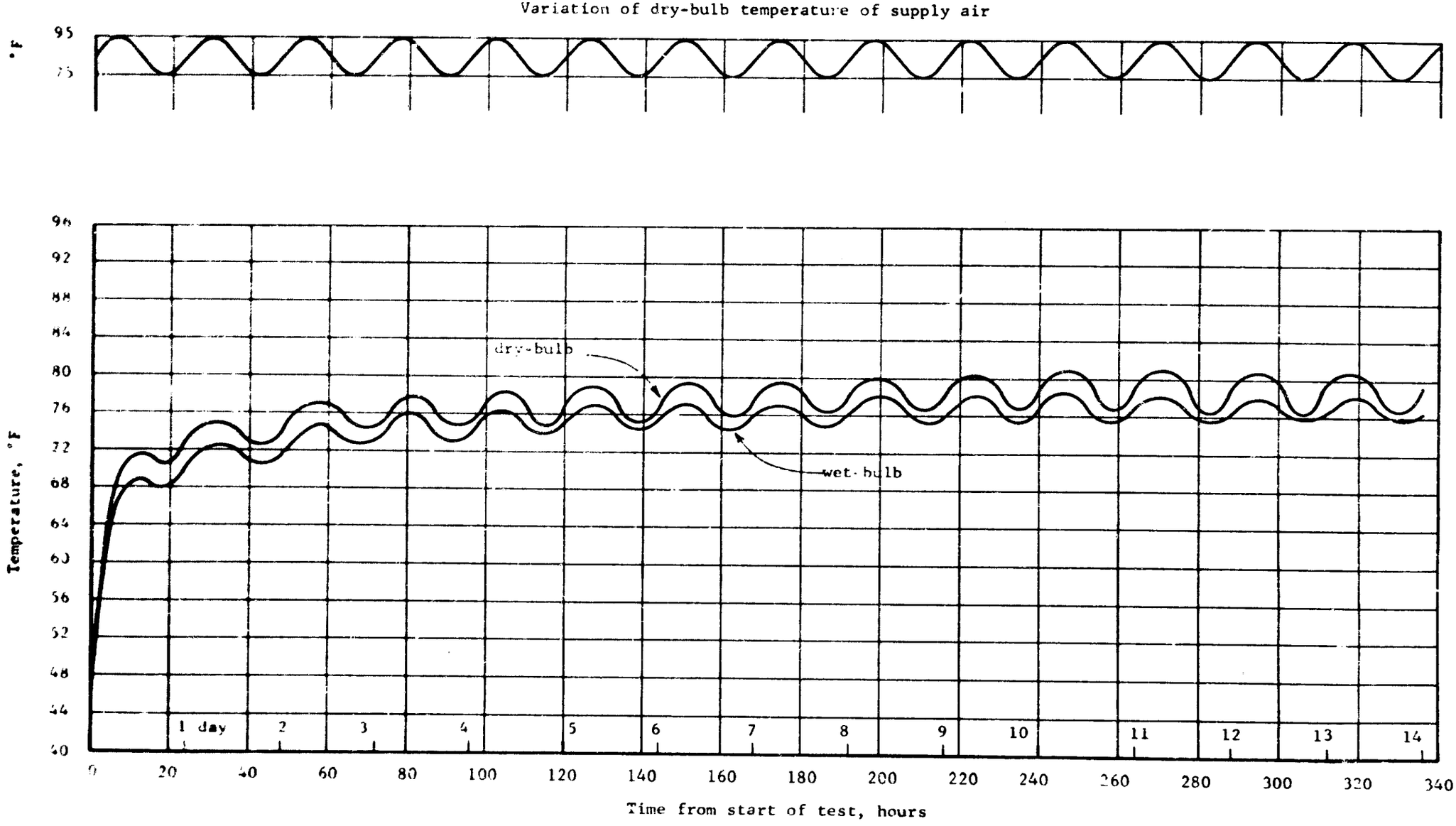


Fig.2 . VARIATION OF SHELTER AIR TEMPERATURES WITH TIME

7 x 7 x 7 ft. shelter; 5 occupants; 7 cfm/occupant

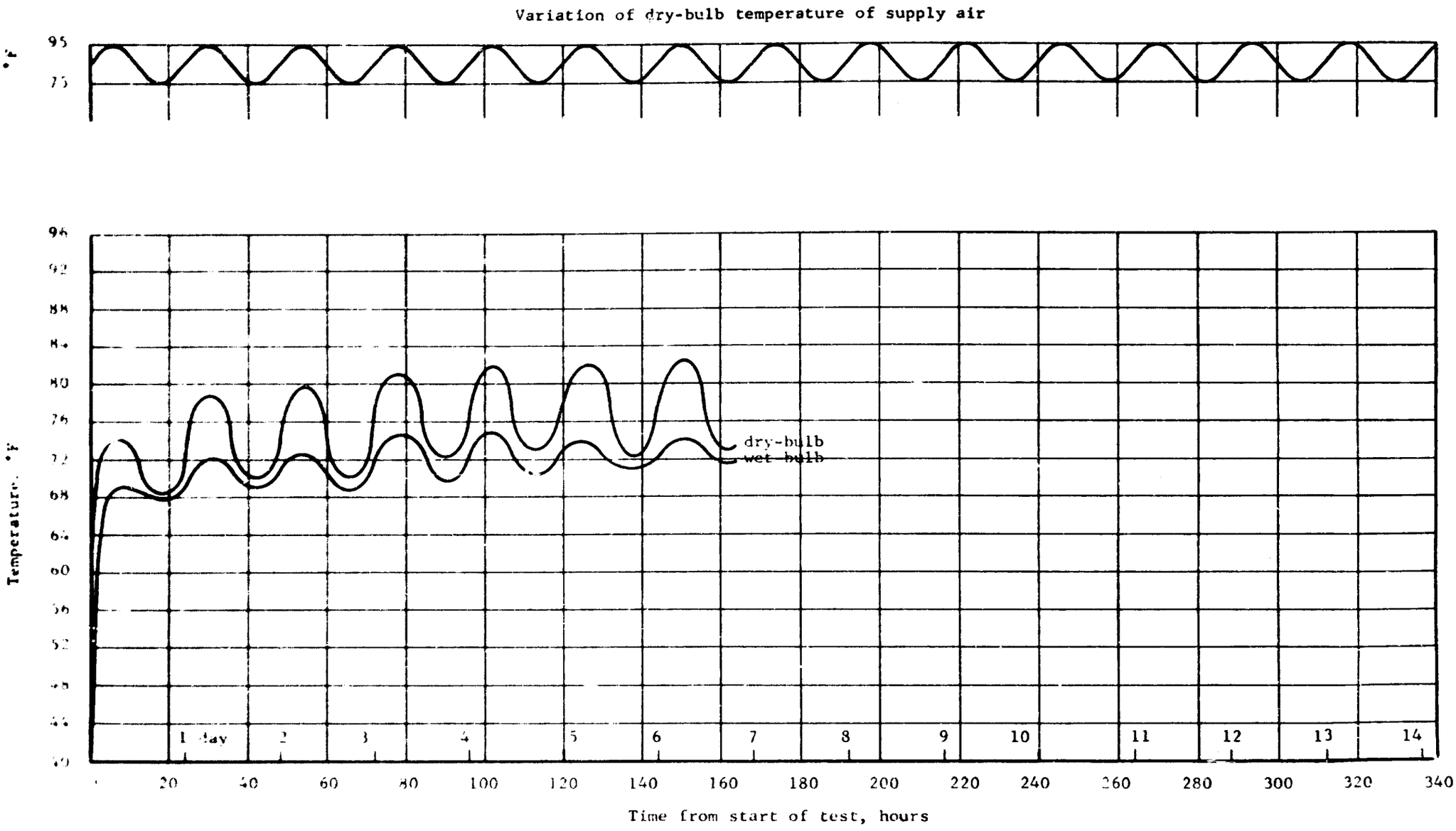


Fig.28. VARIATION OF SHELTER AIR TEMPERATURES WITH TIME

[illegible] x 7 ft. shelter; 5 occupants; 15 cfm/occupant

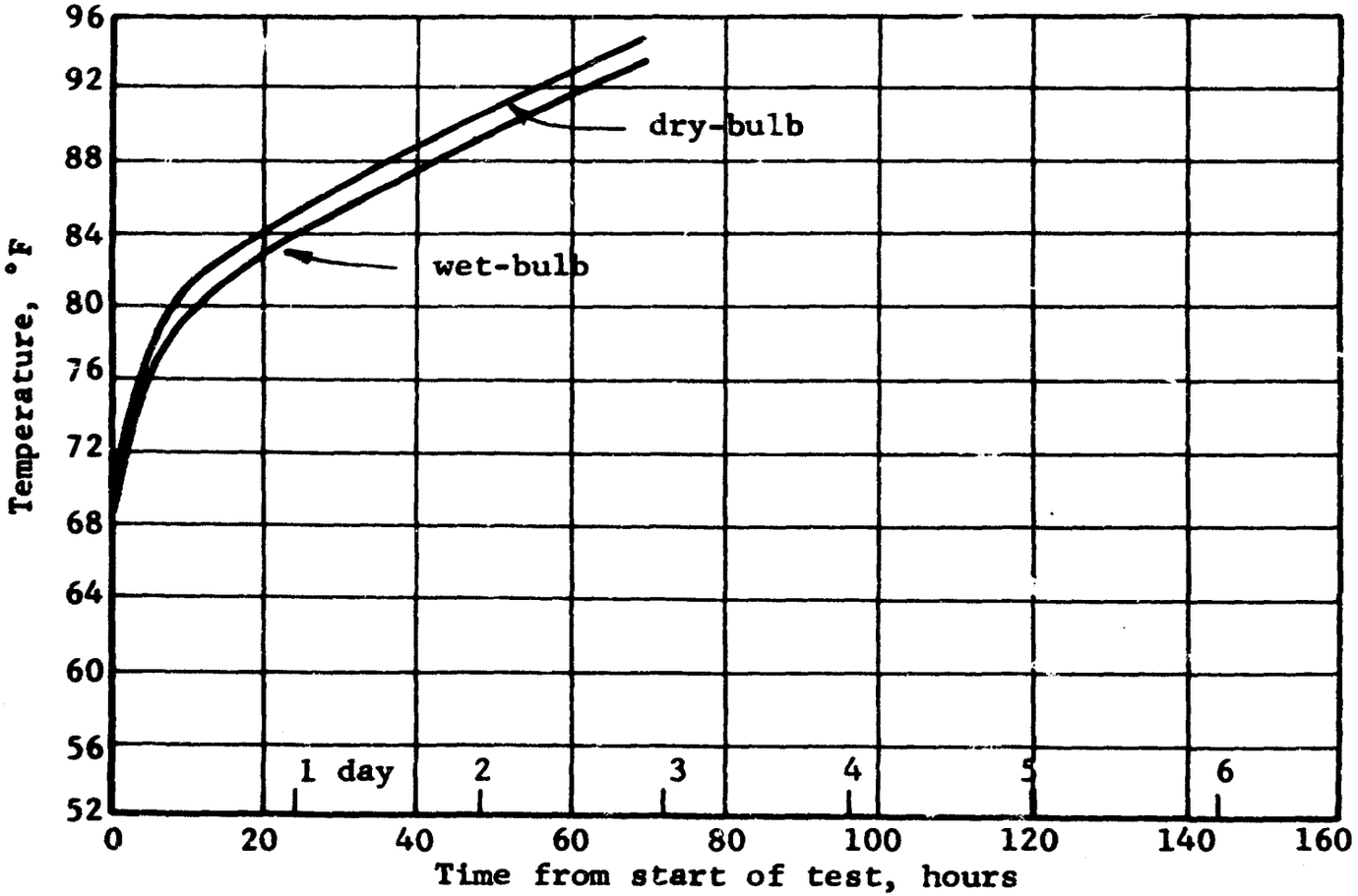


Fig. 29. VARIATION OF SHELTER AIR TEMPERATURES WITH TIME

21 x 7 x 7 ft shelter; 15 occupants;
no ventilation

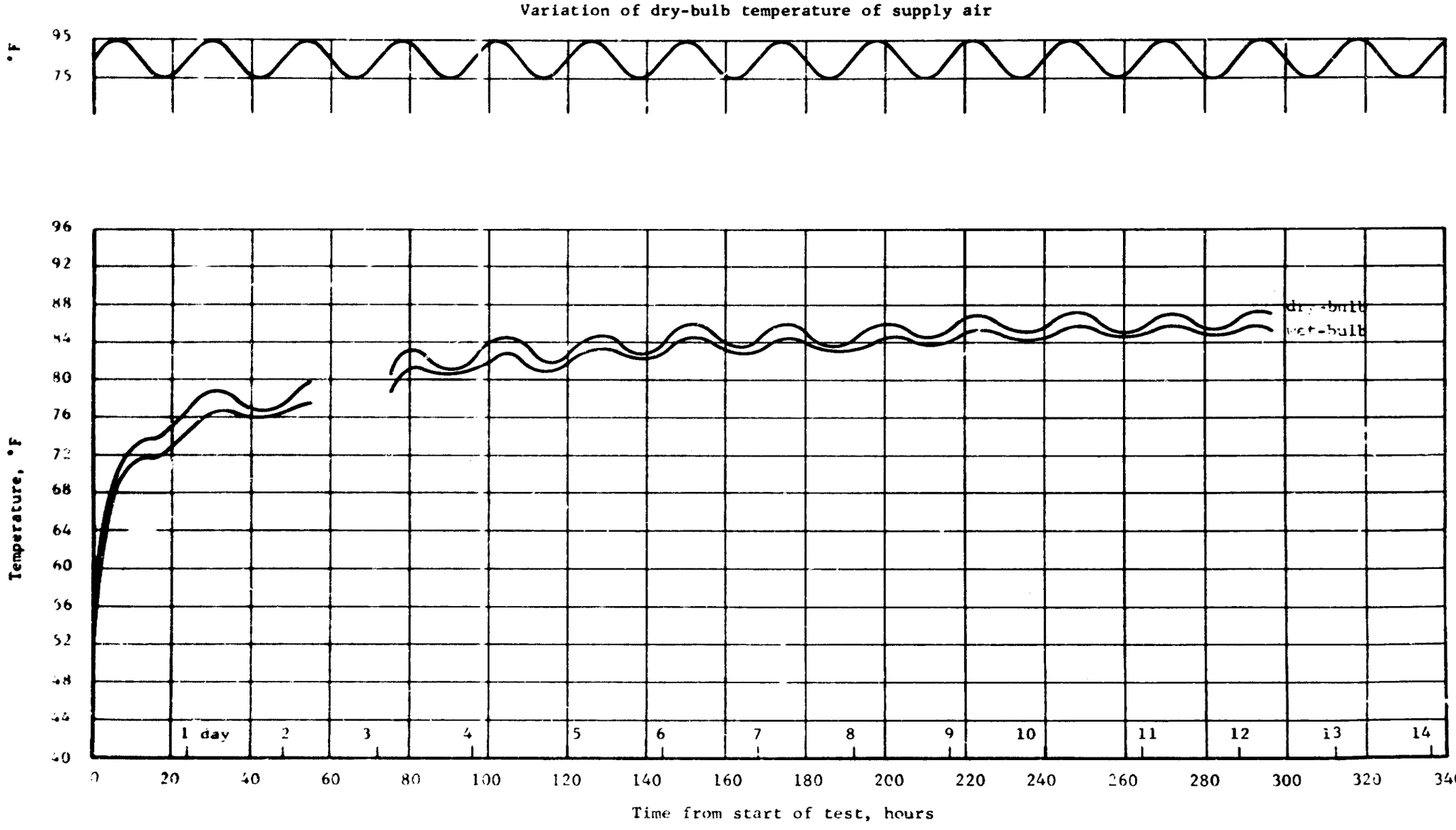


Fig. 30. VARIATION OF SHELTER AIR TEMPERATURES WITH TIME

[illegible] ft. shelter; 15 occup nts; 3 cfm/occup nt

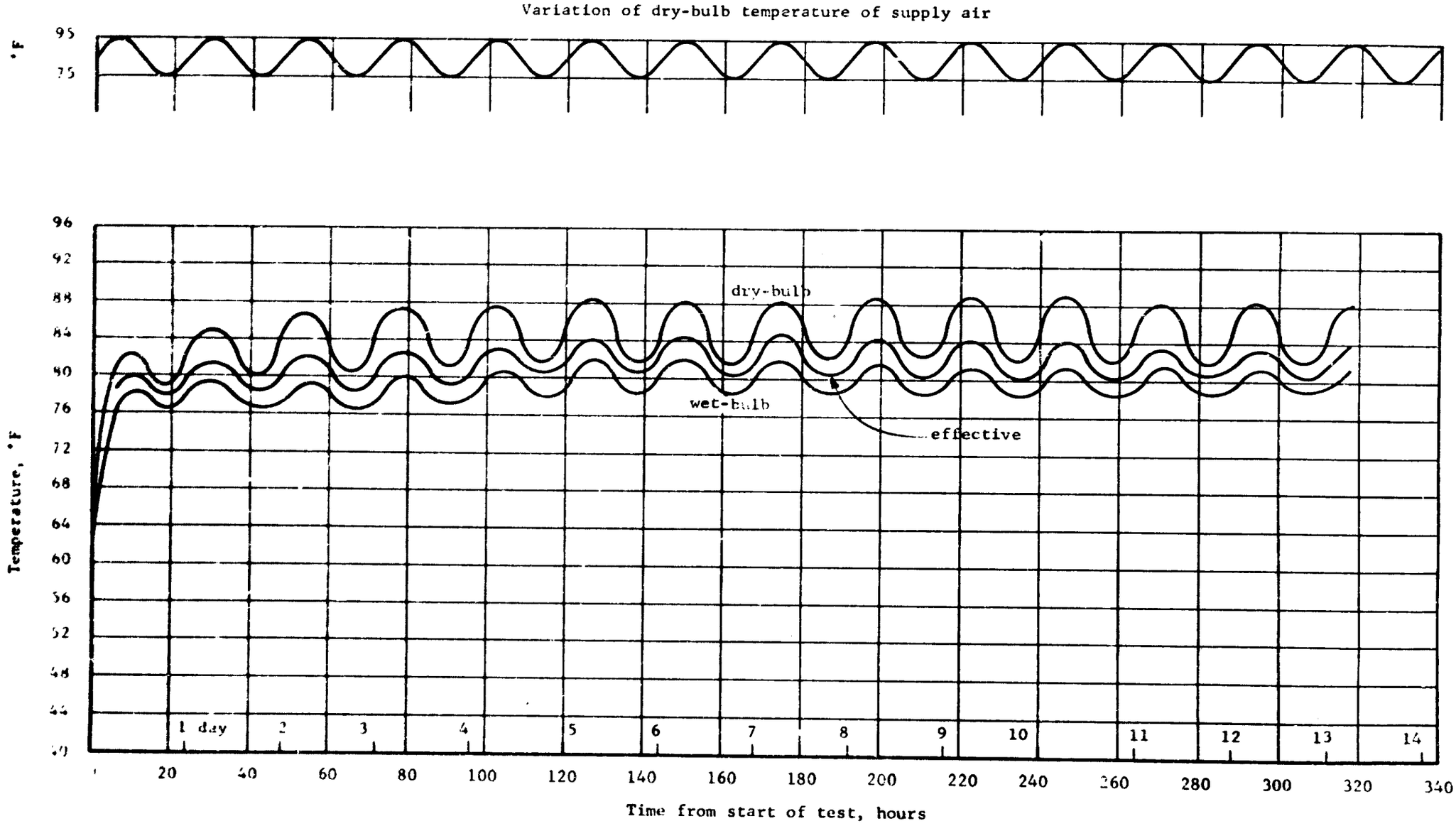


Fig. 31. VARIATION OF SHELTER AIR TEMPERATURES WITH TIME

21 x 7 x 7 ft. shelter; 15 occupants; 7 cfm/occupant

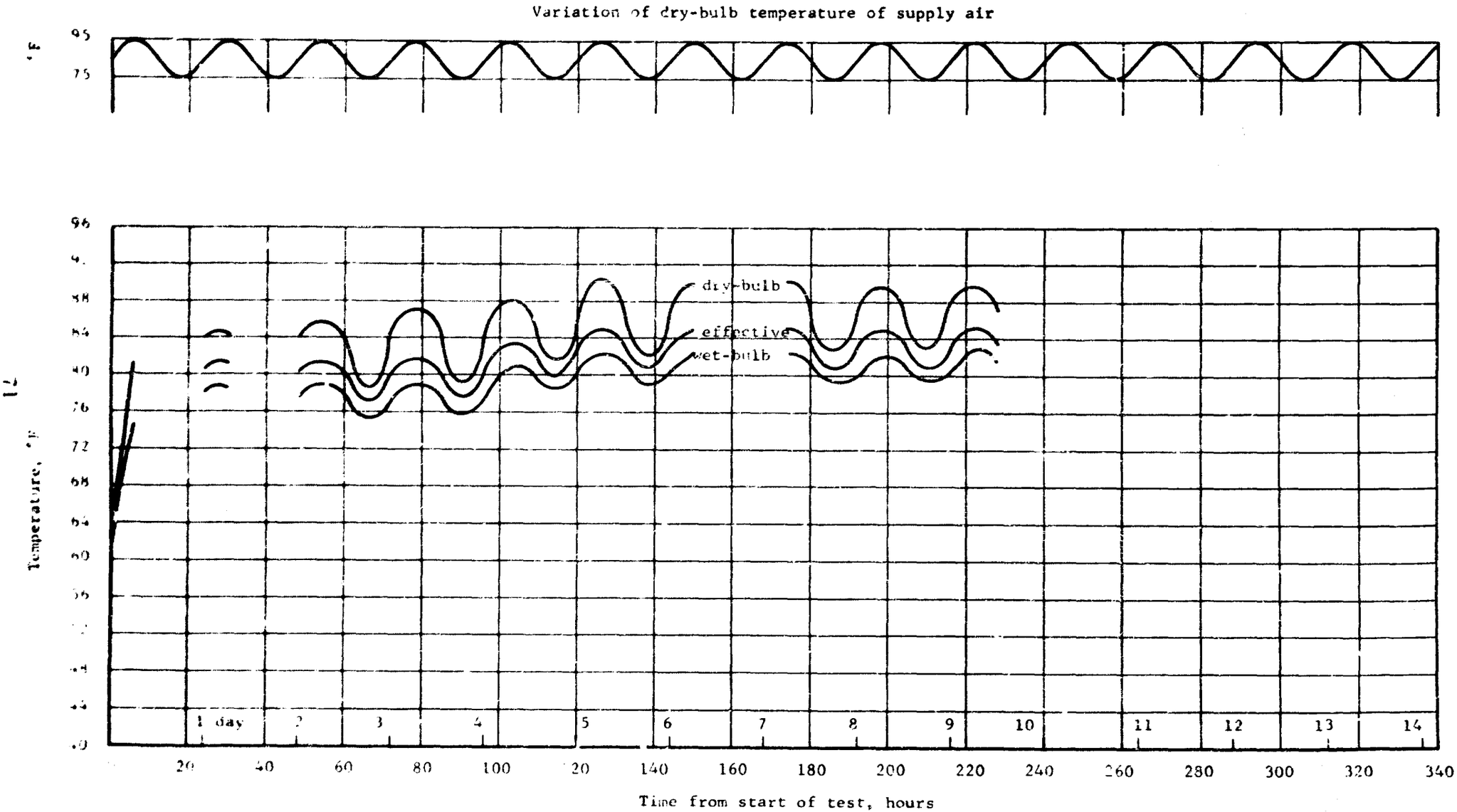


Fig. 32. VARIATION OF SHELTER AIR TEMPERATURES WITH TIME

21 × 7 × 7 ft. shelter; 15 occupants; 15 cfm/occupant

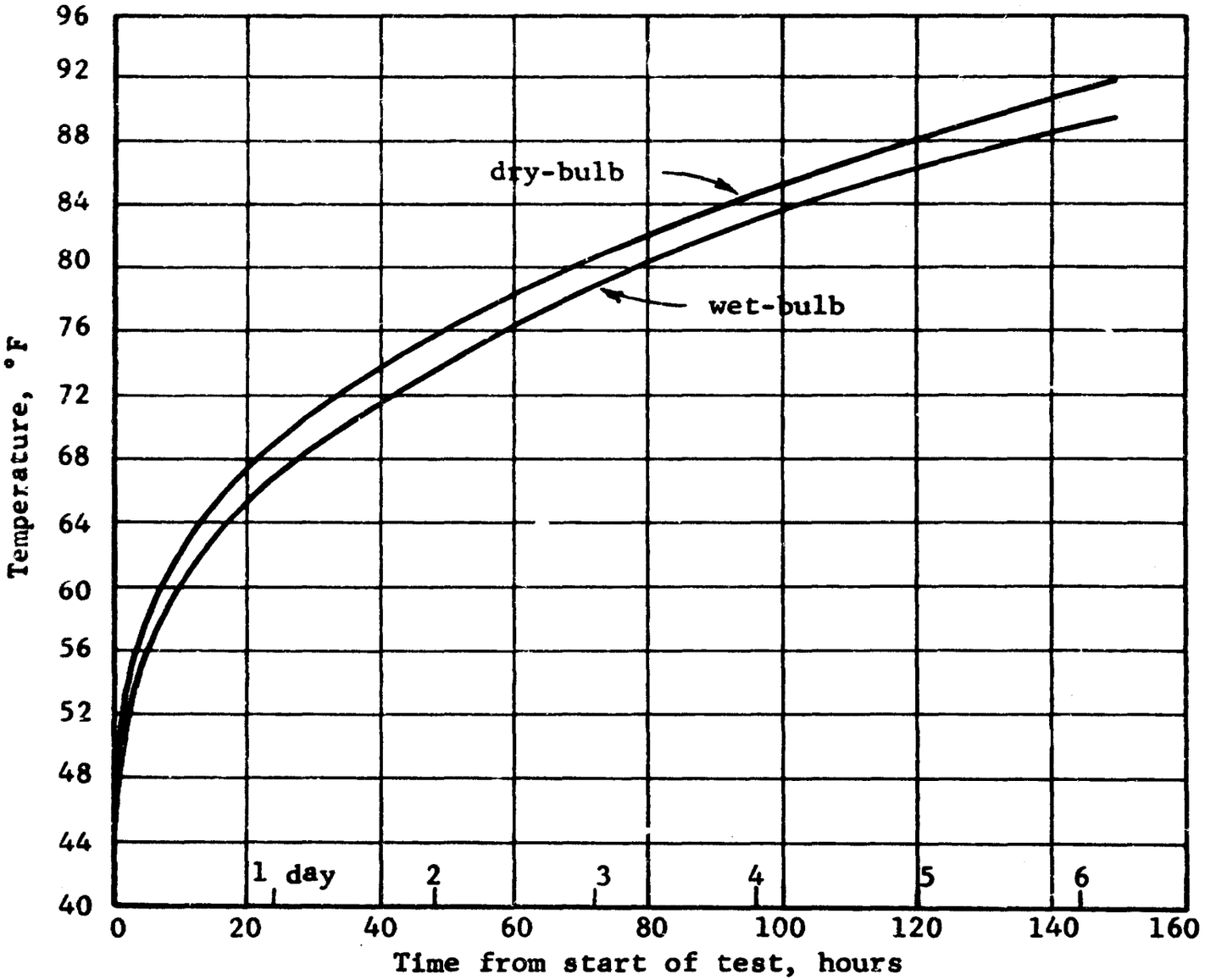


Fig. 33. VARIATION OF SHELTER AIR TEMPERATURES WITH TIME

21 x 21 x 7 ft shelter; 45 occupants
no ventilation

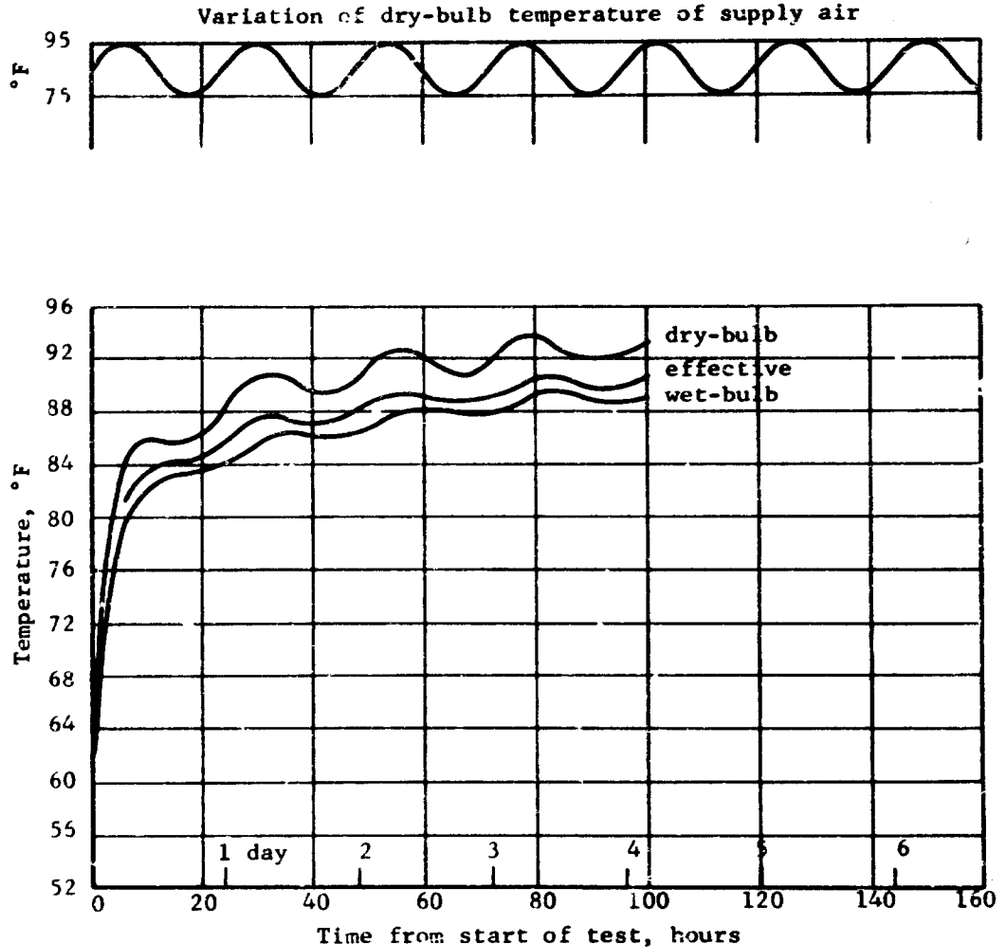


Fig. 34. VARIATION OF SHELTER AIR TEMPERATURES WITH TIME

21 × 21 × 7 ft shelter; 45 occupants;
3 cfm/occupant
(Test conducted July 9-13)

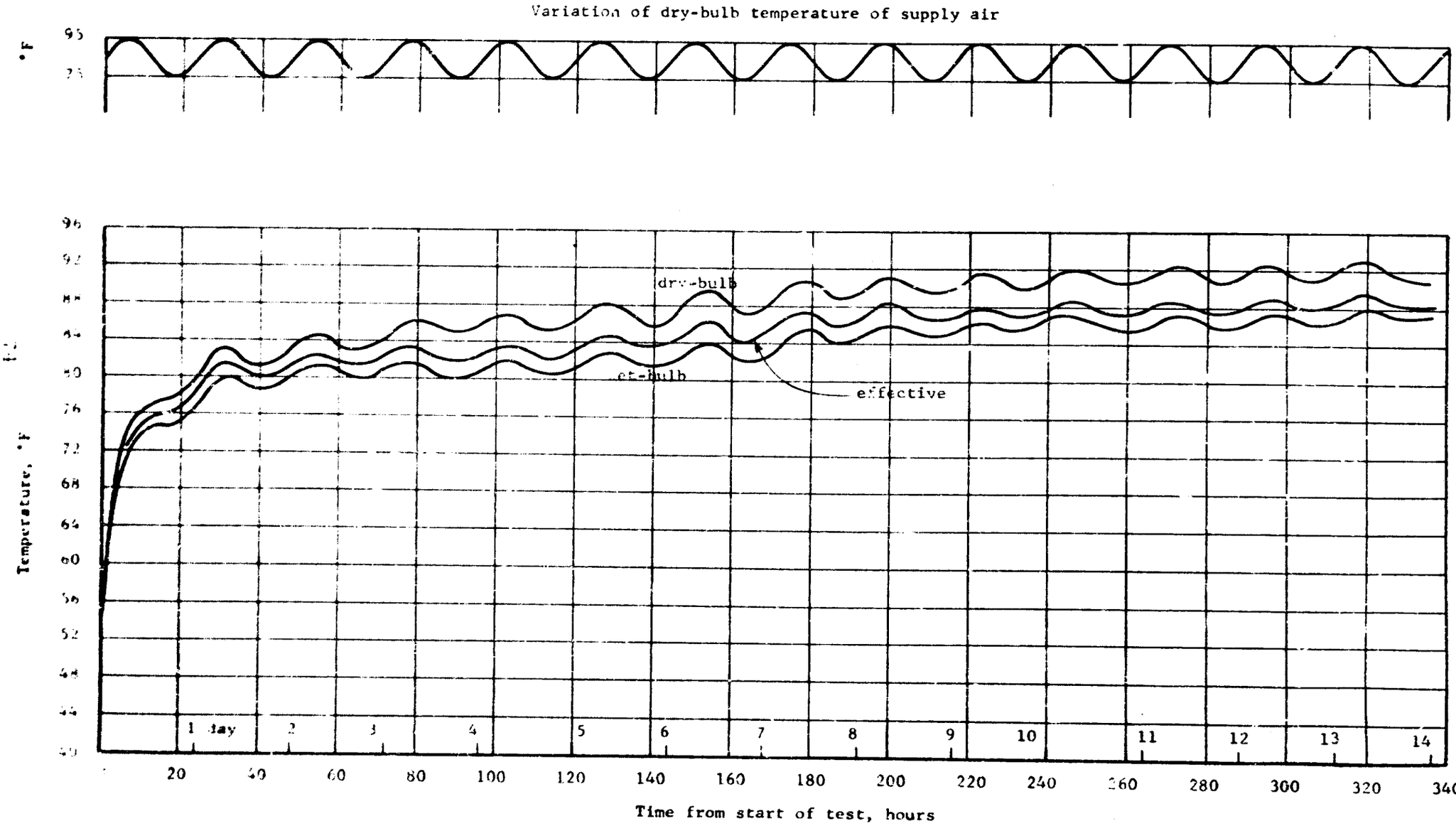


Fig. 35. VARIATION OF SHELTER AIR TEMPERATURES WITH TIME

21 x 21 x 7 ft. shelter; 45 occupants; 3 cfm/occupant
(Test conducted Apr. 20-May 4)

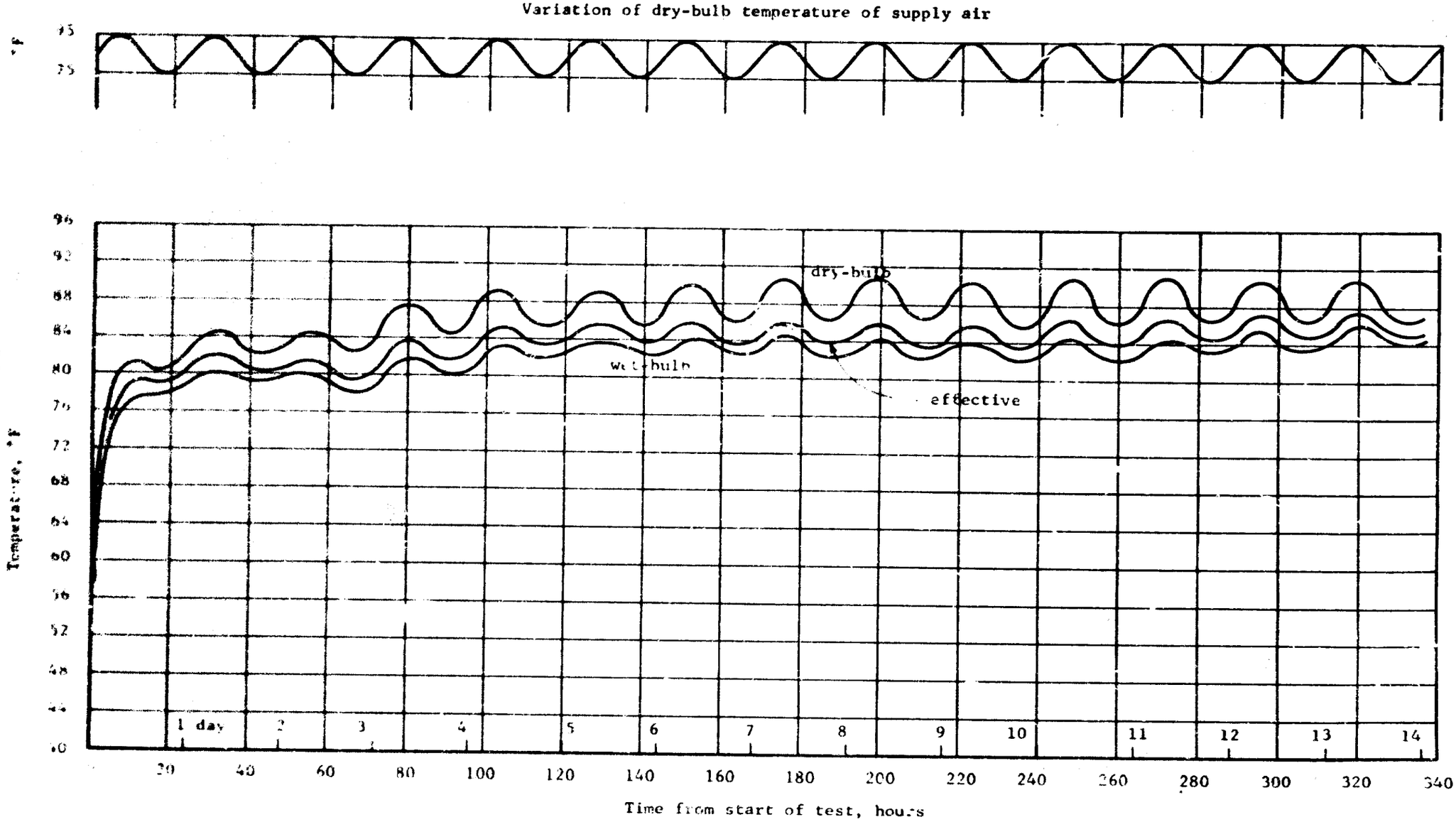


Fig. 36. VARIATION OF SHELTER AIR TEMPERATURES WITH TIME

21 x 21 x 7 ft shelter; 4 occupants;
7 cf.../occupant

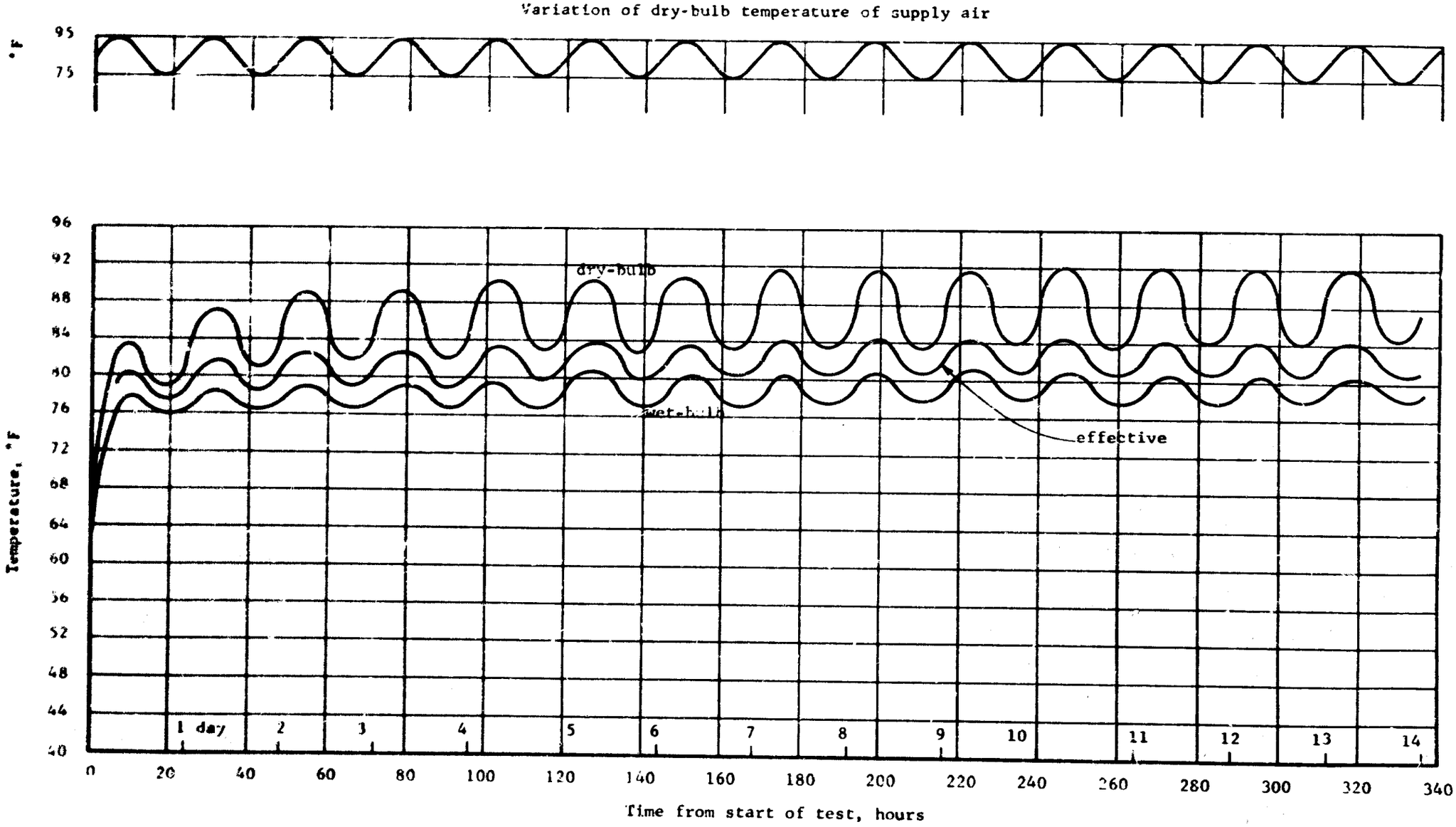


Fig. 37. VARIATION OF SHELTER AIR TEMPERATURES WITH TIME

21 × 21 × 7 ft. shelter; 45 occupants; 15 cfm/occupant

Table II. RATE OF HEAT GENERATION IN SHELTER DURING SIMULATED OCCUPANCY TESTS

Shelter size, ft	No. of occupants	Ventilation rate, cfm/ occupant	Rate of heat generation, watts/occupant		
			by simulated occupants	by other sources (lights, blowers)	Total
7 x 7 x 7	5	0	119.8	10.4	130.2
		3	116.5	6.9	123.4
		7	116.8	9.4	126.2
		15	119.4	7.1	126.5
21 x 7 x 7	15	0	117.0	6.4	123.4
		3	118.8	8.3	127.1
		7	118.9	6.4	125.3
		15	118.3	6.4	124.7
21 x 21 x 7	45	0	116.6	6.9	123.5
		3*	116.1	8.3	124.4
		3**	115.9	7.0	122.9
		7	116.1	7.2	123.3
		15	116.2	7.1	123.3

*Test of April 20 - May 4

**Test of July 9 - 13

The plots show the variations of dry-bulb, wet-bulb, and effective temperature as functions of time, with the latter temperature being derived from the former two by means of the nomogram included in the Guide of the ASHRAE (Ref. 4), or in Ref. 5. The plot of effective temperature has been omitted in those instances where the difference between the dry-bulb and wet-bulb temperatures is small, because the effective temperature must necessarily lie between the two. For experiments that involved ventilation of the shelter, the cyclic variation of the dry-bulb temperature of the supply air is included at the top of each graph (using a different temperature scale) to indicate the time relationship between variations in the temperature of the supply air and those of the shelter air.

Considering the results for any given shelter size, it is immediately apparent that for the case of no ventilation, the temperatures in the shelter increase monotonically with time, while with the addition of ventilation, the effect of the diurnal variation in the temperature of the supply air is superimposed on this rising characteristic. The daily variation in the temperature of the shelter air is only a fraction of the variation of the supply air. This effect, however, is seen to increase with increasing rates of ventilation. Similarly the humidity of the shelter, as evidenced by the difference between the dry-bulb and wet-bulb temperatures, is seen to decrease with increasing ventilation rates.

The temperature rise in the shelter during the early hours of occupancy is greater in instances when there is ventilation, because the temperature of the incoming ventilation air is higher than the initial soil temperature. This effect is particularly pronounced for the case of the small shelter because the initial inside temperature during each of the four experimental runs was less than 50°F. From a comparison of the graphs for the small shelter, Figs. 25 to 28, it can be seen that objectionably high temperatures were not reached during any one of these four experiments, and the most gradual temperature rise was for the case of no ventilation. The very important effect of initial shelter and soil temperatures shown by the data for the small shelter is also borne out by all of the other experiments.

The experiments that did not involve any ventilation were the least complicated and lend themselves best to direct comparison in terms of temperature rises above initial values. It is interesting to note the relationship between the total areas available for heat transfer in each of the three shelter structures (floor, walls, ceiling), and the temperature rises inside these structures at specific times after the beginning of simulated occupancy. The nominal surface area per occupant in the small shelter was 58.8 ft^2, while in the medium and large shelters it was 45.8 ft^2 and 32.7 ft^2 respectively. After 70 hours of occupancy, for example--which was the total running time for the medium-sized shelter--the respective

temperature rises in the three structures were 19.5°F, 26.5°F, and 34°F. The fact that the temperature rise in the shelter at any time is inversely proportional to the surface area per occupant can be seen from the following Table III which shows relatively good agreement between the respective ratios. It is also clear that the total surface area per occupant is an important factor for heat dissipation, and in this respect a small shelter is superior to a large one of the same ceiling height if the population density is based on maintaining the same floor area per occupant.

The mass of the shelter structure is also approximately proportional to the total surface area. Insofar as its function as a heat sink is concerned, however, the heat capacity of the steel is not high enough to have a significant effect. The smallest shelter had the greatest mass of steel per occupant, approximately 1200 lb, but even a 30°F rise in the temperature of this steel would represent the amount of heat generated by an occupant in only about 10 hours. For the large shelter, it would be the equivalent of less than 6 hours.

The results of all the experiments that involved ventilation indicate that environmental conditions in the shelter changed very little after the first week of occupancy. With a ventilation rate of only 3 cfm per occupant, the temperature rise during the second week of the order of 2 to 3°F. For higher ventilation rates, the temperature rise was even smaller, and several of the tests were terminated before the

Table III. CORRELATION BETWEEN TEMPERATURE RISE AND SURFACE AREA PER OCCUPANT FOR CASES OF NO VENTILATION

Shelter size	Surface Area Per Occupant Ft^2	Temperature rises, °F		
		At 35 hr	At 70 hr	At 140 hrs
Small	58.8	15	19.5	24.5
Medium	45.8	19	26.5	---
Large	32.7	26	34	45

	Inverse of Area Ratio	Ratios of Temperature Rises		
		At 35 hr	At 70 hr	At 140 hrs
$\frac{\text{Medium}}{\text{Small}}$	$\frac{58.8}{45.8} = 1.28$	$\frac{19}{15} = 1.27$	$\frac{26.5}{19.5} = 1.36$	- - -
$\frac{\text{Large}}{\text{Small}}$	$\frac{58.8}{32.7} = 1.80$	$\frac{26}{15} = 1.73$	$\frac{34}{19.5} = 1.74$	$\frac{45}{24.5} = 1.84$

end of the two-week period, because there were no further discernible changes. It may also be noted that as the ventilation rate is increased, the inside air temperatures become more responsive to the temperature variations of the supply air and undergo considerable daily cyclic fluctuations. The time at which a prescribed limiting temperature level is first reached cannot therefore be considered as the sole criterion for length of time for safe occupancy since the given limiting temperature will not be maintained continuously after being first reached.

B. Tables of Temperature Variation as a Function of Location and Time

Temperature data for all the experiments conducted on the three shelter sizes are compiled in Tables IV to XVI. These are arranged, as were the graphs, in the order of increasing ventilation rates for each shelter, with the data for the smallest unit given first. Each table consists of two parts--the "A" part includes temperatures measured inside the shelter enclosure, while the "B" part consists of temperatures measured in the soil surrounding the shelter. Temperatures of the inside surfaces are repeated in both parts for completeness. Skin temperatures of the simulated occupants and outdoor air temperatures at the time of an experiment (which are unrelated to the condition of the ventilation air) are given as the last items in part "A" of the tables.

Temperatures measured within the shelter, besides surface temperatures, included those in the supply and return

air, ducts and of shelter air at several locations as indicated in Section IV-B above. The identification of these thermocouples in the tables is self-explanatory. It should be pointed out, however, that the readings indicated by the air aspirator located only one foot above floor level indicated readings that were abnormally high, contrary to the effect of stratification that would be expected in an enclosure having relatively little air movement. These higher readings are attributed to the manner in which heat was generated and dissipated by the simulated occupants. The resistance heaters in the simulators were located less than one foot above floor level (see Fig. 19), and although a radiation shield of aluminum foil was inserted immediately below the resistor, radiant heat transfer to the steel floor could not be eliminated completely and some direct heating of the floor plate probably took place. Differences between the temperatures indicated by the other aspirators in the shelter were small, and temperatures measured in the return air ducts were representative of those existing in the middle of the shelter.

Inside surface temperatures of wall, ceiling, and floor are tabulated for the three cross-sectional planes shown in Fig. 11, and the location of the individual thermocouples were given in Figs. 12 to 14. As the shelter was reduced in size from the original 9-cell configuration, section B-B was automatically eliminated, and the number of thermocouples was reduced to those located in the remaining two cross-sections.

Temperatures indicated by thermocouples attached to the floor plate tended to read high for the reason indicated in the previous paragraph. All temperatures measured inside the shelter are tabulated at 6-hour intervals for the duration of each experiment in order to pick up the periodic wave-form imposed by the condition of the supply air.

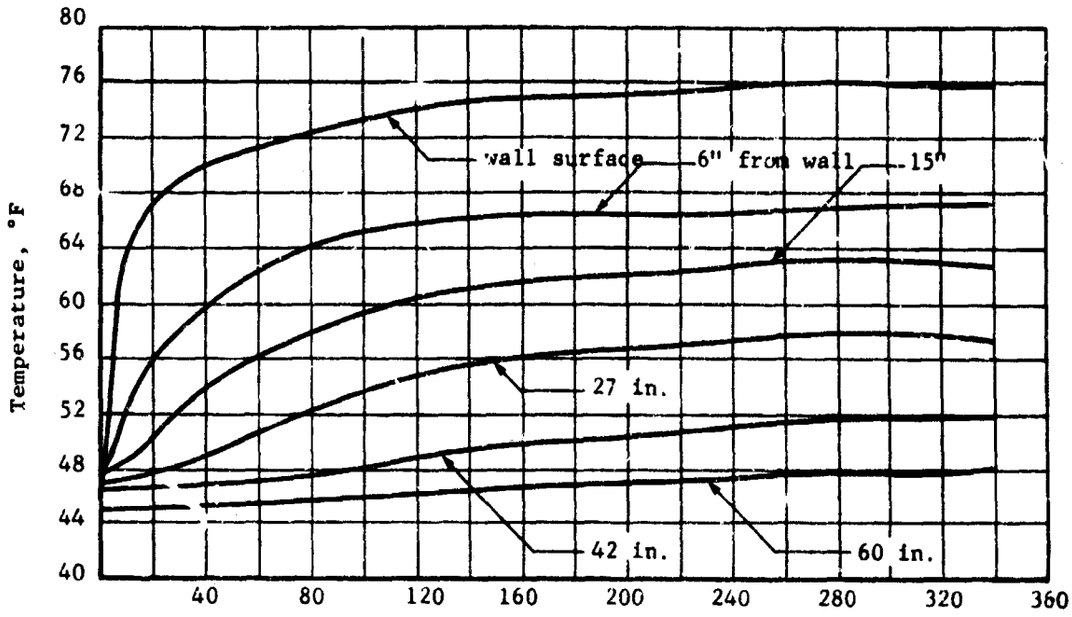
Visual observation at the conclusion of an experiment showed that at least some unevaporated perspiration water had accumulated in the drip cans beneath the simulated occupants. In some experiments, water on the floor indicated earlier condensation on the inside surfaces, although the walls had been dry at the time the test was terminated. It can be seen from the tables that, with increasing time, surface temperatures differed little from inside air temperatures, as could be expected.

These experimental shelters were constructed of impermeable inside surfaces primarily in order to avoid the problems of moisture emigration in any subsequent correlation with analytical results. Impermeable walls are probably not most typical of actual structures, but they represent a more severe case insofar as heat transfer from the structure is concerned. Permeable walls that would permit the migration of water vapor would tend to increase the rate of heat transfer in two respects--by increasing the thermal conductivity of the surrounding soil, or at least maintaining it at a high level, and by the convective transport of heat resulting from condensation beyond the

inside surfaces of the structure. The major extent to which moisture content affects the thermal conductivity of soils could be seen from the measurements made on the sand used to cover these shelters, as shown earlier in Fig. 7.

Temperature variations in the sand surrounding the shelter, for each of the experiments, are tabulated in the "A" part of each table. Readings are given for time intervals of one day beginning with the time at which an experiment was started. These are arranged in sequence for each of the cross-sectional planes in which thermocouples were located as shown in Fig. 11. For each cross-section, temperatures are given first for locations in the soil beyond the wall of the shelter, then for locations above the roof, and finally for locations beneath the floor. The nomenclature used in the tables for these thermocouples is also intended to be mostly self-explanatory, but for the exact layout of the thermocouples reference should be made to Figs. 12 to 14. It is to be noted that as the size of the shelter was reduced, the numbering system for the thermocouples was retained unaltered; that is, the identification of a thermocouple located at a given elevation and distance from the wall remained the same even when the wall itself was moved during a change of configuration

An example of typical cross-plots showing the temperature variations in the soil during a test is shown in Fig. 38. These data are for the small shelter when the ventilation rate was 7 cfm/occupant. The upper set of curves shows the rates



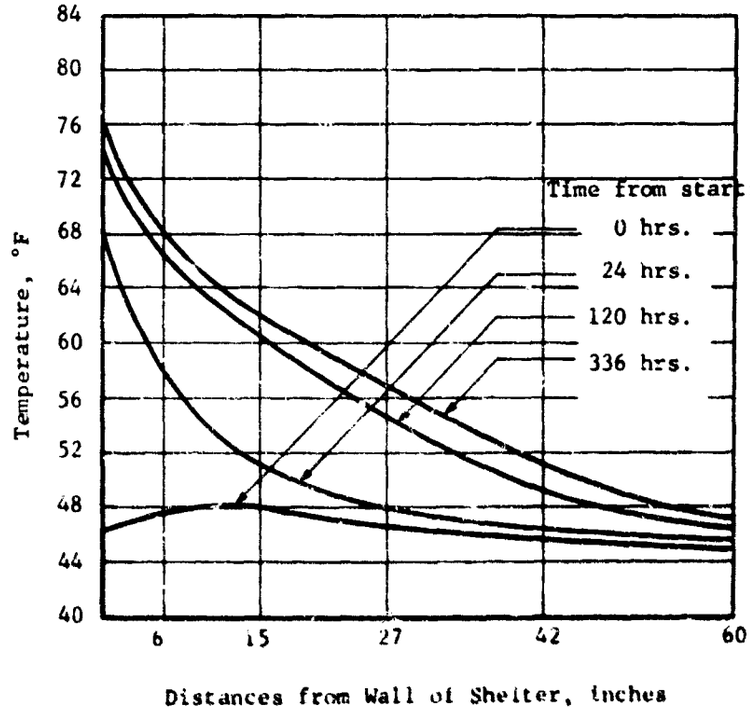


Fig. 38. TYPICAL PLOTS OF TEMPERATURE VARIATIONS IN SOIL

7 x 7 x 7 ft. shelter; 7 cfm/occupant; elev. of 1 ft. above shelter floor

at which temperatures in the soil increased with time at various distances from the wall. The topmost curve represents the temperature of the steel shelter wall, and it can be seen that there was practically no discernible temperature rise after the first week of occupancy, as was true for the air temperature in the shelter. While the temperature of the wall increased from approximately 46°F to 76°F during the two-week test, the temperature at a distance of 5 ft. from the wall increased only around 3°F. Temperatures at intermediate locations follow the expected pattern.

The lower set of curves shows the variation of temperatures with distance from the wall of the shelter after several time intervals from the start of the test. The lowest curve for zero hours shows the temperature distribution in the soil at the indicated elevation at the time the test was begun. It covers the 5-feet distance from the shelter wall outward, where the thermocouples were located, and shows that the initial soil temperatures were nearly uniform. The curve for the temperature distribution after one day indicates the pronounced temperature rise that has already occurred in the soil close to the shelter wall, while the difference between the curves for 120 hrs. (5 days) and 336 hrs. (14 days) is not very great. The final temperature rise after 14 days at a distance of 5 ft. was of the order of 2 to 3°F, and it may be recalled that the soil cover extended considerably beyond 5 feet.

As mentioned in the introduction to this report, one of the purposes of this effort was to provide experimental data for correlation with analytical predictions of environmental conditions in a shelter for various conditions of occupancy. Toward this end it would have been preferable to use a soil cover that would be completely free of moisture, and to house the shelter in an air-conditioned environment that would correspond with the selected supply condition of the ventilation air. The size of the experimental shelters made these items prohibitive; but the thermal properties of the sand have been measured for the range of moisture content encountered, and the bulk of the soil cover around the shelters was such that the effects on the measurements of variations in outdoor temperatures during an experimental run were kept as low as possible. In real underground structures, the problem of moisture migration is unavoidable, and much basic research effort is still required with respect to heat transfer phenomena under such conditions.

REFERENCES

1. Miles S. Kersten, "Thermal Properties of Soils," Bulletin No. 28, Engineering Experiment Station, U. of Minn., June 1, 1949, pp. 69-73.

2. Achenbach, P. R., Drapeau, F. J., and Phillips, C. W., "Studies of Environmental Factors in a Family-Size Underground Shelter," OCDM-NBS-60-1, March 1961 (NBS 7369).

3. Allen, F. C., "Mechanical Equipment Requirements," Symposium on Survival Shelters, June 25-27, 1962, Proceedings published by the Am. Soc. of Heating, Regrigerating, and Air-Conditioning Engineers, Inc. 347 East 47th Street, New York 17, N. Y.

4. ASHRAE Guide and Data Book, Am. Soc. of Heating, Refrigerating, and Air-Conditioning Engineers, 1962

5. Lee, D. H. K., and Henschel, H., "Evaluation of Thermal Environment in Shelter," U. S. Dept. of Health, Education, and Welfare, Rept. TR-8, August 1963.

6. "Guidelines for Prototype Shelter Research," Annex 3, Engineering Studies, OCDM, November 1960.

Table IV-A. VARIATION OF TEMPERATURES INSIDE SHELTER*

7 x 7 x 7 ft. shelter; 5 occupants; no ventilation

		Time From Start of Test, Hrs. / Days																										
AIR TEMPERATURES	T.C. No.	0 0	6	12	18	24 1	30	36	42	48 2	54	60	66	72 3	78	84	90	96 4	102	108	114	120 5	126	132	138	144 6	150	156	162
SHELTER AIR																													
Center																													
6 ft elev																													
DB	15-12	41.5	49.7	52.8	56.4	56.5	57.4	58.2	59.7	62.0	62.0	60.9	60.9	63.7	61.9	62.5	62.7	65.2	62.3	63.1	65.9	64.7	64.8	64.9	65.3	66.0	65.8	66.2	6
WB	15-11	41.1	47.5	49.9	51.4	54.4	56.9	55.6	56.7	58.0	58.6	58.2	58.8	61.3	58.9	60.0	60.2	62.3	59.8	59.8	61.5	61.7	61.8	61.9	62.4	62.8	63.2	63.6	6
3-1/2 ft elev																													
DB	15-4	41.9	49.8	52.8	56.2	56.2	57.4	58.3	59.7	59.9	60.9	61.0	61.8	61.2	61.6	63.1	63.1	64.8	63.6	64.1	65.7	66.8	66.3	67.0	66.6	67.9	68.8	68.0	
WB	15-3	41.9	48.9	52.0	54.0	55.7	56.6	58.2	58.7	57.9	58.8	59.9	60.3	59.9	61.2	61.7	62.7	63.0	62.2	62.7	64.9	64.7	64.6	64.9	65.3	65.7	65.7	65.4	6
1 ft elev																													
DB	15-2	42.8	48.9	52.0	54.0	56.2	56.5	58.2	58.6	62.0	62.0	59.9	60.3	63.7	61.2	61.7	62.7	65.3	62.2	62.7	64.9	64.7	66.3	64.9	65.3	65.3	65.7	65.4	
WB	15-1	42.6	48.4	51.1	53.7	53.8	54.4	55.2	55.9	58.1	58.2	57.6	58.2	60.7	58.5	59.4	60.0	62.2	59.8	59.7	61.9	61.7	62.1	62.3	62.7	63.0	63.1	63.3	
INSIDE SURFACE TEMP																													
SECTION C-C																													
Wall																													
	6-10	40.8	43.4	45.3	47.5	49.9	50.8	52.1	53.6	54.8	54.9	54.8	55.0	57.0	56.6	58.9	59.7	59.5	56.4	56.4	60.2	61.4	66.2	61.2	61.3	62.6	62.5	62.2	
	7-4	40.7	44.9	47.9	49.9	51.8	[illegible]	54.1	55.4	56.1	56.2	56.9	57.2	58.3	58.2	58.9	59.1	60.5	59.6	59.6	61.2	62.8	62.9	63.0	62.9	64.1	64.3	64.0	
	7-10	40.7	46.5	48.6	51.6	52.8	[illegible]	56.0	57.3	56.8	57.2	59.0	59.4	58.8	59.7	61.0	61.3	61.6	62.0	62.0	63.4	65.4	65.4	65.7	65.3	66.7	66.9	66.9	
	8-4	41.9	46.4	49.2	51.2	53.1	[illegible]	55.5	56.8	58.2	57.8	58.6	58.6	60.4	59.5	60.2	60.4	62.4	60.9	60.6	62.7	63.7	63.8	64.0	64.1	65.0	65.5	65.2	
	8-10	40.9	46.8	49.5	51.6	53.1	55.2	55.9	56.9	57.0	57.4	58.9	59.0	58.9	59.4	60.5	60.8	61.4	61.3	1.3	62.8	64.5	64.2	64.7	64.3	65.7	66.0	65.9	
Ceiling																													
	9-4	39.8	46.8	50.1	49.9	52.8	53.5	54.3	56.0	57.8	57.8	56.9	57.8	60.0	58.7	61.0	60.8	62.0	59.3	59.3	62.3	62.3	62.1	63.1	63.3	64.3	63.3	63.5	
	10-4	39.6	43.7	46.3	48.6	50.5	52.2	53.2	54.4	53.9	54.8	56.3	56.3	56.1	57.2	59.6	60.4	59.1	58.4	58.6	60.8	63.1	61.7	62.2	62.2	64.3	36.9	63.5	
Floor																													
	10-10 12-4	43.1	46.0	50.2	52.0	52.7	53.3	54.2	55.1	51.2	57.2	57.5	57.3	59.0	58.5	61.0	59.0	62.4	59 3	59.8	62.8	64.1	63.2	63.8	63.7	64.9	64.2	63.3	
SECTION D-D																													
	12-10	38.2	43.0	46.0	48.1	49.6	51.5	52.1	53.3	52.8	53.4	55.2	55.3	56.4	55.8	57.0	57.3	57.8	57.7	60.1	59.6	61.2	61.0	60.8	60.7	61.9	62.4	62.0	
	13-4	40.1	42.7	45.4	47.2	49.9	50.7	50 1	52.4	54.4	54.2	54.2	54.4	56.4	55.3	56.1	56.5	58.7	56.4	57.2	58.8	59.4	59.4	59.6	59.7	60.4	60.9	60.6	
	13-8	40.3	45.1	48.0	49.9	51.5	53.3	54.0	55.1	54.9	55.3	57.2	57.3	56.4	57.9	58.5	59.2	59.9	59.8	60.1	61.7	63.2	62.8	62.5	63.0	64.1	64.8	64.1	
	14-2	41.0	45.3	47.6	49.4	52.0	53.7	53.3	54.3	56.3	56.3	56.3	56.2	55.2	57.2	57.9	58.3	60.3	58.4	59.0	60.8	61.1	61.1	61.3	61.3	62.1	62.4	62.2	
	14-6	42.7	45.6	48.0	50.0	51.0	52.6	53.0	54.2	55.8	56.3	55.8	56.0	55.2	56.9	57.4	57.9	58 5	58 4	58.9	60.4	61.7	61 5	61.3	61.4	62.6	63.2	62.9	
SIMOC SKIN TEMPS																													
Center - Top	18-7	43.7	61.9	67.5	69.4	63.3	65.1	67 3	69.3	75.1	76.2	72.4	72.2	70.5	73.0	73.8	72.9	72.4	74.3	74.5	76.1	74.6	76.6	76.6	76 1	75.3	78.9	78.5	
Middle	18-8	43.7	61.1	66.1	66.1	63.8	65 0	67.0	69.3	71.3	71.6	70.0	70.0	70.5	73.0	71.9	72.5	72 3	72.6	72.9	74.2	75.1	75.1	75.6	74.9	75.7	77.2	76.9	
Bottom	18-9	43.6	61.2	66.0	66.0	63.9	65.0	67.0	69.3	71.2	71.7	70.1	70.1	70.9	73.1	71.9	72.5	72.9	72.5	72.9	74.2	75.1	75.1	75.6	75.1	75.3	77.3	76.9	
Corner - Middle	18-10	44.4	61.4	63.9	65.6	65.6	66 1	67.4	69.4			71.9	71.9	72.5	72.6	73.1	73.4	74.7	73.0	73.4	74.2		72.1	73.5	74.2	75 0	78.7		
OUTSIDE AIR TEMPS																													
	19-3	32.4	34.7	33 2	33 1	31 6																							
	19-6	32.4	35.4	32.8		32.3																							
	19-7	32.4	35.2	32.6	34 9	32.0																							

A

*For detailed description of thermocouple locations see Sec. IV-A and B.

TEMPERATURES INSIDE SHELTER*

. shelter; 5 occupants;
o ventilation

	66	72 3	78	84	90	96 4	102	108	114	120 5	126	132	138	144 6	150	156	162	168 7	174	180	186	192 8	198	204	210	216 9	222	228	234	240 10	246
9	60.9	63.7	61.9	62.5	62.7	65.2	62.3	63.1	64.9	64.7	64.8	64.9	65.3	66.0	65.8	66.7	67.0	67.8	67.4	68.5	67.7	69.3	67.7	68.1	66.4	69.3	69.2			70.8	[illegible]
2	58.8	61.3	58.9	60.0	60.2	62.3	59.8	59.8	61.5	61.7	61.8	61.9	62.4	62.8	63.2	63.6	64.0	64.6	64.9	65.2	65.2	66.3	65.2	65.6	66.2	67.2	69.7			68.6	[illegible]
0	61.8	61.2	61.6	63.1	63.1	64.8	63.6	64.1	65.7	66.8	65.3	67.0	66.6	67.9	68.8	68.0	68.7	68.8	69.6	69.4	69.8	69.8	69.6	70.6	70.9	71.4	71.0			71.8	[illegible]
9	60.3	59.9	61.2	61.7	62.7	63.0	62.2	62.7	[illegible]	64.7	64.6	64.9	65.3	65.7	65.7	65.4	67.4	67.8	68.3	68.4	68.0	68.7	68.7	69.3	68.9	69.8	69.5			70.0	[illegible]
9	60.3	63.7	61.2	61.7	62.7	65.3	62.2	62.7	64.9	64.7	64.3	64.9	65.3	65.3	65.7	65.4	67.4	68.2	68.3	68.5	67.8	70.3	68.8	69.8	63.9	70.1	69.4			71.1	[illegible]
5	58.2	60.7	58.5	59.4	60.0	62.2	59.8	59.7	61.5	61.7	62.1	62.3	62.7	63.0	63.1	63.3	64.0	65.1	64.9	64.9	65.4	66.8	65.2	64.8	65.4	67.0	66.8			67.6	[illegible]
8	55.0	57.0	56.6	59.5	59.7	59.5	56.4	56.4	60.2	61.4	66.2	61.2	61.3	62.6	62.5	62.2	62.6	62.8	64.7	65.9	65.9	65.4	63.8	63.7	63.9	65.9	64.8			66.9	[illegible]
9	57.2	58.3	58.2	58.9	59.1	60.5	59.6	59.5	61.2	62.8	62.9	63.0	62.9	64.1	64.3	64.0	64.5	64.2	64.9	65.1	65.2	65.8	65.4	65.6	65.8	65.8	66.5			68.2	[illegible]
0	59.4	58.8	59.7	61.0	61.3	61.6	62.0	62.0	[illegible]	65.4	63.4	65.7	65.3	66.7	66.9	66.9	67.0	65.9	67.0	67.6	67.4	66.6	67.8	68.2	68.8	68.6	[illegible]			69.6	[illegible]
6	58.6	60.4	59.5	60.2	60.4	62.4	60.9	60.6	62.7	63.7	63.8	64.0	64.1	65.0	65.5	65.2	65.8	65.2	66.2	66.5	66.5	67.4	66.4	66.9	67.0	67.7	68.2			68.3	[illegible]
9	59.0	58.9	59.4	60.5	60.8	61.4	61.3	61.3	62.8	64.5	64.2	64.7	64.3	65.7	66.0	65.9	66.5	65.5	66.2	66.6	66.4	66.6	66.9	67.3	67.6	67.9	68.3			68.7	[illegible]
9	57.8	60.0	58.7	61.0	60.8	62.0	59.3	59.3	62.3	62.3	62.1	63.1	63.3	64.3	63.3	63.5	64.0	65.2	67.3	67.4	67.5	66.7	66.0	66.0	66.1	67.9	67.7			69.5	[illegible]
3	56.3	56.1	57.2	59.6	60.4	59.1	58.4	[illegible]	60.8	63.1	61.7	[illegible]	62.2	64.3	36.9	63.9	63.6	63.4	65.6	66.3	65.6	65.1	64.8	65.0	65.3	66.0	66.4			67.3	[illegible]
5	57.3	59.0	58.5	61.0	59.0	62.4	59.3	59.8	62.8	64.1	63.2	63.8	63.7	64.9	64.2	63.3	64.8	65.2	67.3	66.6	65.2	66.3	65.1	65.3	66.9	66.9	67.1			67.5	[illegible]
[illegible]	[illegible]	54.4	55.8	57.0	57.3	57.8	57.7	60.1	59.4	61.2	61.0	60.8	60.7	61.9	62.4	62.0	62.7	61.8	62.6	62.7	62.4	62.4	63.2	63.1	63.3	63.8	[illegible]			65.1	[illegible]
[illegible]	[illegible]	56.4	55.3	56.1	56.5	58.7	56.4	57.2	58.8	59.4	59.4	59.6	59.7	60.4	60.9	60.6	61.2	61.0	61.9	62.0	[illegible]	63.5	62.0	62.0	62.2	63.1	[illegible]			64.3	[illegible]
[illegible]	57.3	56.4	57.9	58.5	59.2	59.9	59.8	60.1	61.7	63.2	62.8	62.9	63.0	64.1	64.8	64.1	64.4	63.8	64.9	64.9	[illegible]	65.5	65.1	65.3	66.0	66.2	66.4			67.2	[illegible]
3	56.2	58.2	57.2	57.9	58.3	60.3	58.4	59.0	60.9	61.1	61.1	61.3	61.3	62.1	62.4	62.2	62.9	63.2	[illegible]	64.0	[illegible]	64.9	63.8	64.1	64.2	65.1	[illegible]			66.9	[illegible]
4	56.0	55.2	56.9	57.4	57.9	58.5	58.4	58.9	60.4	61.7	61.5	61.3	61.4	62.6	63.2	62.9	63.1	62.0	63.2	63.4	63.3	63.0	63.3	63.8	63.9	[illegible]	65.2			[illegible]	[illegible]
[illegible]	72.2	70.5	71.0	71.8	72.9	72.4	74.3	74.5	74.1	74.6	76.6	76.6	76.1	75.4	78.9	78.5	78.4	78.3	76.4	76.7	77.4	77.0	79.3	78.0	78.2	78.3	[illegible]			[illegible]	[illegible]
	70.0	70.5	71.0	71.9	72.5	72.3	72.6	72.9	74.2	75.1	75.1	75.6	74.9	75.7	77.2	76.9	77.7	76.7	75.2	75.3	75.7	75.3	77.4	78.0	78.0	[illegible]	[illegible]			75.3	[illegible]
[illegible]	70.1	70.9	71.1	71.9	72.5	72.9	72.5	72.4	74.2	75.1	75.1	75.6	75.1	75.3	77.3	76.9	77.8	77.6	77.3	76.8	77.4	77.9	77.6	78.1	78.1	[illegible]	[illegible]			75.9	[illegible]
	71.9	72.5	72.6	73.1	73.4	[illegible]	73.0	71.4	74.2		73.1	73.5	74.2	75.9	78.7										79.8	80.2	[illegible]				

couple locations see Sec. IV-A and B.

