# THERMAL LOSSES
*Thermal Losses Calculations*

**Employer**          :
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**Project**           :
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**Location**          :
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**Date**              :
**Project Manager**   :
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**Notes**             :
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## 1. INTRODUCTION

This study is based upon the DIN 4701 methodology. Furthermore, the following literature was also used:

*i) Erlaeterungen zur DIN 4701/77, mit Beispielen, Werner-Verlag*
*ii) Recknagel-Sprenger, Taschenbuch fuer Heizung und Klimatechnik,*
*iii) Rietschel, Raiss, Heiz und Klimatechnik, Springer-Verlag*

## 2. ASSUMPTIONS & RULES OF CALCULATION

Based upon DIN 4701, the thermal losses of a given space (room) consist of:

**i)** Losses due to thermal conductivity $Q_o$ from the surrounding building elements (walls, openings, floors, roofs, etc.).
**ii)** Increment.
**iii)** Space ventilation losses $Q_L$.

**i)** The thermal conductivity losses are calculated using the following equation:

$$Q_o = k*f*(t_i-t_a) = \frac{f*(t_i-t_a)}{1/k}$$

where:

$Q_o$     : Heating loss (W or Kcal/h)
$f$       : Surface of building element ($m^2$)
$k$      : Coefficient of thermal conduction ($W/m^2\ K$ or $Kcal/m^2\ h\ °C$)
$1/k$   : Resistance of thermal conductivity
$t_i$      : Space temperature ($°C$)
$t_a$      : External air temperature ($°C$)

**ii)** The increments are calculated in % and are distinguished in:

**ii1)** increment $Z_H$ due to orientation:
$Z_H=-5$ for S, SW, SE, $Z_H=+5$ for N, NW, NE and $Z_H=0$ for W and E.

**ii2)** increment $Z_U+Z_A=Z_D$ for the shut-down period and cold outer walls. The $Z_D$ increment is calculated using the equation D= $Q_o/(F_{ges}$ x Δt) where $F_{ges}$ is the total surface area that surrounds the space and the shut-down operation period according to the following table:

| $Z_D$ for DIN77 | | | |
|---|---|---|---|
| | Value of D | | |
| *Operation time shut-down hours per day* | *0.1-0.29* | *0.30-0.69* | *0.70-1.49* |
| *0* | 7 | 7 | 7 |
| *8-12* | 20 | 15 | 15 |
| *12-16* | 30 | 25 | 20 |

**iii)** Thermal losses $Q_L$ due to ventilation are calculated alternatively:

**iii1)** from the equation that computes the necessary ventilation:

$Q_L = V$ x ρ x c $(t_i - t_a)$     (W or Kcal/h)

where:

$V$      : Volume of incoming air ($m^3/s$)
$c$      : Air specific heat (Kj/g K)
ρ      : Air density ($kg/m^3$)

**iii2)** from the equation that computes losses due to opening slots (only in the case where there is no forced ventilation):

$Q_L = \Sigma \, QA_i,$

where:

$QA_i = \alpha \times \Sigma l \times R \times H \times \Delta t \times Z_\Gamma$ for every opening.

The parameters of the above equation are:

α      : Coefficient of air penetration
**Σ**l    : Total opening perimeter, (m)
R      : Coefficient of discernment
H      : Coefficient of location and wind-fall
Δt     : Temperature difference (ºC)
$Z_\Gamma$     : Coefficient of corner openings (in case of opening that is located in a corner, $Z_\Gamma$ takes the value of 1.2 instead of the normal value of 1)

**iv)** The total value of thermal heat losses is the sum of $Q_T$ and $Q_L$, namely:

$Q_{tot} = Q_T + Q_L$   (W or Kcal/h)


## 3. PRESENTATION OF RESULTS

The computed results are presented in a table form as follows:

**i)** In the upper part of the table the building elements that have heat losses due to thermal heat conductivity are presented with their characteristics. The table columns correspond to the following data:

- Surface Type (e.g. **W**=wall, **O**=opening, **C**=ceiling **F**=floor)
- Orientation
- Thickness
- Length
- Height or Width
- Surface area
- Number of equal surfaces
- Total surface area
- Subtracted surface area
- Calculated surface area
- U-factor coefficient
- Temperature difference
- Net Thermal Heat Losses

**ii)** In the lowest part of the table the increments as well as the losses due to ventilation are filled in, in detail.

Building Parameters

| City | Thessaloniki |
|---|---|
| Design External Temperature (°C) | -1.8 |
| Desired Indoor Temperature (°C) | 20 |
| Not Heated Spaces Temperature (°C) | 10 |
| Soil Temperature (°C) | 10 |
| Number of Levels (Floors) (1-99) | 3 |
| Floor on the Ground Level | 1 |
| Calculation Method | DIN77 |
| Energy Units | Watt |

Structural Elements - Outer Walls

| Outer Walls | Description | Outer Walls U Factor (Watt/m²K) |
|---|---|---|
| W1 | Outer Wall -4 cm insulation | 0.45 |
| W2 | Outer Wall 10 | 0.45 |

Structural Elements - Inner Walls

| Inner Walls | Description | Inner walls U Factor (Watt/m²K) |
|---|---|---|
| I1 | Inner Wall 15cm | 1 |

Structural Elements - Ceilings

| Ceilings | Description | Ceilings U Factor (Watt/m²K) |
|---|---|---|
| C1 | Roof 1 | 0.4 |

Structural Elements - Floors

| Floors | Description | Floors U Factor (Watt/m²K) |
|---|---|---|
| F1 | Floor 5 | 0.8 |

Structural Elements - Openings

| Openings | Description | Width (m) | Height (m) | Openings U Factor (Watt/m²K) | Coeff.a | Sheets |
|---|---|---|---|---|---|---|
| O1 | D.Glass 12 mm Air Space (W.Fr) | | | 2.6 | 1.5 | 2 |
| O2 | Opening without Glass (Wood.) | | | 2.6 | 1.5 | 1 |

Level : Isogeio   Space : 1
Space Name XI.1

| Surface Type | Orientation | Subtracted | Thicknness | Length (m) | Height or Width (m) | Surface (m2) | Equal Surface Number | Total Surface (m2) | Subtracted Area (m2) | Calculated Surface (m2) | U-Factor (Watt/m² K) | Temperature Difference (°C) | Thermal Losses ( Watt ) |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| W1 | S |   |   | 10.8 | 3.4 | 36.72 | 1 | 36.72 | 26.04 | 10.68 | 0.45 | 21.80 | 104.8 |
| W2 | S | S |   | 10.8 | 0.4 | 4.32 | 1 | 4.32 |   | 4.32 | 0.45 | 21.80 | 42.38 |
| W2 | S | S |   | 1.6 | 3 | 4.80 | 1 | 4.80 |   | 4.80 | 0.45 | 21.80 | 47.09 |
| O1 | S | s |   | 3 | 1.8 | 5.40 | 1 | 5.40 |   | 5.40 | 2.6 | 21.80 | 306.1 |
| O1 | S | s |   | 3.2 | 1.8 | 5.76 | 2 | 11.52 |   | 11.52 | 2.6 | 21.80 | 653.0 |
| W2 | W |   |   | 7.45 | 3.4 | 25.33 | 1 | 25.33 |   | 25.33 | 0.45 | 21.80 | 248.5 |
| I1 | I |   |   | 7.45 | 3.4 | 25.33 | 1 | 25.33 |   | 25.33 | 1 | 10.00 | 253.3 |
| F1 | I |   |   | 10.8 | 7.45 | 80.46 | 1 | 80.46 |   | 80.46 | 0.8 | 10.00 | 643.7 |

Losses due Building Elements             2299

Total Increment ZD+ZH =        20 %     460
Increment due to Orientation =        -5
Increment due to shut-down period =        25
$D = Q_o / (F_{ges} \times \Delta t) = 2299 / (253.2 \times 22) = 0.42$

TOTAL HEAT TRANSFER LOSSES $Q_T = Q_o \times (1 + ZD + ZH)$        2759

LOSSES DUE TO OPENINGS SLOTS $Q_L = SQ_{Ai} (QA_i = a \times Sl \times R \times H \times Dt \times Zc) =$      718.8
Characteristic Building Number H =        0.6
Characteristic Space Number R (or r) =        0.9
Coefficient of Corner Openings ZC =        1

LOSSES DUE TO AIR CHANGES $Q_L = V \times r \times c \times Dt =$        3529
Space Volume V = 10.35x6.90x3.2=        229
Air Changes Number per hour n =        2.1

TOTAL THERMAL LOSSES $Q_{tot} = Q_T + Q_L =$        7006

Level : Isogeio    Space : 2
Space Name XI.4

| Surface Type | Orientation | Subtracted | Thicknness | Length (m) | Height or Width (m) | Surface (m2) | Equal Surface Number | Total Surface (m2) | Subtracted Area (m2) | Calculated Surface (m2) | U-Factor (Watt/m² K) | Temperature Difference (°C) | Thermal Losses ( Watt ) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| W1 | S |   |   | 3.8 | 3.4 | 12.92 | 1 | 12.92 | 9.68 | 3.24 | 0.45 | 21.80 | 31.78 |
| W2 | S | S |   | 3.8 | 0.4 | 1.52 | 1 | 1.52 |   | 1.52 | 0.45 | 21.80 | 14.91 |
| W2 | S | S |   | 0.8 | 3.0 | 2.40 | 1 | 2.40 |   | 2.40 | 0.45 | 21.80 | 23.54 |
| O1 | S | s |   | 3.2 | 1.80 | 5.76 | 1 | 5.76 |   | 5.76 | 2.6 | 21.80 | 326.5 |
| I1 | I |   |   | 7.45 | 3.4 | 25.33 | 1 | 25.33 |   | 25.33 | 1 | 10.00 | 253.3 |
| F1 | I |   |   | 7.45 | 7.3 | 54.39 | 1 | 54.39 |   | 54.39 | 0.8 | 10.00 | 435.1 |

Losses due Building Elements                                                                    1085

Total Increment ZD+ZH =                                                        25 %        271
Increment due to Orientation =                                                 -5
Increment due to shut-down period =                                            30
D=Qo/(Fges x Δt)=   1085/ ( 203.2 x  22) = 0.24

TOTAL HEAT TRANSFER LOSSES QT=Qo x (1+ZD+ZH)                                               1356

LOSSES DUE TO OPENINGS SLOTS QL=SQAi (QAi=axSlxRxHxDtxZc) =                                 242.3
Characteristic Building Number H =                                             0.6
Characteristic Space Number R (or r) =                                        0.9
Coefficient of Corner Openings ZC =                                           1

LOSSES DUE TO AIR CHANGES QL=VxrxcxDt =                                                    4351
Space Volume V = 7.45x7.3x3.2=                                                 174
Air Changes Number per hour n =                                               3.4

TOTAL THERMAL LOSSES Qtot = QT + QL =                                                      5950

Level : Isogeio    Space : 3
Space Name XI.5

| Surface Type | Orientation | Subtracted | Thicknness | Length (m) | Height or Width (m) | Surface (m2) | Equal Surface Number | Total Surface (m2) | Subtracted Area (m2) | Calculated Surface (m2) | U-Factor (Watt/m² K) | Temperature Difference (°C) | Thermal Losses ( Watt ) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| W1 | E |   |   | 7.45 | 3.4 | 25.33 | 1 | 25.33 | 18.10 | 7.23 | 0.45 | 21.80 | 70.93 |
| W2 | E | S |   | 7.45 | 0.4 | 2.98 | 1 | 2.98 |   | 2.98 | 0.45 | 21.80 | 29.23 |
| W2 | E | S |   | 1.2 | 3 | 3.60 | 1 | 3.60 |   | 3.60 | 0.45 | 21.80 | 35.32 |
| O1 | E | s |   | 3.2 | 1.8 | 5.76 | 2 | 11.52 |   | 11.52 | 2.6 | 21.80 | 653.0 |
| F1 | I |   |   | 7.45 | 7.1 | 52.89 | 1 | 52.89 |   | 52.89 | 0.8 | 10.00 | 423.1 |

Losses due Building Elements                                                                              1212

Total Increment ZD+ZH =                                                               30 %            363
Increment due to Orientation =                                                          0
Increment due to shut-down period =                                                    30
D=Qo/(Fges x Δt)=   1212/ ( 198.9 x  22) = 0.28

TOTAL HEAT TRANSFER LOSSES QT=Qo x (1+ZD+ZH)                                                 1575

LOSSES DUE TO OPENINGS SLOTS QL=SQAi (QAi=axSlxRxHxDtxZc) =                                   484.7
Characteristic Building Number H =                                                      0.6
Characteristic Space Number R (or r) =                                                  0.9
Coefficient of Corner Openings ZC =                                                     1

LOSSES DUE TO AIR CHANGES QL=VxrxcxDt =                                                      4231
Space Volume V = 7.45x7.1x3.2=                                                          169
Air Changes Number per hour n =                                                        3.4

