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# ABSORPTION AND TRANSMISSION OF THERMAL RADIATION BY SINGLE AND DOUBLE GLAZED WINDOWS

BY

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# ERRATA SHEET

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Absorption and Transmission of Thermal Radiation
by Single and Double Glazed Windows

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The absorption and transmission factors for diffuse radiation given in these tables are just the simple averages of the values for incident angles between 0° and 90°. It has been brought to our attention that the values for diffuse radiation should be evaluated by the formula

$$T_{Diffuse} = \int_{o}^{\pi/2} T(\Theta) \cdot \mathrm{Sin}\ 2\Theta\ d\Theta \ ,$$

and similarly for the absorption factor.

The following table gives the transmission and absorption factors for diffuse radiation for single and double windows (n = 1.52). The integration has been performed by fitting a 5th degree polynomial of Cos Θ to the tabulated values of transmission and absorption factors and integrating this polynomial multiplied by Sin 2Θ term by term.

Diffuse Radiation
n = 1.52

| KL | Single Glazed Window | | Double Glazed Window KL of Inside Pane = .05 | | |
|---|---|---|---|---|---|
| | A | T | $A_1^*$ | $A_2^*$ | T* |
| .05 | .0544 | .7990 | .0600 | .0451 | .6797 |
| .10 | .1051 | .7542 | .1151 | .0425 | .6413 |
| .15 | .1524 | .7121 | .1659 | .0400 | .6052 |
| .20 | .1966 | .6724 | .2128 | .0377 | .5713 |
| .30 | .2768 | .5998 | .2967 | .0335 | .5094 |
| .40 | .3473 | .5353 | .3690 | .0299 | .4545 |
| .60 | .4641 | .4268 | .4866 | .0237 | .3623 |
| .80 | .5555 | .3406 | .5765 | .0189 | .2892 |
| 1.00 | .6273 | .2720 | .6459 | .0150 | .2311 |
| 1.50 | .7477 | .1553 | .7600 | .0085 | .1322 |
| 2.00 | .8153 | .0889 | .8228 | .0049 | .0758 |

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# ABSORPTION AND TRANSMISSION OF THERMAL RADIATION BY SINGLE AND DOUBLE GLAZED WINDOWS

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## SUMMARY

Tables have been prepared for the transmission and absorption of radiant energy by various types of windows. The tables cover the following range of the independent variables:

Incident angle = 0 (10) 40 (5) 70 (2) 88 degrees

KL = 0.05 to 2.00 with increasing increments

Index of refraction = 1.52 and 1.62

Single and double glazed windows.

For a single sheet of glass the parallel and perpendicular polarized beams are tabulated separately, as are the combined values for a non-polarized incident beam.

## Introduction

In the calculation of the heating or cooling load for a room, it is necessary to know the fraction of the radiation incident on the outside of the window that is absorbed by the glass and the fraction that is transmitted to the interior of the room. The absorptivity and transmissivity of a window depend on the type and thickness of the glass; on whether the window is single or double glazed; on the angle that the incident beam of light makes with the normal to the surface; and on the degree of polarization of the incident beam. The tables presented in this report either give directly, or allow the simple calculation of, the absorptivity and transmissivity of windows made of common glass.

When a beam of radiant energy strikes an interface between air and glass some of the energy is reflected. The ratio of the intensity of the reflected beam to the incident beam is given by Fresnel's formulae

$$r_{/\!/} = \frac{\tan^2(\theta_1 - \theta_2)}{\tan^2(\theta_1 + \theta_2)}$$

$$r_{\perp} = \frac{\sin^2(\theta_1 - \theta_2)}{\sin^2(\theta_1 + \theta_2)}$$

where $r_{/\!/}$ and $r_{\perp}$ are the reflectivity of the interface for radiation that is polarized with the electric vector parallel and perpendicular respectively to the plane that contains the incident beam and a normal to the interface, and $\theta_1$ and $\theta_2$ are the angles that the beam makes with the normal to the interface in the air and in the glass respectively. They are related with the index of refraction of the glass $n$ by Snell's law

$$\text{Sin}\ \theta_1 = n\ \text{Sin}\ \theta_2$$

For normal incidence $\theta_1 = \theta_2 = 0$ and

$$r_{//} = r_{\perp} = \left(\frac{n - 1}{n + 1}\right)^2$$

The energy that is not reflected at the air-glass interface enters the glass, where it is partially absorbed as it passes through. The absorption may be described by

$$\frac{dI}{dX} = -KI$$

where $I$ is the intensity of the beam,

$X$ is distance measured in the direction of the beam, and

$K$ is an absorption coefficient.

Thus if the intensity of a beam incident on the surface of a sheet of glass is unity, the intensity of the beam that penetrates to a depth L measured along a normal to the surface is

$$I_L = (1 - r)e^{-nKL/\sqrt{n^2 - \sin^2\theta_1}}$$

The fraction of the energy that is absorbed is

$$a = (1 - r)\left(1 - e^{-nKL/\sqrt{n^2 - \sin^2\theta_1}}\right)$$

Since $r$ depends on the polarization $a$ does also.

The beam that reaches the second glass-air interface has the intensity $I_L$. A fraction $r$ of this is reflected back into the glass and the rest passes out of the glass into the room. The internally reflected beam is again partially absorbed before reaching the outside glass-air interface where it is again partially reflected. The transmitted portion of this beam goes into the outside air and adds to the beam that was reflected back into the air initially at that interface.

The over-all effect of the multiple reflections in the glass is that the over-all reflectivity, absorptivity and transmissivity are related to the parameters defined above by

$$R = r + \frac{r(1 - r)^2 \ (1 - a)^2}{1 - r^2 \ (1 - a)^2}$$

$$A = \frac{a(1 - r) \ \left[1 + r \ (1 - a)\right]}{1 - r^2 \ (1 - a)^2}$$

and

$$T = \frac{(1 - r)^2 \ (1 - a)}{1 - r^2 \ (1 - a)^2}$$

Each of these quantities has a different value for parallel and perpendicular polarization.

Tables I and II contain values of $A_{//}$, $T_{//}$, $A_{\perp}$, $T_{\perp}$, A and T for incident angles from 0 to 88 degrees for glasses with indices of refraction of 1.52 and 1.62 and values of the absorption parameter KL ranging from 0.05 to 2.00. If the incident beam is polarized it can be represented by parallel and perpendicular polarized components. The transmission and absorption of each component can be evaluated separately and then combined to give the over-all effect for the polarized beam. When the incident beam is not polarized (i.e. the parallel and perpendicular components are equal) the over-all absorption and transmission are given by the T and A values without subscripts.

Double Glazing

For a double glazed window the radiation incident on the inner pane (i. e. the radiation transmitted by the outer pane) is partially polarized, even though the original incident beam was not. The parallel and perpendicular components, therefore, are treated separately and only combined for the over-all value for the complete window.

The total absorption (considering reflections between the panes as well as multiple reflections in each pane) by the outer pane of a double window is

$$A_1^* = A_1 \left\{ 1 + R_2 T_1 \left( \frac{1}{1 - R_1 R_2} \right) \right\}$$

and the total absorption by the inner sheet of a double window is

$$A_2^* = \frac{A_2 T_1}{1 - R_1 R_2}$$

where the quantities without superscripts apply to the panes considered separately, subscript 1 meaning the outer pane and subscript 2 meaning the inner one.

The over-all transmission of the double window is given by

$$T^* = \frac{T_1 T_2}{1 - R_1 R_2}$$

For a polarized incident beam the $A_1^*$, $A_2^*$ and $T^*$ can be evaluated separately for the parallel and perpendicular components using these formulae and the data given in Tables I or II. Table III gives the average of the values for the two components, and hence is directly applicable when the incident beam is not polarized, for the very common case of a double window with an inner pane KL = 0.05 (i.e. ordinary window glass). This table covers the same range of incident angle and KL for the outer pane as Tables I and II.

## Diffuse Radiation

The radiation incident on a window consists of the direct solar beam and diffuse radiation from the sky and reflected from the ground. It is usually assumed that the radiation other than the direct solar beam has equal intensity at all incident angles, so that the absorptivity and transmissivity for this radiation is the average for all angles of incidence. The data for each value of KL in Tables I, II and III have been averaged over incident angles from 0 to 90 degrees. These values for diffuse radiation are given in the last section of Tables I, II and III.

## Sample Application of Tables

Problem I:

Find the absorption and transmission of a double window for a non-polarized incident beam with an incident angle of 65 degrees. The KL for the inner pane is 0.05; KL for outer pane is 1.00 and the index of refraction for both panes is 1.52.

Solution:

The answers for this situation can be taken directly from Table III, but to illustrate the use of the tables the answers are obtained using the data in Table I.

(a) For the parallel polarized beam

$$A_1 = 0.7059$$

$$T_1 = 0.2808$$

$$R_1 = 1 - A_1 - T_1 = 0.0133$$

$$A_2 = 0.0603$$

$$T_2 = 0.9168$$

$$R_2 = 1 - A_2 - T_2 = 0.0229$$

$$A_1^* = A_1 \left\{ 1 + \frac{R_2 T_1}{1 - R_1 R_2} \right\} = 0.7104$$

$$A_2^* = \frac{A_2 T_1}{1 - R_1 R_2} = 0.0169$$

$$T^* = \frac{T_1 T_2}{1 - R_1 R_2} = 0.2576$$

(b) For the perpendicular polarized beam

$$A_1 = 0.5837$$

$$T_1 = 0.1688$$

$$R_1 = 1 - A_1 - T_1 = 0.2475$$

$$A_2 = 0.0593$$

$$T_2 = 0.5768$$

$$R_2 = 1 - A_2 - T_2 = 0.3639$$

Hence $$A_1^* = 0.6231$$

$$A_2^* = 0.0110$$

$$T_1^* = 0.1070$$

Since the incident beam is non polarized (i.e. the perpendicular and parallel components are equal) the total absorptivity and transmissivity of the window is the average of the values for the two components.

Therefore

$$A_1^* = 0.6668$$

$$A_2^* = 0.0140$$

$$T^* = 0.1823$$

These are the values given in Table III.

## Application of Tables to Solar Radiation

The radiation from the sun that reaches the surface of the earth is almost all in the wavelength region between 0.3 and 3 microns. The absorption coefficient K of normal window glass varies greatly with wavelength, so that there is not a single value of KL that can be applied for solar radiation. Instead the solar spectrum must be subdivided into relatively narrow wavelength bands and the appropriate K value of the glass determined for each band. The over-all transmissivity and absorptivity of a window for solar radiation is the average of the values appropriate for the KL of each band, weighted in accordance with the energy content in each wavelength band.