B

174	180	186	192 8	198	204	210	216 9	222	228	234	240 10	246	252	258	264 11	270	276	282	288 12	294	300	306	312 13	318	324	330	336 14
67.4	65.5	67.7	69.3	67.7	68.1	68.4	69.3	69.2			70.8	70.6	71.4	71.0	72.3	71.7	71.7	72.4	72.6	72.3	72.8	72.6	73.2	74.0	74.0	73.0	75.6
64.9	65.7	65.2	66.3	65.2	65.6	66.2	67.2	69.7			68.6	67.5	68.5	68.0	69.5	69.1	69.3	70.0	70.2	70.2	70.4	70.7	71.0	70.9	71.2	70.9	72.6
69.6	69.4	69.8	69.8	69.6	70.6	70.9	71.4	71.0			71.8	71.3	73.0	72.7	73.0	73.0	72.2	73.6	74.2	74.1	74.2	74.6	74.9	75.1	75.2	74.8	76.0
68.3	68.4	68.0	68.7	68.7	69.3	68.9	69.8	69.5			70.0	70.3	70.8	71.3	71.5	71.6	71.8	72.3	72.4	72.3	72.5	72.3	72.1	73.0	73.3	73.1	75.1
68.3	68.5	67.8	70.3	68.8	69.8	68.9	70.1	69.4			71.1	70.4	70.8	71.3	72.4	71.8	71.8	72.4	73.9	72.3	72.6	72.4	72.2	73.0	73.3	73.1	75.5
64.9	64.9	65.4	66.8	65.2	66.8	65.4	67.0	66.8			67.6	67.9	67.7	68.5	68.6	68.3	68.5	69.4	70.0	69.4	70.1	69.9	70.5	70.9	70.9	70.6	72.5
66.7	65.9	65.9	66.6	63.8	63.7	63.9	65.9	64.8			66.9	66.4	67.3	67.0	67.6	66.7	67.8	68.3	68.2	68.0	68.0	68.1	68.2	68.4	68.7	69.3	70.4
64.9	65.1	65.2	65.8	65.4	65.6	65.8	65.8	66.5			68.2	67.7	68.0	68.1	68.6	68.3	68.8	69.6	69.3	69.7	69.8	69.9	70.1	70.9	70.6	71.1	72.0
67.0	67.6	67.4	65.6	67.8	68.2	68.8	68.6	69.7			69.6	70.0	70.5	70.7	70.1	70.3	70.8	71.3	71.6	71.6	71.9	71.9	72.3	73.1	72.2	72.8	73.8
66.2	66.5	66.5	67.4	66.4	66.9	67.0	67.7	68.2			68.3	68.6	69.2	69.0	69.4	69.5	69.6	70.1	70.6	70.8	70.8	70.8	71.1	71.9	71.6	73.1	74.9
66.2	66.6	66.4	66.6	66.9	67.3	67.6	67.9	68.3			68.7	69.0	69.3	69.4	69.6	69.9	70.0	70.5	70.8	71.0	71.1	71.1	71.2	71.8	71.4	73.7	74.9
67.3	67.4	67.5	66.7	66.0	66.0	66.1	67.9	67.2			69.5	68.2	68.9	68.5	69.3	68.7	69.5	69.8	70.0	70.1	70.3	70.8	70.8	71.4	70.9	71.2	73.0
65.6	66.3	65.6	65.1	64.8	65.0	65.3	66.0	66.4			67.3	67.3	68.2	67.8	67.4	67.4	68.3	69.4	69.3	68.9	68.6	69.0	69.4	69.3	70.1	69.9	71.1
67.3	66.6	65.2	66.3	65.1	65.3	66.9	66.9	67.1			67.5	68.0	67.6	68.2	68.7	68.9	68.4	68.9	69.8	69.2	69.3	69.9	70.0	70.0	70.2	69.9	71.9
62.6	62.7	62.4	62.4	63.2	63.1	63.1	63.8	64.2			65.1	65.5	65.7	66.2	65.8	66.1	66.0	66.9	67.2	67.1	67.5	67.5	67.9	68.6	68.5	68.4	69.3
61.9	62.0	62.5	63.5	62.0	62.0	63.2	63.1	63.4			64.3	64.6	65.0	65.0	65.0	65.3	65.1	66.0	66.3	66.3	66.3	66.8	66.9	67.4	67.5	67.4	68.9
64.9	64.9	64.5	65.5	65.1	65.3	66.0	66.2	66.4			67.2	67.3	67.9	68.3	68.0	68.3	68.1	68.9	69.3	69.3	69.7	69.8	70.0	70.4	70.3	70.0	71.3
63.6	64.0	64.2	64.9	63.8	64.1	64.2	65.1	66.0			66.9	66.3	66.9	67.1	67.2	67.4	66.9	68.0	68.1	68.1	68.3	68.5	67.2	69.1	68.9	68.8	70.1
63.2	63.4	63.3	63.0	63.3	63.8	63.9	64.3	65.2			65.4	65.9	66.2	66.3	66.0	66.3	66.1	66.9	67.2	67.2	67.2	67.6	67.8	68.0	68.2	67.9	69.1
76.6	76.7	77.4	77.0	79.3	78.0	78.4	78.3	79.0			78.5	79.5	80.1	79.6	79.9	81.9	79.1	79.8	80.8	82.2	82.8	83.0	83.3	83.2	83.1	83.0	82.6
75.2	75.3	75.7	75.3	77.6	78.0	78.0	78.2	78.5			79.1	79.3	80.4	80.3	79.9	79.9	79.0	80.2	81.1	77.9	77.6	78.1	81.3	78.6	77.7	78.2	80.1
77.3	76.8	77.6	77.9	77.4	78.1	78.9	79.1	78.8			77.5	79.6	80.6	80.4	80.9	80.1	79.1	81.6	81.4	79.6	79.8	80.1	81.7	81.7	80.7	80.1	82.4
						79.8	80.2	79.1								80.3											
															35.9	38.3	36.9	37.2	43.0	44.3	41.7	45.3	44.3	47.0	41.6	35.0	32.9
															37.2	38.4	36.8	36.3	42.8	45.9	42.2	41.6	43.9	47.0	41.4	35.0	32.7
															38.1	38.4	36.4	36.3	42.5	46.3	41.9	41.1	43.9	47.0	40.2	33.6	32.9

C

Table IV-B. VARIATION OF TEMPERATURES IN SOIL SURROUNDING SHELTER*

7 x 7 x 7 ft shelter; 5 occupants; no ventilation

SOIL TEMPERATURES	T.C. No.	Time From Start of Test, Hrs. → Days → 0	24 1	48 2	72 3	96 4	120 5	144 6	168 7	192 8	216 9	240 10	264 11	288 12	312 13	336 14
SECTION C-C																
Outside Wall																
Diagonally Up	6-10	40.8	49.9	54.8	57.0	59.5	61.4	62.6	62.8	66.4	65.9	66.9	67.6	68.2	68.2	70.4
	6-11	35.5	37.4	39.8	41.9	44.0	47.4	49.1	47.3	47.3	49.7	49.9	50.4	51.4	51.8	53.2
	6-12	35.7	35.7	36.2	37.7	39.5	43.4	44.0	42.2	41.9	43.7	44.2	44.4	45.8	46.2	46.8
	7-1	32.4	32.1	32.3	32.9	34.0	37.0	36.4	34.9	35.2	36.4	36.5	36.7	37.7	38.1	39.2
	7-2	32.3	31.8	31.8	31.9	32.9	34.4	34.3	32.4	31.4	32.3	32.5	32.0	32.7	32.5	33.1
	7-3	32.0	31.2	31.6	31.8	30.9	31.0									31.3
Horizontal 6 ft elev	7-4	40.6	51.8	56.1	58.3	60.5	62.8	64.1	64.2	65.8	66.5	68.2	68.4	69.3	70.1	72.0
	7-5	39.0	43.3	47.1	49.9	51.8	52.5	53.4	54.4	56.3	56.5	56.8	57.7	58.2	58.7	60.5
	7-6	39.3	39.3	42.3	44.5	45.9	48.0	49.1	48.4	49.5	50.1	50.9	51.4	52.4	52.8	53.7
	7-7	38.3	36.6	39.0	40.8	41.3	42.4	42.9	43.2	44.1	44.1	44.8	45.3	46.1	46.2	47.2
	7-8	38.3	37.7	39.8	39.9											
	7-9	33.4	32.0	32.5	32.8	33.7			33.9	34.3	35.2	35.3	36.0	36.3	36.0	36.3
3-1/2 ft elev	7-10	40.6	52.8	56.8	58.8	61.6	65.4	66.7	65.9	66.6	68.6	69.6	70.1	71.6	72.3	73.8
	7-11	41.4	45.0	48.9	52.1	54.3	58.9	58.9	58.6	59.8	61.6	62.4	62.8	64.2	64.4	66.0
	7-12	41.1	42.4	45.1	46.9	49.9	53.0	53.5	53.5	54.0	56.0	56.9	57.3	58.5	58.9	59.9
	8-1	39.2	38.6	39.9	41.7	43.6	46.1	46.0	46.3	47.3	48.3	49.4	50.0	50.4	51.0	52.0
	8-2	38.9	38.0	39.2	39.9	41.0	42.6	42.8	42.0	42.8	43.1	43.7	44.3	45.2	45.2	46.0
	8-3	37.5	36.0	36.4	38.6	38.0	39.3	39.3	37.7	39.3	39.0	39.2	39.8	40.4	40.6	40.9
1 ft elev	8-4	41.9	53.1	58.2	60.4	62.4	63.7	65.0	65.2	67.4	67.6	68.3	69.4	70.6	71.1	72.9
	8-5	43.1	47.2	51.6	54.4	55.8	56.9	58.3	58.7	61.0	60.9	61.5	62.9	64.1	63.9	65.7
	8-6	43.1	44.4	48.2	50.5	51.4	53.1	53.8	54.3	55.8	55.9	56.7	57.6	58.3	59.0	59.9
	8-7	41.4	42.6	42.4	42.4	45.0	49.4	50.3	48.7	48.2	50.9	51.6	51.7	53.0	53.4	53.8
	8-8	40.4	40.4	40.1	39.9	42.3	45.0	44 9	43.8	43.6	45.1	45.8	46.0	47.1	47.1	47.7
	8-9	40.0	39.5	39.8	39.7	40.3	42.9	43.0	41.1	41.2	42.3	42.8	42.9	43.9	43.8	44.1

* For detailed description of thermocouple locations see Section IV-A.

Table IV-B. VARIATION OF TEMPERATURES IN SOIL SURROUNDING SHELTER*

7 x 7 x 7 ft shelter; 5 occupants; no ventilation

SOIL TEMPERATURES	T.C. No.	Time From Start of Test, Hrs. → Days → 0	24 1	48 2	72 3	96 4	120 5	144 6	168 7	192 8	216 9	240 10	264 11	288 12	312 13	336 14
SECTION C-C																
Outside Wall																
Diagonally Down	8-10 11-10 12-9	40.9	53.1	57.0	58.9	61.4	64.5	65.7	65.5	66.6	67.9	68.7	69.6	70.8	71.2	72.9
Above Roof																
3-1/2 ft from wall	9-4	39.8	52.7	57.8	60.0	62.0	62.3	64.3	65.2	66.7	67.5	69.5	69.3	70.0	70.8	73.0
1 ft from wall	10-4	39.7	50.4	53.9	56.1	59.1	63.1	63.3	63.4	65.1	66.0	67.3	67.4	69.3	69.4	71.1
	10-5	36.3	43.0	46.6	48.9	51.6	54.1	54.6	54.3	55.1	55.9	56.7	57.6	58.2	59.6	61.3
	10-6	36.2	37.9	41.2	42.9	45.2	48.2	48.6	48.0	48.4	50.0	50.1	50.8	52.5	54.1	56.2
	10-7	34.1	34.4	36.4	38.0	39.5	41.3	41.9	41.9	42.2	42.8	43.4	44.3	47.0	49.2	51.3
	10-8	33.8	32.3	34.1	35.1	35.7	36.2	36.6	36.9	38.0	37.3	37.9	39.6	43.9	46.2	48.1
	10-9	32.0	32.1	32.2	33.3	32.4	32.8	33.2	34.6	34.8	34.3	34.3	37.9	43.2	45.3	46.3
Below Floor																
3-1/2 ft from wall	10-10															
	10-11															
	10-12															
	11-1															
	11-2						(Other Thermocouples Out)									
	11-3															
	11-4															
	11-5															
	11-6															
1 ft from wall	12-4	43.1	52.8	57.2	59.0	62.4	64.1	64.9	65.2	66.3	66.9	67.5	68.7	69.8	70.0	71.9

* For detailed description of thermocouple locations see Section IV-A.

Table IV-B. VARIATION OF TEMPERATURES IN SOIL SURROUNDING SHELTER*

7 x 7 x 7 ft shelter; 5 occupants; no ventilation

SOIL TEMPERATURES	T.C. No.	Time From Start of Test, Hrs. → Days → 0	24 1	48 2	72 3	96 4	120 5	144 6	168 7	192 8	216 9	240 10	264 11	288 12	312 13	336 14
SECTION D-D																
Outside Corner																
Diagonally Up	12-10	38.2	49.5	52.8	54.4	57.8	61.[illegible]	61.9	61.8	62.4	63.8	65.1	65.8	67.2	67.9	69.3
	12-11	35.0	34.9	36.0	37.1	39.0	41.0	41.4	40.9	41.4	42.8	43.2	43.6	44.3	44.6	45.7
	12-12	34.2	34.8	34.9	34.5	36.8	38.[illegible]	39.0	38.2	37.8	38.6	39.1	39.3	39.8	40.0	40.4
	13-1	31.8	31.8	31.3	31.5	32.5	33.[illegible]	32.9	31.8	31.8	32.2	32.1	32.1	32.6	32.6	33.2
	13-2	31.8	31.2	30.9	32.0	31.5	30.[illegible]									30.4
	13-3	31.8	31.0													30.7
Horizontal 6 ft elev	13-4	40.1	49.9	54.4	56.4	58.7	59.[illegible]	60.4	61.0	63.5	63.1	64.3	65.0	66.3	66.9	68.9
	13-5	37.8	38.7	41.6	43.3	44.6	44.[illegible]	45.0	46.0	47.7	47.8	48.2	49.2	49.6	49.8	51.2
	13-6	37.8	37.0	39.4	41.0	41.0	41.[illegible]	41.9	42.4	43.2	42.8	43.5	44.0	44.4	44.7	45.3
	13-7	35.2	35.2	33.8	33.4	35.4	39.[illegible]	39.3	37.0	37.9	37.9	38.3	38.0	38.9	39.1	39.1
5-1/2 ft elev	13-8	40.3	51.4	54.9	56.4	59.9	63.[illegible]	64.1	63.8	65.5	66.2	67.2	68.0	69.2	70.0	71.3
	13-9	40.0	40.9	43.2	44.4	47.3	49.[illegible]	50.3	50.3	51.[illegible]	52.2	53.5	54.0	54.7	55.3	56.0
	13-10	40.0	40.1	40.7	41.5	43.6	46.[illegible]	46.3	46.0	47.0	47.0	47.5	48.0	48.8	49.2	50.1
	13-11	39.[illegible]	39.1	38.6	39.0	40.4	41.[illegible]	41.6	40.9	41.0	41.3	41.9	42.4	42.9	42.9	43.6
	13-12	38.3	38.1	38.4	38.4	39.3	39.[illegible]	39.0	37.8	38.4	38.2	38.6	38.7	39.2	39.2	39.4
	14-1	36.4	35.2	37.0	37.4	37.0	36.[illegible]	35.5	35.4	36.4	36.3	35.3	35.6	35.6	36.9	36.0
1 ft elev	14-2	43.0	52.0	56.3	58.2	60.3	61.[illegible]	62.1	63.1	64.9	65.1	66.9	67.2	68.1	67.2	70.1
	14-3	42.5	43.3	46.4	47.9	49.4	49.[illegible]	49.8	50.2	52.3	52.6	53.9	54.2	54.8	55.3	56.4
	14-4	42.7	42.3	45.2	46.5	46.3	46.[illegible]	47.3	48.1	49.1	48.9	49.6	50.0	50.8	51.1	51.7
	14-5															

* For detailed description of thermocouple locations see Section IV-A.

Table V-A. VARIATION OF TEMPERATURE INSIDE SHELTER*

7 x 7 x 7 ft. shelter; 5 occupants; 3 cfm/occupant

Time From Start of Test, Hrs. → Days →

	T.C No.	0	6	12	18	24	30	36	42	48	54	60	66	72	78	84	90
Days		0				1				2				3			
AIR TEMPERATURES																	
SUPPLY DUCT DB	15-10	49.5	93.9	78.8	68.1	80.8	96.1	83.7	70.8	82.3	97.6	84.0	69.8	81.2	98.2	86.8	71.4
SUPPLY DUCT WB	15-9	48.9	75.8	72.5	67.3	74.3	75.9	71.8	68.6	74.0	77.4	72.9	68.4	74.3	77.2	71.8	66.3
RETURN DUCT DB	16-2	50.0	65.3	67.8	68.9	71.0	72.6	73.1	73.0	73.7	75.4	75.9	74.9	75.7	78.0	77.3	75.7
RETURN DUCT WB	16-1	47.1	62.8	67.3	68.7	70.3	71.4	73.0	72.9	73.4	75.0	75.6	74.4	75.5	77.4	76.9	75.1
SHELTER AIR																	
Center 6 ft elev DB	15-1	49.6	72.7	71.6	69.7	73.6	78.0	76.4	73.4	76.7	80.2	78.1	74.9	77.4	81.9	79.4	75.6
Center 6 ft elev WB	15-11	[illegible]	67.0	67.9	68.0	69.9	72.4	71.9	73.9	72.3	74.3	73.4	71.5	74.4	76.1	75.1	72.2
3-1/2 ft elev DB	15-4	51.4	66.2	68.6	69.8	71.9	73.4	74.8	74.4	75.0	76.3	76.8	74.9	75.7	78.0	77.9	75.7
3-1/2 ft elev WB	15-3	51.4	63.4	66.1	67.3	69.3	70.9	71.8	72.8	72.9	74.6	74.8	74.1	74.5	76.2	74.1	75.6
1 ft elev DB	15-2	51.6	63.5	66.1	67.3	69.3	70.9	71.8	72.8	72.9	74.7	74.9	74.1	74.6	76.0	76.1	75.8
1 ft elev WB	15-1	49.5	61.5	64.4	65.4	67.4	69.1	69.7	70.0	70.6	72.0	72.3	71.4	72.7	73.8	73.9	72.2
INSIDE SURFACE TEMPERATURES																	
SECTION C-C Wall	6-10	48.8	62.3	64.5	64.3	66.3	69.6	69.4	68.8	69.8	73.0	72.1	71.2	73.1	74.1	73.2	71.6
	7-4	49.4	63.2	66.5	66.4	68.9	70.9	71.3	70.3	71.8	73.4	73.8	72.1	73.4	75.5	75.1	73.5
	7-10	48.8	61.8	65.4	67.2	68.8	70.0	71.3	71.2	72.1	73.4	73.8	73.2	73.9	75.0	75.2	74.1
	5-4	49.4	59.4	63.2	65.0	66.7	68.3	69.2	69.4	70.1	71.8	72.0	71.7	72.3	73.4	73.3	72.9
	8-10	49.3	59.0	62.7	64.5	65.9	67.4	68.4	69.0	69.6	71.0	71.6	[illegible]	71.8	72.8	73.1	72.7
Ceiling	9-4 10-4	49.3	62.3	65.0	65.1	67.1	69.6	70.3	69.5	70.6	73.0	73.1	73.3	73.9	75.0	74.1	73.2
Floor	10-10	49.3	61.0	65.3	65.9	68.8	70.8	71.4	71.6	72.6	73.8	74.4	73.8	76.3	75.6	75.8	75.6
	17-4	49.6	57.1	60.9	62.8	64.5	66.2	67.4	67.4	68.4	69.0	70.1	70.1	70.3	71.3	71.3	70.9
SECTION D-D	12-10	51.2	60.3	63.3	64.0	66.0	68.3	68.6	68.6	69.1	71.2	71.4	70.8	71.3	73.2	73.2	72.4
	13-4	51.2	59.7	62.8	63.5	65.7	68.3	68.4	67.8	68.6	70.6	70.4	70.1	70.9	72.6	72.8	71.9
	13-8	49.1	50.9	64.7	65.4	67.4	69.1	69.9	69.9	70.3	72.2	72.2	71.8	72.1	74.0	74.0	73.1
	14-2	51.6	65.5	74.3	79.3												
	14-6	50.8	56.4	59.6	62.3	62.9	64.4	65.3	66.0	66.4	67.4	68.3	68.1	68.8	69.6	70.0	69.3
SDDC SKIN TEMPS	18-7	49.9	72.9	76.8	77.8	79.0	80.6	82.0	79.8	80.1	82.0	81.9	81.7	82.1	85.2	85.6	83.3
	18-8	49.9	72.9	75.8	76.1	78.1	80.2	80.2	78.9	79.5	80.4	79.7	78.3	79.4	81.0	80.5	79.4
Center - Top, Middle	18-9	49.9	72.9	76.3	76.4	78.7	80.2	80.7	80.7	80.4	82.2	81.8	80.8	81.2	82.3	82.1	80.8
Bottom	18-10	49.5	[illegible]	76.3	76.4	78.7	80.2	80.7	80.3	80.4	82.2	81.9	80.9	81.3	82.3	82.1	80.8
Corner - Middle																	
OUTSIDE AIR TEMPERATURES	19-5	43.3	45.5	44.6	44.9	48.0	35.6	31.5	42.5	41.0	44.6	42.9	38.6	49.2	69.3	60.2	33.0
	19-6	43.0	45.2	44.7	44.9	47.8	35.4	31.5	42.2	40.3	43.6	42.5	38.0	47.9	68.1	60.2	33.8
	19-7																

	T.C No.	96	102	108	114	120	126	132	138	144	150
Days		4				5				6	
AIR TEMPERATURES											
SUPPLY DUCT DB	15-10	84.5	93.3	84.1	71.8	83.5		82.5	69.7	82.0	91.8
SUPPLY DUCT WB	15-9	71.0	76.6	71.2	66.7	71.0		72.3	67.1	70.9	77.0
RETURN DUCT DB	16-2	76.5	78.3	78.0	76.5	77.3		89.2	76.5	77.8	79.9
RETURN DUCT WB	16-1	76.4	76.9	77.6	76.3	76.4		78.8	76.3	77.7	79.6
SHELTER AIR											
Center 6 ft elev DB	15-1	77.7	82.6	80.6	76.8	79.0		80.4	76.5	79.6	82.8
Center 6 ft elev WB	15-11	73.9	76.6	75.4	73.2	75.3		78.1	73.1	76.7	78.2
3-1/2 ft elev DB	15-4	76.4	79.3	78.9	76.9	77.3		90.0	76.5	78.2	79.9
3-1/2 ft elev WB	15-3	76.1	76.9	78.0	75.6	77.2		79.1	76.3	76.9	79.9
1 ft elev DB	15-2	76.3	74.7	78.0	75.6	77.7		79.1	76.9	76.9	79.9
1 ft elev WB	15-1	73.0	74.9	73.8	73.3	73.4		75.6	73.1	74.3	76.1
INSIDE SURFACE TEMPERATURES											
SECTION C-C Wall	6-10	73.0	74.7	74.9	73.6	73.0	[illegible]	[illegible]	[illegible]	73.6	76.1
	7-4	73.7	[illegible]	76.3	74.1	[illegible]	[illegible]	[illegible]	74.8	75.3	78.4
	7-10	74.2	75.6	74.1	75.0	[illegible]	[illegible]	[illegible]	75.4	76.2	78.3
	5-4	72.8	73.9	74.2	73.4	73.8	[illegible]	[illegible]	74.3	[illegible]	76.7
	8-10	72.8	73.3	74.4	73.7	[illegible]	[illegible]	[illegible]	74.3	[illegible]	76.0
Ceiling	9-4 10-4	74.0	75.2	75.9	74.8	75.3	[illegible]	[illegible]	[illegible]	75.2	77.8
Floor	10-10	75.2	76.4	77.0	76.2	76.2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	17-4	71.4	72.1	72.6	72.5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
SECTION D-D	12-10	72.0	73.8	73.4	73.0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	76.1
	13-4	72.0	73.4	73.2	72.2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	13-8	72.9	74.3	74.9	73.8	74.0	[illegible]	76.1	[illegible]	75.0	78.3
	14-2		75.6	75.8	74.6	74.5	75.8	75.9	[illegible]	75.0	76.7
	14-6	[illegible]	70.0	70.7	70.2	70.3	70.9	71.9	70.0	71.3	72.6
SDDC SKIN TEMPS	18-7	82.9	86.0	84.0	82.9	83.0	86.6	85.7	84.6	85.8	86.7
	18-8	80.3	81.4	81.8	80.3	86.8	[illegible]	82.0	80.5	80.9	83.4
Center - Top, Middle	18-9	81.5	83.4	83.2	81.6	82.4	[illegible]	84.2	82.2	83.6	85.0
Bottom	18-10	81.5	83.4	82.8	81.2	81.6	83.1	83.4	[illegible]	82.4	84.2
Corner - Middle											
OUTSIDE AIR TEMPERATURES	19-5	60.2	55.3	49.6	46.9	56.8	[illegible]	73.1	62.8	68.2	83.8
	19-6	59.2	54.6	49.6	46.9	55.7	[illegible]	73.1	62.8	68.2	83.7
	19-7										

A

*For detailed description of thermocouple locations see Sec. IV-A and B.

NSIDE SHELTER*

ts; 3 cfm/occupant

	78	84	90	96 4	102	108	114	120 5	126	132	138	144 6	150	156	62	168 7	174	180	186	192 8	198	204	210	216 9	222	228	234	240 10	246	252	258
2	98.2	86.8	71.6	84.5	93.3	64.1	71.8	82.2		62.5	69.7	82.0	91.8	83.3	70.0	42.5	91.2	82.8	74.2	87.4	98.2	84.0	74.3	87.2	95.8	86.8	74.4	85.0	96.3	86.8	74.3
3	77.2	71.8	66.3	71.0	76.6	71.2	66.7	71.0		72.3	67.1	70.9	77.0	73.1	68.0	22.4	77.5	72.9	67.4	71.2	76.8	72.1	68.7	72.2	79.2	74.0	69.8	71.8	78.4	74.3	69.5
7	78.0	77.3	75.7	76.5	78.3	78.0	76.5	77.3		89.2	76.5	77.8	79.4	80.0	8.2	28.8	80.9	80.9	78.6	79.3	80.3	80.9	79.9	79.9	81.3	81.9	80.3	79.9	81.6	82.1	80.9
5	77.4	76.9	75.1	76.4	76.9	77.6	76.3	76.4		78.8	76.3	77.7	79.0	79.6	17.9	26.7	80.0	80.3	78.4	79.2	79.9	80.6	79.6	79.9	80.9	81.8	83.0	79.9	80.7	81.8	80.2
4	81.9	79.4	75.6	77.7	82.6	80.6	76.8	79.0		80.4	76.5	79.6	82.8	81.7	28.2	30.8	84.1	82.2	78.6	81.2	83.7	82.6	79.6	81.6	83.8	82.8	79.7	81.1	85.0	83.7	79.9
4	76.1	75.1	72.2	73.9	76.6	75.4	73.2	75.3		78.1	73.1	76.7	78.2	78.8	14.8	28.1	79.2	78.0	75.3	76.4	78.1	77.5	75.6	77.4	79.6	79.3	77.0	77.4	79.3	80.2	76.9
7	78.0	77.9	75.7	76.4	79.2	78.9	76.9	77.3		80.0	76.5	78.2	79.4	80.2	28.2	29.2	81.1	80.5	79.4	80.2	81.1	81.3	79.8	79.1	80.3	81.3	80.0	79.9	82.2	82.5	80.9
3	76.2	76.1	75.6	76.1	76.9	78.0	75.6	77.2		79.1	76.3	76.9	79.9	79.6	18.5	28.2	79.8	79.2	79.3	79.4	79.4	80.0	79.3	79.1	80.3	81.3	80.0	79.9	82.2	82.4	80.7
4	76.0	76.1	75.8	76.3	76.7	78.0	75.6	77.7		79.1	76.9	76.9	79.6	79.6	9.4	28.7	79.9	79.8	79.4	78.9	79.6	80.1	79.2	77.0	80.4	81.3	81.4	80.3	83.1	83.0	82.0
7	75.8	75.9	72.2	75.0	74.9	73.8	73.3	73.4		75.6	73.1	76.3	76.1	76.5	15.5	25.7	77.5	77.4	76.0	76.3	77.5	77.4	77.2	77.0	78.9	78.5	77.8	77.1	79.2	79.1	77.6
	74.1	73.2	71.6	73.0	74.7	74.9	[illegible]					73.5	76.1	76.3	24.3	26.4	76.9	76.9	77.0	75.2	75.6	[illegible]	76.1	[illegible]	80.3	78.7	76.6	77.6	80.7	78.9	77.3
	75.5	75.1	73.5	73.7	76.3	76.3	74.1	75.0				75.3	78.4	77.9	24.8	26.9	79.1	79.0	77.2	[illegible]	[illegible]	[illegible]	78.0	77.9	80.0	79.4	78.5	77.9	81.1	80.2	79.4
	75.0	75.2	74.1	74.2	75.6	76.1	73.0	[illegible]				76.2	78.3	78.0	7.1	27.0	79.6	79.1	77.8	76.0	[illegible]	[illegible]	78.6	78.0	79.2	80.0	79.1	77.9	80.3	80.7	79.8
	73.6	73.3	72.9	73.8	73.9	74.2	73.4	[illegible]				74.4	76.2	76.2	25.6	25.7	77.2	77.3	76.1	76.4	[illegible]	[illegible]	76.7	76.7	78.4	78.0	77.0	77.2	79.4	78.6	77.9
	72.8	73.1	72.7	72.8	73.3	73.4	73.1	[illegible]				74.4	76.0	76.1	25.9	25.7	76.5	77.0	76.1	76.3	[illegible]	[illegible]	76.9	76.2	77.2	77.7	77.4	76.4	78.7	78.6	77.9
	75.0	74.1	73.2	74.0	75.1	75.9	74.4	[illegible]				75.2	77.8	77.0	26.1	25.1	78.	[illegible]	76.8	76.2	[illegible]	[illegible]	78.7	76.6	80.5	79	78.0	77.3	81.2	79.9	78.7
	75.6	75.8	75.6	75.2	76.4	77.0	76.[illegible]	[illegible]				[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	78.4	78.9	80.0	80.0	79.2	78.8	80.0	79.9	79.2
	71.3	71.3	70.9	71.4	72.1	72.6	[illegible]	[illegible]				[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	75.3	75.6	76.6	76.1	76.4	75.6	77.2	77.1	76.7
	73.2	73.2	72.4	72.0	73.8	[illegible]	[illegible]	[illegible]				[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	76.8	76.3	[illegible]	77.9	77	76.4	78a5	78.8	78.3
	72.6	72.8	71.9	72.0	73.4	[illegible]	[illegible]	[illegible]				[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	76.4	76.2	[illegible]	77.5	77.2	76.1	78.0	78.8	78.3
	74.0	74.0	73.1	72.9	74.3	[illegible]	[illegible]	[illegible]				[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	77.3	76.9	78.3	79.2	78.1	77.2	79.0	79.4	79.1
					75.6	[illegible]	[illegible]	[illegible]				[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	76.8	76.6	77.8	77.9	77.1	76.5	78.5	78.2	77.6
	69.6	70.0	69.3	69.4	70.0	[illegible]	[illegible]	[illegible]				[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	73.4	73.4	73.6	74.4	74.0	73.3	74.8	75.1	74.6
	85.2	85.6	83.3	82.9	84.0	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	85.4	85.3	87.9	87.6	86.4	85.4	88.2	86.0	86.7
	81.0	80.5	79.4	80.3	81.4	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	83.2	81.3	83.8	84.0	83.3	82.8	84.2	84.9	83.6
	82.3	82.1	80.8	81.5	83.1	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	84.9	84.7	85.1	85.3	83.8	83.4	85.8	85.9	84.5
	82.3	82.1	80.8	81.5	83.4	82.6	81.2	[illegible]		83.4	81.2	82.4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	84.1	84.5	84.3	84.9	84.5	82.0	85.7	86.3	85.4
	69.3	69.2	53.8	69.2	53.3	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	53.0	54.3	75.6	70.3	66.6	65.6	73.8	[illegible]	66.1
	68.1	69.2	53.8	79.2	54.4	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	54.1									

locations see Sec. IV-A and B.

B

174	180	186	192 (8)	198	204	210	216 (9)	222	228	234	240 (10)	246	252	258	264 (11)	270	276	282	288 (12)	294	300	306	312 (13)	318	324	330	336 (14)
91.2	87.5	74.2	87.4	98.2	89.0	74.3	87.2	95.0	86.8	74.4	85.0	96.3	86.8	74.3	85.0	94.8	87.3	74.0	86.0	96.3	87.4	76.4	83.4	96.0	87.3	74.7	84.7
77.5	72.9	57.4	71.2	76.8	72.1	68.7	72.2	79.2	74.0	69.8	71.8	78.4	74.3	69.5	71.3												
80.9	80.9	78.6	79.3	60.3	80.9	79.9	79.9	81.3	81.9	80.3	79.9	81.9	82.1	80.9	80.6	81.4	82.4	80.0	75.5	82.3	82.0	80.3	81.2	82.3	81.9	80.3	80.4
80.0	80.8	78.4	79.2	79.9	80.6	79.6	79.9	80.9	81.8	80.0	79.9	80.7	81.8	80.2	80.2	80.6	62.2	79.5	79.2	81.3	82.0	79.7	80.9	81.5	81.9	80.2	80.[illegible]
84.1	82.2	78.6	81.2	83.7	82.6	79.4	81.6	83.8	82.8	79.7	81.2	85.0	83.7	79.9	81.5	84.9	82.8	79.9	81.3	85.7	83.3	80.4	81.8	85.8	83.7	80.3	82.6
79.2	78.0	75.3	76.4	78.1	77.3	75.6	77.4	79.6	79.3	77.0	77.4	79.[illegible]	80.2	76.9	77.8	78.3	80.0	75.3	74.9	78.8	79.0	76.0	78.3	78.9	78.9	76.0	77.3
81.2	80.5	79.4	80.2	81.1	81.3	79.8	80.8	81.3	82.0	80.3	80.3	82.7	82.5	80.9	80.7	82.2	[illegible]	80.0	80.4	82.3	84.5	80.9	82.1	82.9	84.4	82.5	81.8
79.8	79.7	79.0	78.9	79.4	80.0	73.3	79.1	80.3	81.3	80.0	79.9	82.2	82.4	80.7	79.7	82.2				81.3				82.3			
79.9	79.8	79.4	78.9	79.4	80.0	[illegible].9.4	79.1	80.4	81.3	81.4	80.3	83.1	83.0	82.0	80.0	82.6	82.0	81.2	80.9	82.3	82.2	81.0	81.3	82.3	82.4	81.6	80.9
77.5	77.4	76.0	76.3	77.5	77.6	77.2	77.0	78.9	78.5	77.8	77.1	79.2	79.1	77.6	77.2	78.2	79.0	76.4	76.5	78.9	79.5	77.5	77.4	78.5	78.9	77.8	77.4
76.9	77.0	75.7	75.6	78.2	78.1	[illegible]	76.6	80.3	78.7	76.6	77.4	80.7	78.9	77.3	78.1	80.3	78.6	77.4	78.5	80.1	79.4	77.7	78.6	80.0	79.0	77.8	78.7
79.1	79.0	77.2	77.2	79.3	79.3	78.0	77.9	80.0	79.4	78.5	77.9	81.1	80.2	79.4	78.8	81.4	80.4	80.0	78.9	81.8	81.2	79.4	79.0	81.4	81.2	79.9	79.3
78.6	79.1	77.8	78.0	78.8	79.3	78.4	78.0	79.2	80.0	79.1	77.9	80.3	80.7	79.8	78.8	80.7	80.9	80.0	78.9	81.5	81.2	79.[illegible]	79.4	81.6	81.3	80.0	79.5
77.2	77.3	76.1	76.4	77.2	77.6	76.7	76.7	78.2	78.0	77.0	77.2	79.4	78.6	77.9	77.9	79.6	78.7	77.8	78.1	79.8	79.3	77.6	78.2	80.0	78.9	78.2	78.3
76.5	77.0	76.2	76.3	76.[illegible]	77.2	76.9	76.2	77.2	77.7	77.4	76.4	78.7	78.6	77.9	77.2	79.0	78.6	[illegible]	77.7	79.5	79.1	77.6	78.0	78.9	76.8	78.3	78.0
78.4	71.2	76.8	76.[illegible]	79.0	79.8	78.7	76.8	80.5	79.2	78.0	77.3	81.2	79.9	78.7	78.4	81.7	79.4	[illegible].0	78.6	81.9	80.0	[illegible].9	79.0	81.7	80.2	79.6	79.1
78.4	78.5	77.0	78.0	78.[illegible]	[illegible]	78.4	78.9	80.0	80.0	79.5	78.8	80.0	79.9	79.2	78.9	80.3	79.3	78.7	79.0	80.3	80.0	78.0	79.0	79.8	79.1	78.5	79.1
75.1	[illegible]	[illegible]	75.2	75.[illegible]	75.9	75.3	75.6	76.6	76.1	76.4	75.6	77.2	77.1	76.7	76.0	77.6	77.6	76.6	76.8	78.9	77.8	77.0	76.9	79.3	77.4	76.8	77.0
76.9	77.2	75.9	76.1	76.8	77.2	76.8	76.3	77.5	77.9	77.3	76.4	7845	78.8	78.3	77.1	78.9	78.7	77.6	77.3	79.6	79.6	78.8	78.2	79.3	79.0	78.7	78.3
75.0	77.0	75.4	75.6	76.4	76.9	76.4	76.2	77.0	77.5	77.2	76.1	78.0	78.6	78.3	77.0	78.4	78.2	77.9	77.7	78.5	78.4	77.3	77.8	77.3	78.6	78.3	78.0
78.3	77.4	76.7	76.8	78.3	77.7	77.3	76.9	78.3	79.1	76.3	77.2	79.0	79.9	79.3	77.9	79.6	79.5	78.7	78.3	80.0	80.0	79.2	78.5	80.4	79.9	79.2	78.8
77.5	77.8	76.5	76.8	77.2	77.6	76.8	76.6	77.5	77.9	77.1	76.5	78.5	78.3	77.6	77.0	78.9	78.3	77.1	77.1	78.9	78.5	77.4	77.1	79.3	78.3	78.0	77.4
73.2	73.7	73.1	73.5	73.3	74.0	73.4	73.4	73.6	74.4	74.0	73.3	74.8	75.1	74.6	74.7	75.3	75.0	76.3	74.6	76.0	75.4	74.8	75.0	76.4	75.4	75.1	75.0
87.8	87.1	85.9	85.7	86.1	86.9	85.4	85.9	87.9	87.4	86.4	85.4	88.2	88.0	86.7	86.1	88.4	[illegible]	85.4	86.[illegible]	88.3	87.4	86.9	87.2	88.9	88.0	87.[illegible]	87.8
83.6	84.2	82.4	82.9	83.6	84.0	83.2	83.3	83.8	84.0	83.3	82.8	84.2	84.9	83.4	83.2	85.1	85.7	83.0	83.1	86.6	85.4	83.1	84.1	86.3	85.4	83.9	83.3
84.3	85.1	83.[illegible]	84.[illegible]	84.[illegible]	85.2	84.9	84.7	85.1	85.3	83.8	83.4	85.8	85.9	84.5	84.0	85.9	85.8	83.3	84.9	86.7	85.7	85.0	85.2	86.9	86.2	85.0	85.4
84.3	[illegible]	[illegible]	84.0	84.5	85.2	84.1	84.5	84.3	84.9	84.6	82.0	85.7	86.[illegible]	85.4	81.9	85.9	84.5	82.1	83.6	83.6	84.8	[illegible]	[illegible]	84.6	84.1	84.1	83.3
82.3	62.9	50.4	50.1	51.2	54.0	55.8	56.3	75.6	70.3	66.6	65.4	75.8	69.8	66.1	70.2	82.3	76.2	68.1	67.9	84.8	76.8	69.8	71.2	82.8	76.0	68.3	66.0
82.3	62.8	50.4	50.1	51.2	54.0	55.0	56.3	75.6	70.3	66.6	65.4	75.0	69.8	66.1	69.0	82.3	76.2	68.1	67.9	84.8	76.8	70.0	71.2	82.7	76.0	68.4	66.0
						56.1									69.0	82.3	76.2	68.2	67.9	84.8	76.8	70.1	71.2	82.7	76.0	68.3	66.0

C

Table V-B. VARIATION OF TEMPERATURES IN SOIL SURROUNDING SHELTER*

7 x 7 x 7 ft shelter; 5 occupants; 3 cfm/occupant

SOIL TEMPERATURES	T.C. No.	Time From Start of Test, Hrs. → / Days →														
		0	24 1	48 2	72 3	96 4	120 5	144 6	168 7	192 8	216 9	240 10	264 11	288 12	312 13	336 14
SECTION C-C																
Outside Wall																
Diagonally Up	6-10	43.8	66.3	69.8	73.1	73.0	73.0	73.6	74.4	75.6	76.6	77.4	78.1	78.5	78.6	78.7
	6-11	50.8	51.7	54.3	56.7	58.7	59.7	60.8	62.2	63.7	64.3	64.3	65.2	67.0	68.0	68.0
	6-12	50.8	51.3	52.1	53.3	54.8	56.3	57.4	59.0	60.8	62.1	62.9	63.5	64.7	66.2	66.8
	7-1	49.4	48.8	48.3	49.1	49.9	50.8	52.6	54.7	56.2	57.3	57.2	58.4	60.0	62.0	63.1
	7-2	49.4	48.5	48.3	48.7	49.4	50.6	52.3	54.6	56.2	57.0	56.9	58.3	60.0	61.9	62.9
	7-3	49.4	48.3	48.3	47.9	49.5	50.5	52.6	55.6	57.4	57.0	56.9	58.4	60.1	62.3	63.3
Horizontal 6 ft elev	7-4	49.4	68.9	71.8	73.4	73.7	74.8	75.3	76.9	77.2	77.9	77.9	78.8	78.9	79.0	79.3
	7-5	50.7	54.4	57.8	59.4	60.7	62.2	63.4	64.3	65.6	66.4	66.9	67.8	68.3	68.8	69.3
	7-6	50.7	51.1	53.2	55.6	56.1	57.9	58.6	60.3	61.0	62.0	62.8	64.0	64.7	65.4	66.3
	7-7	50.1	50.0	50.4	51.4	52.3	53.3	54.3	55.3	56.4	57.3	58.6	59.6	59.7	61.1	62.0
	7-8	50.2														
	7-9	48.7	48.6	48.6	48.7	48.7	48.7	48.7	49.3	51.0	51.4	51.6	52.3	55.0	55.3	55.2
5-1/2 ft elev	7-10	48.8	68.8	72.1	73.9	74.2	75.3	76.2	77.0	78.0	78.0	77.9	78.8	78.9	79.4	79.5
	7-11	51.5	56.0	60.4	62.8	64.4	65.4	66.3	67.4	68.1	68.2	68.3	69.0	69.7	70.3	70.8
	7-12	51.2	52.5	55.5	57.7	59.6	60.7	61.7	62.5	63.6	64.2	64.3	65.7	66.3	67.1	67.2
	8-1	50.2	50.0	50.3	52.5	53.4	54.4	56.2	57.3	57.4	58.1	58.7	59.9	60.4	61.1	62.3
	8-2	49.4	49.1	49.0	49.2	50.0	50.4	50.8	51.7	52.3	52.8	53.4	54.2	54.4	55.6	56.1
	8-3	47.9	47.4	47.4	47.8	47.9	47.9	48.3	49.2	49.5	50.0	50.3	51.1	51.6	52.3	53.0
5 ft elev	8-4	49.4	66.7	70.1	72.3	72.8	73.8	74.4	75.7	76.4	76.7	77.2	77.9	78.1	78.2	78.3
	8-5	50.8	55.9	59.4	61.6	62.9	64.0	65.1	65.9	66.1	67.3	68.1	68.6	68.8	68.8	69.4
	8-6	50.6	51.8	54.6	57.9	58.3	59.3	60.3	61.4	62.1	62.3	63.4	64.1	64.2	64.3	65.6
	8-7	50.3	50.3	50.9	52.5	53.8	55.3	56.0	57.4	57.5	57.4	57.5	58.1	59.2	60.1	60.6
	8-8	49.3	49.0	48.7	49.1	49.6	50.1	50.8	51.7	51.9	52.3	52.3	52.8	54.6	54.7	54.9
	8-9	47.3	47.8	47.8	47.9	48.2	48.4	48.6	49.2	49.3	49.4	49.5	50.2	50.8	51.4	51.8

* For detailed description of thermocouple locations see Section IV-A.

Table V-B. VARIATION OF TEMPERATURES IN SOIL SURROUNDING SHELTER*

7 x 7 x 7 ft. shelter; 5 occupants; 3 cfm/occupant

SOIL TEMPERATURES	T.C. No.	Time From Start of Test, Hrs. → Days → 0	24 1	48 2	72 3	96 4	120 5	144 6	168 7	192 8	216 9	240 10	264 11	288 12	312 13	336 14
SECTION C-C																
Outside wall																
Diagonally Down	8-10 11-10 12-9	49.3	65.9	69.6	71.8	72.8	73.7	74.4	75.7	76.3	76.2	76.4	77.2	77.7	76.0	78.0
Above Roof																
3-1/3 ft from wall	9-4															
1 ft from wall	10-4	49.3	67.1	70.6	73.9	74.0	75.3	75.2	75.3	76.2	76.8	77.3	78.4	78.6	79.0	79.1
	10-5	49.9	56.3	61.2	62.9	63.0	65.4	67.6	69.9	70.9	71.6	71.5	72.9	74.2	75.4	75.7
	10-6	49.9	54.2	57.7	61.1	63.1	65.1	66.2	68.3	69.9	69.9	70.3	71.6	73.0	73.9	74.4
	10-7	49.9	51.6	55.2	57.2	60.1	61.5	64.1	67.1	68.6	68.3	68.3	70.1	72.0	73.3	73.6
	10-8	49.8	50.4	53.3	54.7	58.4	59.4	63.1	65.6	66.9	67.2	67.6	68.9	71.0	72.4	73.1
	10-9	49.3	50.3	52.7	53.9	58.4	58.3	62.2	65.1	65.4	66.0	67.2	68.5	70.1	71.3	71.8
Below Floor																
3-1/2 ft from wall	10-10 10-11	49.3	68.8	72.6	74.3	75.2	76.2	77.3	77.6	78.0	78.9	78.8	78.9	79.0	79.0	79.1
							(Other Thermocouples Out)									
1 ft from wall	12-4	49.6	64.5	68.4	70.3	71.4	73.0	73.2	74.0	75.2	75.6	75.6	76.0	76.8	76.9	77.0

* For detailed description of thermocouple locations see Section IV-A.

Table V-B. VARIATION OF TEMPERATURES IN SOIL SURROUNDING SHELTER*

7 x 7 x 7 ft. shelter; 5 occupants; 3 cfm/occupant

SOIL TEMPERATURES	T.C. No.	Time From Start of Test, Hrs. → Days → 0	24 1	48 2	72 3	96 4	120 5	144 6	168 7	192 8	216 9	240 10	264 11	288 12	312 13	336 14
SECTION D-D																
Outside Corner																
Diagonally Up	12-10	51.2	66.0	69.1	71.2	72.0	72.8	73.9	74.9	76.1	76.3	76.4	77.1	77.3	78.2	78.3
	12-11	49.9	49.6	51.1	53.0	54.0	55.0	56.0	57.8	59.1	60.0	60.6	61.7	62.8	63.6	64.2
	12-12	49.9	49.4	50.6	51.4	52.4	53.2	54.1	55.6	57.2	58.4	58.4	59.9	61.2	62.8	63.4
	13-1	48.9	48.2	47.5	47.9	48.0	48.2	49.4	51.4	53.0	54.1	56.8	56.7	57.0	58.4	60.0
	13-2	48.8	48.1	47.6	47.5	48.0	48.2	50.1	52.6	54.0	54.2	54.3	56.1	57.7	59.2	60.8
	13-3															
Horizontal																
6 ft elev	13-4	51.2	65.7	68.6	70.9	72.0	72.7	73.8	74.9	75.6	76.2	76.1	77.0	77.7	77.8	78.0
	13-5	50.3	50.9	53.4	55.4	56.5	57.2	58.0	59.9	60.2	61.6	62.0	62.9	63.1	64.8	65.0
	13-6	50.0	50.2	51.0	51.9	52.6	53.6	54.5	55.4	56.8	57.4	58.3	59.1	60.4	61.0	61.7
	13-7	49.3	49.3	49.3	49.5	50.0	50.6	51.0	51.8	52.4	53.2	53.2	54.4	56.1	57.1	57.9
3-1/2 ft elev	13-8	49.1	57.4	70.3	72.1	72.9	74.0	75.0	76.1	76.8	76.9	77.2	77.9	78.3	78.5	78.8
	13-9	51.0	52.0	54.4	56.4	57.9	58.8	59.7	61.1	61.8	62.1	62.4	62.9	64.0	64.1	64.2
	13-10	50.5	50.2	50.9	52.1	53.3	54.2	55.0	55.8	56.7	57.2	57.8	58.8	59.4	60.3	60.6
	13-11	50.0	49.5	49.4	49.6	49.8	50.1	50.4	51.4	51.8	52.2	52.5	53.3	54.2	55.0	55.5
	13-12	49.9	48.1	47.9	48.0	48.3	48.1	48.1	48.8	49.2	49.4	49.6	50.3	51.0	51.9	52.3
	14-1	48.1	46.8	47.0	46.9	46.9	46.9	46.9	47.4	48.3	48.3	48.7	49.2	50.2	50.8	51.3
1 ft elev	14-2	51.6					74.5	75.0	76.0	76.8	76.6	76.5	77.0	77.1	77.3	77.4
	14-3	49.9	51.6	54.1	55.6	56.8	57.9	58.3	59.9	60.2	60.8	61.1	61.6	61.8	62.7	62.7
	14-4	49.9	50.1	50.6	51.6	52.6	53.2	54.0	54.8	55.6	56.0	56.1	56.7	57.7	58.0	58.3
	14-5															

* For detailed description of thermocouple locations see Section IV-A.

Table VI-A. VARIATION OF TEMPERATURES INSIDE SHELTER*

7 x 7 x 7 ft. shelter; 5 occupants;
7 cfm/occupant

	T.C. No.	Time From Start of Test, Hrs. → / Days →																
		0	6	12	18	24	30	36	42	48	54	60	66	72	78	84	90	96
		0				1				2				3				4
AIR TEMPERATURES																		
SUPPLY DUCT																		
DB	15-10	45.0	93.6	82.1	68.3	80.1	94.7	83.1	70.3	81.7	95.6	83.2	79.2	82.8	95.2	82.9	71.7	8
WB	15-9	44.8	77.6	72.9	67.9	73.7	79.8	73.2	6 .0	73.3	79.1	73.3	70.5	73.7	76.3	74.2	69.7	7
RETURN DUCT																		
DB	16-2	45.9	68.2	71.0	70.1	72.1	73.0	74.0	72.4	73.0	76,1	76.3	73.4	74.2	77.2	76.9	73.9	7
WB	16-1	45.0	65.2	69.8	70.0	71.1	72.1	73.4	72.3	72.7	75.1	75.1	72.8	74.2	76.3	76.8	72.7	7
SHELTER AIR																		
Center-6 ft elev																		
DB	15-12	45.4	76.3	74.8	71.3	75.9	79.8	76.1	72.4	76.0	81.6	77.2	74.0	76.8	81.9	78.2	73.9	
WB	15-11	45.0	69.4	70.9	68.5	72.8	71.8	72.9	70.7	73.3	74.8	74.8	72.2	74.1	75.1	76.1	71.8	7
3-1/2 ft elev DB	15-4	45.4	68.2	71.4	70.4	73.0	74.2	74.9	72.7	74.2	76.5	77.0	75.2	74.6	78.2	77.9	75.3	7
WB	15-3	46.0	66.4	68.8	68.0	70.8	71.8	72.3	70.6	71.8	73.9	74.6	73.1	73.6	75.9	75.6	73.0	7
1 ft elev DB	15-2	47.4	66.5	68.8	67.9	70.8	70.8	72.3	70.6	71.8	73.9	74.6	73.0	73.3	75.9	75.6	73.0	7
WB	15-1	45.1	63.9	66.2	66.3	68.2	69.9	70.1	68.4	70.5	72.6	71.7	70.4	71.5	73.4	73.0	71.8	7
INSIDE SURFACE TEMPERATURES																		
SECTION C-C																		
Wall	6-10	44.2	66.3	68.3	66.4	69.4	71.9	72.8	69.2	71.2	76.0	74.5	70.0	72.0	77.6	76.5	72.4	7
	7-4	45.8	67.6	70.1	68.8	71.2	74.0	74.0	71.3	72.5	76.8	76.4	72.1	73.8	78.7	77.3	73.7	7
	7-10	44.2	63.0	67.9	68.8	69.9	70.6	72.8	71.9	72.1	74.0	74.2	73.0	73.2	74.8	76.8	74.6	7
	8-4	46.2	60.7	64.9	66.2	68.2	68.9	70.1	70.0	70.3	72.2	72.7	71.2	71.7	74.3	74.2	72.9	7
	8-10	47.1	57.4	64.0	65.8	66.9	68.0	69.8	69.9	70.0	71.7	72.5	71.2	71.5	73.9	74.2	72.9	7
Ceiling	9-4	44.7	69.3	71.7	70.6	73.3	74.0	73.1	70.9									
	10-4	43.3	66.3	68.8	67.2	69.2	72.8	73.1	69.8	70.9	76.4	75.4	71.2	72.7	77.4	76.8	73.6	7
Floor	10-10	46.3	62.0	66.7	68.3	70.3	71.2	72.2	72.1	72.5	74.8	74.9	73.4	73.9	76.5	76.4	75.3	7
	12-4	45.6	56.3	61.3	62.7	64.7	66.2	67.7	67.4	68.1	70.0	71.0	70.4	70.7	72.8	72 7	72.1	7
SECTION D-D																		
	12-10	44.6	63.6	66.4	65.5	67.3	69.0	69.7	68.3	68.7	71.6	71.8	70.2	70.1	73.2	73.1	71.1	
	13-4	45.9	62.0	64.3	64.4	66.3	68.4	68.8	67.4	68.5	71.4	70.9	68.3	69.8	73.0	72.3	70.3	
	13-8	45.9	62.3	66.3	66.4	68.0	69.3	71.0	69.8	70.3	72.7	73.1	71.7	71.3	74.4	74.4	72.3	
	14-2	47.7	59.9	63.3	64.9	66.3	67.6	68.3	68.0	68.6	71.0	70.8	70.0	70.0	72.8	72.3	71.0	
	14-6	47.2	57.0	61.4	62.7	64.2	64.9	66.5	66.8	67.0	68.2	69.2	68.7	68.2	70.4	70.9	70.0	
SIMOC SKIN TEMPERATURES																		
Center-Top	18-7	44.8	76.2	79.7	79.0	81.0	81.9	82.9	81.7	81.9	84.2	84.3	83.0	82.8	85.3	85.3	82.4	
Middle	8	45.0	75.3	78.1	77.7	79.4	80.8	81.6	79.8	80.7	83.4	83.2	81.9	81.9	85.1	84.4	82.0	
Bottom	9	45.0	75.3	78.1	77.8	79.0	80.8	81.7	80.2	80.9	83.8	83.2	82.2	82.3	85.0	84.6	82.0	
In Corner-Middle	18-10	44.8	75.3	78.2	78.1	80.2	81.8	81.7	80.4	81.1	83 8	83.1	82.1	82.2	79.9	84.6	82.0	
OUTSIDE AIR TEMPERATURES	19-5	30.1	31.4	30.0	30.0										32.3			
	6														32.3			
	7	31.3	32.1	31.0	30.2		30.3								32.4			

A

*For detailed description of thermocouple locations see Sec. IV-A and B.

ATURES INSIDE SHELTER*

lter; 5 occupants;
occupant

Test, Hrs. → / Days →	36	42	48 (2)	54	60	66	72 (3)	78	84	90	96 (4)	102	108	114	120 (5)	126	132	138	144 (6)	150	156	162	96 (4)
	83.1	70.3	81.7	95.6	83.2	79.2	82.8	95.2	82.9	71.7	81.8	94.5	81.3	71.1	82.9	94.9	83.0	71.4	84.3	96.8	84.3	71.	81
	73.2	69.0	73.3	79.1	73.3	70.5	73.7	76.3	74.2	69.7	76.3	78.2	75.0	70.5	75.3	78.7	74.9	71.4	76.2	74.8	71.2	68.	76
	74.0	72.4	73.0	76,1	76.3	73.4	74.2	77.2	76.9	73.9	76.2	78.0	77.7	74.4	77.1	78.8	77.9	75.2	76.7	79.3	78.1	76.	75
	73.4	72.3	72.7	75.1	75.1	72.8	74.2	76.3	76.8	72.7	75.8	78.0	77.0	74.1	76.7	77.1	76.1	74.9	75.1	76.9	76.3	75.	
	76.1	72.4	76.0	81.6	77.2	74.0	76.8	81.9	78.2	73.9	78.4	82.2	78.9	74.1	78.0	82.4	80.3	75.3	79.6	84.1	80.0	75.	78
	72.9	70.7	73.3	74.8	74.8	72.2	74.1	75.1	76.1	71.8	77.0	76.5	76.6	71.5	76.3	76.4	77.0	71.4	76.4	75.4	75.0	71.	77
	74.9	72.7	74.2	76.5	77.0	75.2	74.6	78.2	77.9	75.3	75.4	78.9	78.0	74.9	77.2	78.9	78.3	75.3	77.4	79.3	79.0	76.	75
	72.3	70.6	71.8	73.9	74.6	73.1	73.6	75.9	75.6	73.0	75.0	76.7	76.3	74.1	75.4	76.8	76.5	74.4	75.8	77.4	76.0	74.	75
	72.3	70.6	71.8	73.9	74.6	73.0	73.3	75.9	75.6	73.0	75.0	76.7	76.3	74.0	75.4	76.8	77.1	75.3	76.8	77.5	76.0	75.	73
	70.1	68.4	70.5	72.6	71.7	70.4	71.5	73.4	73.0	71.8	73.8	75.0	74.1	72.8	73.8	74.7	74.0	72.3	74.0	74.9	73.3	72.	
	72.8	69.2	71.2	76.0	74.5	70.0	72.0	77.6	76.5	72.4	75.3	79.3	77.6	74.0	75.0	79.6	76.4	74.2	75.9	79.8	76.3	74.	75
	74.0	71.3	72.5	76.8	76.4	72.1	73.8	78.7	77.3	73.7	75.3	79.7	78.0	74.3	76.4	79.6	77.9	74.3	76.9	80.1	78.4	75.	75
	72.8	71.9	72.1	74.0	74.2	73.0	73.2	74.8	76.8	74.6	75.3	77.2	77.2	75.3	76.5	76.4	77.7	75.2	76.4	78.0	79.0	76.	73
	70.1	70.0	70.3	72.2	72.7	71.2	71.7	74.3	74.2	72.9	73.6	75.1	74.7	73.7	74.1	75.3	75.1	73.6	75.2	75.8	75.3	74.	73
	69.8	69.9	70.0	71.7	72.5	71.2	71.5	73.9	74.2	72.9	73.1	74.7	74.5	73.6	74.1	74.4	74.6	73.6	74.3	75.5	75.9	74.	
	73.1	70.9																					74
	73.1	69.8	70.9	76.4	75.4	71.2	72.7	77.4	76.8	73.6	74.9	79.3	77.7	74.1	75.4	79.5	77.7	74.9	75.2	79.4	77.2	75.	75
	72.2	72.1	72.5	74.8	74.9	73.4	73.9	76.5	76.4	75.3	75.7	76.8	76.3	75.3	75.8	76.9	76.5	75.1	75.9	78.5	78.1	77.	73
	67.7	67.4	68.1	70.0	71.0	70.4	70.0	72.8	72.7	72.1	73.7	74.7	74.2	73.3	74.2	75.2	75.0	72.8	73.2	75.7	74.3	73.	
	69.7	68.3	68.7	71.6	71.8	70.2	70.1	73.2	73.1	71.1	72.0	74.7	73.6	71.9	72.6	74.3	73.7	72.0	72.6	74.8	74.4	73.	72.
	68.8	67.4	68.5	71.4	70.9	68.3	69.8	73.0	72.3	70.3	71.6	73.5	72.7	70.8	71.9	73.4	73.3	71.7	72.0	74.0	73.1	71.	71
	71.0	69.8	70.3	72.7	73.1	71.7	71.3	74.4	74.4	72.3	73.2	75.6	74.7	72.9	73.9	75.3	75.0	73.0	74.3	75.7	75.7	74.	73
	68.3	68.0	68.6	71.0	70.8	70.0	70.0	72.8	72.3	71.0	71.2	73.4	72.6	71.1	71.9	73.2	73.1	72.0	72.1	74.0	73.1	72.	70
	66.5	66.8	67.0	3.2	69.2	68.2	68.2	70.4	70.9	70.0	70.2	72.0	71.1	70.1	71.4	71.7	71.1	70.3	70.6	72.9	71.7	71.	
	82.9	81.2	81.9	84.2	84.3	83.0	82.8	85.1	83.1	82.	81.8	86.4	85.5	84.8	85.2	86.9	85.6	84.9	84.5	86.2	86.1	85.	81
	81.6	79.8	80.7	83.4	83.2	81.9	81.9	85.1	84.4	82.0	81.8	85.6	84.7	82.7	84.4	85.0	85.5	82.0	84.5	85.3	85.2	83.	81
	81.7	80.2	80.9	83.8	83.2	82.2	82.3	85.0	84.6	82.0	81.8	85.6	84.8	82.8	84.6	85.6	85.9	82.8	84.2	86.1	85.3	84.	
	81.5	80.4	81.1	83.8	83.1	82.1	82.2	79.9	84.6	82.0	81.8	85.6	85.8	83.0	84.9	86.0	85.9	82.9	84.3	86.1	85.3	84.	
								32.3				36.1	30.8		39.6	41.3	38.4	34.6	36.4	39.8	34.6	32.	
								32.1				36.4	30.9		39.3	41.3	38.4	34.6	36.2	39.5	34.2	32.	
								32.4				34.8	31.6		34.3	37.1	36.4	34.6	35.0	35.2	34.3	32.	

couple locations see Sec. IV-A and B.

B

96	102	108	114	120	126	132	138	144	150	156	162	168	174	180	186	192	198	204
4				5				6				7				8		
81.8	94.5	81.3	71.1	82.9	94.9	83.0	71.4	84.3	96.8	84.3	71.4	83.8	96.2	83.3	70.9	84.1	97.7	83.8
76.3	78.2	75.0	70.5	75.3	78.7	74.9	71.4	76.2	74.8	71.2	68.4	73.0	77.5	73.0	68.8	73.6	77.9	71.4
76.2	78.0	77.7	74.4	77.1	78.8	77.9	75.2	76.7	79.3	78.1	76.1	76.8	79.3	78.6	76.4	77.9	79.2	79.2
75.8	78.0	77.0	74.1	76.7	77.1	76.1	74.9	75.1	76.9	76.3	75.2	76.7	77.6	78.0	75.5	76.9	77.3	78.3
78.4	82.2	78.9	74.1	78.0	82.4	80.3	75.3	79.6	84.1	80.0	75.3	78.9	82.8	79.0	74.8	79.1	83.3	80.0
77.0	76.5	76.6	71.5	76.3	76.4	77.0	71.4	76.4	75.4	75.0	71.8	75.4	74.8	76.3	72.1	76.9	76.5	77.1
75.4	78.9	78.0	74.9	77.2	78.9	78.3	75.3	77.4	79.3	79.0	76.1	77.6	79.7	79.0	76.4	78.2	80.0	80.0
75.0	76.7	76.3	74.1	75.4	76.8	76.5	74.4	75.8	77.4	76.0	74.9	76.2	77.2	76.3	75.6	76.8	77.8	77.9
75.0	76.7	76.3	74.0	75.4	76.8	77.1	75.3	76.8	77.5	[illegible].0	75.2	76.3	77.3	76.4	75.8	76.9	79.1	78.0
73.8	75.0	74.1	72.8	73.8	74.7	74.0	72.3	74.0	74.9	[illegible].3	72.4	73.7	74.7	73.9	72.2	74.5	75.7	74.3
75.3	79.3	77.6	74.0	75.0	79.6	76.4	74.2	75.9	79.8	76.3	74.6	75.8	79.0	77.7	74.9	75.6	80.7	77.0
75.3	79.7	78.0	74.3	76.4	79.6	77.9	74.3	76.9	80.1	78.4	75.1	76.4	80.4	78.9	75.7	76.2	81.4	79.9
75.3	77.2	77.2	75.3	76.5	78.4	77.7	75.2	76.4	78.0	79.0	76.6	76.8	78.4	79.1	77.0	77.2	79.0	78.3
73.6	75.1	74.7	73.7	74.1	75.3	75.1	73.6	75.2	75.8	75.3	74.8	75.0	76.3	75.9	75.2	75.3	77.4	76.9
73.1	74.7	74.5	73.6	74.1	74.4	74.6	73.6	74.3	75.5	75.9	74.9	75.0	76.0	76.3	75.0	75.3	76.9	77.2
74.9	79.3	77.7	74.1	75.4	79.5	77.7	74.9	75.2	79.4	77.2	75.0	74.7	79.4	78.3	74.4	74.7	80.0	76.1
75.7	76.8	76.3	75.3	75.8	76.9	76.5	75.1	75.9	78.5	78.1	77.3	76.6	78.8	78.9	77.8	77.8	80.6	9
73.7	74.7	74.2	73.3	74.2	75.2	75.0	72.8	73.2	75.7	74.3	73.0	73.1	75.0	73.9	73.4	73.8	75.6	[illegible].2
72.0	74.7	73.6	71.9	72.6	74.3	73.7	72.0	72.6	74.8	74.4	73.0	73.2	75.0	74.9	73.2	73.4	75.1	75.0
71.6	73.5	72.7	70.8	71.9	73.4	73.3	71.7	72.0	74.0	73.1	71.7	72.2	74.4	73.7	72.3	72.5	75.6	74.3
73.2	75.6	74.7	72.9	73.9	75.3	75.0	73.0	74.7	75.7	75.7	74.1	74.5	76.5	76.3	74.4	74.7	76.9	76.7
71.2	73.4	72.6	71.1	71.9	73.2	73.1	72.0	72.1	74.0	73.1	72.1	72.3	74.2	73.7	72.3	72.5	75.4	73.9
70.2	72.0	71.1	70.1	71.4	71.7	71.1	70.3	70.6	71.9	71.7	71.2	71.2	72.8	72.4	71.3	71.5	72.8	72.7
81.8	86.4	85.5	84.8	85.2	86.9	85.6	84.9	85.5	86.0	86.1	85.9	85.3	87.4	87.0	85.8	86.0	87.1	86.7
81.8	85.6	84.7	82.7	84.4	85.0	85.5	82.0	84.5	85.3	85.2	83.8	84.3	86.2	85.7	83.6	85.0	86.3	85.7
81.8	85.6	84.8	82.8	84.6	85.6	85.9	82.8	84.2	86.1	85.3	84.2	84.4	86.4	85.7	84.7	85.2	86.8	86.0
81.8	85.6	85.8	83.0	84.9	86.0	85.9	82.9	84.3	86.1	85.3	84.2	84.4	86.5	85.7	84.8	85.2	86.8	86.0
	36.1	30.8		39.4	41.3	38.4	34.6	36.4	39.8	34.6	32.2	36.3	37.3	31.9		39.9	45.4	39.2
	36.4	30.9		39.3	41.3	38.4	34.6	36.2	39.5	34.2	31.[illegible]	37.4	37.3	31.9		39.1	45.4	38.7
	34.8	31.6		34.3	37.1	36.4	34.6	35.0	35.2	34.3	32.2	34.4	36.1	32.9	31.5	33.5	36.6	38.2

C

Table VI-B. VARIATION OF TEMPERATURES IN SOIL SURROUNDING SHELTER*
7 x 7 x 7 ft. shelter; 5 occupants; 7 cfm/occupant

SOIL TEMPERATURES	T.C. No.	Time From Start of Test, Hrs. → Days → 0	24 1	48 2	72 3	96 4	120 5	144 6	168 7	192 8	216 9	240 10	264 11	288 12	312 13	336 14
SECTION C-C																
Outside Wall																
Diagonally Up	6-10	44.2	69.4	71.2	72.0	75.3	75.9	75.9	75.8	75.6	75.9	76.0	75.9	76.0	76.7	76.8
	6-11	42.8	45.9	49.4	51.4	53.8	54.3	54.4	55.4	56.4	56.5	57.4	59.2	60.1	58.8	59.0
	6-12	41.6	43.6	45.6	47.0	50.0	51.6	51.7	52.2	52.8	53.4	54.3	55.6	56.2	55.1	55.4
	7-1	39.1	39.0	39.6	40.3	42.8	44.0	43.0	43.7	43.8	45.4	46.2	47.6	48.0	48.3	48.2
	7-2	38.1	38.5	38.3	38.1	40.1	40.6	39.8	40.4	41.7	42.2	43.0	44.0	44.9	43.7	44.5
	7-3	34.9	35.9	35.7	35.3	36.4	37.0	36.3	36.6	37.9	38.2	39.8	40.3	41.6	41.4	42.5
Horizontal 6 ft elev	7-4	45.8	71.2	72.5	73.8	75.3	76.4	76.9	76.4	76.2	76.4	76.5	77.3	77.8	77.6	77.3
	7-5	44.3	52.7	55.7	57.4	60.6	60.9	61.5	61.8	62.1	62.2	63.2	63.8	64.2	63.3	63.1
	7-6	44.2	47.2	50.7	52.3	55.1	56.3	56.3	57.1	57.5	58.2	58.4	59.4	59.7	59.1	59.3
	7-7	44.0	44.2	45.6	46.7	49.6	50.4	50.6	50.4	51.1	51.6	52.1	53.3	53.9	53.1	53.0
	7-8															
	7-9	39.3	40.3	39.6	39.3	40.1	41.4	39.9	39.3	39.9	40.8	41.1	41.9	42.5	41.2	41.4
3-1/2 ft elev	7-10	44.2	69.9	72.1	73.2	75.3	76.5	76.4	76.8	77.2	77.3	78.3	78.6	79.0	78.0	78.5
	7-11	45.9	56.6	60.5	62.1	65.3	65.7	65.7	65.9	66.4	67.5	68.4	68.5	68.9	67.8	67.7
	7-12	45.9	50.5	55.0	57.0	59.9	61.5	61.4	62.2	62.5	63.1	63.7	64.1	64.3	62.9	63.1
	8-1	44.1	46.9	47.9	49.7	52.9	53.3	53.4	53.7	54.7	55.3	56.0	56.8	56.9	56.4	56.7
	8-2	44.1	45.0	45.6	46.0	48.0	49.0	49.1	49.0	49.2	49.7	50.3	50.9	51.1	50.0	50.3
	8-3	43.7	42.9	42.8	43.3	44.9	45.3	44.8	44.2	44.4	44.7	45.3	45.8	46.0	45.0	45.2
1 ft elev	8-4	46.2	68.2	70.3	71.7	73.6	74.1	75.2	75.0	75.3	75.4	75.9	76.2	76.3	75.5	75.7
	8-5	48.0	57.1	61.0	62.6	65.3	65.9	66.2	65.6	65.9	66.3	66.7	67.5	68.1	67.0	66.4
	8-6	47.8	51.2	55.2	56.9	59.3	60.6	61.4	61.7	62.0	62.4	62.9	63.2	63.4	62.6	62.6
	8-7	46.7	48.0	49.8	51.2	53.8	54.9	55.1	55.1	55.6	55.7	57.0	58.0	58.6	57.7	57.5
	8-8	45.9	46.8	47.1	47.3	49.2	49.4	49.3	49.9	50.1	50.4	51.3	52.1	52.3	51.0	51.2
	8-9	45.0	45.9	45.6	45.4	45.9	46.4	46.4	46.3	46.6	47.2	47.4	47.9	48.1	47.1	47.3

* For detailed description of thermocouple locations see Section IV-A.

Table VI-B. VARIATION OF TEMPERATURES IN SOIL SURROUNDING SHELTER*

7 x 7 x 7 ft. shelter; 5 occupants; 7 cfm/occupant

SOIL TEMPERATURES	T.C. No.	Time From Start of Test, Hrs.→ Days→ 0	24 1	48 2	72 3	96 4	120 5	144 6	168 7	192 8	216 9	240 10	264 11	288 12	312 13	336 14
SECTION C-C																
Outside Wall																
Diagonally Down	8-10	47.1	66.9	70.0	71.5	73.1	74.1	74.3	75.0	75.3	75.3	75.9	76.2	76.4	75.5	75.4
	11-10															
	12-9															
Above Roof																
3-1/2 ft from wall	9-4	44.7	73.3													
1 ft from wall	10-4	43.3	69.2	70.9	72.7	74.9	75.4	75.2	74.7	74.7	75.0	75.9	76.3	76.0	76.4	76.3
	10-5	41.6	54.4	58.4	60.6	63.2	64.6	64.4	65.2	65.1	65.3	66.4	67.3	67.5	67.1	67.4
	10-6	41.5	48.9	52.8	56.4	59.9	61.1	61.8	63.1	63.0	63.6	64.1	64.6	64.9	64.8	64.9
	10-7	40.3	44.1	48.6	51.3	54.8	56.3	57.4	58.0	58.6	58.8	60.0	61.0	61.4	61.3	61.8
	10-8	39.1	42.0	44.9	47.5	50.4	52.4	55.0	55.3	55.2	55.7	56.9	57.4	58.0	58.2	59.2
	10-9	38.5	40.4	42.9	45.3	47.9	50.4	53.0	53.1	53.1	54.0	54.9	55.6	56.6	56.3	58.7
Below Floor																
3-1/2 ft from wall	10-10	46.3	70.3	72.5	73.9	75.7	75.8	75.9	76.6	77.8	77.8	78.4	79.2	79.0	79.0	78.6
	10-11															
	10-12															
	11-1															
	11-2						(Other Thermocouples Out)									
	11-3															
	11-4															
	11-5															
	11-6															
1 ft from wall	12-4	45.6	64.7	68.1	70.0	73.7	74.0	73.3	73.1	73.8	73.8	74.4	74.4	74.3	73.7	75.2

* For detailed description of thermocouple locations see Section IV-A.

Table VI-B. VARIATION OF TEMPERATURES IN SOIL SURROUNDING SHELTER*
7 x 7 x 7 ft. shelter; 5 occupants; 7 cfm/occupant

SOIL TEMPERATURES	T.C. No.	Time From Start of Test, Hrs. → / Days → 0	24 1	48 2	72 3	96 4	120 5	144 6	168 7	192 8	216 9	240 10	264 11	288 12	312 13	336 14
SECTION D-D																
Outside Corner																
Diagonally Up	12-10	44.6	67.3	68.7	70.1	72.0	72.6	72.6	73.2	73.4	72.6	73.3	73.9	74.1	74.2	74.4
	12-11	40.9	42.3	44.0	45.3	46.2	48.6	49.2	50.2	50.7	51.3	51.9	52.8	53.0	52.9	53.5
	12-12	40.8	42.2	42.9	43.3	45.9	46.8	46.9	47.6	48.3	48.8	49.2	50.5	50.8	50.7	49.6
	13-1	37.7	37.4	36.9	37.1	38.8	38.8	38.8	38.9	39.3	39.8	40.3	41.3	41.8	41.7	42.9
	13-2	35.9	36.3	35.4	35.0	36.9	36.7	37.1	36.9	37.2	37.4	37.5	39.4	40.1	40.3	41.3
	13-3						36.3	36.8	36.8	36.2	36.3	36.3	39.4	39.9	38.3	
Horizontal 5 ft elev	13-4	45.9	66.3	68.5	69.8	71.6	71.9	72.0	72.2	72.5	72.6	73.0	73.3	73.5	73.5	73.3
	13-5	43.7	46.3	48.4	50.3	52.0	53.0	54.6	54.2	55.2	55.6	56.0	56.3	56.4	56.7	56.4
	13-6	43.7	44.4	44.4	46.5	48.4	49.4	50.3	50.3	51.1	51.6	52.1	52.7	52.9	53.2	53.3
	13-7	41.5	42.8	42.4	42.4	44.2	45.3	44.0	44.2	44.3	44.9	45.4	46.3	47.1	46.8	47.0
5-1/2 ft elev	13-8	45.9	68.0	70.3	71.3	73.2	73.9	74.3	74.5	74.7	75.1	75.1	75.4	75.7	75.9	75.8
	13-9	45.2	49.2	52.3	53.4	56.2	57.3	57.3	57.5	58.4	59.1	59.2	59.9	60.0	60.0	59.9
	13-10	45.1	47.1	48.4	49.6	52.0	53.4	53.6	54.0	54.6	55.0	55.3	55.9	56.0	56.3	56.5
	13-11	45.0	45.4	45.5	45.2	47.1	47.9	47.4	46.9	47.3	47.7	48.2	48.8	49.2	49.0	49.1
	13-12	43.8	44.0	43.4	42.8	44.2	44.7	44.4	43.5	43.7	43.7	44.0	44.2	44.5	44.4	44.1
	14-1	41.5	41.1	40.8	40.6	41.7	41.8	41.8	40.7	40.4	40.4	40.7	40.8	40.9	40.9	41.1
1 ft elev	14-2	47.7	66.3	68.6	70.0	71.2	71.9	72.1	72.3	72.5	73.0	73.3	73.7	73.5	73.6	73.7
	14-3	47.6	49.9	52.3	53.4	55.8	56.3	57.2	57.4	57.5	58.3	58.9	59.3	59.0	58.9	58.7
	14-4	47.2	48.8	50.1	50.9	52.3	53.3	54.1	54.0	55.0	55.2	55.2	55.8	55.7	55.9	56.0
	14-5															

* For detailed description of thermocouple locations see Section IV-A.