TOTAL THERMAL LOSSES Qtot = QT + QL =                                                        6291

Level : Isogeio    Space : 4
Space Name XI.6

| Surface Type | Orientation | Subtracted | Thicknness | Length (m) | Height or Width (m) | Surface (m2) | Equal Surface Number | Total Surface (m2) | Subtracted Area (m2) | Calculated Surface (m2) | U-Factor (Watt/m² K) | Temperature Difference (°C) | Thermal Losses ( Watt ) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| W1 | W |   |   | 7.6 | 3.4 | 25.84 | 1 | 25.84 | 19.56 | 6.28 | 0.45 | 21.80 | 61.61 |
| W2 | W | S |   | 7.6 | 0.4 | 3.04 | 1 | 3.04 |   | 3.04 | 0.45 | 21.80 | 29.82 |
| W2 | W | S |   | 2.8 | 3 | 8.40 | 1 | 8.40 |   | 8.40 | 0.45 | 21.80 | 82.40 |
| O1 | W | s |   | 1.4 | 1.8 | 2.52 | 1 | 2.52 |   | 2.52 | 2.6 | 21.80 | 142.8 |
| O2 | W | s |   | 2 | 2.8 | 5.60 | 1 | 5.60 |   | 5.60 | 2.6 | 21.80 | 317.4 |
| I1 | I |   |   | 4 | 3.4 | 13.60 | 1 | 13.60 | 3.08 | 10.52 | 1 | 10.00 | 105.2 |
| O2 | I | s |   | 1.1 | 2.8 | 3.08 | 1 | 3.08 |   | 3.08 | 2.6 | 10.00 | 80.08 |
| I1 | I |   |   | 3.2 | 3.4 | 10.88 | 1 | 10.88 | 5.36 | 5.52 | 1 | 10.00 | 55.20 |
| O2 | I | s |   | 1.1 | 2.8 | 3.08 | 1 | 3.08 |   | 3.08 | 2.6 | 10.00 | 80.08 |
| O1 | I | s |   | 1.9 | 1.2 | 2.28 | 1 | 2.28 |   | 2.28 | 2.6 | 10.00 | 59.28 |
| F1 | I |   |   | 7.6 | 7.2 | 54.72 | 1 | 54.72 |   | 54.72 | 0.8 | 10.00 | 437.8 |

Losses due Building Elements                                                                                 1452

Total Increment ZD+ZH =                                                                        25 %           363
Increment due to Orientation =                                                                    0
Increment due to shut-down period =                                                              25
D=Qo/(Fges x Δt)=   1452/ ( 204.2 x  22) = 0.33

TOTAL HEAT TRANSFER LOSSES QT=Qo x (1+ZD+ZH)                                                             1815

LOSSES DUE TO OPENINGS SLOTS QL=SQAi (QAi=axSlxRxHxDtxZc) =                                               365.5
Characteristic Building Number H =                                                               0.6
Characteristic Space Number R (or r) =                                                           0.9
Coefficient of Corner Openings ZC =                                                               1

LOSSES DUE TO AIR CHANGES QL=VxrxcxDt =                                                                  9012
Space Volume V = 7.6x7.2x3.2=                                                                    175
Air Changes Number per hour n =                                                                   7

TOTAL THERMAL LOSSES Qtot = QT + QL =                                                                    11192

Level : Isogeio    Space : 5
Space Name XI.7

| Surface Type | Orientation | Subtracted | Thicknness | Length (m) | Height or Width (m) | Surface (m2) | Equal Surface Number | Total Surface (m2) | Subtracted Area (m2) | Calculated Surface (m2) | U-Factor (Watt/m² K) | Temperature Difference (°C) | Thermal Losses ( Watt ) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| W1 | S |   |   | 3.8 | 3.4 | 12.92 | 1 | 12.92 | 9.68 | 3.24 | 0.45 | 21.80 | 31.78 |
| W2 | S | S |   | 3.8 | 0.4 | 1.52 | 1 | 1.52 |   | 1.52 | 0.45 | 21.80 | 14.91 |
| W2 | S | S |   | 0.8 | 3 | 2.40 | 1 | 2.40 |   | 2.40 | 0.45 | 21.80 | 23.54 |
| O1 | S | s |   | 3.2 | 1.8 | 5.76 | 1 | 5.76 |   | 5.76 | 2.6 | 21.80 | 326.5 |
| W1 | W |   |   | 3.8 | 3.4 | 12.92 | 1 | 12.92 | 10.64 | 2.28 | 0.45 | 21.80 | 22.37 |
| W2 | W | S |   | 3.8 | 0.4 | 1.52 | 1 | 1.52 |   | 1.52 | 0.45 | 21.80 | 14.91 |
| W2 | W | S |   | 2.2 | 3 | 6.60 | 1 | 6.60 |   | 6.60 | 0.45 | 21.80 | 64.75 |
| O1 | W | s |   | 1.4 | 1.8 | 2.52 | 1 | 2.52 |   | 2.52 | 2.6 | 21.80 | 142.8 |
| I1 | I |   |   | 3.8 | 3.4 | 12.92 | 1 | 12.92 |   | 12.92 | 1 | 10.00 | 129.2 |
| F1 | I |   |   | 3.8 | 3.8 | 14.44 | 1 | 14.44 |   | 14.44 | 0.8 | 10.00 | 115.5 |

Losses due Building Elements                                                                                        886

Total Increment ZD+ZH =                                                                          20 %          177
Increment due to Orientation =                                                                   -5
Increment due to shut-down period =                                                           25
D=Qo/(Fges x Δt)=    886/ ( 77.5 x  22) = 0.52

TOTAL HEAT TRANSFER LOSSES QT=Qo x (1+ZD+ZH)                                                  1064

LOSSES DUE TO OPENINGS SLOTS QL=SQAi (QAi=axSlxRxHxDtxZc) =                    410.7
Characteristic Building Number H =                                                               0.6
Characteristic Space Number R (or r) =                                                           0.9
Coefficient of Corner Openings ZC =                                                               1

LOSSES DUE TO AIR CHANGES QL=VxrxcxDt =                                                       339.7
Space Volume V = 3.8x3.8x3.2=                                                                      46
Air Changes Number per hour n =                                                                   1

TOTAL THERMAL LOSSES Qtot = QT + QL =                                                          1814

Level : Isogeio    Space : 6
Space Name XI.11

| Surface Type | Orientation | Subtracted | Thicknness | Length (m) | Height or Width (m) | Surface (m2) | Equal Surface Number | Total Surface (m2) | Subtracted Area (m2) | Calculated Surface (m2) | U-Factor (Watt/m² K) | Temperature Difference (°C) | Thermal Losses ( Watt ) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| W1 | E |   |   | 4 | 3.4 | 13.60 | 1 | 13.60 | 9.76 | 3.84 | 0.45 | 21.80 | 37.67 |
| W2 | E | S |   | 4 | 0.4 | 1.60 | 1 | 1.60 |   | 1.60 | 0.45 | 21.80 | 15.70 |
| W2 | E | S |   | 0.8 | 3 | 2.40 | 1 | 2.40 |   | 2.40 | 0.45 | 21.80 | 23.54 |
| O1 | E | s |   | 3.2 | 1.8 | 5.76 | 1 | 5.76 |   | 5.76 | 2.6 | 21.80 | 326.5 |
| I1 | I |   |   | 3.5 | 3.4 | 11.90 | 1 | 11.90 |   | 11.90 | 1 | 10.00 | 119.0 |
| F1 | I |   |   | 4 | 3.5 | 14.00 | 1 | 14.00 |   | 14.00 | 0.8 | 10.00 | 112.0 |

Losses due Building Elements        634

Total Increment ZD+ZH =       25 %    159
Increment due to Orientation =       0
Increment due to shut-down period =       25
D=Qo/(Fges x Δt)=   634/ ( 76.0 x 22) = 0.38

TOTAL HEAT TRANSFER LOSSES QT=Qo x (1+ZD+ZH)      793

LOSSES DUE TO OPENINGS SLOTS QL=SQAi (QAi=axSlxRxHxDtxZc) =    242.3
Characteristic Building Number H =      0.6
Characteristic Space Number R (or r) =      0.9
Coefficient of Corner Openings ZC =      1

LOSSES DUE TO AIR CHANGES QL=VxrxcxDt =      1812
Space Volume V = 4x3.5x3.2=      45
Air Changes Number per hour n =      5.5

TOTAL THERMAL LOSSES Qtot = QT + QL =      2847

Level : Isogeio    Space : 7
Space Name XI.12

| Surface Type | Orientation | Subtracted | Thickness | Length (m) | Height or Width (m) | Surface (m2) | Equal Surface Number | Total Surface (m2) | Subtracted Area (m2) | Calculated Surface (m2) | U-Factor (Watt/m² K) | Temperature Difference (°C) | Thermal Losses ( Watt ) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| W1 | E |   |   | 4.1 | 3.4 | 13.94 | 1 | 13.94 | 11.72 | 2.22 | 0.45 | 21.80 | 21.78 |
| W2 | E | S |   | 4.1 | 0.4 | 1.64 | 1 | 1.64 |   | 1.64 | 0.45 | 21.80 | 16.09 |
| W2 | E | S |   | 2.4 | 3 | 7.20 | 1 | 7.20 |   | 7.20 | 0.45 | 21.80 | 70.63 |
| O1 | E | s |   | 1.6 | 1.8 | 2.88 | 1 | 2.88 |   | 2.88 | 2.6 | 21.80 | 163.2 |
| F1 | I |   |   | 4.1 | 7.1 | 29.11 | 1 | 29.11 |   | 29.11 | 0.8 | 10.00 | 232.9 |

Losses due Building Elements                                                                                  505

Total Increment ZD+ZH =                                                                              30 %      151
Increment due to Orientation =                                                                         0
Increment due to shut-down period =                                                                   30
D=Qo/(Fges x Δt)=    505/ ( 129.9 x  22) = 0.18

TOTAL HEAT TRANSFER LOSSES QT=Qo x (1+ZD+ZH)                                                      656

LOSSES DUE TO OPENINGS SLOTS QL=SQAi (QAi=axSlxRxHxDtxZc) =                                      176.6
Characteristic Building Number H =                                                                0.6
Characteristic Space Number R (or r) =                                                            0.9
Coefficient of Corner Openings ZC =                                                                 1

LOSSES DUE TO AIR CHANGES QL=VxrxcxDt =                                                          3767
Space Volume V = 4.1x7.1x3.2=                                                                      93
Air Changes Number per hour n =                                                                   5.5

TOTAL THERMAL LOSSES Qtot = QT + QL =                                                            4600

Level : Isogeio    Space : 8
Space Name XI.13

| Surface Type | Orientation | Subtracted | Thicknness | Length (m) | Height or Width (m) | Surface (m2) | Equal Surface Number | Total Surface (m2) | Subtracted Area (m2) | Calculated Surface (m2) | U-Factor (Watt/m² K) | Temperature Difference (°C) | Thermal Losses ( Watt ) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| W1 | E |   |   | 18.2 | 3.4 | 61.88 | 1 | 61.88 | 48.58 | 13.30 | 0.45 | 21.80 | 130.5 |
| W2 | E | S |   | 18.2 | 0.4 | 7.28 | 1 | 7.28 |   | 7.28 | 0.45 | 21.80 | 71.42 |
| W2 | E | S |   | 7.1 | 3 | 21.30 | 1 | 21.30 |   | 21.30 | 0.45 | 21.80 | 209.0 |
| O1 | E | s |   | 1.6 | 1.8 | 2.88 | 3 | 8.64 |   | 8.64 | 2.6 | 21.80 | 489.7 |
| O1 | E | s |   | 3.2 | 1.8 | 5.76 | 1 | 5.76 |   | 5.76 | 2.6 | 21.80 | 326.5 |
| O2 | E | s |   | 2 | 2.8 | 5.60 | 1 | 5.60 |   | 5.60 | 2.6 | 21.80 | 317.4 |
| W2 | N |   |   | 11.2 | 3.4 | 38.08 | 1 | 38.08 |   | 38.08 | 0.45 | 21.80 | 373.6 |
| W1 | W |   |   | 14.5 | 3.4 | 49.30 | 1 | 49.30 | 37.72 | 11.58 | 0.45 | 21.80 | 113.6 |
| W2 | W | S |   | 14.5 | 0.4 | 5.80 | 1 | 5.80 |   | 5.80 | 0.45 | 21.80 | 56.90 |
| W2 | W | S |   | 6.8 | 3 | 20.40 | 1 | 20.40 |   | 20.40 | 0.45 | 21.80 | 200.1 |
| O1 | W | s |   | 3.2 | 1.8 | 5.76 | 2 | 11.52 |   | 11.52 | 2.6 | 21.80 | 653.0 |
| I1 | I |   |   | 4.5 | 3.4 | 15.30 | 1 | 15.30 |   | 15.30 | 1 | 10.00 | 153.0 |
| F1 | I |   |   | 18.2 | 4.7 | 85.54 | 1 | 85.54 |   | 85.54 | 0.8 | 10.00 | 684.3 |
| F1 | I |   |   | 15.7 | 2.3 | 36.11 | 1 | 36.11 |   | 36.11 | 0.8 | 10.00 | 288.9 |
| F1 | I |   |   | 13.9 | 4 | 55.60 | 1 | 55.60 |   | 55.60 | 0.8 | 10.00 | 444.8 |