The solar spectrum can be divided into ten bands, each of which contains 10 per cent of the energy in the total solar spectrum. The boundary wavelengths of these bands are: 0.30, 0.46, 0.52, 0.58, 0.65, 0.72, 0.80, 0.90, 1.05, 1.27 and 3.00 microns. These values were obtained by integrating the data contained in ~~from~~ Table 815 of the Smithsonian Physical Tables, 1954, "Solar Irradiation at Sea Level with Surface Perpendicular to Sun's Rays, m = 2." Thus if the transmissivity and absorptivity of glass are known at these wavelength bands the simple average of the 10 values gives the value that is appropriate for solar radiation.

The information that is generally available for window glasses is a curve of transmissivity for monochromatic radiation at normal incidence. In addition the refractive index of the glass is usually known. (The variation of n with wavelength is small for wavelengths between 0.3 and 3.00 microns.) Values of transmissivity for normal incidence and corresponding values of KL can be extracted from Tables I and II. These data and the transmissivity curve for the glass indicate the wavelengths that correspond to the tabulated KL values. Table I or II can then be used to indicate the transmissivity and absorptivity of a window for any angle of incidence. These results can be used to construct a graph of absorptivity and transmissivity versus wavelength. Values of the absorptivity and transmissivity can then be read from this graph for the ten 10 per cent bands of the solar spectrum, and the average of these is the value for the window that is appropriate for solar radiation.

This procedure is illustrated by the following sample problem:

Problem II:

Find the over-all absorptivity ($A_s$) and transmissivity ($T_s$) of a single pane of heat absorbing glass for direct solar radiation at an incident angle of 70 degrees. The glass has an index of refraction n = 1.52 and a transmissivity for monochromatic light at normal incidence as given in Fig. 1.

Solution:

The transmissivity data (Fig. 1) and Table I indicate that the glass has the tabulated values of KL at the following values of wavelength:

| From Table I | | From Fig. 1 | |
|---|---|---|---|
| KL | T ($\theta$ = 0°) | T ($\theta$ = 0°) | Wavelength micron |
| 0.40 | 0.6150 | 0.615 | 0.40, 0.59 |
| 0.60 | 0.5034 | 0.503 | 0.33, 0.87 |
| 0.80 | 0.4120 | 0.412 | 1.08 |
| 1.00 | 0.3373 | 0.337 | 1.35 |
| 1.50 | 0.2046 | 0.205 | 2.20 |

The transmissivity and absorptivity for these wavelengths and θ = 70 degrees are (from Table I)

| Wavelength micron | KL | A | T |
|---|---|---|---|
| 0.40, 0.59 | 0.40 | 0.3653 | 0.4254 |
| 0.33, 0.87 | 0.60 | 0.4765 | 0.3282 |
| 1.08 | 0.80 | 0.5592 | 0.2537 |
| 1.35 | 1.00 | 0.6214 | 0.1964 |
| 2.20 | 1.50 | 0.7193 | 0.1038 |

A graphical interpolation of these values gives the following results for the ten solar bands:

| Solar energy band | A | T |
|---|---|---|
| 0.30 - 0.46 micron | 0.363 | 0.382 |
| 0.46 - 0.52 micron | 0.353 | 0.498 |
| 0.52 - 0.58 micron | 0.360 | 0.435 |
| 0.58 - 0.65 micron | 0.376 | 0.415 |
| 0.65 - 0.72 micron | 0.396 | 0.396 |
| 0.72 - 0.80 micron | 0.427 | 0.368 |
| 0.80 - 0.90 micron | 0.465 | 0.335 |
| 0.90 - 1.05 micron | 0.510 | 0.290 |
| 1.05 - 1.27 micron | 0.572 | 0.233 |
| 1.27 - 3.00 micron | 0.705 | 0.115 |
| | $A_s = 0.453$ | $T_s = 0.347$ |

These are the values for this window that are appropriate for solar radiation.

For a double window it is only necessary to obtain the values appropriate for solar radiation for each pane and each polarization component separately in the manner indicated in example problems I and II and then to combine parallel and perpendicular components.

TABLE 1

SINGLE GLAZED WINDOW
n=1.52

KL=.05

| θ | $A_\perp$ | $T_\perp$ | $A_\parallel$ | $T_\parallel$ | A | T |
|---|---|---|---|---|---|---|
| 00. | .0487 | .8734 | .0487 | .8734 | .0487 | .8734 |
| 10. | .0490 | .8698 | .0490 | .8759 | .0490 | .8728 |
| 20. | .0499 | .8590 | .0499 | .8842 | .0499 | .8716 |
| 30. | .0514 | .8384 | .0515 | .8982 | .0514 | .8683 |
| 40. | .0534 | .8031 | .0536 | .9172 | .0535 | .8601 |
| 45. | .0546 | .7772 | .0549 | .9275 | .0547 | .8524 |
| 50. | .0558 | .7439 | .0562 | .9366 | .0560 | .8403 |
| 55. | .0571 | .7011 | .0576 | .9418 | .0573 | .8215 |
| 60. | .0582 | .6403 | .0590 | .9381 | .0586 | .7922 |
| 65. | .0593 | .5768 | .0603 | .9168 | .0598 | .7468 |
| 70. | .0600 | .4900 | .0614 | .8635 | .0607 | .6767 |
| 72. | .0601 | .4501 | .0618 | .8287 | .0610 | .6394 |
| 74. | .0601 | .4072 | .0621 | .7839 | .0611 | .5956 |
| 76. | .0600 | .3612 | .0623 | .7277 | .0612 | .5444 |
| 78. | .0596 | .3123 | .0624 | .6585 | .0610 | .4854 |
| 80. | .0590 | .2608 | .0623 | .5754 | .0606 | .4181 |
| 82. | .0578 | .2069 | .0619 | .4779 | .0599 | .3424 |
| 84. | .0558 | .1512 | .0611 | .3667 | .0584 | .2590 |
| 86. | .0520 | .0946 | .0591 | .2436 | .0556 | .1691 |
| 88. | .0429 | .0392 | .0536 | .1127 | .0483 | .0760 |

KL=.10

| θ | $A_\perp$ | $T_\perp$ | $A_\parallel$ | $T_\parallel$ | A | T |
|---|---|---|---|---|---|---|
| 00. | .0948 | .8307 | .0948 | .8307 | .0948 | .8307 |
| 10. | .0953 | .8270 | .0954 | .8328 | .0954 | .8299 |
| 20. | .0970 | .8159 | .0972 | .8399 | .0971 | .8279 |
| 30. | .0998 | .7949 | .1002 | .8518 | .1000 | .8234 |
| 40. | .1035 | .7595 | .1043 | .8680 | .1039 | .8137 |
| 45. | .1056 | .7339 | .1067 | .8766 | .1061 | .8052 |
| 50. | .1077 | .7012 | .1093 | .8839 | .1085 | .7925 |
| 55. | .1098 | .6593 | .1119 | .8876 | .1109 | .7734 |
| 60. | .1117 | .6060 | .1145 | .8828 | .1131 | .7444 |
| 65. | .1130 | .5387 | .1169 | .8615 | .1150 | .7001 |
| 70. | .1134 | .4549 | .1188 | .8101 | .1161 | .6325 |
| 72. | .1131 | .4164 | .1193 | .7769 | .1162 | .5967 |
| 74. | .1125 | .3749 | .1197 | .7343 | .1161 | .5546 |
| 76. | .1114 | .3306 | .1197 | .6808 | .1156 | .5057 |
| 78. | .1097 | .2835 | .1194 | .6149 | .1146 | .4493 |
| 80. | .1071 | .2344 | .1185 | .5355 | .1128 | .3847 |
| 82. | .1031 | .1825 | .1167 | .4421 | .1099 | .3123 |
| 84. | .0966 | .1298 | .1134 | .3354 | .1050 | .2326 |
| 86. | .0856 | .0773 | .1067 | .2174 | .0961 | .1474 |
| 88. | .0634 | .0289 | .0900 | .0939 | .0767 | .0614 |

KL=.15

| θ | $A_\perp$ | $T_\perp$ | $A_\parallel$ | $T_\parallel$ | A | T |
|---|---|---|---|---|---|---|
| 00. | .1384 | .7900 | .1384 | .7900 | .1384 | .7900 |
| 10. | .1392 | .7863 | .1393 | .7918 | .1393 | .7890 |
| 20. | .1416 | .7749 | .1419 | .7978 | .1418 | .7863 |
| 30. | .1455 | .7537 | .1463 | .8079 | .1459 | .7808 |
| 40. | .1505 | .7183 | .1522 | .8214 | .1513 | .7698 |
| 45. | .1533 | .6930 | .1556 | .8284 | .1545 | .7607 |
| 50. | .1560 | .6609 | .1593 | .8342 | .1577 | .7476 |
| 55. | .1587 | .6201 | .1631 | .8364 | .1609 | .7283 |
| 60. | .1608 | .5685 | .1668 | .8307 | .1638 | .6996 |
| 65. | .1619 | .5035 | .1700 | .8094 | .1659 | .6565 |
| 70. | .1612 | .4229 | .1724 | .7601 | .1668 | .5915 |
| 72. | .1602 | .3858 | .1729 | .7285 | .1665 | .5571 |
| 74. | .1585 | .3461 | .1730 | .6879 | .1658 | .5170 |
| 76. | .1560 | .3036 | .1726 | .6370 | .1643 | .4703 |
| 78. | .1523 | .2586 | .1715 | .5743 | .1619 | .4165 |
| 80. | .1470 | .2114 | .1694 | .4987 | .1582 | .3531 |
| 82. | .1393 | .1626 | .1655 | .4097 | .1524 | .2861 |
| 84. | .1276 | .1132 | .1587 | .3078 | .1432 | .2105 |
| 86. | .1090 | .0652 | .1457 | .1955 | .1273 | .1303 |
| 88. | .0754 | .0227 | .1161 | .0801 | .0958 | .0514 |

KL=.20

| θ | $A_\perp$ | $T_\perp$ | $A_\parallel$ | $T_\parallel$ | A | T |
|---|---|---|---|---|---|---|
| 00. | .1798 | .7514 | .1798 | .7514 | .1798 | .7514 |
| 10. | .1808 | .7476 | .1809 | .7528 | .1809 | .7502 |
| 20. | .1838 | .7360 | .1843 | .7578 | .1840 | .7469 |
| 30. | .1885 | .7146 | .1898 | .7672 | .1892 | .7404 |
| 40. | .1946 | .6794 | .1974 | .7773 | .1960 | .7283 |
| 45. | .1979 | .6545 | .2018 | .7829 | .1999 | .7187 |
| 50. | .2011 | .6231 | .2065 | .7873 | .2038 | .7052 |
| 55. | .2040 | .5834 | .2113 | .7882 | .2076 | .6858 |
| 60. | .2060 | .5335 | .2159 | .7817 | .2109 | .6576 |
| 65. | .2064 | .4709 | .2199 | .7606 | .2131 | .6157 |
| 70. | .2042 | .3935 | .2224 | .7131 | .2133 | .5532 |
| 72. | .2021 | .3581 | .2228 | .6830 | .2124 | .5206 |
| 74. | .1991 | .3201 | .2225 | .6445 | .2108 | .4823 |
| 76. | .1948 | .2796 | .2215 | .5962 | .2083 | .4379 |
| 78. | .1888 | .2367 | .2193 | .5367 | .2041 | .3867 |
| 80. | .1806 | .1920 | .2155 | .4648 | .1980 | .3284 |
| 82. | .1689 | .1461 | .2091 | .3801 | .1890 | .2631 |
| 84. | .1520 | .1000 | .1981 | .2832 | .1751 | .1916 |
| 86. | .1262 | .0561 | .1783 | .1769 | .1522 | .1165 |
| 88. | .0833 | .0177 | .1359 | .0696 | .1096 | .0442 |