Table VII-A. VARIATION OF TEMPERATURES INSIDE SHELTER*

7 x 7 x 7 ft. shelter; 5 occupants; 15 cfm/occupant

	T.C. No.	Time From Start of Test, Hrs. / Days — 0	6	12	18	24 (1)	30	36	42	48 (2)	54	60	66	72 (3)	78	84	90	96 (4)	102	108	114	120 (5)	126	132	138	144 (6)	150	156
AIR TEMPERATURES																												
SUPPLY DUCT																												
DB	15-10	47.6	94.6	80.8	69.0	82.6	94.4	80.3	68.8	82.3	94.1	80.3	68.1	81.3	97.4	83.5		85.6	97.0				95.2	82.9	70.9	84.9	96.8	84.
WB	15-9	46.8	75.5	73.2	66.9	74.0	77.4	72.1	66.4	72.7	77.1	73.0	67.2	73.2	77.3	74.5		73.6	78.0				74.2	70.2	67.9	72.7	74.3	71.
RETURN DUCT																												
DB	16-2	42.6	65.9	69.2	66.9	70.0	73.9	73.3	69.6	72.3	75.7	74.1	71.4	73.6	76.7	76.0		75.1	78.0				76.9	75.2	73.5	75.1	77.6	76
WB	16-1	41.6	63.1	68.1	66.0	68.9	71.3	73.2	68.1	71.5	74.6	73.5	71.3	72.7	74.4	74.5		74.2	75.1				75.2	74.4	73.4	73.8	75.0	75.
SHELTER AIR-Center																												
6 ft elev DB	15-12	44.8	74.1	72.2	68.2	73.2	78.8	74.8	70.0	74.7	79.6	75.8	70.2	76.0	81.6	77.5		76.8	82.0				82.2	77.3	72.7	77.0	82.4	77.
WB	15-11	44.3	68.7	68.7	68.6	69.1	72.2	72.1	68.9	70.8	72.7	72.8	68.4	72.0	74.6	73.0		72.1	74.7				73.8	71.8	70.9	72.0	73.8	72.
3-1/2 ft elev DB	15-4	44.0	67.7	67.9	65.2	67.7	71.8	71.2	68.4	70.6	72.8	72.3	69.9	72.3	75.0	74.2		74.0	75.9				75.2	74.3	72.8	74.1	76.3	75
WB	15-3	42.8	64.7	67.4	65.2	67.7	71.8	71.2	68.0	70.0	72.6	72.2	69.9	72.3	73.3	74.2		74.0	74.2				75.2	71.9	72.6	70.7	73.8	75.
1 ft elev DB	15-2	44.8	66.7	67.4	65.2	67.7	71.8	70.9	69.0	70.2	72.8	72.3	69.9	72.3	75.2	74.2		74.0	75.9				75.6	74.3	72.9	73.3	76.3	75.
WB	14-1	43.8	62.0	65.0	63.9	66.3	68.9	68.8	66.8	68.0	70.2	70.2	67.8	70.2	71.5	71.9		71.0	72.2				72.5	71.1	70.2	71.5	73.0	72.
INSIDE SURFACE TEMPERATURES																												
SECTION C-C																												
Wall	6-10	44.5	65.4	68.6	64.0	68.3	72.8	70.8	66.3	69.8	74.2	72.4	69.0	73.8	75.1	75.3		92.4	75.3				74.8	74.0	69.3	71.8	75.5	74.
	7-4	42.7	66.2	69.0	65.4	69.2	74.2	72.8	68.0	70.9	75.7	73.4	70.0	72.4	77.1	75.2		73.4	78.2				77.7	75.2	71.1	73.2	78.3	77.
	7-10	42.7	62.4	67.9	65.9	68.5	71.8	72.4	68.8	70.7	73.8	73.5	70.9	71.9	74.7	75.0		72.3	76.4				76.1	75.3	72.7	73.2	77.2	77.
	8-4	44.3	56.4	61.9	62.1	64.2	67.8	68.3	66.6	66.6	69.4	70.0	68.9	70.0	71.6	71.4		71.1	72.2				72.7	71.6	70.3	72.7	73.2	72.
	8-10	43.4	55.7	61.0	61.6	63.4	66.8	67.7	66.8	67.3	69.2	69.6	69.0	69.5	71.0	71.2		70.6	70.4				72.4	72.0	71.0	70.1	73.3	73.
Ceiling	9-4	43.2	64.2	66.5	63.8	67.1	70.7	70.7	66.9	68.8	72.8	71.3	68.3	71.4	73.7	73.1		72.2	75.8				75.6	73.9	70.8	72.1	76.3	74.
	10-4	41.2	64.2	67.0	63.2	67.1	72.2	70.7	66.6	68.7	72.4	71.3	68.5	70.7	74.0	75.3		71.7	75.7				74.9	73.9	70.1	71.6	75.7	74.
Floor	10-10	45.2	56.8	62.3	63.2	65.9	69.1	69.8	66.8	69.1	71.0	71.7	70.5	71.6	73.8	73.9		73.6	74.5				75.5	75.0	73.7	72.5	76.8	75.
	12-4	44.2	53.8	58.9	60.0	61.7	64.8	65.0	64.8	65.1	66.7	67.4	67.0	68.3	69.4	70.0		69.8	71.2				70.8	70.8	69.4	70.4	71.0	71.
SECTION D-D																												
	12-10	41.4	59.9	63.7	61.6	63.8	68.2	67.9	64.9	66.7	69.2	69.0	66.6	67.8	69.9	70.2		68.6	70.1				70.7	70.2	68.1	68.6	72.1	72.
	13-7	[illegible]	59.8	62.9	61.7	64.4	68.0	67.6	64.7	66.1	68.7	68.2	66.0	67.7	70.2	69.8		68.8	69.9				71.3	70.1	67.9	69.0	72.4	71.
	13-8	43.1	[illegible]	[illegible]	63.9	64.1	68.3	69.9	68.8	67.3	71.2	71.0	68.8	69.7	71.9	72.1		70.8	71.4				73.0	72.5	70.3	70.8	74.1	74.
	14-2	45.5	55.6	60.2	61.1	62.5	65.9	66.7	66.8	65.3	67.2	67.9	66.3	67.7	69.5	69.4		69.0	70.3				70.8	69.5	67.5	68.9	71.4	71.
	14-6	44.3	52.2	57.3	58.4	59.8	62.6	63.9	63.9	63.6	64.3	65.8	65.0	65.2	66.6	66.7		67.1	68.0				68.2	68.1	67.2	66.9	69.1	69.
SIMOC SKIN TEMPERATURES																												
	18-7	42.6	74.9	78.4	76.6	77.3	80.7	81.9	79.0	80.1	81.8	80.6	77.9	79.6	82.3	81.9		80.9	85.3				84.7	81.2	79.1	81.9	82.9	82.
Center - Top	8	42.4	74.5	77.8	75.9	77.6	80.7	81.3	78.3	80.1	81.8	80.6	77.9	79.6	82.3	81.9		81.0	84.5				82.7	81.2	79.2	81.8	82.8	82.
Middle	9	42.8	74.5	77.8	75.4	77.7	80.8	81.4	77.8	79.6	81.4	80.5	78.2	80.1	83.3	82.9		83.1	84.7				83.2	81.2	80.0	82.4	83.9	83.
Bottom	18-10	42.4	73.3	76.6	74.2	76.3	78.7	79.0	77.4	77.8	81.4	80.5	78.3	80.0	82.3	82.0		80.4	83.4				81.9	80.9	[illegible]	82.4	83.2	82.
Corner-Middle																												
OUTSIDE AIR TEMPERATURES	14-5	20.0	20.0			22.0												33.0	43.2				52.7	66.1	64.6	68.3	53.9	44.
	6	20.0	20.0			22.0												33.5	43.2				52.9	66.1	64.6	68.3	53.5	44.
	7	20.0	20.0			22.0													33.2				41.5	38.8	38.1	38.7	[illegible]	41.

*For detailed description of thermocouple locations see Sec. IV-A and B.

TEMPERATURES INSIDE SHELTER*

.. shelter; 5 occupants;
) cfm/occupant

.	60	66	72 3	78	84	90	96 4	102	108	114	120 5	126	132	138	144 6	150	156	162	168 7	174	180	186	192 8	198	204	210	216 9	222	228	234	240 10	
.1	80.3	68.1	81.3	97.4	83.5		85.6	97.0				95.2	82.9	70.9	84.9	94.8	84.8	71.0	84.4	96.2	83.0	71.4	84.7	94.9			85.[illegible]	95.6	81.8	71.5	84.4	9.2
.1	73.0	67.2	73.2	77.3	74.5		73.6	72.0				74.2	70.2	67.9	72.7	74.3	71.1	68.3	72.9	76.2	72.1	69.3	72.8	76.3			72.1	75.9	71.1	68.7	73.2	[illegible]
5.7	74.1	71.4	73.6	76.7	76.0		75.1	78.0				76.9	75.2	73.5	75.1	77.6	76.6	74.0	75.9	79.8	78.1	74.9	76.9	79.6			76.9	80.2	78.2	75.1	[illegible]	7.8
4.6	73.5	71.3	72.7	74.4	74.5		74.2	75.1				73.2	74.4	73.4	73.8	75.0	75.2	71.8	74.5	75.6	75.9	74.1	75.0	74.7			74.4	75.2	73.7	73.6	73.1	[illegible]
9.8	75.8	70.2	76.0	81.6	77.5		76.8	82.0				82.2	77.3	72.7	77.0	82.4	77.9	73.0	78.0	83.6	79.4	74.0	79.0	84.1			79.0	84.7	76.2	74.7	79.1	8.6
2.7	72.8	68.4	72.0	74.6	73.0		72.1	74.7				73.8	71.8	70.9	72.0	73.8	72.8	71.3	73.4	75.0	73.2	71.7	73.6	74.7			73.0	74.1	71.4	71.6	72.3	[illegible]
2.8	72.3	69.9	72.3	75.0	74.2		74.0	75.9				75.2	74.3	72.8	74.1	76.3	75.3	73.1	74.7	76.2	76.1	74.6	75.1	76.5			75.0	76.3	[illegible]	73.5	74.5	7.2
7.6	72.2	69.9	72.3	73.3	74.2		74.0	74.2				75.2	71.9	72.8	70.7	73.8	75.3	72.2	74.7	74.6	74.4	74.4	73.7	76.3			74.8	76.2	[illegible]	[illegible]	[illegible]	[illegible]
2.8	72.3	69.9	72.3	75.2	74.2		74.0	75.9				75.6	74.3	72.9	73.3	76.3	75.3	73.1	75.4	78.0	77.7	75.0	76.1	78.6			[illegible]	78.9	[illegible]	[illegible]	76.7	8.3
0.2	70.2	67.8	70.2	71.5	71.9		71.0	72.2				72.3	71.1	70.2	71.5	72.0	72.0	71.5	72.1	73.3	73.0	71.1	72.9	73.8			72.2	72.4	[illegible]	[illegible]	72.3	[illegible]
74.2	72.4	69.0	73.8	75.1	75.3		92.4	75.3				74.8	74.0	69.3	71.8	75.5	74.0	69.8	72.3	78.0	76.3	71.4	74.2	78.3			74.2	80.2	78.7	73.[illegible]	74.9	[illegible]
75.7	73.4	70.0	72.4	77.1	75.2		73.4	78.2				77.7	75.2	71.1	75.2	78.3	77.2	72.2	74.4	80.0	78.6	74.0	76.0	80.2			76.6	81.0	78.7	74.[illegible]	77.0	[illegible]
73.8	73.5	70.9	71.9	74.7	75.0		72.3	76.4				76.1	75.3	72.7	73.2	77.2	77.4	74.2	75.3	78.9	79.0	75.4	76.2	79.2			76.7	79.8	79.1	75.6	77.0	[illegible]
69.4	70.0	68.9	70.0	71.4	71.4		71.1	72.2				72.7	71.6	70.3	72.7	73.2	72.0	71.8	72.8	74.5	75.1	71.5	73.8	75.0			74.3	75.4	75.6	74.2	[illegible].9	[illegible]
69.2	69.6	69.0	69.5	71.0	71.2		70.6	70.4				72.4	72.0	71.0	70.1	73.3	73.7	72.7	72.7	74.4	75.1	73.6	73.3	74.4			74.0	75.0	75.2	74.2	[illegible].8	
[illegible]	71.3	68.3	71.4	73.7	73.1		72.2	75.8				75.6	73.9	70.8	72.1	76.3	74.1	70.6	73.3	78.9	76.9	72.3	74.6	79.4			75.[illegible]	79.[illegible]	77.8	73.8	76.1	[illegible]
72.4	71.3	68.5	70.7	76.0	75.3		71.7	75.7				74.9	73.9	70.1	71.6	75.7	74.0	70.6	72.3	78.[illegible]	76.4	72.3	73.8	78.4			74.2	79.7	78.7	72.4	75.8	
71.0	71.7	70.3	71.6	73.8	73.9		73.6	74.5				75.9	75.0	73.[illegible]	72.5	76.8	75.2	[illegible].2	[illegible]	77.5	77.7	76.8	76.2	77.9			77.[illegible]	77.8	79.[illegible]	[illegible]	78.2	[illegible]
64.7	67.4	67.0	68.3	69.4	70.0		69.8	71.2				70.8	70.8	65.4	70.4	71.0	71.1	70.0	71.0	72.7	73.0	71.4	72.0	73.2			72.9	73.1	[illegible]	[illegible]	73.3	
69.2	69.0	66.6	67.8	69.9	70.2		68.6	70.1				70.[illegible]	70.2	66.1	67.6	72.1	72.1	70.0	70.3	73.3	73.9	71.1	71.3	73.4			71.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
68.7	68.2	66.0	67.7	70.2	69.8		68.8	69.9				71.3	70.[illegible]	67.9	[illegible]	72.4	71.9	69.6	70.9	73.3	73.4	70.6	71.2	73.2			71.5	[illegible]	72.8	[illegible]	71.[illegible]	[illegible]
71.2	71.0	68.8	69.7	71.9	72.2		70.8	71.6				73.0	72.5	70.3	70.8	74.1	74.3	72.2	72.4	75.3	74.7	72.8	73.4	76.0			71.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
67.2	67.9	66.3	67.7	69.5	69.4		69.[illegible]	70.3				70.8	69.5	67.5	68.9	71.4	71.0	69.9	70.2	72.3	72.3	70.[illegible]	71.2	72.6			[illegible]	[illegible]	71.[illegible]	[illegible]	71.[illegible]	[illegible]
66.3	65.8	[illegible]	65.2	66.6	66.7		67.[illegible]	68.0				68.2	68.1	67.2	66.9	69.1	69.4	68.8	69.3	70.4	71.1	69.8	64.8	70.7			69.8	[illegible]	69.9	[illegible]	69.[illegible]	
81.8	80.6	77.9	79.6	82.3	81.9		80.9	85.[illegible]				82.7	81.[illegible]	79.1	81.9	[illegible]	82.2	80.3	83.3	85.7	84.4	82.0	84.2	85.0			86.1	[illegible]	81.8	80.5	[illegible]	[illegible]
81.8	80.6	77.9	79.6	82.3	81.9		81.0	84.[illegible]				82.7	81.[illegible]	79.2	[illegible]	[illegible]	82.2	80.3	83.1	85.4	84.2	82.1	83.8	8[illegible].0			86.1	85.1	82.[illegible]	80.6	82.[illegible]	[illegible]
81.4	80.5	78.2	80.1	83.3	82.9		82.1	84.[illegible]				83.2	81.2	80.0	[illegible]	83.9	82.6	80.8	83.5	86.2	84.4	82.8	84.7	86.2			85.1	88.1	[illegible]	83.4	84.9	
81.4	80.5	78.3	80.0	82.5	82.0		80.[illegible]	83.4				81.9	80.[illegible]	79.5	82.[illegible]	83.[illegible]	8[illegible]	80.8	81.8	86.2	84.5	82.9	84.[illegible]	86.3			85.[illegible]	86.[illegible]	[illegible]	[illegible]	85.0	
							33.[illegible]	43.2				52.7	44.1	44.6	48.3	53.9	44.5	40.7	39.8	40.6	38.7	37.0	34.0	34.4			36.[illegible]	[illegible]	[illegible]			
							33.[illegible]	43.2				52.9	44.1	44.6	48.2	53.6	44.8	40.5	35.3	40.6	38.7	37.2	33.6	34.[illegible]			36.6	35.9	[illegible]		30.[illegible]	[illegible]
								33.2				41.5	38.8	38.1	38.7	43.4	41.8	39.5	35.2	34.1	34.0	35.6	33.2	33.7			34.1	34.[illegible]	[illegible]		30.[illegible]	

*...hermocouple locations see Sec. IV-A and B.

B

4	180	186	192 8	198	204	[illegible]	216 9	222	228	234	240 10	246	252	258	264 11	270	276	282	288 12	294	300	306	312 13	318	324	330	336 14
.2	83.0	71.[illegible]	84.7	94.9			85.4	95.6	81.8	71.5	84.4	96.3	83.6	72.[illegible]	84.9	94.8	53.2	71.1	84.8	95.2	82.7	71.5	84.6	95.8	88.0	71.2	[illegible].8
.2	72.1	69.3	72.8	76.3			72.[illegible]	75.9	71.1	68.7	73.2	77.1	71.9	68.9	72.3	74.3	70.6	68.4	71.9	75.0	72.1	69.3	73.6	74.9	72.[illegible]	68.6	72.6
[illegible]	78.[illegible]	74.9	76.9	79.8			76.9	80.2	78.2	75.1	77.4	78.7	80.0	76.6	79.3	83.5	92.3	77.9	80.6	83.5	82.3	78.4	79.3	8[illegible]	82.5	77.2	79.2
.6	75.9	74.1	75.0	74.7			[illegible]	74.2	73.7	73.6	73.1	74.0	75.7	74.3	74.3	74.4	74.2	74.0	74.5	75.0	74.8	73.5	74.1	75.[illegible]	75.4	74.7	76.0
[illegible]	79.4	74.0	79.0	84.1			79.0	84.7	79.2	74.7	79.1	85.1	80.4	76.3	80.1	86.4	81.8	76.6	81.3	87.0	82.[illegible]	77.4	81.8	8[illegible]	84.0	76.9	81.0
[illegible]	73.2	71.7	71.6	74.7			73.0	74.1	71.4	71.6	72.3	75.3	74.0	72.2	72.9	73.8	73.8	71.6	72.8	74.0	74.[illegible]	71.8	73.7	75.[illegible]	[illegible]	71.6	74.8
[illegible]	76.1	74.6	75.1	76.5			75.0	76.3	74.2	73.8	74.5	76.5	76.5	74.5	76.3	76.5	75.9	74.3	75.3	75.4	75.0	74.0	75.2	76.0		75.1	76.4
[illegible]	74.4	[illegible].4	73.7	76.[illegible]			74.8	76.2	74.1	73.7	74.3	76.2	76.4	74.4	74.3	76.0	75.4	74.1	74.6	75.4	74.3	73.5	73.3	75.[illegible]	76.7	75.0	74.1
[illegible]	77.7	75.0	76.1	78.6			76.9	78.[illegible]	77.[illegible]	[illegible]	76.7	80.0	78.8	77.2	78.4	81.5	81.1	77.9	79.7	82.[illegible]	81.9	79.2	80.6	83.[illegible]	81.4	77.8	79.[illegible]
.3	73.0	71.1	72.9	73.8			72.[illegible]	72.4	[illegible]	71.3	72.3	74.1	73.2	71.9	71.6	72.8	72.8	71.6	71.9	73.2	72.8	71.6	72.8	74.0	73.[illegible]	71.6	73.6
[illegible]	76.3	71.4	74.2	78.3			74.2	80.2	78.7	73.3	74.9	78.3	78.1	73.4	76.1	79.7	79.3	73.4	77.3	81.[illegible]	81.0	75.1	78.1	81.6	80.7	75.4	78.5
[illegible]	78.6	74.0	76.0	80.2			76.6	81.0	78.7	74.3	77.0	81.2	79.3	75.3	78.0	82.2	80.9	76.1	78.4	82.7	80.7	76.3	78.9	82.7	81.7	76.2	79.0
[illegible]	79.0	75.4	76.2	79.2			76.7	79.8	79.1	75.6	77.0	79.7	80.0	77.2	79.2	82.6	82.2	78.3	79.9	83.1	82.1	78.2	80.1	82.6	82.9	78.6	80.2
[illegible]	75.1	71.5	73.8	[illegible].0			74.3	75.4	75.6	74.2	74.9	76.2	76.1	75.4	76.0	77.3	77.1	76.4	76.9	76.7	78.4	76.9	77.8	78.8	78.4	77.0	77.8
[illegible]	75.1	73.6	73.3	74.4			74.0	75.0	75.2	74.2	74.8	73.7	[illegible].2	75.4	76.1	77.2	77.9	76.4	76.9	77.9	78.2	76.8	77.0	78.3	78.4	77.0	77.1
[illegible]	76.9	72.3	74.6	79.4			75.3	79.3	77.8	73.8	76.1	80.9	78.5	74.4	76.8	81.1	80.0	75.3	77.1	81.4	79.9	77.1	78.3	82.3	80.9	76.8	78[illegible]
[illegible]	70.4	72.3	73.8	[illegible].4			74.2	79.[illegible]	78.7	72.4	75.8	80.1	76.[illegible]	[illegible].8	76.7	81.8	79.8	75.1	76.9	82.2	80.0	76.2	77.8	81.8	80.7	[illegible]	[illegible]
[illegible]	77.7	76.8	76.2	77.9			77.1	77.8	79.1	77.0	78.2	80.0	79.5	78.4	79.1	80.9	81.3	79.4	79.5	81.9	82.0	79.6	80.4	82.3	82.0	79.[illegible]	[illegible].9
[illegible]	73.0	71.4	72.0	73.2			72.9	73.1	72.8	72.[illegible]	73.3	74.8	74.4	74.0	74.2	75.6	75.8	75.0	75.2	77.6	77.0	75.3	76.5	77.5	76.8	75.0	77.[illegible]
[illegible]	73.9	71.1	71.3	73.6			71.4	74.0	[illegible].8	71.1	71.8	74.4	74.9	72.4	[illegible].0	76.1	76.0	72.8	73.8	76.2	76.0	73.0	74.3	76.7	77.0	[illegible].2	[illegible]
[illegible]	73.4	70.6	71.2	73.2			71.5	74.2	72.8	70.9	71.7	75.6	74.5	71.9	72.6	75.7	75.5	72.4	73.5	76.3	76.0	73.0	74.3	76.[illegible]	76.[illegible]	[illegible].2	[illegible]
[illegible]	74.7	72.8	71.4	76.0			73.7	76.2	74.0	73.1	73.7	76.3	76.8	74.9	75.7	79.0	78.4	75.8	76.4	79.0	78.5	75.9	76.6	78.[illegible]	79.1	75.8	76.[illegible]
[illegible]	72.3	70.7	71.2	77.6			71.3	72.4	71.5	70.9	71.4	73.9	73.3	70.2	72.3	74.3	74.7	72.8	73.4	75.1	74.3	73.4	74.3	75.9	75.3	73.1	74.5
[illegible]	71.1	69.8	69.8	70.7			69.8	70.7	69.9	69.8	69.6	70.8	71.9	70.9	71.2	70.9	72.8	71.5	72.1	73.1	73.3	71.9	72.1	71.8	73.7	72.4	72.[illegible]
[illegible]	84.4	82.0	84.2	83.0			84.1	85.3	81.8	80.5	81.8	84.3	85.4	83.1	[illegible]	86.8	85.7	83.1	87.4	84.8	83.7	81.7	83.4	86.[illegible]	87.0	83.7	85.[illegible]
[illegible]	84.2	82.1	83.8	85.0			84.1	85.3	82.1	80.6	82.2	85.1	85.4	83.2	[illegible]	86.9	85.8	83.1	87.5	86.1	84.9	82.4	85.0	86.3	87.0	83.7	85.[illegible]
[illegible]	84.4	82.8	84.7	86.2			85.1	[illegible].1	85.0	81.4	84.[illegible]	86.9	86.5	84.2	[illegible]	88.7	87.2	84.4	90.8	88.6	87.0	84.9	87.3	88.[illegible]	87.0	84.0	86.3
[illegible]	84.5	82.9	84.7	86.3			85.3	86.1	85.1	83.6	85.0	87.3	86.7	85.2	[illegible].2	89.1	87.9	85.2	86.9	88.6	[illegible]	85.[illegible]	87.4	88.5	87.4	84.9	86.7
[illegible]	38.7	37.0	34.0	34.6			36.5	35.8	30.4			30.8	36.7	35.3	36.[illegible]	[illegible]	34.[illegible]	[illegible]	37.0	37.2	34.4	37.4	37.8	[illegible]	[illegible]	37.5	[illegible]
[illegible]	38.7	37.2	33.4	34.7			34.4	35.9	31.2		30.7	32.0	37.[illegible]	35.9	34.4	35.9	35.4	[illegible]	36.8	36.9	34.1	33.1	37.8	[illegible]	37.[illegible]	[illegible]	34.3
[illegible]	36.0	35.5	33.2	33.7			34.1	34.7	31.3		30.7	32.8	32.8	33.4	34.3	34.2	33.9	34.2	34.4	35.2	34.3	[illegible].2	33.9	35.5	36.3	35.2	33.4

C

Table VII-B. VARIATION OF TEMPERATURES IN SOIL SURROUNDING SHELTER*
7 x 7 x 7 ft. shelter; 5 occupants; 15 cfm/occupant

SOIL TEMPERATURES	T.C. No.	Time From Start of Test, Hrs. → Days → 0	24 1	48 2	72 3	96 4	120 5	144 6	168 7	192 8	216 9	240 10	264 11	288 12	312 13	366 14
SECTION C-C																
Outside Wall																
Diagonally Up	6-10	42.5	68.3	69.8	73.8	72.4	71.8	72.3	74.2	74.2	74.9	76.1	77.3	78.1	78.5	
	6-11	39.8	45.0	49.0	50.7	51.8	55.2	55.8	56.7	56.9	57.7	59.0	59.2	59.2	59.4	
	6-12	38.9	40.0	42.8	43.8	45.8	49.2	50.0	51.2	52.5	53.3	54.1	54.7	54.9	55.2	
	7-1	36.2	36.2	37.1	37.8	39.0	42.4	43.4	43.9	44.5	45.	46.6	46.9	47.2	46.8	
	7-2	35.8	35.7	35.9	36.0	36.4	39.0	40.1	40.0	40.6	40.6	41.4	41.6	42.1	43.2	
	7-3	34.2	34.0	34.1	34.0	34.2	35.9	37.8	37.4	37.3	37.8	37.4	37.7	38.3	39.2	
Horizontal																
4 ft elev	7-4	42.7	69.2	70.9	72.4	73.4	73.2	74.1	76.0	76.6	77.0	78.0	78.4	78.9	79.0	
	7-5	41.0	51.6	55.4	57.4	59.2	61.2	61.1	62.3	62.4	64.2	63.9	64.3	65.4	65.2	
	7-6	41.8	43.4	47.4	50.6	52.3	54.9	55.6	56.6	57.8	58.2	58.8	59.2	60.0	60.2	
	7-7	41.1	40.8	42.3	44.2	45.6	48.6	49.0	49.8	50.5	51.6	51.8	52.3	53.4	53.4	
	7-8	41.3														
	7-9	36.3	37.3	38.1	37.7	37.0	39.2	38.9	39.3	39.3	39.8	40.7	41.0	41.2	41.6	
2 1/2 ft elev	7-10	42.7	68.5	70.7	71.9	72.3	73.2	75.3	76.2	76.7	77.0	79.2	79.9	80.1	80.2	
	7-11	41.8	55.0	59.5	61.7	63.6	65.3	65.9	66.9	67.4	68.0	68.5	69.1	69.8	70.3	
	7-12	42.1	47.0	52.4	55.4	57.5	59.5	60.3	61.4	62.4	63.2	63.8	64.1	64.6	64.9	
	8-1	41.8	42.1	45.2	47.4	49.4	52.3	52.3	53.2	54.5	55.1	56.7	56.3	56.4	57.1	
	8-2	41.8	41.3	42.6	43.4	44.8	47.0	46.3	47.2	47.4	49.1	49.2	49.3	50.3	50.3	
	8-3	40.9	40.1	40.2	40.9	41.3	43.2	41.9	42.6	43.2	43.5	43.9	44.2	45.1	45.2	
1 ft elev	8-4	44.3	64.2	66.6	70.0	71.1	72.7	72.8	73.8	74.3	74.9	76.0	76.9	77.8	77.8	
	8-5	44.3	54.3	57.9	61.1	62.8	68.6	64.7	65.8	66.4	67.2	67.2	67.8	68.9	69.0	
	8-6	44.8	48.2	53.6	55.3	56.8	59.4	59.9	60.8	61.6	62.0	62.4	62.8	63.7	63.8	
	8-7	44.8	45.5	47.9	48.7	50.4	53.4	53.4	54.4	55.2	55.5	56.9	57.4	56.6	57.3	
	8-8	43.8	44.3	45.0	45.0	46.3	48.3	48.9	48.9	49.2	50.0	50.6	50.8	51.0	51.2	
	8-9	42.8	43.0	43.3	43.6	44.3	44.3	44.7	45.1	45.5	46.0	46.7	46.8	46.8	47.2	

For detailed description of thermocouple locations see Section IV-A.

Table VII-B. VARIATION OF TEMPERATURES IN SOIL SURROUNDING SHELTER*
7 x 7 x 7 ft. shelter; 5 occupants; 15 cfm/occupant

SOIL TEMPERATURES	T.C. No.	Time From Start of Test, Hrs. → Days → 0	24 1	48 2	72 3	96 4	120 5	144 6	168 7	192 8	216 9	240 10	264 11	288 12	312 13	336 14
SECTION C-C																
Outside Wall																
Diagonally Down	8-10	43.4	63.4	67.3	69.5	70.6		70.1	72.7	73.3	74.0	74.8	76.1	76.9	77.0	77.1
	11-10															
	12-9															
Above Roof																
3-1/2 ft from wall	9-4	43.2	67.1	68.8	71.4	72.2		72.1	73.7	74.6	75.3	76.1	76.8	77.1	78.3	78.4
1 ft from wall	10-4	41.2	67.1	68.7	70.7	71.7		71.6	72.3	73.8	74.2	75.8	76.7	76.9	77.8	78.0
	10-5	39.2	52.3	56.7	58.6	60.1		62.4	63.8	64.8	65.9	66.3	66.4	66.6	66.6	66.9
	10-6	39.1	44.7	49.7	52.8	54.8		59.3	60.0	61.8	62.4	62.7	63.0	63.0	63.2	63.3
	10-7	37.4	39.2	43.4	46.2	48.6		54.8	56.1	57.4	58.1	58.0	57.6	57.6	57.7	58.4
	10-8	35.7	36.1	40.0	42.1	45.9		53.0	53.9	54.6	55.3	56.0	54.2	54.1	54.7	54.9
	10-9	34.2	34.7	37.9	39.3	45.1		53.0	53.4	54.0	54.5	55.1	51.8	51.7	52.1	52.3
Below Floor																
3-1/2 ft from wall	10-10	45.2	65.9	69.1	71.6	73.6		72.5	75.3	76.2	77.1	78.2	79.1	79.9	80.4	80.8
	10-11															
	10-12															
	11-1															
	11-2						(Other Thermocouples Out)									
	11-3															
	11-4															
	11-5															
	11-6															
1 ft from wall	12-1	44.2	61.7	65.1	68.3	69.8		70.4	71.0	72.0	72.9	73.3	74.2	75.2	76.8	77.0

* For detailed description of thermocouple locations see Section IV-A.

Table VII-B. VARIATION OF TEMPERATURES IN SOIL SURROUNDING SHELTER*

7 x 7 x 7 ft. shelter; 5 occupants; 15 cfm/occupant

SOIL TEMPERATURES	T.C. No.	Time From Start of Test, Hrs. → Days → 0	24 1	48 2	72 3	96 4	120 5	144 6	168 7	192 8	216 9	240 10	264 11	288 12	312 13	336 14
SECTION D-D																
Outside Corner																
Diagonally Up	12-10	41.4	63.8	66.7	67.8	68.6		68.6	70.3	71.3	71.4	71.8	73.0	73.0	74.3	74.5
	12-11	37.8	40.5	42.6	44.8	46.0		49.0	49.2	49.6	50.5	51.4	52.0	52.3	52.4	52.7
	12-12	37.8	38.0	39.1	40.0	41.2		43.7	44.4	46.0	46.4	47.1	47.7	48.0	48.8	49.3
	13-1	34.8	34.1	34.0	34.6	35.4		37.3	37.0	37.5	38.2	39.3	39.4	39.7	40.3	40.3
	13-2	33.9	33.2	33.1	33.1	33.6		35.5	33.3	34.1	35.1	35.8	35.3	36.0	37.0	37.7
	13-3								34.8	33.2	33.2	31.1	33.4	33.5	35.2	34.2
Horizontal																
6 ft elev	13-4	42.9	64.4	66.1	67.7	68.8		69.0	70.9	71.2	71.5	71.7	72.6	73.5	74.3	74.5
	13-5	40.8	44.4	47.1	49.3	51.0		53.1	53.2	54.2	55.0	55.8	55.9	56.3	67.0	67.1
	13-6	40.8	40.3	41.4	43.2	44.3		47.4	47.7	48.3	49.2	49.9	50.3	50.8	51.8	52.2
	13-7	37.9	38.7	39.9	38.9	39.8		42.0	42.4	41.8	42.3	43.3	44.3	44.6	44.2	45.3
3-1/2 ft elev	13-8	43.1	66.1	67.3	69.7	70.8		70.8	72.4	73.4	73.7	73.7	75.7	76.4	76.6	76.9
	13-9	42.3	47.4	51.0	53.3	55.0		57.2	56.9	57.2	58.2	58.9	59.4	60.2	60.4	60.4
	13-10	42.3	42.9	44.4	46.2	48.1		51.0	52.0	51.9	52.4	53.0	53.7	54.3	54.7	55.4
	13-11	42.2	42.0	42.3	42.5	43.3		45.3	45.8	45.3	45.5	46.4	46.6	46.9	47.1	48.0
	13-12	40.8	40.0	39.9	40.1	40.5		41.3	42.3	40.9	41.3	41.8	41.8	41.8	43.0	42.8
	14-1	39.0	38.0	37.7	38.3	39.3		40.4	40.3	38.7	38.5	39.4	39.5	39.5	39.7	39.8
1 ft elev	14-2	45.5	62.5	65.3	67.7	69.0		68.9	70.2	71.2	71.3	71.4	72.3	73.4	74.3	74.5
	14-3	45.2	47.6	50.6	52.9	54.5		56.3	56.6	56.8	57.8	57.9	58.0	58.9	60.2	60.3
	14-4	45.2	45.7	46.8	48.4	49.2		51.8	52.2	52.5	53.2	53.5	53.8	54.2	54.9	55.4
	14-5															

* For detailed description of thermocouple locations see Section IV-A.

Table VIII-A. VARIATION OF TEMPERATURES INSIDE SHELTER*

21 x 7 x 7 ft. shelter; 15 occupants;
no ventilation

	T.C. No.	Time From Start of Test, Hrs. → Days → 0	6	12	18	24 1	30	36	42	48 2	54	60	66	70
AIR TEMPERATURES														
SHELTER AIR														
Center														
6 ft elev														
DB	15-12	68.7	78.9	81.4	83.9	85.7	86.6	87.7	88.8	90.9	91.4	92.4	93.3	94.0
WB	15-11	68.7	77.7	79.6	81.3	84.3	85.0	86.2	86.8	90.2	90.2	91.3	92.2	92.3
3-1/2 ft elev														
DB	15-4	69.0	78.9	81.8	83.3	85.7	86.6	87.8	88.8	90.9	91.9	92.6	93.9	94.8
WB	15-3	68.6	77.7	80.4	82.4	84.6	85.3	86.6	87.9	89.7	90.6	91.9	93.0	92.4
1 ft elev														
DB	15-2	68.2	77.7	80.4	82.4	84.4	85.2	86.6	87.5	89.7	90.2	91.4	92.8	92.4
WB	15-1	68.2	77.7	80.4	82.3	84.2	84.9	86.5	87.5	89.6	90.2	91.3	92.8	92.4
Near wall														
3-1/2 ft elev														
DB	15-6	69.0	78.9	81.3	83.4	85.6	86.5	87.7	88.8	90.5	91.4	92.4	93.8	93.9
WB	15-5	69.0	78.9	81.2	83.4	85.5	86.5	87.6	88.7	90.4	91.4	92.0	93.8	93.8
In Corner														
3-1/2 ft elev														
DB	15-8	69.0	78.9	81.3	83.3	85.6	86.5	87.7	88.8	90.5	91.4	92.4	93.8	93.9
WB	15-7	69.0	78.9	81.3	83.3	85.6	86.5	87.7	88.8	90.5	91.4	92.4	93.8	93.9
NSIDE SURFACE TEMPERATURES														
SECTION C-C														
Wall	6-10	69.4	76.2	79.1	81.6	83.0	84.0	85.5	86.5	88.3	89.0	90.2	91.3	91.8
	7-4	68.6	74.9	78.1	80.8	81.8	81.9	84.4	86.2	88.0	88.3	89.8	91.3	91.8
	7-10	68.6	76.2	78.6	82.4	84.2	85.2	86.6	88.2	89.4	89.8	91.5	91.8	92.8
	8-4	66.9	74.0	77.1	79.8	82.1	83.1	84.4	86.2	87.5	88.4	89.3	90.4	91.3
	8-10	66.9	72.9	76.2	78.6	79.8	81.9	83.1	84.2	86.2	87.2	88.1	89.5	89.7
Ceiling	9-4	69.4	75.7	80.4	82.4	84.2	85.3	86.9	87.9	89.4	90.2	91.2	92.7	93.0
	9-10	69.0	75.4	79.2	82.3	84.2	84.9	85.8	87.4	89.2	89.4	91.0	92.3	92.9
	10-4	68.2	75.2	78.8	82.1	83.9	84.0	86.1	87.4	89.1	89.3	91.0	92.3	92.9
Floor	10-10	68.1	76.7	81.2	83.3	85.6	85.7	87.8	88.4	90.2	90.5	92.1	93.3	93.9
	11-7	68.1	78.7	81.6	83.8	85.6	86.9	87.9	89.0	90.8	91.4	92.4	93.4	93.9
	12-4	67.3	75.7	77.8	80.9	82.4	83.5	84.9	86.2	87.6	88.4	89.4	89.2	91.2
SECTION D-D	12-10	69.9	74.6	77.6	79.1	81.4	82.3	84.0	85.0	86.3	87.2	88.5	89.6	90.1
	13-4	69.9	73.4	76.2	78.4	80.5	80.6	82.8	83.6	85.4	86.0	86.9	88.4	89.6
	13-8	69.0	74.0	77.3	79.5	81.8	82.7	84.0	84.3	87.0	87.9	89.0	90.3	90.9
	14-2	66.9	72.1	75.8	78.5	81.0	81.5	82.8	84.1	86.2	87.2	88.1	89.2	89.7
	14-6	66.9	73.2	75.1	77.8	79.7	80.4	82.2	83.2	84.6	84.8	86.9	87.8	88.2
MOC SKIN TEMPERATURES														
Center-Top	18-7	68.7	85.3	89.2	90.1	91.2	91.8	93.4	94.3	96.1	97.3	98.2	99.9	100.9
Middle	18-8	68.5	85.8	88.2	89.8	91.3	92.1	93.9	94.3	96.4	97.4	98.4	99.9	101.4
Bottom	18-9	68.1	85.7	88.2	90.1	92.0	92.1	93.8	94.3	96.4	97.3	98.3	99.8	100.5
Near wall-Middle	18-10	68.1	85.3	89.3	88.6	89.9	90.0	93.8	94.7	95.0	95.8	98.0	97.7	98.2
In corner-Middle	18-11	68.5	82.3	85.0	87.0	88.7	89.9	93.0	93.8	95.7	95.9	96.3	98.4	99.1
TSIDE AIR TEMPERATURES	19-5	64.8	69.3	63.4	69.2	72.0	87.2	75.1	67.4	78.7	93.2	79.2	72.9	73.9
	19-6	64.8	69.4	63.4	69.3	72.0	88.7	75.1	67.4	78.6	93.7	78.8	72.8	73.8
	19-7	64.8	68.7	63.4	69.3	70.7	87.8	74.3	67.3	78.6	93.6	77.5	72.3	73.8

*For detailed description of thermocouple locations see Sec. IV-A and B.

Table VIII-B. VARIATION OF TEMPERATURES IN SOIL SURROUNDING SHELTER*
21 x 7 x 7 ft. shelter; 15 occupants; no ventilation

SOIL TEMPERATURES	T.C. No.	Time from Start of Test, Hrs.→ / Days→ 0	24 / 1	48 / 2	70 / 3
SECTION C-C					
Outside Wall					
Diagonally up	6-10	69.4	83.0	88.3	91.8
	6-11	69.5	72.0	75.7	79.0
	6-12	69.5	71.6	73.4	75.5
	7-1	70.0	69.0	70.5	72.2
	7-2	70.0	68.5	70.4	72.6
	7-3	67.3	67.3	70.4	72.5
Horizontal 6 ft elev	7-4	68.6	81.8	88.0	91.8
	7-5	69.0	74.2	79.5	82.3
	7-6	69.0	71.6	74.3	76.4
	7-7	69.0	69.9	70.4	72.0
	7-8	69.0	69.9	70.2	70.8
	7-9	69.0	69.7	70.0	70.4
3-1/2 ft elev	7-10	68.6	84.2	89.4	92.8
	7-11	67.8	74.7	79.5	82.9
	7-12	67.8	70.6	73.8	76.0
	8-1	66.9	67.3	69.8	71.0
	8-2	66.9	67.3	69.1	70.0
	8-3	66.9	67.3	69.0	69.2
1 ft elev	8-4	66.9	82.1	87.5	91.3
	8-5	66.9	73.3	78.3	80.3
	8-6	66.9	69.9	71.8	73.5
	8-7	66.9	68.2	69.0	70.8
	8-8	66.9	68.1	68.4	69.1
	8-9	66.9	67.3	68.4	68.2

* For detailed description of thermocouple locations see Section IV-A.

Table VIII-B. VARIATION OF TEMPERATURES IN SOIL SURROUNDING SHELTER*

21 x 7 x 7 ft. shelter; 15 occupants; no ventilation

SOIL TEMPERATURES	T.C. No.	Time From Start of Test, Hrs. → / Days → 0	24 1	48 2	70 3
SECTION C-C					
Outside Wall					
Diagonally Down	8-10	66.9	79.8	86.2	89.7
	8-11	66.8	69.4	72.1	74.6
	8-12	65.9	66.5	69.1	70.3
	9-1	66.3	66.7	67.0	67.1
	9-2	65.8	66.2	66.5	66.2
	9-3	65.2	65.6	65.4	65.5
Above Roof					
10-1/2 ft from wall	9-4	69.4	84.2	89.4	93.0
	9-5	69.5	77.8	82.9	87.0
	9-6	70.0	73.8	78.2	82.3
	9-7	70.2	71.0	75.6	80.1
	9-8	70.2	68.4	73.9	78.4
	9-9	68.5	68.1	73.8	76.8
3 ft from wall	9-10	69.0	84.2	89.2	92.9
	9-11	70.2	76.8	81.7	86.0
	9-12	70.2	73.3	76.3	80.9
	10-1	70.2	69.0	73.5	77.2
	10-2	70.2	68.4	73.4	77.2
	10-3	70.0	68.2	73.4	76.8
1 ft from wall	10-4	68.2	83.9	89.1	92.9
	10-5	70.0	75.1	79.5	83.0
	10-6	70.0	73.3	77.7	80.7
	10-7	70.0	70.8	75.2	78.5
	10-8	70.0	68.4	73.3	76.8
	10-9	70.0	68.2	73.4	75.4

* For detailed description of thermocouple locations see Section IV-A.

Table VIII-B. VARIATION OF TEMPERATURES IN SOIL SURROUNDING SHELTER*
21 x 7 x 7 ft shelter; 15 occupants; no ventilation

SOIL TEMPERATURES	T.C. No.	Time from Start of Test, Hrs. → Days → 0	24 1	48 2	70 3
SECTION C-C					
Below Floor					
10-1/2 ft from wall	10-10	68.1	85.6	90.2	93.9
	10-11	66.3	70.0	74.4	76.9
	10-12	65.9	68.2	71.8	72.6
	11-1	65.3	65.4	67.5	68.8
	11-2	65.1	65.2	66.7	67.5
	11-3	64.8	64.7	65.7	65.5
	11-4	64.3	64.6	64.9	65.0
	11-5	62.3	62.2	64.4	64.3
	11-6	62.3	61.3	63.3	63.2
3 ft from wall	11-7	68.1	85.6	90.8	93.9
	11-8	66.9	69.9	74.0	76.8
	11-9	66.4	68.2	71.8	73.4
	11-10	65.5	66.4	68.3	69.5
	11-11	65.1	66.1	66.6	67.7
	11-12	64.6	65.2	65.7	65.9
	12-1	64.1	64.3	64.4	63.6
	12-2	63.5	63.9	64.2	64.3
	12-3	62.3	63.3	63.3	63.6
1 ft from wall	12-4	67.3	82.4	87.6	91.2
	12-5	66.6	70.3	73.5	75.6
	12-6	66.5	68.2	71.3	72.3
	12-7	65.4	66.4	67.5	68.7
	12-8	65.1	65.5	66.6	67.0
	12-9	64.8	65.2	65.8	66.5

*For detailed description of thermocouple locations see Section IV-A.

Table VIII-8. VARIATION OF TEMPERATURES IN SOIL SURROUNDING SHELTER*

21 x 7 x 7 ft. shelter; 15 occupants; no ventilation

SOIL TEMPERATURES	T. C. No.	Time From Start of Test, Hrs. → / Days → 0	24 1	48 2	70 3
SECTION D-D					
Outside Corner					
Diagonally Up	12-10	69.9	81.4	86.3	90.1
	12-11	70.0	70.8	72.3	74.6
	12-12	69.1	69.1	69.4	70.9
	13-1	71.0	70.6	69.4	70.9
	13-2	70.8	69.9	69.5	71.4
	13-3	67.3	66.4	70.3	71.8
Horizontal 6 ft elev	13-4	69.9	80.5	85.4	89.6
	13-5	69.3	69.4	71.8	73.5
	13-6	69.0	69.3	71.3	72.0
	13-7	69.0	69.3	70.3	71.1
3-1/2 ft elev	13-8	69.0	81.8	87.0	90.9
	13-9	67.3	68.3	70.4	73.0
	13-10	67.3	68.3	70.2	71.2
	13-11	67.3	68.2	69.6	70.0
	13-12	67.3	68.2	68.7	69.2
	14-1	67.3	66.9	67.5	69.1
1 ft elev	14-2	66.9	81.0	86.2	89.7
	14-3	67.8	67.3	69.4	71.3
	14-4	67.3	67.3	68.8	70.0
	14-5	66.9	67.3	68.3	69.2
Diagonally Down	14-6	66.9	79.7	84.6	88.2
	14-7	66.4	66.9	68.8	70.9
	14-8	66.4	66.9	67.9	68.7
	14-9	66.2	66.6	67.0	67.2
	14-10	65.9	66.4	66.6	66.6
	14-11	65.2	66.4	66.2	66.1

* For detailed description of thermocouple locations see Section IV-A.

Table IX-A. VARIATION OF TEMPERATURE INSIDE SHELTER*

21 x 7 x 7 ft. shelter; 15 occupants;
3 cfm/occupant

Time From Start of Test, Hrs. / Days (0–66 hrs)

	T.C. No.	0 (Day 0)	6	12	18	24 (Day 1)	30	36	42	48 (Day 2)	54	60	66
AIR TEMPERATURES													
SUPPLY DUCT DB	15-10	74.4	94.6	82.5	72.2	83.3	98.3	85.6	72.5	87.3	96.3		
SUPPLY DUCT WB	15-9	70.0	72.4	72.8	71.4	75.6	72.5	69.2	68.1	71.1	76.5		
RETURN DUCT DB	16-2	55.7	58.6	72.2	73.5	73.9	76.5	76.5	76.9	77.4	79.0		
RETURN DUCT WB	16-1	52.7	56.9	72.2	73.4	73.8	76.4	75.6	76.0	77.4	79.0		
SHELTER AIR, Center, 6 ft elev DB	15-12	59.1	72.0	72.2	72.8	75.7	75.7	76.5	76.0	76.9	75.9		
SHELTER AIR, Center, 6 ft elev WB	15-11	54.8	57.8	70.0	72.2	75.6	72.5	75.2	73.5	75.2	72.5		
3-1/2 ft elev DB	15-4	56.4	70.7	73.6	74.1	75.6	77.6	77.9	78.3	77.3	79.6		
3-1/2 ft elev WB	15-3	52.8	69.2	71.9	72.3	74.7	75.5	77.0	76.1	76.7	77.5		
1 ft elev DB	15-2	58.3	69.3	71.9	72.3	75.0	75.5	77.1	76.9	77.3	77.6		
1 ft elev WB	15-1		69.2	71.8	72.2	75.0	75.5	76.2	76.6	76.1	77.2		
Near wall, 3-1/2 ft elev DB	15-6	56.5	70.6	73.4	74.1	75.6	77.6	77.9	78.4	77.3	79.6		
Near wall, 3-1/2 ft elev WB	15-5	56.6	70.6	73.4	74.1	75.6	77.6	77.9	78.3	77.3	79.6		
In corner, 3-1/2 ft elev DB	15-8	56.4	70.1	72.7	73.5	75.6	77.6	77.9	78.6	77.3	79.3		
In corner, 3-1/2 ft elev WB	15-7	54.4	70.1	72.7	73.5	75.6	77.6	77.9	78.5	77.3	79.3		
INSIDE SURFACE TEMPS													
SECTION C-C, Wall	6-10	55.3	65.7	69.3	70.9	73.1	74.3	75.4	75.8	76.1	76.3		
	7-4	57.1	64.1	67.8	69.3	71.9	72.5	74.2	74.4	75.0	75.2		
	7-10	54.0	67.1	71.4	73.0	74.0	76.0	77.3	77.4				
	8-4	58.4	66.0	69.2	70.5	73.1	73.8	75.2	75.2	75.6	76.3		
	8-10	55.8	64.1	67.8	70.0	72.0	73.5	75.1	75.3	75.7	75.9		
Ceiling	9-4	56.6	69.4	71.8	73.0	75.4	75.6	76.4	76.3	76.7	77.9		
	9-10	54.5	67.5	71.0	72.4	75.1	75.7	76.6	76.3	76.9	76.7		
	10-4	54.8	65.8	70.0	71.0	72.7	74.1	[illegible]	75.6	75.4	76.3		
Floor	10-10	58.6	70.0	73.0	[illegible]	[illegible]	[illegible]	[illegible]	78.6	79.5			
	11-7	59.1	70.2	73.1	[illegible]	77.6	77.4	78.7	79.6	79.9	80.4		
	12-4	58.3	68.0	71.0	72.2	[illegible]	75.2	76.3	76.6	76.9	77.4		
SECTION D-D	12-[illegible]	[illegible]	61.3	67.4	69.1	70.0	72.2	73.3	73.9	73.8	76.1		
	13-4	57.4	62.2	64.7	66.3	68.9	69.9	[illegible]	[illegible]	[illegible]	[illegible]		
	13-8												
	14-[illegible]	59.0	64.8	67.4	68.4	71.2	71.3	72.9	[illegible]	[illegible]	[illegible]		
	14-8	55.8	61.9	67.6	[illegible]	70.0	71.1	[illegible]	[illegible]	[illegible]	[illegible]		
SIMOC SKIN TEMPS, Center - Top	18-[illegible]	58.9	[illegible]	80.1	80.4	[illegible]	81.8	[illegible]	[illegible]	[illegible]	[illegible]		
Middle	18-8	58.9	[illegible]	81.2	[illegible]	81.9	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		
Bottom	18-[illegible]	58.9	[illegible]	81.2	82.1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		
Near Wall - Middle	18-[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		
In Corner - Middle	18-[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		
OUTSIDE AIR TEMPS	[illegible]												

Time From Start of Test, Hrs. / Days (72–138 hrs)

	T.C. No.	72 (Day 3)	78	84	90	96 (Day 4)	102	108	114	120 (Day 5)	126	132	138	84
SUPPLY DUCT DB	15-10	83.0	95.9	83.4	72.2	83.4	96.6	83.8	72.0	83.9	95.7	83.4	72.3	83.4
SUPPLY DUCT WB	15-9	75.7	77.4	72.7	68.8	75.8	76.1	72.2	68.2	73.1	77.8	72.7	69.1	72.7
RETURN DUCT DB	16-2	79.0	82.1	82.5	81.7	83.0	83.3	83.2	[illegible]	83.1	83.4	85.1	83.2	82.5
RETURN DUCT WB	16-1	79.0	81.3	82.5	80.9	83.0	82.9	83.2	83.1	82.6	82.5	85.0	82.4	82.5
SHELTER AIR, Center, 6 ft elev DB	15-12	80.0	82.1	81.9	80.8	82.5	82.5	83.1	81.9	83.0	83.1	83.8	82.3	81.9
SHELTER AIR, Center, 6 ft elev WB	15-11	80.0	80.1	81.8	78.8	82.1	80.9	82.9	79.4	83.0	81.8	83.4	80.7	81.8
3-1/2 ft elev DB	15-4	78.6	83.0	80.5	80.9	82.2	84.3	83.1	81.9	83.0	84.3	84.2	82.4	80.5
3-1/2 ft elev WB	15-3	78.2	81.5	80.9	80.8	81.3	82.2	82.0	81.4	80.4	83.0	83.3	82.3	80.9
1 ft elev DB	15-2	79.0	82.1	82.5	81.6	83.0	83.3	83.2	[illegible]	83.1	83.2	84.1	82.4	82.5
1 ft elev WB	15-1	78.6	81.0	80.4	80.8	80.5	81.5	81.8	80.6	82.2	82.9	82.0	82.3	80.4
Near wall, 3-1/2 ft elev DB	15-6	78.7	83.0	80.5	81.5	83.0	84.6	83.3	82.4	83.3	84.3	84.2	83.1	80.5
Near wall, 3-1/2 ft elev WB	15-5	78.7	83.0	80.5	81.2	82.5	84.5	83.2	82.1	83.1	84.3	84.2	82.8	80.5
In corner, 3-1/2 ft elev DB	15-8	78.7	82.9	80.5	81.6	83.0	84.1	83.3	82.4	83.3	84.3	84.2	83.1	80.5
In corner, 3-1/2 ft elev WB	15-7	78.7	83.0	80.5	81.6	83.0	84.1	83.3	82.4	83.3	84.3	84.2	83.1	80.5
SECTION C-C, Wall	6-10	78.0	80.3	80.2	80.1	80.4	81.7	81.7	81.0	81.7	82.2	82.8	82.3	80.2
	7-4	78.1	80.0	80.2	79.5	80.0	81.3	81.5	80.6	[illegible]	82.1	82.4	82.1	80.2
	7-10	78.4	82.0	82.0	81.9	81.8	81.9		82.7	83.4	81.9	84.4	85.8	82.0
	8-4	78.0	80.0	80.1	79.8	80.0	[illegible]	81.4	81.4	82.0	82.1	82.1	82.4	80.1
	8-10	78.2	78.9	79.3	79.6	79.9	81.1	81.2	80.7	81.3	81.8	82.3	82.3	79.3
Ceiling	9-4	78.8	81.6	81.4	81.3	81.3	82.6	82.6	82.3	82.9	83.3	83.7	83.6	81.4
	9-10	78.8	81.7	81.4	81.0	81.3	83.0	82.6	82.3	83.0	84.1	83.7	83.3	81.4
	10-4	78.0	80.4	80.5	79.8	80.5	82.2	81.7	81.5	82.1	82.1	[illegible]	82.4	80.5
Floor	10-10	[illegible]	81.3	[illegible]	84.0	84.3	85.5	85.5	85.3	85.6	86.1	86.4	86.2	[illegible]
	11-7	83.0	84.3	84.3	[illegible]	84.7	85.9	85.7	[illegible]	86.4	[illegible]	[illegible]	[illegible]	84.3
	12-4	79.7	81.0	80.9	[illegible]	81.3	82.5	82.4	82.3	82.6	82.9	83.3	83.1	80.9
SECTION D-D	12-[illegible]	76.1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	77.7
	13-4	75.8	76.5	76.9	76.5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	76.9
	13-8		75.7	75.8	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	75.8
	14-[illegible]	[illegible]	78.1	78.1	78.0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	78.1
	14-8	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	77.1
SIMOC SKIN TEMPS, Center - Top	18-[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Middle	18-8	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Bottom	18-[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Near Wall - Middle	18-[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
In Corner - Middle	18-[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
OUTSIDE AIR TEMPS	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]				[illegible]

A

*For detailed description of thermocouple locations see Sec. IV-A and B.

INSIDE SHELTER*

5 occupants;
t

84	90	96	102	108	114	120	126	132	138	144	150	156	162	168	174	180	186	192	198	204	210	216	222	228	234	240	246	252
		4				5				6				7				8				9				10		
83.4	72.2	83.4	96.6	83.8	72.0	83.9	95.7	83.4	72.3	86.2	98.4	85.7	73.2	83.2	98.0	85.4	73.1	86.4	98.2	86.4	72.8	85.5	97.6	86.1	73.1	85.3	97.3	86.[illegible]
72.7	68.8	75.8	76.1	72.2	68.2	73.1	77.8	72.7	69.1	73.4	77.3	73.9	70.3	72.5	75.6	72.0	68.0	73.2	74.7	71.4	67.7	74.3	76.4	72.3	68.4	74.0	76.0	72.[illegible]
82.5	81.7	83.0	83.3	83.2	83.2	83.1	83.4	85.1	83.2	84.8	85.0	86.2	84.4	85.5	84.6	85.1	84.4	85.2	85.9	86.7	85.3	85.9	86.8	86.1	85.7	86.3	86.3	87.[illegible]
82.5	80.9	83.0	82.9	83.2	83.1	82.6	82.5	65.0	82.4	84.8	84.3	86.2	83.3	85.4	84.5	85.1	83.5	84.5	85.9	86.7	85.1	85.9	85.9	85.2	85.0	85.4	85.6	86.[illegible]
81.9	80.8	82.5	82.5	83.1	81.9	83.0	83.1	83.8	82.3	84.6	85.3	85.1	83.5	84.5	85.5	85.3	83.4	85.7	85.6	83.9	84.8	85.9	86.8	85.9	85.0	86.3	86.9	86.[illegible]
81.8	78.8	82.1	80.9	82.9	79.4	83.0	81.8	83.4	80.7	84.5	82.2	85.1	82.3	83.3	81.9	85.2	82.6	85.7	82.2	85.9	83.6	85.6	85.0	84.1	84.8	85.3	85.4	84[illegible]
80.5	80.9	82.2	84.3	83.1	81.9	83.0	84.3	84.2	82.4	84.1	86.1	85.1	83.6	84.4	86.2	84.9	83.6	84.5	86.3	83.8	84.5	85.5	87.2	86.1	85.1	86.0	87.2	86[illegible]
80.9	80.8	81.3	82.2	82.0	81.4	80.4	83.0	83.3	82.3	82.9	84.3	84.2	83.5	83.6	84.9	83.9	83.4	83.4	84.9	84.5	83.9	84.1	85.4	84.8	84.7	84.6	85.5	[illegible]
82.5	81.6	83.0	83.3	83.2	82.3	83.1	83.2	84.1	82.4	84.4	85.6	85.1	83.6	84.4	85.9	84.8	83.9	85.5	85.9	85.8	84.3	86.0	86.9	86.1	85.1	86.7	84.9	86.[illegible]
80.4	80.8	80.5	81.5	81.8	80.6	82.2	82.9	82.0	82.3	82.3	83.9	83.4	83.2	83.6	83.9	84.2	83.4	84.7	84.2	84.4	84.0	85.0	85.3	84.8	84.7	85.9	85.5	85.[illegible]
80.5	81.5	83.0	84.6	83.3	82.4	83.3	84.3	84.2	83.1	84.5	86.2	85.3	84.3	84.7	86.6	83.1	83.9	85.5	86.8	86.2	84.8	86.3	87.3	86.1	85.6	87.1	87.0	87.[illegible]
80.5	81.2	82.5	84.5	83.2	82.1	83.1	84.3	84.2	82.8	84.1	86.2	85.1	83.6	84.6	86.3	84.9	83.4	84.8	86.4	85.9	84.4	85.9	87.2	86.1	85.1	86.0	87.0	86.[illegible]
80.5	81.6	83.0	84.1	83.3	82.4	83.3	84.3	84.2	83.1	84.8	86.1	85.3	84.3	25.1	86.7	85.1	83.9	85.5	86.9	86.9	86.2	86.3	86.4	86.9	86.1	86.7	87.0	87[illegible]
80.5	81.6	83.0	84.1	83.3	82.4	83.3	84.3	84.2	83.1	84.7	86.1	85.3	84.3	84.7	86.6	85.1	83.9	85.5										
80.2	80.1	80.3	81.7	81.7	81.0	81.7	82.2	82.8	82.3	83.0	83.7	83.7	83.5	83.4	84.1	84.0	83.4	83.1	84.3	84.6	84.0	84.6	85.1	84.8	84.7	85.0	85.8	85.[illegible]
80.2	79.5	80.6	81.3	81.5	80.6	81.6	82.1	82.4	82.1	82.6	83.0	83.3	82.9	83.8	83.6	83.8	83.0	83.2	83.8	84.3	83.5	84.3	84.1	84.4	84.3	85.0	85.6	85.[illegible]
82.0	81.9	81.8	81.9		82.7	83.4	83.9	84.4	83.8	84.3	85.5	85.5	85.0	84.9	85.7	85.7	85.1	85.4	85.4	86.3	85.6	85.8	86.8	86.4	86.4	86.3	87.3	87.[illegible]
80.1	79.8	80.0	81.7	81.4	81.4	82.0	82.1	82.1	82.4	83.1	83.7	83.8	83.4	83.3	84.0	84.0	83.4	83.7	83.9	84.6	63.9	85.0	85.5	84.4	84.5	85.4	85.6	85.[illegible]
79.3	79.6	79.9	81.1	81.2	80.7	81.3	81.8	82.3	82.3	83.1	83.8	84.1	83.9	83.6	84.0	84.3	83.8	[illegible]	84.0	84.8	84.5	84.6	85.0	84.7	84.6	85.0	85.7	85.[illegible]
81.4	81.3	81.3	82.6	82.6	82.3	82.9	83.3	83.7	83.6	84.0	84.5	84.7	84.3	84.2	84.5	85.0	84.7	84.6	85.3	86.4	86.2	87.1	87.5	87.2	[illegible]	87.6	87.8	88.[illegible]
81.4	81.0	81.3	83.0	82.6	82.3	83.0	84.1	83.7	83.3	84.1	85.[illegible]	85.0	83.5	84.3	84.9	85.3	84.7	84.5	85.2	85.8	85.2	86.0	86.3	85.7	[illegible]	84.3	84.9	86.[illegible]
80.5	79.8	80.5	82.2	81.7	81.5	82.1	82.1	83.3	82.4	83.1	84.1	84.1	83.4	83.6	84.1	84.4	83.6	83.9	84.2	84.5	84.2	84.3	85.0	85.1	84.9	85.0	85.9	85.[illegible]
[illegible]	84.0	84.3	85.5	85.5	85.3	85.6	86.1	86.4	86.2	87.3	87.2	87.5	87.0	87.3	87.5	87.8	87.3	87.4	87.4	86.4	86.1	88.8	89.1	88.7	88.6	89.1	89.4	89.[illegible]
[illegible]	84.3	84.7	85.9	85.7	85.4	86.4	86.4	87.1	86.9	87.8	87.5	88.1	87.9	88.1	88.0	88.5	86.4	88.1	88.4	88.8	86.6	89.5	89.7	89.2	89.2	90.1	90.0	90.[illegible]
80.9	81.0	81.3	82.5	82.4	82.3	82.6	82.9	83.3	83.1	84.1	84.3	84.8	84.4	84.3	85.0	85.1	84.7	85.3	84.8	85.4	84.9	85.5	85.7	85.6	85.6	84.4	84.2	86
77.7	77.8	78.2	79.5	79.4	79.0	79.6	79.9	80.8	80.0	80.9	81.9	82.0	81.5	81.6	81.6	82.2	81.7	82.0	82.5	82.7	81.9	82.1	83.5	82.9	82.6	83.1	83.7	83
76.9	76.5	77.0	77.8	78.0	77.7	78.3	78.3	79.1	78.7	79.5	80.1	80.2	79.9	79.9	80.8	80.4	80.0	81.0	80.6	80.9	80.4	81.3	81.5	81.7	81.3	82.1	82.2	82
75.8	76.0	76.5	78.0	78.2	78.0	78.6	78.9	79.9	79.3	80.2	81.1	81.3	81.0	80.8	81.1	81.8	81.1	81.3	81.6	81.7	81.9	81.9	82.8	82.2	82.5	82.5	83.1	82
78.1	79.0	78.7	79.5	79.5	79.1	79.7	80.0	80.8	80.3	81.1	81.4	81.7	80.9	81.4	81.4	81.8	81.5	81.7	82.[illegible]	[illegible]	81.9	82.6	81.2	82.6	83.0	83.7	83.4	83
77.1	77.1	77.8	78.8	78.6	78.4	79.2	79.6	79.9	78.4	80.3	81.0	81.2	79.8	80.6	81.0	81.3	80.3	81.1	81.3	[illegible]	81.4	81.5	82.3	81.8	81.1	82.0	82.2	82
[illegible]	[illegible]	89.0	89.3	89.6	88.8	89.9	89.9	90.2	90.0	90.7	91.2	[illegible]	[illegible]	[illegible]	[illegible]	91.5	90.3	[illegible]	91.3	92.4	91.6	[illegible]	92.8	92.6	[illegible]	92.2	92.6	[illegible]
[illegible]	88.4	89.0	89.4	89.7	88.8	89.9	90.0	90.3	90.0	90.8	[illegible]	[illegible]	90.5	90.4	90.9	91.5	90.7	[illegible]	[illegible]	92.6	91.7	[illegible]	92.8	92.6	91.8	92.2	92.8	93
90.1	89.7	91.1	91.3	90.8	90.1	91.9	91.9	91.1	90.0	90.9	[illegible]	91.7	90.6	90.4	90.9	91.5	90.4	91.1	91.3	93.4	91.7	91.9	92.9	92.6	91.9	92.1	92.8	93
[illegible]	[illegible]	[illegible]	92.0	90.1	89.9	90.9	91.1	91.1	90.1	90.8	92.0	89.8	90.4	[illegible]	90.9	91.3	90.[illegible]	91.1	91.1	91.5	91.7	91.9	90.3	92.4	91.9	92.1	92.[illegible]	93
[illegible]	[illegible]	86.2	86.5	87.5	86.4	87.7	88.1	86.4	85.1	86.6	87.1	87.2	86.4	87.0	88.6	89.9	88.[illegible]	89.5	89.6	90.6	88.1	89.6	90.0	90.1	88.0	88.[illegible]	91.0	91
[illegible]	[illegible]	33.8	33.5	33.3	[illegible]	32.8													33.2	31.3							30.1	30
[illegible]	[illegible]	33.4	33.1	34.9	32.2	32.6													33.5	32.2							30.0	30
[illegible]	[illegible]	33.3	33.3	32.[illegible]	32.[illegible]	32.6													33.2	30.5							30.[illegible]	30

ations see Sec. IV-A and B.