Losses due Building Elements                                                   4513

Total Increment ZD+ZH =                                       30 %       1354
Increment due to Orientation =                                  5
Increment due to shut-down period =                          25
$D = Q_o / (F_{ges} \times \Delta t) = 4513/ ( 595.8 \times 22) = 0.35$

TOTAL HEAT TRANSFER LOSSES $Q_T = Q_o \times (1+ZD+ZH)$                 5867

LOSSES DUE TO OPENINGS SLOTS $Q_L = SQA_i$ ($QA_i = a \times Sl \times R \times H \times Dt \times Z_c$) =     1454
Characteristic Building Number H =                                0.6
Characteristic Space Number R (or r) =                         0.9
Coefficient of Corner Openings ZC =                           1

LOSSES DUE TO AIR CHANGES $Q_L = V \times r \times c \times Dt$ =                        41245
Space Volume V = 18.2x11.2x3.2=                              652
Air Changes Number per hour n =                             8.6

TOTAL THERMAL LOSSES $Q_{tot} = Q_T + Q_L$ =                           48566

Level : Isogeio    Space : 9
Space Name XI.14

| Surface Type | Orientation | Subtracted | Thicknness | Length (m) | Height or Width (m) | Surface (m2) | Equal Surface Number | Total Surface (m2) | Subtracted Area (m2) | Calculated Surface (m2) | U-Factor (Watt/m² K) | Temperature Difference (°C) | Thermal Losses ( Watt ) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| W1 | N |   |   | 7.6 | 3.4 | 25.84 | 1 | 25.84 | 18.16 | 7.68 | 0.45 | 21.80 | 75.34 |
| W2 | N | S |   | 7.6 | 0.4 | 3.04 | 1 | 3.04 |   | 3.04 | 0.45 | 21.80 | 29.82 |
| W2 | N | S |   | 1.2 | 3 | 3.60 | 1 | 3.60 |   | 3.60 | 0.45 | 21.80 | 35.32 |
| O1 | N | s |   | 3.2 | 1.8 | 5.76 | 2 | 11.52 |   | 11.52 | 2.6 | 21.80 | 653.0 |
| I1 | I |   |   | 7.2 | 3.4 | 24.48 | 1 | 24.48 | 9.24 | 15.24 | 1 | 10.00 | 152.4 |
| O2 | I | s |   | 1.1 | 2.8 | 3.08 | 3 | 9.24 |   | 9.24 | 2.6 | 10.00 | 240.2 |
| F1 | I |   |   | 14.4 | 3.6 | 51.84 | 1 | 51.84 |   | 51.84 | 0.8 | 10.00 | 414.7 |

Losses due Building Elements                                                    1601

Total Increment ZD+ZH =                                              30 %        480
Increment due to Orientation =                                         5
Increment due to shut-down period =                                   25
D=Qo/(Fges x Δt)=   1601/ ( 218.9 x  22) = 0.34

TOTAL HEAT TRANSFER LOSSES QT=Qo x (1+ZD+ZH)                                    2081

LOSSES DUE TO OPENINGS SLOTS QL=SQAi (QAi=axSlxRxHxDtxZc) =                      484.7
Characteristic Building Number H =                                   0.6
Characteristic Space Number R (or r) =                               0.9
Coefficient of Corner Openings ZC =                                    1

LOSSES DUE TO AIR CHANGES QL=VxrxcxDt =                                          975.8
Space Volume V = 14.4x3.6x3.2=                                       166
Air Changes Number per hour n =                                      0.8

TOTAL THERMAL LOSSES Qtot = QT + QL =                                           3542

Level : Isogeio    Space : 10
Space Name XI.15

| Surface Type | Orientation | Subtracted | Thicknness | Length (m) | Height or Width (m) | Surface (m2) | Equal Surface Number | Total Surface (m2) | Subtracted Area (m2) | Calculated Surface (m2) | U-Factor (Watt/m² K) | Temperature Difference (°C) | Thermal Losses ( Watt ) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| I1 | I | | | 2.3 | 3.4 | 7.82 | 1 | 7.82 | 6.50 | 1.32 | 1 | 10.00 | 13.20 |
| O2 | I | s | | 1.1 | 2.2 | 2.42 | 1 | 2.42 | | 2.42 | 2.6 | 10.00 | 62.92 |
| W2 | I | S | | 1.2 | 3.4 | 4.08 | 1 | 4.08 | | 4.08 | 0.45 | 10.00 | 18.36 |
| F1 | I | | | 11.3 | 3.6 | 40.68 | 1 | 40.68 | | 40.68 | 0.8 | 10.00 | 325.4 |

Losses due Building Elements                                          420

Total Increment ZD+ZH =                                       30 %       126
Increment due to Orientation =                                     0
Increment due to shut-down period =                            30
$D=Q_o/(F_{ges} \times \Delta t)=$    420/ ( 176.7 x  22) = 0.11

TOTAL HEAT TRANSFER LOSSES $Q_T=Q_o \times (1+ZD+ZH)$                546

LOSSES DUE TO OPENINGS SLOTS $Q_L=SQ_{Ai}$ $(QA_i=a \times Sl \times R \times H \times Dt \times Zc) =$
Characteristic Building Number H =                                   0.6
Characteristic Space Number R (or r) =                            0.9
Coefficient of Corner Openings ZC =                              1

LOSSES DUE TO AIR CHANGES $Q_L=V \times r \times c \times Dt =$                  765.7
Space Volume V = 11.3x3.6x3.2=                                130
Air Changes Number per hour n =                               0.8

TOTAL THERMAL LOSSES $Q_{tot} = Q_T + Q_L =$                        1312

Level : Isogeio    Space : 11
Space Name XI.16

| Surface Type | Orientation | Subtracted | Thicknness | Length (m) | Height or Width (m) | Surface (m2) | Equal Surface Number | Total Surface (m2) | Subtracted Area (m2) | Calculated Surface (m2) | U-Factor (Watt/m² K) | Temperature Difference (°C) | Thermal Losses ( Watt ) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| W1 | W | | | 2.8 | 3.4 | 9.52 | 1 | 9.52 | 4.64 | 4.88 | 0.45 | 21.80 | 47.87 |
| W2 | W | S | | 2.8 | 0.4 | 1.12 | 1 | 1.12 | | 1.12 | 0.45 | 21.80 | 10.99 |
| W2 | W | S | | 0.8 | 3 | 2.40 | 1 | 2.40 | | 2.40 | 0.45 | 21.80 | 23.54 |
| O1 | W | s | | 1.4 | 0.8 | 1.12 | 1 | 1.12 | | 1.12 | 2.6 | 21.80 | 63.48 |
| W1 | N | | | 2.3 | 3.4 | 7.82 | 1 | 7.82 | 4.72 | 3.10 | 0.45 | 21.80 | 30.41 |
| W2 | N | S | | 2.8 | 0.4 | 1.12 | 1 | 1.12 | | 1.12 | 0.45 | 21.80 | 10.99 |
| W2 | N | S | | 0.8 | 3 | 2.40 | 1 | 2.40 | | 2.40 | 0.45 | 21.80 | 23.54 |
| O1 | N | s | | 1.5 | 0.8 | 1.20 | 1 | 1.20 | | 1.20 | 2.6 | 21.80 | 68.02 |
| W1 | NW | | | 7.4 | 3.4 | 25.16 | 1 | 25.16 | 23.12 | 2.04 | 0.45 | 21.80 | 20.01 |
| W2 | NW | S | | 7.4 | 0.4 | 2.96 | 1 | 2.96 | | 2.96 | 0.45 | 21.80 | 29.04 |
| O2 | NW | s | | 7.2 | 2.8 | 20.16 | 1 | 20.16 | | 20.16 | 2.6 | 21.80 | 1143 |
| F1 | I | | | 7.6 | 7.2 | 54.72 | 1 | 54.72 | | 54.72 | 0.8 | 10.00 | 437.8 |

Losses due Building Elements                                                           1909

Total Increment ZD+ZH =                          30 %      573
Increment due to Orientation =                    5
Increment due to shut-down period =          25
D=Qo/(Fges x Δt)=   1909/ ( 204.2 x  22) = 0.43

TOTAL HEAT TRANSFER LOSSES QT=Qo x (1+ZD+ZH)              2481

LOSSES DUE TO OPENINGS SLOTS QL=SQAi (QAi=axSlxRxHxDtxZc) =     628.4
Characteristic Building Number H =                  0.6
Characteristic Space Number R (or r) =            0.9
Coefficient of Corner Openings ZC =              1

LOSSES DUE TO AIR CHANGES QL=VxrxcxDt =               1030
Space Volume V = 7.6x7.2x3.2=                  175
Air Changes Number per hour n =               0.8

TOTAL THERMAL LOSSES Qtot = QT + QL =                4140

Level : Isogeio    Space : 12
Space Name XI.18

| Surface Type | Orientation | Subtracted | Thicknness | Length (m) | Height or Width (m) | Surface (m2) | Equal Surface Number | Total Surface (m2) | Subtracted Area (m2) | Calculated Surface (m2) | U-Factor (Watt/m² K) | Temperature Difference (°C) | Thermal Losses ( Watt ) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| W1 | W |   |   | 3.8 | 3.4 | 12.92 | 1 | 12.92 | 7.85 | 5.07 | 0.45 | 21.80 | 49.74 |
| W2 | W | S |   | 3.8 | 0.4 | 1.52 | 1 | 1.52 |   | 1.52 | 0.45 | 21.80 | 14.91 |
| W2 | W | S |   | 0.7 | 3 | 2.10 | 1 | 2.10 |   | 2.10 | 0.45 | 21.80 | 20.60 |
| O2 | W | s |   | 1.8 | 2.35 | 4.23 | 1 | 4.23 |   | 4.23 | 2.6 | 21.80 | 239.8 |
| W1 | N |   |   | 7.4 | 3.4 | 25.16 | 1 | 25.16 | 22.88 | 2.28 | 0.45 | 21.80 | 22.37 |
| W2 | N | S |   | 7.4 | 0.4 | 2.96 | 1 | 2.96 |   | 2.96 | 0.45 | 21.80 | 29.04 |
| W2 | N | S |   | 5.8 | 3 | 17.40 | 1 | 17.40 |   | 17.40 | 0.45 | 21.80 | 170.7 |
| O1 | N | S |   | 1.4 | 1.8 | 2.52 | 1 | 2.52 |   | 2.52 | 2.6 | 21.80 | 142.8 |

Losses due Building Elements                                                                 690

Total Increment ZD+ZH =                                                          35 %       241
Increment due to Orientation =                                                    5
Increment due to shut-down period =                                              30
D=Qo/(Fges x Δt)=    690/ ( 127.9 x  22) = 0.25

TOTAL HEAT TRANSFER LOSSES QT=Qo x (1+ZD+ZH)                                                 931

LOSSES DUE TO OPENINGS SLOTS QL=SQAi (QAi=axSlxRxHxDtxZc) =                                   338.8
Characteristic Building Number H =                                               0.6
Characteristic Space Number R (or r) =                                           0.9
Coefficient of Corner Openings ZC =                                              1

LOSSES DUE TO AIR CHANGES QL=VxrxcxDt =                                                      529.3
Space Volume V = 7.4x3.8x3.2=                                                    90
Air Changes Number per hour n =                                                  0.8

TOTAL THERMAL LOSSES Qtot = QT + QL =                                                        1800

Level : Isogeio    Space : 13
Space Name XI.17

| Surface Type | Orientation | Subtracted | Thicknness | Length (m) | Height or Width (m) | Surface (m2) | Equal Surface Number | Total Surface (m2) | Subtracted Area (m2) | Calculated Surface (m2) | U-Factor (Watt/m² K) | Temperature Difference (°C) | Thermal Losses ( Watt ) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| W1 | E | | | 4 | 3.4 | 13.60 | 1 | 13.60 | 13.38 | 0.22 | 0.45 | 21.80 | 2.16 |
| W2 | E | S | | 4 | 0.4 | 1.60 | 1 | 1.60 | | 1.60 | 0.45 | 21.80 | 15.70 |
| W2 | E | S | | 2.9 | 3 | 8.70 | 1 | 8.70 | | 8.70 | 0.45 | 21.80 | 85.35 |
| O2 | E | s | | 1.1 | 2.8 | 3.08 | 1 | 3.08 | | 3.08 | 2.6 | 21.80 | 174.6 |
| I1 | I | | | 1.8 | 3.4 | 6.12 | 1 | 6.12 | | 6.12 | 1 | 10.00 | 61.20 |

Losses due Building Elements        339

Total Increment ZD+ZH =      30 %    102
Increment due to Orientation =      0
Increment due to shut-down period =      30
D=Qo/(Fges x Δt)=    339/ ( 129.3 x  22) = 0.12