KL=.30

| θ | $A_\perp$ | $T_\perp$ | $A_\parallel$ | $T_\parallel$ | A | T |
|---|---|---|---|---|---|---|
| 00. | .2562 | .6798 | .2562 | .6798 | .2562 | .6798 |
| 10. | .2575 | .6758 | .2578 | .6806 | .2577 | .6782 |
| 20. | .2613 | .6640 | .2634 | .6838 | .2619 | .6739 |
| 30. | .2674 | .6425 | .2701 | .6891 | .2687 | .6658 |
| 40. | .2749 | .6079 | .2806 | .6960 | .2777 | .6520 |
| 45. | .2788 | .5839 | .2866 | .6993 | .2827 | .6416 |
| 50. | .2823 | .5540 | .2931 | .7012 | .2877 | .6276 |
| 55. | .2850 | .5167 | .2995 | .7000 | .2923 | .6083 |
| 60. | .2861 | .4702 | .3056 | .6921 | .2959 | .5812 |
| 65. | .2843 | .4126 | .3105 | .6715 | .2974 | .5420 |
| 70. | .2779 | .3419 | .3129 | .6278 | .2954 | .4849 |
| 72. | .2733 | .3097 | .3126 | .6006 | .2930 | .4551 |
| 74. | .2672 | .2752 | .3113 | .5659 | .2892 | .4206 |
| 76. | .2590 | .2387 | .3085 | .5225 | .2837 | .3806 |
| 78. | .2481 | .2003 | .3036 | .4690 | .2759 | .3346 |
| 80. | .2337 | .1604 | .2958 | .4045 | .2648 | .2825 |
| 82. | .2143 | .1200 | .2834 | .3284 | .2488 | .2242 |
| 84. | .1876 | .0802 | .2634 | .2414 | .2255 | .1608 |
| 86. | .1497 | .0434 | .2292 | .1469 | .1895 | .0952 |
| 88. | .0929 | .0137 | .1636 | .0546 | .1282 | .0341 |

KL=.40

| θ | $A_\perp$ | $T_\perp$ | $A_\parallel$ | $T_\parallel$ | A | T |
|---|---|---|---|---|---|---|
| 00. | .3249 | .6150 | .3249 | .6150 | .3249 | .6150 |
| 10. | .3264 | .6110 | .3268 | .6153 | .3266 | .6132 |
| 20. | .3308 | .5991 | .3325 | .6170 | .3317 | .6081 |
| 30. | .3377 | .5778 | .3420 | .6198 | .3398 | .5988 |
| 40. | .3459 | .5440 | .3548 | .6233 | .3504 | .5837 |
| 45. | .3499 | .5210 | .3623 | .6246 | .3561 | .5728 |
| 50. | .3532 | .4927 | .3701 | .6246 | .3616 | .5587 |
| 55. | .3551 | .4578 | .3779 | .6217 | .3665 | .5398 |
| 60. | .3545 | .4149 | .3851 | .6129 | .3698 | .5139 |
| 65. | .3499 | .3621 | .3904 | .5929 | .3702 | .4775 |
| 70. | .3386 | .2980 | .3920 | .5528 | .3653 | .4254 |
| 72. | .3313 | .2689 | .3908 | .5281 | .3610 | .3985 |
| 74. | .3218 | .2379 | .3880 | .4970 | .3549 | .3675 |
| 76. | .3096 | .2052 | .3830 | .4581 | .3463 | .3317 |
| 78. | .2939 | .1710 | .3751 | .4103 | .3345 | .2907 |
| 80. | .2736 | .1358 | .3628 | .3526 | .3182 | .2442 |
| 82. | .2472 | .1004 | .3440 | .2846 | .2956 | .1925 |
| 84. | .2123 | .0660 | .3147 | .2072 | .2635 | .1366 |
| 86. | .1650 | .0349 | .2670 | .1238 | .2160 | .0793 |
| 88. | .0985 | .0106 | .1819 | .0443 | .1402 | .0274 |

KL=.60

| θ | $A_\perp$ | $T_\perp$ | $A_\parallel$ | $T_\parallel$ | A | T |
|---|---|---|---|---|---|---|
| 00. | .4423 | .5034 | .4423 | .5034 | .4423 | .5034 |
| 10. | .4440 | .4994 | .4448 | .5030 | .4444 | .5012 |
| 20. | .4489 | .4878 | .4521 | .5024 | .4505 | .4951 |
| 30. | .4562 | .4672 | .4641 | .5015 | .4602 | .4844 |
| 40. | .4642 | .4359 | .4805 | .4999 | .4724 | .4679 |
| 45. | .4675 | .4151 | .4899 | .4983 | .4787 | .4567 |
| 50. | .4694 | .3901 | .4997 | .4955 | .4845 | .4428 |
| 55. | .4687 | .3600 | .5093 | .4903 | .4890 | .4251 |
| 60. | .4639 | .3237 | .5176 | .4805 | .4908 | .4021 |
| 65. | .4527 | .2800 | .5229 | .4622 | .4878 | .3711 |
| 70. | .4312 | .2278 | .5217 | .4285 | .4765 | .3282 |
| 72. | .4185 | .2045 | .5182 | .4085 | .4684 | .3065 |
| 74. | .4028 | .1798 | .5121 | .3835 | .4574 | .2816 |
| 76. | .3832 | .1539 | .5024 | .3525 | .4428 | .2532 |
| 78. | .3590 | .1270 | .4879 | .3146 | .4234 | .2208 |
| 80. | .3288 | .0997 | .4666 | .2691 | .3977 | .1844 |
| 82. | .2912 | .0726 | .4355 | .2155 | .3634 | .1440 |
| 84. | .2438 | .0468 | .3893 | .1548 | .3166 | .1008 |
| 86. | .1834 | .0241 | .3187 | .0903 | .2511 | .0572 |
| 88. | .1048 | .0071 | .2045 | .0308 | .1537 | .0189 |

KL=.80

| θ | $A_\perp$ | $T_\perp$ | $A_\parallel$ | $T_\parallel$ | A | T |
|---|---|---|---|---|---|---|
| 00. | .5375 | .4120 | .5375 | .4120 | .5375 | .4120 |
| 10. | .5392 | .4083 | .5403 | .4112 | .5397 | .4097 |
| 20. | .5439 | .3971 | .5486 | .4091 | .5463 | .4031 |
| 30. | .5508 | .3779 | .5624 | .4057 | .5566 | .3918 |
| 40. | .5573 | .3493 | .5809 | .4009 | .5691 | .3751 |
| 45. | .5592 | .3309 | .5916 | .3975 | .5754 | .3642 |
| 50. | .5589 | .3091 | .6025 | .3931 | .5807 | .3511 |
| 55. | .5551 | .2834 | .6129 | .3867 | .5840 | .3350 |
| 60. | .5457 | .2530 | .6215 | .3767 | .5836 | .3149 |
| 65. | .5279 | .2172 | .6258 | .3603 | .5768 | .2887 |
| 70. | .4971 | .1752 | .6213 | .3322 | .5592 | .2537 |
| 72. | .4797 | .1566 | .6154 | .3160 | .5475 | .2363 |
| 74. | .4586 | .1371 | .6059 | .2961 | .5322 | .2166 |
| 76. | .4330 | .1167 | .5916 | .2715 | .5123 | .1941 |
| 78. | .4020 | .0958 | .5710 | .2417 | .4865 | .1688 |
| 80. | .3644 | .0747 | .5416 | .2060 | .4530 | .1403 |
| 82. | .3186 | .0539 | .4998 | .1641 | .4092 | .1090 |
| 84. | .2626 | .0344 | .4396 | .1169 | .3511 | .0757 |
| 86. | .1938 | .0175 | .3516 | .0673 | .2727 | .0424 |
| 88. | .1081 | .0050 | .2175 | .0224 | .1628 | .0137 |

KL=1.00

| θ | $A_{\perp}$ | $T_{\perp}$ | $A_{\parallel}$ | $T_{\parallel}$ | A | T |
|---|---|---|---|---|---|---|
| 00. | .6148 | .3373 | .6148 | .3373 | .6148 | .3373 |
| 10. | .6163 | .3338 | .6178 | .3362 | .6171 | .3350 |
| 20. | .6206 | .3234 | .6267 | .3332 | .6237 | .3283 |
| 30. | .6264 | .3057 | .6415 | .3283 | .6339 | .3170 |
| 40. | .6308 | .2801 | .6613 | .3215 | .6460 | .3008 |
| 45. | .6310 | .2638 | .6725 | .3172 | .6517 | .2905 |
| 50. | .6283 | .2450 | .6840 | .3119 | .6561 | .2784 |
| 55. | .6213 | .2232 | .6947 | .3050 | .6580 | .2641 |
| 60. | .6075 | .1980 | .7030 | .2954 | .6552 | .2467 |
| 65. | .5837 | .1688 | .7059 | .2808 | .6448 | .2248 |
| 70. | .5449 | .1352 | .6979 | .2576 | .6214 | .1964 |
| 72. | .5237 | .1204 | .6897 | .2445 | .6067 | .1825 |
| 74. | .4983 | .1051 | .6771 | .2286 | .5877 | .1669 |
| 76. | .4679 | .0892 | .6588 | .2093 | .5633 | .1492 |
| 78. | .4317 | .0729 | .6328 | .1859 | .5323 | .1294 |
| 80. | .3885 | .0565 | .5965 | .1580 | .4925 | .1073 |
| 82. | .3368 | .0406 | .5459 | .1255 | .4413 | .0830 |
| 84. | .2748 | .0257 | .4748 | .0890 | .3748 | .0573 |
| 86. | .2003 | .0130 | .3737 | .0508 | .2870 | .0319 |
| 88. | .1101 | .0037 | .2258 | .0167 | .1679 | .0102 |