B

0	156	162	168 7	174	180	186	192 8	198	204
.4 .3	85.7 73.9	73.2 70.3	63.2 72.5	98.0 75.6	85.4 72.0	73.1 68.0	86.4 73.2	98.2 74.7	86.4 71.4
.0 .9	86.2 86.2	84.4 83.3	95.5 95.4	84.6 84.5	85.1 85.1	84.4 83.5	85. 84.5	85.9 85.9	86.7 86.7
.3 .2	85.1 85.1	83.5 82.3	84.5 83.3	85.5 81.9	85.3 85.2	83.4 82.6	85.7 85.7	85.6 82.2	85.9 85.9
.1 .3	85.1 84.2	83.6 83.5	84.4 83.6	86.2 84.9	84.9 83.9	83.4 83.4	84.3 83.4	86.3 84.9	85.8 84.5
.6 .9	85.1 83.4	83.6 83.2	84.4 83.6	85.9 83.9	84.8 84.2	82.9 83.4	85.5 84.7	85.9 84.2	85.8 84.4
.2 .2	83.3 85.1	84.3 83.6	84.7 84.6	86.6 86.3	85.1 84.9	83.9 83.4	85.3 84.8	86.8 86.4	86.2 85.9
.1 .1	85.3 85.3	84.3 84.3	85.1 84.7	86.7 86.6	85.1 85.1	83.9 83.9	85.5 85.5	86.9	84.9
.7 .0 .5 .7 .8	83.7 83.3 85.5 83.8 84.1	83.3 82.9 85.0 83.4 83.9	83.4 83.8 84.9 83.3 83.6	84.1 83.6 85.7 84.0 84.0	84.0 83.8 85.7 84.0 84.3	83.4 83.0 85.1 83.4 83.8	83.1 83.2 85.4 83.7 83.8	84.3 83.8 85.4 83.9 85.0	84.6 84.3 86.3 84.4 84.8
.5 .1 .1	84.7 85.0 84.1	84.3 83.5 83.4	84.2 84.3 83.6	84.5 84.9 84.1	85.0 85.3 84.4	84.7 84.7 83.8	84.6 84.5 83.9	85.3 85.2 84.2	86.4 85.8 84.5
.2 .5 .1	87.5 88.1 84.8	87.0 87.9 84.4	87.3 88.1 84.3	87.5 88.0 83.0	87.8 88.1 85.1	87.3 90.4 84.7	87.4 88.1 85.3	87.4 88.4 84.8	88.4 88.8 83.4
.9 .1 .4 .0	82.0 80.2 81.3 81.7 81.2	81. 79.9 81.0 80.9 79.8	81.6 79.9 80.4 81.4 80.6	81.6 80.8 81.1 82.3 81.0	82.2 80.4 81.8 81.8 81.3	81.7 80.0 81.1 81.5 80.3	82.0 81.0 81.5 81.7 81.1	37.5 80.6 81.6 82.0 81.3	82.7 80.9 82.2 82.1 81.9
.2 .2 .2	91.7 91.7 91.7	90. 90.3 90.6	90.4 90.4 90.6	90.6 90.9 90.8	91.5 91.5 91.5	90.3 90.3 90.4	90.7 91.1 91.1	91.3 91.3 91.3	92.4 92.4 92.4
.8	89.8	90.4	90.4	90.9	91.1	90.2	91.1	91.3	91.9
.3	87.2	86.9	89.0	88.6	89.9	88.7	89.5	89.3	90.4
								33.2 33.8 33.2	31.3 32.2 30.5

210	216 9	222	228	234	240 10	246	252	258	264 11	270	276	282	288 12	294	300	306	312 13	318
72.8 67.7	85.5 74.3	97.6 76.4	84.1 72.3	73.1 68.4	85.3 74.0	97.3 76.0	84.4 72.1	72.3 68.4	90.6 74.2	97.0 76.1	84.6 71.0	72.8 68.6	84.7 73.2	97.0 74.2	88.7 70.1			
85.3 85.1	85.9 85.9	86.8 85.9	86.1 85.2	85.7 85.0	86.3 85.4	86.3 85.6	87.0 86.9	86.0 85.6	86.6 86.1	88.1 88.1	87.9 86.9	86.3 85.5	86.9 86.8	87.9 87.9	87.6 87.5			
86.8 83.6	85.9 85.6	86.8 85.0	85.9 84.1	85.0 84.8	86.3 85.3	86.9 85.6	86.7 84.5	85.8 84.3	87.0 87.0	87.0 86.4	86.8 84.6	86.4 84.4	86.6 84.8	87.2 85.5	87.2 86.3			
84.3 83.9	85.5 84.1	87.2 85.4	86.1 84.8	85.1 84.7	86.0 84.6	87.2 85.5	86.8 85.6	84.9 84.8	86.6 85.3	87.4 85.8	86.9 85.6	85.2 84.8	86.5 85.2	87.5 85.3	86.6 85.1			
84.3 84.0	86.0 85.0	86.9 85.3	86.1 84.8	85.1 84.7	86.7 85.9	86.9 85.5	86.7 85.5	85.6 84.7	86.6 85.6	87.0 85.8	86.8 85.6	85.9 85.0	86.6 85.0	87.2 85.3	86.4 85.0			
84.8 84.4	86.3 85.9	87.3 87.2	86.1 86.1	85.6 85.1	87.1 86.0	87.0 87.0	87.0 86.8	86.0 85.6	87.0 86.6	87.8 87.5	86.9 86.4	86.3 85.4	86.9 86.6	87.9 87.3	87.2 86.8			
86.2	86.3	86.4	86.9	86.1	86.2	87.0	87.0	87.0	87.0	87.1	87.2	86.4	86.4	87.7	87.3			
84.0 83.5 85.6 83.9 84.5	84.6 84.2 85.8 85.0 84.6	85.1 84.1 86.8 85.0 85.0	84.8 84.4 86.4 84. 84.7	84.7 84.3 86.4 84.3 84.4	85.0 85.0 86.3 85.4 85.0	85.8 85.6 87.3 85.6 85.7	85.6 85.5 87.4 85.4 85.4	85.1 84.8 86.8 85.0 85.1	85.5 85.1 86.8 85.6 85.2	86.0 85.5 87.6 85.9 85.9	86.0 85.2 87.4 85.6 85.5	85.4 84.9 86.8 85.5 85.3	85.6 85.1 87.3 85.2 85.3	86.0 85.9 87 85 85.9	86.0 85.4 6 6 6			
86.2 85.1 84.2	87.1 86.0 84.3	87.2 86.3 85.0	87.6 85.7 85.1	87.6 85.7 84.9	87.6 86.3 85.0	87.8 86.9 85.9	88.2 86.5 85.9	87.8 86.0 85.1	88.1 86.4 85.4	88.5 86.9 86.0	88.4 86.5 86.0	87.9 86.2 85.3	88.1 86.4 85.5	88.4 87.1 86.0	88.4 86.5 85.9			
84.1 88.6 84.9	84.8 89.5 85.5	89.1 89.7 85.7	88.7 89.2 84.4	88.4 89.2 85.6	89.3 90.1 86.4	89.8 90.0 86.2	89.5 90.6 .4	89.0 90.0 86.0	89.8 90.3 86.2	89.9 90.8 86.5	89.5 90.0 86.3	89.0 89.9 86.0	89.6 90.3 86.1	89.9 90.4 86.4	89.7 90.2 86.3			
81.9 80.4 81.9 81.9 81.4	82.1 81.5 81.9 82.9 81.5	83.5 81.5 82.8 83.2 82.5	82.9 81.7 82.2 82.6 81.8	82.6 81.3 82.5 83.0 82.1	83.1 82.1 82.5 83. 82.0	83.7 82.2 84.1 83.4 83.2	83.9 82.3 82.6 83.6 82.5	83.1 81.8 82.6 83.0 81.9	83.5 82.3 82.6 83.6 82.3	84.0 82.3 83.3 84.0 82.6	84.2 82.4 83.2 83.5 82.6	83.3 82.1 83.0 83.2 82.1	84.0 82.2 83.0 83.5 82.6	84.2 82.4 83.4 84.0 82.8	84.2 82.5 83.3 83.8 82.5			
91.6 91.7 91.7	91.9 91.9 91.9	92.8 92.8 92.9	92.4 92.4 92.4	91.9 91.9 91.9	92.2 92.2 92.3	92.4 92.8 92.8	93.4 93.4 93.4	92.1 92.3 92.3	92.3 92.3 92.3	92.9 92.9 92.9	92.8 92.8 92.8	93.3 93.3 93.3	92.9 92.9 92.9	93.2 93.2 93.2	92.3 92.3 92.3			
91.7	91.9	90.5	92.4	91.9	92.3	92.9	93.4	92.1	92.2	92.9	92.7	92.8	92.8	93.2	91.0			
88.1	89.8	90.0	90.3	89.0	89.7	1.0	91.3	88.5	90.4	91.5	90.6	89.6	90.3	91.4	89.6			
						39.1 36.0 36.0	38.1 38.5 38.1	38.5 38.4 38.5	40.1 40.1 40.2	40.7 40.9 40.2	38.0 38.0 37.7	37.8 37.7 37.7	39.1 39.2 39.1	42.3 44.9 42.9	41.9 42.3 42.2	35.9 36.4 35.1	34.5 34.8 34.4	33.9 33.5 32.2

C

Table IX-B. VARIATION OF TEMPERATURES IN SOIL SURROUNDING SHELTER*

21 x 7 x 7 ft shelter; 15 occupants; 3 cfm/occupant

SOIL TEMPERATURES	T.C. No.	Time From Start of Test, hrs. → Days → 0	24 1	48 2	72 3	96 4	120 5	144 6	168 7	192 8	216 9	240 10	264 11	288 12
SECTION C-C														
Outside Wall														
Diagonally Up	6-10	55.3	73.1	76.1	78.0	80.3	81.7	83.0	83.4	83.7	84.6	85.0	85.5	85.6
	6-11	49.8	53.6	56.2	56.5	59.4	60.9	61.[illegible]	61.8	61.8	62.2	62.3	62.8	63.2
	6-12	50.0	51.4	52.4	54.4	54.5	55.3	55 [illegible]	56.0	55.7	56.0	56.4	56.8	58.2
	7-1	49.1	48.1	47.6	47.9	47.8	49.1	[illegible]8.1	48.9	48.5	48.4	49.5	49.7	50.3
	7-2	42.9	41.2	41.3	42.3	42.1	41.[illegible]	40.7	39.4	40.0	40.7	40.4	42.2	44.2
	7-3			33.2	36.0	35.4	34.5			31.8	31.3	31.6	40.0	39.6
Horizontal 6 ft elev	7-4	57.1	71.9	75.0	78.1	80.0	81.6	82.6	82.8	83.2	84.3	85.0	85.1	85.2
	7-5	56.2	60.8	62.4	65.1	66.3	68.0	68.9	69.3	69.8	69.7	70.[illegible]	69.8	70.0
	7-6	56.1	57.2	58.8	60.6	60.2	61.4	62.9	63.1	63.9	64.3	64.5	64.4	64.8
	7-7	56.1	55.1	55.4	56.1	56.8	57.2	57.1	57.3	58.1	58.2	58.4	58.1	58.3
	7-8	55.7	54.1	53.2	53.1	52.9	52.9	52.9	52.9	53.2	53.4	53.3	53.1	53.3
	7-9	51.8	51.8	51.4	50.1	49.7	49.8	49.5	49.9	48.5	48.6	48.4	48.7	49.3
3-1/2 ft elev	7-10	54.0	74.0	77.0	78.4	81.8	83.4	84.3	84.9	85.4	85.8	86.3	86.8	87.3
	7-11	55.0	62.5	66.1	68.2	71.8	72.6	73.2	73.4	73.7	74.1	74.0	74.0	74.8
	7-12	55.7	60.2	63.2	65.2	65.9	67.9	68.4	69.1	69.1	69.7	70.0	70.0	70.5
	8-1	55.7	56.7	57.8	58.2	59.1	60.1	60.7	61.0	61.6	61.6	62.3	61.9	62.0
	8-2	55.8	56.7	57.2	57.4	57.3	58.1	58.1	58.1	58.5	58.6	58.5	58.4	58.2
	8-3	55.8	56.5	55.9	55.3	55.2	55.1	54.7	54.3	54.4	54.6	54.3	53.8	53.8
1 ft elev	8-4	58.4	73.1	75.6	78.0	80.0	82.0	83.1	83.3	83.7	85.0	85.4	85.6	85.5
	8-5	60.4	64.6	66.7	71.0	71.4	73.5	73.2	73.9	75.0	75.2	74.8	74.9	75.1
	8-6	60.4	62.2	63.9	66.4	67.5	69.1	69.[illegible]	69.9	70.5	71.0	71.2	71.2	71.2
	8-7	59.4	59.9	60.8	61.3	62.4	64.1	63.9	64.0	63.6	63.9	64.2	64.7	65.4
	8-8	59.4	59.9	60.2	59.9	60.4	61.5	61.5	61.4	61.5	61.5	61.4	61.5	62.0
	8-9	59.3	59.9	59.6	59.1	58.9	59.3	59.1	59.0	58.6	58.6	58.4	58.3	58.3

*For detailed description of thermocouple locations see Section IV-A.

Table IX-B. VARIATION OF TEMPERATURES IN SOIL SURROUNDING SHELTER*

21 x 7 x 7 ft shelter; 15 occupants; 3 cfm/occupant

SOIL TEMPERATURES	T.C. No.	Time From Start of Test, Hrs. → / Days → 0	24 1	48 2	72 3	96 4	120 5	144 6	168 7	192 8	216 9	240 10	264 11	288 12
SECTION C-C														
Outside Wall														
Diagonally Down	8-10	55.8	72.0	75.7	75.2	79.9	81.3	83.1	83.6	83.8	84.6	85.0	85.2	85.3
	8-11	57.9	62.3	63.8	67.0	67.7	69.7	69.8	70.0	70.8	71.0	71.3	71.1	71.3
	8-12	58.7	60.0	60.1	60.3	63.8	64.5	67.2	67.4	66.5	66.7	67.0	67.5	67.6
	9-1	60.7	60.3	61.0	59.8	60.4	61.8	62.0	63.2	62.9	63.3	64.0	64.2	63.3
	9-2	60.8	60.4	61.3	60.4	60.3	61.3	62.0	62.1	62.8	62.3	61.5	61.9	62.0
	9-3	62.8	62.2	61.3	60.4	61.2	61.3	61.9	61.3	60.9	61.1	59.8	60.0	60.2
Above Roof 10-1/2 ft from wall	9-4	56.6	75.4	76.7	78.8	81.3	82.9	84.0	84.2	84.6	87.1	87.6	88.1	88.1
	9-5	48.5	56.2	59.3	60.8	64.4	66.0	67.2	67.8	68.4	69.2	70.1	70.7	72.0
	9-6	48.5	53.0	55.2	57.3	58.8	61.5	62.3	63.0	63.9	64.9	65.8	66.7	68.0
	9-7	47.6	49.2	50.4	52.7	53.6	56.4	56.9	57.9	59.1	59.9	60.9	61.4	63.1
	9-8	46.7	47.6	48.3	50.5	50.9	53.5	54.8	54.6	56.3	57.2	57.7	58.9	60.2
	9-9	45.8	46.7	46.8	48.0	49.7	52.1	52.4	53.8	54.4	55.1	55.4	57.7	58.4
3 ft from wall	9-10	54.5	75.1	76.9	78.8	81.3	83.0	84.1	84.3	84.5	86.0	86.3	86.4	86.4
	9-11	51.8	58.3	61.2	63.4	66.4	68.4	70.2	70.9	71.5	72.3	72.6	72.3	72.7
	9-12	51.9	55.1	57.9	60.4	62.0	64.1	65.5	66.1	67.3	68.3	68.8	68.9	69.6
	10-1	50.8	50.0	51.6	53.1	55.3	58.1	59.2	59.2	61.4	61.9	62.9	63.3	64.0
	10-2	48.4	47.1	48.2	51.3	52.3	54.8	55.8	56.1	57.4	58.1	58.9	59.7	60.7
	10-3	44.4	44.8	46.9	48.2	50.8	53.3	53.0	53.7	54.9	54.9	55.9	57.9	59.3
1 ft from wall	10-4	54.8	72.7	75.4	78.0	80.5	82.1	83.1	83.6	83.9	84.3	85.0	85.4	85.5
	10-5	50.9	57.1	61.2	62.0	64.7	65.9	66.8	67.9	68.3	68.3	68.4	68.4	69.1
	10-6	50.9	54.0	56.0	58.2	59.4	61.5	62.6	62.6	63.3	64.0	64.2	64.4	65.3
	10-7	49.7	49.3	50.5	52.8	53.8	55.6	56.2	56.3	58.3	58.0	58.6	59.0	59.3
	10-8	47.4	46.3	47.1	49.1	49.8	49.9	51.8	51.3	52.8	53.9	54.2	55.4	54.7
	10-9	44.8	43.7	44.8	46.8	47.1	47.1	47.4	47.4	49.3	50.3	50.3	53.0	53.4

* For detailed description of thermocouple locations see Section IV-A.

Table IX-8. VARIATION OF TEMPERATURES IN SOIL SURROUNDING SHELTER*
21 x 7 x 7 ft shelter; 15 occupants; 3 cfm/occupant

SOIL TEMPERATURES	T.C. No.	Time From Start of Test, Hrs. → / Days → 0	24 1	48 2	72 3	96 4	120 5	144 6	168 7	192 8	216 9	240 10	264 11	288 12
SECTION C-C														
Below Floor														
10-1/2 ft from wall	10-10	58.6	77.5	79.5	82.0	84.3	85.6	87.3	87.3	87.4	89.8	89.3	89.8	89.8
	10-11	58.4	62.6	65.6	71.0	71.9	72.7	73.2	74.6	75.3	75.8	76.1	76.4	76.6
	10-12	59.5	63.0	65.4	69.0	70.3	71.9	73.2	73.4	74.4	75.0	75.6	75.7	75.7
	11-1	58.6	61.0	63.0	64.7	66.0	67.9	68.4	68.2	69.3	70.1	70.4	70.9	71.5
	11-2	59.6	60.9	63.0	64.6	65.2	66.7	67.1	67.3	68.1	68.1	69.1	69.2	69.6
	11-3	60.4	61.1	62.5	63.0	63.4	64.6	64.4	64.4	65.0	65.0	66.3	65.8	65.7
	11-4	63.7	63.7	62.8	63.0	63.3	64.5	64.1	64.8	65.3	65.4	65.7	65.2	65.4
	11-5													
	11-6													
3 ft from wall	11-7	59.1	77.6	79.9	83.0	84.7	86.4	87.8	88.1	88.1	89.5	90.1	90.3	90.3
	11-8	59.3	62.9	65.3	71.8	71.9	71.9	73.3	73.6	74.9	75.4	76.4	75.9	76.0
	11-9	59.4	62.9	64.1	69.0	69.3	71.2	72.4	72.7	73.8	72.9	74.7	74.4	74.8
	11-10	59.8	62.9	63.9	66.8	66.8	68.2	69.3	69.7	70.3	71.1	71.3	71.3	71.5
	11-11	60.3	61.8	63.3	64.3	65.3	66.6	66.9	67.3	67.5	68.0	67.1	68.4	68.2
	11-12	60.5	61.9	62.4	63.4	64.1	65.0	65.1	65.3	65.4	65.9	65.8	65.9	66.3
	12-1	63.1	63.1	62.5	62.6	63.2	64.1	64.4	64.5	64.5	64.4	64.5	64.2	64.8
	12-2													
	12-3	63.1	63.1	62.9	62.9	62.9	63.0	63.1	63.1	62.8	63.1	63.3	62.9	62.8
1 ft from wall	12-4	58.3	64.6	76.9	79.7	81.3	82.6	84.1	84.3	85.3	85.5	86.4	86.2	86.1
	12-5	61.3	62.9	65.4	68.6	70.2	70.2	72.4	72.7	73.2	73.9	73.9	73.8	74.1
	12-6	61.2	62.8	64.5	67.2	68.0	69.3	70.3	70.6	71.3	71.8	72.1	72.0	72.0
	12-7	61.2	62.7	62.9	64.7	65.4	66.3	67.2	67.5	68.1	68.8	68.9	68.4	68.4
	12-8	61.4	62.7	62.9	63.8	63.9	64.4	65.3	65.9	65.9	66.3	66.4	66.3	66.3
	12-9	61.7	62.2	62.2	63.2	63.6	64.2	64.4	64.7	64.4	64.4	64.8	64.7	65.1

* For detailed description of thermocouple locations see Section IV-A.

Table IX-B. VARIATION OF TEMPERATURES IN SOIL SURROUNDING SHELTER*

21 x 7 x 7 ft shelter; 15 occupants; 3 cfm/occupant

SOIL TEMPERATURES	T.C. No.	Time From Start of Test, Hrs. → Days → 0	24 1	48 2	72 3	96 4	120 5	144 6	168 7	192 8	216 9	240 10	264 11	288 12
SECTION D-D														
Outside Corner														
Diagonally Up	12-10	53.4	70.0	73.8	76.1	78.2	79.6	80.9	81.6	82.0	82.1	83.1	83.5	84.0
	12-11	51.5	52.4	53.9	54.0	55.6	55.8	56.1	56.4	57.9	57.9	57.9	57.9	58.2
	12-12	49.5	49.7	49.3	48.8	48.8	49.4	50.2	50.6	50.5	51.0	50.9	50.1	50.2
	13-1	47.4	46.2	47.1	47.9	44.4	46.7	44.8	44.7	46.0	44.3	46.1	45.8	46.2
	13-2	44.4	42.7	41.2	42.2	40.8	40.2	40.1	39.0	38.1	39.0	38.4	39.0	40.8
	13-3			32.5	35.9	33.9	33.4						38.4	38.1
Horizontal 6 ft elev	13-4	57.5	68.9	71.2	75.1	77.0	78.3	79.5	79.9	81.0	81.5	82.1	82.3	82.2
	13-5	56.2	55.5	56.3	57.4	59.3	59.6	61.0	61.4	61.8	62.3	62.3	61.8	61.9
	13-6	56.1	55.5	55.3	56.4	56.4	56.8	57.1	57.7	57.8	57.9	58.1	57.8	57.8
	13-7	53.5	53.8	54.2	53.9	53.8	54.0	53.2	53.3	52.9	52.9	52.9	52.9	53.0
3-1/2 ft elev	13-8					76.5	78.8	80.2	80.8	81.3	81.9	82.5	82.6	83.0
	13-9	54.9	57.2	58.8	61.0	62.4	63.0	64.2	64.9	65.1	65.4	65.7	65.7	65.5
	13-10	55.4	57.3	58.7	60.1	60.4	61.0	62.1	62.0	62.4	62.6	62.8	62.6	62.5
	13-11	55.7	57.3	58.2	58.1	58.1	58.0	58.2	58.3	58.2	58.3	58.3	57.9	58.0
	13-12	55.9	57.4	56.4	56.8	56.8	56.0	55.7	55.0	54.6	55.1	54.5	54.0	54.0
	14-1	54.9	53.9	53.6	53.3	52.1	52.0	51.6	51.2	51.0	50.0	50.4	50.2	50.0
1 ft elev	14-2	59.0	71.2	73.4	76.4	78.7	79.7	81.1	81.4	81.7	82.9	83.7	83.6	83.5
	14-3	60.9	59.7	60.7	61.1	63.8	64.7	65.7	66.2	66.9	67.1	67.4	67.1	67.2
	14-4	60.6	59.9	60.6	60.8	62.0	62.8	63.1	63.2	63.7	64.0	64.1	63.9	64.8
	14-5	59.3	59.7	59.9	59.6	60.3	60.9	60.9	60.6	60.0	60.3	60.1	60.3	60.4
Diagonally Down	14-6	55.8	70.0	73.3	74.3	77.8	79.2	80.3	80.6	81.1	81.5	82.0	82.3	82.6
	14-7	60.8	60.7	61.0	63.7	64.7	65.4	66.2	66.8	67.0	67.4	67.5	67.7	67.9
	14-8	60.7	60.7	61.0	62.7	63.3	63.5	64.2	64.0	64.6	64.8	64.9	64.3	64.3
	14-9	60.7	60.8	60.9	62.2	62.2	62.4	62.5	62.3	62.5	62.3	62.3	62.1	62.1
	14-10	60.7	60.8	60.9	62.0	61.7	61.7	61.8	61.4	61.6	61.3	61.3	60.7	60.3
	14-11	61.2	60.9	60.3	59.9	60.0	59.5	59.5	60.0	59.0	59.0	58.0	58.2	58.0

* For detailed description of thermocouple locations see Section IV-A.

Table X-A. VARIATION OF TEMPERATURES INSIDE SHELTER*

21 x 7 x 7 ft. shelter; 15 occupants; 7 cfm/occupant

	T.C. No.	Time From Start of Test, Hrs. — Days — 0	6	12	18	24 1	30	36	42	48 2	54	60	66	72 3	78	84	90	96 4	102	108	114	120 5	126	132	138	144 6	150	60
AIR TEMPERATURES																												
SUPPLY DUCT																												
DB	15-10	65.7	94.3	82.6	76.0	84.6	94.7	84.1	73.2	85.4	94.5	84.0	73.3	84.4	94.5	84.1	75.8	83.9	94.0	83.8	75.0	83.7	94.6	84.2	76.5	86.6	5[illegible]	84
WB	15-9	64.9	76.5	73.3	70.7	73.1	74.7	72.3	70.5	72.2	75.9	72.3	69.3	72.9	75.8	72.2	71.1	73.1	74.0	72.2	71.5	72.2	75.0	72.6	71.0	73.7	[illegible]	72
RETURN DUCT																												
DB	16-2	66.4	85.0	84.0	81.9	84.6	88.2	86.3	83.8	87.1	88.9	87.0	85.2	87.4	89.0	87.7	85.7	86.8	88.9	87.4	86.1	88.0	90.4	88.0	85.5	87.2	8[illegible]	87
WB	16-1	61.4	77.0	78.0	78.3	77.9	80.2	80.4	79.0	79.5	80.1	79.0	78.6	78.5	80.4	79.6	78.8	79.8	80.8	81.8	80.1	81.2	83.5	82.0	82.3	82.5	8[illegible]	79
SHELTER AIR																												
Center																												
6 ft elev																												
DB	15-12	66.7	84.8	81.4	78.0	81.6	87.5	83.3	80.0	84.3	88.2	84.4	80.5	84.4	89.0	85.0	81.7	84.6	88.2	85.0	82.0	84.6	89.1	85.0	82.4	84.7	8[illegible]	84
WB	15-11	65.1	74.9	75.9	74.0	75.8	76.0	76.2	74.5	75.5	76.7	76.7	74.5	76.3	77.6	77.4	75.8	76.5	77.7	78.5	77.2	77.8	78.5	79.0	77.9	78.9	5[illegible]	76
3-1/2 ft elev																												
DB	15-4	64.1	81.6	81.9	79.0	82.5	85.0	83.8	80.0	85.0	86.6	84.4	80.6	85.0	87.2	85.4	81.8	84.7	87.5	85.0	82.0	85.6	88.4	86.0	81.8	85.0	8[illegible]	84
WB	15-3	63.0	76.4	78.0	77.0	78.2	79.3	77.7	76.8	76.9	79.4	78.0	76.4	77.2	80.0	78.6	77.2	77.0	80.8	80.0	79.3	79.0	82.1	80.4	78.7	81.6	8[illegible]	78
1 ft elev																												
DB	15-2	65.7	79.5	80.1	79.0	80.8	83.2	83.3	80.8	84.5	85.2	84.0	80.4	84.4	86.2	85.0	81.7	85.0	86.3	85.0	82.0	84.7	86.7	85.5	82.1	84.0	8[illegible]	84
WB	15-1	63.7	74.5	77.2	75.0	78.2	78.5	76.4	74.9	75.6	77.5	78.0	74.5	78.0	79.4	78.6	76.4	76.5	79.0	78.5	78.4	77.0	80.0	79.0	79.0	80.4	8[illegible]	78
Near wall																												
3-1/2 ft elev																												
DB	15-6	65.2	80.8	80.5	79.0	81.2	84.4	83.2	81.7	83.8	85.3	84.0	82.5	84.3	87.0	84.6	83.2	84.2	86.2	84.6	83.5	86.7	87.0	85.0	83.3	83.9	8[illegible]	84
WB	15-5	63.2	76.2	77.[illegible]	78.0	78.2	79.0	79.0	78.5	78.4	79.3	78.0	79.2	78.8	79.4	79.4	79.6	78.7	80.5	80.3	81.0	80.0	81.8	81.1	81.6	80.5	8[illegible]	77
In corner																												
3-1/2 ft elev																												
DB	15-8	65.7	80.8	80.2	79.2	81.2	84.4	83.3	81.0	84.[illegible]	9[illegible]	84.0	82.6	84.2	86.2	84.1	83.2	84.2	86.0	84.5	83.5	84.7	87.5	85.0	83.4	84.6	8[illegible]	84
WB	15-7	63.5	76.5	77.6	78.4	78.1	79.0	79.0	79.0	78.5	79.3	80.0	79.2	79.1	79.1	80.4	79.6	80.0	80.7	82.4	81.8	81.0	81.8	83.3	81.2	82.8	8[illegible]	80
INSIDE SURFACE TEMPS																												
SECTION C-C																												
Wall	6-10	66.4	73.8	75.4	75.8	76.5	78.4	78.5	78.2	79.2	80.1	80.0	79.5	80.5	81.5	81.0	80.4	81.2	82.0	81.5	81.0	81.3	82.3	82.5	81.5	81.3	8[illegible]	8
	7-6	67.3	73.[illegible]	75.1	75.3	76.6	77.6	78.4	78.2	79.1	79.6	78.9	79.5	80.4	80.3	80.7	80.0	80.8	80.8	81.0	81.0	81.0	81.5	82.0	81.5	81.3	8[illegible]	7
	7-10	65.2	73.8	76.7	76.6	78.0	79.6	79.8	79.5	81.0	81.4	81.5	81.2	82.2	82.9	82.9	81.7	82.6	82.9	82.8	82.5	83.0	83.5	83.1	82.8	83.2	8[illegible]	8
	8-4	67.3	73.4	75.4	75.0	76.0	78.4	78.6	78.3	80.2	80.1	80.8	79.6	80.5	82.1	81.4	81.0	82.0	82.0	81.1	81.0	82.0	83.3	83.0	81.9	81.8	8[illegible]	8
	8-10	65.8	72.5	74.2	75.0	76.1	78.0	78.4	78.5	80.0	80.0	80.0	80.0	81.0	82.0	81.5	81.0	82.0	82.0	82.0	81.5	82.0	83.5	83.0	82.0	82.0	8[illegible]	8
Ceiling	9-4	66.4	78.0	79.6	78.2	79.0	83.0	83.0	81.5	83.2	85.1	84.1	82.5	83.3	86.1	85.0	83.0	84.6	86.2	85.2	84.0	84.4	86.4	85.9	84.2	84.4	8[illegible]	8
	9-10	65.9	74.6	77.0	76.8	78.2	80.2	79.5	79.5	81.5	81.2	80.9	80.8	81.8	82.0	81.4	80.5	81.8	82.0	82.3	82.0	83.0	83.2	83.3	82.3	82.3	8[illegible]	8
	10-4	65.5	74.6	75.6	77.0	77.6	77.5	79.4	79.0	80.5	80.5	80.5	80.0	81.0	81.2	81.3	80.4	81.2	81.2	82.0	81.4	82.5	82.7	82.6	82.0	83.5	8[illegible]	8
Floor	10-10	66.6	77.3	79.9	80.0	82.0	83.4	84.1	82.9	85.2	85.8	85.5	84.0	85.6	87.2	86.6	85.1	86.0	87.5	87.0	85.7	86.0	86.6	87.0	85.5	86.0	5[illegible]	8
	11-7	65.6	80.0	81.3	81.8	83.4	85.0	85.4	84.8	86.6	86.2	86.6	86.3	87.4	88.5	88.0	87.3	88.0	87.5	88.0	87.4	88.1	89.1	89.0	88.0	88.1	5[illegible]	8
	12-4	65.9	76.0	78.0	78.2	80.0	81.0	81.2	81.5	83.2	83.2	83.1	83.0	83.6	84.3	84.0	83.3	84.2	84.7	84.5	84.0	84.7	85.3	85.5	84.6	84.6	5[illegible]	8
SECTION D-D																												
	12-10	64.8	72.4	73.5	74.0	75.2	76.0	76.5	75.5	76.7	76.6	77.0	76.7	77.5	78.2	78.5	78.0	78.3	78.3	79.3	78.9	78.5	79.2	80.0	79.7	80.0	5[illegible]	[illegible]
	13-4	67.8	73.8	73.7	74.0	75.6	76.0	76.0	76.0	77.1	77.5	77.0	77.0	78.0	78.2	78.4	78.0	78.3	78.6	78.7	79.0	78.7	79.3	79.4	79.5	78.8	5[illegible]	[illegible]
	13-8	65.9	73.0	74.8	75.4	75.3	77.2	78.0	78.0	78.9	79.0	79.1	78.2	79.7	80.3	80.5	80.0											
	14-2	66.4	71.2	73.0	73.2	74.8	76.0	75.5	75.2	77.1	77.5	77.4	77.4	78.1	79.0	79.0	78.0	78.5	79.0	79.2	79.0	79.5	79.7	80.2	79.5	79.9	5[illegible]	[illegible]
	14-6	65.2	72.2	73.0	73.2	74.0	75.1	76.4	75.2	76.1	76.6	77.0	76.5	77.5	78.3	78.6	78.3	76.8	78.5	78.9	78.8	78.8	79.0	80.0	79.0	79.2	5[illegible]	[illegible]
SIMOC SKIN TEMPS																												
Center - Top	18-7	85.1	86.0	85.6	85.1	85.3	87.8	87.0	86.1	87.5	88.5	87.8	86.0	87.9	88.4	88.8	86.3	87.8	89.0	89.0	87.2	89.0	89.0	89.2	87.0	88.0	5[illegible]	[illegible]
Middle	18-8	86.3	90.7	87.2	86.0	86.5	91.0	89.6	89.0	92.3	90.9	90.5	89.6	93.3	90.4	90.0	89.2	91.6	90.2	89.5	87.5	92.8	92.2	89.2	87.3	88.0	5[illegible]	[illegible]
Bottom	18-9	86.3	89.8	89.4	88.2	90.0	92.0	92.0	90.2	93.2	93.8	92.9	91.0	94.4	94.4	93.5	91.0	93.3	94.4	92.5	91.0	94.6	95.5	92.8	87.3	88.5	5[illegible]	[illegible]
Nearwall - Middle	18-10	85.7	89.4	90.3	88.2	89.5	91.5	92.9	91.5	92.9	93.5	91.0	92.5	92.5	93.0	94.0	93.0	92.5	94.4	92.0	93.0	93.0	94.1	89.8	88.2	87.7	5[illegible]	[illegible]
In Corner - Middle	18-11	86.5	87.6	84.4	83.9	83.2	86.0	85.3	84.5	85.3	86.6	84.0	83.7	86.1	87.6	85.9	85.5	86.6	87.6	87.0	86.0	86.0	87.0	87.6	87.0	87.8	5[illegible]	[illegible]
OUTSIDE AIR TEMPS																												
	19-5	50.8	56.6	54.3	48.1	55.0	60.8	55.0	49.3	58.0	62.3	56.5	53.3	58.9	73.5	63.0	62.0	65.9	69.5	59.[illegible]	52.0	57.9	73.3	63.7	59.7	59.0	5[illegible]	[illegible]
	19-6	51.2	56.5	54.1	48.0	55.0	60.7	55.0	49.3	58.0	62.3	56.1	53.3	58.8	73.5	65.0	61.9	65.9	69.6	59.5	52.0	58.1	73.5	63.[illegible]	59.7	59.0	5[illegible]	[illegible]
	19-7	51.2	56.5	54.1	48.0	55.0	60.7	54.5	49.1	57.5	62.3	56.0	53.3	58.7	73.4	63.3	61.9	65.9	68.4	58.5	51.6	56.8	73.5	63.5	59.5	57.5	5[illegible]	[illegible]

A

For detailed description of thermocouple locations see Sec. IV-A and B.

ERATURES INSIDE SHELTER*

shelter; 15 occupants;
/occupant

60	66	72	78	84	90	96	102	108	114	120	126	132	138	144	150	156	162	168	174	180	186	192	198	204	210	216	222	228	[illegible]	162
		3				4				5				6				7				8				9				
84.0	73.3	84.4	94.5	84.1	75.8	83.9	94.0	83.8	75.0	83.7	94.4	84.2	76.5	86.6	94.5	84.5	74.6	84.7	95.0	85.0	76.0	83.9	93.8	86.7	75.4	83.5	94.3	86.4	[illegible]	74.6
72.3	69.3	72.9	75.8	[illegible]	71.1	73.1	74.0	72.2	71.5	72.2	75.0	72.6	71.0	73.7	75.3	74.3	69.5	72.3	74.5	72.6	69.7	70.5	74.3	74.5	71.3	71.5	73.9	[illegible]	[illegible]	[illegible]
87.0	85.2	87.4	89.0	87.7	85.7	86.8	88.9	87.4	86.1	88.0	90.4	88.0	85.5	87.2	88.5	88.0	86.3	87.3	91.0	89.4	87.3	87.2	90.3	89.0	86.0	88.3	90.4	88.4	[illegible]	86.3
79.0	78.6	78.5	80.4	79.6	78.8	79.8	80.8	81.8	80.1	81.2	82.5	82.0	82.3	82.5	82.3	81.5	81.2	79.5	82.3	81.2	80.4	80.0	82.0	82.2	80.0	79.4	81.6	81.3	[illegible]	81.2
84.4	80.5	[illegible]	89.0	85.0	81.7	84.6	88.2	85.0	82.0	84.6	89.1	85.0	82.4	84.7	88.9	85.0	82.4	[illegible]	90.0	86.3	83.3	84.7	89.1	86.4	82.2	84.9	89.5	86.2	[illegible]	82.4
76.7	74.5	76.3	77.6	77.4	75.8	76.5	77.7	78.5	77.2	77.8	78.5	79.0	77.9	78.9	79.5	80.0	79.2	77.6	79.0	79.0	77.5	76.5	78.2	78.7	77.1	77.9	78.5	78.3	[illegible]	79.2
84.4	80.6	85.0	87.2	85.4	81.8	84.7	87.5	85.0	82.0	85.6	88.4	86.0	81.8	85.0	87.7	85.5	81.4	85.7	89.1	86.3	82.4	85.0	88.7	86.5	82.3	85.2	88.8	86.8	[illegible]	81.4
78.0	76.4	77.2	80.0	78.6	77.2	77.0	80.8	80.0	79.3	79.0	82.1	80.4	78.7	81.6	83.3	80.2	79.2	78.8	82.3	80.3	79.0	79.3	81.5	79.8	78.3	79.3	81.4	80.0	[illegible]	79.2
84.0	80.4	84.4	86.2	85.0	81.7	85.0	86.3	85.0	82.0	84.7	86.7	85.5	82.1	84.0	86.8	85.0	82.2	85.2	87.9	86.6	83.3	85.0	87.1	87.5	82.2	85.3	87.5	86.0	[illegible]	82.2
78.0	74.5	78.0	79.4	78.6	76.4	76.5	79.0	78.5	78.4	77.0	80.0	79.0	79.0	80.4	82.3	82.1	79.7	79.1	82.2	80.7	79.0	77.0	79.9	79.5	76.0	79.3	81.3	80.2	[illegible]	79.7
84.0	82.5	84.3	87.0	84.6	83.2	84.2	86.2	84.6	83.5	86.7	87.0	85.0	83.3	83.9	86.8	85.4	83.5	84.8	88.0	86.3	84.7	84.2	87.5	85.5	83.9	85.2	87.5	85.9	[illegible]	83.5
78.0	79.2	78.8	79.4	79.4	79.6	78.7	80.4	80.3	81.0	80.0	81.8	81.1	81.6	88.5	82.5	82.4	81.3	79.7	82.3	82.0	81.0	79.5	81.2	81.3	80.7	80.0	81.9	81.1	[illegible]	81.3
84.0	82.6	[illegible]	86.2	84.1	83.2	84.2	86.0	84.5	83.5	84.7	87.5	85.0	83.4	84.6	87.3	85.0	83.5	85.2	88.5	86.0	84.6	85.1	86.9	85.1	83.9	85.3	88.0	85.0	[illegible]	83.5
80.0	79.2	75.1	79.1	80.4	79.6	80.0	80.7	82.4	81.8	81.0	81.8	83.3	81.2	82.8	82.7	83.2	82.3	81.8	81.9	84.0	81.9	80.8	80.7	83.0	81.0	80.3	81.3	82.0	[illegible]	82.3
80.0	79.5	80.5	81.5	81.0	80.4	81.2	82.0	81.5	81.0	81.3	82.3	82.5	81.5	81.3	82.0	82.4	81.7	81.7	82.5	82.3	81.2	81.8	82.5	82.0	81.1	81.2	82.7	82.3	[illegible]	[illegible]
78.9	79.5	80.4	80.3	80.7	80.0	80.8	80.8	81.0	81.0	81.0	81.5	82.0	81.5	81.3	82.0	82.3	81.5	81.8	82.1	82.2	81.5	81.6	82.3	82.1	81.1	81.9	82.8	82.3	[illegible]	[illegible]
81.5	81.2	82.2	82.9	82.9	81.7	82.4	82.9	82.8	82.5	83.0	83.5	83.1	82.8	83.2	83.8	83.8	83.0	83.2	84.0	84.0	83.2	83.6	84.1	83.8	83.2	83.5	85.0	84.5	[illegible]	[illegible]
80.8	79.6	80.5	82.1	81.4	81.0	82.0	82.0	81.1	81.0	82.0	83.3	83.0	81.9	81.8	83.7	82.9	82.2	82.6	84.0	83.2	82.2	83.2	83.8	83.0	82.1	83.2	84.5	83.3	[illegible]	[illegible]
80.0	80.0	81.0	82.0	81.5	81.0	82.0	82.0	82.0	81.5	82.0	83.5	83.0	82.0	82.0	83.9	83.2	82.2	82.6	84.0	83.5	82.8	83.5	83.8	[illegible]	82.5	83.5	85.0	83.6	[illegible]	[illegible]
84.1	82.5	83.3	86.1	85.0	83.0	84.4	86.2	85.2	84.0	84.4	86.4	85.9	84.2	84.4	86.5	85.7	84.0	84.3	86.6	85.5	84.1	84.4	86.2	85.4	83.7	84.4	86.5	85.3	[illegible]	[illegible]
80.9	80.8	81.8	82.0	81.4	80.5	81.8	82.0	82.3	82.0	83.0	83.2	83.3	82.3	82.5	84.0	83.5	82.2	83.9	84.3	84.0	83.2	83.6	84.1	83.9	82.5	83.6	85.0	84.0	[illegible]	[illegible]
80.5	80.0	81.0	81.2	81.3	80.4	81.2	81.2	82.0	81.4	82.5	82.7	82.6	82.0	83.5	83.6	83.1	82.2	82.6	83.5	83.2	82.0	82.1	83.3	83.0	81.6	82.3	83.4	82.8	[illegible]	[illegible]
85.5	84.0	85.6	87.2	86.6	85.1	86.0	87.5	87.0	85.7	86.0	86.6	87.0	[illegible]	86.0	87.4	87.4	85.6	86.8	38.0	88.0	85.8	87.4	88.4	87.6	85.5	87.1	89.2	88.0	[illegible]	[illegible]
86.6	86.3	87.4	88.5	88.0	87.3	88.0	87.5	88.0	87.4	88.1	89.1	89.0	88.0	88.1	89.5	88.7	88.2	88.6	90.0	89.0	88.0	89.0	89.5	89.0	87.7	89.0	90.0	89.2	[illegible]	[illegible]
83.1	83.0	83.6	84.3	84.0	83.3	84.2	[illegible]	84.5	84.0	84.7	85.3	85.5	84.6	84.6	85.5	85.4	84.9	85.1	85.0	85.7	84.5	[illegible]	85.9	85.5	84.3	85.6	86.5	85.4	[illegible]	[illegible]
77.0	76.7	77.5	78.2	78.5	78.0	78.3	78.3	79.3	78.9	78.5	79.2	80.0	79.7	30.0	81.0	80.6	79.9	80.4	81.0	80.0	80.0	79.6	80.2	80.0	79.9	79.3	80.1	80.1	[illegible]	[illegible]
77.0	77.0	78.0	78.2	78.4	78.0	78.3	78.6	78.7	79.0	78.7	79.3	79.4	79.5	78.8	80.0	80.0	79.6	79.4	80.6	80.5	80.0	79.5	80.2	80.0	80.0	79.3	80.1	[illegible]	[illegible]	[illegible]
79.1	78.2	79.7	80.3	80.5	80.0																									
77.4	77.4	78.1	79.0	79.0	78.0	78.5	79.0	79.2	79.0	79.5	79.7	80.2	79.5	79.9	80.4	80.7	80.1	80.0	80.7	80.6	80.5	80.7	80.7	80.6	79.8	80.5	81.5	80.7	[illegible]	[illegible]
77.0	76.5	77.5	78.3	78.6	78.3	78.0	78.5	78.9	78.8	78.6	79.0	80.0	79.0	79.2	79.5	79.9	79.7	79.7	80.5	80.0	80.1	80.0	80.3	80.0	79.9	79.8	80.6	80.4	[illegible]	[illegible]
87.8	86.0	87.9	88.4	86.8	86.3	87.8	89.0	89.0	87.2	89.0	89.0	89.2	87.0	88.0	89.2	88.9	87.0	88.0	91.0	90.0	[illegible]	88.5	89.5	89.5	87.2	88.8	89.3	[illegible]	[illegible]	87
90.5	89.6	93.3	90.6	90.0	89.2	91.8	90.2	89.5	87.5	92.8	92.2	89.2	87.3	88.0	89.9	89.7	88.3	91.3	92.0	90.0	90.5	92.2	90.8	90.0	88.5	93.1	92.2	89.9	[illegible]	88
92.9	91.0	94.4	94.4	93.5	91.0	93.3	94.4	92.5	91.0	[illegible]	95.5	92.8	87.3	88.5	89.5	89.5	88.3	91.4	95.3	[illegible]	[illegible]	93.5	94.8	91.0	90.2	94.3	95.2	92.9	[illegible]	[illegible]
92.0	92.5	92.5	93.0	94.0	93.0	92.5	94.6	92.0	93.0	[illegible]	[illegible]	89.6	88.2	87.7	88.3	88.9	89.3	93.0	95.1	91.0	[illegible]	[illegible]	[illegible]	[illegible]	91.5	93.5	91.5	89.5	[illegible]	89
86.0	83.7	86.1	87.6	85.9	85.5	86.6	87.6	87.0	86.0	86.0	87.0	87.4	87.0	87.8	88.2	88.0	87.5	85.9	89.2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	85.5	85.5	88.0	86.2	[illegible]	87
56.5	55.3	58.9	73.5	65.0	62.0	65.9	69.5	59.5	52.0	57.9	73.3	63.7	59.7	59.0	59.6	55.3	[illegible]	51.0	55.4	52.2	47.8	46.8	49	[illegible]	30.5	65.6	65.0	59.5	[illegible]	50.
56.3	53.3	58.6	73.5	65.0	61.9	65.9	69.6	59.5	52.0	58.1	73.3	63.7	59.7	59.0	[illegible]	54.7	50.6	51.0	55.4	52.2	[illegible]	46.5	[illegible]	46.8	30.9	65.6	65.0	59.5	[illegible]	50
56.0	53.3	58.7	71.4	63.5	61.9	65.7	68.6	59.5	51.6	56.8	73.3	63.5	59.5	57.1	58.5	54.7	50.6	50.1	55.4	51.1	47.4	46.4	[illegible]	46.2	30.0	65.2	65.0	59.5	[illegible]	50

B

thermocouple locations see Sec. IV-A and B.

162	168 7	174	180	186	192 8	198	204
74.6 69.[illegible]	84.7 72.3	95.0 74.5	85.0 72.6	76.0 69.7	83.9 70.5	93.8 74.3	86.7 74.5
86.3 81.2	87.3 79.5	91.0 82.3	89.4 81.2	87.3 80.4	87.2 80.0	90.3 82.0	89.0 82.2
82.4 79.2	84.7 77.6	90.0 79.0	86.3 79.0	83.3 77.5	84.7 76.5	89.1 78.2	86.4 78.7
81.4 79.2	85.7 78.8	89.1 82.3	86.3 80.3	82.4 79.0	85.0 79.9	88.7 81.5	86.5 79.8
82.2 79.7	85.2 79.1	87.9 82.2	86.6 80.7	83.3 79.0	85.0 77.0	87.1 79.9	87.5 79.5
83.5 81.3	84.8 79.7	88.0 82.3	86.3 82.0	84.7 81.0	84.2 79.5	87.5 81.2	85.5 81.3
83.5 82.3	85.2 81.8	88.5 81.9	86.0 84.0	84.6 81.9	85.1 80.8	86.9 80.7	85.1 83.0
81.7 81.5 83.0 82.2 82.2	81.7 81.8 83.2 82.6 82.6	82.5 82.1 84.0 84.0 84.0	82.3 82.2 84.0 83.2 83.5	81.2 81.5 83.2 82.2 82.8	81.8 81.6 83.6 83.2 83.6	82.5 82.3 84.1 83.8 83.8	82.0 82.1 83.8 83.0 83.7
84.0 82.2 82.2	84.3 83.9 82.6	86.6 84.3 83.5	85.5 84.0 83.2	84.1 83.2 82.0	84.4 83.6 82.1	86.2 84.1 83.3	85.4 83.9 83.0
85.6 88.2 84.9	86.8 86.6 85.1	88.0 90.0 86.0	88.0 89.0 85.7	85.8 88.0 84.5	87.4 89.0 85.4	88.4 89.5 85.9	87.6 89.0 85.5
79.9 79.6	80.[illegible] 79.[illegible]	81.0 [illegible].6	80.0 [illegible].0	80.0 80.0	79.6 79.4	80.2 80.2	80.0 80.0
80.1 79.7	80.0 79.7	80.[illegible] 80.5	80.6 80.0	80.5 80.1	80.7 80.0	80.7 80.3	80.6 80.0
87.0 88.3 88.3	88.0 91.3 91.[illegible]	91.8 92.0 [illegible].1	90.0 90.0 91.7	88.3 90.5 [illegible].[illegible]	88.5 92.2 91.4	89.5 90.8 [illegible].8	89.5 90.0 91.0
89.3	91.0	93.[illegible]	91.0	92.7	92.2	93.[illegible]	89.2
87.5	85.9	89.2	87.2	86.7	85.5	89.[illegible]	87.4
50.[illegible] 50.6 50.6	51.6 51.0 50.7	53.[illegible] 53.[illegible] 55.[illegible]	52.2 52.2 51.3	47.8 47.7 47.[illegible]	50.6 50.5 50.4	49.7 49.7 49.7	47.[illegible] 46.8 46.2

210	216 9	222	228	234	240 10	246	252	258	264 11	270	276	282	288 12	294	300	306	312 13	318
75.4 71.3	83.5 71.5	94.3 73.9	86.4 72.1	74.2 69.3	84.3 70.7	93.6 74.0	83.6 73.4	73.2 68.4	83.8 73.8	94.0 73.3	83.5 71.2	73.7 69.4	85.2 72.4	93.5 74.0	84.2 71.0	73.0 69.7	83.4 72.5	93.8 74.0
86.0 80.0	88.3 79.4	90.4 81.6	88.4 81.3	85.9 80.6	88.0 79.6	90.2 81.8	86.0 80.3	85.4 81.0	88.0 80.5	89.2 81.8	87.5 82.0	83.4 81.4	87.3 79.2	89.3 82.0	87.3 80.0	84.9 79.0	87.3 79.7	89.4 81.9
82.2 77.1	84.9 77.9	89.5 78.5	86.2 78.3	82.7 76.8	85.3 76.3	89.4 78.0	85.4 79.0	83.4 77.5	86.1 77.4	88.6 78.0	85.0 78.5	82.8 77.2	84.5 77.6	88.5 77.8	84.6 78.6	81.8 77.5	84.4 78.2	88.5 78.2
82.3 78.3	85.2 79.3	88.8 81.4	86.8 80.0	82.0 78.0	85.5 78.0	88.6 81.3	85.9 79.6	81.9 78.3	85.3 78.7	88.1 80.5	85.4 79.1	81.9 78.8	84.8 78.9	88.0 80.4	85.0 80.0	81.2 78.9	84.3 78.9	88.0 81.2
82.2 76.0	85.3 79.3	87.5 81.3	86.0 80.2	82.0 75.3	85.5 76.5	87.3 81.0	85.4 79.7	81.8 75.3	85.4 77.0	87.0 79.2	85.3 78.4	81.6 76.3	84.7 78.8	86.8 79.4	85.0 79.5	81.0 78.0	84.8 78.4	86.4 80.8
83.9 80.7	85.2 80.0	87.5 81.9	85.9 81.1	83.6 81.0	84.7 78.8	87.4 81.0	85.4 80.7	83.3 80.8	85.0 79.8	86.6 80.5	84.6 81.1	83.1 80.8	84.7 79.7	86.8 80.8	85.0 81.2	82.6 80.1	84.3 80.3	86.4 81.2
81.9 81.0	85.3 80.3	88.0 81.3	85.0 82.0	83.5 80.5	84.7 80.5	87.3 81.1	8..0 82.9	83.3 80.8	84.9 80.1	86.7 80.5	84.6 83.2	83.1 80.0	84.7 81.3	86.3 81.2	84.5 82.5	82.6 79.8	84.4 81.1	86.0 81.2
81.1 81.1 83.2 82.1 82.5	81.2 81.9 83.5 83.2 83.5	82.7 82.8 85.0 84.5 85.0	82.3 82.3 84.5 83.3 83.6	81.0 81.4 83.1 82.8 82.8	81.5 81.9 83.4 83.3 83.4	82.6 83.0 84.8 84.2 84.7	82.2 82.2 84.4 83.4 83.6	81.0 81.1 83.4 83.0 82.5	81.5 81.4 83.5 83.2 83.5	82.3 82.8 84.2 84.0 84.0	82.3 82.0 34.3 83.5 83.5	80.8 81.0 83.2 82.4 82.6	81.3 81.3 83.4 83.[illegible] 83.4	81.9 82.5 84.5 83.8 84.2	81.5 81.5 84.0 83.1 83.2	80.5 80.6 83.0 82.[illegible] 82.5	81.5 81.5 83.8 83.1 83.5	81.5 82.5 84.6 83.3 83.8
83.7 82.5 81.6	84.4 83.6 82.3	86.5 85.0 83.4	85.3 84.0 82.8	83.5 82.[illegible] 81.7	84.3 83.4 82.1	86.5 84.2 83.5	85.6 84.0 82.4	84.2 83.0 82.0	84.1 83.5 [illegible].3	86.4 84.0 83.7	85.2 83.6 82.8	84.0 82.7 81.7	84.1 83.0 82.2	85.9 84.2 83.3	85.3 82.9 82.3	84.0 82.2 81.0	84.2 83.6 [illegible].[illegible]	85.5 [illegible].5
85.3 87.7 84.3	87.1 89.0 85.6	89.2 90.0 86.5	88.0 89.2 85.4	85.7 88.2 84.8	86.9 88.5 85.[illegible]	88.6 90.0 86.[illegible]	88.2 89.0 85	85.[illegible] [illegible].0	87.0 89.1 85.8	88.2 89.5 85.9	87.8 89.2 85.7	85.3 87.6 85.0	86.9 88.9 85.2	88.0 89.0 85.9	87.5 88.7 85.3	85.1 87.8 84.3	[illegible].[illegible] 89.2 85.3	88.0 89.4 86.0
79.9 80.0	79.3 79.5	8. 1 80.1	80.1 79.6	79.9 79.5	[illegible] [illegible]	[illegible].5 81.3	79.8 79.3	79.0 79.0	79.0 79.3	79.9 79.3	79.9 79.2	78.8 78.7	78.9 78.8	79.5 79.0	79.3 79.0	78.3 78.4	78.9 78.7	79.0 79.0
79.8 79.9	80.5 79.8	81.5 80.6	80.[illegible] 80.4	80.0 79.5	80.2 80.[illegible]	81.3 81.3	81.2 80.3	80.2 79.5	80.2 80.1	80.7 81.2	80.7 81.1	79.5 80.1	80.0 80.3	80.7 80.7	80.2 80.8	79.8 80.0	80.0 80.2	80.8 81.2
87.2 88.5 90.2	88.8 93.1 94.3	89.3 92.2 95.2	89.6 89.6 92.9	87.6 89.0 90.7	88.0 91.4 94.[illegible]	89.2 92.1 94.0	89.5 89.5 93.6	87.3 89.8 90.[illegible]	88.6 92.5 94.0	89.4 90.3 [illegible].[illegible]	89.2 89.2 93.0	87.7 87.7 89.5	88.9 93.2 [illegible].5	89.4 90.2 95.0	89.7 90.0 92.2	84.6 88.6 90.0	88.4 91.2 93.7	89.5 90.3 95.0
91.5	93.5	91.5	88.5	92.0	93.0	93.8	90.8	[illegible].[illegible]	92.5	92.7	89.6	89.5	93.2	90.3	89.5	89.0	91.0	90.3
[illegible].[illegible]	85.5	88.0	86.2	85.0	85.[illegible]	88.6	87.1	85.9	85.5	88.2	87.6	86.0	85.1	88.6	86.7	85.8	85.6	86.5
59.5 58.9 58.0	63.6 63.6 63.2	65.0 65.0 65.0	59.5 58.5 58.5	56.0 53.7 53.6	53.7 53.6 53.6	52.8 52.8 52.7	47.3 47.2 46.8	44.3 43.9 43.8	43.5 43.5 42.8	43.8 43.6 42.9	44.6 44.1 43.4	43.7 43.5 43.0	42.2 42.6 41.8	47.5 47.5 47.5	42.5 41.9 41.0	37.3 35.6 35.0	42.8 42.8 41.0	55.3 56.6 56.[illegible]

C

Table X-B. VARIATION OF TEMPERATURES IN SOIL SURROUNDING SHELTER*

21 x 7 x 7 ft. shelter; 15 occupants; 7 cfm/occupant

SOIL TEMPERATURES	T.C. No.	Time From Start of Test, Hrs. → Days → 0	24 1	48 2	72 3	96 4	120 5	144 6	168 7	192 8	216 9	240 10	264 11	288 12	312 13
SHELTER C-C															
Outside Wall															
Diagonally Up	6-10	66.4	76.5	79.2	80.5	81.2	81.3	81.4	81.7	81.8	81.3	81.5	81.5	81.3	81.5
	6-11	65.2	68.0	70.9	71.2	71.5	73.6	73.7	73.6	72.9	73.0	72.0	71.6	72.0	71.2
	6-12	64.8	67.0	67.8	68.2	68.7	69.8	70.4	70.5	69.2	68.4	68.2	67.0	67.2	66.5
	7-1	62.9	63.3	65.2	65.2	65.6	65.4	65.4	66.4	65.0	64.7	63.3	63.3	62.2	61.9
	7-2	61.3	61.1	61.0	61.0	64.1	62.4	63.2	62.5	58.5	55.8	58.6	56.3	53.6	52.0
	7-3	53.3	54.7	56.3	57.4	64.1	57.3	61.4	53.5	48.8	45.5	54.0	46.0	45.0	42.1
Horizontal 6 ft elev	7-4	67.3	76.5	79.1	80.4	80.8	81.0	81.3	81.8	81.6	81.8	81.9	81.4	81.3	81.5
	7-5	67.3	72.2	75.1	75.8	76.1	77.0	78.0	78.0	76.8	77.5	77.0	77.4	76.3	76.5
	7-6	67.3	69.2	71.3	72.0	72.6	72.8	74.1	74.5	73.7	73.8	73.7	73.3	73.2	73.1
	7-7	67.3	68.0	68.7	68.6	69.6	69.6	70.0	70.2	69.9	70.4	69.7	70.0	69.9	69.0
	7-8	67.3	66.7	67.9	67.3	67.5	66.9	67.6	68.0	67.3	67.4	66.9	66.5	65.1	65.5
	7-9	65.2	66.7	67.0	66.3	65.9	66.2	66.8	66.3	65.6	65.3	65.0	64.4	64.1	63.8
3-1/2 ft elev	7-10	65.2	78.0	81.0	82.2	82.4	83.0	83.2	83.2	83.6	83.5	83.4	83.5	83.4	83.8
	7-11	66.2	73.5	76.7	77.2	77.9	78.8	78.7	78.8	79.0	78.5	79.2	79.7	78.7	79.4
	7-12	66.9	70.0	72.4	73.1	73.8	74.9	75.8	76.2	75.4	76.0	75.8	76.0	75.8	75.9
	8-1	66.8	67.0	68.2	69.3	70.3	70.5	70.4	70.4	70.5	69.5	70.6	70.9	70.1	70.2
	8-2	67.0	67.1	67.7	68.1	68.8	68.7	69.2	69.0	68.7	68.4	68.5	68.7	68.7	68.9
	8-3	67.0	67.1	67.2	67.3	67.5	67.0	67.6	66.7	66.5	66.3	66.5	66.2	65.9	
1 ft elev	8-4	67.4	76.0	80.2	80.5	82.0	82.0	81.8	83.0	83.2	83.2	83.2	83.2	83.1	83.1
	8-5	67.8	73.0	75.5	76.9	77.8	77.9	78.0	78.2	78.1	78.4	78.7	78.4	78.0	78.0
	8-6	67.9	69.4	72.0	72.9	74.3	74.0	75.0	74.9	74.5	75.0	75.3	75.2	75.0	75.3
	8-7	65.8	68.8	69.5	69.8	70.2	71.2	71.8	71.4	71.0	71.6	71.9	71.7	72.4	72.0
	8-8	65.8	68.3	68.6	68.5	68.8	69.5	69.0	69.1	69.0	68.9	69.0	69.1	69.0	69.4
	8-9	65.8	68.0	68.6	67.7	67.5	67.7	67.1	67.6	67.3	67.4	66.9	67.3	66.8	66.9

* For detailed description of thermocouple locations see Section IV-A.

Table X-B. VARIATION OF TEMPERATURES IN SOIL SURROUNDING SHELTER*
21 x 7 x 7 ft. shelter; 15 occupants; 7 cfm/occupant

SOIL TEMPERATURES	T.C. No.	Time From Start of Test, Hrs → / Days → 0	24 1	48 2	72 3	96 4	120 5	144 6	168 7	192 8	216 9	240 10	264 11	288 12	312 13
SECTION C-C															
Outside Wall															
Diagonally Down	8-10	65.8	76.2	80.0	81.0	82.0	82.0	82.0	82.5	83.6	83.5	83.4	83.5	83.4	83.5
	8-11	65.6	69.0	71.6	72.0	73.5	73.9	74.7	74.8	73.9	74.6	74.5	75.2	74.6	75.2
	8-12	65.5	68.0	68.4	69.5	70.5	71.0	71.0	71.7	71.6	71.6	71.9	72.5	72.2	72.0
	9-1	66.7	67.1	66.5	67.0	67.5	67.3	67.6	67.0	66.5	67.4	67.6	67.4	68.2	67.9
	9-2	65.9	66.7	66.5	66.4	66.7	56.3	67.2	66.5	66.5	66.4	66.3	66.5	66.3	66.5
	9-3	65.4	65.1	66.5	66.0	66.3	66.0	66.3	66.3	65.6	65.5	65.3	65.3	65.2	65.1
Above Roof															
10-1/2 ft from wall	9-4	64.5	79.0	83.2	83.3	84.4	84.4	84.4	84.3	84.4	84.4	84.2	84.2	84.1	84.2
	9-5	63.1	73.5	78.1	79.3	80.3	81.3	81.4	81.0	79.1	79.4	78.8	79.0	78.1	77.5
	9-6	62.2	71.0	75.0	76.3	78.0	78.2	78.6	78.3	76.3	75.0	74.7	74.6	73.5	73.0
	9-7	60.5	68.0	71.7	73.3	75.4	74.3	75.0	74.0	71.0	70.0	70.6	69.8	67.6	66.7
	9-8	58.7	66.2	69.0	70.3	73.5	70.0	72.0	69.3	66.2	63.7	66.9	64.4	62.4	61.9
	9-9	56.3	66.2	68.6	69.4	73.5	66.6	69.3	65.4	62.0	59.5	64.2	60.0	58.7	56.2
3 ft from wall	9-10	65.9	78.2	81.5	81.8	81.8	82.0	82.5	83.9	83.6	83.7	83.4	83.5	83.0	83.6
	9-11	65.6	72.5	74.7	75.5	77.4	78.5	79.0	78.6	78.3	76.4	76.6	77.2	76.3	75.9
	9-12	65.4	67.5	70.0	71.2	73.1	73.8	74.3	75.0	73.2	72.9	72.1	72.1	70.4	70.1
	10-1	63.0	63.1	65.2	65.2	69.8	69.8	70.0	69.0	68.0	66.4	67.0	66.3	64.1	63.3
	10-2	61.3	60.2	61.4	62.8	67.5	65.3	67.3	65.4	61.5	58.4	63.0	59.8	57.4	54.9
	10-3	55.9	57.5	59.2	60.9	66.7	63.2	66.3	61.3	56.5	53.3	59.5	54.6	53.5	53.8
1 ft from wall	10-4	65.5	77.5	80.5	81.0	81.2	82.5	82.5	82.6	82.1	82.3	82.1	82.3	82.2	82.2
	10-5	65.6	71.0	73.0	73.8	75.2	75.7	76.5	76.0	76.0	74.6	74.4	74.3	73.5	73.2
	10-6	65.1	67.5	69.5	70.2	71.8	73.0	73.2	73.8	71.8	70.7	70.6	70.8	69.3	68.8
	10-7	63.4	64.0	63.6	66.0	69.2	69.2	70.3	69.0	66.7	65.1	66.0	64.4	62.5	62.0
	10-8	61.0	60.2	61.4	62.4	65.3	64.4	66.8	65.0	60.8	57.9	61.8	59.2	56.2	54.0
	10-9	58.0	57.5	58.6	60.4	65.2	61.5	64.2	60.5	54.3	51.1	58.1	51.6	49.8	48.0

* For detailed description of thermocouple locations see Section IV-A.

Table X-B. VARIATION OF TEMPERATURES IN SOIL SURROUNDING SHELTER*

21 x 7 x 7 ft. shelter; 15 occupants; 7 cfm/occupant

SOIL TEMPERATURES	T.C. No.	Time From Start of Test, Hrs. → / Days → 0	24 1	48 2	72 3	96 4	120 5	144 6	168 7	192 8	216 9	240 10	264 11	288 12	312 13
SECTION C-C															
Below Floor	10-10	66.6	82.0	85.2	85.5	86.0	86.0	86.0	86.8	87.4	87.0	86.9	87.0	86.9	87.2
10-1/2 ft from wall	10-11	65.6	69.6	73.5	74.7	76.2	76.4	77.8	77.9	77.8	77.5	77.9	78.1	77.9	78.0
	10-12	65.5	68.8	71.3	72.9	74.4	74.7	75.8	76.5	76.0	76.2	76.5	76.6	76.5	76.5
	11-1	62.8	65.4	68.7	68.2	70.0	71.5	71.4	72.0	71.5	71.6	72.4	72.6	72.4	72.9
	11-2	63.2	65.5	67.3	67.3	68.3	69.2	69.8	70.2	69.9	70.4	70.6	70.9	70.9	70.3
	11-3	63.4	65.2	65.9	65.3	66.2	66.3	67.2	67.7	67.3	67.4	67.5	67.8	60.0	68.3
	11-4	63.0	65.0	65.3	6[illegible].0	65.3	66.2	66.4	67.3	66.6	66.5	66.3	67.4	67.2	67.1
	11-5	62.2	63.0	63.4	62.8	65.0	63.8	63.7	64.0	64.9	63.1	64.2	65.5	63.3	63.8
	11-6	62.7	62.0	63.2	62.2	64.2	63.6	62.9	63.0	63.2	62.1	63.7	63.9	62.2	62.2
3 ft from wall	11-7	65.6	83.4	86.5	87.4	88.0	88.2	88.1	88.5	89.0	89.0	88.9	89.1	88.9	89.2
	11-8	65.6	69.8	73.3	74.1	75.8	76.1	77.0	77.9	77.3	77.5	77.8	78.0	77.7	78.1
	11-9	65.6	68.3	71.3	72.8	74.0	73.8	75.3	75.7	75.2	75.9	75.9	76.3	75.9	76.2
	11-10	65.6	67.0	68.7	69.5	70.5	71.0	72.1	72.4	72.4	72.5	72.8	73.4	73.2	73.3
	11-11	64.0	66.7	67.8	67.4	68.5	69.3	69.8	70.2	69.5	69.3	70.2	70.4	70.8	71.0
	11-12	63.1	65.8	66.5	66.0	66.5	66.6	67.5	66.8	67.3	66.4	67.5	67.7	67.6	68.0
	12-1	62.2	65.2	64.0	65.2	63.9	64.2	65.2	66.8	64.2	66.4	65.0	65.3	66.8	66.9
	12-2	63.4	64.5	63.7	64.8	65.0	64.5	65.4	65.4	64.6	64.8	65.9	65.3	64.7	64.8
	12-3	63.2	64.0	64.4	64.3	64.2	64.2	64.6	64.6	63.7	63.9	64.1	63.9	63.9	63.8
1 ft from wall	12-4	66.0	80.0	83.2	83.6	84.2	84.7	84.6	85.1	85.4	85.7	85.5	85.8	85.2	85.8
	12-5	67.3	70.0	73.2	73.8	75.0	75.2	76.0	76.3	76.0	76.3	76.5	76.3	76.2	76.5
	12-6	67.0	68.8	70.4	71.5	72.3	72.7	74.0	74.5	73.7	74.2	74.0	74.3	74.3	74.7
	12-7	66.3	67.0	67.9	68.6	69.7	69.7	70.4	71.0	70.2	70.7	71.0	71.2	71.0	71.4
	12-8	65.8	66.2	67.0	67.2	67.6	67.6	67.6	69.0	68.3	68.4	68.4	69.1	69.0	69.0
	12-9	63.5	66.1	66.5	66.3	66.7	66.6	66.7	67.7	66.7	67.4	66.4	67.4	67.6	67.8

* For detailed description of thermocouple locations see Section IV-A.

Table X-B. VARIATION OF TEMPERATURES IN SOIL SURROUNDING SHELTER*
21 x 7 x 7 ft. shelter; 15 occupants; 7 cfm/occupant

SOIL TEMPERATURES	T.C. No.	Time From Start of Test, Hrs. → Days → 0	24 1	48 2	72 3	96 4	120 5	144 6	168 7	192 8	216 9	240 10	264 11	288 12	312 13
SECTION D-D															
Outside Corner															
Diagonally Up	12-10	64.8	75.2	76.7	77.5	78.3	78.5	80.0	80.4	79.6	79.3	79.1	79.0	78.9	78.9
	12-11	66.5	67.5	68.0	68.2	69.0	69.3	70.6	70.8	69.3	69.5	68.5	68.6	67.7	67.9
	12-12	64.9	64.9	64.9	64.0	65.0	65.4	65.5	66.8	65.0	63.9	63.4	63.5	62.5	61.7
	13-1	65.1	64.8	63.0	64.3	63.0	63.3	63.7	65.1	61.6	62.0	60.0	59.8	60.0	58.8
	13-2	63.1	62.3	62.2	61.7	62.1	62.7	63.2	62.9	59.8	57.3	58.2	57.4	54.5	53.0
	13-3	55.0	54.9	56.0	57.4	62.0	57.2	60.3	55.3	50.0	46.3	54.4	47.9	46.0	42.5
Horizontal 6 ft elev	13-4	67.8	75.5	77.1	78.0	78.3	78.7	78.8	79.4	79.4	79.3	79.1	79.3	78.8	78.7
	13-5	67.4	68.0	70.0	69.7	70.5	70.5	72.0	71.9	71.0	71.2	71.0	71.2	70.0	70.2
	13-6	67.3	68.0	68.7	68.5	69.2	69.2	69.6	69.8	69.2	69.0	68.3	68.6	68.3	68.1
	13-7	65.9	68.0	68.6	67.3	67.5	67.6	67.7	68.0	67.0	67.3	66.5	66.4	66.4	65.9
3-1/2 ft elev	13-8	65.9	75.3	78.9	79.7										
	13-9	65.9	68.0	70.0	70.6	71.8	72.6	73.4	72.3	72.6	73.4	73.1	72.9	73.5	73.4
	13-10	67.0	68.0	69.5	69.4	69.6	70.0	70.5	71.0	70.0	70.7	70.6	70.4	70.4	70.5
	13-11	67.0	68.0	69.1	68.6	68.5	68.7	69.0	69.0	68.0	68.1	68.0	68.0	68.0	67.9
	13-12	67.0	68.0	68.7	67.3	67.5	66.9	67.5	67.6	66.6	66.3	66.3	66.4	65.5	65.6
	14-1	66.0	65.9	67.0	65.1	66.7	64.5	64.9	64.7	65.4	63.0	64.6	64.0	62.7	62.0
1 ft elev	14-2	66.4	74.8	77.1	78.1	78.5	79.5	79.9	80.0	80.7	80.5	80.2	80.2	80.0	80.0
	14-3	67.0	68.0	70.0	69.8	71.0	71.0	72.2	72.0	71.7	71.6	71.9	72.5	71.6	71.5
	14-4	67.3	68.0	69.1	69.0	69.3	69.2	69.7	70.2	69.5	70.0	70.0	70.0	70.0	69.9
	14-5	65.6	68.0	68.7	68.5	68.4	68.8	69.1	69.0	68.0	68.1	68.3	68.2	68.2	68.3
Diagonally Down	14-6	65.3	74.0	76.1	77.5	78.0	78.8	79.2	79.7	80.0	79.7	80.0	80.1	80.3	80.2
	14-7	65.9	68.0	68.8	69.0	70.2	70.5	71.5	71.1	70.5	70.7	71.0	71.6	71.8	71.8
	14-8	65.9	67.9	68.6	68.1	67.4	68.8	69.2	69.8	69.1	69.0	69.0	69.0	69.0	69.3
	14-9	65.6	67.1	67.9	67.3	67.4	67.0	67.6	68.0	67.3	67.3	66.9	67.3	67.2	67.3
	14-10	65.5	66.6	67.0	66.8	66.6	66.3	66.8	67.3	66.0	66.0	65.9	65.5	65.5	65.4
	14-11	64.5	66.2	66.5	66.0	65.5	65.9	66.4	65.8	65.3	64.8	65.0	64.8	63.8	63.9

* For detailed description of thermocouple locations see Section IV-A.

