|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **طرح نگهداشت و افزایش تولید 27 مخزن** | | | | | | | |
| **HVAC CALCULATION NOTE FOR CCTV ROOM (DU,PU,GCS)**  **نگهداشت و افزایش تولید میدان نفتی بینک** | | | | | | | |
|  | |  |  |  |  |  |  |
|  | |  |  |  |  |  |  |
|  | |  |  |  |  |  |  |
|  | |  |  |  |  |  |  |
| D00 | | APR. 2024 | IFC | K.Ahmadi | M.Fakharian | S.Faramarzpour |  |
| **Rev.** | | **Date** | **Purpose of Issue/Status** | **Prepared by:** | **Checked by:** | **Approved by:** | **CLIENT Approval** |
| **Class: 2** | | | **CLIENT Doc. Number:** **F0Z-709533** | | | | |
| **Status:** | | **IDC: Inter-Discipline Check**  **IFC: Issued For Comment**  **IFA: Issued For Approval**  **AFD: Approved For Design**  **AFC: Approved For Construction**  **AFP: Approved For Purchase**  **AFQ:** Approved For Quotation  **IFI: Issued For Information**  **AB-R: As-Built for CLIENT Review**  **AB-A: As-Built –Approved** | | | | | |

**REVISION RECORD SHEET**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PAGE** | **D00** | **D01** | **D02** | **D03** | **D04** |  | **PAGE** | **D00** | **D01** | **D02** | **D03** | **D04** |
| **1** | **X** |  |  |  |  | **58** |  |  |  |  |  |
| **2** | **X** |  |  |  |  | **59** |  |  |  |  |  |
| **3** | **X** |  |  |  |  | **60** |  |  |  |  |  |
| **4** | **X** |  |  |  |  | **61** |  |  |  |  |  |
| **5** | **X** |  |  |  |  | **62** |  |  |  |  |  |
| **6** | **X** |  |  |  |  | **63** |  |  |  |  |  |
| **7** | **X** |  |  |  |  | **64** |  |  |  |  |  |
| **8** | **X** |  |  |  |  | **65** |  |  |  |  |  |
| **9** | **X** |  |  |  |  | **66** |  |  |  |  |  |
| **10** | **X** |  |  |  |  | **67** |  |  |  |  |  |
| **11** | **X** |  |  |  |  | **68** |  |  |  |  |  |
| **12** | **X** |  |  |  |  | **69** |  |  |  |  |  |
| **13** | **X** |  |  |  |  | **70** |  |  |  |  |  |
| **14** | **X** |  |  |  |  | **71** |  |  |  |  |  |
| **15** | **X** |  |  |  |  | **72** |  |  |  |  |  |
| **16** | **X** |  |  |  |  | **73** |  |  |  |  |  |
| **17** | **X** |  |  |  |  | **74** |  |  |  |  |  |
| **18** | **X** |  |  |  |  | **75** |  |  |  |  |  |
| **19** | **X** |  |  |  |  | **76** |  |  |  |  |  |
| **20** | **X** |  |  |  |  | **77** |  |  |  |  |  |
| **21** | **X** |  |  |  |  | **78** |  |  |  |  |  |
| **22** | **X** |  |  |  |  | **79** |  |  |  |  |  |
| **23** | **X** |  |  |  |  | **80** |  |  |  |  |  |
| **24** | **X** |  |  |  |  | **81** |  |  |  |  |  |
| **25** | **X** |  |  |  |  | **82** |  |  |  |  |  |
| **26** | **X** |  |  |  |  | **83** |  |  |  |  |  |
| **27** | **X** |  |  |  |  | **84** |  |  |  |  |  |
| **28** | **X** |  |  |  |  | **85** |  |  |  |  |  |
| **29** | **X** |  |  |  |  | **86** |  |  |  |  |  |
| **30** | **X** |  |  |  |  | **87** |  |  |  |  |  |
| **31** | **X** |  |  |  |  | **88** |  |  |  |  |  |
| **32** | **X** |  |  |  |  | **89** |  |  |  |  |  |
| **33** | **X** |  |  |  |  | **90** |  |  |  |  |  |
| **34** | **X** |  |  |  |  | **91** |  |  |  |  |  |
| **35** | **X** |  |  |  |  | **92** |  |  |  |  |  |
| **36** |  |  |  |  |  | **93** |  |  |  |  |  |
| **37** |  |  |  |  |  | **94** |  |  |  |  |  |
| **38** |  |  |  |  |  | **95** |  |  |  |  |  |
| **39** |  |  |  |  |  | **96** |  |  |  |  |  |
| **40** |  |  |  |  |  | **97** |  |  |  |  |  |
| **41** |  |  |  |  |  | **98** |  |  |  |  |  |
| **42** |  |  |  |  |  | **99** |  |  |  |  |  |
| **43** |  |  |  |  |  | **100** |  |  |  |  |  |
| **44** |  |  |  |  |  | **101** |  |  |  |  |  |
| **45** |  |  |  |  |  | **102** |  |  |  |  |  |
| **46** |  |  |  |  |  | **103** |  |  |  |  |  |
| **47** |  |  |  |  |  | **104** |  |  |  |  |  |
| **48** |  |  |  |  |  | **105** |  |  |  |  |  |
| **49** |  |  |  |  |  | **106** |  |  |  |  |  |
| **50** |  |  |  |  |  | **107** |  |  |  |  |  |
| **51** |  |  |  |  |  | **108** |  |  |  |  |  |
| **52** |  |  |  |  |  | **109** |  |  |  |  |  |
| **53** |  |  |  |  |  | **110** |  |  |  |  |  |
| **54** |  |  |  |  |  | **111** |  |  |  |  |  |
| **55** |  |  |  |  |  | **112** |  |  |  |  |  |
| **56** |  |  |  |  |  | **113** |  |  |  |  |  |
| **57** |  |  |  |  |  | **114** |  |  |  |  |  |