KL=1.50

| θ | $A_{\perp}$ | $T_{\perp}$ | $A_{\parallel}$ | $T_{\parallel}$ | A | T |
|---|---|---|---|---|---|---|
| 00. | .7509 | .2046 | .7509 | .2046 | .7509 | .2046 |
| 10. | .7518 | .2018 | .7540 | .2032 | .7529 | .2025 |
| 20. | .7542 | .1936 | .7632 | .1994 | .7587 | .1965 |
| 30. | .7564 | .1800 | .7784 | .1933 | .7674 | .1867 |
| 40. | .7547 | .1612 | .7987 | .1852 | .7767 | .1732 |
| 45. | .7505 | .1499 | .8100 | .1803 | .7802 | .1651 |
| 50. | .7423 | .1372 | .8212 | .1748 | .7818 | .1560 |
| 55. | .7282 | .1231 | .8312 | .1685 | .7798 | .1458 |
| 60. | .7055 | .1075 | .8377 | .1608 | .7716 | .1342 |
| 65. | .6704 | .0903 | .8367 | .1507 | .7536 | .1205 |
| 70. | .6173 | .0712 | .8213 | .1364 | .7193 | .1038 |
| 72. | .5894 | .0630 | .8084 | .1288 | .6989 | .0959 |
| 74. | .5568 | .0547 | .7899 | .1199 | .6733 | .0873 |
| 76. | .5166 | .0461 | .7640 | .1092 | .6413 | .0777 |
| 78. | .4741 | .0375 | .7284 | .0966 | .6013 | .0670 |
| 80. | .4222 | .0289 | .6801 | .0817 | .5512 | .0553 |
| 82. | .3617 | .0206 | .6146 | .0646 | .4882 | .0426 |
| 84. | .2911 | .0130 | .5257 | .0455 | .4084 | .0292 |
| 86. | .2088 | .0065 | .4044 | .0258 | .3066 | .0161 |
| 88. | .1126 | .0018 | .2366 | .0083 | .1746 | .0051 |

KL=2.00

| θ | $A_\perp$ | $T_\perp$ | $A_\parallel$ | $T_\parallel$ | A | T |
|---|---|---|---|---|---|---|
| 00. | .8327 | .1241 | .8327 | .1241 | .8327 | .1241 |
| 10. | .8329 | .1220 | .8355 | .1228 | .8342 | .1224 |
| 20. | .8333 | .1159 | .8443 | .1194 | .8388 | .1176 |
| 30. | .8318 | .1060 | .8586 | .1139 | .8452 | .1099 |
| 40. | .8248 | .0928 | .8776 | .1067 | .8512 | .0997 |
| 45. | .8170 | .0852 | .8880 | .1025 | .8525 | .0938 |
| 50. | .8046 | .0769 | .8981 | .0980 | .8514 | .0875 |
| 55. | .7855 | .0680 | .9066 | .0931 | .8460 | .0805 |
| 60. | .7568 | .0585 | .9110 | .0875 | .8339 | .0730 |
| 65. | .7146 | .0484 | .9068 | .0808 | .8107 | .0646 |
| 70. | .6532 | .0376 | .8861 | .0722 | .7697 | .0549 |
| 72. | .6216 | .0332 | .8702 | .0679 | .7459 | .0505 |
| 74. | .5850 | .0286 | .8480 | .0629 | .7165 | .0457 |
| 76. | .5428 | .0240 | .8176 | .0570 | .6802 | .0405 |
| 78. | .4940 | .0194 | .7765 | .0503 | .6353 | .0348 |
| 80. | .4378 | .0149 | .7214 | .0424 | .5796 | .0286 |
| 82. | .3730 | .0106 | .6479 | .0334 | .5105 | .0220 |
| 84. | .2983 | .0066 | .5497 | .0234 | .4240 | .0150 |
| 86. | .2125 | .0033 | .4184 | .0132 | .3155 | .0083 |
| 86. | .1137 | .0009 | .2413 | .0043 | .1775 | .0026 |

DIFFUSE RADIATION

| KL | $A_\perp$ | $T_\perp$ | $A_\parallel$ | $T_\parallel$ | A | T |
|---|---|---|---|---|---|---|
| .05 | .0534 | .6626 | .0546 | .8193 | .0540 | .7409 |
| .10 | .1014 | .6244 | .1052 | .7732 | .1033 | .6988 |
| .15 | .1452 | .5888 | .1523 | .7300 | .1487 | .6594 |
| .20 | .1854 | .5556 | .1962 | .6895 | .1908 | .6225 |
| .30 | .2570 | .4956 | .2760 | .6151 | .2665 | .5553 |
| .40 | .3188 | .4426 | .3461 | .5491 | .3324 | .4958 |
| .60 | .4196 | .3538 | .4628 | .4381 | .4412 | .3959 |
| .80 | .4973 | .2835 | .5545 | .3498 | .5259 | .3166 |
| 1.00 | .5578 | .2274 | .6269 | .2795 | .5924 | .2535 |
| 1.50 | .6589 | .1315 | .7489 | .1600 | .7039 | .1458 |
| 2.00 | .7157 | .0763 | .8179 | .0918 | .7668 | .0840 |

TABLE 2

SINGLE GLAZED WINDOW
n=1.62

KL=.05

| θ | $A_\perp$ | $T_\perp$ | $A_\parallel$ | $T_\parallel$ | A | T |
|---|---|---|---|---|---|---|
| 00. | .0486 | .8501 | .0486 | .8501 | .0486 | .8501 |
| 10. | .0489 | .8459 | .0489 | .8532 | .0489 | .8496 |
| 20. | .0497 | .8334 | .0497 | .8635 | .0497 | .8495 |
| 30. | .0510 | .8097 | .0511 | .8811 | .0510 | .8454 |
| 40. | .0527 | .7699 | .0529 | .9053 | .0528 | .8376 |
| 45. | .0537 | .7415 | .0540 | .9189 | .0538 | .8302 |
| 50. | .0546 | .7055 | .0551 | .9317 | .0549 | .8186 |
| 55. | .0556 | .6603 | .0563 | .9411 | .0560 | .8007 |
| 60. | .0565 | .6037 | .0574 | .9417 | .0570 | .7727 |
| 65. | .0573 | .5340 | .0585 | .9246 | .0579 | .7293 |
| 70. | .0577 | .4494 | .0594 | .8747 | .0585 | .6620 |
| 72. | .0577 | .4112 | .0597 | .8409 | .0587 | .6260 |
| 74. | .0577 | .3705 | .0599 | .7968 | .0588 | .5837 |
| 76. | .0574 | .3274 | .0600 | .7408 | .0587 | .5341 |
| 78. | .0570 | .2821 | .0601 | .6714 | .0585 | .4767 |
| 80. | .0562 | .2346 | .0599 | .5875 | .0581 | .4111 |
| 82. | .0550 | .1854 | .0596 | .4887 | .0573 | .3371 |
| 84. | .0530 | .1349 | .0588 | .3756 | .0559 | .2553 |
| 86. | .0491 | .0839 | .0570 | .2502 | .0530 | .1671 |
| 88. | .0402 | .0345 | .0520 | .1163 | .0461 | .0754 |

KL=.10

| θ | $A_\perp$ | $T_\perp$ | $A_\parallel$ | $T_\parallel$ | A | T |
|---|---|---|---|---|---|---|
| 00. | .0946 | .8084 | .0946 | .8084 | .0946 | .8084 |
| 10. | .0951 | .8042 | .0952 | .8112 | .0951 | .8077 |
| 20. | .0966 | .7915 | .0968 | .8203 | .0967 | .8059 |
| 30. | .0989 | .7678 | .0994 | .8359 | .0992 | .8018 |
| 40. | .1020 | .7284 | .1030 | .8573 | .1025 | .7928 |
| 45. | .1037 | .7004 | .1050 | .8692 | .1044 | .7848 |
| 50. | .1054 | .6653 | .1072 | .8804 | .1063 | .7728 |
| 55. | .1069 | .6212 | .1094 | .8881 | .1082 | .7546 |
| 60. | .1082 | .5663 | .1116 | .8876 | .1099 | .7270 |
| 65. | .1090 | .4988 | .1135 | .8705 | .1113 | .6846 |
| 70. | .1088 | .4169 | .1150 | .8225 | .1119 | .6197 |
| 72. | .1084 | .3800 | .1154 | .7903 | .1119 | .5851 |
| 74. | .1075 | .3407 | .1156 | .7483 | .1116 | .5445 |
| 76. | .1063 | .2991 | .1156 | .6950 | .1109 | .4970 |
| 78. | .1044 | .2554 | .1152 | .6288 | .1098 | .4421 |
| 80. | .1016 | .2098 | .1143 | .5485 | .1080 | .3792 |
| 82. | .0975 | .1628 | .1127 | .4538 | .1051 | .3083 |
| 84. | .0910 | .1151 | .1096 | .3451 | .1003 | .2301 |
| 86. | .0801 | .0681 | .1034 | .2245 | .0917 | .1463 |
| 88. | .0587 | .0251 | .0879 | .0977 | .0733 | .0614 |

KL=.15

| θ | $A_{\perp}$ | $T_{\perp}$ | $A_{\parallel}$ | $T_{\parallel}$ | A | T |
|---|---|---|---|---|---|---|
| 00. | .1382 | .7688 | .1382 | .7688 | .1382 | .7688 |
| 10. | .1388 | .7645 | .1389 | .7712 | .1389 | .7679 |
| 20. | .1409 | .7518 | .1413 | .7793 | .1411 | .7655 |
| 30. | .1441 | .7281 | .1451 | .7930 | .1446 | .7605 |
| 40. | .1482 | .6891 | .1502 | .8118 | .1492 | .7505 |
| 45. | .1504 | .6618 | .1532 | .8222 | .1518 | .7420 |
| 50. | .1525 | .6274 | .1563 | .8318 | .1544 | .7296 |
| 55. | .1543 | .5846 | .1595 | .8381 | .1569 | .7114 |
| 60. | .1556 | .5315 | .1626 | .8367 | .1591 | .6841 |
| 65. | .1559 | .4663 | .1653 | .8195 | .1606 | .6429 |
| 70. | .1544 | .3875 | .1671 | .7735 | .1607 | .5805 |
| 72. | .1530 | .3520 | .1674 | .7428 | .1602 | .5474 |
| 74. | .1511 | .3142 | .1674 | .7028 | .1592 | .5085 |
| 76. | .1483 | .2743 | .1670 | .6521 | .1576 | .4632 |
| 78. | .1444 | .2324 | .1659 | .5890 | .1551 | .4107 |
| 80. | .1389 | .1890 | .1638 | .5125 | .1514 | .3508 |
| 82. | .1311 | .1446 | .1602 | .4220 | .1457 | .2833 |
| 84. | .1196 | .1000 | .1539 | .3180 | .1367 | .2090 |
| 86. | .1014 | .0571 | .1419 | .2029 | .1216 | .1300 |
| 88. | .0694 | .0197 | .1141 | .0840 | .0918 | .0518 |