TOTAL HEAT TRANSFER LOSSES QT=Qo x (1+ZD+ZH)      441

LOSSES DUE TO OPENINGS SLOTS QL=SQAi (QAi=axSlxRxHxDtxZc) =      160.2
Characteristic Building Number H =      0.6
Characteristic Space Number R (or r) =      0.9
Coefficient of Corner Openings ZC =      1

LOSSES DUE TO AIR CHANGES QL=VxrxcxDt =      5421
Space Volume V = 7.2x4x3.2=      92
Air Changes Number per hour n =      08

TOTAL THERMAL LOSSES Qtot = QT + QL =      6022

Level : A Orofos    Space : 1
Space Name XA.1

| Surface Type | Orientation | Subtracted | Thickness | Length (m) | Height or Width (m) | Surface (m2) | Equal Surface Number | Total Surface (m2) | Subtracted Area (m2) | Calculated Surface (m2) | U-Factor (Watt/m² K) | Temperature Difference (°C) | Thermal Losses ( Watt ) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| W1 | S |   |   | 11 | 3.4 | 37.40 | 1 | 37.40 | 26.12 | 11.28 | 0.45 | 21.80 | 110.7 |
| W2 | S | S |   | 11 | 0.4 | 4.40 | 1 | 4.40 |   | 4.40 | 0.45 | 21.80 | 43.16 |
| W2 | S | S |   | 1.6 | 3 | 4.80 | 1 | 4.80 |   | 4.80 | 0.45 | 21.80 | 47.09 |
| O1 | S | s |   | 3.2 | 1.8 | 5.76 | 2 | 11.52 |   | 11.52 | 2.6 | 21.80 | 653.0 |
| O1 | S | s |   | 3 | 1.8 | 5.40 | 1 | 5.40 |   | 5.40 | 2.6 | 21.80 | 306.1 |
| W2 | W |   |   | 7.2 | 3.4 | 24.48 | 1 | 24.48 |   | 24.48 | 0.45 | 21.80 | 240.1 |

Losses due Building Elements               1400

Total Increment ZD+ZH =      25 %    350
Increment due to Orientation =      -5
Increment due to shut-down period =      30
$D=Q_o/(F_{ges} \times \Delta t)= 1400/ ( 266.6 \times 22) = 0.24$

TOTAL HEAT TRANSFER LOSSES $Q_T=Q_o \times (1+ZD+ZH)$      1750

LOSSES DUE TO OPENINGS SLOTS $QL=SQA_i (QA_i=a \times Sl \times R \times H \times Dt \times Z_c) =$      718.8
Characteristic Building Number H =      0.6
Characteristic Space Number R (or r) =      0.9
Coefficient of Corner Openings ZC =      1

LOSSES DUE TO AIR CHANGES $QL=V \times r \times c \times Dt =$      6285
Space Volume V = 10.6x7.2x3.2=      244
Air Changes Number per hour n =      3.5

TOTAL THERMAL LOSSES $Q_{tot} = Q_T + Q_L =$      8754

Level : A Orofos    Space : 2
Space Name XA.2

| Surface Type | Orientation | Subtracted | Thicknness | Length (m) | Height or Width (m) | Surface (m2) | Equal Surface Number | Total Surface (m2) | Subtracted Area (m2) | Calculated Surface (m2) | U-Factor (Watt/m² K) | Temperature Difference (°C) | Thermal Losses ( Watt ) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| W1 | S |   |   | 4 | 3.4 | 13.60 | 1 | 13.60 | 11.92 | 1.68 | 0.45 | 21.80 | 16.48 |
| W2 | S | S |   | 4 | 0.4 | 1.60 | 1 | 1.60 |   | 1.60 | 0.45 | 21.80 | 15.70 |
| W2 | S | S |   | 2.6 | 3 | 7.80 | 1 | 7.80 |   | 7.80 | 0.45 | 21.80 | 76.52 |
| O1 | S | s |   | 1.4 | 1.8 | 2.52 | 1 | 2.52 |   | 2.52 | 2.6 | 21.80 | 142.8 |

Losses due Building Elements             252

Total Increment ZD+ZH =           25 %     63
Increment due to Orientation =          -5
Increment due to shut-down period =      30
$D = Qo/(Fges \times \Delta t) = 252/ (89.0 \times 22) = 0.13$

TOTAL HEAT TRANSFER LOSSES $QT = Qo \times (1 + ZD + ZH)$      314

LOSSES DUE TO OPENINGS SLOTS $QL = SQAi (QAi = a \times Sl \times R \times H \times Dt \times Zc) =$      168.4
Characteristic Building Number H =          0.6
Characteristic Space Number R (or r) =       0.9
Coefficient of Corner Openings ZC =        1

LOSSES DUE TO AIR CHANGES $QL = V \times r \times c \times Dt =$      414.1
Space Volume V = 4x4.4x3.2=           56
Air Changes Number per hour n =         1

TOTAL THERMAL LOSSES $Qtot = QT + QL =$      897

Level : A Orofos    Space : 3
Space Name XA.3

| Surface Type | Orientation | Subtracted | Thicknness | Length (m) | Height or Width (m) | Surface (m2) | Equal Surface Number | Total Surface (m2) | Subtracted Area (m2) | Calculated Surface (m2) | U-Factor (Watt/m² K) | Temperature Difference (°C) | Thermal Losses ( Watt ) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | |

Losses due Building Elements                                                                            0

Total Increment ZD+ZH =                                                                    30 %        0
Increment due to Orientation =                                                               0
Increment due to shut-down period =                                                        30
D=Qo/(Fges x Δt)=      0/ ( 60.0 x  22) = 0.00

TOTAL HEAT TRANSFER LOSSES QT=Qo x (1+ZD+ZH)                                                            0

LOSSES DUE TO OPENINGS SLOTS QL=SQAi (QAi=axSlxRxHxDtxZc) =
Characteristic Building Number H =                                                          0.6
Characteristic Space Number R (or r) =                                                      0.9
Coefficient of Corner Openings ZC =                                                          1

LOSSES DUE TO AIR CHANGES QL=VxrxcxDt =                                                               1856
Space Volume V = 2.9x3.4x3.2=                                                               32
Air Changes Number per hour n =                                                             8

TOTAL THERMAL LOSSES Qtot = QT + QL =                                                                 1856

Level : A Orofos    Space : 4
Space Name XA.4

| Surface Type | Orientation | Subtracted | Thickness | Length (m) | Height or Width (m) | Surface (m2) | Equal Surface Number | Total Surface (m2) | Subtracted Area (m2) | Calculated Surface (m2) | U-Factor (Watt/m² K) | Temperature Difference (°C) | Thermal Losses ( Watt ) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| W1 | S |   |   | 7.6 | 3.4 | 25.84 | 1 | 25.84 | 18.16 | 7.68 | 0.45 | 21.80 | 75.34 |
| W2 | S | S |   | 7.6 | 0.4 | 3.04 | 1 | 3.04 |   | 3.04 | 0.45 | 21.80 | 29.82 |
| W2 | S | S |   | 1.2 | 3 | 3.60 | 1 | 3.60 |   | 3.60 | 0.45 | 21.80 | 35.32 |
| O1 | S | s |   | 3.2 | 1.8 | 5.76 | 2 | 11.52 |   | 11.52 | 2.6 | 21.80 | 653.0 |

Losses due Building Elements                                                              793

Total Increment ZD+ZH =                                                    25 %        198
Increment due to Orientation =                                              -5
Increment due to shut-down period =                                        30
D=Qo/(Fges x Δt)=   793/ ( 199.8 x  22) = 0.18

TOTAL HEAT TRANSFER LOSSES QT=Qo x (1+ZD+ZH)                                            992

LOSSES DUE TO OPENINGS SLOTS QL=SQAi (QAi=axSlxRxHxDtxZc) =                              484.7
Characteristic Building Number H =                                          0.6
Characteristic Space Number R (or r) =                                      0.9
Coefficient of Corner Openings ZC =                                        1

LOSSES DUE TO AIR CHANGES QL=VxrxcxDt =                                                 1189
Space Volume V = 7.6x7x3.2=                                                 170
Air Changes Number per hour n =                                            0.95

TOTAL THERMAL LOSSES Qtot = QT + QL =                                                   2666

Level : A Orofos    Space : 5
Space Name XA.5

| Surface Type | Orientation | Subtracted | Thicknness | Length (m) | Height or Width (m) | Surface (m2) | Equal Surface Number | Total Surface (m2) | Subtracted Area (m2) | Calculated Surface (m2) | U-Factor (Watt/m² K) | Temperature Difference (°C) | Thermal Losses ( Watt ) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| W2 | S |   |   | 7.6 | 3.4 | 25.84 | 1 | 25.84 |   | 25.84 | 0.45 | 21.80 | 253.5 |
| W1 | E |   |   | 7.4 | 3.4 | 25.16 | 1 | 25.16 | 19.28 | 5.88 | 0.45 | 21.80 | 57.68 |
| W2 | E | S |   | 7.4 | 0.4 | 2.96 | 1 | 2.96 |   | 2.96 | 0.45 | 21.80 | 29.04 |
| W2 | E | S |   | 2.8 | 3 | 8.40 | 1 | 8.40 |   | 8.40 | 0.45 | 21.80 | 82.40 |
| O1 | E | s |   | 3 | 1.8 | 5.40 | 1 | 5.40 |   | 5.40 | 2.6 | 21.80 | 306.1 |
| O1 | E | s |   | 1.4 | 1.8 | 2.52 | 1 | 2.52 |   | 2.52 | 2.6 | 21.80 | 142.8 |

Losses due Building Elements                                                                 872

Total Increment ZD+ZH =                                                          25 %        218
Increment due to Orientation =                                                   -5
Increment due to shut-down period =                                              30
D=Qo/(Fges x Δt)=    872/ ( 208.5 x  22) = 0.19

TOTAL HEAT TRANSFER LOSSES QT=Qo x (1+ZD+ZH)                                                 1089

LOSSES DUE TO OPENINGS SLOTS QL=SQAi (QAi=axSlxRxHxDtxZc) =                                   402.5
Characteristic Building Number H =                                               0.6
Characteristic Space Number R (or r) =                                          0.9
Coefficient of Corner Openings ZC =                                              1

LOSSES DUE TO AIR CHANGES QL=VxrxcxDt =                                                      4631
Space Volume V = 7.6x7.4x3.2=                                                    180
Air Changes Number per hour n =                                                 3.5

TOTAL THERMAL LOSSES Qtot = QT + QL =                                                        6123

Level : A Orofos    Space : 6
Space Name XA.6

| Surface Type | Orientation | Subtracted | Thicknness | Length (m) | Height or Width (m) | Surface (m2) | Equal Surface Number | Total Surface (m2) | Subtracted Area (m2) | Calculated Surface (m2) | U-Factor (Watt/m²K) | Temperature Difference (°C) | Thermal Losses (Watt) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| W1 | E |   |   | 7.4 | 3.4 | 25.16 | 1 | 25.16 | 18.08 | 7.08 | 0.45 | 21.80 | 69.45 |
| W2 | E | S |   | 7.4 | 0.4 | 2.96 | 1 | 2.96 |   | 2.96 | 0.45 | 21.80 | 29.04 |
| W2 | E | S |   | 1.2 | 3 | 3.60 | 1 | 3.60 |   | 3.60 | 0.45 | 21.80 | 35.32 |
| O1 | E | s |   | 3.2 | 1.8 | 5.76 | 2 | 11.52 |   | 11.52 | 2.6 | 21.80 | 653.0 |

Losses due Building Elements    787

Total Increment ZD+ZH =    30 %    236
Increment due to Orientation =    0
Increment due to shut-down period =    30
$D = Qo/(Fges \times \Delta t) = 787/(208.5 \times 22) = 0.17$

TOTAL HEAT TRANSFER LOSSES $QT = Qo \times (1+ZD+ZH)$    1023

LOSSES DUE TO OPENINGS SLOTS $QL = SQAi (QAi = a \times Sl \times R \times H \times Dt \times Zc) =$    484.7
Characteristic Building Number H =    0.6
Characteristic Space Number R (or r) =    0.9
Coefficient of Corner Openings ZC =    1

LOSSES DUE TO AIR CHANGES $QL = V \times r \times c \times Dt =$    4631
Space Volume V = 7.4x7.6x3.2=    180
Air Changes Number per hour n =    3.5

TOTAL THERMAL LOSSES $Qtot = QT + QL =$    6139

Level : A Orofos     Space : 7
Space Name XA.7

| Surface Type | Orientation | Subtracted | Thicknness | Length (m) | Height or Width (m) | Surface (m2) | Equal Surface Number | Total Surface (m2) | Subtracted Area (m2) | Calculated Surface (m2) | U-Factor (Watt/m² K) | Temperature Difference (°C) | Thermal Losses ( Watt ) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| W1 | E |   |   | 7.6 | 3.4 | 25.84 | 1 | 25.84 | 19.72 | 6.12 | 0.45 | 21.80 | 60.04 |
| W2 | E | S |   | 7.6 | 0.4 | 3.04 | 1 | 3.04 |   | 3.04 | 0.45 | 21.80 | 29.82 |
| W2 | E | S |   | 2.8 | 3 | 8.40 | 1 | 8.40 |   | 8.40 | 0.45 | 21.80 | 82.40 |
| O1 | E | s |   | 3.2 | 1.8 | 5.76 | 1 | 5.76 |   | 5.76 | 2.6 | 21.80 | 326.5 |
| O1 | E | s |   | 1.4 | 1.8 | 2.52 | 1 | 2.52 |   | 2.52 | 2.6 | 21.80 | 142.8 |