Table XI-A. VARIATION OF TEMPERATURES INSIDE SHELTER*

21 x 7 x 7 ft. shelter; 15 occupants;
15 cfm/occupant

	T.C. No.	Time From Start of Test, Hrs. → / Days →																				
		0	6	12	18	24	30	36	42	48	54	60	66	72	78	84	90	96	102	66
		0				1				2				3				4		
AIR TEMPERATURES																				
SUPPLY DUCT																				
DB	15-10	63.9	89.3			77.9	91.2			82.5	92.3	81.8	72.7	80.9	93.5	81.8	72.7	82.0	93.[illegible]	72
WB	15-9	61.3	76.1			89.7	78.4			76.2	77.8	75.9	72.6	74.7	77.9	75.6	72.8	75.1	80.[illegible]	72
RETURN DUCT																				
DB	16-2	63.9	80.2			82.4	82.9			82.0	84.4	82.7	80.2	82.0	86.3	84.2	81.3	83.0	87.[illegible]	80
WB	16-1	62.7	74.8			78.3	78.9			78.3	78.9	78.3	75.3	77.0	78.5	79.1	74.9	77.0	81.[illegible]	75
SHELTER AIR																				
Center																				
6 ft elev																				
DB	15-12	61.8	80.3			84.4	83.3			84.2	85.6	84.2	75.3	84.3	85.3	84.6	75.8	84.9	87.[illegible]	75
WB	15-11	63.1	75.0			77.9	78.9			77.6	79.3	77.7	73.1	76.0	78.1	78.0	72.7	76.8	81.[illegible]	73
3-1/2 ft elev																				
DB	15-4	63.9	81.1			84.0	84.2			83.9	85.8	83.6	78.5	84.4	87.3	84.9	78.9	84.4	88.[illegible]	78
WB	15-3	61.3	74.1			78.0	78.5			77.6	78.8	78.2	75.2	77.3	77.9	78.0	75.3	77.4	80.[illegible]	75
1 ft elev																				
DB	15-2	66.8	72.2			82.0	82.2			81.9	84.7	82.[illegible]	78.3	82.0	86.4	84.2	78.9	83.1	86.[illegible]	78
WB	15-1	63.6	68.9			75.0	75.2			75.1	75.9	75.2	72.9	74.5	76.1	76.3	72.8	74.6	78.[illegible]	72
Near wall																				
3-1/2 ft elev																				
DB	15-6	65.2	80.0			82.9	83.5			82.9	85.3	83.8	79.6	82.9	86.6	85.4	80.3	83.4	87.[illegible]	79
WB	15-5	64.7	79.8			82.8	83.3			82.8	84.9	83.6	78.8	82.3	86.4	84.9	79.6	83.2	87.[illegible]	78
In corner																				
3-1/2 ft elev																				
DB	15-8	64.7	79.2			82.8	82.1			82.8	84.0	81.4	78.8	81.6	85.9	83.1	79.5	82.2	86.[illegible]	78
WB	15-7	62.6	76.7			77.9	78.9			78.1	78.8	78.9	76.9	76.9	78.7	78.6	76.8	77.4	80.[illegible]	76
INSIDE SURFACE TEMPS																				
SECTION C-C																				
Wall																				
	6-10	63.8	67.2			73.6	74.0			75.0	76.8	76.4	74.6	75.3	78.5	77.6	75.4	76.0	80.[illegible]	74
	7-4	63.3	68.4			73.1	73.3			75.2	76.3	76.8	75.0	75.3	78.2	77.3	76.0	76.0	79.[illegible]	75
	7-10	63.3	71.6			75.0	75.5			76.1	78.0	78.8	75.7	76.4	79.8	79.3	77.0	77.6	81.[illegible]	75
	8-4	64.9	68.4			75.0	75.7			76.9	78.6	78.3	76.4	77.4	80.7	79.8	77.9	78.2	81.[illegible]	76
	8-10	63.3	69.1			74.3	73.6			75.7	76.7	77.2	75.6	76.9	78.9	78.5	76.9	77.5	80.[illegible]	75
Ceiling																				
	9-4	63.8	71.2			78.3	79.4			78.5	81.6	80.3	76.5	79.3	83.2	81.4	77.3	79.7	84.[illegible]	76
	9-10	63.4	68.8			75.7	76.0			76.7	78.6	78.0	75.7	76.9	80.3	79.3	76.9	77.8	81.[illegible]	75
	10-4	63.4	70.3			75.8	76.2			76.9	78.8	78.2	76.5	76.9	79.9	79.3	76.9	77.8	81.[illegible]	76
Floor																				
	10-10	64.6	68.4			79.6	78.7			80.3	82.3	81.9	80.0	81.4	84.6	84.0	81.0	82.0	85.[illegible]	80
	11-7	65.2	70.0			81.1	81.9			82.9	84.7	84.2	83.1	83.2	86.7	85.9	84.0	84.8	88.[illegible]	83
	12-4	65.2	68.6			78.1	78.5			79.8	81.3	80.9	79.8	79.9	83.1	82.[illegible]	80.8	81.1	84.[illegible]	79
SECTION D-D																				
	12-10	62.5	65.8			71.3	71.7			72.4	73.6	73.6	72.4	72.6	75.0	74.8	73.4	74.4	76.[illegible]	72
	13-4	64.0	61.0			71.2	71.0			72.6	73.9	73.8	72.8	72.7	75.3	74.8	73.4	74.1	76.[illegible]	72
	13-8	62.7								71.2	72.8	73.4	71.9	72.0	74.8	75.3	73.2	73.3	77.[illegible]	71
	14-2	65.5	63.7			73.0	73.0			74.1	75.8	75.2	73.8	74.3	77.9	76.5	74.9	75.4	78.[illegible]	73
	14-6	64.8	68.3			72.9	72.7			74.0	74.9	75.1	73.8	74.4	76.9	76.4	74.9	75.4	78.[illegible]	73
SINOC SKIN TEMPS																				
Center - Top	18-7	65.1	85.3			85.4	86.2			85.0	85.4	85.0	82.8	83.9	89.0	85.4	83.9	85.3	89.[illegible]	82
Middle	18-8	65.1	89.7			90.2	89.9			89.1	90.3	88.6	87.0	88.8	92.9	91.3	88.4	90.8	91.[illegible]	87
Bottom	18-9	65.1	89.8			90.3	90.1			89.5	90.6	88.8	87.3	89.1	93.3	91.5	88.5	91.0	92.[illegible]	87
Near Wall - Middle	18-10	66.6	90.0			91.6	91.8			92.2	89.1	90.9	87.4	89.1	93.5	91.5	90.0	91.0	92.[illegible]	87
In Corner - Middle	18-11	65.9	87.9			86.6	87.3			85.8	93.9	86.1	84.3	85.0	92.7	87.1	90.3	90.8	90.[illegible]	84
OUTSIDE AIR TEMPS																				
	19-5	61.6	69.3			57.0	56.8			51.5	56.9	50.9	51.7	52.9	57.5	56.1	50.5	55.3	62.[illegible]	51
	19-6	63.2	70.0			57.0	56.1			51.1	56.4	49.9	51.1	52.3	57.2	55.3	49.7	55.2	62.[illegible]	51
	19-7	63.0	70.0			55.4	55.1			49.6	55.1	49.6	50.6	52.2	57.2	55.2	49.6	54.4	61.[illegible]	50

*For detailed description of thermocouple locations see Sec. IV-A and

IDE SHELTER*

ccupants:

66	72 3	78	84	90	96 4	102	108	114	120 5	126	132	138	144 6	150	156	162	168 7	174	180	186	192 8
72.7	80.9	93.5	81.8	72.7	82.0	93.6	83.2	75.3	86.0	95.4	84.9	74.9	85.9	94.5				96.6	85.9	74.9	85.4
72.6	74.7	77.9	75.6	72.8	75.1	80.0	77.7	75.2	78.2	81.3	77.4	73.2	78.6	81.0				77.8	74.3	72.9	75.3
80.2	82.0	86.3	84.2	81.3	83.0	87.1	85.3	82.9	86.8	89.1	86.1	84.0	87.1	88.5				88.4	86.3	83.3	86.4
75.3	77.0	78.5	79.1	74.9	77.0	81.6	81.6	79.4	80.9	83.0	81.9	78.2	81.0	82.8				79.8	81.4	79.4	78.9
75.3	84.3	85.3	84.6	75.8	84.9	87.9	84.8	77.8	84.8	90.0	84.9	78.9	85.0	90.7				90.5	85.0	79.4	85.2
73.1	76.0	78.1	78.0	72.7	76.8	81.3	80.2	75.5	80.2	82.9	80.9	75.6	80.8	82.5				79.1	80.9	75.2	77.9
78.3	84.4	87.3	84.9	78.9	84.4	88.2	86.0	81.2	87.4	90.3	86.9	82.1	87.7	89.4				90.1	87.2	82.7	87.8
75.2	77.3	77.9	78.0	75.3	77.4	80.9	80.6	78.2	80.1	82.4	81.2	78.7	80.1	82.1				82.3	81.4	79.0	80.0
78.3	82.0	86.4	84.2	78.9	83.1	86.9	85.1	80.8	86.8	87.8	86.2	82.7	87.6	88.7				88.6	86.3	82.5	87.8
72.9	74.5	76.1	76.3	72.8	74.6	78.2	77.9	75.3	78.1	79.9	78.1	76.0	78.6	79.7				80.3	80.3	76.7	79.2
79.6	82.9	86.6	85.4	80.3	83.4	87.7	86.8	82.4	87.1	90.0	87.1	83.1	87.5	88.8				87.9	86.3	82.4	86.2
78.8	82.3	86.4	84.9	79.6	83.2	87.6	86.2	81.5	87.0	89.4	86.9	82.7	87.4	88.7				87.5	86.3	82.0	85.8
78.8	81.0	85.9	83.1	79.5	82.2	86.6	84.0	81.4	86.1	88.7	84.9	81.8	86.5	88.9				88.4	85.4	81.6	85.8
76.9	76.9	78.7	78.6	76.8	77.4	80.8	80.6	79.3	80.9	82.6	81.3	80.2	81.1	82.6				80.4	80.1	78.8	78.4
74.6	75.3	78.5	77.6	75.4	76.0	80.6	79.3	77.8	79.0	81.2	81.5	79.6	80.5	81.9				83.6	83.8	81.8	82.8
75.0	75.3	78.2	77.3	76.0	76.0	79.3	79.8	78.0	79.0	81.0	80.7	79.4	80.4	81.1				82.4	82.8	80.9	81.7
75.7	76.4	79.8	79.3	77.0	77.6	81.4	81.2	79.7	80.6	83.0	82.3	80.4	81.8	83.2				85.0	85.7	83.0	84.1
76.4	77.4	80.7	79.8	77.9	78.2	81.8	81.7	80.3	80.2	84.0	83.1	81.5	81.7	84.0				84.9	84.9	83.0	83.9
75.6	75.9	78.9	78.5	76.9	77.5	80.2	80.6	79.7	80.3	82.2	81.5	80.0	81.4	83.0				84.9	85.0	83.1	84.2
76.5	79.3	83.2	81.4	77.3	79.7	84.7	83.3	79.8	80.7	86.1	85.2	81.6	82.2	85.8				86.8	86.0	82.5	84.1
75.7	76.9	80.3	79.3	76.9	77.8	81.5	80.6	78.9	80.2	83.0	81.8	79.4	81.8	83.3				85.2	84.9	81.4	83.9
76.5	76.9	79.9	79.3	76.9	77.8	81.5	81.2	79.8	80.6	83.1	81.9	79.5	81.9	82.5				84.0	84.0	81.2	82.9
80.0	81.4	84.6	84.0	81.0	82.0	85.7	85.4	83.4	84.2	87.5	86.9	84.5	86.6	87.9				90.0	89.6	87.2	88.6
83.1	83.2	86.7	85.9	84.0	84.8	88.4	88.1	86.7	86.4	90.3	88.4	87.8	89.3	89.9				91.1	90.6	88.9	90.3
79.8	79.9	83.1	82.5	80.8	81.1	84.6	84.5	83.1	82.8	86.4	86.7	84.1	85.6	86.0				87.4	87.1	85.3	86.5
72.4	72.6	75.0	74.8	73.4	74.4	76.8	77.1	76.0	75.3	78.0	78.4	76.9	77.7	78.3				80.3	81.0	79.2	79.6
72.8	72.7	75.3	74.8	73.4	74.1	76.4	77.2	76.0	75.3	78.8	78.0	76.6	78.4	78.8				80.1	80.3	78.7	79.6
71.9	72.0	74.8	75.3	73.2	73.3	77.2	77.2	76.0	75.8	78.8	78.8	76.6	78.5	79.1				81.0	81.2	79.0	80.0
73.8	74.3	77.9	76.5	74.9	75.4	78.8	78.5	77.8	76.1	80.4	79.9	78.4	79.9	80.4				82.0	81.6	80.3	80.9
73.8	74.4	76.9	76.4	74.3	73.4	78.5	78.5	77.8	77.0	80.0	79.4	78.3	79.9	80.0				81.3	81.6	80.2	80.4
82.8	83.9	89.0	85.4	82.9	85.3	89.8	86.3	84.2	89.3	89.6	88.9	87.3	89.8	91.1				89.9	88.0	86.3	88.6
87.0	88.8	92.9	91.3	88.6	90.8	91.7	88.8	89.4	93.1	93.1	90.3	91.9	93.4	93.6				92.5	89.1	91.2	93.3
87.3	89.1	93.3	91.5	88.5	91.0	92.2	90.1	89.7	93.3	95.0	91.9	92.0	93.5	94.0				93.5	91.9	91.3	93.4
87.4	89.1	93.5	91.5	90.0	91.0	92.4	90.2	89.8	93.3	93.2	92.1	92.1	93.8	93.0				93.6	92.0	91.9	93.4
84.3	85.0	92.7	87.1	90.3	90.8	90.6	85.0	84.9	94.3	88.0	90.3	93.2	93.4	88.1							
51.7	52.9	57.5	56.1	50.5	55.3	62.7	53.8	51.1	59.4	67.8	60.2	54.4	57.6	63.2				71.1	53.3	59.9	62.3
51.1	52.3	57.2	55.3	49.7	55.2	62.3	52.9	50.3	59.3	68.0	59.4	53.9	57.5	62.8				71.1	53.3	59.9	62.5
50.6	52.2	57.2	55.2	49.6	54.4	61.4	52.3	50.3	58.5	68.1	59.1	51.9	56.5	62.2				71.1	53.2	59.9	62.5

ocations see Sec. IV-A and B.

114	120 5	126	132	138	144 6	150	156	162	168 7	174	180	186	192 8	198	204	210	216 9	222	228
75.3	85.0	95.4	84.9	74.9	85.9	94.5				96.6	85.9	74.9	85.4	94.4	85.9	74.8	86.0	97.3	84.1
75.2	78.2	81.3	77.4	73.3	78.6	81.0				77.8	74.3	72.9	75.3	77.2	75.1	72.1	74.7	76.9	74.3
82.9	86.8	89.1	86.1	84.0	87.1	88.5				88.4	86.3	83.3	86.4	88.4	86.3	85.4	87.2	87.4	86.0
79.4	80.9	83.0	81.9	78.2	81.0	82.8				79.8	81.4	79.4	78.9	79.8	81.1	79.1	78.6	78.4	81.0
77.8	84.8	90.0	84.9	78.9	85.0	90.7				90.5	85.0	79.4	85.2	90.0	85.2	80.2	85.4	91.7	86.3
75.5	80.2	82.9	80.9	75.6	80.8	82.5				79.1	80.9	75.2	77.9	78.5	80.8	75.0	77.4	79.5	80.2
81.2	87.4	90.3	86.9	82.1	87.7	89.4				90.1	87.2	82.7	87.8	89.8	86.8	82.9	88.3	89.9	86.8
78.2	80.1	82.4	81.2	78.7	80.1	82.1				82.3	81.4	79.0	80.0	82.4	81.1	79.0	80.3	82.7	81.5
80.8	86.8	87.8	86.2	82.7	87.6	88.7				88.8	86.3	82.5	87.8	88.8	86.3	82.3	88.0	89.0	85.4
75.3	78.1	79.9	78.1	76.0	78.6	79.7				80.0	80.3	76.7	79.2	80.0	80.9	76.7	79.4	80.7	80.1
82.4	87.1	90.0	87.1	83.1	87.5	88.8				87.9	86.3	82.4	86.2	87.9	86.5	83.3	86.3	87.9	86.3
81.5	87.0	89.4	86.9	82.7	87.4	88.7				87.5	86.3	82.0	85.8	87.4	86.3	82.4	86.2	87.2	86.3
81.4	86.1	88.7	84.9	81.8	86.5	88.9				88.4	85.4	81.6	85.8	88.3	85.3	83.3	86.6	89.0	85.9
79.3	80.9	82.6	81.3	80.2	81.1	82.6				80.4	80.1	78.8	78.4	79.8	79.7	78.0	78.1	79.4	79.2
77.8	79.0	81.2	81.5	79.6	80.5	81.9				83.6	83.8	81.8	82.8	84.1	84.1	82.3	83.8	84.7	83.7
78.0	79.0	81.0	80.7	79.4	80.4	81.1				82.4	82.8	80.9	81.7	83.0	82.8	81.3	82.7	83.1	82.0
79.7	80.6	83.0	82.3	80.4	81.8	83.2				85.0	85.7	83.0	84.1	85.6	85.6	83.5	84.0	85.0	85.2
80.3	80.2	84.0	83.1	81.5	81.7	84.0				84.9	84.9	83.0	83.9	85.4	85.1	83.6	84.0	85.7	84.1
79.7	80.3	82.2	81.5	80.0	81.4	83.0				84.9	85.0	83.1	84.2	85.5	85.1	83.3	84.0	84.9	83.8
79.8	80.7	86.1	85.2	81.6	82.2	85.8				86.8	86.0	82.5	84.1	86.7	86.0	82.7	84.0	87.6	86.1
78.9	80.2	83.0	81.8	79.4	81.8	83.3				85.2	84.9	81.4	83.9	85.5	84.7	82.3	84.0	86.0	84.0
79.8	80.6	83.1	81.9	79.5	81.9	82.5				84.0	84.0	81.2	82.9	84.2	83.9	81.8	83.9	83.4	83.7
83.4	84.2	87.5	86.9	84.5	86.6	87.9				90.0	89.6	87.2	88.6	90.2	89.6	87.6	89.6	90.2	87.6
86.7	86.4	90.3	88.4	87.8	89.3	89.9				91.1	90.6	88.9	90.3	91.3	90.0	89.3	91.0	91.8	89.9
83.1	82.8	86.4	86.7	84.1	85.6	86.0				87.4	87.1	85.3	86.5	87.4	87.2	85.9	87.4	87.9	86.1
76.0	75.3	78.0	78.4	76.9	77.7	78.3				80.3	81.0	79.2	79.6	80.4	81.2	79.6	80.5	80.0	80.4
76.0	75.3	78.8	78.0	76.6	78.4	78.8				80.1	80.3	78.7	79.6	80.0	80.3	79.0	80.2	81.3	79.6
76.0	75.8	78.8	78.8	76.6	78.5	79.1				81.0	81.2	79.0	80.0	80.9	81.6	79.9	80.8	80.5	80.6
77.8	76.1	80.4	79.9	78.4	79.9	80.4				82.0	81.6	80.3	80.9	81.6	80.0	80.3	81.3	82.5	80.5
77.8	77.0	80.0	79.4	78.3	79.9	80.0				81.3	81.6	80.2	80.4	81.4	81.6	80.3	81.2	80.3	80.6
84.2	89.3	89.4	88.9	87.3	89.8	91.3				89.9	88.0	86.3	88.6	88.7	88.2	87.2	90.1	88.7	87.6
89.4	95.1	93.1	90.3	91.9	95.4	93.6				92.5	89.1	91.2	95.3	93.2	89.9	93.0	96.4	89.0	88.0
89.7	95.3	95.0	91.9	92.0	95.5	95.0				95.5	91.9	91.3	95.4	95.1	93.1	93.2	96.5	93.3	91.8
89.8	95.3	95.2	92.1	92.1	95.8	95.0				95.6	92.0	91.9	95.4	95.2	93.2	93.7	96.5	94.7	91.6
86.9	94.3	88.0	90.3	93.2	93.4	88.1													
51.1	59.4	67.8	60.2	54.4	57.6	63.2				71.1	53.3	59.9	62.3	67.0	56.9	48.5	52.0	58.0	47.8
50.3	59.3	68.0	59.4	53.9	57.5	62.8				71.1	53.3	59.9	62.5	67.0	56.8	48.4	51.8	58.4	47.8
50.3	58.5	68.1	59.1	51.9	56.5	62.2				71.1	53.2	59.9	62.5	66.8	56.7	48.2	51.2	58.0	47.0

C

Table XI-B. VARIATION OF TEMPERATURES IN SOIL SURROUNDING SHELTER*
21 x 7 x 7 ft shelter; 15 occupants; 15 cfm/occupant

SOIL TEMPERATURES	T.C. No.	Time From Start of Test, Hrs. → / Days → 0	24 1	48 2	72 3	96 4	120 5	144 6	168 7	192 8	216 9
SECTION C-C											
Outside Wall											
Diagonally Up	6-10	63.8	73.6	75.0	75.3	76.0	79.0	80.5		82.8	83.8
	6-11	63.6	66.3	68.3	67.7	68.1	70.4	70.5		70.6	70.5
	6-12	61.6	62.9	64.2	64.6	65.3	66.7	67.1		67.5	68.4
	7-1	60.4	59.9	61.9	60.5	60.5	62.4	63.6		63.8	64.5
	7-2	60.3	59.9	59.3	57.4	57.4	59.0	60.3		61.5	61.8
	7-3	58.2	59.0	53.3	53.6	53.4	54.8	55.5		57.0	58.0
Horizontal 6 ft elev	7-4	63.3	73.1	75.2	75.3	76.0	79.0	80.4		81.7	82.7
	7-5	65.4	69.3	71.8	71.6	72.3	73.3	73.7		74.0	75.1
	7-6	64.7	65.1	67.1	67.0	67.4	69.0	71.2		71.6	71.7
	7-7	64.6	63.2	63.2	63.3	63.8	64.9	65.2		66.7	67.8
	7-8	64.2	62.0	62.2	62.3	62.3	63.2	63.6		63.7	63.9
	7-9	61.9	61.4	61.3	61.4	61.2	62.8	63.0		63.6	63.6
3-1/2 ft elev	7-10	63.3	75.0	76.1	76.4	77.6	80.6	81.8		84.1	84.0
	7-11	65.9	68.9	74.2	74.7	75.3	76.5	77.0		77.5	77.8
	7-12	64.1	65.8	68.2	69.5	70.0	72.5	73.0		73.5	74.2
	8-1	64.0	62.5	64.6	65.0	65.6	66.4	67.4		68.2	68.3
	8-2	64.2	62.8	64.1	63.1	63.9	64.8	64.9		65.3	65.3
	8-3	64.1	62.4	62.7	61.7	62.4	63.1	63.1		63.4	63.9
1 ft elev	8-4	64.9	75.0	76.9	77.4	78.2	80.2	81.7		83.9	84.0
	8-5	67.1	70.5	73.8	73.8	74.2	75.4	76.2		76.4	77.2
	8-6	66.4	67.5	69.3	69.2	69.9	72.3	72.9		73.3	73.5
	8-7	66.2	66.2	66.9	66.9	67.0	68.4	68.7		68.9	69.1
	8-8	65.9	64.8	65.1	65.3	66.3	67.3	67.4		67.6	67.8
	8-9	65.4	63.9	64.1	64.3	64.4	64.7	65.0		65.4	65.6

* For detailed description of thermocouple locations see Section IV-A.

Table XI-B. VARIATION OF TEMPERATURES IN SOIL SURROUNDING SHELTER*

21 x 7 x 7 ft. shelter; 15 occupants; 15 cfm/occupant

SOIL TEMPERATURES	T.C. No.	Time From Start of Test, Hrs. → Days → 0	24 1	48 2	72 3	96 4	120 5	144 6	168 7	192 8	216 9
SECTION C-C											
Outside Wall											
Diagonally Down	8-10	63.8	74.1	75.7	75.9	77.5	80.3	81.4		84.2	84.1
	8-11	65.4	67.5	71.7	71.7	72.0	73.2	73.4		73.7	73.9
	8-12	65.9	64.6	65.1	65.3	65.4	65.8	66.0		68.4	69.7
	9-1	66.3	64.3	65.5	65.3	65.7	66.3	66.3		66.8	67.4
	9-2	67.2	65.3	65.2	65.2	65.4	65.8	65.7		65.8	66.0
	9-3	67.2	65.0	65.0	65.1	65.8	65.7	65.8		66.0	66.1
Above Roof											
10-1/2 ft from wall	9-4	63.8	78.3	78.5	79.3	79.7	80.7	82.2		84.1	84.0
	9-5	63.8	70.6	71.2	71.7	73.1	74.3	74.6		74.9	75.5
	9-6	63.4	66.2	66.3	67.3	68.8	70.3	71.0		72.9	73.4
	9-7	62.7	62.6	63.8	64.0	65.0	66.7	67.3		70.1	70.3
	9-8	61.7	60.5	61.9	61.9	62.9	63.3	65.2		67.3	67.8
	9-9	60.2	60.5	60.7	60.8	61.7	62.9	63.8		65.4	66.1
3 ft from wall	9-10	63.4	75.7	76.7	76.9	77.8	80.2	81.8		83.9	84.0
	9-11	63.8	71.0	73.6	74.0	75.1	76.1	75.9		76.5	77.3
	9-12	63.2	65.7	69.3	69.4	70.6	72.2	73.8		75.3	76.3
	10-1	63.1	62.0	65.7	65.9	66.6	60.1	71.0		71.4	71.7
	10-2	62.7	60.8	62.1	62.3	63.3	63.7	64.5		65.5	67.0
	10-3	62.3	60.9	61.5	61.4	62.3	63.1	64.0		65.3	66.2
1 ft from wall	10-4	63.4	75.8	76.9	76.9	77.8	80.6	81.9		82.9	83.9
	10-5	64.7	69.3	69.2	71.2	72.3	74.2	74.7		75.0	75.3
	10-6	64.2	66.2	67.7	67.8	68.8	70.1	71.0		72.3	73.8
	10-7	63.8	64.1	64.9	64.2	65.0	66.3	67.1		70.0	70.8
	10-8	63.4	62.3	62.3	62.0	62.7	63.7	64.7		66.9	67.1
	10-9	62.9	60.8	60.4	60.4	60.9	62.8	63.6		64.8	65.7

* For detailed description of thermocouple locations see SectionIV-A.

Table XI-B. VARIATION OF TEMPERATURES IN SOIL SURROUNDING SHELTER*

21 x 7 x 7 ft. shelter; 15 occupants; 15 cfm/occupant

SOIL TEMPERATURES	T.C. No.	Time From Start of Test, Hrs. → / Days → 0	24 1	48 2	72 3	96 4	120 5	144 6	168 7	192 8	216 9
SECTION C-C											
Below Floor 10-1/2 ft from wall	10-10	64.6	79.6	80.3	81.4	82.0	84.2	86.6		88.6	89.6
	10-11	66.7	70.8	71.2	73.2	75.4	77.0	77.5		77.8	78.1
	10-12	66.7	66.3	68.0	71.1	71.5	72.4	73.1		75.4	76.2
	11-1	67.8	65.9	66.6	68.4	69.2	71.2	72.0		72.5	73.4
	11-2	67.9	66.4	66.9	67.0	67.4	69.9	70.1		70.4	71.6
	11-3	66.9	65.5	65.4	64.0	64.1	66.0	67.2		67.9	68.2
	11-4	68.7	66.1	65.8	65.8	66.2	66.5	67.9		67.8	68.2
	11-5	66.4	64.6	64.4	62.6	63.0	63.3	63.8		64.3	64.6
	11-6										
3 ft from wall	11-7	65.2	81.1	82.9	83.2	84.8	86.4	89.3		90.3	91.0
	11-8	68.2	70.8	73.9	74.1	75.3	76.9	77.2		77.5	77.9
	11-9	67.9	67.2	70.4	70.8	72.1	75.2	75.4		75.9	76.4
	11-10	67.9	65.0	68.5	68.6	68.9	72.6	73.0		73.5	73.8
	11-11	67.2	65.3	68.1	68.0	68.5	70.3	71.0		71.7	72.0
	11-12	67.0	65.0	67.8	67.9	67.9	68.1	67.9		69.0	69.1
	12-1	68.0	65.0	66.9	65.3	65.4	66.0	66.4		67.0	67.6
	12-2	67.7	66.3	66.3	65.0	65.1	65.8	66.0		66.5	66.7
	12-3	66.9	65.0	66.0	64.2	64.2	64.6	64.7		64.8	65.0
1 ft from wall	12-4	65.2	78.1	79.8	79.9	81.1	82.8	85.6		86.5	87.4
	12-5	67.7	70.8	73.4	73.2	74.2	75.2	75.8		75.9	76.4
	12-6	67.0	68.2	68.7	69.9	70.9	71.3	72.1		73.7	74.5
	12-7	67.1	67.0	66.4	67.2	68.1	70.2	72.5		73.0	73.6
	12-8	67.0	65.0	65.0	66.0	66.3	66.7	68.1		69.1	69.8
	12-9	67.0	65.0	63.7	65.0	65.6	65.9	66.1		66.9	67.3

* For detailed description of thermocouple locations see Section IV-A.

Table XI-B. VARIATION OF TEMPERATURES IN SOIL SURROUNDING SHELTER*

21 x 7 x 7 ft. shelter; 15 occupants; 15 cfm/occupant

SOIL TEMPERATURES	T.C. No.	Time From Start of Test, Hrs. → / Days → 0	24 1	48 2	72 3	96 4	120 5	144 6	168 7	192 8	216 9
SECTION D-D											
Outside Corner											
Diagonally Up	12-10	62.5	71.3	72.4	72.6	74.4	75.3	77.7		79.6	80.5
	12-11	64.5	64.9	66.1	65.2	65.6	65.7	66.0		66.3	67.6
	12-12	63.0	62.2	62.6	62.6	62.7	63.1	63.4		63.5	63.7
	13-1	61.8	58.9	60.3	60.2	60.2	60.4	60.5		60.8	61.3
	13-2	60.8	59.1	58.5	58.9	59.0	59.9	60.4		60.8	61.3
	13-3	59.1	58.2	53.3	53.9	53.6	53.7	53.7		57.0	58.0
Horizontal 6 ft elev	13-4	64.0	71.2	72.6	72.7	74.1	75.3	78.4		79.6	80.2
	13-5	65.3	64.8	66.0	65.6	66.4	66.9	67.1		68.1	68.7
	13-6	64.8	63.1	63.0	63.1	63.2	64.1	64.4		65.0	65.7
	13-7	63.0	62.6	62.1	62.3	62.4	63.0	63.9		64.3	64.8
3-1/2 ft elev	13-8	62.7		71.2	72.0	73.3	75.8	78.5		80.0	80.8
	13-9	65.9	66.4	68.1	68.3	68.4	70.3	70.9		71.2	71.4
	13-10	65.0	65.0	65.6	65.6	65.9	67.1	67.5		68.1	68.4
	13-11	64.4	64.2	64.5	64.6	65.2	65.6	65.8		65.9	66.1
	13-12	62.6	61.9	61.8	61.8	62.3	62.6	62.6		63.0	63.3
	14-1	67.3	59.3	59.7	60.0	60.3	60.7	60.9		61.2	61.4
1 ft elev	14-2	65.5	73.0	74.1	74.3	75.4	76.1	79.9		80.9	81.3
	14-3	67.7	66.6	68.0	68.1	68.2	69.1	69.7		69.9	70.3
	14-4	67.3	63.5	65.3	65.2	65.4	65.8	66.4		67.6	68.3
	14-5	65.5	63.9	64.8	65.0	65.5	65.6	65.8		66.0	66.3
Diagonally Down	14-6	64.8	72.9	74.0	74.4	75.4	77.0	79.9		80.4	81.2
	14-7	67.0	67.8	68.7	68.9	69.0	70.6	71.2		71.6	71.8
	14-8	67.0	65.3	65.3	65.7	66.2	67.6	68.0		68.4	68.8
	14-9	66.7	64.3	64.7	64.6	64.9	66.0	66.9		67.0	67.5
	14-10	68.7	63.7	64.0	64.1	64.6	65.1	65.5		65.9	66.4
	14-11	65.4	63.9	64.0	64.4	64.6	64.8	65.0		65.5	65.8

* For detailed description of thermocouple locations see Section IV-A.

Table XII-A. VARIATION OF TEMPERATURES INSIDE SHELTER*

21 x 21 x 7 ft. shelter; 45 occupants
no ventilation

	T.C. No.	Time From Start of Test, Hrs. → Days → 0	6	12	18	24	30	36	42	48	54	60	66
		0				1				2			
AIR TEMPERATURES													
SHELTER AIR													
Center													
6 ft elev													
DB	15-12	46.2	59.3	63.0	66.5	69.4	70.0	72.0	73.1	74.2	78.5	79.8	80.8
WB	15-11	45.3	56.0	59.8	62.6	66.0	66.6	68.9	70.2	71.5	76.0	77.0	78.2
3-1/2 ft elev													
DB	15-4	45.7	59.3	63.5	66.5	68.8	70.0	72.0	73.3	74.1	78.0	79.5	80.8
WB	15-3	45.1	57.4	61.2	64.1	67.4	68.8	70.5	72.0	73.3	76.0	77.5	79.0
1 ft elev													
DB	15 2	47.2	59.0	63.4	65.1	68.5	69.0	71.0	72.3	73.3	77.5	78.4	79.8
WB	15-1	44.8		45.5		67.6	68.1	70.2	72.0	72.9	75.4	75.7	77.9
Near Wall													
3-1/2 ft elev													
DB	15-6	45.8	59.2	62.7	65.3	68.4	69.4	71.3	72.9	73.9	77.7	78.8	80.3
WB	15-5	45.3	57.5	61.3	64.2	68.2	69.3	71.2	72.8	73.8	76.9	78.4	79.8
In Corner													
3-1/2 ft elev													
DB	15-8	46.1	58.0	62.0	64.8	67.7	69.0	70.8	72.1	73.9	77.0	78.0	79.3
WB	15-7	45.3	56.6	61.0	63.6	67.4	68.8	70.4	71.9	73.8	76.0	77.2	79.0
INSIDE SURFACE TEMPS													
SECTION B-B													
Wall	1-1	43.2	51.2	55.2	58.0	60.8	62.6	65.2	66.2	66.3	69.7	71.2	72.5
	1-7	45.5	51.7	55.0	57.6	62.0	63.6	65.3	66.2	67.7	70.4	71.6	72.9
	2-1	45.0	55.0	59.3	61.4	65.3	67.5	69.5	71.0	72.1	73.8	75.4	76.7
	2-7	47.0	52.0	55.7	58.8	62.5	64.0	66.0	66.9	68.0	71.3	72.5	74.0
	3-1	47.0	52.2	55.3	58.5	67.0	63.5	65.8	67.2	67.9	70.0	71.0	72.2
Ceiling	3-7	45.7	59.5	60.3	63.1	69.5	71.0	73.2					
	4-1	44.8	53.9	58.0	60.5	65.0	66.5	68.5	69.8	70.8	72.6	74.2	75.3
	4-7	45.0	52.3	56.3	59.3	63.0	64.9	66.8	68.4	68.7	71.3	73.0	74.2
Floor	5-1	46.2	58.5	62.8	65.4	70.2	71.5	73.2	74.6	75.1	77.3	78.2	79.4
	5-10	46.3	59.5	64.0	67.0	71.5	72.5	74.7	75.7	76.6	78.5	79.8	81.4
	6-4	46.0	52.7	57.1	60.2	63.5	65.0	67.2	68.5	69.9	71.4	73.0	74.1
SECTION C-C	6-10	44.3	51.0	54.5	57.7	62.0	63.4	65.2	66.6	68.0	70.0	71.0	72.5
Wall	7-4	45.2	50.5	53.3	56.0	61.0	62.5	64.0	65.0	66.5	69.1	70.2	72.0
	7-10	46.0	54.5	58.8	61.0	65.0	66.6	69.0	70.0	70.9	73.5	75.0	76.3
	8-4	46.0	52.2	56.3	59.2	64.6	65.0	66.7	67.9	69.1	71.3	72.2	73.7
	8-10	45.5	15.0	55.2	58.1	62.0	63.2	65.4	66.5	67.2	69.4	70.4	72.0
Ceiling	9-4	44.1	53.5	58.0	60.7	65.9	67.0	68.2	69.8	0.8	73.1	74.3	75.4
	9-10	45.1	52.6	56.3	59.4	64.2	65.4	67.2	68.9	70.0	72.4	73.4	75.0
	10-4	44.7	51.0	55.0	57.8	62.4	64.0	66.0	67.2	68.4	70.4	71.7	73.3
Floor	10-10	47.1	59.0	63.4	67.0	71.9	72.5	74.0	75.3	76.4	79.5	80.2	81.4
	11-7	46.6	59.2	63.5	66.5	71.4	72.4	74.1	75.7	76.2	78.5	79.8	80.8
	12-4	45.5	53.3	57.2	60.3	64.2	65.4	67.0	68.8	70.0	71.3	72.5	73.6
SECTION D-D	12-10	43.8	49.4	53.0	55.8	59.5	61.0	63.1	64.7	65.7	67.3	68.6	70.1
	13-4	45.0	49.0	51.7	54.7	60.2	61.0	62.0	63.3	64.8	67.0	68.0	69.4
	13-8	45.2	50.4	54.2	57.0	61.0	62.4	64.5	65.8	67.0	68.7	70.1	71.4
	14-2	45.5	50.8	54.1	56.8	61.5	62.7	64.4	65.8	66.8	68.5	69.5	71.1
	14-6	45.9	49.4	53.7	56.1	59.4	60.4	62.4	64.0	64.5	66.0	67.0	68.8
SIMOC SKIN TEMPS.													
Center - Top	18-7	46.3	69.0	71.2	74.0	75.3	75.5	78.3	78.8	80.9	86.4		86.5
Middle	18-8	46.3	69.2	73.0	75.0	77.0	77.0	78.3	79.1	80.8	83.4	84.4	85.6
Near Wall - Middle	18-10	46.7	68.6	72.0	75.4	77.0	78.0	79.5	82.6	83 3	86.6	87.0	89 3
In Corner - Middle	18-11	46.4	64.9	68.0	70.0	73.5	73.9	75.5	76.8	77.0	80.0	80.8	82.5
OUTSIDE AIR TEMPS	19-5	63.7	66.5	64.8	64.5	70.0	71.0	68.7	67.3	67.0	73.1	71.4	72.0
	19-6	63.5	66.2	64.8	64.4	69.8	71.0	68.7	67.3	67.0	71.6	69.6	70.5
	19-7	63.5	65.9	64.5	64.0	69.5	71.0	68.7	67.2	66.7	69.8	68.0	68.4

*For detailed description of thermocouple locations see Sec. IV-A and B.

TEMPERATURES INSIDE SHELTER"

elter; 45 occupants
ilation

Time From Start of Test, Hrs. → Days →																		
12	18	24 1	30	36	42	48 2	54	60	66	72 3	78	84	90	96 4	102	108		78
63.0	66.5	69.4	70.0	72.0	73.2	74.2	78.5	79.8	80.8	81.0	81.5	82.1	83.5	84.6	85.2	86.2		81
59.8	62.6	66.0	66.6	68.9	70.2	71.5	76.0	77.0	78.2	78.4	78.5	80.0	80.8	82.4	82.8	84.0		78
63.5	66.5	68.8	70.0	72.0	73.3	74.1	78.0	79.5	80.8	80.9	81.1	82.2	84.0	85.0	85.1	86.2		81
61.2	64.1	67.4	68.8	70.5	72.0	73.3	76.0	77.5	79.0	79.4	79.6	81.2	82.2	83.0	83.5	85.1		79
63.4	65.1	68.5	69.0	71.0	72.3	73.3	77.5	78.4	79.8	79.9	80.1	81.3	82.2	83.7	84.3	85.1		80
45.5		67.6	68.1	70.2	72.0	72.9	75.4	75.7	77.9	78.1	78.1	79.3	80.6	81.7	82.2	83.0		78
62.7	65.3	68.4	69.4	71.3	72.9	73.9	77.7	78.8	80.3	80.4	80.8	82.2	83.0	84.8	84.9	85.6		80
61.3	64.2	68.2	69.3	71.2	72.8	73.8	76.9	78.4	79.8	80.0	80.3	81.6	82.6	84.0	84.2	85.5		80
62.0	64.8	67.7	69.0	70.8	72.1	73.9	77.0	78.0	79.3	79.7	79.8	81.1	81.8	83.3	83.4	84.6		79
61.0	63.6	67.4	68.8	70.4	71.9	73.8	76.0	77.2	79.0	79.3	79.4	81.0	81.8	83.0	83.3	84.6		79
55.2	58.0	60.8	62.6	65.2	66.2	66.3	69.7	71.2	72.5	73.2	74.0	75.2	77.0	77.2	78.0	79.3		74
55.0	57.6	62.0	63.6	65.3	66.2	67.7	70.4	71.6	72.9	73.1	74.0	75.2	76.0	77.2	78.3	79.3		74
59.3	61.4	65.3	67.5	69.5	71.0	72.1	73.8	75.4	76.7	72.0	77.4	78.6	80.0	80.8	82.0	83.0		77
55.7	58.8	62.5	64.0	66.0	66.9	68.0	71.3	72.5	74.0	74.1	74.9	75.7	77.2	78.2	79.2	80.2		74
55.3	58.5	67.0	63.5	65.8	67.2	67.9	70.0	71.0	72.2	72.5	73.0	74.2	75.5	76.5	77.0	78.4		73
60.3	63.1	69.5	71.0	73.2														
58.0	60.5	65.0	66.5	68.5	69.8	70.8	72.6	74.2	75.3	75.9	76.2	77.2	78.7	79.9	80.7	81.7		76
56.3	59.3	63.0	64.9	66.8	68.4	68.7	71.3	73.0	74.2	74.3	74.6	75.7	77.2	78.5	79.3	80.6		74
62.8	65.4	70.2	71.3	73.2	74.6	75.1	77.3	78.2	79.4	79.6	79.9	80.4	82.0	83.1	84.0	84.9		79
64.0	67.0	71.5	72.5	74.7	75.7	76.6	78.5	79.8	81.4	81.5	81.6	82.5	83.6	85.3	86.0	87.0		81
57.1	60.2	63.5	65.0	67.2	68.5	69.9	71.4	73.0	74.1	74.3	74.5	75.6	77.0	78.2	78.7	80.0		74
54.5	57.7	62.0	63.4	65.2	66.6	68.0	70.0	71.0	72.5	72.9	73.2	74.4	75.5	77.9	78.0	79.3		73
53.3	56.0	61.0	62.5	64.0	65.0	66.5	69.1	70.2	72.0	72.1	72.3	73.5	75.1	76.4	77.0	78.4		72
58.8	61.0	65.0	66.6	69.0	70.0	70.9	73.5	75.0	76.3	76.5	76.9	77.9	79.4	80.5	81.3	82.6		76
56.3	59.2	64.6	65.0	66.7	67.9	69.1	71.3	72.2	73.7	73.9	74.0	75.2	76.5	77.8	78.4	79.4		74
55.2	58.1	62.0	63.2	65.4	66.5	67.2	69.4	70.4	72.0	72.1	72.3	73.6	74.9	76.0	76.6	77.6		72
58.0	60.7	65.9	67.0	68.2	69.8	0.8	73.1	74.3	75.4	76.0	76.2	77.3	78.6	79.9	80.8	82.0		76
56.3	59.4	64.2	65.4	67.2	68.9	70.0	72.4	73.4	75.0	75.1	75.3	76.3	77.7	79.0	79.6	81.0		75
55.0	57.8	62.4	64.0	66.0	67.2	68.4	70.4	71.7	73.3	73.6	73.9	75.4	76.8	78.1	78.6	79.5		73
63.4	67.0	71.9	72.5	74.0	75.3	76.4	79.5	80.2	81.4	81.8	81.9	83.0	84.0	85.4	86.0	87.0		81
63.5	66.5	71.4	72.4	74.1	75.7	76.2	78.5	79.8	80.8	80.9	81.1	82.2	83.5	85.0	85.4	86.1		81
57.2	60.3	64.2	65.4	67.0	68.8	70.0	71.3	72.5	73.6	73.9	74.3	75.2	76.7	78.2	78.4	79.4		74
53.0	55.8	59.3	61.0	63.1	64.7	65.7	67.3	68.6	70.1	70.4	70.6	72.1	73.3	74.3	75.0	76.0		70
51.7	54.7	60.2	61.0	62.0	63.3	64.8	67.0	68.0	69.4	69.6	70.0	71.0	72.4	73.8	74.0	75.0		70
54.2	57.0	61.0	62.4	64.5	65.8	67.0	68.7	70.1	71.4	71.7	72.2	73.4	75.0	75.9	76.2	77.2		72
54.1	56.8	61.5	62.7	64.4	65.8	66.8	68.5	69.5	71.1	71.3	71.4	72.8	74.0	75.4	75.5	76.7		71
53.7	56.1	59.4	60.4	62.4	64.0	64.5	66.0	67.0	68.8	68.9	69.3	70.4	71.6	72.4	72.9	74.0		69
71.2	74.0	75.3	75.5	78.3	78.8	80.9	86.4		86.5	86.7	87.2	88.9	89.5	90.0	90.1	91.3		87
73.0	75.0	77.0	77.0	78.3	79.1	80.8	83.4	84.4	85.6	85.8	86.2	87.6	89.0	89.2	89.8	90.7		86
72.0	75.4	77.0	78.0	79.5	82.6	83.3	86.6	87.0	89.3	89.3	89.7	90.5	91.7	93.6	93.9	95.0		89
68.0	70.0	73.5	73.9	75.5	76.8	77.0	80.0	80.8	82.5	82.8	83.2	84.1	85.5	86.4	87.1	87.8		83
64.8	64.5	70.0	71.0	68.7	67.3	67.0	73.1	71.4	72.0	72.0	69.1	65.2	63.8	63.5	65.3	64.0		69
64.8	64.4	69.8	71.0	68.7	67.3	67.0	71.6	69.6	70.5	71.4	68.7	65.1	63.8	63.5	64.3	63.9		68
64.5	64.0	69.5	71.0	68.7	67.2	66.7	69.8	68.0	68.4	68.8	68.2	64.3	63.4	63.0	63.8	63.9		68

ermocouple locations see Sec. IV-A and B.

8	84	90	96 4	102	108	114	120 5	126	132	138	144 6
1.5	82.1	83.5	84.6	85.2	86.2	87.1	88.5	88.9	89.7	90.5	92.2
8.5	80.0	80.8	82.4	82.8	84.0	85.0	86.2	86.5	87.0	88.0	90.0
1.1	82.2	84.0	85.0	85.1	86.2	87.1	88.0	88.9	89.4	90.4	91.8
9.6	81.2	82.2	83.0	83.5	85.1	85.4	86.3	87.3	87.4	89.0	89.2
0.1	81.3	82.2	83.7	84.3	85.1	86.2	87.2	87.9	88.2	89.0	91.1
8.1	79.3	80.6	81.7	82.2	83.0	84.1	85.4	85.8	86.4	87.4	89.3
0.8	82.2	83.0	84.8	84.9	85.6	86.6	87.6	88.4	88.5	89.5	91.3
0.3	81.6	82.6	84.0	84.2	85.5	86.0	87 1	88.0	88.1	89.4	90.0
9.8	81.1	81.8	83.3	83.4	84.6	85.4	86.9	87.3	87.8	88.7	90.4
9.4	81.0	81.8	83.0	83.3	84.6	85.5	86.3	87.0	87.5	88.4	89.6
4.0	75.2	77.0	77.2	78.0	79.3	80.0	81.0	81.7	82.6	83.8	84.7
4.0	75.2	76.0	77.2	78.3	79.3	80.0	81.0	82.0	82.5	83.6	85.0
7.4	78.6	80.0	80.8	82.0	83.0	83.4	84.8	85.5	86.0	87.0	88.2
4.9	75.7	77.2	78.2	79.2	80.2	81.0	82.0	82.9	83.4	84.5	86.0
3.0	74.2	75.5	76.5	77.0	78.4	79.0	80.4	80.9	81.3	82.3	83.8
6.2	77.2	78.7	79.9	80.7	81.7	82.7	84.0	84.7	85.0	86.2	87.7
4.6	75.7	77.2	78.5	79.3	80.6	81.1	82.1	83.3	83.5	84.8	85.9
9.9	80.4	82.0	83.1	84.0	84.9	85.8	87.1	87.5	88.0	89.0	90.5
1.6	82.5	83.6	85.3	86.0	87.0	87.5	89.0	89.7	90.0	91.0	92.5
4.5	75.6	77.0	78.2	78.7	80.0	80.7	82.0	82.7	83.0	83.8	85.3
3.2	74.4	75.5	77.9	78.0	79.3	80.0	81.5	82.0	82.5	83.7	85.2
2.3	73.5	75.1	76.4	77.0	78.4	79.1	80.7	81.4	81.8	83.1	84.6
6.9	77.9	79.4	80.5	81.3	82.6	83.0	84.4	85.4	85.5	86.8	88.0
4.0	75.2	76.5	77.8	78.4	79.4	80.0	82.0	82.4	82.7	83.7	85.4
2.3	73.6	74.9	76.0	76.6	77.6	78.4	80.0	80.3	80.8	81.5	83.1
6.2	77.3	78.6	79.9	80.8	82.0	82.6	84.0	84.7	85.0	86.2	88.0
5.3	76.3	77.7	79.0	79.6	81.0	81.4	83.2	84.0	84.1	85.5	87.0
3.9	75.4	76.8	78.1	78.6	79.5	80.7	82.0	82.7	83.0	84.0	85.4
1.9	83.0	84.0	85.4	86.0	87.0	87.6	89.0	89.5	89.9	90.5	92.6
1.1	82.2	83.5	85.0	85.4	86.1	87.0	88.5	89.0	89.2	90.2	92.1
4.3	75.2	76.7	78.2	78.4	79.4	80.0	81.7	82.0	82.6	83.6	85.3
0.6	72.1	73.5	74.5	75.0	76.0	77.0	77.9	78.9	79.2	80.3	81.5
0.0	71.0	72.4	73.8	74.0	75.0	76.0	77.3	78.0	78.4	79.3	81.4
2.2	73.4	75.0	75.9	76.2	77.2	78.2	79.5	80.1	80.5	81.9	82.8
1.4	72.8	74.0	75.4	75.5	76.7	77.6	78.8	79.5	79.8	80.9	82.8
9.3	70.4	71.6	72.4	72.9	74.0	74.9	75.6	76.6	76.9	77.8	79.0
7.2	88.9	89.5	90.0	90.1	91.3	92.0	92.5	93.4	94.0	95.0	95.6
6.2	87.6	89.0	89.2	89.8	90.7	91.5	92.2	93.0	93.2	94.2	94.7
9.7	90.5	91.7	93.6	93.9	95.0	95.6	95.7	96.5	96.8	98.4	99.4
3.2	84.1	85.5	86.4	87.1	87.8	89.0	89.8	90.2	90.8	92.0	93.0
9.1	65.2	63.8	63.5	65.3	64.0	62.4	64.4	65.0	63.9	63.2	66.2
8.7	65.1	63.8	63.5	64.3	63.9	62.4	64.4	64.0	63.0	62.5	59.1
8.2	64.3	63.4	63.0	63.8	63.9	62.4	64.0	63.2	61.4	61.5	50.4

C

Table XII-B. VARIATION OF TEMPERATURES IN SOIL SURROUNDING SHELTER*

21 x 21 x 7 ft shelter; 45 occupants; no ventilation

SOIL TEMPERATURES	T.C. No.	Time From Start of Test, Hrs. → Days → 0	24 1	48 2	72 3	96 4	120 5	144 6
SECTION B-B								
Outside Wall								
Diagonally Up	1-1	43.2	60.8	66.2	73.2	77.2	81.0	84.7
	1-2	43.5	44.3	49.3	55.4	58.5	62.1	64.7
	1-3	42.3	43.2	45.4	46.2	48.5	51.4	54.0
	1-4	40.0	40.6	41.4	41.8	43.3	44.7	45.5
	1-5	35.9	36.8	38.0	40.0	41.7	39.5	39.8
	1-6	31.2	36.3	36.0	42.7	38.4	37.4	38.0
Horizontal 6 ft elev	1-7	45.5	62.0	67.7	73.1	77.2	81.0	85.0
	1-8	44.8	50.0	56.0	61.4	65.0	68.4	72.3
	1-9	44.6	47.0	49.4	51.4	54.2	57.4	60.6
	1-10	43.9	44.8	45.5	46.6	47.4	49.9	52.1
	1-11	41.5	42.0	42.8	42.5	42.8	43.9	44.7
	1-12	40.0	40.0	40.4	40.3	40.7	41.5	40.7
3-1/2 ft elev	2-1	45.0	65.3	72.1	77.0	80.7	84.9	88.2
	2-2	46.2	51.3	56.9	63.7	67.0	71.1	74.0
	2-3	45.7	48.0	51.2	53.6	56.3	59.5	62.4
	2-4	45.5	46.2	47.4	48.2	49.5	52.0	54.0
	2-5	44.6	45.8	46.6	46.4	46.0	47.1	47.9
	2-6	31.2	31.2	31.1	31.2	31.3	31.2	31.3
1 ft elev	2-7	47.0	62.5	68.0	74.1	78.8	82.0	86.1
	2-8	47.3	53.2	59.4	64.0	67.6	71.0	74.0
	2-9	46.3	48.4	51.7	54.6	56.8	59.9	62.3
	2-10	46.3	46.7	48.4	49.4	50.6	52.5	54.1
	2-11	45.9	46.3	46.9	47.2	46.6	47.9	48.3
	2-12	45.0	45.3	45.7	45.4	44.8	45.0	44.7

*For detailed description of thermocouple locations see Section IV-A.

Table XII-B. VARIATION OF TEMPERATURES IN SOIL SURROUNDING SHELTER*

21 x 21 x 7 ft. shelter; 45 occupants; no ventilation

SOIL TEMPERATURES	T.C. No.	Time From Start of Test, Hrs.→ Days→ 0	24 1	48 2	72 3	96 4	120 5	144 6
SECTION B-B								
Outside Wall								
Diagonally Down	3-1	47.0	62.0	67.9	72.5	76.5	80.3	83.8
	3-2	47.5	50.1	53.4	58.3	61.1	63.6	66.1
	3-3	47.5	49.4	51.6	51.7	53.3	55.2	57.3
	3-4	47.5	48.9	49.3	49.9	50.0	51.0	51.5
	3-5	47.5	48.9	48.5	49.0	48.8	48.9	48.5
	3-6	47.5	48.4	48.2	48.3	47.7	47.8	47.3
Above Roof 10-1/2 ft from wall	3-7	45.7	69.5	72.1		83.3	86.8	86.6
	3-8	44.1	54.8	62.6	68.9	73.1	77.3	81.1
	3-9	44.1	49.5	55.1	59.9	64.6	69.2	73.2
	3-10	43.5	45.5	49.8	53.4	58.4	63.0	66.9
	3-11	41.7	43.5	45.8	49.5	54.4	57.9	61.5
	3-12	41.0	42.6	44.4	49.2	52.4	56.0	59.2
3 ft from wall	4-1	44.7	65.0	70.8	75.9	80.0	84.0	87.7
	4-2	44.7	57.3	63.4	68.9	73.2	77.7	81.5
	4-3	44.0	49.6	54.2	59.4	64.1	68.9	73.0
	4-4	42.9	45.3	49.0	53.0	57.2	62.0	66.0
	4-5	40.5	42.1	44.8	48.8	53.2	56.3	59.5
	4-6	39.5	41.4	43.9	48.1	52.0	55.0	57.8
1 ft from wall	4-7	45.0	63.0	68.8	74.3	78.6	82.1	86.0
	4-8	44.3	54.7	59.3	66.3	70.1	74.3	78.1
	4-9	43.5	47.8	52.7	57.8	60.7	65.0	68.7
	4-10	42.3	44.4	47.4	50.6	54.2	58.1	61.4
	4-11	40.5	42.3	43.9	47.4	50.7	53.4	55.9
	4-12	40.0	41.5	43.0	46.5	49.4	52.0	54.1

*For detailed description of thermocouple locations see Section IV-A.

Table XII-B. VARIATION OF TEMPERATURES IN SOIL SURROUNDING SHELTER*

21 x 21 x 7 ft. shelter; 45 occupants; no ventilation

SOIL TEMPERATURES	T.C. No.	Time From Start of Test, Hrs. → / Days → 0	24 1	48 2	72 3	96 4	120 5	144 6
SECTION B-B								
Below Floor 10-1/2 ft from wall	5-1	46.2	70.3	75.1	79.6	83.0	87.1	90.5
	5-2	49.0	56.5	61.5	67.7	70.4	74.0	77.0
	5-3	48.8	52.5	57.5	60.8	63.6	66.2	69.0
	5-4	49.3	51.2	53.5	56.1	57.9	60.2	62.2
	5-5	50.1	51.2	52.3	53.7	54.5	56.3	57.2
	5-6	51.0	51.3	51.9	52.4	52.1	53.0	53.4
	5-7	51.9	51.0	50.9	52.3	52.1	53.0	52.7
	5-8	52.0	51.0	50.8	52.4	52.1	52.2	52.1
	5-9	52.5	51.1	50.9	52.6	52.1	52.2	52.0
3 ft from wall	5-10	46.3	71.5	76.7	81.5	85.3	89.0	92.5
	5-11	48.0	57.3	62.8	69.0	71.7	74.5	77.3
	5-12	48.5	53.9	57.5	60.7	63.2	66.2	69.0
	6-1	49.3	50.9	53.2	54.8	56.8	58.5	61.0
	6-2	49.4	50.9	51.7	53.0	53.9	55.3	56.2
	6-3	50.0	50.9	51.2	51.8	51.8	52.3	52.5
1 ft from wall	6-4	46.0	63.5	69.9	74.3	78.2	82.0	85.4
	6-5	47.2	54.0	58.4	63.0	65.9	69.2	71.9
	6-6	47.5	51.3	54.4	57.0	59.0	61.4	64.0
	6-7	48.5	50.9	51.7	53.4	55.0	57.1	58.4
	6-8	49.2	50.9	50.8	51.8	52.0	53.4	54.1
	6-9	49.9	50.8	50.7	51.0	50.3	51.3	51.5

*For detailed description of thermocouple locations see Section IV-A.

Table XII-3. VARIATION OF TEMPERATURES IN SOIL SURROUNDING SHELTER*

21 x 21 x 7 ft shelter; 45 occupants; no ventilation

SOIL TEMPERATURES	T.C. No.	Time from start of test, Hrs.→ Days→ 0	24 1	48 2	72 3	96 4	120 5	144 6
SECTION C-C								
Outside Wall								
Diagonally Up	6-10	44.3	62.0	68.0	72.9	77.0	81.5	85.2
	6-11	42.8	44.3	48.5	54.8	58.3	61.6	64.2
	6-12	41.1	42.2	43.9	45.0	47.4	50.3	52.5
	7-1	39.4	39.9	41.0	40.2	42.2	43.5	45.0
	7-2	33.9	36.4	36.2	40.2	41.0	37.5	39.0
	7-3	31.2	36.2	35.7	42.6	38.4	37.3	37.9
Horizontal 6 ft elev	7-4	45.2	61.0	66.5	72.1	76.5	80.7	84.6
	7-5	45.0	51.3	56.0	61.3	65.0	68.9	72.5
	7-6	44.1	46.0	47.3	49.7	52.1	55.5	58.8
	7-7	43.3	44.0	44.2	44.8	46.0	48.3	50.5
	7-8	41.8	42.5	42.1	41.8	42.4	44.3	45.0
	7-9	39.0	39.5	39.8	39.9	40.8	41.0	40.4
3-1/2 ft elev	7-10	46.0	65.0	70.9	76.5	80.5	84.4	88.0
	7-11	45.5	52.0	57.9	64.3	68.0	71.8	74.8
	7-12	45.1	48.0	50.8	53.6	56.3	59.9	62.6
	8-1	44.4	45.5	46.1	46.7	48.1	50.1	52.3
	8-2	44.1	44.8	44.6	44.6	44.7	46.0	46.8
	8-3	43.3	44.0	43.5	42.8	42.1	43.0	43.0
1 ft elev	8-4	46.0	63.6	69.1	74.0	77.9	82.0	85.4
	8-5	47.0	55.2	59.9	64.5	67.9	71.8	74.8
	8-6	46.7	49.8	52.0	55.3	57.6	61.0	64.0
	8-7	45.6	46.5	47.6	48.1	49.1	50.4	52.3
	8-8	45.1	45.8	46.0	46.2	46.4	47.1	47.3
	8-9	44.4	45.0	45.0	45.0	44.5	44.3	44.2

*For detailed description of thermocouple locations see Section IV-A.

Table XII-B. VARIATION OF TEMPERATURES IN SOIL SURROUNDING SHELTER*

21 x 21 x 7 ft. shelter; 45 occupants; no ventilation

SOIL TEMPERATURES	T.C. No.	Time from Start of Test, Hrs.→ Days→ 0	24 1	48 2	72 3	96 4	120 5	144 6
SECTION C-C								
Outside Wall								
Diagonally Down	8-10	45.5	62.0	67.6	72.1	76.0	80.0	83.1
	8-11	47.5	50.0	53.5	58.7	61.0	64.0	66.3
	8-12	47.2	49.1	50.8	51.4	53.1	55.0	57.0
	9-1	47.3	49.1	48.9	49.3	48.6	50.3	50.8
	9-2	47.3	48.8	48.2	48.3	47.8	48.1	48.0
	9-3	47.5	48.8	48.1	47.9	47.3	47.3	47.0
Above Roof 10-1/2 ft from wall	9-4	44.0	65.9	70.8	76.0	80.0	84.0	88.0
	9-5	41.6	53.0	61.0	67.3	72.1	76.1	80.0
	9-6	39.1	45.0	50.8	57.3	62.4	67.2	71.3
	9-7	37.6	41.1	45.5	50.6	56.0	61.0	64.5
	9-8	36.3	38.9	42.9	47.4	52.3	56.3	60.0
	9-9	35.2	38.0	41.3	46.4	51.4	54.6	58.0
3 ft from wall	9-10	45.1	64.2	70.0	75.1	79.1	83.2	87.0
	9-11	44.0	55.2	61.3	67.3	71.9	76.0	80.0
	9-12	42.0	46.2	50.8	56.9	61.5	66.3	70.5
	10-1	40.0	43.0	46.6	50.4	55.3	59.9	64.0
	10-2	36.8	40.2	42.9	47.4	51.5	55.1	58.4
	10-3	34.0	38.0	41.3	46.0	49.9	52.3	55.0
1 ft from wall	10-4	44.7	62.3	68.4	73.6	78.2	82.0	85.3
	10-5	44.0	53.4	59.7	64.8	69.6	73.5	77.3
	10-6	42.4	46.5	50.3	55.4	60.0	63.8	67.3
	10-7	40.7	43.0	46.0	49.2	53.4	56.9	60.2
	10-8	38.1	40.5	42.6	46.0	50.0	52.0	54.5
	10-9	36.9	39.8	41.3	45.0	48.1	49.4	52.0

*For detailed description of thermocouple locations see Section IV-A.

Table XII-B. VARIATION OF TEMPERATURES IN SOIL SURROUNDING SHELTER*

21 x 21 x 7 ft. shelter; 45 occupants; no ventilation

SOIL TEMPERATURES	T.C. No.	Time from Start of Test, Hrs. → / Days → 0	24 1	48 2	72 3	96 4	120 5	144 6
SECTION C-C								
Below Floor								
10-1/2 ft from wall	10-10	47.1	71.9	76.3	82.0	85.5	89.0	92.5
	10-11	48.5	56.5	61.0	67.6	70.8	73.5	76.4
	10-12	49.0	54.0	57.9	61.0	63.6	66.8	69.5
	11-1	49.0	49.2	52.9	55.7	58.0	59.9	61.9
	11-2	50.0	50.0	52.3	53.9	55.0	56.3	57.3
	11-3	50.7	50.3	51.9	52.5	52.4	53.0	53.6
	11-4	51.3	50.4	51.2	52.4	52.0	53.0	52.9
	11-5	51.3	51.0	51.2	52.2	51.5	51.9	52.0
	11-6	52.2	51.3	51.2	52.6	52.0	52.1	52.0
3 ft from wall	11-7	46.6	71.3	76.2	80.8	85.0	88.5	92.0
	11-8	47.6	55.2	59.5	66.0	69.0	71.7	74.7
	11-9	48.0	53.0	56.6	59.4	61.9	65.0	67.8
	11-10	49.2	51.4	52.8	55.0	56.7	59.2	61.0
	11-11	49.3	50.8	51.3	52.6	53.5	55.0	55.9
	11-12	49.9	50.5	50.8	51.9	51.8	52.0	52.4
	12-1	50.2	52.0	51.6	51.0	51.1	51.3	51.6
	12-2	51.3	52.0	51.6	51.8	51.4	51.3	51.1
	12-3	52.0	50.5	51.6	51.9	51.4	51.3	51.0
1 ft from wall	12-4	45.5	64.2	70.0	74.0	78.2	81.8	85.3
	12-5	47.2	54.1	57.8	62.6	65.4	68.8	71.6
	12-6	47.6	51.5	54.2	56.5	58.5	61.2	64.0
	12-7	48.1	50.5	51.4	52.8	54.1	56.0	57.8
	12-8	49.0	50.5	50.3	51.3	51.5	53.0	54.0
	12-9	49.0	50.0	49.9	50.5	50.3	50.6	50.5

* For detailed description of thermocouple locations see Section IV-A.

Table XII-B. VARIATION OF TEMPERATURES IN SOIL SURROUNDING SHELTER*

21 x 21 x 7 ft. shelter; 45 occupants; no ventilation

SOIL TEMPERATURES	T.C. No.	Time from Start of Test, Hrs. → / Days → 0	24 1	48 2	72 3	96 4	120 5	144 6
SECTION D-D								
Outside Corner								
Diagonally Up	12-10	43.8	59.5	65.8	70.4	74.5	77.8	81.5
	12-11	41.6	40.6	42.2	46.2	48.3	50.7	52.0
	12-12	40.0	40.0	40.6	40.4	41.5	43.5	44.4
	13-1	36.5	38.0	38.0	37.2	40.0	39.3	39.5
	13-2	31.5	37.5	37.3	44.1	38.3	38.2	38.4
	13-3	31.3	37.5	37.0	44.1	38.3	38.2	38.5
Horizontal								
6 ft elev	13-4	45.0	60.2	64.8	69.7	73.8	77.3	81.3
	13-5	43.7	43.3	44.5	49.3	51.4	53.7	55.9
	13-6	42.7	43.0	43.1	42.9	43.7	45.8	47.7
	13-7	40.7	41.0	40.8	40.6	40.8	41.8	41.7
3-1/2 ft elev	13-8	45.3	61.0	67.0	71.7	76.0	79.4	82.9
	13-9	43.4	44.5	47.0	51.4	53.4	55.1	56.8
	13-10	43.9	44.0	43.9	45.5	46.3	47.3	49.0
	13-11	43.5	44.0	43.3	43.6	43.3	43.8	44.0
	13-12	42.5	43.1	42.6	41.7	41.9	41.7	41.4
	14-1	41.2	41.8	40.5	39.3	39.5	40.0	40.0
1 ft elev	14-2	45.3	61.5	66.9	71.3	75.4	78.9	82.8
	14-3	46.4	46.0	47.3	51.7	53.7	56.0	57.5
	14-4	46.0	46.0	46.9	47.0	46.9	47.9	49.7
	14-5	44.3	45.3	45.2	45.3	45.0	45.0	44.8
Diagonally Down	14-6	45.3	59.4	64.5	68.9	72.8	75.5	79.0
	14-7	46.9	47.0	48.2	52.5	54.3	56.0	57.1
	14-8	46.8	47.0	47.6	48.2	48.3	49.0	49.9
	14-9	46.4	47.0	47.3	47.1	47.0	46.8	46.5
	14-10	46.5	47.0	46.9	46.7	46.3	46.0	45.9
	14-11	45.3	46.3	45.9	45.4	45.0	44.5	44.3

* For detailed description of thermocouple locations see Section IV-A.

Table XIII-A. VARIATION OF TEMPERATURES INSIDE SHELTER*

21 x 21 x 7 ft. shelter; 45 occupants;
3 cfm/occupant

Time From Start of Test, Hrs. → / Days →

	T.C. No.	0 (0)	6	12	18	24 (1)	30	36	42	48 (2)	54	60	66	72 (3)	78	84	90
AIR TEMPERATURES																	
SUPPLY DUCT DB	15-10	59.3	95.0	84.1	76.8	84.5	96.6	84.2	73.1	83.8	95.7	84.0	74.7	85.0	93.3	83.0	73.3
SUPPLY DUCT WB	15-9	58.0	80.0	76.1	72.6	78.5	77.8	72.8	70.0	75.3	76.3	71.9	68.5	73.9	78.9	74.6	69.4
RETURN DUCT DB	16-2	56.4	71.2	74.9	75.5	77.9	81.2	80.1	79.9	80.9	82.1	81.9	81.4	82.4	83.4	83.2	83.0
RETURN DUCT WB	16-1	55.8	70.4	74.0	73.3	77.1	80.3	79.7	77.7	79.1	81.9	81.4	79.3	80.2	80.5	81.2	80.8
SHELTER AIR Center 6 ft elev DB	15-12	57.3	72.9	76.2	76.5	78.9	82.7	80.7	81.0	82.1	86.2	83.2	82.8	83.5	85.6	85.3	84.5
WB	15-11	57.5	69.0	72.4	74.1	75.3	77.9	78.0	75.9	78.9	79.1	79.8	77.4	79.9	80.3	79.3	79.1
3-1/2 ft elev DB	15-4	57.8	73.7	77.[illegible]	[illegible]	79.9	83.0	81.4	81.3	82.9	84.7	83.2	[illegible]	84.0	85.6	85.3	84.8
WB	15-3	57.3	71.0	74.3	[illegible]	77.2	80.1	79.3	78.9	80.1	81.1	80.8	79.9	81.3	80.3	80.2	79.9
1 ft elev DB	15-2	57.3	72.2	75.1	75.8	78.1	81.8	80.3	80.3	81.7	83.2	82.3	82.4	83.3	84.8	84.4	84.2
WB	15-1	57.3	69.0	72.7	74.1	75.7	79.5	78.0	78.0	78.7	80.6	79.9	78.7	80.2	79.9	79.3	78.7
Near wall 3-1/2 ft elev DB	15-6	57.8	72.9	75.7	76.6	78.4	81.7	80.5	80.1	81.6	83.2	82.2	82.0	83.3	84.0	83.3	83.3
WB	15-5	57.7	71.2	74.7	75.8	77.7	81.2	80.1	80.1	80.9	82.4	81.8	81.3	82.3	81.3	81.4	80.7
In corner 3-1/2 ft elev DB	15-8	57.8	72.2	75.3	75.8	78.0	81.7	80.0	80.1	80.6	83.1	81.9	81.5	81.9	83.9	83.1	82.9
WB	15-7	57.7	70.8	74.0	74.9	77.2	80.9	79.4	79.2	80.2	82.0	81.0	81.2	82.4	81.4	81.3	80.9
INSIDE SURFACE TEMPS																	
SECTION B-B Wall	1-1	55.1	64.0	69.3	70.8	72.1	75.1	75.2	76.8	76.3	77.0	78.6	78.2	78.7	79.0	80.0	80.0
	1-7	56.7	64.6	68.9	71.0	72.5	74.3	74.9	76.3	76.7	77.9	77.1	78.3	78.7	78.9	78.9	78.5
	2-1	56.4	67.8	72.6	74.9	75.8	78.9	78.9	78.9	79.8	78.7	81.2	80.9	81.3	80.8	80.8	80.6
	2-7	55.0	64.3	68.7	70.4	72.4	76.3	75.3	75.9	76.6	78.2	78.2	78.1	78.7	78.9	78.4	78.3
	3-1	55.0	62.3	67.4	70.0	71.4	75.5	74.7	76.3	76.2	77.1	77.5	77.8	78.2	77.6	77.8	77.9
Ceiling	3-7																
	4-1	55.2	65.2	70.4	72.8	74.6	77.9	77.2	78.0	78.6	80.2	78.3	79.8	80.6	80.4	80.1	80.0
	4-7	56.9	65.8	70.1	71.9	73.6	76.9	76.7	77.0	77.9	78.9	77.8	78.9	79.7	79.2	79.4	79.2
Floor	5-1	56.4	70.1	74.3	76.5	78.8	83.0	81.9	82.9	83.8	83.8	82.4	85.0	85.8	85.4	85.5	85.1
	5-10	56.7	71.5	76.2	78.7	80.7	84.7	83.9	85.0	86.2	87.2	87.0	87.4	87.8	87.8	87.4	88.1
	6-4	54.9	64.7	69.3	70.9	72.9	76.4	75.8	76.4	77.2	78.4	78.4	78.7	79.2	78.8	79.0	79.2
SECTION C-C Wall	6-10	55.1	64.1	68.4	69.8	72.0	76.1	73.6	74.5	76.1	77.8	77.7	77.3	78.4	78.2	77.7	77.7
	7-4	56.5	64.2	68.3	69.8	71.9	73.7	73.8	75.3	76.3	77.7	77.7	77.2	78.2	77.9	77.4	77.5
	7-10	56.0	67.8	72.1	73.6	75.3	78.8	78.3	78.5	79.5	80.3	80.3	80.5	81.0	80.3	80.2	80.6
	8-4	54.7	64.8	68.6	70.0	72.0	74.2	75.2	75.4	76.3	77.9	77.3	77.1	78.1	77.9	77.3	77.6
	8-10	53.0	62.4	67.2	68.9	71.1	74.6	74.2	74.1	75.3	76.2	76.4	76.7	76.8	76.7	76.6	76.6
Ceiling	9-4	57.5	68.6	72.6	74.1	75.8	80.8	79.3	79.3	80.3	82.1	81.3	81.1	81.7	82.2	81.9	81.4
	9-10	56.0	66.4	70.2	71.9	74.2	78.0	77.1	77.2	78.0	80.0	78.9	77.6	79.8	80.0	79.7	80.0
	10-4	57.1	65.4	70.0	71.5	73.3	76.6	76.3	76.3	77.4	78.5	78.5	78.4	79.3	78.7	78.8	79.0
Floor	10-10	53.3	71.0	76.2	78.3	80.5	84.6	83.8	84.6	85.3	87.2	86.9	86.6	87.6	87.7	87.4	87.0
	11-7	55.6	70.2	75.2	75.8	79.8	83.5	82.7	83.5	84.6	85.7	85.4	85.6	86.2	86.0	85.8	86.0
	12-4	53.1	64.7	69.0	70.6	72.9	76.2	75.3	75.9	76.8	78.2	78.2	78.1	78.6	78.3	78.2	78.1
SECTION D-D	12-10	55.6	63.7	67.8	69.1	71.2	76.8	76.1	73.9	75.2	76.2	76.0	76.4	76.6	76.2	76.1	76.3
	13-4	55.2	63.0	66.4	67.9	69.8	72.8	71.3	72.8	73.7	73.3	75.1	75.1	75.5	75.3	75.1	74.9
	13-8	56.0	63.0	67.8	68.3	71.6	73.5	74.5	74.4	75.5	76.9	76.8	76.4	77.0	76.6	76.8	76.6
	14-2	53.6	62.1	66.6	68.1	70.3	74.0	73.1	73.3	74.1	75.9	75.6	73.7	76.0	75.0	75.3	75.3
	14-6	52.6	60.4	64.8	66.8	68.5	71.0	71.2	71.6	72.7	73.5	73.4	73.8	74.3	73.3	73.0	73.6
SIMOC SKIN TEMPS																	
Center - Top	18-7	62.5	79.9	82.1	83.6	85.3	88.0	82.0	87.1	88.3	88.8	88.6	88.6	89.6	89.6	90.0	90.0
Middle	18-8	62.0	81.3	82.6	83.7	85.3	88.0	86.9	87.0	88.1	86.9	88.5	88.0	89.3	88.6	88.8	87.4
Bottom	18-9	61.0	83.2	83.2	85.1	86.7	89.9	88.2	88.1	88.4	90.0	88.5	88.9	90.3	89.4	87.5	86.6
Near Wall - Middle	18-10								88.7	91.1	93.2	92.5	91.8	92.9	94.8	94.3	93.6
In Corner - Middle	18-11	58.0	75.6	79.0	79.0	81.1	83.1	83.3	86.0	85.0	86.0	85.6	85.6	85.6	85.6	85.0	86.9
OUTSIDE AIR TEMPS	19-5	66.6	67.6	49.7	51.7	56.2	71.0	65.3	56.6	51.7	60.0	55.9	50.1	53.7	50.1	63.7	64.9
	19-6	66.9	68.1	49.8	52.0	56.1	70.9	65.3	56.5	51.7	60.2	56.2	50.1	53.8	50.2	65.1	64.3
	19-7	66.9	68.0	49.8	52.0	56.7	70.9	65.3	56.5	51.7	60.2	56.2	50.1	53.8	60.0	64.3	63.8

	T.C. No.	210	216 (9)	222	228	234	240 (10)	246	252	258	264 (11)	270
AIR TEMPERATURES												
SUPPLY DUCT DB	15-10	78.7	86.3	94.5	83.9	77.8	85.1	94.4	83.9	78.1	86.8	94..
SUPPLY DUCT WB	15-9	76.5	81.0	88.8	81.0	76.1	82.2	89.3	81.2	76.8	83.9	89
RETURN DUCT DB	16-2	88.8	88.4	90.1	89.3	89.1	90.3	90.6	89.9	89.4	90.1	90.
RETURN DUCT WB	16-1	86.0	85.4	86.9	86.5	86.3	87.3	87.7	87.0	86.6	87.2	87
SHELTER AIR Center 6 ft elev DB	15-12	90.0	90.4	91.9	91.1	90.6	91.8	91.9	91.6	90.9	91.8	92..
WB	15-11	84.6	84.1	85.6	84.6	85.0	85.9	86.0	85.4	85.4	85.7	86
3-1/2 ft elev DB	15-4	89.7	89.6	91.5	90.7	89.8	91.6	92.0	91.1	90.4	91.4	91..
WB	15-3	85.3	84.7	86.0	85.6	86.1	86.9	86.9	86.0	86.2	86.3	86
1 ft elev DB	15-2	89.2	90.0	91.7	90.8	89.2	91.2	92.0	90.8	89.5	91.1	92..
WB	15-1	84.4	86.3	86.0	86.6	86.8	86.0	86.4	85.6	85.3	86.2	87
Near wall 3-1/2 ft elev DB	15-6	89.2	88.9	90.6	89.5	89.5	90.8	90.9	90.1	89.7	90.4	90.
WB	15-5	85.1	85.5	87.8	86.3	85.4	87.3	88.3	86.3	85.9	87.3	88
In corner 3-1/2 ft elev DB	15-8	88.7	88.4	94.4	89.3	89.3	90.3	90.6	90.0	89.4	90.3	90..
WB	15-7	86.0	86.0	87.3	86.5	86.5	87.8	88.1	87.0	86.9	87.7	88
INSIDE SURFACE TEMPS												
SECTION B-B Wall	1-1	85.9	85.0	85.9	87.1	86.9	85.9	87.0	87.3	87.1	86.9	86
	1-7	86.7	86.5	85.8	85.4	85.5	86.1	86.4	86.2	85.9	87.1	86.
	2-1	86.4	85.9	87.3	87.6	87.8	88.0	88.3	88.3	88.0	88.6	88.
	2-7	86.1	86.1	85.7	85.0	86.0	85.7	86.2	85.6	85.0	85.7	86
	3-1	83.7	83.3	84.9	84.6	84.4	85.2	85.2	85.1	84.6	85.1	85
Ceiling	3-7						81.3	92.0	92.1	91.4	91.4	91.
	4-1	87.2	87.9	88.3	87.8	87.9	88.8	88.7	88.6	88.3	88.9	89
	4-7	85.4	85.8	86.6	86.1	86.2	86.9	87.3	86.9	86.6	87.2	8
Floor	5-1	91.4	92.3	93.3	92.9	91.9	93.3	93.7	93.2	92.0	92.9	92
	5-10	94.2	94.5	95.3	94.9	95.0	95.9	95.6	95.3	95.2	95.6	95
	6-4	85.1	85.3	86.2	85.7	85.5	86.7	86.7	86.2	85.9	86.4	8
SECTION C-C Wall	6-10	84.3	84.7	85.6	85.0	85.0	85.9	86.0	85.5	85.5	86.0	86
	7-4	84.1	84.2	85.3	86.5	86.7	85.9	85.9	85.4	85.1	85.9	85
	7-10	86.7	86.6	87.6	87.3	87.4	88.0	88.3	88.0	87.6	88.0	88
	8-4	83.6	84.0	84.9	84.1	84.3	85.4	85.5	84.8	84.7	85.3	85
	8-10	82.6	82.7	83.8	83.2	8[illegible].3	84.4	84.5	83.8	83.7	84.3	8
Ceiling	9-4	90.6	90.4	91.9	91.6	91.4	92.3	92.3	92.1	91.6	92.2	92
	9-10	86.8	87.1	88.0	87.3	87.4	88.6	88.5	88.0	87.8	88.5	88
	10-4	85.1	84.5	86.1	85.6	85.5	86.4	86.0	86.3	86.0	86.5	8
Floor	10-10	92.6	92.6	93.1	91.3	90.5	92.2	92.9	91.5	90.7	92.3	9
	11-7	91.8	91.7	93.4	92.6	92.5	93.9	93.7	93.0	92.8	93.7	93
	12-4	84.2	84.6	85.4	84.6	84.8	86.0	85.9	85.3	85.0	85.9	8
SECTION D-D	12-10	82.4	81.7	81.2	81.7	82.9	84.0	83.0	83.6	83.1	83.8	8
	13-4	81.0	81.8	82.3	81.4	81.7	83.0	83.0	82.2	82.1	82.9	82
	13-8	82.6	82.7	83.4	83.0	83.2	83.0	84.0	83.5	83.3	83.0	84
	14-2	81.3	81.9	82.8	81.8	81.9	83.0	83.0	82.4	82.3	82.9	8
	14-6	79.8	79.7	80.6	80.0	80.2	81.0	81.1	80.9	80.8	81.1	8
SIMOC SKIN TEMPS												
Center - Top	18-7	94.2	94.0	95.0	95.1	95.3	96.1	95.4	95.3	93.3	93.3	9
Middle	18-8	92.2	91.6	93.5	94.3	92.6	93.5	94.0	93.0	93.1	90.1	9
Bottom	18-9	90.8	90.3	91.7	91.3	91.0	92.6	92.4	91.9	91.0	91.9	9
Near Wall - Middle	18-10	98.6	98.[illegible]	100.6	98.7	98.8	100.0	100.9	100.0	99.1	100.0	1
In Corner - Middle	18-11	90.0	89.9	90.3	90.6	90.4	91.3	[illegible]	90.9	90.7	91.2	9
OUTSIDE AIR TEMPS	19-5	51.3	52.1	50.0	52.0	49.5	48.8	51.7	51.8	50.4	56.8	[illegible]
	19-6	51.1	51.5	50.0	52.0	48.3	48.8	51.5	50.5	50.3	56.2	[illegible]
	19-7	50.6	51.4	50.5	50.9	48.3	48.2	51.3	50.1	48.3	56.1	[illegible]

*For detailed description of thermocouple locations see Sec. IV-A and B.