KL=.20

| θ | $A_{\perp}$ | $T_{\perp}$ | $A_{\parallel}$ | $T_{\parallel}$ | A | T |
|---|---|---|---|---|---|---|
| 00. | .1793 | .7311 | .1793 | .7311 | .1793 | .7311 |
| 10. | .1802 | .7269 | .1803 | .7332 | .1803 | .7300 |
| 20. | .1827 | .7141 | .1833 | .7403 | .1830 | .7272 |
| 30. | .1866 | .6905 | .1883 | .7523 | .1874 | .7214 |
| 40. | .1915 | .6521 | .1949 | .7688 | .1932 | .7104 |
| 45. | .1940 | .6253 | .1987 | .7778 | .1964 | .7015 |
| 50. | .1963 | .5919 | .2027 | .7859 | .1995 | .6889 |
| 55. | .1982 | .5504 | .2068 | .7909 | .2025 | .6707 |
| 60. | .1991 | .4991 | .2107 | .7886 | .2049 | .6439 |
| 65. | .1985 | .4363 | .2139 | .7716 | .2062 | .6039 |
| 70. | .1951 | .3606 | .2159 | .7274 | .2055 | .5440 |
| 72. | .1927 | .3266 | .2161 | .6981 | .2044 | .5124 |
| 74. | .1893 | .2905 | .2157 | .6602 | .2025 | .4753 |
| 76. | .1847 | .2524 | .2146 | .6119 | .1997 | .4322 |
| 78. | .1785 | .2125 | .2125 | .5520 | .1955 | .3823 |
| 80. | .1701 | .1714 | .2089 | .4792 | .1895 | .3253 |
| 82. | .1584 | .1295 | .2029 | .3929 | .1807 | .2612 |
| 84. | .1418 | .0881 | .1928 | .2937 | .1673 | .1909 |
| 86. | .1169 | .0490 | .1742 | .1844 | .1456 | .1167 |
| 88. | .0763 | .0161 | .1341 | .0734 | .1052 | .0447 |

KL=.30

| θ | $A_{\perp}$ | $T_{\perp}$ | $A_{\parallel}$ | $T_{\parallel}$ | A | T |
|---|---|---|---|---|---|---|
| 00. | .2553 | .6613 | .2553 | .6613 | .2553 | .6613 |
| 10. | .2563 | .6570 | .2567 | .6628 | .2565 | .6599 |
| 20. | .2595 | .6443 | .2608 | .6681 | .2602 | .6562 |
| 30. | .2644 | .6211 | .2677 | .6771 | .2660 | .6491 |
| 40. | .2702 | .5840 | .2770 | .6894 | .2736 | .6367 |
| 45. | .2729 | .5585 | .2823 | .6959 | .2776 | .6272 |
| 50. | .2752 | .5270 | .2879 | .7016 | .2816 | .6143 |
| 55. | .2764 | .4882 | .2935 | .7044 | .2850 | .5963 |
| 60. | .2760 | .4406 | .2987 | .7006 | .2873 | .5706 |
| 65. | .2727 | .3828 | .3028 | .6839 | .2877 | .5333 |
| 70. | .2648 | .3136 | .3045 | .6432 | .2846 | .4784 |
| 72. | .2597 | .2826 | .3041 | .6168 | .2819 | .4497 |
| 74. | .2531 | .2498 | .3027 | .5825 | .2779 | .4162 |
| 76. | .2445 | .2154 | .2999 | .5391 | .2722 | .3772 |
| 78. | .2334 | .1796 | .2953 | .4852 | .2644 | .3324 |
| 80. | .2190 | .1430 | .2879 | .4195 | .2535 | .2812 |
| 82. | .1999 | .1062 | .2763 | .3416 | .2381 | .2239 |
| 84. | .1741 | .0704 | .2576 | .2521 | .2158 | .1613 |
| 86. | .1379 | .0377 | .2254 | .1543 | .1816 | .0960 |
| 88. | .0847 | .0117 | .1625 | .0580 | .1236 | .0349 |

KL=.40

| θ | $A_{\perp}$ | $T_{\perp}$ | $A_{\parallel}$ | $T_{\parallel}$ | A | T |
|---|---|---|---|---|---|---|
| 00. | .3234 | .5982 | .3234 | .5982 | .3234 | .5982 |
| 10. | .3246 | .5940 | .3251 | .5992 | .3248 | .5966 |
| 20. | .3281 | .5814 | .3303 | .6030 | .3292 | .5922 |
| 30. | .3335 | .5588 | .3388 | .6095 | .3362 | .5841 |
| 40. | .3395 | .5232 | .3504 | .6182 | .3449 | .5707 |
| 45. | .3421 | .4990 | .3570 | .6227 | .3495 | .5609 |
| 50. | .3438 | .4694 | .3639 | .6263 | .3538 | .5479 |
| 55. | .3439 | .4334 | .3708 | .6273 | .3573 | .5303 |
| 60. | .3414 | .3895 | .3769 | .6225 | .3592 | .5060 |
| 65. | .3349 | .3366 | .3814 | .6062 | .3581 | .4714 |
| 70. | .3218 | .2737 | .3824 | .5689 | .3521 | .4213 |
| 72. | .3139 | .2457 | .3811 | .5449 | .3475 | .3953 |
| 74. | .3039 | .2162 | .3783 | .5141 | .3411 | .3652 |
| 76. | .2913 | .1853 | .3735 | .4752 | .3324 | .3302 |
| 78. | .2755 | .1534 | .3660 | .4267 | .3208 | .2901 |
| 80. | .2554 | .1210 | .3544 | .3678 | .3049 | .2444 |
| 82. | .2297 | .0887 | .3367 | .2979 | .2832 | .1933 |
| 84. | .1962 | .0579 | .3091 | .2178 | .2526 | .1379 |
| 86. | .1514 | .0303 | .2638 | .1305 | .2076 | .0806 |
| 88. | .0896 | .0091 | .1816 | .0473 | .1356 | .0282 |

KL=.60

| θ | $A_\perp$ | $T_\perp$ | $A_\parallel$ | $T_\parallel$ | A | T |
|---|---|---|---|---|---|---|
| 00. | .4394 | .4895 | .4394 | .4895 | .4394 | .4895 |
| 10. | .4407 | .4855 | .4417 | .4898 | .4412 | .4877 |
| 20. | .4445 | .4735 | .4484 | .4913 | .4465 | .4824 |
| 30. | .4498 | .4524 | .4596 | .4938 | .4547 | .4731 |
| 40. | .4549 | .4201 | .4746 | .4971 | .4647 | .4586 |
| 45. | .4562 | .3987 | .4832 | .4986 | .4697 | .4487 |
| 50. | .4560 | .3730 | .4921 | .4992 | .4740 | .4361 |
| 55. | .4529 | .3422 | .5007 | .4975 | .4768 | .4198 |
| 60. | .4457 | .3053 | .5081 | .4913 | .4769 | .3983 |
| 65. | .4319 | .2616 | .5126 | .4762 | .4723 | .3689 |
| 70. | .4083 | .2103 | .5112 | .4450 | .4597 | .3276 |
| 72. | .3950 | .1877 | .5077 | .4255 | .4514 | .3066 |
| 74. | .3788 | .1641 | .5018 | .4007 | .4403 | .2824 |
| 76. | .3590 | .1395 | .4926 | .3694 | .4258 | .2545 |
| 78. | .3350 | .1144 | .4789 | .3308 | .4069 | .2226 |
| 80. | .3055 | .0891 | .4588 | .2838 | .3821 | .1864 |
| 82. | .2692 | .0643 | .4291 | .2282 | .3492 | .1462 |
| 84. | .2242 | .0411 | .3850 | .1646 | .3046 | .1029 |
| 86. | .1675 | .0210 | .3170 | .0966 | .2422 | .0588 |
| 88. | .0950 | .0061 | .2052 | .0333 | .1501 | .0197 |

KL=.80

| | | | | | | |
|---|---|---|---|---|---|---|
| 00. | .5333 | .4007 | .5333 | .4007 | .5333 | .4007 |
| 10. | .5345 | .3969 | .5358 | .4005 | .5351 | .3987 |
| 20. | .5379 | .3857 | .5437 | .4003 | .5408 | .3930 |
| 30. | .5423 | .3664 | .5566 | .4001 | .5495 | .3833 |
| 40. | .5454 | .3375 | .5740 | .3998 | .5597 | .3687 |
| 45. | .5450 | .3188 | .5839 | .3992 | .5645 | .3590 |
| 50. | .5422 | .2967 | .5941 | .3978 | .5681 | .3472 |
| 55. | .5356 | .2706 | .6038 | .3946 | .5697 | .3326 |
| 60. | .5234 | .2400 | .6117 | .3878 | .5675 | .3139 |
| 65. | .5027 | .2041 | .6155 | .3742 | .5592 | .2891 |
| 70. | .4697 | .1627 | .6110 | .3481 | .5403 | .2554 |
| 72. | .4517 | .1447 | .6053 | .3323 | .5285 | .2385 |
| 74. | .4302 | .1259 | .5962 | .3124 | .5132 | .2191 |
| 76. | .4046 | .1065 | .5827 | .2875 | .4936 | .1970 |
| 78. | .3741 | .0868 | .5630 | .2568 | .4865 | .1718 |
| 80. | .3375 | .0671 | .5349 | .2196 | .4362 | .1434 |
| 82. | .2937 | .0480 | .4948 | .1757 | .3943 | .1119 |
| 84. | .2409 | .0304 | .4369 | .1258 | .3389 | .0781 |
| 86. | .1767 | .0153 | .3513 | .0728 | .2640 | .0440 |
| 88. | .0979 | .0043 | .2191 | .0245 | .1585 | .0144 |

KL=1.00

| θ | $A_{\perp}$ | $T_{\perp}$ | $A_{\parallel}$ | $T_{\parallel}$ | A | T |
|---|---|---|---|---|---|---|
| 00. | .6093 | .3280 | .6093 | .3280 | .6093 | .3280 |
| 10. | .6103 | .3245 | .6121 | .3274 | .6112 | .3260 |
| 20. | .6131 | .3143 | .6206 | .3262 | .6169 | .3202 |
| 30. | .6162 | .2968 | .6347 | .3242 | .6254 | .3105 |
| 40. | .6168 | .2713 | .6536 | .3215 | .6352 | .2964 |
| 45. | .6144 | .2550 | .6643 | .3197 | .6394 | .2874 |
| 50. | .6090 | .2361 | .6753 | .3171 | .6421 | .2766 |
| 55. | .5990 | .2124 | .6855 | .3130 | .6422 | .2636 |
| 60. | .5821 | .1889 | .6934 | .3061 | .6378 | .2475 |
| 65. | .5553 | .1597 | .6962 | .2940 | .6257 | .2268 |
| 70. | .5142 | .1265 | .6886 | .2723 | .6014 | .1994 |
| 72. | .4924 | .1121 | .6808 | .2595 | .5866 | .1858 |
| 74. | .4667 | .0972 | .6667 | .2436 | .5677 | .1704 |
| 76. | .4365 | .0820 | .6512 | .2238 | .5439 | .1529 |
| 78. | .4010 | .0665 | .6264 | .1995 | .5137 | .1330 |
| 80. | .3592 | .0512 | .5915 | .1703 | .4754 | .1107 |
| 82. | .3099 | .0365 | .5426 | .1358 | .4263 | .0861 |
| 84. | .2516 | .0229 | .4737 | .0968 | .3626 | .0598 |
| 86. | .1824 | .0114 | .3746 | .0555 | .2785 | .0335 |
| 88. | .0996 | .0032 | .2279 | .0184 | .1638 | .0108 |