Losses due Building Elements                                                                 642

Total Increment ZD+ZH =                                              30 %              192
Increment due to Orientation =                                        0
Increment due to shut-down period =                                  30
D=Qo/(Fges x Δt)=    642/ ( 212.8 x  22) = 0.14

TOTAL HEAT TRANSFER LOSSES QT=Qo x (1+ZD+ZH)                                           834

LOSSES DUE TO OPENINGS SLOTS QL=SQAi (QAi=axSlxRxHxDtxZc) =                            410.7
Characteristic Building Number H =                                   0.6
Characteristic Space Number R (or r) =                               0.9
Coefficient of Corner Openings ZC =                                  1

LOSSES DUE TO AIR CHANGES QL=VxrxcxDt =                                               4756
Space Volume V = 7.6x7.6x3.2=                                        185
Air Changes Number per hour n =                                      3.5

TOTAL THERMAL LOSSES Qtot = QT + QL =                                                 6001

Level : A Orofos    Space : 8
Space Name XA.8

| Surface Type | Orientation | Subtracted | Thicknness | Length (m) | Height or Width (m) | Surface (m2) | Equal Surface Number | Total Surface (m2) | Subtracted Area (m2) | Calculated Surface (m2) | U-Factor (Watt/m² K) | Temperature Difference (°C) | Thermal Losses ( Watt ) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| W1 | E |   |   | 7.6 | 3.4 | 25.84 | 1 | 25.84 | 19.72 | 6.12 | 0.45 | 21.80 | 60.04 |
| W2 | E | S |   | 7.6 | 0.4 | 3.04 | 1 | 3.04 |   | 3.04 | 0.45 | 21.80 | 29.82 |
| W2 | E | S |   | 2.8 | 3 | 8.40 | 1 | 8.40 |   | 8.40 | 0.45 | 21.80 | 82.40 |
| O1 | E | s |   | 3.2 | 1.8 | 5.76 | 1 | 5.76 |   | 5.76 | 2.6 | 21.80 | 326.5 |
| O1 | E | s |   | 1.4 | 1.8 | 2.52 | 1 | 2.52 |   | 2.52 | 2.6 | 21.80 | 142.8 |
| I1 | I |   |   | 7.6 | 3.4 | 25.84 | 1 | 25.84 |   | 25.84 | 1 | 10.00 | 258.4 |

Losses due Building Elements　　　　　　　　　　　　　　　　　　　　　　　　　　900

Total Increment ZD+ZH =　　　　　　　　　　　　　　　　　　　　　　30 %　　270
Increment due to Orientation =　　　　　　　　　　　　　　　　　　　　0
Increment due to shut-down period =　　　　　　　　　　　　　　　　　30
D=Qo/(Fges x Δt)=   900/ ( 212.8 x  22) = 0.19

TOTAL HEAT TRANSFER LOSSES QT=Qo x (1+ZD+ZH)　　　　　　　　　　　　1170

LOSSES DUE TO OPENINGS SLOTS QL=SQAi (QAi=axSlxRxHxDtxZc) =　　　　410.7
Characteristic Building Number H =　　　　　　　　　　　　　　　　　0.6
Characteristic Space Number R (or r) =　　　　　　　　　　　　　　　0.9
Coefficient of Corner Openings ZC =　　　　　　　　　　　　　　　　1

LOSSES DUE TO AIR CHANGES QL=VxrxcxDt =　　　　　　　　　　　　　4756
Space Volume V = 7.6x7.6x3.2=　　　　　　　　　　　　　　　　　185
Air Changes Number per hour n =　　　　　　　　　　　　　　　　　3.5

TOTAL THERMAL LOSSES Qtot = QT + QL =　　　　　　　　　　　　　　6337

Level : A Orofos    Space : 9
Space Name XA.9

| Surface Type | Orientation | Subtracted | Thicknness | Length (m) | Height or Width (m) | Surface (m2) | Equal Surface Number | Total Surface (m2) | Subtracted Area (m2) | Calculated Surface (m2) | U-Factor (Watt/m² K) | Temperature Difference (°C) | Thermal Losses ( Watt ) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| W1 | E | | | 7.4 | 3.4 | 25.16 | 1 | 25.16 | 19.40 | 5.76 | 0.45 | 21.80 | 56.51 |
| W2 | E | S | | 7.4 | 0.4 | 2.96 | 1 | 2.96 | | 2.96 | 0.45 | 21.80 | 29.04 |
| W2 | E | S | | 2.6 | 3 | 7.80 | 1 | 7.80 | | 7.80 | 0.45 | 21.80 | 76.52 |
| O1 | E | s | | 3.2 | 1.8 | 5.76 | 1 | 5.76 | | 5.76 | 2.6 | 21.80 | 326.5 |
| O1 | E | s | | 1.6 | 1.8 | 2.88 | 1 | 2.88 | | 2.88 | 2.6 | 21.80 | 163.2 |
| W2 | N | | | 7.6 | 3.4 | 25.84 | 1 | 25.84 | | 25.84 | 0.45 | 21.80 | 253.5 |

Losses due Building Elements        905

Total Increment ZD+ZH =      35 %    317
Increment due to Orientation =      5
Increment due to shut-down period =      30
$D=Qo/(Fges \times \Delta t)= 905/ ( 208.5 \times 22) = 0.20$

TOTAL HEAT TRANSFER LOSSES $QT=Qo \times (1+ZD+ZH)$      1222

LOSSES DUE TO OPENINGS SLOTS $QL=SQAi (QAi=a \times Sl \times R \times H \times Dt \times Zc)$ =      418.9
Characteristic Building Number H =      0.6
Characteristic Space Number R (or r) =      0.9
Coefficient of Corner Openings ZC =      1

LOSSES DUE TO AIR CHANGES $QL=V \times r \times c \times Dt$ =      4631
Space Volume V = 7.4x7.6x3.2=      180
Air Changes Number per hour n =      3.5

TOTAL THERMAL LOSSES $Qtot = QT + QL$ =      6272

Level : A Orofos    Space : 10
Space Name XA.10

| Surface Type | Orientation | Subtracted | Thicknness | Length (m) | Height or Width (m) | Surface (m2) | Equal Surface Number | Total Surface (m2) | Subtracted Area (m2) | Calculated Surface (m2) | U-Factor (Watt/m² K) | Temperature Difference (°C) | Thermal Losses ( Watt ) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| W1 | N |   |   | 14.8 | 3.4 | 50.32 | 1 | 50.32 | 38.16 | 12.16 | 0.45 | 21.80 | 119.3 |
| W2 | N | S |   | 14.8 | 0.4 | 5.92 | 1 | 5.92 |   | 5.92 | 0.45 | 21.80 | 58.08 |
| W2 | N | S |   | 2 | 3 | 6.00 | 1 | 6.00 |   | 6.00 | 0.45 | 21.80 | 58.86 |
| O1 | N | s |   | 3.2 | 1.8 | 5.76 | 3 | 17.28 |   | 17.28 | 2.6 | 21.80 | 979.4 |
| O2 | N | s |   | 3.2 | 2.8 | 8.96 | 1 | 8.96 |   | 8.96 | 2.6 | 21.80 | 507.9 |

Losses due Building Elements            1724

Total Increment ZD+ZH =      30 %      517
Increment due to Orientation =      5
Increment due to shut-down period =      25
D=Qo/(Fges x Δt)=   1724/ ( 224.3 x  22) = 0.35

TOTAL HEAT TRANSFER LOSSES QT=Qo x (1+ZD+ZH)      2241

LOSSES DUE TO OPENINGS SLOTS QL=SQAi (QAi=axSlxRxHxDtxZc) =      973.4
Characteristic Building Number H =      0.6
Characteristic Space Number R (or r) =      0.9
Coefficient of Corner Openings ZC =      1

LOSSES DUE TO AIR CHANGES QL=VxrxcxDt =      1003
Space Volume V = 14.8x3.6x3.2=      170
Air Changes Number per hour n =      0.8

TOTAL THERMAL LOSSES Qtot = QT + QL =      4217

Level : A Orofos    Space : 11
Space Name XA.11

| Surface Type | Orientation | Subtracted | Thicknness | Length (m) | Height or Width (m) | Surface (m2) | Equal Surface Number | Total Surface (m2) | Subtracted Area (m2) | Calculated Surface (m2) | U-Factor (Watt/m² K) | Temperature Difference (°C) | Thermal Losses ( Watt ) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| W1 | W |   |   | 7.1 | 3.4 | 24.14 | 1 | 24.14 | 18.32 | 5.82 | 0.45 | 21.80 | 57.09 |
| W2 | W | S |   | 7.1 | 0.4 | 2.84 | 1 | 2.84 |   | 2.84 | 0.45 | 21.80 | 27.86 |
| W2 | W | S |   | 2.4 | 3 | 7.20 | 1 | 7.20 |   | 7.20 | 0.45 | 21.80 | 70.63 |
| O1 | W | s |   | 3.2 | 1.8 | 5.76 | 1 | 5.76 |   | 5.76 | 2.6 | 21.80 | 326.5 |
| O1 | W | s |   | 1.4 | 1.8 | 2.52 | 1 | 2.52 |   | 2.52 | 2.6 | 21.80 | 142.8 |

Losses due Building Elements      625

Total Increment ZD+ZH =      30 %    187
Increment due to Orientation =      0
Increment due to shut-down period =      30
D=Qo/(Fges x Δt)=   625/ ( 164.3 x  22) = 0.17

TOTAL HEAT TRANSFER LOSSES QT=Qo x (1+ZD+ZH)      812

LOSSES DUE TO OPENINGS SLOTS QL=SQAi (QAi=axSlxRxHxDtxZc) =      410.7
Characteristic Building Number H =      0.6
Characteristic Space Number R (or r) =      0.9
Coefficient of Corner Openings ZC =      1

LOSSES DUE TO AIR CHANGES QL=VxrxcxDt =      691.2
Space Volume V = 10.8x3.4x3.2=      118
Air Changes Number per hour n =      0.8

TOTAL THERMAL LOSSES Qtot = QT + QL =      1914

Level : A Orofos    Space : 12
Space Name XA.12

| Surface Type | Orientation | Subtracted | Thicknness | Length (m) | Height or Width (m) | Surface (m2) | Equal Surface Number | Total Surface (m2) | Subtracted Area (m2) | Calculated Surface (m2) | U-Factor (Watt/m² K) | Temperature Difference (°C) | Thermal Losses ( Watt ) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| W1 | W |   |   | 8.2 | 3.4 | 27.88 | 1 | 27.88 | 19.60 | 8.28 | 0.45 | 21.80 | 81.23 |
| W2 | W | S |   | 8.2 | 0.4 | 3.28 | 1 | 3.28 |   | 3.28 | 0.45 | 21.80 | 32.18 |
| W2 | W | S |   | 1.6 | 3 | 4.80 | 1 | 4.80 |   | 4.80 | 0.45 | 21.80 | 47.09 |
| O1 | W | s |   | 3.2 | 1.8 | 5.76 | 2 | 11.52 |   | 11.52 | 2.6 | 21.80 | 653.0 |
| I1 | I |   |   | 4.2 | 3.4 | 14.28 | 1 | 14.28 | 10.94 | 3.34 | 1 | 10.00 | 33.40 |
| O2 | I | s |   | 1.1 | 2.2 | 2.42 | 1 | 2.42 |   | 2.42 | 2.6 | 10.00 | 62.92 |
| O2 | I | s |   | 1.1 | 2.8 | 3.08 | 1 | 3.08 |   | 3.08 | 2.6 | 10.00 | 80.08 |
| W2 | I | S |   | 1.6 | 3.4 | 5.44 | 1 | 5.44 |   | 5.44 | 0.45 | 10.00 | 24.48 |

Losses due Building Elements                                                                1014

Total Increment ZD+ZH =                                                      30 %        304
Increment due to Orientation =                                                0
Increment due to shut-down period =                                          30
D=Qo/(Fges x Δt)=   1014/ ( 219.8 x  22) = 0.21

TOTAL HEAT TRANSFER LOSSES QT=Qo x (1+ZD+ZH)                                          1319

LOSSES DUE TO OPENINGS SLOTS QL=SQAi (QAi=axSlxRxHxDtxZc) =                            484.7
Characteristic Building Number H =                                           0.6
Characteristic Space Number R (or r) =                                       0.9
Coefficient of Corner Openings ZC =                                          1

LOSSES DUE TO AIR CHANGES QL=VxrxcxDt =                                               959.9
Space Volume V = 15x3.4x3.2=                                                 163
Air Changes Number per hour n =                                             0.8