ERATURES INSIDE SHELTER*

lter; 45 occupants;
ccupant

2	78	84	90
5.0	93.3	83.0	73.3
3.9	78.9	74.6	69.5
2.4	83.4	83.2	83.0
0.2	80.5	81.2	80.8
3.5	85.6	85.3	84.5
9.9	80.3	79.3	79.1
4.0	83.6	85.3	84.8
1.3	80.3	80.2	79.9
3.3	84.8	84.6	84.2
0.2	79.9	79.3	78.7
3.3	84.0	83.3	83.3
2.3	81.3	81.4	80.7
1.9	83.9	83.1	82.9
2.4	81.4	81.3	80.9
0.7	79.0	80.0	80.0
8.7	78.9	78.9	78.5
1.3	80.8	80.8	80.4
8.7	78.9	78.4	78.3
8.2	77.6	77.8	77.5
0.6	80.4	80.1	80.0
9.7	79.2	79.4	79.2
5.8	85.4	85.5	85.1
7.8	87.8	87.6	88.1
9.2	78.8	79.0	79.2
8.4	78.2	77.7	77.7
8.2	77.9	77.6	77.5
1.0	80.3	80.2	80.6
8.1	77.9	77.3	77.6
6.8	76.7	76.6	76.6
1.7	82.2	81.9	81.4
9.8	80.0	79.7	80.0
9.3	78.7	78.8	79.0
7.6	87.7	87.6	87.0
6.2	86.0	85.8	86.0
8.5	78.3	78.2	78.1
6.6	76.2	76.1	76.3
5.3	75.3	75.1	74.9
7.0	76.6	76.8	76.6
6.0	75.8	75.3	75.3
4.3	73.3	73.8	73.6
9.6	89.4	89.8	89.0
9.3	88.6	88.8	87.4
0.3	88.4	87.5	86.6
2.9	96.8	96.3	93.6
5.6	85.6	85.0	84.9
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]

210	216 9	222	228	234	240 10	246	252	258	264 11	270	276	282	288 12	294	300	306	312 13	318
78.7	94.3	94.5	83.9	77.8	85.1	94.4	83.9	78.1	86.8	94.2	84.2	78.0	83.8	93.2	83.7	82.6	86.9	93.7
76.5	81.0	88.8	81.0	76.1	82.2	89.3	81.2	76.8	83.9	89.9	81.6	76.6	81.6	89.0	81.6	80.6	82.6	89.7
88.8	88.4	90.1	89.3	89.1	90.3	90.6	89.9	89.4	90.1	90.6	90.2	89.9	89.3	90.4	90.2	89.9	90.9	90.8
86.0	85.4	86.9	86.5	86.3	87.3	87.7	87.0	86.6	87.2	87.4	87.5	87.2	86.4	88.5	87.5	87.1	88.1	88.2
90.0	90.4	91.9	91.1	90.6	91.8	91.9	91.6	90.9	91.8	92.2	91.9	91.1	91.5	91.6	91.7	91.4	92.3	92.1
86.4	86.1	85.6	84.6	85.0	85.9	86.0	85.4	85.4	85.7	86.2	85.9	85.0	85.9	85.6	85.2	86.1	87.0	86.4
	89.8	91.5	90.7	89.8	91.6	92.0	91.1	90.4	91.4	91.9	91.4	90.8	90.1	91.6	91.1	90.8	91.9	92.1
3	84.7	86.0	85.6	86.1	86.9	86.9	86.0	86.2	86.3	86.8	86.4	86.8	86.0	86.7	86.8	86.5	87.2	87.3
89.2	90.0	91.7	90.8	89.2	91.2	92.0	90.8	89.5	91.1	92.1	91.0	90.2	90.6	91.3	90.7	90.4	91.4	91.9
84.4	84.3	86.0	84.6	84.8	86.0	86.4	85.6	85.3	86.2	87.0	86.0	86.2	86.3	86.8	86.8	86.3	87.6	87.6
89.2	88.9	90.4	89.5	89.5	90.8	90.9	90.1	89.7	90.4	90.9	90.5	90.2	90.0	90.4	90.6	90.3	91.3	91.1
85.1	85.5	87.8	86.3	85.4	87.3	88.3	86.3	85.9	87.3	88.0	87.2	86.8	86.3	88.1	87.3	87.3	88.1	88.6
88.7	88.4	94.4	89.3	89.3	90.3	90.6	90.0	89.4	90.3	90.6	90.3	90.1	89.8	90.4	90.6	90.2	91.2	90.6
86.0	86.0	87.3	86.5	86.5	87.8	88.1	87.0	86.9	87.7	88.0	87.6	87.7	87.2	87.7	87.7	87.3	88.5	88.2
85.9	85.0	85.9	87.1	86.9	85.9	87.0	87.3	87.1	86.9	86.9	87.8	87.3	87.0	87.4	87.6	87.4	87.6	88.3
84.7	84.5	85.8	85.4	85.5	86.1	84.4	86.2	85.9	87.1	84.9	86.6	86.1	86.3	86.3	86.7	86.6	87.1	87.1
86.4	85.9	87.3	87.6	87.8	88.0	88.3	88.3	88.0	89.6	88.4	88.8	88.4	88.3	88.6	89.0	88.8	89.3	89.5
86.1	86.1	85.7	85.0	86.8	85.7	86.2	85.6	85.0	85.7	86.4	86.1	85.6	85.7	85.9	86.0	86.0	86.5	87.0
83.7	83.3	84.9	84.6	84.4	85.2	85.2	85.1	84.6	85.1	85.3	85.8	85.0	85.0	85.1	85.7	85.2	85.9	86.2
					81.3	92.0	92.1	91.4	91.1	91.8	92.4	91.9	91.4	91.7	92.3	92.0	91.9	92.5
87.2	87.9	88.3	87.8	87.9	88.8	88.7	88.6	88.3	88.9	89.1	88.9	88.7	88.4	88.4	89.0	88.9	89.6	89.3
85.4	85.6	86.6	86.1	86.2	86.9	87.3	86.9	86.6	87.2	87.2	87.4	87.1	86.8	87.3	87.5	87.3	88.0	88.3
91.4	92.3	93.3	92.9	91.9	93.3	93.7	93.2	92.0	92.9	93.5	93.5	91.0	91.3	91.4	91.7	91.2	92.1	92.2
96.2	94.5	95.3	94.9	95.0	95.9	95.6	95.3	95.2	95.6	95.1	94.8	94.6	94.2	94.2	94.7	94.4	95.5	95.0
85.1	85.3	86.2	85.7	85.5	86.7	86.7	86.2	85.9	86.4	86.6	86.7	86.2	85.8	86.6	86.8	86.3	87.3	87.3
84.3	84.7	85.6	85.0	85.0	85.9	86.0	85.6	85.5	86.0	86.3	86.2	85.9	86.1	85.7	86.3	85.2	86.9	86.6
84.1	84.2	85.3	84.5	84.7	85.9	85.9	85.4	85.1	85.9	85.9	85.9	85.9	85.6	85.4	86.1	86.0	87.0	86.5
86.7	86.6	87.6	87.3	87.6	88.0	88.3	88.0	87.6	88.0	88.2	88.3	88.1	87.7	88.2	88.6	88.4	89.2	89.0
83.6	84.0	84.9	84.1	84.3	85.4	85.5	84.8	84.7	85.3	85.7	85.3	85.1	85.3	85.0	85.5	85.2	86.3	85.8
82.4	82.7	83.8	83.2	83.3	84.4	84.5	83.8	83.7	84.3	84.4	84.3	84.3	83.9	84.1	84.7	84.3	85.3	84.9
90.6	90.4	91.9	91.4	91.4	92.3	92.3	92.1	91.6	92.3	92.8	92.7	92.1	92.1	92.1	92.7	92.2	93.2	92.8
86.8	87.1	88.0	87.3	87.4	88.6	88.5	88.0	87.8	88.5	88.7	88.4	88.3	88.1	88.4	88.6	88.4	89.3	89.1
85.1	84.5	86.1	85.6	85.5	86.4	86.0	86.3	86.0	86.5	86.7	86.8	86.5	86.4	86.4	86.9	86.8	87.5	87.3
92.6	92.6	93.1	91.3	90.5	92.2	92.9	91.5	90.7	92.1	93.2	92.4	91.9	92.1	92.7	92.7	92.3	93.3	93.6
91.9	91.7	93.4	92.4	92.5	93.9	93.7	93.0	92.8	93.7	93.9	93.5	93.3	93.3	93.2	93.8	93.4	94.3	94.1
84.2	84.6	85.4	84.6	84.8	86.0	85.9	85.3	85.0	85.9	86.1	85.8	85.8	85.8	85.5	86.1	85.7	87.0	86.4
82.4	81.7	83.2	82.7	82.9	84.0	83.8	83.4	83.1	83.8	83.9	84.0	83.8	83.8	83.6	84.0	83.9	84.9	84.4
81.0	81.8	82.5	81.4	81.7	83.0	83.0	82.2	82.1	82.9	82.9	82.8	82.7	82.8	82.5	83.1	82.9	83.0	83.2
82.6	82.7	83.6	83.0	83.2	83.0	84.0	83.5	83.5	83.8	84.5	84.2	84.1	83.9	83.9	84.3	84.1	85.2	84.7
81.3	81.9	82.8	81.8	81.9	83.0	83.0	82.4	82.3	82.9	83.2	82.9	83.0	83.1	82.6	83.2	83.0	84.0	83.4
79.8	79.7	80.6	80.0	80.7	81.0	81.1	80.9	80.8	81.1	81.1	81.3	81.3	81.4	81.3	81.5	81.3	82.3	81.8
94.6	[illegible]	95.0	93.1	93.3	96.1	95.6	95.5	95.5	95.5	95.3	96.1	95.9	94.9	95.6	95.9	95.6	96.3	96.1
92.2	91.6	93.5	93.3	92.5	[illegible]	94.0	93.0	93.1	93.1	94.0	93.6	93.3	92.4	93.9	93.7	93.2	94.0	94.4
90.8	[illegible]	[illegible]	91.3	91.0	92	92.4	91.9	91.0	91.9	92.3	92.2	91.4	91.2	92.1	92.0	91.6	92.7	92.5
98.4	[illegible]	100.6	99.7	98.8	100.0	100.9	100.0	99.1	100.0	101.0	100.4	99.4	99.2	100.7	100.3	[illegible]	100.8	101.0
90.0	84.9	[illegible]	[illegible]	90.4	91.3	91.0	[illegible]	[illegible]	91.2	91.1	91.4	91.2	90.8	90.8	91.5	91.3	90.8	91.3
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	48.8	[illegible]	51.0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	70.1
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	48.8	[illegible]	[illegible]	50.0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	79.3
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

96 4	102	108	114	120 5	126	132	138	288 12
83.9	92.8	82.7	73.4	85.6	92.6	82.9	73.	83.8
75.5	74.4	71.7	68.4	74.9	80.2	75.4	70.	81.6
83.6	84.4	84.1	83.6	85.4	85.8	85.0	85.	89.3
81.3	81.3	81.8	81.2	82.9	83.1	82.9	82.	86.4
85.6	86.1	86.0	85.1	86.7	87.4	87.6	85.	91.3
79.3	81.1	79.4	79.9	80.8	81.6	81.0	81.	85.9
85.8	86.2	85.9	84.9	87.1	87.5	87.4	86.	90.1
80.2	82.0	81.0	80.8	81.3	82.3	81.9	82.	86.0
84.9	85.3	85.3	84.4	83.3	87.1	86.9	85.	90.6
79.3	80.3	79.8	79.8	80.9	81.3	80.8	80.	86.3
85.1	85.0	84.4	84.1	85.9	85.7	85.7	85.	90.0
81.3	82.3	81.9	81.0	82.9	83.4	82.7	81.	86.3
83.5	84.4	83.9	83.6	85.4	85.7	85.4	84.	89.8
81.6	82.0	81.8	81.5	83.2	83.3	82.9	82.	87.2
80.6	80.1	81.4	81.0	81.5	82.4	82.5	82.	87.0
79.0	79.7	79.7	79.3	80.1	81.0	81.3	80.	86.3
81.1	81.4	81.6	81.1	82.0	83.2	83.6	82.	88.3
78.9	79.7	79.4	78.9	79.9	80.6	80.8	80.	85.7
78.0	78.4	78.8	78.9	79.4	80.2	80.3	80.	85.0
								91.4
80.4	81.2	81.2	81.0	82.0	82.8	82.9	82.	88.4
80.0	80.3	80.6	80.1	81.2	81.9	82.1	81.	86.8
86.0	85.4	86.4	85.8	87.3	88.0	88.2	87.	91.3
88.3	88.8	83.7	88.9	90.0	89.9	90.2	90.	94.2
79.5	79.9	80.1	80.0	81.2	81.3	81.8	81.	85.8
78.3	79.0	79.2	78.9	80.3	80.2	80.8	80.	86.1
78.0	78.9	78.4	78.3	80.0	80.0	80.4	79.	85.6
81.0	81.2	81.6	81.1	82.8	82.8	83.0	82.	87.7
78.0	79.0	78.6	78.4	80.0	79.9	80.1	79.	85.3
77.4	77.8	77.4	77.3	78.6	78.9	78.8	78.	83.9
83.1	83.1	83.9	84.2	85.8	86.2	86.5	86.	92.1
80.4	81.1	80.8	80.8	82.2	82.7	82.8	82.	88.1
79.5	79.9	79.3	79.8	80.9	81.1	81.4	81.	86.4
87.7	88.9	87.3	85.8	87.6	88.1	88.2	87.	92.1
87.3	87.1	86.8	86.7	88.0	88.1	88.3	88.	93.3
79.3	79.4	78.9	78.9	80.1	80.2	80.2	80.	83.8
[illegible]	77.2	77.1	77.2	78.2	78.5	78.7	78.	83.8
75.3	76.8	75.9	75.9	77.1	77.6	77.4	77.	82.8
[illegible]	[illegible]	[illegible]	77.6	79.6	78.9	79.1	78.	83.9
75.8	75.6	76.3	76.2	77.3	77.8	77.8	77.	83.1
74.1	74.7	74.3	74.2	75.6	[illegible]	76.1	75.	81.6
90.3	89.4	90.0	90.0	91.7	91.4	91.4	91.	94.9
88.8	88.7	88.3	87.9	89.8	89.9	89.4	88.	92.4
88.2	87.7	86.9	86.8	88.4	87.9	87.8	87.	91.7
96.3	95.3	96.7	93.7	95.7	96.1	95.9	95	99.2
85.0	85.6	85.3	85.4	86.8	86.6	87.0	86.	90.8
66.0	66.1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	58.0
[illegible]	67.1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
64.7	66.2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

ouple locations see Sec. IV-A and B.

B

	294	300	306	312	318	96	102	108	114	120	126	132	138	144	150	156	162	168	174	180	186	192	198	204	324	330	336
				13		4				5				6				7				8					14
8	93.2	83.7	82.6	84.9	93.7	83.9	92.8	82.7	73.4	85.6	92.6	82.9	73.7	84.3	92.4	83.8	74.8	83.1	93.8	84.8	79.8	84.1	93.6	84.0	83.7	82.3	85.2
6	89.0	81.6	80.6	82.6	89.7	75.5	74.4	71.7	68.4	74.9	80.2	75.4	70.0	77.1	83.7	78.2	72.0	77.9	86.4	80.7	77.0	81.0	87.5	80.5	81.7	80.4	80.6
3	90.4	90.2	89.9	90.9	90.8	83.6	84.4	84.1	83.6	85.4	85.8	85.8	85.0	86.5	87.7	87.2	86.2	85.8	88.1	88.8	88.6	88.7	89.0	88.8	90.6	90.5	93.8
4	88.3	87.3	87.1	88.1	88.2	81.3	81.3	81.8	81.2	82.9	83.1	82.9	82.4	83.7	84.4	84.5	83.4	83.1	85.0	86.3	86.0	86.0	85.9	85.8	87.9	87.9	87.8
3	91.6	91.7	91.4	92.3	92.1	85.6	86.1	86.0	85.1	86.7	87.4	87.6	86.4	88.0	89.4	88.8	87.7	88.2	90.0	90.6	90.2	90.4	90.8	90.3	92.0	92.0	91.5
9	85.6	86.2	86.1	87.0	86.4	79.3	81.1	79.4	79.9	80.8	81.6	81.0	81.0	82.2	83.5	82.3	82.1	81.4	84.4	84.1	84.3	84.5	87.5	86.0	86.4	86.6	89.2
1	91.6	91.1	90.8	91.9	92.1	85.8	86.2	85.9	84.9	87.1	87.5	87.4	86.1	88.1	89.4	88.7	87.2	87.8	90.0	90.4	89.9	90.3	90.5	90.1	91.5	91.5	90.5
0	86.7	86.8	86.5	87.2	87.3	80.2	82.0	81.0	80.8	81.3	[illegible]	81.9	82.1	82.7	84.0	83.7	83.2	81.8	84.5	85.2	85.4	85.3	85.0	85.0	87.1	87.6	87.3
6	91.3	90.7	90.4	91.4	91.9	84.9	85.3	85.3	84.4	86.3	87.1	86.9	85.3	87.3	89.4	89.3	86.8	87.3	90.0	89.8	89.4	89.9	90.4	89.8	91.1	91.0	90.6
3	85.8	86.8	86.3	87.6	87.6	79.3	80.3	79.8	79.8	80.9	81.3	80.8	80.6	82.1	83.7	82.4	81.9	81.6	84.0	84.1	84.1	84.4	84.5	84.0	87.2	87.2	86.0
0	90.4	90.6	90.3	91.3	91.1	85.1	85.0	84.4	84.1	85.9	85.7	85.7	85.2	87.0	88.3	87.2	86.5	86.1	88.7	89.0	88.9	89.2	89.3	89.1	91.1	91.0	89.6
3	86.1	87.3	87.3	88.1	88.6	81.3	82.3	81.9	81.0	82.9	83.4	82.9	81.9	[illegible]	85.6	84.3	82.8	83.1	86.2	85.7	85.2	86.1	86.4	85.8	87.8	87.6	87.4
8	90.4	90.6	90.2	91.2	90.6	83.5	84.4	83.9	83.6	85.4	85.7	85.6	84.9	84.4	88.2	87.2	86.0	86.1	88.3	88.8	88.6	88.7	89.1	88.8	90.8	90.6	89.3
2	87.7	87.7	87.3	88.5	88.2	82.6	82.0	81.8	81.5	83.2	83.3	82.9	82.3	[illegible]	85.6	84.6	83.6	82.4	85.8	86.2	85.9	86.2	86.1	86.1	88.1	88.1	88.7
0	87.4	87.6	87.4	87.6	88.3	80.6	80.1	81.4	81.0	81.5	82.4	82.5	82.2	82.4	82.4	83.9	83.4	83.5	84.1	86.0	85.9	83.5	85.0	86.0	88.0	88.1	88.0
3	86.3	86.7	86.6	87.1	87.2	79.0	79.7	79.7	79.3	80.1	81.0	81.3	80.6	81.9	83.3	82.9	82.0	81.9	83.8	84.5	84.3	83.6	84.7	84.8	87.8	86.9	86.7
3	88.4	89.0	88.8	89.3	89.5	81.1	81.4	81.6	81.1	82.0	83.2	83.0	82.3	83.4	85.7	84.8	83.7	83.8	85.2	86.3	86.0	84.0	86.0	86.4	89.2	89.2	89.2
7	85.9	86.0	86.0	86.5	87.0	78.9	79.7	79.4	78.9	79.9	80.6	80.8	80.3	81.5	83.3	82.6	81.4	81.5	83.7	84.2	83.9	83.8	84.7	84.4	86.2	86.0	85.8
0	85.1	85.7	85.2	85.9	86.2	78.0	78.4	78.8	78.9	79.4	80.2	80.3	80.0	80.9	82.4	82.1	81.0	80.8	82.8	83.8	83.3	82.8	83.4	83.9	85.9	[illegible]	[illegible]
4	91.7	92.3	92.0	94.9	92.5																				92.2	92.5	92.3
6	88.4	89.0	88.8	89.6	89.3	80.6	81.2	81.2	81.0	82.0	82.8	82.9	82.4	83.4	85.3	84.8	84.0	83.5	85.8	86.7	86.5	86.2	86.5	87.0	89.1	89.2	89.0
8	87.3	87.5	87.3	88.0	88.3	80.0	80.3	80.6	80.1	81.2	81.9	82.1	81.4	82.6	84.4	83.8	82.7	82.9	84.4	85.4	85.1	83.4	85.3	85.6	88.0	88.1	87.8
3	91.4	91.7	91.2	92.1	92.2	86.0	85.4	84.4	85.8	87.5	88.0	88.2	87.3	89.1	90.9	90.2	88.6	88.8	91.3	91.7	91.0	91.2	92.0	92.0	91.9	91.4	93.1
2	94.2	94.7	94.4	95.3	95.0	88.3	88.8	88.7	88.9	90.0	89.9	90.2	90.0	91.2	92.6	92.1	91.2	90.9	92.9	93.7	93.6	93.2	93.6	94.0	94.8	95.0	94.7
8	84.4	84.8	84.3	87.3	87.2	79.5	79.9	80.1	80.0	81.2	81.3	81.8	81.3	82.6	84.1	83.4	82.7	82.7	84.3	84.9	84.8	84.4	84.9	85.2	87.0	86.9	86.7
1	85.7	86.3	86.2	86.9	86.6	78.3	79.0	79.2	78.9	80.3	80.2	80.8	80.3	81.8	83.0	82.5	81.4	81.3	83.2	84.0	84.0	83.6	84.0	84.3	86.6	86.4	86.3
6	85.4	86.1	86.0	87.0	86.5	78.0	78.9	78.4	78.3	80.0	80.0	80.4	79.9	81.3	82.8	82.2	81.2	81.1	82.8	83.8	83.4	83.5	83.4	83.9	86.2	86.3	86.3
7	88.2	88.6	88.4	89.2	89.6	81.0	81.2	81.5	81.1	82.8	82.8	83.0	82.6	83.9	85.0	85.0	84.0	84.0	85.3	86.4	86.3	85.6	86.0	86.6	88.9	89.0	88.8
3	85.0	[illegible]	85.2	86.3	85.8	78.0	79.0	78.4	78.4	80.0	79.9	80.1	79.8	81.2	82.6	81.9	81.0	80.9	82.8	83.2	83.3	83.2	83.4	83.6	85.8	85.8	85.8
9	84.1	84.7	84.3	85.2	84.9	77.4	77.8	77.4	77.3	78.6	78.9	78.8	78.9	80.1	81.3	80.9	80.0	80.1	81.4	82.4	82.3	81.9	82.3	82.5	84.9	84.9	84.9
1	92.1	92.7	92.2	93.7	92.8	83.3	83.1	83.9	84.2	85.8	86.2	86.5	86.2	[illegible]	89.0	88.6	87.7	87.3	89.5	90.0	90.1	89.6	90.4	90.7	92.9	92.7	92.4
1	88.4	88.6	88.4	89.3	89.1	80.6	83.1	80.8	80.8	82.2	82.7	82.9	82.4	83.9	85.5	84.7	83.5	84.0	85.8	86.3	86.3	86.1	86.4	86.6	88.9	89.0	88.8
4	84.6	84.9	84.8	87.5	87.3	79.5	79.9	79.8	79.8	80.9	81.3	81.4	81.0	82.3	83.6	83.3	82.3	82.3	83.8	84.9	84.6	83.9	84.5	85.0	87.3	87.4	87.2
1	92.7	92.7	93.3	93.3	93.6	87.7	88.9	87.3	85.8	87.6	88.1	88.2	87.2	89.4	91.4	90.6	88.7	89.2	91.7	91.7	91.6	92.3	92.8	92.8	93.0	93.0	92.6
3	93.2	93.8	93.4	94.3	94.1	87.3	87.1	86.8	86.7	88.0	88.1	84.3	88.1	89.5	91.2	90.2	89.5	89.5	91.3	91.7	91.5	91.4	91.8	91.8	94.0	94.0	93.8
8	85.5	86.1	85.7	87.0	86.4	79.3	79.4	78.9	78.9	80.3	80.2	80.5	80.1	81.9	83.0	82.1	81.2	81.5	83.3	84.0	83.9	84.0	83.9	83.9	86.3	86.4	86.1
8	83.6	84.0	83.9	84.9	84.6	76.7	77.2	77.1	77.2	78.2	78.5	78.7	78.4	79.9	80.7	80.5	79.7	79.9	81.2	82.1	82.1	81.3	81.8	82.0	84.1	84.8	84.4
8	82.5	83.1	82.9	83.8	83.2	75.3	76.8	75.9	[illegible]	77.1	77.6	77.4	77.2	78.9	80.2	79.1	78.4	78.6	80.3	80.9	80.9	80.9	81.2	80.8	83.3	83.4	83.4
9	83.0	84.3	84.1	85.2	84.7	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	84.8	85.0	84.9
1	82.6	83.2	83.0	84.0	83.4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	83.4	83.7	83.5
4	81.3	81.5	81.3	82.3	81.8	76.2	76.7	76.3	76.2	75.6	75.9	76.1	75.9	77.2	78.0	77.6	77.2	77.2	78.6	79.6	[illegible]	78.7	79.3	79.3	82.1	82.2	82.0
9	95.6	95.4	95.6	96.3	96.1	90.3	90.4	90.0	90.6	91.7	91.6	91.6	91.3	92.1	92.9	92.8	92.6	91.8	93.2	94.7	94.6	94.3	93.8	94.3	94.3	94.5	92.0
4	93.9	93.7	93.2	94.8	94.4	88.8	88.7	88.3	87.9	89.8	89.9	89.4	88.9	90.0	91.7	90.4	90.0	89.6	91.6	92.0	92.0	91.8	92.5	91.9	94.1	94.1	91.7
2	92.1	92.0	91.6	92.7	92.5	88.2	87.7	86.9	86.2	86.4	87.9	87.8	87.4	88.4	90.0	89.3	88.3	88.0	90.0	90.9	90.7	90.8	90.8	90.7	92.4	92.3	91.2
2	100.7	100.5	100.0	100.2	101.0	96.3	95.2	94.7	93.7	93.7	94.3	95.9	95.0	96.3	98.5	97.3	[illegible]	96.2	98.8	98.6	98.3	98.4	99.5	98.8	101.0	100.7	98.7
8	90.8	91.5	91.3	90.0	93.3	85.8	85.6	85.5	85.6	86.8	86.6	87.0	86.7	87.6	88.4	88.2	[illegible]	87.6	88.5	90.0	88.8	88.7	88.3	88.9	91.8	91.9	93.2
0	76.8	67.6	58.2	63.1	78.1	66.0	66.1	63.6	62.2	60.0	53.6	60.8	67.3	53.4	61.2	58.8	58.8	57.6	60.3	61.8	57.2	57.6	56.0	52.0	70.7	62.9	63.3
4	76.7	68.5	58.1	62.8	78.3	63.3	67.1	63.4	62.2	60.2	54.1	60.6	60.5	52.2	61.5	58.8	58.6	57.1	60.3	61.6	57.2	57.6	56.0	51.7	71.9	62.8	62.8
[illegible]	75.6	62.7	57.6	62.0	78.5	66.7	66.7	62.5	61.5	60.2	52.3	60.1	60.4	52.1	61.2	58.4	58.0	57.0	60.0	60.6	56.8	57.1	55.6	51.1	70.7	62.1	62.8

C

Table XIII-B. VARIATION OF TEMPERATURES IN SOIL SURROUNDING SHELTER*

21 x 21 x 7 ft. shelter; 45 occupants; 3 cfm/occupant

(Test of April 20 - May 4)

SOIL TEMPERATURES	T.C. No.	Time From Start of Test, Hrs. → Days → 0	24 1	48 2	72 3	96 4	120 5	144 6	168 7	192 8	216 9	240 10	264 11	288 12	312 13	336 14
SECTION B-B																
Outside Wall																
Diagonally Up	1-1	55.1	72.1	76.3	78.7	80.6	81.5	82.4	83.5	83.5	85.0	85.9	86.9	87.0	87.6	88.0
	1-2	54.2	59.6	63.7	66.3	68.6	70.4	72.1	72.4	73.8	76.6	76.7	77.5	78.1	79.0	79.8
	1-3	54.2	56.7	58.7	60.7	61.2	63.6	65.2	66.2	67.3	68.8	70.0	71.0	71.7	72.6	73.3
	1-4	54.0	55.0	55.7	57.1	57.1	58.3	59.3	60.3	62.1	62.9	64.0	64.4	65.3	66.8	68.0
	1-5	51.8	52.7	55.7	55.2	53.6	52.4	54.1	57.0	58.4	57.6	57.6	57.8	59.4	62.8	65.1
	1-6	46.8	54.4	53.2	53.1	48.2	49.3	50.8		57.0	52.7	50.9	54.2	59.6	60.8	62.0
Horizontal 6 ft elev	1-7	56.7	72.5	76.7	78.7	79.0	80.1	81.9	81.9	83.6	84.5	86.1	87.1	86.3	87.1	86.7
	1-8	55.3	61.5	66.4	68.9	70.9	72.4	74.5	75.0	76.7	77.7	79.0	79.6	79.8	80.9	80.9
	1-9	54.2	57.1	60.0	61.8	63.0	64.8	67.2	67.8	69.9	70.7	72.5	72.8	73.3	74.3	74.2
	1-10	52.0	54.6	55.6	57.1	57.3	58.9	60.9	61.5	63.5	64.4	66.0	66.8	67.5	68.4	68.8
	1-11	52.0	54.5	54.0	55.0	54.5	55.0	55.8	56.9	57.5	58.7	60.1	61.2	61.8	62.9	64.0
	1-12	51.6	52.6	53.1	53.3	52.0	51.5	52.0	52.9	54.0	54.5	55.4	56.0	56.6	58.0	59.4
3-1/2 ft elev	2-1	56.5	75.8	79.8	81.3	81.1	82.0	83.4	83.8	84.0	85.9	88.0	88.4	88.3	89.3	89.2
	2-2	55.4	62.3	67.3	69.8	72.0	73.0	75.1	75.8	76.8	77.8	79.4	80.1	80.2	81.3	81.3
	2-3	54.0	56.3	60.0	62.3	63.4	65.3	67.3	68.0	69.7	70.4	72.2	72.9	73.4	74.6	74.8
	2-4	52.9	53.4	53.6	56.6	57.1	58.9	60.8	61.5	63.5	64.0	66.0	66.6	67.0	68.3	68.3
	2-5	51.6	52.3	51.1	53.4	53.3	54.2	55.8	56.3	58.0	58.4	60.2	60.8	61.3	62.6	62.4
	2-6	50.6	51.3	50.9	51.3	51.0	51.2	52.2	52.2	53.6	53.8	55.1	55.4	56.2	57.2	57.2
1 ft elev	2-7	55.0	72.5	76.6	78.7	78.9	79.9	81.5	81.5	83.8	84.1	85.7	85.8	85.7	86.5	85.8
	2-8	53.9	61.3	66.4	68.4	70.4	71.7	73.8	73.9	75.9	76.4	77.6	78.1	78.5	79.3	79.3
	2-9	53.3	58.1	60.3	62.9	63.2	64.9	66.4	67.5	68.3	69.2	70.7	71.8	72.0	73.1	73.6
	2-10	52.3	53.3	54.7	56.0	57.1	58.4	60.0	61.0	62.2	62.8	64.5	65.4	65.6	67.1	67.4
	2-11	51.0	51.9	52.4	52.9	52.1	53.3	54.6	55.2	56.2	56.6	58.4	59.0	59.3	60.6	61.1
	2-12	49.9	50.8	51.1	51.2	50.2	50.2	51.2	51.3	52.2	52.5	53.5	54.0	54.2	55.4	55.5

* For detailed description of thermocouple locations see Section IV-A.

Table XIII-B. VARIATION OF TEMPERATURES IN SOIL SURROUNDING SHELTER*

21 x 21 x 7 ft. shelter; 45 occupants; 3 cfm/occupant

(Test of April 20 - May 4)

SOIL TEMPERATURES	T.C. No.	Time From Start of Test, Hrs. → Days → 0	24 1	48 2	72 3	96 4	120 5	144 6	168 7	192 8	216 9	240 10	264 11	288 12	312 13	336 14
SECTION B-B																
Outside Wall																
Diagonally Down	3-1	55.0	71.4	76.2	78.2	78.0	79.4	80.9	80.8	82.8	83.3	85.2	85.1	85.0	85.9	85.6
	3-2	52.1	56.8	60.6	62.8	65.6	67.0	68.8	68.8	71.0	72.3	73.1	73.5	73.5	74.8	74.8
	3-3	52.0	54.5	56.0	57.6	58.1	59.3	61.2	61.8	63.6	64.0	66.0	66.2	66.3	67.5	67.5
	3-4	51.3	52.2	53.0	53.0	53.0	53.9	55.1	55.2	57.2	58.1	58.8	59.1	59.4	60.5	60.3
	3-5	50.3	50.9	51.3	50.9	50.2	50.3	51.3	51.2	52.4	52.9	53.3	53.4	53.8	54.6	54.2
	3-6	48.9	50.2	49.4	49.5	48.3	48.8	49.3	49.0	50.0	50.3	50.3	50.3	50.7	51.3	51.0
Above Roof 10-1/2 ft from wall	3-7											91.3	91.1	91.4	91.9	92.3
	3-8	57.7	69.1	74.3	77.4	78.4	80.8	82.7	82.8	84.9	86.1	87.9	88.4	88.2	89.3	89.7
	3-9	57.1	62.6	67.7	72.0	73.8	77.0	79.5	80.8	82.1	83.5	85.4	86.0	85.8	87.3	87.4
	3-10	56.8	59.2	63.7	67.2	71.6	74.3	76.6	77.2	80.0	81.1	83.0	83.5	83.4	85.1	85.5
	3-11	55.9	57.1	61.0	64.7	71.6	71.7	74.0	75.2	78.0	78.8	80.6	81.1	80.9	82.9	83.3
	3-12	55.2	56.4	59.6	64.3	71.0	71.0	72.7	74.2	77.2	78.6	79.2	79.6	79.3	81.3	81.9
3 ft from wall	4-1	55.2	74.6	78.6	80.6	80.4	82.0	83.4	83.5	86.2	87.9	88.8	88.9	88.4	89.6	89.0
	4-2	57.0	68.2	73.0	76.6	77.4	79.1	81.1	81.8	83.7	85.8	86.4	86.5	86.7	87.7	87.3
	4-3	56.3	61.9	66.8	70.3	72.2	75.3	77.4	78.1	80.7	82.6	83.3	83.9	84.0	85.1	85.1
	4-4	55.8	58.3	62.9	66.8	70.2	72.5	74.4	75.4	78.0	80.0	80.7	81.1	81.5	82.7	83.0
	4-5	55.5	57.3	61.1	64.7	70.3	70.7	72.3	74.5	75.3	76.6	78.2	78.8	78.9	80.8	81.7
	4-6	55.2	57.0	60.0	63.4	68.3	69.2	71.5	73.8	75.1	75.8	77.3	77.9	77.3	79.5	80.4
1 ft from wall	4-7	56.8	73.6	77.9	79.7	80.0	81.2	82.6	82.9	83.4	85.8	86.9	87.2	86.8	88.0	87.8
	4-8	55.2	66.8	71.0	74.4	75.4	77.3	79.2	79.5	81.1	82.6	83.7	84.1	83.9	85.1	85.1
	4-9	55.2	61.3	65.9	68.6	70.3	73.3	75.1	75.7	77.6	78.4	80.0	80.5	80.4	81.9	82.0
	4-10	55.1	57.4	62.0	64.7	68.8	70.1	71.9	72.7	74.9	75.4	77.4	77.5	77.6	79.0	79.4
	4-11	55.1	55.6	59.0	61.9	68.4	67.5	69.0	70.3	72.6	73.6	74.5	74.5	74.6	76.4	76.8
	4-12	54.3	55.1	58.0	61.1	67.9	67.2	68.1	69.6	72.0	72.7	73.2	73.4	73.4	75.2	76.6

* For detailed description of thermocouple locations see Section IV-A.

Table XIII-B. VARIATION OF TEMPERATURES IN SOIL SURROUNDING SHELTER*

21 x 21 x 7 ft. shelter; 45 occupants; 3 cfm/occupant

(Test of April 20 - May 4)

SOIL TEMPERATURES	T.C. No.	Time From Start of Test, Hrs. → Days → 0	24 1	48 2	72 3	96 4	120 5	144 6	168 7	192 8	216 9	240 10	264 11	288 12	312 13	336 14
SECTION B-B																
Below Floor																
10-1/2 ft from wall	5-1	54.3	78.8	83.8	86.4	86.0	87.3	89.1	88.8	91.2	92.3	93.3	92.9	91.3	92.1	91.1
	5-2	55.2	62.8	69.0	72.8	74.6	76.4	78.4	78.5	80.7	81.4	83.0	83.1	83.2	83.9	83.2
	5-3	55.2	61.8	64.9	68.6	69.1	71.1	72.9	73.9	74.8	75.9	77.4	78.3	78.3	79.6	79.9
	5-4	55.2	57.4	60.0	61.8	62.9	64.6	66.6	67.7	68.9	69.9	71.6	72.4	72.4	73.8	73.9
	5-5	55.1	56.5	57.3	58.5	58.9	59.8	61.2	62.0	63.7	64.3	66.4	66.7	67.0	68.4	68.3
	5-6	55.2	55.7	56.1	55.8	55.8	56.0	57.4	57.5	59.1	59.5	61.2	61.4	61.8	63.1	63.2
	5-7	55.2	55.4	55.3	55.0	54.9	55.4	56.5	56.7	58.0	58.4	59.6	60.0	60.2	61.6	61.5
	5-8	54.2	55.1	54.1	54.1	54.0	54.2	55.0	54.9	56.3	56.3	57.4	57.7	57.8	59.0	58.9
	5-9	53.0	54.8	53.2	53.2	53.4	54.2	54.2	53.7	55.0	54.9	55.8	55.8	56.0	57.0	56.9
3 ft from wall	5-10	54.7	80.7	86.2	87.8	88.3	90.0	91.2	90.9	93.2	94.5	95.9	95.6	94.2	95.3	94.7
	5-11	55.0	64.7	70.2	72.9	75.7	77.3	79.5	79.2	81.3	82.4	83.7	83.8	83.5	84.3	83.5
	5-12	54.2	58.7	63.6	66.9	68.1	70.3	72.6	73.0	75.0	75.8	77.4	77.7	78.0	78.8	78.1
	6-1	53.0	56.5	59.6	62.0	62.6	64.4	66.0	67.0	68.0	68.9	70.8	71.5	71.8	72.9	73.1
	6-2	53.0	55.1	56.8	57.9	57.9	59.2	60.6	61.4	62.7	63.5	65.0	65.6	65.4	67.3	67.3
	6-3	52.6	54.9	55.2	55.0	54.4	55.1	56.5	56.7	58.0	58.4	59.7	60.2	60.3	61.8	61.9
1 ft from wall	6-4	54.8	72.9	75.8	79.2	79.5	81.2	82.6	82.7	84.4	85.3	86.7	86.4	85.8	87.3	86.7
	6-5	54.2	60.9	66.4	68.2	70.3	72.2	73.9	74.1	75.7	76.8	78.0	78.2	78.2	79.2	79.0
	6-6	53.6	57.0	60.6	62.9	63.9	65.8	67.7	68.1	70.1	70.3	72.2	72.4	72.7	73.9	73.6
	6-7	53.4	54.5	56.7	58.8	59.2	60.7	62.0	62.5	64.3	65.3	66.8	67.0	67.3	68.6	68.2
	6-8	52.4	53.3	54.2	55.0	55.2	56.3	57.9	57.9	59.8	60.0	61.6	61.7	62.1	63.2	63.0
	6-9	52.3	52.8	53.0	53.1	52.7	53.3	54.4	54.3	56.1	56.1	57.3	57.3	57.8	59.0	58.4

* For detailed description of thermocouple locations see Section IV-A.

Table XIII-B. VARIATION OF TEMPERATURES IN SOIL SURROUNDING SHELTER*

21 x 21 x 7 ft. shelter; 45 occupants; 3 cfm/occupant
(Test of April 20 - May 4)

SOIL TEMPERATURES	T.C. No.	Time From Start of Test, Hrs. → / Days → 0	24 1	48 2	72 3	96 4	120 5	144 6	168 7	192 8	216 9	240 10	264 11	288 12	312 13	336 14
SECTION C-C																
Outside Wall																
Diagonally Up	6-10	55.2	72.0	76.1	78.4	78.3	80.3	81.8	81.3	83.6	84.7	85.9	86.0	86.1	86.9	86.3
	6-11	54.6	59.2	63.0	65.3	67.7	69.6	71.1	72.1	72.9	73.7	75.6	76.0	76.3	77.6	78.1
	6-12	54.2	55.6	57.7	59.2	60.3	62.3	63.8	64.3	66.1	67.2	68.8	69.1	69.0	70.8	71.3
	7-1	51.9	54.0	54.2	55.4	55.8	57.3	58.2	59.0	61.3	61.8	63.4	62.9	63.9	65.5	66.4
	7-2	50.3	52.1	54.1	53.3	51.2	50.5	52.2	56.9	57.9	55.6	55.4	55.4	57.3	61.0	62.6
	7-3	47.0	52.2	52.5	52.1	48.3	49.4	51.0	56.7	57.0	53.8	51.3	54.0	59.0	60.4	61.6
Horizontal																
6 ft elev	7-4	56.5	71.9	76.3	78.2	78.0	80.0	81.3	81.1	83.5	84.2	85.9	85.9	85.6	87.0	86.2
	7-5	53.5	61.9	66.7	68.7	70.6	72.5	74.3	74.4	76.3	77.6	79.1	79.1	79.2	80.4	80.1
	7-6	53.5	55.5	58.4	60.1	61.6	63.7	65.8	66.0	68.4	69.2	71.0	71.0	71.4	72.6	72.4
	7-7	52.6	53.4	54.7	56.0	56.2	58.0	59.7	60.0	62.4	63.1	64.8	65.1	65.5	66.9	66.7
	7-8	51.7	52.3	52.8	53.3	52.9	54.1	55.2	55.3	57.7	58.4	59.5	59.9	60.4	61.6	62.0
	7-9	51.0	52.2	52.6	53.2	52.0	51.7	51.9	52.5	54.0	54.3	55.5	55.4	55.9	58.0	59.4
3-1/2 ft elev	7-10	56.0	75.3	79.5	81.0	81.0	82.8	83.9	84.0	85.6	86.6	88.0	88.0	87.7	89.2	82.8
	7-11	53.5	62.7	67.6	69.8	72.0	73.9	75.3	75.6	77.1	78.1	79.4	79.6	79.3	80.9	80.6
	7-12	53.3	56.1	59.8	62.0	63.1	65.7	67.3	67.7	69.7	70.3	72.2	72.3	72.4	73.8	73.5
	8-1	50.0	53.0	52.2	55.0	56.1	58.3	59.6	60.0	62.1	62.2	64.4	64.7	65.1	66.4	65.4
	8-2	50.0	52.3	52.2	53.4	52.8	54.2	55.3	55.3	57.2	57.7	59.2	59.5	59.8	61.1	61.1
	8-3	50.0	51.0	50.8	51.1	50.4	51.6	51.8	51.3	53.2	53.2	54.4	54.8	55.0	56.1	56.1
1 ft elev	8-4	54.7	72.0	76.3	78.1	78.0	80.0	81.2	80.9	83.2	84.0	85.4	85.3	85.3	86.3	85.8
	8-5	53.7	62.2	66.7	69.3	70.6	72.5	74.1	74.1	75.9	76.7	78.0	77.9	78.0	78.9	78.5
	8-6	52.4	55.1	59.0	61.0	62.2	64.6	66.4	66.5	68.6	69.3	70.7	71.0	71.4	72.3	72.0
	8-7	51.1	52.8	53.6	55.0	55.3	57.0	58.5	59.0	60.0	60.8	62.2	62.9	63.2	64.5	64.9
	8-8	50.3	51.4	52.1	52.0	51.9	53.0	53.9	54.2	55.4	55.8	57.4	57.7	58.0	59.5	59.4
	8-9	49.0	50.5	50.4	50.4	49.4	50.1	50.0	50.7	51.5	51.7	52.8	53.0	53.0	54.4	54.2

* For detailed description of thermocouple locations see Section IV-A.

Table XIII-B. VARIATION OF TEMPERATURES IN SOIL SURROUNDING SHELTER*

21 x 21 x 7 ft. shelter; 45 occupants; 3 cfm/occupant

(Test of April 20 - May 4)

SOIL TEMPERATURES	T.C. No.	Time From Start of Test, Hrs. → / Days → 0	24 1	48 2	72 3	96 4	120 5	144 6	168 7	192 8	216 9	240 10	264 11	288 12	312 13	336 14
SECTION C-C																
Outside Wall																
Diagonally Down	8-10	53.0	71.1	75.3	76.8	77.4	78.6	80.1	80.1	81.9	82.7	84.4	84.3	83.9	85.3	84.7
	8-11	51.7	57.0	61.0	62.9	65.1	66.6	68.4	68.7	70.3	71.1	72.4	72.7	72.9	73.8	73.6
	8-12	50.8	53.1	55.1	56.6	57.1	59.2	60.6	61.0	62.9	63.2	64.7	65.0	65.1	66.4	66.0
	9-1	51.0	49.8	57.1	52.0	52.4	53.0	54.5	54.2	56.1	56.2	57.5	57.7	58.0	59.0	52.7
	9-2	50.0	49.8	50.8	50.2	49.9	50.2	50.8	50.3	52.2	51.7	52.7	52.7	53.0	53.8	53.3
	9-3	48.8	49.3	49.2	48.9	48.2	49.0	48.9	48.4	49.6	49.1	50.0	49.9	50.1	50.6	50.4
Above Roof 10-1/2 ft from wall	9-4	57.5	75.8	80.3	81.7	83.1	85.8	87.4	87.3	89.6	90.4	92.3	92.3	92.1	93.2	92.4
	9-5	57.8	68.8	75.3	76.9	78.9	82.0	84.4	86.8	86.9	88.2	90.2	90.7	90.5	91.8	92.1
	9-6	57.6	63.4	68.0	71.3	73.6	76.7	79.7	81.0	83.0	84.1	86.3	86.9	86.7	88.3	88.4
	9-7	56.8	59.2	64.1	67.0	71.4	73.1	75.9	77.3	80.0	81.0	83.3	83.6	83.8	85.3	85.6
	9-8	56.0	57.3	61.6	64.8	71.2	71.3	73.3	75.2	77.8	78.4	80.8	81.0	81.0	83.1	83.3
	9-9	55.4	57.0	60.6	64.3	68.3	69.8	72.2	74.3	76.9	77.2	79.1	79.3	79.3	81.4	82.0
5 ft from wall	9-10	56.0	74.2	78.0	79.8	80.4	82.2	83.9	84.0	86.1	87.1	88.6	88.5	88.1	89.3	88.9
	9-11	55.2	67.3	71.8	73.9	75.9	78.7	80.9	80.9	83.1	84.0	85.6	85.7	85.6	86.8	86.4
	9-12	55.2	61.1	65.8	67.9	71.0	74.3	76.7	76.8	79.3	79.8	82.0	81.7	82.2	83.2	83.1
	10-1	53.9	57.1	60.8	64.0	69.3	71.4	73.3	73.8	76.4	77.5	79.2	79.1	79.3	80.6	80.6
	10-2	53.9	55.6	59.8	62.9	68.6	69.0	70.7	71.4	74.1	75.2	76.2	76.3	77.4	78.0	78.5
	10-3	53.9	55.6	59.6	62.8	67.3	67.8	69.8	70.7	73.2	73.4	75.0	75.3	75.3	77.3	78.0
1 ft from wall	10-4	57.2	73.3	77.4	79.3	79.5	80.9	82.3	82.3	83.9	84.5	86.4	86.5	86.4	87.5	87.2
	10-5	56.5	66.8	70.1	73.9	74.2	76.9	78.4	78.5	80.3	80.9	83.0	83.0	82.9	84.4	83.8
	10-6	55.8	60.5	64.9	67.7	69.3	72.3	74.1	74.3	76.4	76.9	79.0	79.0	79.0	80.3	80.4
	10-7	55.2	57.4	61.6	64.4	67.8	69.5	71.1	71.3	73.7	74.5	75.6	75.8	76.1	77.6	77.8
	10-8	54.2	55.2	59.0	61.8	66.8	67.0	68.0	69.1	71.3	71.7	73.0	72.8	73.0	74.9	75.2
	10-9	53.6	54.8	57.6	60.5	66.0	65.3	66.3	67.8	70.2	70.0	71.3	71.0	71.2	73.2	73.7

* For detailed description of thermocouple locations see Section IV-A.

Table XIII-B. VARIATION OF TEMPERATURES IN SOIL SURROUNDING SHELTER*

21 x 21 x 7 ft. shelter; 45 occupants; 3 cfm/occupant

(Test of April 20 - May 4)

SOIL TEMPERATURES	T.C. No.	Time From Start of Test, Hrs. → / Days → 0	24 1	48 2	72 3	96 4	120 5	144 6	168 7	192 8	216 9	240 10	264 11	288 12	312 13	336 14
SECTION C-C																
Below Floor 10-1/2 ft from wall	10-10	54.3	80.5	85.3	87.6	87.7	87.6	89.4	89.1	92.3	92.6	92.2	92.3	92.1	93.3	92.6
	10-11	53.8	63.1	68.9	72.7	74.5	76.0	77.4	78.5	81.0	81.9	82.2	82.1	82.4	83.3	82.9
	10-12	53.9	59.2	64.1	67.8	68.0	70.3	72.4	72.8	75.5	75.8	77.0	77.3	77.8	78.5	78.3
	11-1	54.7	57.4	58.1	61.0	62.8	64.5	66.4	67.2	68.6	69.2	71.2	71.7	72.1	73.3	73.3
	11-2	54.7	56.1	57.1	58.6	58.8	59.8	61.5	62.0	63.9	64.5	66.0	66.3	66.8	68.1	67.8
	11-3	54.7	54.8	55.6	56.3	55.6	56.2	57.5	57.5	59.3	59.5	61.0	61.2	61.5	63.1	62.5
	11-4	54.7	54.7	54.0	55.5	55.0	55.3	56.6	56.3	58.0	58.1	59.4	59.5	60.0	61.2	60.8
	11-5	53.4	53.4	53.2	54.2	54.1	54.3	54.9	54.7	56.0	55.9	57.0	57.0	57.1	58.3	58.2
	11-6	53.1	53.2	53.0	53.8	53.7	53.6	54.0	53.3	54.9	54.4	55.4	55.2	55.3	56.3	56.0
3 ft from wall	11-7	55.6	79.8	84.6	86.2	87.3	88.0	89.5	89.5	91.4	91.7	93.9	93.7	93.3	94.3	93.8
	11-8	53.0	62.0	68.0	71.2	73.7	75.4	77.6	77.[illegible]	79.0	80.7	82.1	82.3	82.7	83.5	83.3
	11-9	53.0	57.8	62.7	65.7	66.8	68.9	71.1	71.6	73.7	74.8	76.0	76.4	76.8	77.9	77.6
	11-10	53.0	54.9	57.5	60.1	60.8	62.7	64.8	65.3	67.4	67.8	69.8	70.1	70.8	71.5	71.4
	11-11	53.0	54.4	54.3	57.5	57.4	58.8	60.3	60.9	63.0	62.8	64.2	64.6	65.4	66.5	66.5
	11-12	52.7	54.3	54.2	55.0	53.7	54.9	56.1	56.2	57.7	57.9	59.3	59.4	60.0	61.4	61.2
	12-1	53.8	54.1	54.1	54.4	52.7	53.8	55.3	54.9	56.4	56.6	57.8	58.0	58.4	59.7	59.2
	12-2	53.4	53.8	54.7	54.0	52.1	52.9	53.9	53.3	54.5	54.4	55.5	55.4	55.6	56.8	56.4
	12-3	53.3	53.6	54.0	53.7	51.8	52.5	52.8	52.4	53.5	53.3	54.0	54.0	54.2	55.0	54.8
1 ft from wall	12-4	53.1	72.9	76.8	78.6	79.3	80.3	81.9	81.5	84.0	84.6	86.0	85.9	85.8	87.0	86.1
	12-5	53.4	59.3	64.2	66.2	68.4	70.2	72.3	72.1	74.2	74.9	76.2	76.3	76.6	77.7	77.0
	12-6	52.9	55.7	59.3	61.8	62.1	64.1	66.1	66.3	68.4	69.1	70.2	70.6	71.0	72.1	71.6
	12-7	52.5	53.4	55.1	56.8	57.1	58.8	60.6	60.8	62.8	63.6	64.5	65.0	65.6	66.4	66.2
	12-8	51.8	52.3	53.1	54.1	55.0	55.3	56.7	56.8	58.5	59.2	60.0	60.3	60.9	61.8	61.7
	12-9	51.8	52.4	52.9	53.3	52.7	53.4	54.4	54.2	55.3	55.4	56.5	56.9	57.0	58.5	58.5

* For detailed description of thermocouple locations see Section IV-A.

Table XIII-B. VARIATION OF TEMPERATURES IN SOIL SURROUNDING SHELTER*

21 x 21 x 7 ft. shelter; 45 occupants; 3 cfm/occupant

(Test of April 20 - May 4)

SOIL TEMPERATURES	T.C. No.	Time From Start of Test, Hrs. → / Days → 0	24 1	48 2	72 3	96 4	120 5	144 6	168 7	192 8	216 9	240 10	264 11	288 12	312 13	336 14
SECTION D-D																
Outside Corner																
Diagonally Up	12-10	55.6	71.2	75.2	76.6	76.7	78.2	79.9	79.9	81.3	81.7	84.0	83.8	83.8	84.9	84.4
	12-11	53.7	53.8	55.6	57.6	59.3	60.8	62.2	62.2	64.3	65.3	66.5	66.7	67.0	68.4	68.5
	12-12	52.6	52.9	53.4	55.0	55.0	55.5	56.4	56.3	58.9	59.6	60.5	60.5	60.9	62.5	63.0
	13-1	49.4	50.2	52.2	52.4	52.1	51.2	52.0	52.5	56.0	55.6	56.0	55.2	56.3	59.4	61.3
	13-2	45.7	53.6	51.4	52.3	46.7	50.5	51.8	56.3	59.5	52.8	50.0	53.9	57.9	62.8	60.8
	13-3	45.0	53.6	51.0	52.0	46.7	50.1	51.2	56.3	59.3	52.5	49.4	53.5	57.2	61.9	60.3
Horizontal 6 ft elev	13-4	55.2	69.8	73.7	75.5	75.3	77.1	78.9	78.4	80.9	81.8	83.0	82.9	82.8	83.8	83.4
	13-5	51.1	53.6	56.0	58.0	60.1	61.3	63.5	63.4	65.4	66.2	67.7	68.0	68.3	69.3	69.2
	13-6	51.1	52.4	53.2	55.0	55.0	55.9	57.3	57.4	59.2	59.8	61.3	61.6	62.0	63.0	63.1
	13-7	51.1	52.3	51.2	53.2	52.4	52.9	53.4	53.2	54.4	54.9	56.3	56.5	57.0	58.1	58.8
3-1/2 ft elev	13-8	53.9	71.6	75.5	77.6	77.2	78.6	80.1	80.0	81.8	82.7	83.8	83.8	83.9	85.2	84.9
	13-9	50.7	53.3	56.0	58.4	60.2	61.8	63.8	63.9	65.4	65.9	67.3	67.8	68.2	69.4	69.2
	13-10	49.4	50.5	51.7	53.2	54.0	55.9	57.4	57.5	59.1	59.4	60.8	61.1	61.5	62.8	63.5
	13-11	49.3	49.4	51.1	51.6	51.0	52.0	52.8	52.8	54.3	54.3	55.2	55.4	55.8	57.2	57.0
	13-12	49.0	49.3	50.4	50.2	49.6	49.8	50.2	49.7	51.3	51.1	52.0	52.0	52.2	53.2	53.0
	14-1	47.6	47.0	47.9	48.6	49.0	48.9	49.0	48.1	49.9	49.8	50.3	50.2	50.2	51.2	51.4
1 ft elev	14-2	53.7	70.3	74.1	76.0	75.8	77.3	77.6	78.4	81.3	81.9	83.0	82.9	83.1	84.0	83.5
	14-3	50.8	51.6	54.1	56.2	58.2	59.7	61.3	61.4	63.7	64.1	65.2	65.4	65.8	66.9	66.6
	14-4	49.4	50.6	51.5	52.4	52.4	53.3	54.9	55.0	56.6	57.2	57.9	58.3	58.9	59.8	59.8
	14-5	48.9	50.5	50.4	51.2	49.9	50.7	51.4	51.7	52.3	52.4	53.4	53.9	54.3	55.3	55.3
Diagonally Down	14-6	52.6	68.5	72.7	74.3	74.1	75.6	77.2	77.2	78.7	79.7	81.0	81.1	81.4	82.3	82.0
	14-7	50.0	52.4	54.7	56.1	57.8	59.4	60.9	60.9	62.3	62.8	64.0	64.3	64.7	65.9	65.6
	14-8	50.0	51.3	51.5	52.3	52.0	52.9	54.1	54.1	55.4	55.4	56.5	56.9	57.3	58.3	58.0
	14-9	48.8	49.8	50.3	50.2	46.0	49.7	50.2	49.9	51.2	51.1	51.8	51.8	52.3	52.9	52.9
	14-10	47.7	48.3	48.7	48.1	48.1	48.0	48.5	47.6	49.1	49.5	49.2	49.1	49.2	49.8	49.7
	14-11	46.1	47.2	46.7	46.5	46.3	46.4	47.0	46.0	47.4	46.6	47.2	47.0	46.9	47.6	47.0

* For detailed description of thermocouple locations see Section IV-A.

Table XIV-A. VARIATION OF TEMPERATURES INSIDE SHELTER*

21 x 21 x 7 ft. shelter; 45 occupants; 3 cfm/occupant

	T.C. No.	Time From Start of Test, Hrs. → / Days → 0 (0)	6	12	18	24 (1)	30	36	42	48 (2)	54	60	66	72 (3)	78	84	90	96
AIR TEMPERATURES																		
SUPPLY DUCT																		
DB	15-10	67.4	93.8	83.2	78.5	85.5	94.3	83.0	77.8	85.4	94.5	83.4	77.5	85.0	94.5	84.0	77.4	85.0
WB	15-4	64.4	75.0	72.3	71.3	72.3	74.8	70.5	70.4	72.5	74.5	72.0	70.5	72.0	75.0	72.0	70.5	72.0
RETURN DUCT																		
DB	16-2	67.4	82.4	84.5	85.5	86.0	87.7	88.6	88.2	89.2	90.4	90.0	90.0	90.5	91.2	91.6	91.0	90.3
WB	16-1	64.9	79.7	82.0	83.4	83.9	85.0	86.4	86.0	86.3	88.3	88.4	88.9	87.9	90.0	89.5	88.9	88.0
SHELTER AIR																		
Center																		
6 ft elev																		
DB	15-12	69.0	83.8	85.0	86.9	87.3	88.8	89.0	88.5	90.0	91.0	90.0	90.0	90.9	92.5	91.5	91.0	91.0
WB	15-11	68.7	77.8	81.6	81.1	84.5	84.0	84.2	85.0	85.6	86.5	86.0	86.0	86.0	88.0	87.4	88.0	86.5
3-1/2 ft elev																		
DB	15-4	68.6	84.5	85.9	87.0	88.0	88.9	90.0	89.3	90.3	92.2	92.0	91.2	92.0	93.8	92.5	92.2	92.3
WB	15-3	67.9	80.0	83.0	83.6	84.2	84.2	86.0	86.3	86.5	87.4	88.0	88.0	88.2	88.7	90.0	89.2	89.7
1 ft elev																		
DB	15-2	67.9	82.4	85.0	85.8	87.3	88.6	89.0	88.4	90.0	91.2	90.1	90.0	90.0	92.7	91.5	91.0	91.4
WB	15-1	67.9	77.7	80.8	82.3	83.4	85.0	85.0	85.5	85.7	87.0	86.9	86.4	86.9	87.4	87.8	87.5	88.0
Near Wall																		
3-1/2 ft elev																		
DB	15-6	68.7	83.4	84.8	85.8	87.0	88.7	89.0	88.7	89.6	90.4	90.5	90.0	90.9	91.6	92.0	91.0	91.9
WB	15-5	68.5	80.7	83.4	84.5	85.5	87.3	87.5	86.8	88.3	90.0	89.7	88.8	90.0	90.6	90.3	90.0	90.2
In Corner																		
3-1/2 ft elev																		
DB	15-8	68.7	83.3	84.5	85.8	87.2	88.7	89.0	89.0	90.0	90.4	90.5	90.0	90.9	91.7	92.0	91.0	91.8
WB	15-7	68.5	81.0	83.3	84.7	86.4	87.0	87.5	88.0	88.6	89.0	89.7	89.5	90.0	90.4	91.0	91.0	90.8
INSIDE SURFACE TEMPS.																		
SECTION B-B																		
Wall	1-1	69.0	77.0	81.0	82.2	82.8	83.2	85.0	85.2	85.8	87.0	87.4	87.1	87.7	88.3	89.2	88.6	88.8
	1-7	71.2	77.6	79.2	82.0	83.4	84.4	85.0	85.6	86.5	87.2	87.3	86.7	87.6	88.2	89.1	88.5	88.5
	2-1	68.5	76.9	81.7	82.0	84.2	84.1	86.3	85.2	85.7	88.1	88.7	87.7	87.7	90.0	90.0	90.2	39.4
	2-7	68.9	76.6	78.9	81.0	82.9	82.2	84.4	85.0	85.3	87.0	87.0	86.2	87.0	87.0	88.4	86.9	88.1
	3-1	66.3	74.4	79.6	80.2	82.5	83.2	84.0	84.2	84.5	86.5	87.0	86.1	86.9	88.2	87.7	88.0	88.2
Ceiling	3-7	68.3	83.8	87.0	87.9	88.0	89.6	90.7	90.3	90.5	92.5	92.3	92.3	92.8	94.2	94.2	93.7	94.0
	4-1	69.5	76.6	81.0	82.6	84.0	85.0	85.3	86.0	87.2	87.9	88.8	88.4	89.0	90.0	90.4	90.1	90.2
	4-7	70.8	78.3	80.0	82.3	83.3	84.5	85.6	86.0	87.6	87.9	88.0	86.3	88.2	89.1	89.5	89.3	89.0
Floor	5-1	67.9	81.4	86.0	86.0	87.1	89.2	90.1	89.3	90.0	92.5	92.6	91.0	92.3	94.0	92.5	91.0	91.8
	5-10	67.9	86.7	89.8	91.2	92.6	93.5	94.5	95.8	95.4	96.9	97.3	97.0	97.5	97.7	98.0	97.9	97.3
	6-4	66.5	78.0	91.0	82.0	82.9	84.6	85.1	86.3	87.4	88.0	88.2	87.7	88.3	89.2	89.2	89.3	89.0
SECTION C-C																		
Wall	6-10	70.0	77.2	80.0	81.8	83.0	84.0	84.6	85.3	86.5	87.0	86.6	86.5	87.0	88.3	87.8	88.3	88.2
	7-4	72.0	76.9	80.0	81.4	82.6	84.1	84.5	85.0	85.3	86.5	86.9	86.3	87.0	88.3	88.3	88.5	88.6
	7-10	70.0	76.9	81.5	83.1	84.0	84.0	86.0	86.4	88.0	88.5	88.6	88.0	89.0	90.0	90.0	90.0	89.9
	8-4	67.9	75.2	79.1	80.7	82.5	83.2	84.0	84.2	85.0	86.5	86.7	86.0	86.7	87.5	88.3	88.0	88.2
	8-10	67.0	75.0	76.8	80.2	81.2	83.2	83.7	84.0	84.4	86.0	86.6	86.0	86.4	87.5	87.8	87.5	87.7
Ceiling	9-4	69.2	80.2	83.0	84.4	86.0	87.0	87.5	88.0	88.5	90.0	90.4	89.7	90.3	91.6	91.3	91.3	91.4
	9-10	70.0	76.8	80.4	82.3	83.5	84.5	85.4	86.3	87.0	88.3	88.8	88.1	89.0	90.0	90.3	90.0	90.0
	10-4	70.2	77.8	81.1	82.3	83.7	84.5	84.3	85.5	86.3	87.6	87.5	87.2	88.2	89.2	89.5	88.3	89.7
Floor	10-10	68.5	80.0	83.5	85.7	87.4	87.9	88.3	88.7	89.6	90.5	91.4	90.6	91.1	92.4	92.5	91.5	92.2
	11-7	67.4	85.8	88.0	89.9	91.6	91.0	94.0	94.4	94.7	96.3	96.9	95.4	96.7	97.0	97.1	97.0	97.2
	12-4	66.6	78.5	81.1	82.3	84.2	85.4	85.5	86.3	87.0	88.0	88.2	87.7	88.3	89.5	89.4	89.3	89.8
SECTION D-D	12-10	70.4	76.5	80.0	81.5	82.4	83.5	84.2	84.7	85.0	86.5	86.7	86.3	86.6	87.9	88.2	87.9	88.0
	13-4	71.3	76.0	79.0	80.1	80.6	82.4	82.5	83.6	84.4	84.8	85.3	84.8	85.7	85.7	86.4	86.5	87.1
	13-8	70.0	75.1	8.7	80.2	82.2	82.8	84.2	84.5	85.0	86.3	86.6	86.0	86.7	88.2	88.1	88.0	88.3
	14-2	68.5	75.6	78.0	80.0	81.8	82.0	83.3	83.5	84.3	85.2	85.8	85.1	85.7	87.0	86.5	86.5	87.1
	14-6	67.3	74.7	78.2	79.3	80.3	81.0	81.6	82.1	83.0	84.0	84.7	84.0	84.4	85.4	85.6	85.4	86.0
SIDE SKIN TEMPS.																		
Center - Top	18-7	68.5	89.3	90.4	91.5	92.5	93.4	94.1	94.0	95.0	96.0	96.6	95.9	96.6	97.0	97.2	97.0	95.5
Middle	18-8	68.5	91.3	90.5	91.4	92.5	93.3	94.1	93.3	94.6	96.0	95.8	95.0	95.9	96.8	97.0	96.8	95.4
Bottom	18-9	68.3	94.5	92.6	92.5	91.6	90.8	92.3	97.3	92.4	93.0	93.5	93.1	94.0	94.6	93.5	92.6	93.4
Near Wall - Middle	18-10	97.8	96.4	95.0	95.2	97.0	99.0	98.8	98.6	99.3	101.5	101.1	100.0	101.4	102.5	102.4	101.5	100.8
In Corner - Middle	18-11	67.5	89.0	88.5	88.0	90.0	91.6	92.3	92.3	92.6	93.3	93.0	93.5	94.0	94.3	93.5	93.8	92.6
OUTSIDE AIR TEMPS	19-5	70.4	74.3	71.8	67.4	75.3	78.1	73.9	65.8	78.0	79.8	70.3	68.3	66.2	67.0	63.4	62.0	63.7
	19-6	70.4	74.3	71.3	67.3	75.3	80.5	73.4	65.8	78.0	81.8	70.2	68.3	66.2	67.0	63.4	62.0	63.6
	19-7	70.4	74.3	70.9	67.3	75.3	79.3	73.1	65.8	78.0	81.0	70.0	68.3	66.2	67.0	63.4	62.0	63.9

*For detailed description of thermocouple locations see Sec. IV-A and B.

Table XIV-B. VARIATION OF TEMPERATURES IN SOIL SURROUNDING SHELTER*

21 x 21 x 7 ft. shelter; 45 occupants; 3 cfm/occupant

(Test of July 9 - 13)

SOIL TEMPERATURES	T.C. No.	Time from Start of Test, Hrs. Days → 0	24 1	48 2	72 3	96 4
SECTION B-B						
Outside Wall						
Diagonally Up	1-1	69.0	82.8	85.8	87.7	88.8
	1-2	70.8	74.3	76.5	79.6	80.0
	1-3	70.9	74.0	74.8	76.5	76.6
	1-4	70.9	73.0	73.0	75.0	73.3
	1-5	70.4	72.1	72.4	72.8	69.0
	1-6	70.0	72.2	72.8	67.2	63.2
Horizontal						
6 ft elev	1-7	71.2	83.4	86.5	87.6	88.5
	1-8	70.3	77.1	79.2	81.0	82.2
	1-9	70.8	73.4	75.8	77.3	78.3
	1-10	71.2	72.6	73.2	74.0	74.5
	1-11	70.7	72.0	72.5	73.5	74.5
	1-12	70.4	71.7	71.4	72.4	72.6
3-1/2 ft elev	2-1	68.5	84.2	85.7	87.7	89.4
	2-2	69.0	75.2	79.4	81.8	81.9
	2-3	69.3	73.0	74.5	76.5	78.8
	2-4	69.6	71.3	71.5	73.2	74.0
	2-5	70.0	70.0	70.2	70.6	71.6
	2-6	70.0	70.3	70.1	69.6	70.0
1 ft elev	2-7	68.9	82.9	85.3	87.0	88.1
	2-8	67.3	74.9	77.4	79.2	80.0
	2-9	67.3	70.5	72.7	75.7	76.9
	2-10	67.3	68.8	69.0	71.4	72.7
	2-11	67.2	68.0	68.5	69.0	69.5
	2-12	67.0	67.6	67.2	68.0	68.5

* For detailed description of thermocouple locations see Section IV-A.

Table XIV-B. VARIATION OF TEMPERATURES IN SOIL SURROUNDING SHELTER*

21 x 21 x 7 ft. shelter; 45 occupants; 3 cfm/occupant

(Test of July 9 - 13)

SOIL TEMPERATURES	T.C No.	Time from Start of Test, Hrs.→ Days→ 0	24 1	48 2	72 3	96 4
SECTION B-B						
Outside Wall						
Diagonally Down	3-1	66.3	82.5	84.5	86.9	88.2
	3-2	66.3	69.5	71.5	73.7	74.4
	3-3	66.3	67.4	68.4	69.5	70.4
	3-4	65.2	66.1	66.5	66.3	66.8
	3-5	64.0	64.4	63.9	64.2	64.5
	3-6	62.4	63.2	63.3	62.8	62.9
Above Roof						
10-1/2 ft from wall	3-7	68.3	88.0	90.5	92.8	94.0
	3-8	69.8	79.0	83.4	87.0	88.1
	3-9	70.0	76.0	80.3	83.9	84.6
	3-10	70.0	74.0	76.2	80.5	80.0
	3-11	70.0	72.7	74.5	77.0	74.5
	3-12	70.0	72.5	74.5	72.5	69.4
3 ft from wall	4-1	69.5	84.0	87.2	89.0	90.2
	4-2	72.0	79.5	83.3	86.0	87.3
	4-3	71.2	76.1	80.0	82.5	83.4
	4-4	71.2	74.2	77.0	79.4	79.7
	4-5	69.5	72.5	74.1	77.4	75.5
	4-6	69.2	72.2	73.5	75.0	72.2
1 ft from wall	4-7	70.8	83.3	87.6	88.2	89.0
	4-8	72.0	79.3	82.0	84.5	84.8
	4-9	72.0	76.0	77.5	81.4	82.3
	4-10	72.0	73.9	76.0	78.8	79.0
	4-11	72.0	73.0	74.0	76.3	75.0
	4-12	71.5	72.5	73.5	75.4	73.9

* For detailed description of thermocouple locations see Section IV-A.

Table XIV-B. VARIATION OF TEMPERATURES IN SOIL SURROUNDING SHELTER*

21 x 21 x 7 ft. shelter; 45 occupants; 3 cfm/occupant

(Test of July 9 - 13)

SOIL TEMPERATURES	T.C. No.	Time from Start of Test, Hrs. → Days → 0	24 1	48 2	72 3	96 4
SECTION B-B						
Below Floor						
10-1/2 ft from wall	5-1	67.9	87.1	90.0	92.3	91.8
	5-2	67.3	72.3	75.3	78.0	79.5
	5-3	67.0	70.0	73.0	76.3	77.3
	5-4	66.5	67.5	68.5	71.1	72.8
	5-5	66.0	66.6	67.0	67.5	69.3
	5-6	65.2	65.8	65.0	65.5	66.8
	5-7	64.8	65.0	65.0	65.2	65.5
	5-8	64.0	63.0	63.5	63.9	64.0
	5-9	62.5	62.5	62.9	63.0	62.9
3 ft from wall	5-10	67.9	92.6	95.4	97.5	97.3
	5-11	67.9	73.0	76.0	78.5	79.7
	5-12	67.0	69.5	72.0	74.6	76.2
	6-1	64.4	67.0	68.0	71.1	72.8
	6-2	64.4	66.1	67.0	67.7	68.9
	6-3	63.5	65.0	65.3	65.2	66.0
1 ft from wall	6-4	66.5	82.9	87.4	88.3	89.0
	6-5	67.3	71.0	73.8	76.3	77.9
	6-6	66.6	68.5	70.2	72.3	73.6
	6-7	66.0	66.2	67.0	68.5	69.8
	6-8	65.2	65.0	65.0	65.5	65.5
	6-9	64.4	64.0	64.6	64.8	64.4

* For detailed description of thermocouple locations see Section IV-A.