KL=1.50

| θ | $A_{\perp}$ | $T_{\perp}$ | $A_{\parallel}$ | $T_{\parallel}$ | A | T |
|---|---|---|---|---|---|---|
| 00. | .7427 | .1989 | .7427 | .1989 | .7427 | .1989 |
| 10. | .7430 | .1962 | .7456 | .1980 | .7443 | .1971 |
| 20. | .7437 | .1884 | .7548 | .1955 | .7493 | .1920 |
| 30. | .7430 | .1754 | .7700 | .1917 | .7565 | .1835 |
| 40. | .7370 | .1572 | .7902 | .1865 | .7636 | .1719 |
| 45. | .7301 | .1462 | .8016 | .1834 | .7659 | .1648 |
| 50. | .7189 | .1337 | .8130 | .1798 | .7660 | .1567 |
| 55. | .7015 | .1198 | .8232 | .1753 | .7624 | .1476 |
| 60. | .6754 | .1042 | .8301 | .1694 | .7528 | .1368 |
| 65. | .6372 | .0870 | .8299 | .1608 | .7335 | .1239 |
| 70. | .5818 | .0680 | .8156 | .1474 | .6987 | .1077 |
| 72. | .5535 | .0599 | .8033 | .1399 | .6784 | .0999 |
| 74. | .5208 | .0517 | .7856 | .1308 | .6532 | .0913 |
| 76. | .4831 | .0433 | .7606 | .1198 | .6219 | .0816 |
| 78. | .4397 | .0350 | .7262 | .1064 | .5830 | .0707 |
| 80. | .3898 | .0268 | .6792 | .0905 | .5345 | .0586 |
| 82. | .3323 | .0189 | .6152 | .0718 | .4737 | .0454 |
| 84. | .2661 | .0118 | .5278 | .0509 | .3970 | .0313 |
| 86. | .1898 | .0058 | .4075 | .0289 | .2987 | .0174 |
| 88. | .1018 | .0016 | .2397 | .0094 | .1704 | .0055 |

KL=2.00

| θ | $A_\perp$ | $T_\perp$ | $A_\parallel$ | $T_\parallel$ | A | T |
|---|---|---|---|---|---|---|
| 00. | .8225 | .1206 | .8225 | .1206 | .8225 | .1206 |
| 10. | .8221 | .1186 | .8254 | .1197 | .8238 | .1192 |
| 20. | .8209 | .1129 | .8344 | .1172 | .8276 | .1152 |
| 30. | .8165 | .1037 | .8493 | .1133 | .8329 | .1085 |
| 40. | .8052 | .0912 | .8691 | .1082 | .8371 | .0997 |
| 45. | .7947 | .0838 | .8801 | .1052 | .8374 | .0945 |
| 50. | .7792 | .0758 | .8910 | .1019 | .8351 | .0889 |
| 55. | .7568 | .0671 | .9004 | .0982 | .8286 | .0826 |
| 60. | .7247 | .0576 | .9058 | .0938 | .8152 | .0757 |
| 65. | .6793 | .0475 | .9029 | .0880 | .7911 | .0678 |
| 70. | .6157 | .0367 | .8838 | .0798 | .7497 | .0583 |
| 72. | .5837 | .0322 | .8686 | .0755 | .7262 | .0539 |
| 74. | .5472 | .0277 | .8473 | .0703 | .6972 | .0490 |
| 76. | .5055 | .0231 | .8178 | .0642 | .6617 | .0436 |
| 78. | .4581 | .0186 | .7777 | .0568 | .6179 | .0377 |
| 80. | .4040 | .0142 | .7237 | .0482 | .5639 | .0312 |
| 82. | .3426 | .0010 | .6513 | .0381 | .4969 | .0241 |
| 84. | .2726 | .0062 | .5540 | .0269 | .4133 | .0166 |
| 86. | .1931 | .0031 | .4229 | .0153 | .3080 | .0092 |
| 88. | .1027 | .0009 | .2429 | .0050 | .1738 | .0029 |

DIFFUSE RADIATION

| KL | $A_\perp$ | $T_\perp$ | $A_\parallel$ | $T_\parallel$ | A | T |
|---|---|---|---|---|---|---|
| .05 | .0522 | .6323 | .0536 | .8126 | .0529 | .7225 |
| .10 | .0990 | .5959 | .1033 | .7676 | .1012 | .6818 |
| .15 | .1417 | .5622 | .1497 | .7254 | .1457 | .6438 |
| .20 | .1808 | .5308 | .1930 | .6856 | .1869 | .6082 |
| .30 | .2503 | .4738 | .2717 | .6128 | .2610 | .5433 |
| .40 | .3102 | .4236 | .3411 | .5480 | .3256 | .4858 |
| .60 | .4076 | .3394 | .4568 | .4386 | .4322 | .3890 |
| .80 | .4826 | .2727 | .5480 | .3514 | .5154 | .3120 |
| 1.00 | .5411 | .2192 | .6202 | .2817 | .5807 | .2505 |
| 1.50 | .6388 | .1277 | .7424 | .1623 | .6906 | .1450 |
| 2.00 | .6939 | .0744 | .8119 | .0938 | .7529 | .0842 |

TABLE 3 

DOUBLE GLAZED WINDOW

KL of Inside Pane = .05

| KL=.05 | n=1.52 | | | n=1.62 | | |
|---|---|---|---|---|---|---|
| θ | $A_1^*$ | $A_2^*$ | T* | $A_1^*$ | $A_2^*$ | T* |
| 00. | .0520 | .0428 | .7675 | .0529 | .0418 | .7301 |
| 10. | .0523 | .0430 | .7666 | .0532 | .0419 | .7293 |
| 20. | .0533 | .0438 | .7646 | .0540 | .0426 | .7277 |
| 30. | .0550 | .0450 | .7602 | .0555 | .0437 | .7242 |
| 40. | .0574 | .0465 | .7502 | .0575 | .0449 | .7165 |
| 45. | .0589 | .0473 | .7411 | .0588 | .0456 | .7094 |
| 50. | .0605 | .0480 | .7269 | .0601 | .0461 | .6982 |
| 55. | .0625 | .0484 | .7046 | .0617 | .0465 | .6799 |
| 60. | .0648 | .0483 | .6689 | .0636 | .0463 | .6495 |
| 65. | .0676 | .0474 | .6122 | .0658 | .0454 | .5987 |
| 70. | .0710 | .0451 | .5254 | .0687 | .0432 | .5176 |
| 72. | .0725 | .0437 | .4808 | .0700 | .0419 | .4748 |
| 74. | .0741 | .0420 | .4305 | .0713 | .0403 | .4261 |
| 76. | .0756 | .0400 | .3751 | .0726 | .0383 | .3720 |
| 78. | .0769 | .0377 | .3157 | .0738 | .0360 | .3135 |
| 80. | .0779 | .0349 | .2538 | .0746 | .0334 | .2524 |
| 82. | .0781 | .0318 | .1915 | .0747 | .0303 | .1907 |
| 84. | .0770 | .0280 | .1308 | .0736 | .0267 | .1305 |
| 86. | .0731 | .0231 | .0742 | .0697 | .0220 | .0744 |
| 88. | .0614 | .0153 | .0257 | .0587 | .0146 | .0261 |
| KL=.10 | | | | | | |
| 00. | .1009 | .0407 | .7297 | .1025 | .0397 | .6940 |
| 10. | .1016 | .0409 | .7286 | .1030 | .0399 | .6930 |
| 20. | .1035 | .0416 | .7261 | .1047 | .0405 | .6909 |
| 30. | .1066 | .0426 | .7206 | .1074 | .0414 | .6866 |
| 40. | .1110 | .0440 | .7094 | .1111 | .0425 | .6778 |
| 45. | .1137 | .0446 | .6997 | .1133 | .0431 | .6702 |
| 50. | .1167 | .0452 | .6851 | .1158 | .0435 | .6585 |
| 55. | .1202 | .0455 | .6627 | .1185 | .0437 | .6401 |
| 60. | .1241 | .0453 | .6277 | .1217 | .0435 | .6102 |
| 65. | .1288 | .0443 | .5730 | .1253 | .0425 | .5611 |
| 70. | .1341 | .0419 | .4900 | .1296 | .0402 | .4835 |
| 72. | .1364 | .0405 | .4474 | .1315 | .0389 | .4427 |
| 74. | .1385 | .0388 | .3995 | .1332 | .0372 | .3963 |
| 76. | .1403 | .0368 | .3467 | .1346 | .0352 | .3447 |
| 78. | .1414 | .0343 | .2902 | .1355 | .0329 | .2891 |
| 80. | .1414 | .0316 | .2314 | .1353 | .0302 | .2310 |
| 82. | .1394 | .0283 | .1723 | .1332 | .0270 | .1723 |
| 84. | .1377 | .0243 | .1152 | .1277 | .0232 | .1156 |
| 86. | .1213 | .0192 | .0629 | .1158 | .0184 | .0635 |
| 88. | .0927 | .0116 | .0199 | .0888 | .0112 | .0205 |

KL=.15

| θ | n=1.52 $A_1^*$ | $A_2^*$ | $T^*$ | n=1.62 $A_1^*$ | $A_2^*$ | $T^*$ |
|---|---|---|---|---|---|---|
| 00. | .1470 | .0387 | .6939 | .1490 | .0377 | .6598 |
| 10. | .1479 | .0389 | .6926 | .1498 | .0379 | .6586 |
| 20. | .1506 | .0395 | .6895 | .1521 | .0384 | .6560 |
| 30. | .1549 | .0404 | .6832 | .1559 | .0392 | .6509 |
| 40. | .1611 | .0416 | .6709 | .1611 | .0402 | .6412 |
| 45. | .1648 | .0422 | .6608 | .1641 | .0407 | .6332 |
| 50. | .1689 | .0426 | .6459 | .1674 | .0410 | .6212 |
| 55. | .1735 | .0428 | .6236 | .1710 | .0412 | .6028 |
| 60. | .1786 | .0425 | .5893 | .1749 | .0408 | .5735 |
| 65. | .1844 | .0414 | .5366 | .1793 | .0398 | .5262 |
| 70. | .1906 | .0391 | .4573 | .1841 | .0375 | .4521 |
| 72. | .1930 | .0377 | .4168 | .1859 | .0361 | .4133 |
| 74. | .1949 | .0360 | .3713 | .1874 | .0345 | .3692 |
| 76. | .1963 | .0339 | .3212 | .1883 | .0325 | .3202 |
| 78. | .1963 | .0315 | .2676 | .1880 | .0302 | .2674 |
| 80. | .1943 | .0287 | .2120 | .1859 | .0275 | .2123 |
| 82. | .1889 | .0254 | .1562 | .1805 | .0243 | .1569 |
| 84. | .1777 | .0215 | .1027 | .1697 | .0205 | .1036 |
| 86. | .1560 | .0164 | .0545 | .1492 | .0158 | .0553 |
| 88. | .1121 | .0093 | .0163 | .1077 | .0091 | .0168 |