TOTAL THERMAL LOSSES Qtot = QT + QL =                                                 2763

Level : A Orofos    Space : 13
Space Name XA.13

| Surface Type | Orientation | Subtracted | Thicknness | Length (m) | Height or Width (m) | Surface (m2) | Equal Surface Number | Total Surface (m2) | Subtracted Area (m2) | Calculated Surface (m2) | U-Factor (Watt/m² K) | Temperature Difference (°C) | Thermal Losses ( Watt ) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| W1 | W |   |   | 11.2 | 3.4 | 38.08 | 1 | 38.08 | 24.64 | 13.44 | 0.45 | 21.80 | 131.8 |
| W2 | W | S |   | 11.2 | 0.4 | 4.48 | 1 | 4.48 |   | 4.48 | 0.45 | 21.80 | 43.95 |
| W2 | W | S |   | 4.8 | 3 | 14.40 | 1 | 14.40 |   | 14.40 | 0.45 | 21.80 | 141.3 |
| O1 | W | s |   | 3.2 | 1.8 | 5.76 | 1 | 5.76 |   | 5.76 | 2.6 | 21.80 | 326.5 |
| I1 | I |   |   | 3.4 | 3.4 | 11.56 | 1 | 11.56 | 2.20 | 9.36 | 1 | 10.00 | 93.60 |
| O2 | I | s |   | 1 | 2.2 | 2.20 | 1 | 2.20 |   | 2.20 | 2.6 | 10.00 | 57.20 |

Losses due Building Elements                                                                                          794

Total Increment ZD+ZH =                                                                              30 %            238
Increment due to Orientation =                                                                       0
Increment due to shut-down period =                                                                  30
D=Qo/(Fges x Δt)=   794/ ( 169.6 x  22) = 0.21

TOTAL HEAT TRANSFER LOSSES QT=Qo x (1+ZD+ZH)                                                                        1033

LOSSES DUE TO OPENINGS SLOTS QL=SQAi (QAi=axSlxRxHxDtxZc) =                                                          242.3
Characteristic Building Number H =                                                                   0.6
Characteristic Space Number R (or r) =                                                               0.9
Coefficient of Corner Openings ZC =                                                                 1

LOSSES DUE TO AIR CHANGES QL=VxrxcxDt =                                                                             716.8
Space Volume V = 11.2x3.4x3.2=                                                                       122
Air Changes Number per hour n =                                                                      0.8

TOTAL THERMAL LOSSES Qtot = QT + QL =                                                                               1992

Level : A Orofos    Space : 14
Space Name XA.16

| Surface Type | Orientation | Subtracted | Thicknness | Length (m) | Height or Width (m) | Surface (m2) | Equal Surface Number | Total Surface (m2) | Subtracted Area (m2) | Calculated Surface (m2) | U-Factor (Watt/m² K) | Temperature Difference (°C) | Thermal Losses ( Watt ) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| W1 | S |   |   | 4 | 3.4 | 13.60 | 1 | 13.60 | 9.76 | 3.84 | 0.45 | 21.80 | 37.67 |
| W2 | S | S |   | 4 | 0.4 | 1.60 | 1 | 1.60 |   | 1.60 | 0.45 | 21.80 | 15.70 |
| W2 | S | S |   | 0.8 | 3 | 2.40 | 1 | 2.40 |   | 2.40 | 0.45 | 21.80 | 23.54 |
| O1 | S | s |   | 3.2 | 1.8 | 5.76 | 1 | 5.76 |   | 5.76 | 2.6 | 21.80 | 326.5 |
| W1 | W |   |   | 3.8 | 3.4 | 12.92 | 1 | 12.92 | 10.64 | 2.28 | 0.45 | 21.80 | 22.37 |
| W2 | W | S |   | 3.8 | 0.4 | 1.52 | 1 | 1.52 |   | 1.52 | 0.45 | 21.80 | 14.91 |
| W2 | W | S |   | 2.2 | 3 | 6.60 | 1 | 6.60 |   | 6.60 | 0.45 | 21.80 | 64.75 |
| O1 | W | s |   | 1.4 | 1.8 | 2.52 | 1 | 2.52 |   | 2.52 | 2.6 | 21.80 | 142.8 |

Losses due Building Elements        648

Total Increment ZD+ZH =        20 %    130
Increment due to Orientation =        -5
Increment due to shut-down period =        25
$D=Q_o/(F_{ges} \times \Delta t) = 648/(71.9 \times 22) = 0.41$

TOTAL HEAT TRANSFER LOSSES $Q_T = Q_o \times (1+ZD+ZH)$        778

LOSSES DUE TO OPENINGS SLOTS $Q_L = SQ_{Ai}$ $(Q_{Ai} = a \times Sl \times R \times H \times Dt \times Zc) =$        410.7
Characteristic Building Number H =        0.6
Characteristic Space Number R (or r) =        0.9
Coefficient of Corner Openings ZC =        1

LOSSES DUE TO AIR CHANGES $Q_L = V \times r \times c \times Dt =$        288.8
Space Volume V = 3.8x3.4x3.2=        41
Air Changes Number per hour n =        0.95

TOTAL THERMAL LOSSES $Q_{tot} = Q_T + Q_L =$        1477

Level : B Orofos    Space : 1
Space Name XB.1

| Surface Type | Orientation | Subtracted | Thickness | Length (m) | Height or Width (m) | Surface (m2) | Equal Surface Number | Total Surface (m2) | Subtracted Area (m2) | Calculated Surface (m2) | U-Factor (Watt/m² K) | Temperature Difference (°C) | Thermal Losses ( Watt ) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| W1 | S |   |   | 7.4 | 3.4 | 25.16 | 1 | 25.16 | 17.72 | 7.44 | 0.45 | 21.80 | 72.99 |
| W2 | S | S |   | 7.4 | 0.4 | 2.96 | 1 | 2.96 |   | 2.96 | 0.45 | 21.80 | 29.04 |
| W2 | S | S |   | 1.2 | 3 | 3.60 | 1 | 3.60 |   | 3.60 | 0.45 | 21.80 | 35.32 |
| O1 | S | s |   | 3.2 | 1.8 | 5.76 | 1 | 5.76 |   | 5.76 | 2.6 | 21.80 | 326.5 |
| O1 | S | s |   | 3 | 1.8 | 5.40 | 1 | 5.40 |   | 5.40 | 2.6 | 21.80 | 306.1 |
| W2 | W |   |   | 7.6 | 3.4 | 25.84 | 1 | 25.84 |   | 25.84 | 0.45 | 21.80 | 253.5 |
| C1 | I |   |   | 7.4 | 7.6 | 56.24 | 1 | 56.24 |   | 56.24 | 0.4 | 10.00 | 225.0 |

Losses due Building Elements                                                                          1248

Total Increment ZD+ZH =                                                        25 %           312
Increment due to Orientation =                                                 -5
Increment due to shut-down period =                                            30
D=Qo/(Fges x Δt)=   1248/ ( 208.5 x  22) = 0.27

TOTAL HEAT TRANSFER LOSSES QT=Qo x (1+ZD+ZH)                                                          1561

LOSSES DUE TO OPENINGS SLOTS QL=SQAi (QAi=axSlxRxHxDtxZc) =                                            476.4
Characteristic Building Number H =                                             0.6
Characteristic Space Number R (or r) =                                         0.9
Coefficient of Corner Openings ZC =                                           1

LOSSES DUE TO AIR CHANGES QL=VxrxcxDt =                                                               4631
Space Volume V = 7.6x7.4x3.2=                                                  180
Air Changes Number per hour n =                                               3.5

TOTAL THERMAL LOSSES Qtot = QT + QL =                                                                 6668

Level : B Orofos    Space : 2
Space Name XB.2

| Surface Type | Orientation | Subtracted | Thicknness | Length (m) | Height or Width (m) | Surface (m2) | Equal Surface Number | Total Surface (m2) | Subtracted Area (m2) | Calculated Surface (m2) | U-Factor (Watt/m² K) | Temperature Difference (°C) | Thermal Losses ( Watt ) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| W1 | S | | | 7.6 | 3.4 | 25.84 | 1 | 25.84 | 20.32 | 5.52 | 0.45 | 21.80 | 54.15 |
| W2 | S | S | | 7.6 | 0.4 | 3.04 | 1 | 3.04 | | 3.04 | 0.45 | 21.80 | 29.82 |
| W2 | S | S | | 3 | 3 | 9.00 | 1 | 9.00 | | 9.00 | 0.45 | 21.80 | 88.29 |
| O1 | S | s | | 1.4 | 1.8 | 2.52 | 1 | 2.52 | | 2.52 | 2.6 | 21.80 | 142.8 |
| O1 | S | s | | 3.2 | 1.8 | 5.76 | 1 | 5.76 | | 5.76 | 2.6 | 21.80 | 326.5 |
| C1 | I | | | 7.6 | 7.6 | 57.76 | 1 | 57.76 | | 57.76 | 0.4 | 10.00 | 231.0 |

Losses due Building Elements      873

Total Increment ZD+ZH =      25 %    218
Increment due to Orientation =      -5
Increment due to shut-down period =      30
$D=Qo/(Fges \times \Delta t)= 873/ ( 212.8 \times 22) = 0.19$

TOTAL HEAT TRANSFER LOSSES $QT=Qo \times (1+ZD+ZH)$      1091

LOSSES DUE TO OPENINGS SLOTS $QL=SQAi (QAi=a \times Sl \times R \times H \times Dt \times Zc)$ =      410.7
Characteristic Building Number H =      0.6
Characteristic Space Number R (or r) =      0.9
Coefficient of Corner Openings ZC =      1

LOSSES DUE TO AIR CHANGES $QL=V \times r \times c \times Dt$ =      4756
Space Volume V = 7.6x7.6x3.2=      185
Air Changes Number per hour n =      3.5

TOTAL THERMAL LOSSES $Qtot = QT + QL$ =      6257

Level : B Orofos     Space : 3
Space Name XB.3

| Surface Type | Orientation | Subtracted | Thicknness | Length (m) | Height or Width (m) | Surface (m2) | Equal Surface Number | Total Surface (m2) | Subtracted Area (m2) | Calculated Surface (m2) | U-Factor (Watt/m² K) | Temperature Difference (°C) | Thermal Losses ( Watt ) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| W1 | S |   |   | 7.6 | 3.4 | 25.84 | 1 | 25.84 | 18.16 | 7.68 | 0.45 | 21.80 | 75.34 |
| W2 | S | S |   | 7.6 | 0.4 | 3.04 | 1 | 3.04 |   | 3.04 | 0.45 | 21.80 | 29.82 |
| W2 | S | S |   | 1.2 | 3 | 3.60 | 1 | 3.60 |   | 3.60 | 0.45 | 21.80 | 35.32 |
| O1 | S | s |   | 3.2 | 1.8 | 5.76 | 2 | 11.52 |   | 11.52 | 2.6 | 21.80 | 653.0 |
| C1 | I |   |   | 7.6 | 7.6 | 57.76 | 1 | 57.76 |   | 57.76 | 0.4 | 10.00 | 231.0 |

Losses due Building Elements                                    1024

Total Increment ZD+ZH =                         25 %        256
Increment due to Orientation =                     -5
Increment due to shut-down period =              30
D=Qo/(Fges x Δt)=  1024/ ( 212.8 x  22) = 0.22

TOTAL HEAT TRANSFER LOSSES QT=Qo x (1+ZD+ZH)            1281

LOSSES DUE TO OPENINGS SLOTS QL=SQAi (QAi=axSlxRxHxDtxZc) =      484.7
Characteristic Building Number H =                   0.6
Characteristic Space Number R (or r) =              0.9
Coefficient of Corner Openings ZC =                 1

LOSSES DUE TO AIR CHANGES QL=VxrxcxDt =                4756
Space Volume V = 7.6x7.6x3.2=                     185
Air Changes Number per hour n =                 3.5

TOTAL THERMAL LOSSES Qtot = QT + QL =                6521

Level : B Orofos    Space : 4
Space Name XB.4

| Surface Type | Orientation | Subtracted | Thicknness | Length (m) | Height or Width (m) | Surface (m2) | Equal Surface Number | Total Surface (m2) | Subtracted Area (m2) | Calculated Surface (m2) | U-Factor (Watt/m² K) | Temperature Difference (°C) | Thermal Losses ( Watt ) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| W2 | S |   |   | 7.6 | 3.4 | 25.84 | 1 | 25.84 |   | 25.84 | 0.45 | 21.80 | 253.5 |
| W1 | E |   |   | 7.4 | 3.4 | 25.16 | 1 | 25.16 | 19.28 | 5.88 | 0.45 | 21.80 | 57.68 |
| W2 | E | S |   | 7.4 | 0.4 | 2.96 | 1 | 2.96 |   | 2.96 | 0.45 | 21.80 | 29.04 |
| W2 | E | S |   | 2.8 | 3 | 8.40 | 1 | 8.40 |   | 8.40 | 0.45 | 21.80 | 82.40 |
| O1 | E | s |   | 3 | 1.8 | 5.40 | 1 | 5.40 |   | 5.40 | 2.6 | 21.80 | 306.1 |
| O1 | E | s |   | 1.4 | 1.8 | 2.52 | 1 | 2.52 |   | 2.52 | 2.6 | 21.80 | 142.8 |
| C1 | I |   |   | 7.4 | 7.6 | 56.24 | 1 | 56.24 |   | 56.24 | 0.4 | 10.00 | 225.0 |
| I1 | I |   |   | 3.8 | 3.4 | 12.92 | 1 | 12.92 |   | 12.92 | 1 | 10.00 | 129.2 |