Table XIV-B. VARIATION OF TEMPERATURES IN SOIL SURROUNDING SHELTER*

21 x 21 x 7 ft. shelter; 45 occupants; 3 cfm/occupant

(Test of July 9 - 13)

SOIL TEMPERATURES	T.C. No.	Time from Start of Test, Hrs. → Days → 0	24 1	48 2	72 3	96 4
SECTION C-C						
Outside Wall						
Diagonally Up	6-10	70.0	83.0	86.5	87.0	88.2
	6-11	70.5	74.0	76.3	80.0	81.4
	6-12	71.2	73.0	73.7	76.3	77.0
	7-1	70.5	72.5	71.6	72.0	73.4
	7-2	70.0	71.2	71.5	69.4	65.2
	7-3	70.0	72.2	72.8	67.2	64.3
Horizontal						
6 ft elev	7-4	72.0	82.6	85.3	87.0	88.6
	7-5	72.3	76.8	79.7	81.3	83.0
	7-6	72.0	73.3	73.8	76.3	76.4
	7-7	72.0	71.2	72.0	73.0	74.4
	7-8	72.0	71.0	71.5	72.0	72.4
	7.9	70.5	71.0	71.2	72.0	62.3
3-1/2 ft elev	7-10	70.0	84.0	88.0	89.0	89.9
	7-11	70.6	75.0	79.0	81.5	83.1
	7-12	70.4	72.6	74.3	75.5	78.0
	8-1	69.0	68.5	71.5	72.8	73.6
	8-2	69.9	68.8	69.8	70.7	71.4
	8-3	69.9	68.8	69.3	69.5	69.6
1 ft elev	8-4	67.9	82.5	85.0	86.7	88.2
	8-5	68.5	73.5	77.2	79.3	80.4
	8-6	67.9	70.5	73.0	74.5	75.0
	8-7	67.0	68.3	69.6	70.7	72.0
	8-8	67.0	68.0	68.9	69.3	69.4
	8-9	67.0	67.4	68.1	68.0	68.1

* For detailed description of thermocouple locations see Section IV-A.

Table XIV-B. VARIATION OF TEMPERATURES IN SOIL SURROUNDING SHELTER*

21 x 21 x 7 ft. shelter; 45 occupants; 3 cfm/occupant

(Test of July 9 - 13)

SOIL TEMPERATURES	T.C. No.	Time from Start of Test, Hrs.→ Days→ 0	24 1	48 2	72 3	96 4
SECTION C-C						
Outside Wall						
Diagonally Down	8-10	67.0	81.2	84.4	86.4	87.7
	8-11	66.2	69.7	71.6	73.1	74.5
	8-12	66.3	67.0	67.8	69.4	70.8
	9-1	65.0	65.0	65.0	65.4	65.7
	9-2	63.6	63.3	64.1	64.3	64.3
	9-3	62.5	62.5	63.3	63.5	63.3
Above Roof						
10-1/2 ft from wall	9-4	69.2	86.0	88.5	90.3	91.4
	9-5	70.0	80.3	85.3	89.0	90.3
	9-6	70.0	75.6	80.5	84.0	85.3
	9-7	70.0	73.5	77.2	80.5	81.0
	9-8	70.0	72.5	75.4	77.5	76.8
	9-9	70.0	72.0	74.0	74.1	72.5
3 ft from wall	9-10	70.0	83.5	87.0	89.0	90.0
	9-11	70.5	79.5	83.0	85.7	86.7
	9-12	70.9	75.3	79.7	82.2	82.8
	10-1	70.0	71.2	75.0	77.2	77.3
	10-2	70.0	71.2	73.7	76.3	74.7
	10-3	69.4	71.2	73.7	75.4	72.9
1 ft from wall	10-4	70.2	83.7	86.5	88.2	89.7
	10-5	70.0	79.0	82.7	84.6	86.3
	10-6	71.0	75.6	79.0	80.0	82.1
	10-7	71.2	74.3	76.4	79.0	79.4
	10-8	71.2	72.5	74.1	76.3	75.4
	10-9	71.2	72.2	73.6	74.2	72.6

* For detailed description of thermocouple locations see Section IV-A.

Table XIV-B. VARIATION OF TEMPERATURES IN SOIL SURROUNDING SHELTER*

21 x 21 x 7 ft shelter; 45 occupants; 3 cfm/occupant

(Test of July 9 - 13)

SOIL TEMPERATURES	T.C. No.	Time from Start of Test Hrs. → Days → 0	24 1	48 2	72 3	96 4
SECTION C-C						
Below Floor						
10-1/2 ft from wall	10-10	68.5	87.4	89.6	91.1	92.2
	10-11	67.9	71.3	75.0	76.9	78.2
	10-12	67.0	69.0	72.0	74.0	76.0
	11-1	64.5	65.4	67.0	70.8	71.8
	11-2	64.4	65.3	66.4	67.7	68.7
	11-3	64.3	65.0	64.8	64.6	65.8
	11-4	63.6	64.0	64.3	64.0	65.0
	11-5	62.0	62.5	63.0	63.0	63.1
	11-6	61.0	61.5	61.8	61.7	61.9
3 ft from wall	11-7	67.4	91.6	94.7	96.7	97.2
	11-8	67.6	71.4	75.0	77.3	79.2
	11-9	66.6	68.8	72.0	74.0	75.5
	11-10	65.5	66.5	67.5	69.5	70.2
	11-11	64.5	65.3	66.0	67.7	67.6
	11-12	63.5	64.0	64.5	64.5	65.3
	12-1	63.1	63.7	64.0	64.0	64.2
	12-2	62.2	63.0	63.4	63.5	63.3
	12-3	61.3	61.8	61.8	61.7	61.4
1 ft from wall	12-4	66.6	84.2	87.0	88.3	89.8
	12-5	67.3	70.2	73.0	75.4	76.4
	12-6	66.4	68.0	70.0	71.5	73.0
	12-7	65.3	65.3	67.0	67.8	68.7
	12-8	64.0	64.0	64.8	65.2	65.1
	12-9	62.5	63.3	63.6	64.4	64.3

* For detailed description of thermocouple locations see Section IV-A.

Table XIV-B. VARIATION OF TEMPERATURES IN SOIL SURROUNDING SHELTER*

21 x 21 x 7 ft. shelter; 45 occupants; 3 cfm/occupant

(Test of July 9 - 13)

SOIL TEMPERATURES	T.C. No.	Time from Start of Test, Hrs. → / Days → 0	24 1	48 2	72 3	96 4
SECTION D-D						
Outside Corner						
Diagonally Up	12-10	70.4	82.4	85.0	86.6	88.0
	12-11	71.0	72.2	73.0	74.6	75.2
	12-12	71.3	72.2	73.0	73.0	73.8
	13-1	70.0	70.8	70.8	70.8	70.5
	13-2	70.0	74.0	76.5	66.0	64.4
	13-3	70.0	74.0	76.5	65.5	63.0
Horizontal						
6 ft elev	13-4	71.3	79.6	84.4	85.7	87.1
	13-5	73.0	73.2	73.9	74.7	76.1
	13-6	72.1	72.2	72.4	72.9	73.0
	13-7	71.3	72.0	72.0	72.4	71.8
3-1/2 ft elev	13-8	70.0	82.2	85.0	86.7	88.3
	13-9	70.0	71.0	72.5	74.1	74.8
	13-10	69.3	70.5	71.5	72.0	72.9
	13-11	69.5	70.5	70.3	70.4	70.9
	13-12	69.5	70.2	70.6	70.8	70.5
	14-1	68.7	68.7	68.9	69.3	69.1
1 ft elev	14-2	68.5	81.8	84.3	85.7	87.1
	14-3	68.0	68.0	69.8	70.4	71.3
	14-4	67.4	68.0	68.3	69.4	69.5
	14-5	66.8	68.0	68.4	68.5	69.2
Diagonally Down	14-6	67.3	80.3	83.0	84.4	86.0
	14-7	66.2	66.8	68.3	69.5	71.0
	14-8	65.2	66.3	67.0	67.0	67.8
	14-9	64.4	65.0	65.0	65.2	65.7
	14-10	62.7	63.4	64.3	64.0	64.2
	14-11	62.3	63.3	63.8	63.8	63.8

* For detailed description of thermocouple locations see Section IV-A.

Table XV-A. VARIATION OF T ERATURES INSIDE SHELTER*

21 x 21 x 7 ft. shelter; 45 occupants;
7 cfm/occupant

Time From Start of Test, Hrs. → / Days →

	T.C. No.	0	6	12	18	24	30	36	42	48	54	60	66	72	78	84	90
		0				1				2				3			
AIR TEMPERATURES																	
SUPPLY DUCT DB	15-10	90.4	90.7	89.5	77.6	84.4	92.8	84.3	73.9	83.4				83.7	93.4	85.1	74.4
WB	15-9	68.4	76.8	73.2	71.2	74.9	75.7	73.6	71.0	73.9				73.4	76.0	74.0	71.9
RETURN DUCT DB	16-2	62.2	77.4	79.2	79.2	80.1	82.6	81.9	90.9	82.3				83.0	85.7	84.7	83.1
WB	16-1	58.8	72.9	77.4	78.0	78.3	78.3	79.8	77.2	78.4				79.9	79.9	80.3	79.4
SHELTER AIR Center 6 ft elev DB	15-12	65.3	78.2	80.4	80.1	81.8	84.3	83.1	81.7	83.4				84.6	86.7	85.8	84.2
WB	15-11	60.0	74.1	75.8	76.8	78.3	76.8	78.9	77.1	79.1				80.1	81.1	80.8	79.5
3-1/2 ft elev DB	15-4	66.1	78.9	81.2	80.9	81.8	84.3	83.6	82.0	83.4				84.7	87.2	86.4	84.3
WB	15-3	60.3	75.0	77.5	78.0	78.8	80.0	79.9	79.0	79.2				80.0	81.2	81.2	80.0
1 ft elev DB	15-2	62.6	78.3	80.5	79.2	81.3	84.0	82.9	81.0	82.7				84.2	86.7	85.7	83.8
WB	15-1	58.4	75.0	75.3	75.3	77.1	79.2	77.5	77.8	78.8				78.5	80.8	79.9	78.6
Near wall 3-1/2 ft elev DB	15-6	66.4	77.8	79.7	79.2	80.1	82.5	81.8	81.0	82.2				82.9	84.6	84.3	83.0
WB	15-5	60.1	75.0	76.7	78.3	77.8	79.4	79.8	79.9	80.5				81.2	81.5	82.1	80.9
In corner 3-1/2 ft elev DB	15-8	66.0	78.2	80.3	78.5	81.1	83.4	81.8	80.7	82.2				83.0	86.3	84.6	83.9
WB	15-7	60.1	75.4	77.9	78.0	79.2	80.0	80.1	79.9	80.5				81.2	82.4	82.1	81.7
INSIDE SURFACE TEMPS																	
SECTION B-B Wall	1-1	60.8	69.0	72.9	74.4	74.5	76.2	77.0	77.2	77.3				78.3	78.8	79.9	79.9
	1-7	60.3	70.7	73.2	73.3	74.9	75.8	77.0	77.8	77.9				78.3	79.1	80.2	78.5
	2-1	59.2	70.2	72.9	74.4	74.9	77.8	77.9	78.5	79.1				79.3	81.1	81.1	81.1
	2-7	58.4	68.9	72.0	72.8	74.3	75.7	76.0	76.3	77.0				77.8	79.2	79.4	78.8
	3-1	56.1	68.4	70.7	72.3	73.2	75.7	75.8	76.3	77.3				78.3	78.8	79.2	78.8
Ceiling	3-7	59.7	77.9	81.7	81.2	81.7	84.7	84.8	84.5	85.1				85.4	87.2	87.7	86.2
	4-1	59.3	71.1	72.9	74.4	75.7	77.9	77.4	78.5	79.1				79.1	82.4	82.5	81.2
	4-7	60.0	70.7	73.3	74.4	74.9	74.9	77.1	77.2	78.1				78.6	79.4	79.9	79.5
Floor	5-1	58.9	76.4	79.2	80.6	82.3	84.3	[illegible]	84.9	85.2				88.8	85.9	88.0	88.0
	5-10	59.0	76.0	79.6	81.3	83.0	84.4	85.2	85.2	85.9				87.7	89.2	86.9	88.8
	6-4	58.3	69.6	73.2	74.4	75.3	77.4	77.4	77.6	78.3				79.1	80.8	81.2	80.8
SECTION C-C Wall	6-10	60.1	69.5	72.8	74.0	76.1	76.5	76.7	77.1	77.8				78.2	79.8	79.0	79.4
	7-4	60.5	69.2	73.2	72.9	73.7	76.6	[illegible]	77.2	77.8				77.3	79.4	[illegible]	77.8
	7-10	59.5	70.7	74.4	75.3	77.0	78.5	78.4	78.5	79.2				79.4	81.3	81.5	80.8
	8-4	58.7	69.0	71.5	72.9	74.5	76.3	76.6	76.4	77.5				78.2	79.8	79.4	79.9
	8-10	57.9	67.6	70.8	72.4	73.6	75.7	76.0	76.3	77.3				77.8	76.8	79.3	78.6
Ceiling	9-4	58.9	74.2	76.9	76.6	79.2	80.9	80.8	80.7	81.7				83.0	85.0	85.0	83.8
	9-10	[illegible]	71.1	74.0	75.2	76.3	78.2	78.3	78.2	78.8				79.4	81.3	81.1	80.4
	10-4	[illegible]	71.0	73.8	75.0	75.3	77.5	78.6	78.7	78.8				77.8	74.8	80.3	79.3
Floor	10-10	58.7	76.4	80.4	82.2	83.8	86.0	86.0	85.8	87.2				88.2	89.6	88.9	87.6
	11-7	58.2	76.7	80.2	82.2	83.8	86.0	86.0	86.0	87.2				88.1	90.1	88.9	89.4
	12-4	58.3	70.2	73.7	75.1	76.4	77.1	78.0	78.2	78.8				79.8	81.4	81.2	80.3
SECTION D-D	12-10	60.8	69.1	72.6	73.7	74.1	75.7	75.9	76.0	76.7				78.0	78.5	78.7	78.2
	13-4	60.0	67.8	71.4	72.0	73.3	75.3	75.0	75.1	75.8				76.4	66.8	[illegible]	76.2
	13-8	59.2	68.1	71.4	72.7	73.8	75.8	76.0	76.0	76.5				77.2	78.8	78.8	78.2
	14-2	58.2	67.7	70.6	71.6	72.9	75.3	75.0	75.1	75.6				76.5	78.2	77.8	77.3
	14-6	57.9	66.0	69.3	70.8	71.5	73.3	73.6	73.9	74.3				75.3	76.4	76.8	76.2
SUBJ SKIN TEMPS Center-Top	18-7	85.7	88.8	85.6	85.8	86.1	[illegible]	87.7	86.8	87.7				88.8	89.8	89.3	88.6
Middle	18-8	86.1	86.8	85.5	85.7	86.1	88.0	87.3	86.7	87.7				88.5	89.7	89.3	88.1
Bottom	18-9	83.5	87.2	88.9	88.7	89.4	90.2	88.7	87.5	88.0				91.4	91.0	88.9	88.9
Near Wall - Middle	18-10																
In Corner - Middle	18-11	83.7	83.8	83.5	83.8	83.5	86.1	86.0	86.1	85.1				86.3	86.4	86.6	85.1
OUTSIDE AIR TEMPS	19-5	[illegible]	[illegible]	72.3	66.3	63.1	76.0	55.5	52.1	62.2				78.3	89.1	81.7	75.1
	19-6	56.7	70.3	73.2	66.6	63.1	75.0	56.0	53.1	62.3				[illegible]	89.8	83.0	76.9
	19-7	[illegible]	70.3	73.3	66.4	63.1	76.5	56.2	52.0	62.2				60.0	89.8	83.0	76.8

	T.C. No.	96	102	108	114	120	126	132	138	144	150	156
		4				5				6		
AIR TEMPERATURES												
SUPPLY DUCT DB	15-10	84.2	94.9	85.4	75.0	64.3	92.0	84.9	73.9	85.0	93.3	85.
WB	15-9	74.3	76.3	74.9	73.7	73.5	76.3	74.3	70.4	74.6	77.0	73.
RETURN DUCT DB	16-2	84.1	87.3	86.0	84.9	85.5	86.8	86.3	85.1	86.1	87.5	87.
WB	16-1	80.1	83.1	82.9	82.8	83.0	83.2	83.4	81.6	82.5	83.4	81.
SHELTER AIR Center 6 ft elev DB	15-12	86.7	88.4	87.2	85.7	86.4	88.6	87.6	86.2	86.8	88.5	88
WB	15-11	80.8	83.1	82.1	81.8	82.2	83.9	82.7	80.6	82.9	83.0	82.
3-1/2 ft elev DB	15-4	85.7	89.7	87.4	85.7	86.4	89.8	87.8	85.8	87.5	88.7	88
WB	15-3	80.3	83.3	82.5	82.2	82.6	83.2	83.3	82.9	83.0	83.0	83.
1 ft elev DB	15-2	85.7	88.3	86.3	85.4	86.0	88.0	86.6	85.3	[illegible]	88.4	87.
WB	15-1	79.9	82.4	81.2	80.8	81.8	82.9	81.9	81.0	[illegible]	82.6	82.
Near wall 3-1/2 ft elev DB	15-6	84.1	87.3	85.9	84.7	85.2	86.7	86.1	85.1	86.1	86.9	86
WB	15-5	81.3	82.7	83.8	[illegible]	83.9	84.1	84.8	83.7	84.4	[illegible]	84
In corner 3-1/2 ft elev DB	15-8	83.8	88.3	85.4	84.9	85.4	87.8	86.1	85.1	86.1	87.7	87
WB	15-7	81.1	84.1	83.7	83.5	83.7	84.2	83.9	84.7	84.1	84.8	84
INSIDE SURFACE TEMPS												
SECTION B-B Wall	1-1	80.0	81.2	82.1	81.8	81.7	81.8	83.2	82.3	81.9	82.2	83
	1-7	79.0	81.2	80.7	81.7	82.2	82.7	83.1	82.4	82.7	81.6	81
	2-1	80.9	83.3	82.9	82.6	83.0	83.3	84.2	83.0	83.5	84.4	85
	2-7	80.0	81.9	81.2	80.7	81.1	82.2	82.4	81.8	81.8	83.1	83.
	3-1	78.9	81.1	80.7	80.7	81.2	81.8	82.1	81.3	81.9	82.7	82
Ceiling	3-7	86.5	89.7	89.3	88.1	88.5	89.4	90.0	88.1	88.8	90.0	90.
	4-1	80.9	83.3	82.6	81.9	82.6	[illegible]	83.7	82.1	84.0	85.5	85.
	4-7	78.9	81.5	81.5	81.3	81.8	82.2	82.4	81.8	82.3	83.0	83
Floor	5-1	89.0	91.1	89.4	[illegible]	89.3	90.8	90.5	90.0	90.9	91.7	91.
	5-10	89.0	91.3	90.7	89.0	90.7	91.6	91.8	91.2	91.4	92.4	92
	6-4	80.3	83.8	82.9	82.7	83.4	84.0	84.2	83.9	84.0	84.9	85
SECTION C-C Wall	6-10	80.0	81.6	[illegible]	81.2	81.5	82.6	82.8	[illegible]	82.3	83.8	83
	7-4	77.5	81.0	80.4	80.7	81.1	81.8	82.3	81.8	82.3	82.7	81.
	7-10	80.0	83.8	83.0	82.6	83.0	83.9	84.4	83.5	84.0	84.8	84.
	8-4	79.1	81.9	80.7	80.6	81.4	81.9	81.4	80.9	81.9	82.7	82
	8-10	78.3	80.8	80.5	80.2	80.7	81.2	81.4	80.8	81.3	82.1	82
Ceiling	9-4	85.7	87.3	86.3	85.6	86.2	87.6	87.7	87.6	87.1	88.8	84
	9-10	79.9	83.6	82.5	83.4	83.0	83.6	83.6	83.1	83.6	84.8	84
	10-4	78.7	81.5	82.1	81.3	82.7	82.3	82.3	82.0	82.8	83.4	82
Floor	10-10	88.8	91.4	90.0	89.0	90.2	91.6	91.2	90.0	90.9	92.3	91
	11-7	89.8	92.1	91.3	90.8	90.5	92.4	92.3	91.8	91.8	93.2	92
	12-4	80.8	83.0	82.5	82.2	83.0	83.4	83.4	82.8	83.7	83.9	84
SECTION D-D	12-10	79.6	80.2	80.0	80.1	80.3	80.8	81.0	80.8	81.1	81.3	81
	13-4	77.8	79.5	78.7	79.0	79.6	80.2	80.1	79.9	80.0	80.7	80
	13-8	78.0	80.4	80.2	80.0	80.3	80.6	80.0	80.2	[illegible]	[illegible]	81
	14-2	78.2	[illegible]	[illegible]	78.9	79.6	80.1	79.8	78.3	80.3	80.3	80
	14-6	76.1	78.1	[illegible]	77.8	78.2	78.5	78.7	78.4	78.9	75.9	79
SUBJ SKIN TEMPS Center-Top	18-7	88.9	91.1	90.7	90.0	90.3	91.3	91.2	90.1	91.0	91.7	91
Middle	18-8	88.8	90.9	90.6	89.9	90.0	90.0	90.7	89.8	90.9	91.6	91
Bottom	18-9	90.7	91.3	89.3	89.1	91.5	90.1	89.7	89.3	90.1	90.8	90
Near Wall - Middle	18-10											
In Corner - Middle	18-11	[illegible]	[illegible]	87.6	[illegible]	86.6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
OUTSIDE AIR TEMPS	19-5	[illegible]	[illegible]	[illegible]	[illegible]	56.3	56.2	[illegible]	[illegible]	[illegible]	[illegible]	77
	19-6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	55.0	[illegible]	[illegible]	[illegible]	[illegible]	77
	19-7	[illegible]	[illegible]	[illegible]	[illegible]	56.3	55.0	[illegible]	[illegible]	[illegible]	[illegible]	77

A

*For detailed description of thermocouple locations see Sec. IV-A and B.

OF TEMPERATURES INSIDE SHELTER*

7 ft. shelter; 45 occupants;
7 cfm/occupant

	54	60	66	72 3	78	84	90	96 4	102	108	114	120 5	126	132	138	144 6	150	156	162	168 7	174	180	186	192 8	198	204	210	216 9	222	228	234	240 10	174
4				83.7	93.4	85.1	74.4	84.2	94.9	85.4	75.0	84.3	92.0	84.9	73.9	85.0	93.3	85.3	74.5	83.7	94.2	84.8	74.9	83.7	94.7	84.5	75.6	82.7	93.2	84.0	74.5	82.4	94.2
9				73.4	76.0	74.0	71.9	74.3	76.1	74.9	73.7	73.5	76.3	74.3	70.4	74.6	77.0	73.8	71.1	73.8	[illegible]	73.9	71.1	74.0	76.7	73.5	70.0	72.9	75.6	73.0	70.0	72.8	77.0
3				83.0	85.7	86.7	83.1	84.1	87.3	86.0	84.5	85.2	86.8	86.5	85.[illegible]	86.1	87.5	[illegible]	85.3	85.8	89.0	87.5	85.5	86.0	88.6	[illegible]	85.4	86.3	88.1	87.3	85.3	85.2	89.0
4				79.9	79.9	80.3	79.4	80.4	83.[illegible]	82.9	82.8	83.[illegible]	83.2	83.4	81.6	82.[illegible]	85.4	81.9	81.4	81.5	83.3	83.9	81.3	82.1	84.[illegible]	82.0	81.3	82.7	82.3	83.5	82.5	81.4	83.3
4				84.6	86.7	85.8	84.2	86.7	88.4	87.2	85.7	86.4	88.6	87.6	86.2	86.8	86.5	88.[illegible]	86.5	87.7	90.6	88.6	86.3	88.5	89.7	90.7	86.6	87.8	89.1	88.2	86.5	86.3	90.8
1				80.1	81.1	80.8	79.5	80.8	83.1	82.1	81.8	82.2	83.9	82.7	80.6	82.9	83.0	82.8	80.5	81.3	83.0	82.5	80.4	82.0	82.7	81.9	79.8	81.0	82.1	82.0	80.1	81.3	83.6
4				84.7	87.2	86.6	84.3	83.7	89.7	87.4	85.7	85.4	88.8	87.8	85.8	87.5	88.7	89.8	85.9	87.0	91.0	88.6	86.0	87.4	90.0	89.2	86.4	87.7	89.8	88.3	85.7	86.3	91.0
2				80.0	81.2	81.2	80.0	80.3	83.3	82.5	82.2	82.6	83.2	83.3	82.9	83.0	83.0	83.3	82.7	81.5	83.8	82.6	82.7	81.2	83.5	82.3	82.0	81.8	83.3	82.4	81.8	80.4	83.8
7				84.2	86.7	85.7	83.8	85.7	88.3	86.3	85.4	86.0	88.0	86.8	85.3	86.8	88.4	87.8	85.8	86.6	89.9	87.8	86.0	87.3	89.1	88.1	86.6	86.8	88.7	87.7	85.7	85.6	89.9
8				78.5	80.8	79.9	78.6	79.9	81.4	81.2	80.8	81.8	82.9	81.9	81.0	82.4	82.6	82.8	80.8	81.1	83.3	82.2	80.6	81.6	83.0	81.9	80.2	81.0	82.4	82.0	80.5	80.8	83.3
2				82.9	84.6	84.3	83.0	84.1	87.3	85.9	84.7	85.2	86.7	86.1	75.1	86.7	86.9	86.[illegible]	85.2	85.2	84.3	87.2	85.6	85.9	87.9	87.4	85.4	86.2	87.6	87.0	85.6	85.8	89.3
3				81.2	81.[illegible]	82.1	80.9	81.3	[illegible]	82.8	83.0	83.9	84.1	84.8	83.2	84.4	83.9	84.9	83.0	83.2	81.3	84.8	82.5	83.8	84.3	84.4	82.3	83.4	84.3	84.3	82.4	82.7	81.8
2				83.0	84.3	84.6	83.0	83.8	[illegible]	85.4	84.9	85.4	87.8	86.1	85.1	86.1	87.7	87.1	85.5	85.4	90.[illegible]	87.2	85.9	85.9	89.[illegible]	87.0	85.3	85.0	88.5	87.3	85.6	85.4	90.2
5				81.2	82.4	82.1	81.7	82.1	84.1	83.7	83.5	83.7	84.2	83.9	84.1	84.1	84.8	84.4	83.9	83.2	85.[illegible]	84.2	83.8	83.3	84.9	84.0	83.0	82.7	84.2	84.0	83.5	82.8	85.0
[illegible]				78.3	78.8	79.9	79.9	80.0	81.2	82.1	82.8	81.7	81.6	83.2	82.3	81.9	82.2	83.2	83.0	[illegible]	83.6	84.3	83.3	84.3	83.4	84.4	84.1	86.[illegible]	84.2	84.7	84.4	84.0	83.6
				78.5	79.1	80.2	78.5	79.0	81.2	80.7	81.7	82.[illegible]	82.7	83.1	82.4	82.7	81.8	81.9	81.9	[illegible]	84.4	83.5	82.7	83.1	83.9	84.9	82.4	82.4	82.9	83.4	83.[illegible]	83.4	84.4
				79.3	81.1	81.1	81.1	80.9	83.3	82.[illegible]	82.[illegible]	83.0	83.3	84.1	83.0	83.5	84.0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	85.7	84.6	84.5	85.4	85.2	84.0	84.7	86.0
				77.8	79.2	79.4	78.8	80.0	81.9	81.2	80.7	81.1	82.2	82.4	81.8	81.8	83.[illegible]	83.1	82.2	82.3	84.8	83.2	82.1	83.9	83.9	83.8	82.6	82.8	83.5	83.4	82.5	83.8	84.8
				78.3	78.8	79.2	78.8	78.9	81.[illegible]	80.7	[illegible]	81.2	81.8	8[illegible].1	81.3	81.9	82.[illegible]	82.8	82.[illegible]	82.8	83.4	83.1	82.1	83.0	83.0	83.4	82.[illegible]	82.9	83.0	83.2	81.4	83.0	83.9
[illegible]				85.4	87.2	87.[illegible]	88.2	86.5	8[illegible]	89.3	[illegible]	88.5	89.4	90.0	88.1	88.0	90.0	90.6	89.2	89.2	91.6	90.8	88.9	90.0	90.[illegible]	91.1	89.4	[illegible]	91.6	90.7	89.0	89.2	91.6
				79.[illegible]	82.4	82.[illegible]	81.2	80.9	83.3	82.6	81.9	82.6	83.5	83.7	83.1	84.0	85.5	85.0	83.7	83.2	86.1	84.5	83.9	85.2	85.3	85.3	86.6	84.6	85.5	85.2	84.6	85.0	86.1
				78.6	79.4	79.9	79.5	78.[illegible]	81.5	81.5	81.3	81.8	82.2	82.4	81.8	82.3	83.0	83.1	82.0	81.9	84.1	83.5	82.6	81.8	81.9	84.4	83.3	83.0	85.0	84.8	84.5	84.0	84.1
[illegible]				86.8	88.9	88.9	88.0	89.0	91.1	89.4	88.5	89.3	90.8	90.5	90.0	90.9	91.[illegible]	91.1	90.0	91.0	91.[illegible]	91.2	90.[illegible]	[illegible]	91.6	91.7	90.3	90.1	92.3	91.[illegible]	90.2	90.0	93.[illegible]
				87.7	89.2	88.9	88.8	89.0	91.[illegible]	90.7	89.0	90.7	91.6	91.8	91.2	91.4	92.4	92.5	91.7	91.8	93.8	92.5	91.6	[illegible]	93.4	92.5	91.8	91.7	92.5	92.4	91.2	91.7	93.8
				79.1	80.0	81.2	80.8	80.1	[illegible]	[illegible]	82.7	83.4	84.0	84.2	83.9	84.0	84.5	85.0	84.[illegible]	84.0	86.4	85.2	83.9	85.4	85.6	85.6	84.5	84.5	85.3	84.9	84.0	83.6	86.4
[illegible]				78.2	79.8	79.8	79.4	80.0	[illegible]	81.2	8[illegible]	81.5	82.6	82.3	82.3	82.3	83.0	83.1	82.3	82.8	84.2	81.1	82.6	81.7	84.0	84.0	83.2	85.7	83.9	84.4	84.0	84.[illegible]	84.2
				77.3	79.4	79.4	77.8	77.5	81.5	80.[illegible]	80.[illegible]	81.1	81.6	82.3	81.8	82.3	8[illegible]	81.6	81.1	81.6	83.9	83.0	80.8	83.6	83.5	83.5	81.3	82.4	83.0	83.[illegible]	82.8	82.[illegible]	83.4
				79.4	81.3	81.5	80.8	80.0	81.6	83.0	82.6	83.0	83.2	84.4	83.5	84.0	84.4	84.9	84.[illegible]	84.[illegible]	86.0	84.9	81.8	84.7	85.5	85.[illegible]	84.0	84.5	85.0	85.0	84.0	83.[illegible]	86.0
				78.2	79.8	79.6	79.9	79.1	81.9	80.[illegible]	80.6	81.4	8[illegible]	82.4	80.9	81.9	82.7	82.5	81.4	81.4	83.9	82.2	81.2	82.5	83.1	83.7	81.3	82.0	82.5	82.5	81.0	81.1	83.9
				77.6	78.8	79.3	78.8	78.3	80.8	[illegible]	[illegible]	80.7	8[illegible]	81.4	80.8	81.5	82.[illegible]	82.[illegible]	80.8	81.4	83.0	81.8	80.6	82.1	82.1	81.8	80.8	81.3	81.4	81.6	80.8	81.[illegible]	83.0
[illegible]				83.0	85.0	85.0	83.8	85.7	8[illegible]	[illegible]	85.[illegible]	86.[illegible]	8[illegible]	8[illegible]	87.0	87.1	88.[illegible]	88.1	87.2	87.5	89.9	88.[illegible]	87.4	89.0	89.5	89.[illegible]	87.8	88.2	89.2	89.0	88.2	88.[illegible]	89.9
				79.6	81.5	81.1	80.4	79.9	81.[illegible]	[illegible]	83.[illegible]	[illegible]	83.6	83.6	83.[illegible]	83.6	84.8	84.5	83.1	83.2	86.0	84.[illegible]	83.8	84.3	85.6	85.3	84.1	84.6	85.[illegible]	85.[illegible]	84.3	84.[illegible]	86.0
				77.8	76.8	80.3	79.3	78.7	81.5	[illegible]	81.3	82.[illegible]	82.[illegible]	83.3	82.0	82.0	83.[illegible]	82.9	81.8	82.2	83.9	83.5	81.4	83.0	83.5	83.5	82.9	84.5	85.1	84.8	84.9	[illegible]	83.9
[illegible]				88.2	89.6	88.9	87.6	88.8	91.[illegible]	90.[illegible]	89.0	[illegible]	91.6	91.2	90.0	90.9	92.3	91.8	89.7	90.8	93.5	91.[illegible]	89.[illegible]	91.5	92.5	91.7	89.3	91.0	92.0	91.[illegible]	90.[illegible]	89.[illegible]	93.[illegible]
				88.1	90.1	89.9	[illegible]	89.8	92.1	[illegible]	[illegible]	[illegible]	92.[illegible]	[illegible]	[illegible]	91.8	93.[illegible]	92.6	91.6	91.8	93.6	92.2	91.[illegible]	92.2	92.9	92.1	91.1	9[illegible]	92.1	91.9	91.6	91.[illegible]	93.6
				79.8	81.4	81.2	80.3	80.8	83.0	82.5	82.[illegible]	83.0	83.[illegible]	83.4	82.0	83.7	83.9	8[illegible]	83.0	83.2	85.0	83.9	83.0	83.0	84.1	84.0	82.6	83.[illegible]	83.1	83.1	82.4	82.[illegible]	85.0
[illegible]				78.0	78.5	78.7	78.2	79.4	80.[illegible]	80.0	80.[illegible]	8[illegible].3	80.8	81.0	80.8	81.1	81.3	81.9	80.7	80.8	82.5	81.1	80.7	81.5	82.0	82.2	81.[illegible]	8[illegible]	81.[illegible]	[illegible]	81.6	81.[illegible]	82.5
				76.6	66.8	77.8	76.2	[illegible]	[illegible]	78.[illegible]	7[illegible]	79.6	80.2	80.1	79.9	80.[illegible]	80.7	80.4	79.7	80.1	80.8	80.5	78.[illegible]	80.0	80.8	81.0	76.7	79.8	8[illegible]	80.6	80.1	80.[illegible]	80.8
				77.2	78.8	78.6	78.2	[illegible]	[illegible]	80.[illegible]	80.0	80.3	80.6	80.6	80.2	81.0	81.2	81.5	80.7	80.6	82.5	81.8	80.7	81.3	82.[illegible]	82.0	80.[illegible]	81.1	81.[illegible]	81.4	[illegible]	80.[illegible]	82.5
				76.5	78.2	77.8	77.3	[illegible]	[illegible]	[illegible]	[illegible]	79.6	80.1	80.6	79.3	80.[illegible]	80.5	80.3	79.[illegible]	80.3	81.[illegible]	80.4	79.6	80.[illegible]	[illegible]	80.4	[illegible]	79.8	80.[illegible]	[illegible]	[illegible]	79.[illegible]	81.7
				75.2	76.5	76.6	76.2	[illegible]	[illegible]	[illegible]	[illegible]	78.2	78.3	78.[illegible]	78.4	78.9	78.9	79.2	78.[illegible]	[illegible]	[illegible]	78.2	78.1	78.3	[illegible]	79.1	76.2	76.[illegible]	76.[illegible]	[illegible]	78.[illegible]	78.[illegible]	80.[illegible]
[illegible]				90.3	89.8	89.3	88.6	[illegible]	[illegible]	[illegible]	[illegible]	90.1	91.1	91.2	90.1	91.0	91.7	91.4	90.1	90.0	92.[illegible]	91.5	90.4	90.1	[illegible]	91.8	90.[illegible]	[illegible]	[illegible]	[illegible]	90.[illegible]	[illegible]	92.[illegible]
				81.0	89.7	88.3	88.1	[illegible]	[illegible]	[illegible]	[illegible]	90.3	90.9	90.7	89.8	90.9	91.6	91.2	89.8	89.6	91.9	91.1	89.8	89.6	91.5	90.9	89.6	[illegible]	[illegible]	[illegible]	88.[illegible]	[illegible]	91.6
				91.6	91.0	88.9	89.9	[illegible]	[illegible]	[illegible]	[illegible]	91.5	90.1	89.7	60.1	90.1	90.8	90.0	89.1	[illegible]	[illegible]	89.8	87.5	90.[illegible]	91.[illegible]	88.2	88.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	90.5
[illegible]				76.1	86.4	86.4	85.1	[illegible]	[illegible]	[illegible]	[illegible]	86.[illegible]	[illegible]	88.[illegible]	[illegible]	88.[illegible]	89.1	88.8	[illegible]	[illegible]	[illegible]	89.8	[illegible]	[illegible]	[illegible]	88.2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	88.[illegible]	89.[illegible]
[illegible]				79.2	80.1	81.[illegible]	75.1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	92.[illegible]
				69.9	89.8	81.0	74.9	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	93.[illegible]
				69.8	89.4	81.0	74.6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	91.[illegible]

B

thermccouple locations see Sec. IV-A and B.

174	180	186	192 8	198	204	210	216 9	222	228	234	240 10	246	252	258	264 11	270	276	282	288 12	294	300	306	312 13	318	324	330	336 14
94.2 77.0	84.8 73.9	74.9 71.1	83.7 74.0	94.7 76.7	84.3 73.3	75.6 70.0	82.7 72.9	93.2 75.6	84.0 73.0	74.5 70.0	82.4 72.0	94.3 76.4	83.6 73.2	74.6 70.0	84.2 72.6	94.0 76.3	84.0 73.0	73.2 70.2	85.5 75.3	94.9 77.4	84.3 72.9	73.9 70.8	83.8 75.2	94.3 77.5	94.1 74.4	74.3 71.9	83.3 74.9
89.0 83.3	87.5 83.9	85.5 81.3	86.0 82.1	88.6 84.0	87.5 82.0	85.4 81.3	86.3 82.7	88.1 82.3	87.3 83.8	85.3 82.5	85.7 81.4	88.2 82.5	87.3 82.0	85.8 82.4	85.3 82.8	88.4 82.8	88.0 83.3	86.3 83.8	87.2 83.0	89.0 85.5	88.3 85.6	85.9 82.4	87.4 85.3	89.2 85.3	88.2 86.0	86.1 84.8	86.6 82.8
90.6 83.0	88.6 82.6	86.5 80.4	88.5 82.0	89.7 82.7	88.7 81.9	86.6 79.8	87.8 81.0	89.1 82.1	88.2 82.0	86.5 80.1	86.5 81.3	89.6 83.2	88.0 82.6	87.0 80.5	87.5 82.3	90.4 83.6	88.8 83.7	87.0 81.2	88.3 83.3	90.3 84.7	88.8 83.7	86.7 81.3	88.2 82.9	91.1 85.5	89.0 84.0	87.6 81.4	86.6 83.1
91.0 85.8	88.6 82.6	86.0 82.2	87.4 81.2	90.0 83.5	89.2 82.3	86.4 82.0	87.7 81.8	89.8 83.3	88.3 82.4	85.7 81.6	86.3 80.4	89.4 83.2	88.3 82.9	86.0 82.7	87.4 82.1	90.0 84.0	88.8 83.4	86.5 83.0	88.4 83.2	90.1 85.2	89.2 84.3	86.4 83.9	88.7 84.0	90.2 85.0	89.2 84.2	86.4 83.9	87.3 84.1
89.9 83.1	87.8 82.2	86.0 80.6	87.3 81.6	89.1 83.0	88.1 81.9	86.6 80.2	86.6 81.0	88.7 82.4	87.7 82.0	85.7 80.5	85.6 80.9	88.9 83.4	88.2 82.1	86.2 81.4	87.3 80.3	89.6 84.0	88.8 82.0	86.4 81.2	88.1 83.0	90.0 85.1	88.8 82.5	86.3 82.9	88.2 82.3	90.0 84.2	89.0 81.8	86.9 81.3	86.6 82.7
89.3 83.8	87.2 84.5	85.6 82.5	85.9 83.8	87.9 84.3	87.4 84.4	85.4 82.3	86.2 83.4	87.6 84.3	87.0 84.3	85.6 82.4	85.0 82.7	87.8 85.2	87.2 84.4	85.6 83.0	86.3 83.7	88.0 84.5	88.0 84.9	86.0 83.1	87.2 85.2	88.5 85.9	88.3 85.3	85.9 83.3	87.9 85.4	89.1 86.4	88.2 86.4	85.6 84.1	86.5 84.3
90.2 85.0	87.2 84.2	85.9 83.8	85.9 83.3	89.2 84.9	87.0 84.0	85.5 83.0	86.0 82.7	88.5 84.2	87.3 84.0	85.6 83.5	85.4 82.8	89.2 85.0	87.3 84.0	85.9 83.7	86.4 83.7	89.2 85.0	87.9 84.8	86.7 84.5	87.5 84.8	89.4 85.9	88.2 85.7	86.5 85.3	87.0 85.6	89.7 86.4	88.2 86.4	86.1 85.1	86.6 84.6
83.6 84.4 86.0 84.8 83.9	84.3 83.5 85.2 83.3 83.1	83.3 82.7 84.2 82.1 82.1	84.3 83.1 84.9 83.9 83.0	83.4 83.9 85.1 83.9 83.0	84.4 84.0 85.7 83.8 83.4	84.1 82.4 84.6 82.6 82.4	84.2 82.4 84.5 82.8 82.9	84.2 82.9 85.4 83.5 83.0	84.7 83.4 85.2 83.4 83.1	84.4 83.5 84.0 82.5 82.4	84.0 83.4 84.7 83.8 83.0	83.6 83.2 85.3 84.0 83.6	85.2 83.2 85.7 83.5 83.6	84.6 82.8 85.1 81.3 82.4	84.6 82.9 84.7 82.8 81.6	85.3 84.0 86.5 84.4 83.5	86.0 84.0 86.2 83.6 83.2	85.6 84.2 84.2 82.4 82.0	84.3 85.1 85.0 83.8 83.0	85.1 84.2 86.2 84.5 83.7	86.5 86.0 87.0 84.4 83.6	85.6 85.8 86.5 83.3 83.1	84.4 85.4 85.8 83.1 82.3	84.9 86.4 86.4 84.8 83.1	86.6 86.6 87.3 84.4 82.9	87.3 83.6 85.1 83.0 81.7	85.3 85.7 87.3 83.0 82.9
91.6 86.1 84.1	90.8 84.5 83.5	88.9	90.0 85.2 83.8	90.7 85.3 83.9	91.1 85.3 84.4	89.4 84.6 83.3	90.3 84.6 83.0	91.0 85.5 85.0	90.7 85.2 84.8	89.0 84.6 84.5	89.2 85.0 84.0	90.4 85.5 85.6	91.2 85.7 84.5	89.4 85.0 83.5	89.7 84.6 83.8	91.8 86.6 85.2	91.3 86.6 85.0	90.0 85.4 84.6	89.6 86.0 85.3	91.9 87.3 85.6	91.6 88.6 87.4	[illegible] 87.3 85.3	90.0 86.5 85.5	91.1 88.7 86.9	92.1 88.0 86.9	[illegible] 84.3 85.4	90.1 92.2 85.8
93.1 93.8 86.4	91.2 92.5 85.2	90.0 91.6 85.5	90.7 93.2 85.4	91.6 93.4 85.6	91.7 92.5 85.6	90.3 91.8 84.5	90.1 91.7 84.5	92.3 92.3 85.3	91.2 92.4 84.9	90.2 91.2 84.0	90.0 91.7 83.4	91.8 93.0 85.6	92.4 92.5 85.0	90.4 91.3 83.2	89.9 91.4 84.0	93.6 93.7 85.0	92.6 93.0 85.2	91.0 92.0 83.2	91.3 91.6 83.3	94.0 94.0 84.7	92.5 94.2 84.9	91.2 92.5 83.3	91.8 92.5 83.4	92.4 93.3 84.7	93.3 93.3 83.6	89.0 92.2 82.6	89.0 92.0 84.0
84.2 83.9 86.0 83.9 83.0	83.3 83.0 84.9 82.2 81.8	82.6 80.8 83.8 81.2 80.6	83.7 83.8 84.[illegible] 82.5 82.1	84.0 83.5 85.5 83.1 82.1	84.0 83.5 85.3 82.7 81.8	83.2 81.3 84.0 81.3 80.6	83.7 82.4 84.5 82.0 81.3	83.9 83.0 85.0 82.3 81.4	84.4 83.0 85.0 82.5 81.4	84.0 82.6 84.0 81.0 80.8	84.0 82.9 83.7 81.8 81.1	85.0 84.1 84.6 82.7 82.0	84.5 83.5 85.2 82.3 81.9	84.4 83.0 84.2 81.4 81.0	84.9 82.8 84.0 81.1 81.0	85.3 84.0 85.6 84.0 82.2	85.2 83.6 85.6 82.9 82.4	84.8 83.7 84.6 82.0 81.5	84.5 83.6 84.5 81.6 81.1	84.3 84.2 85.4 84.7 82.6	86.1 85.3 86.1 83.4 83.0	85.3 85.3 86.2 81.6 81.9	85.3 85.3 85.1 83.9 82.0	86.4 86.1 86.1 84.1 83.0	85.6 85.8 85.4 83.0 82.4	85.1 85.1 84.0 83.3 81.3	84.9 85.2 85.6 82.6 83.0
89.9 86.0 83.9	88.7 86.4 83.5	87.4 83.8 83.4	89.0 84.3 83.0	89.5 85.6 83.5	89.4 85.3 83.5	87.8 84.1 82.9	88.2 84.6 84.[illegible]	88.2 85.2 85.1	89.0 85.1 84.8	88.2 84.5 84.9	88.5 84.0 84.4	90.0 86.9 85.3	89.5 85.5 85.7	88.3 84.5 85.2	88.3 84.5 84.5	91.0 86.8 84.2	90.0 86.4 85.7	89.0 86.0 85.0	88.8 85.3 85.1	91.2 86.9 86.4	90.8 86.5 86.1	89.9 86.6 84.5	89.8 85.7 85.8	90.7 87.4 87.0	90.4 86.5 86.3	89.0 85.2 85.1	88.7 86.0 86.0
93.5 91.6 85.0	91.4 92.2 83.9	89.4 91.1 83.0	91.5 92.2 83.8	92.5 92.4 84.3	91.7 92.1 84.0	89.3 91.1 82.4	91.0 91.2 83.1	92.0 92.3 83.1	91.3 91.9 83.1	90.8 91.6 82.4	89.7 91.2 82.4	92.2 93.0 84.0	91.7 92.3 83.5	89.5 91.6 82.9	89.6 91.4 82.8	92.9 91.2 84.4	92.2 92.5 84.6	89.8 92.2 83.4	90.3 92.1 83.3	93.2 94.1 85.4	92.2 92.8 84.9	90.3 93.0 84.0	91.7 93.3 84.5	94.2 94.6 85.5	92.7 93.8 84.7	92.1 92.0 83.9	91.0 91.4 84.1
82.5 80.8 82.5 81.7 80.0	81.7 80.5 81.8 80.4 79.2	80.7 78.7 80.7 79.6 78.3	81.5 80.0 81.5 80.6 78.5	82.0 80.8 82.2 80.7 79.3	82.2 81.0 82.0 80.6 79.1	83.0 78.7 80.[illegible] 79.3 78.2	81.9 79.6 81.1 79.8 78.0	81.7 80.4 81.2 80.1 78.7	82.1 80.6 81.8 80.0 78.8	81.6 80.1 81.0 79.3 78.0	81.8 80.1 80.9 79.2 78.0	82.6 82.3 81.3 81.0 79.3	82.7 81.9 81.9 80.2 78.8	82.1 80.3 81.2 79.5 79.1	82.0 80.7 80.4 79.2 77.8	83.5 82.3 82.3 81.3 79.0	83.3 81.2 83.3 80.7 79.5	83.0 81.2 82.0 80.0 78.5	82.9 81.5 81.9 79.9 78.8	84.2 82.8 83.0 82.3 80.0	84.3 83.1 83.1 81.4 80.2	83.4 82.3 82.2 80.7 79	83.8 83.0 83.0 81.2 79.3	84.1 83.7 83.2 82.6 80.0	84.1 83.2 83.1 81.0 80.0	83.0 83.0 82.6 80.4 79.3	83.8 [illegible] [illegible] 81.3 79.3
92.2 91.9 90.5	91.5 91.1 89.4	[illegible] 89.8 87.5	90.1 89.6 90.6	92.[illegible] 91.5 91.1	91.8 90.9 88.8	90.6 89.6 88.1	90.0 [illegible] 91.2	92.1 91.6 [illegible]	91.[illegible] [illegible] 89.1	90.2 88.8 88.6	90.1 89.5 87.1	92.2 92.0 88.2	91.5 90.9 88.8	90.1 89.6 87.7	[illegible] 88.7 88.3	92.7 92.2 90.7	92.2 91.5 90.1	91.0 90.2 89.6	89.9 89.8 88.9	93.2 93.0 90.0	92.6 92.1 91.2	91.4 90.7 88.7	[illegible] [illegible] 91.2	92.2 92.6 91.0	92.6 92.4 91.1	91.0 90.3 89.[illegible]	89.0 88.8 87.0
89.6	88.8	87.5	87.0	89.1	89.3	87.5	[illegible]	[illegible]	89.0	87.7	88.2	90.0	89.6	88.[illegible]	87.1	90.5	90.0	89.0	88.3	91.5	90.3	90.0	89.9	91.1	90.[illegible]	89.[illegible]	88.6
94.2 93.2 93.2	81.0 81.[illegible] 61.9	[illegible] 74.9 74.2	78.4 77.8 77.9	90.5 90.8 90.8	86.5 86.4 86.0	76.4 76.[illegible] 75.[illegible]	68.[illegible] 68.6 65.[illegible]	[illegible] [illegible] [illegible]	69.4 68.4 63.5	61.6 61.8 61.8	65.8 66.8 66.5	79.4 79.4 79.3	77.7 70.2 77.6	68.[illegible] 68.6 68.7	60.0 60.0 60.0	76.[illegible] 76.9 70.1	72.6 72.[illegible] 72.0	61.8 61.8 61.7	66.2 66.1 61.3	70.8 71.8 70.8	60.8 60.9 60.0	56.0 56.1 56.1	57.0 57.5 57.3	57.8 58.2 58.2	56.[illegible] 56.9 56.8	51.[illegible] 51.0 51.0	63.3 63.8 63.7

C

Table XV-B. VARIATION OF TEMPERATURES IN SOIL SURROUNDING SHELTER*

21 x 21 x 7 ft. shelter; 45 occupants; 7 cfm/occupant

SOIL TEMPERATURES	T.C. No.	Time From Start of Test, Hrs. → Days → 0	24 1	48 2	72 3	96 4	120 5	144 6	168 7	192 8	216 9	240 10	264 11	288 12	312 13	336 14
SECTION B-B																
Outside Wall																
Diagonally Up	1-1	60.8	74.5	77.3	78.3	80.0	81.7	81.9	82.3	84.3	84.2	84.0	84.6	84.3	84.4	85.3
	1-2	61.2	64.3	68.4	69.3	72.4	72.8	75.4	76.2	78.6	77.9	77.6	78.3	80.0	79.9	80.9
	1-3	61.3	63.8	65.4	67.1	68.5	71.0	70.9	71.6	74.9	74.9	75.0	76.2	76.9	76.8	77.3
	1-4	61.0	62.9	63.9	64.5	65.6	68.9	67.4	68.2	72.3	72.4	72.4	73.2	73.5	73.7	73.5
	1-5	56.7	62.8	61.9	64.1	66.8	67.0	62.8	66.9	72.3	72.3	70.9	71.5	71.4	68.3	65.8
	1-6	53.6	62.8	62.3	65.6	74.9	56.1	57.0	69.4	76.5	71.8	71.9	70.0	66.8	59.2	56.1
Horizontal 6 ft elev	1-7	60.3	74.9	77.9	78.5	79.0	82.1	82.7	82.8	83.1	82.3	83.4	82.9	85.1	85.4	85.7
	1-8	60.5	68.9	71.4	73.3	75.3	76.1	77.1	78.2	78.8	79.0	79.2	79.0	80.4	82.3	81.9
	1-9	61.0	65.3	66.3	68.3	70.1	71.0	71.9	73.2	74.3	74.3	75.4	76.0	77.4	77.3	78.1
	1-10	61.2	63.8	63.9	64.9	66.7	66.9	68.1	69.5	70.2	70.7	71.7	72.1	73.9	74.3	74.6
	1-11	61.3	62.2	63.1	62.8	63.6	65.0	65.7	66.8	66.9	68.2	68.9	70.0	69.7	70.4	72.0
	1-12	60.3	61.3	62.4	62.3	62.5	64.2	63.8	63.6	65.4	66.4	67.2	67.4	67.8	67.8	68.3
3-1/2 ft elev	2-1	59.2	74.9	79.1	79.3	80.9	83.0	83.9	83.9	84.9	84.5	84.7	84.7	85.0	85.8	85.3
	2-2	60.0	68.1	71.5	73.4	74.4	76.9	77.4	77.6	80.0	79.0	78.9	79.7	80.9	81.1	81.8
	2-3	60.0	63.8	66.3	68.9	69.3	71.1	71.8	72.3	73.3	73.9	73.8	75.1	75.4	76.5	77.1
	2-4	60.0	62.0	62.9	64.1	64.7	66.3	67.1	67.3	70.2	69.2	70.0	70.2	71.3	72.0	72.9
	2-5	60.0	62.0	61.5	62.1	62.4	63.3	63.7	64.3	66.3	65.3	65.3	66.4	67.9	68.5	69.3
	2-6	59.9	61.5	60.5	60.6	61.0	61.2	61.6	62.0	63.3	62.8	63.4	63.4	65.3	65.7	66.0
1 ft elev	2-7	58.4	74.9	77.0	77.8	80.0	81.1	81.8	82.3	83.8	82.8	83.8	82.8	83.8	83.1	83.0
	2-8	58.1	67.6	70.2	71.7	74.0	73.5	75.2	76.2	77.0	76.8	77.1	77.3	77.8	77.3	77.9
	2-9	58.2	61.9	65.3	66.7	67.8	70.0	70.2	70.2	72.0	72.3	72.7	73.2	73.2	73.8	75.0
	2-10	58.2	59.9	62.0	62.4	63.1	64.8	65.4	65.4	67.4	67.4	68.1	67.9	68.4	69.5	70.4
	2-11	58.1	59.4	60.1	60.2	59.1	61.6	61.7	61.7	63.8	63.2	63.8	63.9	64.6	65.2	66.0
	2-12	57.6	59.0	59.4	58.3	58.4	59.4	59.5	59.2	61.2	60.2	61.2	61.0	61.6	62.2	63.0

* For detailed description of thermocouple locations see Section IV-A.

Table XV-B. VARIATION OF TEMPERATURES IN SOIL SURROUNDING SHELTER*

21 x 21 x 7 ft. shelter; 45 occupants; 7 cfm/occupant

SOIL TEMPERATURES	T.C. No.	Time From Start of Test, Hrs. → Days → 0	24 1	48 2	72 3	96 4	120 5	144 6	168 7	192 8	216 9	240 10	264 11	288 12	312 13	336 14
SECTION B-B																
Outside Wall																
Diagonally Down	3-1	58.1	73.2	77.3	78.3	78.9	81.2	81.9	82.8	83.0	82.9	83.0	81.6	83.0	82.3	82.9
	3-2	57.7	63.1	65.3	67.3	67.6	69.3	69.9	70.2	72.2	71.8	72.4	72.7	73.3	73.8	74.7
	3-3	57.5	59.9	61.5	62.3	63.2	64.5	65.2	65.4	67.0	66.7	66.3	67.0	68.3	68.9	69.3
	3-4	56.8	58.6	58.5	58.8	59.8	60.1	60.8	60.9	62.3	61.9	62.7	62.3	63.2	63.7	63.6
	3-5	55.3	57.3	56.9	56.9	57.3	57.4	57.4	57.4	58.0	58.1	58.2	58.2	59.3	59.6	59.8
	3-6	53.2	54.8	55.2	55.5	55.6	55.2	55.3	55.3	56.0	55.4	55.5	55.8	57.2	56.9	57.2
Above Roof 10-1/2 ft from wall	3-7	59.7	81.7	85.1	85.4	86.5	88.5	88.8	89.2	90.0	90.3	89.2	89.7	89.6	90.0	90.1
	3-8	59.6	70.7	76.2	78.4	80.3	82.9	84.9	84.9	86.6	87.1	87.0	87.6	88.7	87.9	87.3
	3-9	59.2	65.9	71.4	74.3	76.6	80.6	81.9	82.9	84.7	85.4	85.8	86.2	86.7	85.3	85.5
	3-10	59.0	62.9	67.4	70.5	73.0	77.9	78.8	79.7	83.0	83.7	84.2	84.7	85.2	83.3	81.6
	3-11	58.1	62.0	64.6	68.4	72.1	75.8	75.9	78.0	81.3	82.1	82.6	83.6	82.5	79.6	76.9
	3-12	57.5	61.6	63.8	67.5	71.8	73.4	73.4	76.5	81.2	81.0	81.3	82.0	79.3	75.7	72.5
3 ft from wall	4-1	59.3	75.7	79.1	79.1	80.9	82.6	84.0	83.2	85.2	84.6	85.0	84.6	86.0	86.5	87.2
	4-2	59.2	71.9	76.8	77.3	79.5	82.0	83.1	83.1	85.0	84.5	84.0	84.1	85.6	86.4	86.2
	4-3	58.9	66.3	70.1	74.0	76.2	77.9	79.8	80.1	82.5	82.9	83.0	83.7	84.4	84.0	83.2
	4-4	58.2	63.0	66.3	69.6	73.5	75.8	77.0	78.0	81.3	81.3	81.5	82.0	83.0	81.4	79.2
	4-5	57.5	61.2	64.2	67.4	71.0	74.0	74.4	75.9	79.5	80.7	79.9	80.1	79.6	76.5	73.7
	4-6	57.5	61.2	63.2	67.1	70.4	73.2	72.3	75.0	79.5	79.8	79.2	79.2	76.0	72.5	69.4
1 ft from wall	4-7	60.0	74.9	78.1	78.6	78.9	81.8	82.3	81.9	83.8	83.8	84.0	83.8	85.3	85.5	85.8
	4-8	60.3	70.6	74.2	75.7	76.8	79.1	80.8	81.0	82.1	82.0	83.8	83.7	83.7	85.3	84.2
	4-9	60.2	66.3	69.8	71.7	73.6	77.0	78.0	78.0	80.1	80.6	81.4	82.0	82.7	82.1	81.6
	4-10	59.6	63.4	66.4	68.8	71.0	74.0	74.8	75.0	78.5	78.9	79.4	79.5	80.7	79.9	78.3
	4-11	59.1	62.3	64.6	67.1	69.8	72.2	71.5	72.9	77.9	77.7	77.4	77.8	77.9	76.7	74.7
	4-12	58.3	62.2	63.8	66.4	69.7	71.1	70.3	72.3	77.4	77.0	76.4	76.8	76.0	74.4	72.0

* For detailed description of thermocouple locations see Section IV-A.

Table XV-B. VARIATION OF TEMPERATURES IN SOIL SURROUNDING SHELTER*
21 x 21 x 7 ft. shelter; 45 occupants; 7 cfm/occupant

SOIL TEMPERATURES	T.C. No.	Time From Start of Test, Hrs. → Days → 0	24 1	48 2	72 3	96 4	120 5	144 6	168 7	192 8	216 9	240 10	264 11	288 12	312 13	336 14
SECTION B-B																
Below Floor 10-1/2 ft from wall	5-1	58.9	82.3	85.2	86.8	89.0	89.3	90.9	91.0	90.7	90.1	90.0	89.9	91.3	91.8	89.0
	5-2	58.9	67.7	72.1	74.8	77.4	78.4	79.3	80.0	81.3	81.4	82.0	82.0	82.4	83.1	83.1
	5-3	59.2	64.2	69.3	71.0	72.4	75.4	75.4	75.4	77.9	78.6	78.0	78.9	79.8	80.8	80.0
	5-4	59.8	61.2	64.7	65.9	66.7	70.0	71.1	71.2	72.8	72.9	73.0	73.7	74.3	74.6	75.5
	5-5	60.0	61.2	62.9	62.9	63.4	65.9	66.4	66.9	68.3	68.2	68.7	69.1	69.9	70.0	71.3
	5-6	60.1	61.2	61.5	61.5	61.2	62.8	63.0	63.2	64.3	64.1	64.0	64.9	65.4	66.3	67.2
	5-7	59.8	61.2	61.2	61.0	60.3	61.1	62.2	62.6	63.3	63.2	63.8	63.7	64.3	65.3	65.8
	5-8	59.2	60.7	60.2	60.2	59.0	59.9	60.3	60.3	61.2	60.9	61.9	61.4	62.3	63.0	62.9
	5-9	58.3	59.4	59.3	59.1	58.3	59.4	59.4	59.2	60.0	59.8	59.9	59.8	60.6	61.1	60.3
3 ft from wall	5-10	59.0	83.0	85.9	87.7	89.0	90.7	91.4	91.8	93.2	91.7	91.7	91.4	91.8	92.5	92.0
	5-11	58.8	68.7	72.4	74.4	76.2	77.5	78.1	78.6	80.4	79.9	80.0	79.5	80.8	81.4	81.8
	5-12	58.4	63.8	67.2	69.3	72.1	72.8	73.9	74.5	75.2	75.2	75.3	75.5	76.0	77.5	77.2
	6-1	58.4	60.7	64.2	64.8	66.2	68.1	69.4	69.5	71.1	71.8	70.9	72.0	72.0	72.9	73.7
	6-2	58.8	60.0	61.8	62.0	62.4	64.3	65.0	65.1	66.7	66.6	66.8	67.0	67.8	68.5	69.3
	6-3	58.8	59.5	60.3	60.2	59.7	61.6	61.7	61.8	62.4	62.8	63.2	63.1	64.1	64.7	65.4
1 ft from wall	6-4	58.3	75.3	78.3	79.1	80.3	83.4	84.0	84.0	85.4	84.6	84.6	84.0	83.3	83.4	84.0
	6-5	58.2	66.0	69.3	71.0	71.9	73.7	74.6	74.4	75.9	75.9	76.0	74.7	76.4	77.0	76.9
	6-6	58.0	61.9	64.7	66.1	67.2	69.3	68.5	69.1	71.8	71.3	71.7	71.7	71.9	73.0	72.8
	6-7	57.8	59.6	61.6	62.4	63.2	64.9	66.0	66.3	67.7	67.0	67.9	67.3	67.9	69.0	69.4
	6-8	57.5	59.1	59.5	60.2	60.6	61.6	62.5	62.5	63.6	63.1	63.7	63.9	64.2	65.2	65.5
	6-9	57.1	58.6	58.5	58.0	58.3	59.1	59.5	59.7	61.0	60.3	60.0	60.6	61.4	62.0	62.4

* For detailed description of thermocouple locations see Section IV-A.

Table XV-B. VARIATION OF TEMPERATURES IN SOIL SURROUNDING SHELTER*
21 x 21 x 7 ft. shelter; 45 occupants; 7 cfm/occupant

SOIL TEMPERATURES	T.C. No.	Time From Start of Test, Hrs. → Days → 0	24 1	48 2	72 3	96 4	120 5	144 6	168 7	192 8	216 9	240 10	264 11	288 12	312 13	336 14
SECTION C-C																
Outside Wall																
Diagonally Up	6-10	60.1	76.1	77.8	78.2	80.0	81.5	82.3	82.8	83.7	83.7	84.0	84.0	84.5	85.3	84.9
	6-11	61.2	65.3	68.5	68.5	70.3	72.8	74.0	75.0	76.1	77.3	77.1	78.1	80.2	78.7	80.5
	6-12	61.2	63.6	65.1	65.4	67.2	70.1	71.2	70.6	72.8	73.2	73.0	75.1	76.0	76.2	76.2
	7-1	60.0	61.0	61.7	63.6	63.8	68.7	66.5	67.6	69.4	71.8	72.1	72.6	73.0	73.2	72.3
	7-2	53.5	61.9	61.3	63.6	68.5	60.0	58.2	67.8	72.3	70.5	68.0	70.0	66.2	62.5	58.7
	7-3	53.5	63.2	62.6	65.3	73.6	57.0	57.3	69.4	75.3	69.2	68.0	69.1	63.0	59.4	56.3
Horizontal 6 ft elev	7-4	60.5	75.7	77.8	77.3	77.5	81.1	82.3	81.6	83.8	82.5	82.9	82.8	83.6	85.3	85.2
	7-5	60.8	69.2	71.2	72.8	73.0	76.0	77.2	77.6	78.5	78.5	79.4	79.7	80.7	81.3	81.2
	7-6	61.1	64.7	65.5	66.8	68.5	70.1	71.2	71.8	72.9	73.0	74.0	74.6	75.6	76.4	76.6
	7-7	61.1	63.2	63.1	63.6	65.0	66.5	67.7	67.8	70.0	69.6	69.7	70.7	71.7	73.0	73.3
	7-8	60.6	62.2	61.8	62.0	63.5	64.2	64.8	64.4	66.4	66.6	66.7	67.9	69.2	69.8	70.0
	7-9	59.5	61.4	61.8	61.8	62.4	64.2	63.1	63.3	65.2	66.4	66.7	67.0	67.8	67.5	67.7
3-1/2 ft elev	7-10	59.5	77.0	79.2	79.4	80.0	83.0	84.0	84.0	84.8	84.5	83.7	84.0	84.5	85.1	85.6
	7-11	59.3	68.5	71.8	73.0	73.1	76.2	76.7	77.7	78.4	78.5	78.1	79.2	81.3	80.6	81.0
	7-12	59.5	64.0	66.5	67.5	68.8	71.0	71.8	71.9	73.9	73.5	73.4	73.9	75.1	75.0	76.2
	8-1	59.5	61.7	62.1	63.2	62.5	66.0	66.0	67.1	68.0	68.1	68.1	68.3	70.0	70.6	71.9
	8-2	59.6	61.3	61.2	61.8	61.5	63.0	63.8	64.0	65.5	65.0	65.3	65.6	66.3	67.5	68.1
	8-3	59.3	60.4	60.2	60.4	59.8	61.2	61.8	61.6	63.0	62.3	63.3	63.2	64.1	65.2	65.4
1 ft elev	8-4	58.7	74.5	77.5	78.2	79.1	81.4	81.9	81.4	82.6	82.0	81.8	81.1	81.6	82.9	82.6
	8-5	58.2	68.0	70.7	71.8	73.7	74.6	75.0	74.9	76.7	76.0	76.8	76.8	77.2	78.4	78.3
	8-6	57.7	62.1	64.8	66.2	68.5	69.0	69.9	70.2	71.4	71.4	71.8	71.5	72.1	73.7	73.7
	8-7	57.6	59.5	61.3	61.5	63.6	63.9	64.4	64.4	65.6	65.9	65.9	66.6	67.2	67.7	68.8
	8-8	57.6	59.1	59.8	60.0	61.4	61.2	61.7	61.6	63.3	62.8	63.2	63.4	64.0	64.7	65.3
	8-9	57.1	58.2	58.6	58.5	59.4	59.0	59.2	58.9	59.6	59.8	60.0	60.1	61.4	61.7	61.7

* For detailed description of thermocouple locations see Section IV-A.

Table XV-B. VARIATION OF TEMPERATURES IN SOIL SURROUNDING SHELTER*

21 x 21 x 7 ft. shelter; 45 occupants; 7 cfm/occupant

SOIL TEMPERATURES	T.C. No.	Time From Start of Test, Hrs.→ Days→ 0	24 1	48 2	72 3	96 4	120 5	144 6	168 7	192 8	216 9	240 10	264 11	288 12	312 13	336 14
SECTION C-C																
Outside Wall																
Diagonally Down	8-10	57.9	73.6	77.3	77.8	78.3	80.7	81.3	81.4	82.1	81.3	81.1	81.0	81.1	82.0	83.0
	8-11	57.7	62.9	65.6	66.7	68.0	69.8	69.9	70.0	71.9	71.3	71.4	71.6	72.7	73.8	74.6
	8-12	56.7	59.4	61.0	62.0	62.4	64.2	63.5	64.3	66.3	65.9	66.3	66.4	67.0	68.0	68.0
	9-1	55.5	56.9	57.9	57.1	58.4	59.5	58.8	59.1	60.5	60.6	60.7	60.9	62.3	62.4	61.4
	9-2	55.0	55.9	56.1	56.1	57.3	56.8	57.0	56.7	57.8	57.2	57.3	57.2	58.2	58.2	59.0
	9-3	52.9	54.3	54.4	54.9	55.6	54.8	55.0	54.9	56.1	55.0	55.1	55.3	55.6	56.3	56.8
Above Roof 10-1/2 ft from wall	9-4	58.9	79.2	81.7	83.0	85.7	86.2	87.1	87.5	89.0	88.2	88.5	88.3	88.8	89.8	88.7
	9-5	58.8	72.0	76.6	78.9	80.3	84.7	84.1	85.7	86.4	87.6	87.9	87.4	88.6	89.3	88.2
	9-6	58.0	65.0	71.1	72.1	76.3	80.3	81.9	82.8	84.7	85.3	85.8	85.8	87.1	86.4	85.4
	9-7	57.4	61.6	66.3	69.3	73.2	77.4	78.3	79.8	82.6	83.3	83.5	83.7	84.8	82.8	81.3
	9-8	56.6	60.4	64.3	67.4	71.3	75.3	75.9	78.0	81.2	81.4	81.8	82.7	82.8	79.3	77.2
	9-9	56.1	60.2	63.2	66.8	71.2	73.5	73.5	77.1	80.1	81.0	80.6	81.9	80.3	76.3	73.3
ft from wall	9-10	59.9	76.3	78.8	79.4	79.9	83.0	83.6	83.2	84.3	84.6	84.0	84.5	85.3	85.7	86.0
	9-11	59.7	71.1	75.0	76.4	78.5	81.2	82.8	82.8	83.8	83.7	83.5	84.4	85.1	85.6	85.2
	9-12	59.2	65.4	69.8	71.8	74.7	77.9	79.1	79.3	81.6	81.7	82.1	82.8	83.3	83.0	81.8
	10-1	58.1	62.3	64.8	68.0	71.0	73.7	74.0	75.1	78.6	78.6	78.8	79.0	79.9	78.9	77.0
	10-2	57.5	61.7	63.8	67.2	71.0	73.0	72.7	75.0	78.4	78.5	78.8	78.9	78.8	76.0	73.3
	10-3	57.2	61.5	63.8	66.6	70.9	72.3	71.9	74.9	78.3	78.5	78.2	78.7	76.0	72.3	69.9
1 ft from wall	10-4	60.0	75.3	78.8	77.8	78.7	82.7	82.8	82.2	83.0	84.5	84.4	84.5	85.1	85.8	86.0
	10-5	60.5	70.7	74.3	75.6	76.8	79.9	80.8	80.5	82.5	82.3	82.4	82.8	84.0	84.3	83.9
	10-6	60.3	65.9	69.8	70.9	73.4	76.4	77.4	77.6	79.8	79.9	80.2	80.2	81.4	81.7	81.0
	10-7	60.0	63.8	66.8	68.8	71.4	73.8	74.0	75.4	77.9	78.5	78.8	78.8	79.8	79.3	78.0
	10-8	58.9	62.3	64.7	66.6	70.0	71.7	71.3	72.9	76.5	77.0	76.6	76.8	76.9	75.4	73.2
	10-9	57.9	62.2	62.9	65.7	69.6	70.2	69.1	72.0	76.1	76.3	75.8	75.9	74.8	73.1	69.9

* For description of thermocouple locations see Section IV-A.

Table XV-B. VARIATION OF TEMPERATURES IN SOIL SURROUNDING SHELTER*

21 x 21 x 7 ft. shelter; 45 occupants; 7 cfm/occupant

SOIL TEMPERATURES	T.C.	Time From Start of Test, Hrs. → Days → 0	24 1	48 2	72 3	96 4	120 5	144 6	168 7	192 8	216 9	240 10	264 11	288 12	312 13	336 14
SECTION C-C																
Below Floor 10-1/2 ft from wall	10-10	58.7	83.8	87.2	88.2	88.8	90.2	90.9	90.9	91.5	91.0	89.9	89.6	90.3	91.7	91.0
	10-11	58.9	67.3	71.6	73.5	75.7	76.6	77.8	78.0	79.5	79.0	79.3	79.0	79.3	81.1	81.5
	10-12	58.7	64.8	67.4	69.5	72.2	73.1	74.0	75.0	76.2	75.4	75.6	75.9	76.5	77.2	77.6
	11-1	59.2	61.6	63.9	65.3	67.2	68.9	69.1	70.3	71.4	71.7	71.7	71.4	71.4	71.4	72.4
	11-2	59.2	61.2	62.6	63.0	63.1	64.9	66.1	66.2	67.4	67.3	67.7	67.2	68.3	69.8	69.4
	11-3	59.3	60.6	60.8	61.3	62.4	62.1	62.7	62.8	64.3	63.7	63.9	64.0	65.0	66.0	66.0
	11-4	59.4	60.3	60.2	60.2	61.2	61.2	61.3	61.8	62.4	62.2	62.2	62.7	63.6	64.3	64.7
	11-5	58.3	58.7	58.3	58.9	59.4	59.0	58.7	59.8	59.8	60.1	59.5	60.2	61.4	62.0	62.1
	11-6	57.6	58.2	57.5	57.9	58.3	58.5	56.7	58.2	57.8	58.2	57.1	58.3	59.8	60.1	60.3
3 ft from wall	11-7	59.2	83.8	87.2	88.1	89.8	91.5	91.8	91.8	92.2	91.2	91.2	91.4	92.1	93.3	91.4
	11-8	58.3	66.8	71.2	73.1	75.3	76.2	77.7	77.6	79.2	78.2	77.9	78.1	78.8	79.7	80.4
	11-9	58.2	62.7	66.8	68.8	71.3	72.2	73.4	73.8	75.3	74.2	74.4	74.3	75.0	76.1	76.3
	11-10	57.9	60.3	62.6	64.1	66.2	67.0	68.3	69.0	70.2	69.6	69.3	70.0	70.3	71.6	71.6
	11-11	58.0	59.6	61.2	61.4	62.3	64.2	64.8	64.8	65.6	65.7	66.0	65.2	67.1	67.6	68.3
	11-12	57.6	59.5	59.5	60.0	61.1	60.7	61.4	61.5	62.0	62.3	62.1	63.0	63.3	64.3	64.5
	12-1	57.5	59.4	59.5	59.2	60.3	59.1	59.9	59.6	61.2	60.8	61.0	61.3	60.7	61.1	62.8
	12-2	57.1	58.9	57.9	58.2	59.0	58.5	58.0	58.6	59.4	58.8	59.1	59.2	60.2	60.8	61.0
	12-3	56.4	58.4	56.0	55.9	56.6	57.3	56.8	57.4	58.1	57.8	56.1	57.6	58.3	59.2	59.2
1 ft from wall	12-4	58.3	76.4	78.8	79.8	80.8	83.0	83.7	83.2	83.8	83.1	82.4	82.8	83.3	84.4	84.1
	12-5	57.5	65.2	68.2	70.0	71.8	72.7	73.9	73.9	75.2	74.0	73.7	74.0	76.5	76.1	76.3
	12-6	57.4	61.3	63.9	65.2	67.4	68.4	69.5	69.8	71.1	69.9	70.2	70.0	70.9	72.0	72.1
	12-7	57.0	59.2	60.6	61.5	63.1	63.8	64.8	65.0	66.3	65.6	65.6	65.7	67.0	67.7	67.8
	12-8	56.5	58.4	58.4	59.0	60.5	60.7	61.7	62.1	62.9	62.2	62.3	62.8	63.4	64.3	64.4
	12-9	56.5	57.8	58.4	58.2	59.9	58.5	60.0	59.5	60.6	60.6	60.0	60.3	61.9	62.1	62.7

* For detailed description of thermocouple locations see Section IV-A.