KL=.20

| θ | n=1.52 $A_1^*$ | $A_2^*$ | $T^*$ | n=1.62 $A_1^*$ | $A_2^*$ | $T^*$ |
|---|---|---|---|---|---|---|
| 00. | .1904 | .0368 | .6598 | .1927 | .0359 | .6272 |
| 10. | .1915 | .0369 | .6584 | .1937 | .0360 | .6259 |
| 20. | .1949 | .0375 | .6548 | .1966 | .0365 | .6229 |
| 30. | .2003 | .0383 | .6476 | .2014 | .0372 | .6172 |
| 40. | .2079 | .0393 | .6345 | .2077 | .0381 | .6067 |
| 45. | .2124 | .0398 | .6240 | .2114 | .0384 | .5983 |
| 50. | .2174 | .0402 | .6089 | .2153 | .0387 | .5862 |
| 55. | .2228 | .0403 | .5868 | .2194 | .0387 | .5678 |
| 60. | .2287 | .0399 | .5534 | .2238 | .0384 | .5392 |
| 65. | .2351 | .0388 | .5027 | .2284 | .0373 | .4937 |
| 70. | .2414 | .0364 | .4271 | .2329 | .0350 | .4230 |
| 72. | .2434 | .0350 | .3887 | .2344 | .0337 | .3862 |
| 74. | .2449 | .0333 | .3455 | .2353 | .0320 | .3444 |
| 76. | .2452 | .0314 | .2981 | .2351 | .0301 | .2980 |
| 78. | .2437 | .0290 | .2475 | .2333 | .0278 | .2480 |
| 80. | .2391 | .0262 | .1949 | .2287 | .0252 | .1959 |
| 82. | .2298 | .0230 | .1424 | .2197 | .0221 | .1436 |
| 84. | .2127 | .0192 | .0924 | .2034 | .0184 | .0936 |
| 86. | .1822 | .0143 | .0479 | .1745 | .0138 | .0489 |
| 88. | .1253 | .0078 | .0137 | .1208 | .0076 | .0143 |

| KL=.30 | n=1.52 | | | n=1.62 | | |
|---|---|---|---|---|---|---|
| θ | $A_1^*$ | $A_2^*$ | T* | $A_1^*$ | $A_2^*$ | T* |
| 00. | .2699 | .0332 | .5967 | .2725 | .0324 | .5670 |
| 10. | .2714 | .0334 | .5950 | .2738 | .0325 | .5655 |
| 20. | .2758 | .0338 | .5905 | .2777 | .0329 | .5618 |
| 30. | .2830 | .0345 | .5822 | .2838 | .0335 | .5549 |
| 40. | .2928 | .0352 | .5677 | .2919 | .0341 | .5433 |
| 45. | .2985 | .0355 | .5567 | .2964 | .0343 | .5344 |
| 50. | .3046 | .0357 | .5414 | .3011 | .0345 | .5221 |
| 55. | .3110 | .0357 | .5199 | .3058 | .0344 | .5042 |
| 60. | .3176 | .0352 | .4884 | .3103 | .0339 | .4771 |
| 65. | .3238 | .0340 | .4417 | .3143 | .0328 | .4352 |
| 70. | .3286 | .0314 | .3733 | .3169 | .0306 | .3712 |
| 72. | .3294 | .0304 | .3388 | .3170 | .0293 | .3381 |
| 74. | .3290 | .0288 | .3002 | .3159 | .0278 | .3006 |
| 76. | .3265 | .0270 | .2579 | .3131 | .0260 | .2591 |
| 78. | .3210 | .0247 | .2127 | .3075 | .0238 | .2145 |
| 80. | .3108 | .0222 | .1661 | .2975 | .0214 | .1680 |
| 82. | .2934 | .0192 | .1199 | .2809 | .0185 | .1217 |
| 84. | .2651 | .0156 | .0762 | .2541 | .0151 | .0778 |
| 86. | .2192 | .0113 | .0383 | .2107 | .0110 | .0394 |
| 88. | .1422 | .0058 | .0103 | .1376 | .0057 | .0108 |

| KL=.40 | | | | | | |
|---|---|---|---|---|---|---|
| 00. | .3406 | .0301 | .5396 | .3431 | .0293 | .5126 |
| 10. | .3423 | .0302 | .5377 | .3447 | .0294 | .5109 |
| 20. | .3475 | .0305 | .5327 | .3492 | .0297 | .5067 |
| 30. | .3560 | .0309 | .5234 | .3564 | .0301 | .4991 |
| 40. | .3673 | .0315 | .5080 | .3656 | .0305 | .4866 |
| 45. | .3737 | .0317 | .4967 | .3706 | .0307 | .4775 |
| 50. | .3804 | .0317 | .4816 | .3756 | .0307 | .4652 |
| 55. | .3872 | .0316 | .4609 | .3802 | .0305 | .4479 |
| 60. | .3935 | .0310 | .4313 | .3841 | .0300 | .4225 |
| 65. | .3986 | .0299 | .3885 | .3867 | .0289 | .3841 |
| 70. | .4006 | .0277 | .3269 | .3864 | .0268 | .3264 |
| 72. | .3996 | .0265 | .2960 | .3846 | .0256 | .2967 |
| 74. | .3966 | .0251 | .2616 | .3811 | .0242 | .2632 |
| 76. | .3909 | .0233 | .2240 | .3752 | .0226 | .2262 |
| 78. | .3811 | .0213 | .1839 | .3654 | .0206 | .1865 |
| 80. | .3651 | .0189 | .1427 | .3501 | .0183 | .1452 |
| 82. | .3403 | .0162 | .1020 | .3264 | .0157 | .1042 |
| 84. | .3022 | .0130 | .0640 | .2903 | .0126 | .0658 |
| 86. | .2438 | .0092 | .0314 | .2350 | .0090 | .0326 |
| 88. | .1523 | .0046 | .0082 | .1478 | .0045 | .0086 |

| KL=.60 | n=1.52 | | | n=1.62 | | |
|---|---|---|---|---|---|---|
| θ | $A_1^*$ | $A_2^*$ | T* | $A_1^*$ | $A_2^*$ | T* |
| 00. | .4597 | .0246 | .4415 | .4614 | .0240 | .4192 |
| 10. | .4618 | .0247 | .4394 | .4632 | .0240 | .4173 |
| 20. | .4680 | .0248 | .4335 | .4685 | .0242 | .4124 |
| 30. | .4779 | .0250 | .4231 | .4768 | .0243 | .4039 |
| 40. | .4906 | .0252 | .4069 | .4870 | .0245 | .3907 |
| 45. | .4975 | .0252 | .3957 | .4922 | .0245 | .3815 |
| 50. | .5043 | .0251 | .3814 | .4969 | .0244 | .3698 |
| 55. | .5104 | .0248 | .3625 | .5005 | .0241 | .3540 |
| 60. | .5148 | .0242 | .3370 | .5023 | .0235 | .3320 |
| 65. | .5161 | .0231 | .3014 | .5007 | .0225 | .3000 |
| 70. | .5110 | .0213 | .2516 | .4933 | .0207 | .2533 |
| 72. | .5058 | .0203 | .2271 | .4875 | .0197 | .2297 |
| 74. | .4976 | .0190 | .1998 | .4790 | .0186 | .2030 |
| 76. | .4853 | .0176 | .1702 | .4667 | .0172 | .1737 |
| 78. | .4672 | .0160 | .1389 | .4492 | .0156 | .1424 |
| 80. | .4411 | .0141 | .1069 | .4242 | .0137 | .1100 |
| 82. | .4037 | .0119 | .0754 | .3886 | .0116 | .0780 |
| 84. | .3503 | .0094 | .0465 | .3379 | .0092 | .0484 |
| 86. | .2739 | .0065 | .0222 | .2653 | .0064 | .0233 |
| 88. | .1637 | .0031 | .0055 | .1595 | .0031 | .0059 |
| KL=.80 | | | | | | |
| 00. | .5548 | .0201 | .3613 | .5550 | .0196 | .3429 |
| 10. | .5571 | .0201 | .3591 | .5569 | .0196 | .3410 |
| 20. | .5634 | .0202 | .3529 | .5625 | .0197 | .3359 |
| 30. | .5739 | .0203 | .3422 | .5711 | .0197 | .3270 |
| 40. | .5867 | .0202 | .3261 | .5812 | .0197 | .3139 |
| 45. | .5933 | .0201 | .3154 | .5859 | .0196 | .3051 |
| 50. | .5993 | .0199 | .3022 | .5898 | .0194 | .2942 |
| 55. | .6039 | .0196 | .2855 | .5918 | .0191 | .2802 |
| 60. | .6056 | .0189 | .2636 | .5908 | .0185 | .2614 |
| 65. | .6024 | .0179 | .2342 | .5849 | .0176 | .2350 |
| 70. | .5899 | .0164 | .1943 | .5704 | .0161 | .1973 |
| 72. | .5806 | .0156 | .1748 | .5606 | .0153 | .1784 |
| 74. | .5676 | .0146 | .1534 | .5475 | .0143 | .1574 |
| 76. | .5495 | .0134 | .1302 | .5297 | .0132 | .1342 |
| 78. | .5245 | .0121 | .1058 | .5056 | .0119 | .1096 |
| 80. | .4902 | .0106 | .0810 | .4728 | .0105 | .0842 |
| 82. | .4432 | .0089 | .0566 | .4280 | .0088 | .0594 |
| 84. | .3789 | .0070 | .0346 | .3668 | .0069 | .0364 |
| 86. | .2910 | .0047 | .0163 | .2826 | .0047 | .0173 |
| 88. | .1697 | .0022 | .0040 | .1657 | .0022 | .0043 |