Losses due Building Elements             1226

Total Increment ZD+ZH =      25 %     306
Increment due to Orientation =      -5
Increment due to shut-down period =      30
$D = Qo/(Fges \times \Delta t) = 1226/ ( 208.5 \times 22) = 0.27$

TOTAL HEAT TRANSFER LOSSES $QT = Qo \times (1+ZD+ZH)$      1532

LOSSES DUE TO OPENINGS SLOTS $QL = SQAi$ $(QAi = a \times Sl \times R \times H \times Dt \times Zc) =$      402.5
Characteristic Building Number H =      0.6
Characteristic Space Number R (or r) =      0.9
Coefficient of Corner Openings ZC =      1

LOSSES DUE TO AIR CHANGES $QL = V \times r \times c \times Dt =$      4631
Space Volume V = 7.6x7.4x3.2=      180
Air Changes Number per hour n =      3.5

TOTAL THERMAL LOSSES $Qtot = QT + QL =$      6566

Level : B Orofos    Space : 5
Space Name XB.5

| Surface Type | Orientation | Subtracted | Thicknness | Length (m) | Height or Width (m) | Surface (m2) | Equal Surface Number | Total Surface (m2) | Subtracted Area (m2) | Calculated Surface (m2) | U-Factor (Watt/m² K) | Temperature Difference (°C) | Thermal Losses ( Watt ) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| W1 | E |   |   | 7.6 | 3.4 | 25.84 | 1 | 25.84 | 12.40 | 13.44 | 0.45 | 21.80 | 131.8 |
| W2 | E | S |   | 7.6 | 0.4 | 3.04 | 1 | 3.04 |   | 3.04 | 0.45 | 21.80 | 29.82 |
| W2 | E | S |   | 1.2 | 3 | 3.60 | 1 | 3.60 |   | 3.60 | 0.45 | 21.80 | 35.32 |
| O1 | E | s |   | 3.2 | 1.8 | 5.76 | 1 | 5.76 |   | 5.76 | 2.6 | 21.80 | 326.5 |
| C1 | I |   |   | 7.6 | 7.6 | 57.76 | 1 | 57.76 |   | 57.76 | 0.4 | 10.00 | 231.0 |

Losses due Building Elements                                                       754

Total Increment ZD+ZH =                  30 %      226
Increment due to Orientation =             0
Increment due to shut-down period =     30
D=Qo/(Fges x Δt)=   754/ ( 212.8 x  22) = 0.16

TOTAL HEAT TRANSFER LOSSES QT=Qo x (1+ZD+ZH)             981

LOSSES DUE TO OPENINGS SLOTS QL=SQAi (QAi=axSlxRxHxDtxZc) =      242.3
Characteristic Building Number H =             0.6
Characteristic Space Number R (or r) =         0.9
Coefficient of Corner Openings ZC =           1

LOSSES DUE TO AIR CHANGES QL=VxrxcxDt =              4756
Space Volume V = 7.6x7.6x3.2=                  185
Air Changes Number per hour n =               3.5

TOTAL THERMAL LOSSES Qtot = QT + QL =              5979

Level : B Orofos    Space : 6
Space Name XB.6

| Surface Type | Orientation | Subtracted | Thicknness | Length (m) | Height or Width (m) | Surface (m2) | Equal Surface Number | Total Surface (m2) | Subtracted Area (m2) | Calculated Surface (m2) | U-Factor (Watt/m² K) | Temperature Difference (°C) | Thermal Losses ( Watt ) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| W1 | E |   |   | 7.6 | 3.4 | 25.84 | 1 | 25.84 | 19.72 | 6.12 | 0.45 | 21.80 | 60.04 |
| W2 | E | S |   | 7.6 | 0.4 | 3.04 | 1 | 3.04 |   | 3.04 | 0.45 | 21.80 | 29.82 |
| W2 | E | S |   | 2.8 | 3 | 8.40 | 1 | 8.40 |   | 8.40 | 0.45 | 21.80 | 82.40 |
| O1 | E | s |   | 3.2 | 1.8 | 5.76 | 1 | 5.76 |   | 5.76 | 2.6 | 21.80 | 326.5 |
| O1 | E | s |   | 1.4 | 1.8 | 2.52 | 1 | 2.52 |   | 2.52 | 2.6 | 21.80 | 142.8 |
| C1 | I |   |   | 7.6 | 7.6 | 57.76 | 1 | 57.76 |   | 57.76 | 0.4 | 10.00 | 231.0 |

Losses due Building Elements                                                                 873

Total Increment ZD+ZH =                                                        30 %         262
Increment due to Orientation =                                                 0
Increment due to shut-down period =                                            30
D=Qo/(Fges x Δt)=    873/ ( 212.8 x  22) = 0.19

TOTAL HEAT TRANSFER LOSSES QT=Qo x (1+ZD+ZH)                                                1134

LOSSES DUE TO OPENINGS SLOTS QL=SQAi (QAi=axSlxRxHxDtxZc) =                                  410.7
Characteristic Building Number H =                                             0.6
Characteristic Space Number R (or r) =                                         0.9
Coefficient of Corner Openings ZC =                                            1

LOSSES DUE TO AIR CHANGES QL=VxrxcxDt =                                                     4756
Space Volume V = 7.6x7.6x3.2=                                                  185
Air Changes Number per hour n =                                               3.5

TOTAL THERMAL LOSSES Qtot = QT + QL =                                                       6301

Level : B Orofos    Space : 7
Space Name XB.7

| Surface Type | Orientation | Subtracted | Thickness | Length (m) | Height or Width (m) | Surface (m2) | Equal Surface Number | Total Surface (m2) | Subtracted Area (m2) | Calculated Surface (m2) | U-Factor (Watt/m² K) | Temperature Difference (°C) | Thermal Losses ( Watt ) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| W1 | E |   |   | 7.6 | 3.4 | 25.84 | 1 | 25.84 | 19.72 | 6.12 | 0.45 | 21.80 | 60.04 |
| W2 | E | S |   | 7.6 | 0.4 | 3.04 | 1 | 3.04 |   | 3.04 | 0.45 | 21.80 | 29.82 |
| W2 | E | S |   | 2.8 | 3 | 8.40 | 1 | 8.40 |   | 8.40 | 0.45 | 21.80 | 82.40 |
| O1 | E | s |   | 3.2 | 1.8 | 5.76 | 1 | 5.76 |   | 5.76 | 2.6 | 21.80 | 326.5 |
| O1 | E | s |   | 1.4 | 1.8 | 2.52 | 1 | 2.52 |   | 2.52 | 2.6 | 21.80 | 142.8 |
| C1 | I |   |   | 7.6 | 7.6 | 57.76 | 1 | 57.76 |   | 57.76 | 0.4 | 10.00 | 231.0 |

Losses due Building Elements                                                                                                  873

Total Increment ZD+ZH =                                                                          30 %                    262
Increment due to Orientation =                                                                     0
Increment due to shut-down period =                                                              30
D=Qo/(Fges x Δt)=    873/ ( 212.8 x  22) = 0.19

TOTAL HEAT TRANSFER LOSSES QT=Qo x (1+ZD+ZH)                                                           1134

LOSSES DUE TO OPENINGS SLOTS QL=SQAi (QAi=axSlxRxHxDtxZc) =                                       410.7
Characteristic Building Number H =                                                                  0.6
Characteristic Space Number R (or r) =                                                              0.9
Coefficient of Corner Openings ZC =                                                                  1

LOSSES DUE TO AIR CHANGES QL=VxrxcxDt =                                                                4756
Space Volume V = 7.6x7.6x3.2=                                                                       185
Air Changes Number per hour n =                                                                    3.5

TOTAL THERMAL LOSSES Qtot = QT + QL =                                                                  6301

Level : B Orofos    Space : 8
Space Name XB.8

| Surface Type | Orientation | Subtracted | Thicknness | Length (m) | Height or Width (m) | Surface (m2) | Equal Surface Number | Total Surface (m2) | Subtracted Area (m2) | Calculated Surface (m2) | U-Factor (Watt/m² K) | Temperature Difference (°C) | Thermal Losses ( Watt ) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| W1 | E |   |   | 7.4 | 3.4 | 25.16 | 1 | 25.16 | 19.40 | 5.76 | 0.45 | 21.80 | 56.51 |
| W2 | E | S |   | 7.4 | 0.4 | 2.96 | 1 | 2.96 |   | 2.96 | 0.45 | 21.80 | 29.04 |
| W2 | E | S |   | 2.6 | 3 | 7.80 | 1 | 7.80 |   | 7.80 | 0.45 | 21.80 | 76.52 |
| O1 | E | s |   | 3.2 | 1.8 | 5.76 | 1 | 5.76 |   | 5.76 | 2.6 | 21.80 | 326.5 |
| O1 | E | s |   | 1.6 | 1.8 | 2.88 | 1 | 2.88 |   | 2.88 | 2.6 | 21.80 | 163.2 |
| W2 | N |   |   | 7.6 | 3.4 | 25.84 | 1 | 25.84 |   | 25.84 | 0.45 | 21.80 | 253.5 |
| C1 | I |   |   | 7.4 | 7.6 | 56.24 | 1 | 56.24 |   | 56.24 | 0.4 | 10.00 | 225.0 |

Losses due Building Elements                                                   1130

Total Increment ZD+ZH =                                  35 %       396
Increment due to Orientation =                                      5
Increment due to shut-down period =                                30
$D = Q_o/(F_{ges} \times \Delta t) = 1130/(208.5 \times 22) = 0.25$

TOTAL HEAT TRANSFER LOSSES $Q_T = Q_o \times (1+ZD+ZH)$                 1526

LOSSES DUE TO OPENINGS SLOTS $QL = SQA_i$ $(QA_i = a \times Sl \times R \times H \times Dt \times Zc) =$       418.9
Characteristic Building Number H =                                  0.6
Characteristic Space Number R (or r) =                              0.9
Coefficient of Corner Openings ZC =                                1

LOSSES DUE TO AIR CHANGES $QL = V \times r \times c \times Dt =$                        4631
Space Volume V = 7.4x7.6x3.2=                                    180
Air Changes Number per hour n =                                  3.5

TOTAL THERMAL LOSSES $Q_{tot} = Q_T + QL =$                         6576

Level : B Orofos    Space : 9
Space Name XB.9

| Surface Type | Orientation | Subtracted | Thicknness | Length (m) | Height or Width (m) | Surface (m2) | Equal Surface Number | Total Surface (m2) | Subtracted Area (m2) | Calculated Surface (m2) | U-Factor (Watt/m² K) | Temperature Difference (°C) | Thermal Losses ( Watt ) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| W1 | N | | | 14.8 | 3.4 | 50.32 | 1 | 50.32 | 34.96 | 15.36 | 0.45 | 21.80 | 150.7 |
| W2 | N | S | | 14.8 | 0.4 | 5.92 | 1 | 5.92 | | 5.92 | 0.45 | 21.80 | 58.08 |
| W2 | N | S | | 2 | 3 | 6.00 | 1 | 6.00 | | 6.00 | 0.45 | 21.80 | 58.86 |
| O1 | N | s | | 3.2 | 1.8 | 5.76 | 4 | 23.04 | | 23.04 | 2.6 | 21.80 | 1306 |
| C1 | I | | | 14.8 | 3.6 | 53.28 | 1 | 53.28 | | 53.28 | 0.4 | 10.00 | 213.1 |

Losses due Building Elements                                    1787

Total Increment ZD+ZH =               30 %      536
Increment due to Orientation =           5
Increment due to shut-down period =       25
D=Qo/(Fges x Δt)=   1787/ ( 224.3 x  22) = 0.37

TOTAL HEAT TRANSFER LOSSES QT=Qo x (1+ZD+ZH)             2323

LOSSES DUE TO OPENINGS SLOTS QL=SQAi (QAi=axSlxRxHxDtxZc) =      969.3
Characteristic Building Number H =             0.6
Characteristic Space Number R (or r) =         0.9
Coefficient of Corner Openings ZC =           1

LOSSES DUE TO AIR CHANGES QL=VxrxcxDt =             1003
Space Volume V = 3.6x14.8x3.2=           170
Air Changes Number per hour n =          0.8