Table XV-B. VARIATION OF TEMPERATURES IN SOIL SURROUNDING SHELTER*
21 x 21 x 7 ft. shelter; 45 occupants; 7 cfm/occupant

SOIL TEMPERATURES	T.C. No.	Time From Start of Test, Hrs. — Days → 0	24 1	48 2	72 3	96 4	120 5	144 6	168 7	192 8	216 9	240 10	264 11	288 12	312 13	336 14
SECTION D-D																
Outside Corner																
Diagonally Up	12-10	60.8	74.1	76.7	78.0	79.6	80.3	81.1	80.8	81.5	81.1	81.8	82.0	82.9	83.8	83.8
	12-11	61.3	62.1	63.9	64.1	65.2	67.7	68.8	68.6	70.2	70.3	71.2	71.8	73.6	74.0	74.2
	12-12	60.8	61.2	62.9	63.3	64.5	66.7	67.2	66.7	68.4	69.1	70.2	70.3	71.3	72.4	71.3
	13-1	58.1	60.9	60.7	62.1	63.8	66.0	62.8	63.4	67.4	68.7	68.3	68.5	68.7	69.3	66.1
	13-2	57.5	61.3	61.4	68.0	78.5	54.8	59.8	72.5	77.1	68.3	66.0	67.7	63.0	57.4	56.2
	13-3	56.2	61.3	61.3	68.0	78.2	54.7	58.9	72.4	77.0	67.8	65.5	67.7	62.9	57.3	55.8
Horizontal 6 ft elev	13-4	60.0	73.3	75.8	76.4	77.8	79.6	80.0	80.1	80.0	79.8	80.3	80.7	81.5	83.0	82.7
	13-5	60.9	63.0	64.0	65.2	66.6	67.6	68.8	69.4	70.5	70.3	70.7	71.1	73.0	74.2	74.8
	13-6	60.9	62.1	62.5	62.8	64.2	64.8	66.5	66.6	67.4	67.2	67.7	69.0	69.5	71.2	71.2
	13-7	60.7	61.3	62.1	62.1	62.4	64.2	64.8	64.3	65.4	66.0	66.0	66.8	68.2	69.3	69.2
3-1/2 ft elev	13-8	59.2	73.8	76.5	77.2	78.0	80.3	81.0	80.6	81.3	81.1	80.9	80.4	81.9	82.0	82.3
	13-9	59.3	61.3	63.4	63.7	65.2	67.0	67.9	68.1	69.3	69.1	69.5	70.0	71.1	72.4	72.7
	13-10	59.3	61.2	62.1	62.4	62.5	64.2	64.8	65.0	66.2	65.6	65.5	66.4	67.7	69.0	69.4
	13-11	59.2	60.8	60.6	60.6	60.6	61.6	62.3	62.5	63.2	63.1	63.0	64.0	64.8	65.9	66.3
	13-12	58.8	59.7	59.5	59.0	59.2	60.1	60.9	60.8	61.4	60.8	61.4	62.2	62.8	64.3	64.1
	14-1	57.2	59.2	56.9	57.3	57.2	60.1	58.9	60.0	60.8	60.8	60.5	61.9	62.2	63.3	61.9
1 ft elev	14-2	58.2	72.9	75.8	76.5	78.2	79.6	80.3	80.3	80.5	79.8	79.2	79.2	79.9	81.2	81.3
	14-3	56.8	59.6	61.0	62.1	63.7	64.1	65.3	65.5	66.8	66.2	66.2	66.9	68.1	69.0	69.3
	14-4	56.7	58.9	59.4	59.8	60.7	61.2	61.9	62.4	63.3	62.8	63.0	63.2	64.0	65.2	65.7
	14-5	56.7	58.5	58.6	58.4	58.3	59.3	60.1	60.0	60.6	60.7	60.9	60.4	62.3	62.8	63.1
Diagonally Down	14-6	57.9	71.5	74.3	75.2	76.1	78.2	78.9	78.7	78.6	78.4	78.0	77.8	78.8	79.3	79.3
	14-7	56.5	58.7	60.6	61.2	62.0	63.3	64.1	64.8	65.4	65.3	65.7	65.8	67.0	67.8	67.9
	14-8	55.8	57.8	57.9	58.0	59.0	59.6	60.3	60.4	61.1	60.7	61.2	61.3	62.2	62.9	63.0
	14-9	54.3	56.0	56.0	56.1	57.2	57.9	57.7	57.4	57.3	57.3	57.7	57.3	58.2	59.1	59.9
	14-10	52.4	53.0	53.8	54.3	55.2	54.8	55.1	54.9	55.2	54.5	54.8	55.0	55.5	56.5	56.8
	14-11	50.7	52.8	52.7	53.1	53.5	52.7	53.2	52.9	53.2	52.8	53.0	53.1	54.6	55.1	55.2

* For detailed description of thermocouple locations see Section IV-A.

Table XVI-A. VARIATION OF TEMPERATURES INSIDE SHELTER*

21 x 21 x 7 ft. shelter; 45 occupants; 15 cfm/occupant

Time From Start of Test, Hrs. →, Days →

	T.C. No.	0 0	6	12	18	24 1	30	36	42	48 2	54	60	66	72 3	78	84	90
AIR TEMPERATURES																	
SUPPLY DUCT DB	15-10	63.4	92.8	82.8	73.0	83.2	94.4	83.5	73.3	83.5	94.5	83.[illegible]	73.4	83.5	94.6	87.4	72.5
WB	15-9	62.8	76.5	74.3	71.7	74.6	76.0	73.7	71.2	74.5	76.6	73.3	71.6	74.2	75.9	72.1	69.4
RETURN DUCT DB	16-2	62.4	68.6	86.7	83.6	85.6	86.7	88.4	85.0	88.0	91.4	88.8	85.7	88.4	91.3	89.3	85.7
WB	16-1	61.7	79.0	78.8	77.3	79.2	76.4	80.0	79.7	80.0	82.0	80.7	79.0	80.2	82.0	79.5	79.1
SHELTER AIR Center 6 ft elev DB	15-12	63.4	81.3	81.0	78.1	81.5	86.2	83.5	80.5	83.5	88.2	85.4	81.0	84.4	88.3	85.0	81.8
WB	15-11	63.4	73.6	76.0	73.5	76.0	76.8	77.0	75.0	76.4	77.8	77.5	75.0	77.2	77.7	77.0	73.9
3-1/2 ft elev DB	15-4	62.5	82.5	82.8	78.8	81.5	87.0	85.5	81.0	84.7	88.7	85.7	82.0	85.[illegible]	89.8	86.[illegible]	82.0
WB	15-3	62.4	76.0	77.4	76.0	76.4	78.0	77.5	76.7	77.5	78.9	77.6	76.7	77.5	78.4	78.5	76.3
1 ft elev DB	15-2	62.4	81.8	81.2	79.8	81.4	86.6	84.8	81.5	84.6	87.7	85.7	82.3	85.0	89.2	86.0	82.3
WB	15-1	62.3	73.2	76.3	75.0	75.5	76.4	75.8	74.7	75.0	77.8	76.0	74.3	76.0	77.7	77.3	73.4
Near wall 3-1/2 ft elev DB	15-6	62.9	80.0	80.3	77.8	79.4	85.0	82.6	80.0	83.0	86.4	83.5	81.0	83.5	87.2	84.5	61.5
WB	15-5	62.7	74.8	76.4	76.0	75.5	76.8	76.2	76.7	76.8	77.4	77.2	76.6	77.2	77.3	75.5	76.3
In corner 3-1/2 ft elev DB	15-8	62.9	83.0	82.0	78.8	81.5	87.0	84.3	81.[illegible]	84.2	88.0	84.7	81.0	85.0	88.3	85.0	81.6
WB	15-7	62.9	76.5	77.7	76.4	77.0	79.0	77.6	77.0	78.0	79.2	78.2	76.8	77.6	79.4	78.5	75.5
INSIDE SURFACE TEMPS																	
SECTION B-B Wall	1-1	63.4	72.0	76.1	76.0	75.4	78.7	79.3	78.5	78.5	81.0	81.0	79.3	79.3	81.3	82.3	80.8
	1-7	63.3	71.8	73.6	74.0	74.2	78.5	78.2	77.0	77.3	80.0	80.5	78.4	78.5	89.4	80.0	79.4
	2-1	61.6	71.0	76.2	75.3	74.6	78.8	79.2	78.4	79.3	81.0	80.7	78.9	80.0	83.0	82.8	80.3
	2-7	62.4	70.5	73.1	73.0	73.7	77.4	78.2	76.7	77.8	79.7	79.8	78.2	78.8	81.5	80.6	79.0
	3-1	60.3	68.4	74.0	73.8	73.0	76.2	76.7	75.8	76.8	78.5	78.6	77.5	77.9	80.6	80.6	78.5
Ceiling	3-7	62.9	82.0	63.2	81.5	82.2	87.3	86.4	83.2	85.5	89.0	87.0	83.6	85.5	89.3	88.2	85.4
	4-1	62.9	72.9	76.9	[illegible]	73.4	79.8	80.0	78.5	79.3	82.0	81.0	79.4	80.5	83.1	83.4	80.8
	4-7	63.6	71.8	75.7	75.2	74.2	79.0	78.8	77.8	78.8	82.0	81.0	80.0	80.5	53.7	81.9	81.2
Floor	5-1	61.6	77.0	82.0	80.6	80.6	85.5	85.2	85.0	85.6	87.4	86.6	84.7	85.0	90.0	89.4	85.0
	5-10	60.4	80.4	84.8	85.0	85.3	89.5	89.5	88.6	89.7	92.0	91.5	39.9	90.8	93.0	9[illegible].5	90.9
	6-4	59.9	70.5	75.5	75.2	75.3	80.0	80.0	79.0	60.0	82.7	82.0	80.1	81.0	83.4	82.9	81.4
SECTION C-C Wall	6-10	62.5	72.6	75.5	75.0	76.0	79.5	79.5	78.4	[illegible]9.0	81.3	81.0	79.4	80.0	82.3	81.5	80.5
	7-4	63.3	72.4	74.4	73.5	73.4	79.4	78.1	77.9	79.4	80.5	81.0	79.7	79.7	82.0	81.0	79.7
	7-10	62.0	[illegible]	77.0	75.6	75.5	80.6	80.9	78.9	80.0	83.0	81.9	79.3	80.5	84.1	82.9	80.7
	8-6	61.6	70.2	74.0	73.0	73.4	78.0	78.0	76.7	78.0	80.2	80.5	78.0	79.3	82.3	80.8	79.0
	8-10	61.5	69.0	73.2	73.0	73.4	76.9	77.5	76.[illegible]	77.5	79.2	79.0	78.1	79.3	82.0	80.8	79.5
Ceiling	9-4	63.2	79.4	81.[illegible]	89.0	80.5	85.3	84.3	82.0	83.5	87.2	85.5	87.[illegible]	[illegible].3	84.0	86.6	83.3
	9-10	63.8	72.5	76.0	[illegible]	75.5	80.0	79.6	78.7	79.4	81.8	81.0		80.1	81.6	82.0	80.7
	10-4	64.8	74.0	76.0	75.2	[illegible]	[illegible]	80.3	78.0	79.0	82.2	82.0	[illegible]	81.0	81.3	82.4	80.7
Floor	10-10	62.0	75.3	79.5	79.5	80.2	84.5	84.4	83.2	84.5	86.0	85.5	8[illegible]	85.0	87.1	85.8	85.0
	11-7	60.0	80.0	84.0	84.1	85.0	89.2	89.0	88.5	89.4	91.4	90.8	89.[illegible]	90.8	93.0	91.5	90.2
	12-4	59.9	73.3	76.8	76.4	77.0	81.4	81.0	80.0	81.6	83.4	82.7	81.[illegible]	82.5	85.0	81.6	82.3
SECTION D-D	12-10	62.0	71.5	75.5	74.7	74.2	78.0	78.3	77.1	77.9	79.5	80.[illegible]	78.0	79.0	81.0	80.7	79.2
	13-4	63.1	71.7	73.0	72.5	73.0	77.2	77.7	76.7	77.5	74.0	[illegible]	[illegible]	78.7	81.0	79.8	77.7
	13-8	62.2	70.5	74.3	74.0	73.4	77.5	77.7	76.3	77.[illegible]	79.6	74.0	77.4	78.5	80.7	80.2	78.0
	14-2	61.5	68.5	73.1	71.5	72.0	75.2	75.4	74.2	76.5	77.8	74.9	75.5	76.8	79.4	78.1	76.3
	14-6	60.5	67.5	71.6	71.0	71.3	73.5	77.4	73.3	74.3	76.2	76.0	75.0	76.0	77.8	77.3	76.0
SIMOC SKIN TEMPS																	
Center - Top	18-7	61.7	85.5	86.6	84.5	85.3	89.2	87.4	85.4	87.0	90.3	87.8	85.4	87.0	91.8	86.8	85.0
Middle	18-8	61.5	88.5	84.7	84.5	86.8	89.5	87.4	85.7	8[illegible].7	90.3	87.8	85.[illegible]	88.9	91.1	87.3	86.1
Bottom	18-9	62.4	90.5	89.5	8[illegible].0	90.0	91.0	91.3	89.0	92.2	93.[illegible]	92.1	88.8	92.5	93.5	92.3	90.0
Near Wall - Middle	18-10																
In Corner - Middle	18-11	62.5	87.3	85.9	86.0	85.3	89.5	87.7	87.2	87.5	90.6	88.[illegible]	86.2	88.3	90.7	88.2	87.0
OUTSIDE AIR TEMPS	19-5	63.1	71.0	71.0	68.[illegible]	66.3	80.6	76.4	77.8	[illegible]	93.1	[illegible]	[illegible]	[illegible]	76.8	68.2	68.4
	19-6	63.1	72.8	70.4	68.[illegible]	66.3	[illegible]	76.3	[illegible]	[illegible]	93.0	[illegible]	[illegible]	[illegible]	75.8	68.1	68.4
	19-7	63.1	71.0	70.0	68.3	66.3	[illegible]	76.0	[illegible]	[illegible]	92.5	[illegible]	[illegible]	[illegible]	75.0	68.6	68.3

	T.C. No.	96 4	102	108	114	120 5	126	132	138	144 6	150	156	162
SUPPLY DUCT DB	15-10		94.5	86.0	73.7	86.3	95.0	93.5	74.0		95.0	86.5	73.[illegible]
WB	15-9		77.0	74.5	71.7	75.3	75.7	75.5	71.7		75.0	72.3	70.[illegible]
RETURN DUCT DB	16-2		92.4	90.5	89.5	92.8	92.9	92.7	86.3		93.2	91.0	84.[illegible]
WB	16-1		83.0	82.2	89.5	92.9	84.2	84.3	81.2		81.0	80.8	76[illegible]
SHELTER AIR Center 6 ft elev DB	15-12		89.8	87.0	82.5	85.5	89.5	89.4	82.5		90.0	87.4	83[illegible]
WB	15-11		78.7	79.5	75.5	78.5	78.9	78.6	76.2		77.8	78.2	75[illegible]
3-1/2 ft elev DB	15-4		90.0	88.2	83.0	86.3	89.4	89.4	82.5		90.5	88.7	84[illegible]
WB	15-3		79.5	78.4	78.[illegible]	79.2	79.6	80.0	79.0		78.3	78.2	77[illegible]
1 ft elev DB	15-2		89.4	87.5	83.4	86.5	89.4	89.0	82.4		89.3	88.5	84[illegible]
WB	15-1		79.3	78.3	77.3	77.5	79.5	80.4	76.6		79.3	79.0	76[illegible]
Near wall 3-1/2 ft elev DB	15-6		87.7	85.7	82.6	84.7	88.1	88.0	82.4		87.9	86.6	8[illegible]
WB	15-5		78.3	78.5	78.2	76.5	78.3	78.3	79.0		76.5	76.5	7[illegible]
In corner 3-1/2 ft elev DB	15-8		89.4	86.7	83.0	85.9	89.5	88.3	82.4		89.4	86.3	8[illegible]
WB	15-7		80.9	80.0	78.0	79.9	80.9	80.8	79.0		79.5	79.0	7[illegible]
SECTION B-B Wall	1-1		83.0	84.2	82.3	81.8	83.0	84.1	82.4		83.3	84.2	[illegible]
	1-7		82.9	83.5	82.2	82.2	83.4	83.7	82.4		83.2	83.0	8[illegible]
	2-1		82.8	83.6	83.0	82.5	84.7	83.2	83.2		84.0	85.0	8[illegible]
	2-7		82.4	83.1	81.3	81.6	83.2	83.1	81.7		83.6	83.8	8[illegible]
	3-1		80.8	82.7	81.4	81.4	83.0	84.0	81.5		83.2	84.2	[illegible]
Ceiling	3-7		90.0	90.0	86.3	87.4	90.2	89.[illegible]	86.3		88.9	88.7	[illegible]
	4-1		85.5	85.2	84.3	83.0	85.2	86.0	83.3		85.8	83.4	[illegible]
	4-7		83.4	84.4	83.0	83.0	86.2	85.2	83.0		84.3	85.0	[illegible]
Floor	5-1		91.0	90.0	88.2	88.0	91.4	90.0	87.6		90.5	90.7	[illegible]
	5-10		94.0	94.6	92.1	93.4	94.5	94.2	92.2		93.5	94.3	[illegible]
	6-4		84.2	85.1	83.0	84.2	85.3	85.3	83.2		85.5	86.0	[illegible]
SECTION C-C Wall	6-10		83.2	83.9	81.8	82.5	83.8	83.3	82.5		83.2	83.3	
	7-4		87.3	83.4	82.2	82.4	83.3	83.3	82.4		83.8	83.3	
	7-10		83.9	84.0	81.5	82.5	85.0	85.3	82.5		85.5	85.8	
	8-6		83.0	83.0	80.4	81.3	83.4	83.8	81.0		83.8	83.3	
	8-10		82.5	83.0	80.5	81.6	83.2	83.0	81.5		83.3	83.7	
Ceiling	9-4		89.0	88.2	85.0	86.2	88.[illegible]	87.0	86.6		86.0	86.8	
	9-10		83.8	84.4	82.4	83.0	84.5	84.5	83.0		83.0	84.0	
	10-4		84.0	84.4	82.7	83.0	84.3	83.0	83.0		83.5	84.5	
Floor	10-10		88.3	89.4	87.2	88.0	89.3	87.5	85.5		87.5	87.8	
	11-7		93.8	93.5	91.8	92.8	94.0	93.7	91.8		93.2	93.1	
	12-4		84.8	85.7	84.0	85.0	86.3	86.0	83.9		86.0	86.0	
SECTION D-D	12-10		82.0	82.3	80.0	81.2	83.3	83.3	81.0		81.8	82.3	
	13-4		81.7	82.2	80.0	80.4	83.1	81.8	80.6		80.3	81.7	
	13-8		81.3	81.9	79.7	80.3	83.1	83.4	80.2		82.8	83.2	
	14-2		80.3	80.2	78.5	79.2	81.3	[illegible]	79.0		81.3	83.1	
	14-6		78.7	79.3	78.0	78.3	78.[illegible]	[illegible]	78.3		78.7	80.7	
SIMOC SKIN TEMPS Center - Top	18-7		92.3	89.9	88.[illegible]	88.0	90.0	88.6	88.3		89.7	88.0	
Middle	18-8		91.7	88.6	88.[illegible]	88.5	88.7	88.4	88.5		90.0	87.5	
Bottom	18-9		95.3	93.2	93.0	93.4	94.5	93.7	93.0		93.5	93.7	
Near Wall - Middle	18-10												
In Corner - Middle	18-11		94.0	90.5	87.6	90.3	90.7	88.4	87.2		88.7	88.1	
OUTSIDE AIR TEMPS	19-5		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	
	19-6		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	
	19-7		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	

A

*For detailed description of thermocouple locations see Sec. IV-A and B.

MPERATURES INSIDE SHELTER*

shelter; 45 occupants;
m/occupant

	78	84	90	96 4	102	108	114	120 5	126	132	138	144 6
1.5 4.2	94.6 75.9	82.6 72.1	72.5 69.4		94.5 77.0	86.0 74.5	73.7 71.7	84.3 75.3	95.0 75.7	93.5 75.5	74.0 71.7	
9.4 0.2	91.3 82.0	89.3 79.5	85.7 79.1		92.4 83.0	90.5 82.2	89.5 89.5	92.8 92.9	92.9 84.7	92.7 84.3	86.3 81.2	
4.6 1.2	88.3 77.7	85.0 77.0	81.8 73.9		89.8 78.7	87.0 79.5	82.5 75.5	85.5 78.5	89.5 78.9	89.4 78.6	82.5 76.2	
5.7 7.5	88.8 78.4	86.7 78.5	82.0 76.3		90.0 79.5	88.2 78.4	83.0 78.3	86.3 79.2	89.4 79.6	89.3 80.0	82.5 79.0	
5.0 6.0	89.2 77.7	86.0 77.3	82.3 73.4		89.4 79.3	87.5 78.3	83.4 77.3	86.5 77.5	89.4 79.5	89.0 80.4	82.4 76.6	
3.5 7.2	87.2 77.3	84.5 75.5	81.5 76.3		87.7 78.3	85.7 78.5	82.6 78.2	84.7 76.5	88.1 78.3	88.0 78.3	82.6 79.0	
5.0 7.6	88.3 79.4	85.0 78.5	81.6 76.5		89.4 80.9	86.7 80.0	83.0 78.6	85.9 79.9	89.3 80.9	88.3 80.8	82.4 79.0	
79.3 78.5 80.0 78.8 77.9	81.3 89.4 83.0 81.5 80.6	82.3 80.0 82.8 80.6 80.6	[illegible] 79.4 80.3 79.0 78.5		83.0 82.9 83.8 82.4 80.8	84.2 83.5 83.6 83.1 82.7	82.3 82.2 83.0 81.3 81.4	81.8 82.[illegible] 82.[illegible] 81.6 83.4	83.0 83.4 84.7 83.2 83.0	84.1 83.7 85.2 83.1 84.0	82.4 82.4 83.2 81.7 81.5	
85.5 80.5 80.5	89.3 83.1 83.7	88.2 83.4 81.9	85.4 80.8 81.2		90.0 85.5 83.4	90.0 85.2 84.4	86.3 84.3 83.0	87.4 83.0 83.0	90.2 85.2 84.2	89.2 86.0 85.2	86.3 83.3 83.0	
85.0 90.8 91.0	90.0 93.[illegible] [illegible]	[illegible] [illegible] [illegible]	85.0 90.9 81.4		91.0 94.0 84.2	90.0 94.6 85.1	83.2 92.1 83.0	88.0 93.4 84.2	91.4 94.5 85.3	90.0 94.2 85.3	87.6 92.7 83.2	
80.0 79.7 80.5 79.3 79.3	[illegible]	[illegible]	80.5 79.7 80.7 [illegible] 79.5		83.7 82.3 83.9 83.0 82.5	83.9 83.4 84.8 83.0 83.0	81.8 82.2 81.5 80.4 80.5	82.5 82.4 82.5 81.3 81.6	83.8 83.3 85.0 83.4 83.2	83.3 83.3 85.3 83.0 83.0	82.5 82.4 82.5 81.0 81.5	
[illegible]	[illegible]	[illegible]	[illegible]		89.0 83.8 84.0	88.2 84.4 84.4	85.0 82.4 82.[illegible]	86.2 83.0 83.0	88.1 84.5 84.3	87.0 84.5 85.0	84.6 83.0 83.0	
[illegible]	[illegible]	[illegible]	85.0 90.[illegible] 82.1		8[illegible].5 [illegible] 84.0	89.4 93.5 85.7	87.2 91.8 84.0	88.0 92.8 93.0	89.3 94.0 84.3	87.5 93.7 84.0	85.5 91.8 83.9	
[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	

150	156	162	168 7	174	180	186	192 8	198	204
95.0 75.0	84.5 72.3	73.6 70.2	84.5 72.5	95.8 76.0	84.7 73.6	74.0 71.0	83.0 73.3	95.0 76.7	89.4 74.5
93.2 81.0	91.0 80.8	84.5 76.0	89.8 79.3	95.0 82.[illegible]	91.4 81.2	87.2 79.6	89.4 81.0	93.7 83.0	91.8 81.3
90.0 77.8	87.4 78.2	83.7 75.5	86.0 77.0	91.3 79.0	86.9 78.7	83.3 76.5	84.3 78.8	89.5 80.0	87.8 78.6
90.5 78.3	88.7 78.2	84.0 77.2	86.2 76.6	91.5 80.0	88.0 78.8	88.3 78.3	85.6 78.9	90.6 81.0	88.[illegible] 79.[illegible]
85.3 79.3	88.5 79.0	84.5 75.0	87.0 77.0	91.2 79.9	88.4 79.0	84.2 78.2	85.6 79.3	89.4 81.3	87.6 79.8
87.9 76.5	86.6 76.5	83.3 77.5	85.8 76.2	89.5 78.5	86.3 78.0	83.0 79.2	84.2 78.9	88.5 79.6	82.0 78.2
89.4 79.5	86.3 79.0	83.0 78.4	85.7 78.2	90.7 80.8	86.0 80.0	82.5 79.5	84.7 79.3	90.0 81.7	87.5 80.2
83.3 83.2 84.0 83.6 83.2	84.2 83.[illegible] 8[illegible].0 [illegible].8 84.2	83.0 82.6 83.5 82.2 82.7	82.9 82.8 83.5 81.9 82.4	85.0 83.5 86.0 85.5 85.0	84.5 83.6 85.0 84.0 84.2	83.0 83.0 83.9 81.3 82.8	82.7 82.7 83.0 82.3 83.6	84.2 83.0 85.7 84.6 84.7	84.1 83.4 84.3 83.8 83.8
88.9 85.8 84.3	86.7 85.4 85.0	85.7 82.6 83.0	86.9 83.0 83.1	91.2 86.2 86.2	88.5 85.6 85.0	85.5 82.0 83.3	86.3 83.9 83.3	90.5 87.1 85.9	88.8 85.8 84.4
90.5 93.5 85.5	90.7 94.3 86.0	88.4 92.5 84.0	88.8 92.9 84.4	92.9 95.9 87.0	90.7 94.5 86.0	87.5 92.4 84.2	88.5 92.8 84.4	90.3 95.8 87.2	90.4 94.0 85.3
83.2 83.8 85.5 83.8 83.3	83.3 83.3 85.9 83.3 83.7	82.0 82.2 83.5 81.4 82.2	82.1 82.3 84.3 82.4 82.5	84.6 84.0 86.9 85.7 84.9	83.4 83.3 85.5 83.9 83.8	82.0 82.1 83.7 82.0 82.5	82.0 82.3 83.8 82.3 82.2	86.7 83.1 86.8 85.0 85.0	83.5 83.2 85.2 83.3 83.5
86.0 85.0 83.5	86.8 86.0 84.5	84.4 82.3 83.0	84.9 82.9 83.3	89.1 85.0 85.8	87.1 84.5 84.5	84.5 84.1 83.4	85.1 86.1 83.4	89.0 87.1 85.8	87.4 85.2 84.3
87.5 93.2 86.0	87.8 93.1 86.0	86.0 91.5 84.0	87.3 92.4 84.8	89.0 93.0 87.4	88.0 93.6 84.7	86.4 92.0 84.5	86.6 92.4 85.1	88.5 95.0 87.7	86.9 93.3 85.2
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

210	216 .9	222	228	234	240 10	246	252		180
74.5 71.7	89.8 75.3	94.2 77.0	84.5 74.0	74.0 71.0	87.3 74.6	94.0 77.0	93.[illegible] 72.[illegible]	.8 .0	84.7 73.6
86.5 80.5	90.8 81.7	94.4 83.5	91.6 82.8	89.0 80.8	92.4 82.0	95.6 83.9	91.[illegible] 83.[illegible]	.0 .3	91.4 81.2
83.5 77.0	86.0 78.3	90.0 79.6	87.4 79.5	84.0 77.0	87.6 78.3	91.3 79.2	86.[illegible] 78.[illegible]	.3 .0	86.9 78.7
82.9 78.6	86.6 79.7	90.7 81.0	88.8 80.0	84.2 78.6	88.4 79.3	92.0 80.0	87.[illegible] 79.[illegible]	.5 .0	88.0 78.8
83.3 77.4	87.2 79.8	89.3 81.2	88.0 80.0	84.5 77.4	88.1 79.3	91.0 81.2	88.3 78.5	.2 .9	86.4 79.0
83.0 79.2	85.6 79.3	89.0 79.3	87.0 78.5	83.3 78.3	86.6 78.3	89.6 78.8	87.0 78.3	.3 .3	86.3 78.0
82.9 79.5	86.2 80.9	90.1 81.3	87.0 80.3	83.1 79.5	87.3 80.2	90.9 [illegible]	86.7 79.4	.7 .8	86.0 80.0
82.5 82.8 82.9 82.6 82.7	83.1 83.1 83.9 81.9 82.6	85.0 84.9 86.0 84.8 84.9	83.3 84.2 85.8 84.4 84.5	84.3 83.2 84.2 83.0 83.2	84.4 83.5 84.8 8[illegible].0 84.0	85.1 84.7 86.4 85.5 85.6	85.0 84.7 85.[illegible] 84.[illegible] 84.2		84.5 83.6 85.0 84.0 84.2
85.6 84.3 83.3	86.5 85.1 83.9	90.1 85.3 86.5	89.5 85.0 86.3	[illegible]	[illegible]	[illegible]	[illegible]		88.5 85.6 85.0
87.7 92.8 84.3	89.1 92.8 84.4	90.3 94.7 87.0	89.8 94.8 86.8	[illegible]	[illegible]	[illegible]	[illegible]		90.7 94.5 86.0
82.6 82.0 83.0 82.2 82.6	83.0 82.5 83.7 82.3 82.4	84.8 84.9 87.2 85.5 85.2	84.3 83.2 85.2 84.7 84.5	83.0 82.8 81.7 82.1 82.7	83.5 83.5 84.6 83.4 83.5	[illegible]	[illegible]		83.4 83.3 85.5 83.9 83.8
85.2 83.0 83.3	84.1 83.6 83.4	89.0 83.6 84.9	88.0 84.8 83.8	84.5 84.0 84.2	86.9 85.5 84.2	89.7 86.4 86.4	[illegible]		87.1 84.5 84.5
85.3 92.4 85.2	86.3 92.4 85.1	88.3 94.5 87.3	88.5 94.1 86.7	86.8 92.1 84.6	89.0 93.2 86.0	90.5 95.7 88.0	88.[illegible] 93.[illegible] 86.[illegible]		88.0 93.6 84.7
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]

ocouple locations see Sec. IV-A and B.

B

30	186	192 8	198	204	210	216 9	222	228	234	240 10	246	252	258	264 11	270	276	282	288 12	294	300	306	312 13	318	324	330	336 14
.7	74.0	83.0	95.0	89.4	74.5	89.8	94.2	84.5	74.0	87.3	94.0	83.3	73.0	84.3	94.8	83.5	74.2	84.6	95.0	84.5	73.0	93.5	94.8	83.5	74.0	85.3
.6	71.0	73.3	76.7	74.5	71.2	75.3	77.0	74.0	71.0	74.6	77.0	72.8	70.0	72.5	75.9	72.2	69.8	72.5	75.4	72.3	69.7	75.3	75.3	[illegible]	70.7	72.5
.4	87.2	89.4	93.7	91.8	86.5	90.8	94.4	91.6	89.0	92.6	95.6	91.6	87.5	90.3	94.2	91.5	87.8	90.4	95.1	91.4	87.5	93.5	94.2	92.0	88.2	[illegible]
.2	79.6	81.0	83.0	81.3	80.5	81.7	83.5	82.8	80.8	82.0	83.9	83.0	81.2	81.8	82.0	81.0	79.8	79.5	82.0	81.4	80.3	82.1	83.8	82.1	81.2	80.6
.9	83.3	84.3	89.5	87.8	83.5	86.0	90.0	87.4	86.0	87.6	91.3	86.5	83.2	86.0	91.5	87.0	86.0	86.8	92.0	87.4	83.5	90.4	91.0	87.7	84.4	87.0
.7	76.5	78.8	80.0	78.6	77.0	78.3	79.6	79.5	77.0	74.3	79.2	78.5	76.0	77.5	79.0	79.0	76.0	78.5	79.4	79.0	76.8	78.8	79.5	80.6	76.6	78.0
.0	88.3	85.6	90.6	88.7	82.9	86.6	90.7	88.8	84.2	88.4	92.0	87.5	83.3	84.0	92.0	88.0	84.0	87.0	92.0	88.4	84.2	90.8	92.0	89.1	[illegible]	87.4
.8	78.3	78.9	81.0	79.3	78.6	79.7	81.0	80.0	78.6	79.3	80.0	79.0	78.0	77.6	79.7	78.3	77.6	77.8	80.0	78.7	78.1	78.7	79.2	75.7	78.3	76.8
.4	84.2	85.6	89.4	87.6	83.3	87.2	89.3	88.0	84.5	88.1	91.0	88.3	84.4	87.0	91.2	88.4	[illegible]	87.4	91.0	89.0	85.0	89.8	90.8	89.0	85.2	88.0
.0	78.2	79.3	81.3	79.8	77.4	79.8	81.2	80.0	77.4	79.3	81.2	78.5	77.3	78.0	90.8	78.5	76.7	78.4	81.0	80.0	78.0	81.2	81.5	80.0	78.3	78.0
.3	83.0	84.2	88.5	82.0	83.0	85.6	89.0	87.0	83.3	86.6	89.6	87.0	83.2	84.7	90.0	86.5	83.5	85.3	90.0	[illegible]	83.3	89.2	89.8	87.6	[illegible]	86.1
.0	79.2	78.9	79.6	78.2	79.2	79.3	79.3	78.5	78.3	78.3	78.8	78.5	78.4	76.7	79.2	78.0	78.3	78.2	78.5	79.0	[illegible]	78.4	78.9	78.8	78.4	76.8
.0	82.5	84.7	90.0	87.5	82.9	86.2	90.1	87.0	83.1	87.3	90.9	86.2	82.8	85.2	91.4	86.2	83.0	86.2	91.2	87.0	83.0	90.1	91.0	87.6	85.5	86.5
.0	79.5	79.3	81.7	80.2	79.5	80.9	81.3	80.3	79.5	80.2	81.3	79.4	78.7	79.0	80.0	9.0	78.4	79.0	80.0	79.8	79.0	79.9	80.1	[illegible]	79.2	78.1
.3	83.0	82.7	84.2	84.1	82.5	83.1	83.0	85.3	84.3	84.4	85.1	85.0	84.0	84.4	86.3	[illegible]	84.5	85.4	86.2	86.2	85.1	85.2	86.3	86.5	85.3	85.0
.4	83.0	82.7	83.0	83.4	82.8	83.1	84.9	84.2	83.2	83.5	84.7	84.2	83.3	84.3	84.0	84.6	83.5	84.8	84.5	85.0	83.9	85.2	85.0	85.7	84.5	84.5
.0	83.9	83.0	85.7	84.3	82.9	83.9	86.0	85.8	84.2	84.8	86.4	85.2	83.9	85.2	87.0	83.7	84.0	85.3	87.0	86.2	84.7	85.6	87.3	87.0	85.3	85.0
.0	81.3	82.3	84.6	83.8	82.6	81.9	84.8	84.4	83.0	84.0	85.5	84.1	82.5	84.3	85.7	86.7	83.3	84.8	85.6	85.8	83.9	85.2	85.3	85.6	83.8	84.2
.2	82.8	83.4	84.7	83.8	82.7	82.6	84.9	84.6	83.2	84.0	85.5	84.5	83.0	84.3	86.0	84.8	83.4	84.5	86.3	85.3	84.0	85.2	86.3	86.0	84.5	84.2
5	85.5	84.3	90.5	88.8	85.6	86.5	90.1	89.5	86.6	88.6	91.0	88.9	86.0	88.4	91.1	89.0	86.1	88.4	91.3	89.4	86.2	89.5	92.0	90.0	86.5	87.6
6	82.0	83.9	87.1	85.8	84.3	85.1	85.3	85.0	85.1	85.4	86.0	86.3	84.5	85.6	86.9	86.3	85.0	85.6	87.6	86.6	84.7	85.7	87.0	87.0	85.9	86.0
0	83.3	83.3	85.9	84.4	83.3	83.9	86.5	86.3	84.0	84.8	87.0	85.4	84.2	85.2	85.9	85.4	84.9	85.0	87.0	86.3	84.8	85.8	86.9	84.8	85.3	85.1
7	87.5	88.5	90.3	90.6	87.7	89.1	90.3	89.8	87.3	90.3	92.0	[illegible]	89.1	90.8	93.0	90.5	88.5	91.0	93.2	91.4	[illegible]	92.1	95.3	92.4	88.4	90.1
5	92.4	92.8	95.8	94.0	92.8	92.8	94.7	94.8	92.7	93.6	95.7	[illegible]	92.3	94.5	[illegible]	94.8	92.5	94.0	96.0	95.3	92.1	95.4	96.3	95.8	93.2	93.9
0	84.2	84.4	87.2	85.3	86.3	84.6	87.0	86.8	84.7	83.7	87.4	86.3	[illegible]	86.0	88.7	86.4	85.0	86.0	88.3	87.1	85.2	87.0	88.2	87.7	85.6	86.1
4	82.0	82.0	84.7	83.5	82.6	83.0	84.8	84.3	83.0	83.5	85.2	[illegible]	82.6	[illegible]	[illegible]	84.2	83.3	84.6	85.8	85.0	84.0	85.3	86.5	85.5	84.2	84.3
3	82.1	82.3	83.1	83.2	82.0	82.5	84.9	83.2	82.8	83.5	85.1	[illegible]	82.6	[illegible]	[illegible]	[illegible]	81.0	83.3	85.3	85.0	83.8	85.3	86.5	85.6	84.2	82.6
5	83.7	83.8	86.8	85.2	83.0	83.7	87.2	85.8	83.7	84.6	87.2	85.5	83.4	[illegible]	88.1	85.7	83.8	85.3	87.9	86.6	84.1	86.2	86.2	87.1	85.0	85.4
9	82.0	82.3	85.0	83.5	82.2	82.3	85.5	84.3	82.1	83.4	86.0	83.7	82.2	[illegible]	[illegible]	[illegible]	82.7	84.0	86.4	85.0	83.0	84.5	86.3	85.7	83.4	84.1
8	82.3	82.2	85.0	83.5	82.6	82.4	85.2	84.5	82.7	83.3	85.4	84.1	82.5	[illegible]	[illegible]	[illegible]	83.0	84.0	84.0	85.0	83.4	85.2	86.7	85.5	84.2	84.1
1	84.5	85.1	89.0	87.4	85.2	86.1	89.0	88.0	84.5	86.9	89.7	87.3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	87.6	89.5	87.8	85.0	88.7	89.1	88.2	85.2	85.2
5	84.1	84.1	87.1	85.2	83.0	83.6	85.6	84.8	84.0	85.5	86.4	86.2	92.8	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	86.5	86.9	85.0	86.9	87.5	87.4	85.5	85.9
5	83.4	83.4	85.8	84.5	83.3	83.6	84.9	83.8	84.2	84.2	84.6	84.0	84.2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	87.0	86.3	85.0	85.8	87.3	87.0	85.5	84.6
0	84.4	86.6	88.5	86.9	85.3	86.3	89.3	88.3	86.8	89.0	90.5	88.5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	90.0	88.5	91.0	91.6	91.5	89.9	90.0
6	92.0	93.4	95.0	93.3	92.6	92.8	94.5	94.1	92.1	93.2	95.7	93.5	91.8	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	94.2	92.2	95.0	95.6	95.0	[illegible]	93.6
7	84.5	85.1	87.7	85.2	85.2	85.1	87.3	84.7	84.6	84.0	88.0	86.1	84.3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	87.0	84.8	87.2	88.5	86.0	85.5	85.9
.5	80.8	81.3	83.5	82.7	81.2	81.6	83.4	83.7	82.0	82.5	84.1	83.0	82.1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	82.8	83.7	85.2	84.7	81.5	[illegible]
.2	80.4	81.0	81.3	81.2	80.9	81.3	83.2	82.8	81.1	83.0	83.9	82.3	81.3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	82.3	83.3	84.2	84.3	82.5	82.6
.2	81.4	81.8	84.2	83.2	81.3	81.6	84.6	84.0	81.7	82.3	84.3	83.3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	82.3	84.0	85.7	85.0	83.4	81.0
.7	80.0	80.4	82.5	81.1	80.4	80.9	82.9	82.0	80.3	81.2	83.3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	83.0	81.1	82.7	84.2	83.0	[illegible]	[illegible]
.2	79.3	79.8	81.6	80.3	79.5	79.8	82.2	81.4	80.3	80.8	82.1	81.6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	82.5	[illegible]	82.0	83.2	82.3	81.0	[illegible]
6	[illegible]	82.5	92.3	90.8	86.8	88.2	91.0	89.0	87.3	88.4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	87.0	[illegible]	[illegible]	[illegible]	[illegible]
0	86.5	88.0	90.5	90.0	86.3	87.9	[illegible]	90.0	87.6	88.5	[illegible]	[illegible]	[illegible]	87.2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
9	88.1	88.1	88.6	87.8	86.9	87.3	87.7	[illegible]	90.8	93.5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	87.0	86.9	89.6	88.2	86.4	87.6	87.0	88.6	88.8	87.3	90.0	87.7	85.3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	87.2
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

C

Table XVI-B. VARIATION OF TEMPERATURES IN SOIL SURROUNDING SHELTER*
21 x 21 x 7 ft. shelter; 45 occupants; 15 cfm/occupant

SOIL TEMPERATURES	T.C. No.	Time From Start of Test, Hrs. — Days → 0	24 1	48 2	72 3	96 4	120 5	144 6	168 7	192 8	216 9	240 10	264 11	288 12	312 13	336 14
SECTION B-B																
Outside Wall																
Diagonally Up	1-1	63.4	75.4	78.5	79.3		81.8		82.9	82.7	83.1	84.4	84.4	85.4	85.2	85.0
	1-2	65.4	69.4	72.4	74.0		75.9		77.8	77.3	78.4	79.8	80.2	80.8	80.5	82.1
	1-3	65.4	68.5	69.5	70.8		75.0		74.9	75.8	75.8	78.0	78.8	79.1	79.2	80.1
	1-4	65.4	68.0	68.4	69.6		71.8		71.5	74.0	75.3	76.3	76.8	77.8	77.6	77.8
	1-5	65.4	67.6	69.0	70.8		68.0		70.1	74.0	74.3	75.3	75.2	77.2	75.8	75.3
	1-6	62.3	67.3	72.8	72.0		62.0		70.1	76.8	72.7	73.0	76.5	82.5	75.8	68.0
Horizontal 6 ft elev	1-7	63.3	74.2	77.3	78.5		82.2		82.9	82.7	83.1	83.5	84.3	84.8	85.2	84.5
	1-8	63.3	71.0	73.7	75.0		78.2		79.1	78.0	78.8	79.5	81.0	81.1	81.5	80.8
	1-9	63.3	67.6	69.5	71.0		75.0		75.4	76.3	77.1	77.5	78.3	79.3	79.4	79.4
	1-10	63.5	66.8	67.2	68.2		71.5		72.5	72.7	73.9	74.5	75.5	76.3	76.4	76.8
	1-11	63.8	65.6	66.9	66.9		69.5		70.3	70.4	71.2	73.0	72.5	74.8	73.6	75.3
	1-12	64.2	65.0	66.9	66.9		67.8		67.7	69.2	70.3	71.4	71.5	73.2	72.4	73.0
3-1/2 ft elev	2-1	61.6	74.6	79.3	80.0		82.5		83.5	83.0	83.9	84.8	85.2	85.3	85.6	85.0
	2-2	63.2	69.0	73.7	74.5		78.0		78.9	79.6	78.9	80.4	80.0	80.0	80.3	81.2
	2-3	62.7	65.0	68.6	70.0		73.7		74.9	75.8	76.3	76.7	77.5	78.2	78.2	78.7
	2-4	62.4	63.5	66.5	66.8		70.2		71.1	72.0	72.3	73.0	73.5	74.0	74.5	74.9
	2-5	62.4	63.3	64.9	64.8		67.5		68.0	68.7	69.4	70.0	70.7	71.7	71.6	71.9
	2-6	62.4	63.3	64.2	63.8		65.8		66.0	66.2	67.2	67.6	68.3	69.4	69.4	69.5
1 ft elev	2-7	62.4	73.7	77.8	78.8		81.6		81.9	82.3	81.9	84.0	84.3	84.8	85.2	84.2
	2-8	62.0	69.5	72.4	73.5		76.5		76.7	77.0	76.7	77.8	79.0	78.7	78.4	78.0
	2-9	61.5	64.6	68.2	69.0		71.5		73.7	74.3	73.9	75.4	75.2	76.5	75.8	77.0
	2-10	61.5	62.5	65.2	65.2		68.5		69.4	70.3	70.4	71.5	71.4	72.6	71.8	72.8
	2-11	61.5	62.0	63.4	63.0		65.0		65.9	66.3	66.6	67.7	68.0	69.0	69.0	69.3
	2-12	60.7	61.2	63.0	62.2		63.3		64.2	64.5	64.4	65.4	65.5	66.3	66.5	[illegible]

* For detailed description of thermocouple locations see Section IV-A.

Table XVI-B. VARIATION OF TEMPERATURES IN SOIL SURROUNDING SHELTER*

21 x 21 x 7 ft. shelter; 45 occupants; 15 cfm/occupant

SOIL TEMPERATURES	T.C. No.	Time From Start of Test, Hrs. → Days → 0	24 1	48 2	72 3	96 4	120 5	144 6	168 7	192 8	216 9	240 10	264 11	288 12	312 13	336 14
SECTION B-B																
Outside Wall																
Diagonally Down	3-1	60.3	73.0	76.8	77.9		81.4		82.4	82.4	82.6	84.0	84.3	84.5	85.2	84.2
	3-2	61.5	65.2	68.5	69.5		72.8		72.0	72.4	73.0	73.3	73.8	74.3	74.2	74.2
	3-3	60.7	62.5	64.4	64.6		68.0		68.4	69.8	70.0	70.3	70.9	71.7	71.6	71.9
	3-4	60.7	61.0	62.2	62.2		64.0		64.3	64.7	65.4	65.6	66.2	66.8	66.6	66.4
	3-5	59.9	60.4	60.6	60.4		61.0		60.9	61.2	62.3	62.5	63.0	63.1	63.2	63.3
	3-6	59.0	59.0	59.6	59.2		59.8		59.3	59.3	60.0	60.4	60.5	60.6	60.4	60.8
Above Roof 10-1/2 ft from wall	3-7	62.9	82.2	85.5	85.5		87.4		86.9	86.3	86.5	88.6	88.4	88.4	89.2	87.6
	3-8	64.3	74.5	80.0	82.0		84.3		83.5	85.0	84.0	86.4	85.0	87.3	86.8	85.5
	3-9	64.3	71.4	77.5	80.5		82.5		81.6	83.8	84.0	85.5	84.8	86.7	85.8	84.4
	3-10	64.8	69.8	75.0	79.3		78.2		79.3	82.5	83.9	84.3	83.9	85.5	84.5	84.3
	3-11	64.2	68.5	73.8	77.5		72.3		76.0	82.0	79.8	82.3	81.0	83.6	82.2	79.5
	3-12	63.4	67.2	73.3	76.3		68.5		74.5	81.3	77.6	78.5	80.7	82.1	81.8	75.5
3 ft from wall	4-1	62.9	75.4	79.3	80.5		83.0		83.9	83.9	85.1	85.4	85.5	85.4	85.7	86.0
	4-2	65.9	74.5	79.0	80.5		82.5		81.4	82.6	84.0	84.0	84.3	85.4	85.6	84.9
	4-3	65.9	71.2	76.0	79.3		80.6		80.0	82.0	83.4	83.5	84.2	85.3	84.5	84.5
	4-4	65.9	70.0	74.2	77.5		77.4		78.0	80.9	82.7	83.0	82.9	83.8	83.5	83.0
	4-5	64.3	68.5	74.2	77.2		72.4		76.2	80.9	80.0	82.2	80.4	83.6	81.2	80.3
	4-6	63.3	67.5	73.8	76.1		69.9		74.5	80.9	78.0	79.6	79.6	82.0	81.2	77.0
1 ft from wall	4-7	63.6	74.2	78.8	80.5		83.0		83.1	83.3	83.9	84.8	85.2	85.0	85.8	85.1
	4-8	64.0	72.2	77.2	78.7		81.7		81.4	81.8	82.7	83.0	83.4	82.5	84.3	84.5
	4-9	64.4	70.2	74.6	76.7		79.2		79.6	80.8	81.4	82.2	82.6	82.5	83.5	83.8
	4-10	64.5	68.5	72.5	75.0		76.6		77.1	79.8	80.5	81.4	81.3	82.0	82.6	82.4
	4-11	64.5	68.1	71.5	74.3		73.3		75.0	78.8	79.7	80.5	80.0	81.4	81.3	80.1
	4-12	64.5	67.6	71.0	74.2		71.7		74.5	78.6	78.0	79.3	79.5	81.0	80.9	78.8

* For detailed description of thermocouple locations see Section IV-A.

Table XVI-B. VARIATION OF TEMPERATURES IN SOIL SURROUNDING SHELTER*
21 x 21 x 7 ft. shelter; 45 occupants; 15 cfm/occupant

SOIL TEMPERATURES	T.C. No.	Time From Start of Test, Hrs. → Days → 0	24 1	48 2	72 3	96 4	120 5	144 6	168 7	192 8	216 9	240 10	264 11	288 12	312 13	336 14
SECTION B-B																
Below Floor 10-1/2 ft from wall	5-1	61.6	80.6	85.6	85.8		88.0		88.8	88.5	89.1	90.3	90.8	91.0	92.1	90.1
	5-2	62.3	69.7	74.2	76.2		79.2		78.4	79.2	79.8	79.8	80.3	80.8	80.5	80.6
	5-3	62.0	65.8	70.8	72.1		76.0		78.0	77.8	77.5	79.0	79.3	79.9	79.1	80.1
	5-4	61.5	63.3	67.3	67.8		71.2		72.7	73.2	73.3	74.5	74.6	74.9	75.0	75.8
	5-5	61.5	62.5	65.0	65.0		67.3		68.5	69.6	69.4	70.5	70.8	71.7	71.6	71.7
	5-6	61.5	62.5	63.2	63.0		64.2		65.1	66.0	66.1	67.0	67.3	67.7	68.8	68.3
	5-7	60.4	62.6	63.0	62.3		63.5		64.2	64.0	65.1	66.0	65.5	65.8	66.9	67.5
	5-8	59.0	61.7	62.5	61.6		62.3		61.6	61.5	62.7	63.5	63.4	63.2	64.7	64.2
	5-9	58.5	61.0	61.6	61.4		61.2		59.6	60.0	60.6	61.3	61.2	61.3	63.0	61.6
3 ft from wall	5-10	60.4	85.3	89.7	90.8		93.4		92.9	92.8	92.8	93.6	94.5	94.0	95.4	93.9
	5-11	60.3	69.5	74.7	76.5		78.6		78.9	79.3	79.8	80.0	80.5	80.7	80.6	80.9
	5-12	60.3	65.2	70.0	71.5		75.3		75.6	76.6	77.1	77.2	77.9	77.9	78.4	78.3
	6-1	58.6	62.6	66.5	67.0		70.7		72.3	72.7	72.4	74.0	72.9	74.7	72.4	75.3
	6-2	59.0	61.5	64.0	64.0		66.8		67.9	68.3	68.6	70.0	70.2	70.3	70.3	70.9
	6-3	59.0	61.0	62.5	62.2		63.4		64.3	65.0	65.0	66.0	66.1	66.5	66.5	67.6
1 ft from wall	6-4	59.9	75.3	80.0	81.0		84.2		84.4	84.4	84.4	85.7	86.0	86.1	87.0	86.1
	6-5	61.2	67.7	71.8	73.0		75.6		75.3	76.2	76.3	76.7	76.3	76.4	76.8	77.1
	6-6	60.6	63.3	67.3	68.5		71.6		72.4	73.1	73.3	74.1	74.4	74.3	75.0	75.3
	6-7	60.6	61.7	64.2	65.2		67.6		68.4	69.3	69.4	70.2	70.6	70.8	71.2	71.3
	6-8	59.9	60.9	62.5	62.4		64.3		64.2	65.9	66.2	66.8	67.3	67.4	68.0	68.0
	6-9	59.4	60.4	61.3	61.0		62.1		62.2	62.9	63.4	63.9	64.6	64.8	64.7	64.2

* For detailed description of thermocouple locations see Section IV-A.

Table XVI-B. VARIATION OF TEMPERATURES IN SOIL SURROUNDING SHELTER*

21 x 21 x 7 ft. shelter; 45 occupants; 15 cfm/occupant

SOIL TEMPERATURES	T.C. No.	Time From Start of Test, Hrs.→ Days→ 0	24 1	48 2	72 3	96 4	120 5	144 6	168 7	192 8	216 9	240 10	264 11	288 12	312 13	336 14
SECTION C-C																
Outside Wall																
Diagonally Up	6-10	62.5	76.0	79.0	80.0		82.5		82.1	82.0	83.0	83.9	84.0	84.6	85.3	84.3
	6-11	62.9	69.5	73.4	74.2		77.5		77.1	76.6	76.6	79.7	79.7	82.1	79.2	80.0
	6-12	63.4	67.0	69.5	71.0		74.0		74.0	75.0	75.6	77.5	77.7	78.5	78.0	77.3
	7-1	64.2	66.5	68.3	69.0		70.7		69.5	71.0	73.1	74.0	74.0	75.5	75.8	73.4
	7-2	61.5	66.0	70.0	70.8		61.3		69.5	75.0	72.2	74.0	74.1	75.4	75.0	69.5
	7-3	61.4	65.6	73.0	72.0		61.3		69.5	76.8	71.8	72.5	76.6	77.3	75.0	69.5
Horizontal 6 ft elev	7-4	63.3	73.4	79.4	79.7		82.4		82.3	82.3	82.5	83.5	83.1	83.3	85.3	82.6
	7-5	63.3	70.0	74.3	75.4		78.4		79.3	78.8	78.7	79.3	80.2	81.1	81.0	80.5
	7-6	63.3	65.9	69.4	70.6		73.9		74.5	75.1	75.6	76.2	77.5	77.7	78.3	79.4
	7-7	63.3	64.4	67.3	68.0		71.0		71.1	72.2	72.4	73.6	74.6	75.0	75.8	75.8
	7-8	63.3	64.4	66.5	66.5		68.9		68.4	68.3	70.5	71.5	72.4	73.2	73.0	73.9
	7-9	63.3	64.4	66.5	66.5		68.2		67.7	68.2	69.8	71.0	71.5	72.9	72.1	73.0
3-1/2 ft elev	7-10	62.0	75.5	80.0	80.5		82.6		84.3	83.8	83.7	84.6	85.1	85.3	86.2	85.4
	7-11	62.0	69.5	74.7	75.5		78.3		77.3	78.0	78.3	79.4	80.0	80.0	80.1	82.4
	7-12	61.5	65.0	69.4	70.5		73.4		74.9	75.7	75.7	76.2	76.7	77.2	77.1	77.7
	8-1	60.7	63.3	66.5	66.7		69.0		69.2	69.3	69.8	70.6	71.6	71.3	73.7	73.0
	8-2	60.7	62.6	65.0	64.8		67.0		67.7	68.3	68.8	69.4	70.3	70.5	71.0	71.1
	8-3	60.7	62.6	63.8	63.5		65.1		66.0	66.5	66.4	67.3	68.0	68.3	69.0	69.2
1 ft elev	8-4	61.6	73.4	78.0	79.3		81.3		82.4	82.3	82.3	83.4	84.0	84.0	84.5	84.1
	8-5	59.9	69.1	73.3	74.2		76.0		75.5	77.1	77.0	77.1	78.0	78.2	77.5	77.3
	8-6	59.9	64.8	68.2	68.6		71.8		72.8	73.1	73.4	74.4	74.5	75.1	75.0	75.5
	8-7	59.9	62.0	64.3	64.8		67.0		68.3	68.9	68.4	70.0	70.3	70.8	70.3	71.3
	8-8	59.8	61.3	63.0	63.0		64.3		65.9	66.2	66.1	67.5	67.3	68.0	68.2	68.7
	8-9	59.8	60.9	62.5	62.0		62.8		63.9	64.2	63.8	64.9	65.0	65.4	65.5	66.2

* For detailed description of thermocouple locations see Section IV-A.

Table XVI-B. VARIATION OF TEMPERATURES IN SOIL SURROUNDING SHELTER*
21 x 21 x 7 ft. shelter; 45 occupants; 15 cfm/occupant

SOIL TEMPERATURES	T.C. No.	Time From Start of Test, Hrs. → Days → 0	24 1	48 2	72 3	96 4	120 5	144 6	168 7	192 8	216 9	240 10	264 11	288 12	312 13	336 14
SECTION C-C																
Outside Wall																
Diagonally Down	8-10	61.5	73.4	77.5	79.6		81.6		82.5	82.2	82.4	83.5	83.9	84.0	85.2	84.1
	8-11	60.7	65.1	68.7	70.0		72.4		72.0	72.8	72.6	73.3	73.8	73.9	73.8	74.3
	8-12	59.8	61.7	64.0	65.1		67.5		68.1	68.8	68.9	69.8	70.3	70.4	70.2	71.8
	9-1	59.0	60.5	61.8	61.8		63.0		62.0	62.5	63.0	64.5	64.0	64.2	65.2	66.2
	9-2	57.6	59.0	60.5	59.9		60.7		59.9	60.8	61.2	61.6	61.9	62.2	62.2	62.3
	9-3	56.7	58.0	59.2	58.8		59.2		58.9	59.1	59.0	60.0	60.0	60.6	60.5	61.4
Above Roof 10-1/2 ft from wall	9-4	63.2	80.5	83.5	84.3		86.2		84.9	85.1	86.1	86.9	87.2	87.6	88.7	86.2
	9-5	65.0	76.3	81.0	82.5		85.0		84.4	85.1	83.3	86.5	86.8	87.3	87.8	86.1
	9-6	65.0	71.9	77.4	80.5		82.5		81.9	83.8	83.3	85.4	85.8	86.3	85.9	86.0
	9-7	65.0	69.5	75.0	79.3		78.5		79.2	82.2	83.3	83.9	83.4	84.9	84.2	84.3
	9-8	64.3	68.5	73.6	77.3		72.9		76.6	81.5	80.8	82.3	81.0	83.6	82.6	81.5
	9-9	63.3	68.3	73.4	76.0		69.9		74.5	81.2	78.7	80.0	80.0	81.9	81.3	77.3
3 ft from wall	9-10	63.8	75.5	79.4	80.1		83.0		82.9	84.1	83.4	84.0	84.3	84.6	86.9	85.9
	9-11	64.3	73.9	78.3	79.3		82.6		81.4	80.9	81.7	84.0	84.0	84.5	84.8	84.5
	9-12	64.4	70.2	75.0	78.2		79.9		79.5	80.9	81.6	82.2	83.5	84.1	84.1	84.2
	10-1	64.0	67.5	72.5	75.6		74.8		75.5	79.9	80.8	80.4	80.5	82.2	82.3	81.3
	10-2	64.0	67.5	72.5	75.3		72.3		74.5	79.8	79.7	80.0	79.8	81.9	81.2	79.8
	10-3	63.3	67.4	72.5	75.1		70.1		74.4	79.8	78.2	79.6	79.6	81.5	81.2	77.3
1 ft from wall	10-4	63.8	74.7	79.0	81.0		83.0		83.3	83.4	83.4	84.2	85.2	85.6	85.8	84.6
	10-5	64.2	73.4	77.5	79.3		81.7		80.8	80.4	82.0	83.0	83.1	83.6	84.3	84.4
	10-6	64.2	70.0	74.5	76.8		79.1		78.8	80.0	81.2	82.2	82.0	82.5	83.4	83.3
	10-7	64.4	68.9	73.0	75.0		76.6		77.1	79.2	80.3	81.3	81.0	82.0	82.6	82.3
	10-8	64.3	67.4	71.5	73.9		72.9		74.0	78.8	78.7	79.7	79.7	81.1	81.0	79.9
	10-9	63.7	67.4	71.5	73.3		71.0		73.4	78.5	77.6	78.3	78.3	80.4	80.4	77.6

* For detailed description of thermocouple locations see Section IV-A.

Table XVI-B. VARIATION OF TEMPERATURES IN SOIL SURROUNDING SHELTER*
21 x 21 x 7 ft. shelter; 45 occupants; 15 cfm/occupant

SOIL TEMPERATURES	T.C. No.	Time From Start of Test, Hrs. → / Days →													
		0	24 1	48 2	72 3	96 4	120 5	144 6	168 7	192 8	216 9	240 10	264 11	288 12	312 13	336 14
SECTION C-C																
Below Floor 10-1/2 ft from wall	10-10	62.0	80.2	84.5	85.0		88.0		87.3	86.6	86.3	89.0	88.9	89.0	91.0	90.0
	10-11	61.5	68.4	73.4	75.0		77.6		77.1	78.4	77.8	78.2	78.9	79.0	79.2	79.4
	10-12	61.0	65.0	69.5	71.0		74.8		74.9	75.7	75.2	76.2	77.0	77.5	77.5	77.5
	11-1	59.0	63.1	66.0	67.7		70.6		71.0	72.0	71.7	72.7	72.2	73.4	73.7	73.9
	11-2	59.0	61.8	64.0	64.5		66.7		68.1	68.4	69.0	69.5	70.0	70.0	70.3	70.9
	11-3	59.0	61.4	63.0	62.3		63.8		65.1	65.2	65.3	66.3	66.3	66.5	67.3	67.9
	11-4	59.0	61.3	62.2	61.7		62.4		63.8	64.0	64.6	65.0	65.2	65.5	65.6	66.2
	11-5	57.8	60.5	61.3	61.0		60.9		60.3	60.7	61.2	61.6	61.6	61.8	63.4	62.0
	11-6	57.3	59.6	61.0	60.4		60.7		59.2	59.3	60.7	60.0	60.4	60.0	61.7	60.7
3 ft from wall	11-7	60.0	85.0	89.4	90.8		92.8		92.4	92.4	92.4	93.2	93.6	93.0	95.0	93.4
	11-8	58.5	68.0	73.3	75.5		78.0		78.1	79.2	78.9	79.2	79.3	80.0	79.9	80.0
	11-9	59.0	64.0	69.3	71.0		75.0		75.1	76.6	76.5	76.6	77.4	77.5	77.3	76.8
	11-10	59.0	62.5	65.2	66.5		69.8		70.2	71.1	71.4	72.0	72.4	72.5	72.5	73.0
	11-11	59.0	61.8	63.5	63.5		66.4		67.7	68.0	68.0	69.4	68.3	70.0	69.8	71.4
	11-12	59.0	61.0	62.0	62.0		63.2		64.3	64.5	64.6	65.3	65.4	65.7	65.8	66.7
	12-1	59.6	59.7	59.8	59.8		61.2		62.3	62.9	63.3	64.0	64.2	64.6	63.5	64.7
	12-2	59.0	60.0	60.9	60.5		61.2		60.6	61.2	61.2	61.6	62.0	62.3	62.2	62.7
	12-3	56.5	59.1	60.0	59.5		60.0		59.6	60.0	60.3	60.8	60.4	60.6	61.0	60.5
1 ft from wall	12-4	59.9	77.0	81.6	82.5		85.0		84.8	85.1	85.1	86.0	86.0	86.2	87.2	85.9
	12-5	60.7	66.5	70.7	71.5		74.9		74.5	75.2	75.3	75.3	75.9	76.3	76.2	76.8
	12-6	59.8	62.0	67.2	68.2		70.9		71.9	72.8	72.5	73.1	73.6	74.3	73.4	74.3
	12-7	59.4	61.2	63.0	64.2		66.5		67.4	68.2	68.8	69.0	69.4	70.0	70.0	70.0
	12-8	59.4	61.0	61.8	62.0		63.7		64.4	65.2	65.4	66.2	66.0	66.4	67.0	67.0
	12-9	59.0	60.9	61.3	61.0		62.1		63.3	63.3	63.3	64.3	64.2	64.0	64.3	65.3

* For detailed description of thermocouple locations see Section IV-A.

Table XVI-B. VARIATION OF TEMPERATURES IN SOIL SURROUNDING SHELTER*
21 x 21 x 7 ft. shelter; 45 occupants; 15 cfm/occupant

SOIL TEMPERATURES	T.C. No.	Time From Start of Test, Hrs.→ Days → 0	24 1	48 2	72 3	96 4	120 5	144 6	168 7	192 8	216 9	240 10	264 11	288 12	312 13	336 14
SECTION D-D																
Outside Corner																
Diagonally Up	12-10	62.0	74.2	77.8	79.0		81.2		81.3	81.3	81.6	82.5	82.8	82.9	83.7	83.4
	12-11	62.9	67.0	69.0	70.2		73.0		71.2	72.0	73.3	74.5	75.3	75.3	76.1	76.0
	12-12	64.2	67.0	68.2	69.5		71.0		70.2	71.4	72.6	74.0	73.7	74.5	75.8	75.8
	13-1	64.4	66.0	67.9	69.5		67.7		68.1	69.9	73.2	72.4	72.2	74.0	74.8	75.1
	13-2	62.3	66.0	76.3	73.3		63.8		70.4	80.0	72.2	71.2	80.9	79.4	78.2	69.1
	13-3	62.0	65.6	76.3	73.3		62.5		70.6	79.8	71.9	71.0	80.9	79.4	77.0	68.8
Horizontal 6 ft elev	13-4	63.3	73.0	77.5	78.7		80.4		80.7	81.0	81.3	82.0	82.0	82.2	83.3	82.8
	13-5	63.3	65.8	68.7	70.3		72.3		72.5	72.9	73.3	73.7	75.0	75.3	74.9	76.0
	13-6	63.3	64.8	67.3	67.3		70.5		70.2	70.6	71.0	71.8	72.8	73.3	74.0	74.7
	13-7	63.3	64.4	67.0	66.8		69.0		68.4	69.2	69.9	71.2	71.4	72.2	72.2	73.8
3-1/2 ft elev	13-8	62.2	73.4	77.8	78.5		80.2		81.8	81.8	81.6	82.5	82.9	83.3	84.0	83.0
	13-9	62.0	64.3	66.5	67.4		70.7		71.1	71.4	71.4	72.2	72.4	73.0	73.1	73.9
	13-10	61.5	63.2	65.5	65.6		68.5		67.6	68.3	68.1	70.4	70.3	71.3	71.8	72.4
	13-11	61.5	63.0	64.4	64.5		66.4		66.6	67.2	67.3	68.0	68.2	68.3	69.8	69.5
	13-12	61.5	63.0	64.0	63.5		65.0		65.1	65.4	65.8	66.5	67.0	67.5	67.9	68.3
	14-1	60.6	63.0	63.0	62.7		64.0		64.5	65.0	65.4	65.5	65.5	67.1	67.2	68.3
1 ft elev	14-2	61.5	72.0	76.4	76.8		79.2		80.1	80.4	80.9	81.2	81.4	81.5	82.7	81.8
	14-3	60.7	63.1	65.2	66.2		68.5		67.8	68.4	69.0	69.0	69.4	70.1	69.8	70.4
	14-4	60.5	61.9	63.0	63.2		65.5		66.0	65.6	66.6	67.5	67.2	68.0	68.3	68.6
	14-5	60.5	61.7	63.0	62.5		64.0		64.5	64.6	64.1	66.0	65.5	66.1	66.2	62.0
Diagonally Down	14-6	60.6	71.3	74.3	76.0		78.2		79.0	79.8	79.8	80.8	80.8	81.0	82.0	81.4
	14-7	60.6	62.6	64.6	65.3		67.4		67.2	67.4	67.8	68.5	68.3	68.5	68.9	69.2
	14-8	59.8	61.0	62.0	62.2		63.8		64.2	64.5	64.8	65.6	65.4	65.8	66.3	66.7
	14-9	59.0	60.0	60.4	60.5		61.1		61.3	61.9	62.1	62.3	62.2	62.3	62.8	63.0
	14-10	56.8	58.0	59.3	59.0		59.5		59.2	59.4	59.8	60.0	60.0	60.3	60.7	61.0
	14-11	55.1	57.0	57.8	57.8		58.5		58.3	58.6	58.7	59.0	58.8	59.0	59.3	59.8

* For detailed description of thermocouple locations see Section IV-A.

UNCLASSIFIED

Security Classification

DOCUMENT CONTROL DATA - R&D

(Security classification of title, body of abstract and indexing annotation must be entered when the overall report is classified)

1. ORIGINATING ACTIVITY (Corporate author) IIT Research Institute 10 West 35th Street Chicago, Illinois 60616	2a. REPORT SECURITY CLASSIFICATION Unclassified 2b. GROUP - - - -

3. REPORT TITLE

Experimental Evaluation of Simulated Heat and Moisture Loads in Shelters (U)

4. DESCRIPTIVE NOTES (Type of report and inclusive dates)

Final Report

5. AUTHOR(S) (Last name, first name, initial)

Goldsmith, Alexander

6. REPORT DATE	7a. TOTAL NO. OF PAGES	7b. NO. OF REFS
December, 1965	185	6

8a. CONTRACT OR GRANT NO.	9a. ORIGINATOR'S REPORT NUMBER(S)
OCD-OS-62-227 b. PROJECT NO 1200 c. Task No. 1210 d. Work Unit 1211B	M6116 9b. OTHER REPORT NO(S) (Any other numbers that may be assigned this report) - - - -

10. AVAILABILITY/LIMITATION NOTICES

Distribution of this report is unlimited.

11. SUPPLEMENTARY NOTES	12. SPONSORING MILITARY ACTIVITY
- - - -	Office of Civil Defense (OCD) Department of the Army-OSA Washington, D. C. 20310

13. ABSTRACT

An experimental program was carried out to determine the variation of temperatures inside a fallout shelter, and in the surrounding soil, under conditions of simulated occupancy. Variables investigated included the ventilation rate, and the size and shape of the shelter structure.

The experimental shelters had floor areas of 21 x 21, 21 x 7, and 7 x 7 ft., all with a 7-ft. ceiling height, and were loaded with 45, 15, and 5 simulated occupants respectively. Each shelter was ventilated at constant rates of 0, 3, 7, and 15 cfm per occupant for periods up to two weeks. The supply air was maintained at a constant dew-point temperature of 69°F and a dry-bulb temperature that varied sinusoidally between 75 and 95°F each day. Detailed test data are given for the variation of temperatures with time and location.

DD FORM 1473

UNCLASSIFIED

Security Classification

14 KEY WORDS	LINK A		LINK B		LINK C	
	ROLE	WT	ROLE	WT	ROLE	WT
Fallout Shelter						
Simulated Occupancy						
Ventilation Rate						
Experimental Shelter						

INSTRUCTIONS

1. ORIGINATING ACTIVITY: Enter the name and address of the contractor, subcontractor, grantee, Department of Defense activity or other organization *(corporate author)* issuing the report.

2a. REPORT SECURITY CLASSIFICATION: Enter the overall security classification of the report. Indicate whether "Restricted Data" is included. Marking is to be in accordance with appropriate security regulations.

2b. GROUP: Automatic downgrading is specified in DoD Directive 5200.10 and Armed Forces Industrial Manual. Enter the group number. Also, when applicable, show that optional markings have been used for Group 3 and Group 4 as authorized.

3. REPORT TITLE: Enter the complete report title in all capital letters. Titles in all cases should be unclassified. If a meaningful title cannot be selected without classification, show title classification in all capitals in parenthesis immediately following the title.

4. DESCRIPTIVE NOTES: If appropriate, enter the type of report, e.g., interim, progress, summary, annual, or final. Give the inclusive dates when a specific reporting period is covered.

5. AUTHOR(S): Enter the name(s) of author(s) as shown on or in the report. Enter last name, first name, middle initial. If military, show rank and branch of service. The name of the principal author is an absolute minimum requirement.

6. REPORT DATE: Enter the date of the report as day, month, year; or month, year. If more than one date appears on the report, use date of publication.

7a. TOTAL NUMBER OF PAGES: The total page count should follow normal pagination procedures, i.e., enter the number of pages containing information.

7b. NUMBER OF REFERENCES: Enter the total number of references cited in the report.

8a. CONTRACT OR GRANT NUMBER: If appropriate, enter the applicable number of the contract or grant under which the report was written.

8b, 8c, & 8d. PROJECT NUMBER: Enter the appropriate military department identification, such as project number, subproject number, system numbers, task number, etc.

9a. ORIGINATOR'S REPORT NUMBER(S): Enter the official report number by which the document will be identified and controlled by the originating activity. This number must be unique to this report.

9b. OTHER REPORT NUMBER(S): If the report has been assigned any other report numbers *(either by the originator or by the sponsor)*, also enter this number(s).

10. AVAILABILITY/LIMITATION NOTICES: Enter any limitations on further dissemination of the report, other than those imposed by security classification, using standard statements such as:

(1) "Qualified requesters may obtain copies of this report from DDC."

(2) "Foreign announcement and dissemination of this report by DDC is not authorized."

(3) "U. S. Government agencies may obtain copies of this report directly from DDC. Other qualified DDC users shall request through _____."

(4) "U. S. military agencies may obtain copies of this report directly from DDC. Other qualified users shall request through _____."

(5) "All distribution of this report is controlled. Qualified DDC users shall request through _____."

If the report has been furnished to the Office of Technical Services, Department of Commerce, for sale to the public, indicate this fact and enter the price, if known.

11. SUPPLEMENTARY NOTES: Use for additional explanatory notes.

12. SPONSORING MILITARY ACTIVITY: Enter the name of the departmental project office or laboratory sponsoring *(paying for)* the research and development. Include address.

13. ABSTRACT: Enter an abstract giving a brief and factual summary of the document indicative of the report, even though it may also appear elsewhere in the body of the technical report. If additional space is required, a continuation sheet shall be attached.

It is highly desirable that the abstract of classified reports be unclassified. Each paragraph of the abstract shall end with an indication of the military security classification of the information in the paragraph, represented as *(TS)*, *(S)*, *(C)*, or *(U)*.

There is no limitation on the length of the abstract. However, the suggested length is from 150 to 225 words.

14. KEY WORDS: Key words are technically meaningful terms or short phrases that characterize a report and may be used as index entries for cataloging the report. Key words must be selected so that no security classification is required. Identifiers, such as equipment model designation, trade name, military project code name, geographic location, may be used as key words but will be followed by an indication of technical context. The assignment of links, rules, and weights is optional.