| KL=1.00 | n=1.52 | | | n=1.62 | | |
|---|---|---|---|---|---|---|
| θ | $A_1^*$ | $A_2^*$ | T* | $A_1^*$ | $A_2^*$ | T* |
| 00. | .6311 | .0165 | .2957 | .6296 | .0161 | .2806 |
| 10. | .6333 | .0165 | .2935 | .6315 | .0160 | .2787 |
| 20. | .6398 | .0164 | .2873 | .6370 | .0160 | .2736 |
| 30. | .6499 | .0164 | .2768 | .6453 | .0160 | .2649 |
| 40. | .6620 | .0162 | .2614 | .6547 | .0158 | .2522 |
| 45. | .6679 | .0160 | .2515 | .6588 | .0157 | .2441 |
| 50. | .6727 | .0158 | .2395 | .6615 | .0154 | .2342 |
| 55. | .6754 | .0154 | .2249 | .6618 | .0151 | .2220 |
| 60. | .6744 | .0148 | .2064 | .6581 | .0146 | .2060 |
| 65. | .6668 | .0140 | .1823 | .6480 | .0138 | .1842 |
| 70. | .6476 | .0127 | .1503 | .6271 | .0125 | .1539 |
| 72. | .6347 | .0120 | .1349 | .6140 | .0119 | .1390 |
| 74. | .6174 | .0112 | .1181 | .5968 | .0111 | .1223 |
| 76. | .5945 | .0103 | .0999 | .5744 | .0102 | .1041 |
| 78. | .5639 | .0093 | .0810 | .5449 | .0092 | .0847 |
| 80. | .5232 | .0081 | .0617 | .5060 | .0080 | .0649 |
| 82. | .4692 | .0067 | .0431 | .4543 | .0067 | .0455 |
| 84. | .3972 | .0052 | .0261 | .3855 | .0052 | .0278 |
| 86. | .3014 | .0035 | .0122 | .2934 | .0035 | .0131 |
| 88. | .1732 | .0016 | .0029 | .1693 | .0017 | .0032 |

| KL=1.50 | | | | | | |
|---|---|---|---|---|---|---|
| 00. | .7629 | .0100 | .1793 | .7577 | .0097 | .1701 |
| 10. | .7648 | .0100 | .1774 | .7593 | .0097 | .1684 |
| 20. | .7704 | .0098 | .1719 | .7640 | .0096 | .1639 |
| 30. | .7787 | .0096 | .1629 | .7706 | .0094 | .1565 |
| 40. | .7877 | .0093 | .1505 | .7772 | .0092 | .1462 |
| 45. | .7912 | .0091 | .1429 | .7791 | .0090 | .1399 |
| 50. | .7927 | .0088 | .1342 | .7789 | .0087 | .1327 |
| 55. | .7910 | .0085 | .1241 | .7751 | .0084 | .1242 |
| 60. | .7837 | .0081 | .1122 | .7658 | .0080 | .1138 |
| 65. | .7671 | .0075 | .0976 | .7474 | .0075 | .1005 |
| 70. | .7350 | .0067 | .0793 | .7144 | .0068 | .0831 |
| 72. | .7156 | .0063 | .0708 | .6951 | .0064 | .0747 |
| 74. | .6909 | .0058 | .0617 | .6708 | .0059 | .0654 |
| 76. | .6595 | .0053 | .0520 | .6402 | .0054 | .0555 |
| 78. | .6196 | .0048 | .0419 | .6017 | .0049 | .0449 |
| 80. | .5688 | .0041 | .0317 | .5526 | .0042 | .0343 |
| 82. | .5039 | .0034 | .0220 | .4901 | .0035 | .0239 |
| 84. | .4208 | .0026 | .0132 | .4100 | .0027 | .0145 |
| 86. | .3144 | .0018 | .0061 | .3070 | .0018 | .0067 |
| 88. | .1773 | .0008 | .0015 | .1737 | .0008 | .0016 |

| KL=2.00 | n=1.52 | | | n=1.62 | | |
|---|---|---|---|---|---|---|
| θ | $A_1^*$ | $A_2^*$ | T* | $A_1^*$ | $A_2^*$ | T* |
| 00. | .8407 | .0061 | .1087 | .8326 | .0059 | .1031 |
| 10. | .8422 | .0060 | .1072 | .8338 | .0058 | .1018 |
| 20. | .8465 | .0059 | .1029 | .8374 | .0057 | .0983 |
| 30. | .8526 | .0057 | .0959 | .8421 | .0056 | .0925 |
| 40. | .8581 | .0054 | .0866 | .8457 | .0053 | .0848 |
| 45. | .8592 | .0052 | .0812 | .8457 | .0051 | .0802 |
| 50. | .8580 | .0050 | .0752 | .8430 | .0049 | .0752 |
| 55. | .8528 | .0047 | .0685 | .8362 | .0047 | .0695 |
| 60. | .8409 | .0044 | .0610 | .8229 | .0044 | .0629 |
| 65. | .8184 | .0040 | .0523 | .7992 | .0041 | .0550 |
| 70. | .7785 | .0035 | .0420 | .7588 | .0036 | .0449 |
| 72. | .7552 | .0033 | .0373 | .7357 | .0034 | .0402 |
| 74. | .7263 | .0031 | .0323 | .7073 | .0032 | .0351 |
| 76. | .6902 | .0028 | .0271 | .6721 | .0029 | .0297 |
| 78. | .6453 | .0025 | .0218 | .6284 | .0026 | .0240 |
| 80. | .5892 | .0021 | .0164 | .5740 | .0022 | .0182 |
| 82. | .5190 | .0018 | .0114 | .5060 | .0019 | .0127 |
| 84. | .4306 | .0014 | .0068 | .4205 | .0014 | .0076 |
| 86. | .3196 | .0009 | .0031 | .3125 | .0009 | .0035 |
| 88. | .1789 | .0004 | .0007 | .1754 | .0004 | .0009 |

DIFFUSE RADIATION

| | n=1.52 | | | n=1.62 | | |
|---|---|---|---|---|---|---|
| KL | $A_1^*$ | $A_2^*$ | T* | $A_1^*$ | $A_2^*$ | T* |
| .05 | .0607 | .0426 | .6231 | .0601 | .0411 | .5988 |
| .10 | .1148 | .0399 | .5877 | .1135 | .0385 | .5649 |
| .15 | .1637 | .0374 | .5546 | .1618 | .0362 | .5333 |
| .20 | .2084 | .0352 | .5236 | .2060 | .0341 | .5037 |
| .30 | .2874 | .0312 | .4672 | .2839 | .0302 | .4499 |
| .40 | .3550 | .0277 | .4172 | .3504 | .0269 | .4022 |
| .60 | .4640 | .0220 | .3334 | .4575 | .0212 | .3222 |
| .80 | .5470 | .0175 | .2669 | .5389 | .0171 | .2585 |
| 1.00 | .6110 | .0140 | .2139 | .6016 | .0137 | .2076 |
| 1.50 | .7161 | .0080 | .1233 | .7046 | .0079 | .1204 |
| 2.00 | .7742 | .0046 | .0713 | .7616 | .0045 | .0700 |

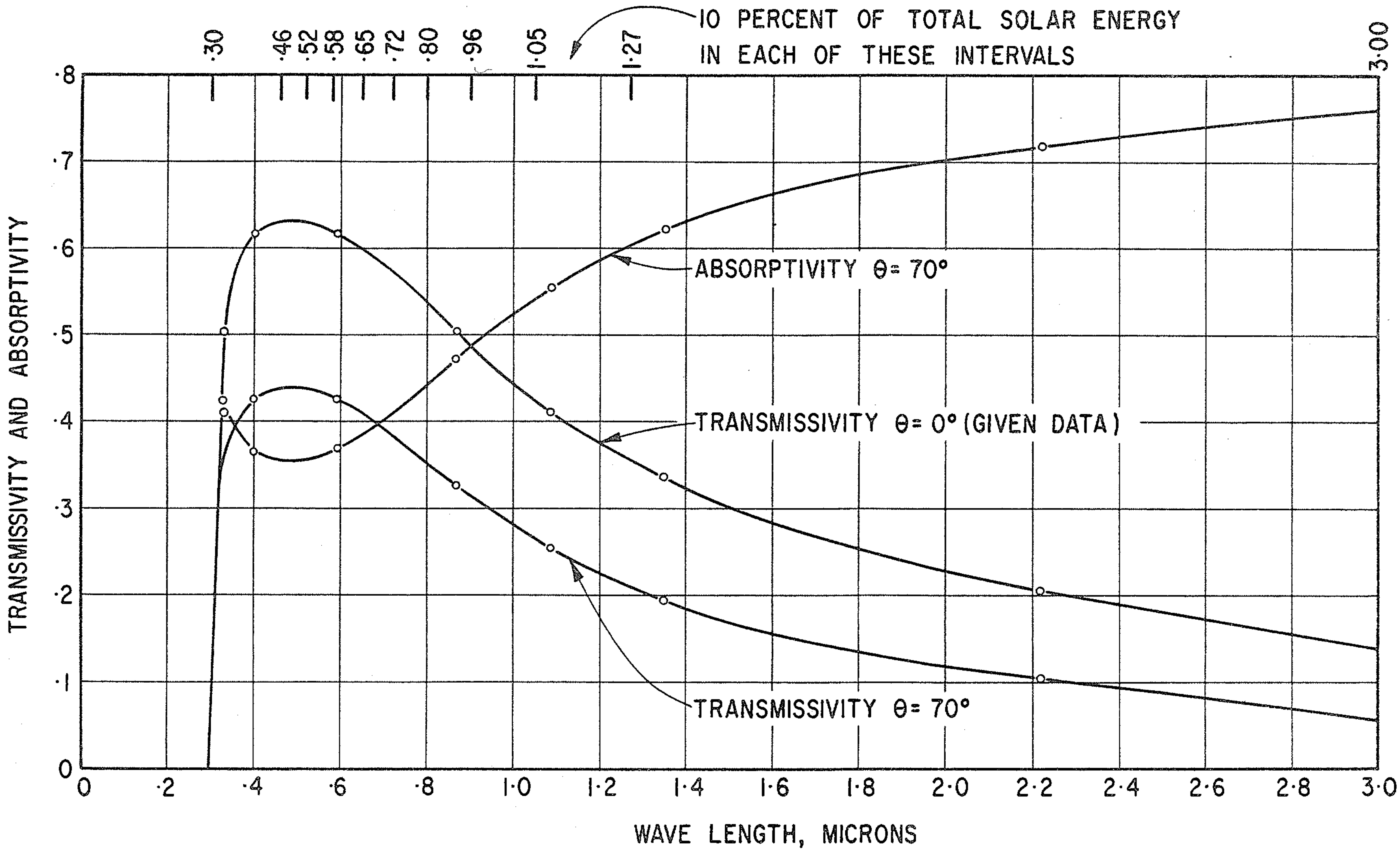


FIGURE 1

MONOCHROMATIC TRANSMISSIVITY & ABSORPTIVITY VERSUS WAVE LENGTH FOR SINGLE PANE WINDOW

BR. 2687