TOTAL THERMAL LOSSES Qtot = QT + QL =             4295

Level : B Orofos    Space : 10
Space Name XB.10

| Surface Type | Orientation | Subtracted | Thicknness | Length (m) | Height or Width (m) | Surface (m2) | Equal Surface Number | Total Surface (m2) | Subtracted Area (m2) | Calculated Surface (m2) | U-Factor (Watt/m² K) | Temperature Difference (°C) | Thermal Losses ( Watt ) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| W1 | W |   |   | 7.2 | 3.4 | 24.48 | 1 | 24.48 | 18.36 | 6.12 | 0.45 | 21.80 | 60.04 |
| W2 | W | S |   | 7.2 | 0.4 | 2.88 | 1 | 2.88 |   | 2.88 | 0.45 | 21.80 | 28.25 |
| W2 | W | S |   | 2.4 | 3 | 7.20 | 1 | 7.20 |   | 7.20 | 0.45 | 21.80 | 70.63 |
| O1 | W | s |   | 3.2 | 1.8 | 5.76 | 1 | 5.76 |   | 5.76 | 2.6 | 21.80 | 326.5 |
| O1 | W | s |   | 1.4 | 1.8 | 2.52 | 1 | 2.52 |   | 2.52 | 2.6 | 21.80 | 142.8 |
| I1 | I |   |   | 3.4 | 3.4 | 11.56 | 1 | 11.56 | 2.20 | 9.36 | 1 | 10.00 | 93.60 |
| O2 | I | s |   | 1 | 2.2 | 2.20 | 1 | 2.20 |   | 2.20 | 2.6 | 10.00 | 57.20 |
| C1 | I |   |   | 11.2 | 3.4 | 38.08 | 1 | 38.08 |   | 38.08 | 0.4 | 10.00 | 152.3 |

Losses due Building Elements          931

Total Increment ZD+ZH =      30 %    279
Increment due to Orientation =      0
Increment due to shut-down period =      30
$D=Qo/(Fges \times \Delta t)= $    931/ ( 169.6 x  22) = 0.25

TOTAL HEAT TRANSFER LOSSES QT=Qo x (1+ZD+ZH)      1211

LOSSES DUE TO OPENINGS SLOTS QL=SQAi (QAi=axSlxRxHxDtxZc) =      410.7
Characteristic Building Number H =      0.6
Characteristic Space Number R (or r) =      0.9
Coefficient of Corner Openings ZC =      1

LOSSES DUE TO AIR CHANGES QL=VxrxcxDt =      716.8
Space Volume V = 11.2x3.4x3.2=      122
Air Changes Number per hour n =      0.8

TOTAL THERMAL LOSSES Qtot = QT + QL =      2338

Level : B Orofos    Space : 11
Space Name XB.11

| Surface Type | Orientation | Subtracted | Thicknness | Length (m) | Height or Width (m) | Surface (m2) | Equal Surface Number | Total Surface (m2) | Subtracted Area (m2) | Calculated Surface (m2) | U-Factor (Watt/m² K) | Temperature Difference (°C) | Thermal Losses ( Watt ) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| W1 | W |   |   | 8.2 | 3.4 | 27.88 | 1 | 27.88 | 19.60 | 8.28 | 0.45 | 21.80 | 81.23 |
| W2 | W | S |   | 8.2 | 0.4 | 3.28 | 1 | 3.28 |   | 3.28 | 0.45 | 21.80 | 32.18 |
| W2 | W | S |   | 1.6 | 3 | 4.80 | 1 | 4.80 |   | 4.80 | 0.45 | 21.80 | 47.09 |
| O1 | W | s |   | 3.2 | 1.8 | 5.76 | 2 | 11.52 |   | 11.52 | 2.6 | 21.80 | 653.0 |
| I1 | I |   |   | 2.5 | 3.4 | 8.50 | 1 | 8.50 | 6.50 | 2.00 | 1 | 10.00 | 20.00 |
| O2 | I | s |   | 1.1 | 2.2 | 2.42 | 1 | 2.42 |   | 2.42 | 2.6 | 10.00 | 62.92 |
| W2 | I | S |   | 1.2 | 3.4 | 4.08 | 1 | 4.08 |   | 4.08 | 0.45 | 10.00 | 18.36 |
| C1 | I |   |   | 14.8 | 3.4 | 50.32 | 1 | 50.32 |   | 50.32 | 0.4 | 10.00 | 201.3 |

Losses due Building Elements                                                                                                  1116

Total Increment ZD+ZH =                                                                       30 %              335
Increment due to Orientation =                                                                0
Increment due to shut-down period =                                                  30
D=Qo/(Fges x Δt)=   1116/ ( 217.1 x  22) = 0.24

TOTAL HEAT TRANSFER LOSSES QT=Qo x (1+ZD+ZH)                                                  1451

LOSSES DUE TO OPENINGS SLOTS QL=SQAi (QAi=axSlxRxHxDtxZc) =                     484.7
Characteristic Building Number H =                                                            0.6
Characteristic Space Number R (or r) =                                                        0.9
Coefficient of Corner Openings ZC =                                                           1

LOSSES DUE TO AIR CHANGES QL=VxrxcxDt =                                                       947.1
Space Volume V = 14.8x3.4x3.2=                                                                161
Air Changes Number per hour n =                                                              0.8

TOTAL THERMAL LOSSES Qtot = QT + QL =                                                         2883

Level : B Orofos    Space : 12
Space Name XB.12

| Surface Type | Orientation | Subtracted | Thicknness | Length (m) | Height or Width (m) | Surface (m2) | Equal Surface Number | Total Surface (m2) | Subtracted Area (m2) | Calculated Surface (m2) | U-Factor (Watt/m² K) | Temperature Difference (°C) | Thermal Losses ( Watt ) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| W1 | W |   |   | 11.2 | 3.4 | 38.08 | 1 | 38.08 | 29.80 | 8.28 | 0.45 | 21.80 | 81.23 |
| W2 | W | S |   | 11.2 | 0.4 | 4.48 | 1 | 4.48 |   | 4.48 | 0.45 | 21.80 | 43.95 |
| W2 | W | S |   | 4.6 | 3 | 13.80 | 1 | 13.80 |   | 13.80 | 0.45 | 21.80 | 135.4 |
| O1 | W | s |   | 3.2 | 1.8 | 5.76 | 2 | 11.52 |   | 11.52 | 2.6 | 21.80 | 653.0 |
| I1 | I |   |   | 3.4 | 3.4 | 11.56 | 1 | 11.56 | 2.20 | 9.36 | 1 | 10.00 | 93.60 |
| O2 | I | s |   | 1 | 2.2 | 2.20 | 1 | 2.20 |   | 2.20 | 2.6 | 10.00 | 57.20 |
| C1 | I |   |   | 11.2 | 3.4 | 38.08 | 1 | 38.08 |   | 38.08 | 0.4 | 10.00 | 152.3 |

Losses due Building Elements                                              1217

Total Increment ZD+ZH =                       25 %      304
Increment due to Orientation =                  0
Increment due to shut-down period =           25
D=Qo/(Fges x Δt)=   1217/ ( 169.6 x  22) = 0.33

TOTAL HEAT TRANSFER LOSSES QT=Qo x (1+ZD+ZH)           1521

LOSSES DUE TO OPENINGS SLOTS QL=SQAi (QAi=axSlxRxHxDtxZc) =      484.7
Characteristic Building Number H =                0.6
Characteristic Space Number R (or r) =           0.9
Coefficient of Corner Openings ZC =             1

LOSSES DUE TO AIR CHANGES QL=VxrxcxDt =            716.8
Space Volume V = 11.2x3.4x3.2=                 122
Air Changes Number per hour n =               0.8

TOTAL THERMAL LOSSES Qtot = QT + QL =             2722

Circuits - Radiators - Owners

| Lev. | No | Space Name | Qth Watt | Circuit N? | Radiator N? Prop. |
|------|-----|-----------|------|-----------|-------------------|
| 1 | 1 | XI.1 | 7006 | | |
| 1 | 2 | XI.4 | 5950 | | |
| 1 | 3 | XI.5 | 6291 | | |
| 1 | 4 | XI.6 | 11192 | | |
| 1 | 5 | XI.7 | 1814 | | |
| 1 | 6 | XI.11 | 2847 | | |
| 1 | 7 | XI.12 | 4600 | | |
| 1 | 8 | XI.13 | 48566 | | |
| 1 | 9 | XI.14 | 3542 | | |
| 1 | 10 | XI.15 | 1312 | | |
| 1 | 11 | XI.16 | 4140 | | |
| 1 | 12 | XI.18 | 1800 | | |
| 1 | 13 | XI.17 | 6022 | | |
| 2 | 1 | XA.1 | 8754 | | |
| 2 | 2 | XA.2 | 897 | | |
| 2 | 3 | XA.3 | 1856 | | |
| 2 | 4 | XA.4 | 2666 | | |
| 2 | 5 | XA.5 | 6123 | | |
| 2 | 6 | XA.6 | 6139 | | |
| 2 | 7 | XA.7 | 6001 | | |
| 2 | 8 | XA.8 | 6337 | | |
| 2 | 9 | XA.9 | 6272 | | |
| 2 | 10 | XA.10 | 4217 | | |
| 2 | 11 | XA.11 | 1914 | | |
| 2 | 12 | XA.12 | 2763 | | |
| 2 | 13 | XA.13 | 1992 | | |
| 2 | 14 | XA.16 | 1477 | | |
| 3 | 1 | XB.1 | 6668 | | |
| 3 | 2 | XB.2 | 6257 | | |
| 3 | 3 | XB.3 | 6521 | | |
| 3 | 4 | XB.4 | 6566 | | |
| 3 | 5 | XB.5 | 5979 | | |
| 3 | 6 | XB.6 | 6301 | | |
| 3 | 7 | XB.7 | 6301 | | |
| 3 | 8 | XB.8 | 6576 | | |
| 3 | 9 | XB.9 | 4295 | | |
| 3 | 10 | XB.10 | 2338 | | |
| 3 | 11 | XB.11 | 2883 | | |
| 3 | 12 | XB.12 | 2722 | | |

Total Thermal Losses     225894

-45- appears at bottom right.

SPACES TOTAL THERMAL LOSSES ( Watt )

Level : Isogeio

| | | |
|---|---|---|
| 1 XI.1 | : | 7006 |
| 2 XI.4 | : | 5950 |
| 3 XI.5 | : | 6291 |
| 4 XI.6 | : | 11192 |
| 5 XI.7 | : | 1814 |
| 6 XI.11 | : | 2847 |
| 7 XI.12 | : | 4600 |
| 8 XI.13 | : | 48566 |
| 9 XI.14 | : | 3542 |
| 10 XI.15 | : | 1312 |
| 11 XI.16 | : | 4140 |
| 12 XI.18 | : | 1800 |
| 13 XI.17 | : | 6022 |

Total Level Thermal Losses          :     105080

Level : A Orofos

| | | |
|---|---|---|
| 1 XA.1 | : | 8754 |
| 2 XA.2 | : | 897 |
| 3 XA.3 | : | 1856 |
| 4 XA.4 | : | 2666 |
| 5 XA.5 | : | 6123 |
| 6 XA.6 | : | 6139 |
| 7 XA.7 | : | 6001 |
| 8 XA.8 | : | 6337 |
| 9 XA.9 | : | 6272 |
| 10 XA.10 | : | 4217 |
| 11 XA.11 | : | 1914 |
| 12 XA.12 | : | 2763 |
| 13 XA.13 | : | 1992 |
| 14 XA.16 | : | 1477 |

Total Level Thermal Losses          :     57407

Level : B Orofos

| | | |
|---|---|---|
| 1 XB.1 | : | 6668 |
| 2 XB.2 | : | 6257 |
| 3 XB.3 | : | 6521 |
| 4 XB.4 | : | 6566 |
| 5 XB.5 | : | 5979 |
| 6 XB.6 | : | 6301 |
| 7 XB.7 | : | 6301 |
| 8 XB.8 | : | 6576 |
| 9 XB.9 | : | 4295 |
| 10 XB.10 | : | 2338 |
| 11 XB.11 | : | 2883 |
| 12 XB.12 | : | 2722 |

Total Level Thermal Losses          :     63408

Total Building Thermal Losses        :     225894

UNSPECIFIED OWNERS

| LEVEL | SPACE |
|-------|-------|
| 1 | 1 |
| 1 | 2 |
| 1 | 3 |
| 1 | 4 |
| 1 | 5 |
| 1 | 6 |
| 1 | 7 |
| 1 | 8 |
| 1 | 9 |
| 1 | 10 |
| 1 | 11 |
| 1 | 12 |
| 1 | 13 |
| 2 | 1 |
| 2 | 2 |
| 2 | 3 |
| 2 | 4 |
| 2 | 5 |
| 2 | 6 |
| 2 | 7 |
| 2 | 8 |
| 2 | 9 |
| 2 | 10 |
| 2 | 11 |
| 2 | 12 |
| 2 | 13 |
| 2 | 14 |
| 3 | 1 |
| 3 | 2 |
| 3 | 3 |
| 3 | 4 |
| 3 | 5 |
| 3 | 6 |
| 3 | 7 |
| 3 | 8 |
| 3 | 9 |
| 3 | 10 |
| 3 | 11 |
| 3 | 12 |

Estimation of Energy Consumption with Degree Day Method

There is no Data about Degree Days in the Library

Building checks according to EN 1283 1

The selected calculation method is not EN 1283 1