**CONTENTS**

[1.0 INTRODUCTION 4](#_Toc164506568)

[2.0 Scope 4](#_Toc164506569)

[3.0 NORMATIVE REFERENCES 5](#_Toc164506570)

[3.1 Local Codes and Standards 5](#_Toc164506571)

[3.2 International Codes and Standards 5](#_Toc164506572)

[3.3 ENVIRONMENTAL DATA 5](#_Toc164506573)

[4.0 HVAC CALCULATION 6](#_Toc164506574)

[4.1 Design weather Parameters: 6](#_Toc164506575)

[4.2 CONSTRUCTIONS U-VALUE: 8](#_Toc164506576)

[4.3 SPACE INPUT DATA: 12](#_Toc164506579)

[4.4 SYSTEM INPUT DATA: 18](#_Toc164506582)

[4.5 AIR SYSTEM SIZING SUMMARY: 20](#_Toc164506585)

[4.6 ventilation sizing summary 22](#_Toc164506588)

[4.7 air system design load summary: 23](#_Toc164506591)

[4.8 ZONE DESIGN LOAD SUMMARY: 25](#_Toc164506594)

[4.9 SPACE DESIGN LOAD SUMMARY: 27](#_Toc164506597)

[5.0 Equipment Selection 33](#_Toc164506600)

[5.1 Air Conditioning Unit 33](#_Toc164506601)

[5.2 Exhaust fan selection 35](#_Toc164506604)

[CCTV CONTROL ROOM - BINAK GCS & DU 35](#_Toc164506605)

1. **INTRODUCTION**

Binak oilfield in Bushehr province is a part of the southern oilfields of Iran, is located 20 km northwest of Genaveh city.

With the aim of increasing production of oil from Binak oilfield, an EPC/EPD Project has been defined by NIOC/NISOC and awarded to Petro Iran Development Company (PEDCO).Also PEDCO (as General Contractor) has assigned the EPC-packages of the Project to "Hirgan Energy - Design and Inspection" JV.

**GENERAL DEFINITION**

The following terms shall be used in this document.

|  |  |
| --- | --- |
| CLIENT: | National Iranian South Oilfields Company (NISOC) |
| PROJECT: | Binak Oilfield Development – General Facilities |
| GENERAL CONTRACTOR (GC): | Petro Iran Development Company (PEDCO) |
| EPC CONTRACTOR: | Joint Venture of :Hirgan Energy – Design & Inspection(D&I) Companies |
| VENDOR: | The firm or person who will fabricate the equipment or material. |
| EXECUTOR: | Executor is the party which carries out all or part of construction and/or commissioning for the project. |
| THIRD PARTY INSPECTOR (TPI): | The firm appointed by EPD/EPC CONTRACTOR (GC) and approved by CLIENT (in writing) for the inspection of goods. |
| SHALL: | Is used where a provision is mandatory. |
| SHOULD: | Is used where a provision is advisory only. |
| WILL: | Is normally used in connection with the action by CLIENT rather than by an EPC/EPD CONTRACTOR, supplier or VENDOR |
| MAY: | Is used where a provision is completely discretionary. |

1. **Scope**

The main purpose of this document is to define the HVAC system load calculation has been carried out by computer program (HAP software) as per ASHRAE method in order to evaluate cooling load (summer) and heating load (winter) and also to select HVAC equipment for the calculated cooling and heating load.

1. **NORMATIVE REFERENCES**

## Local Codes and Standards

* IPS Iranian petroleum standards
* INBC Iranian National Building Code

## International Codes and Standards

* ASTM American Society for Testing Materials Relevant Parts
* API 610 Centrifugal Pumps for General Refinery Service, 10th Edition
* ISO 15156 Petroleum and Natural Gas Industries. Materials for use in H2S Containing Environments in Oil and Gas

Production

* AMCA Air Movement and Control Association
* ANSI American National Standards Institute.
* ASHRAE American Society of Heating, Refrigeration and Air-conditioning Engineer
* ASTM American Society for Testing and Material
* BOCA Building Officials and Code Administrators international
* BS British Standards
* CIBSE Chartered Institute of Building Services Engineers.
* NFPA National fire protection association
* SBCCI Southern Building Code Congress International
* SMACNA Sheet Metal and Air Conditioning Contractors’ National Association
* AWWA [American Water Works Association](http://www.awwa.org/)
* ASME [The American Society of Mechanical Engineers](https://www.asme.org/)

Note: The latest issued or revised edition of all above mentioned codes and standards shall be considered as reference.

## ENVIRONMENTAL DATA

Refer to "Process Basis of Design; Doc. No BK-GNRAL-PEDCO-000-PR-DB-0001.

1. **HVAC CALCULATION**

## Design weather Parameters:

**Design Parameters:**

    City Name   **Binak**

    Location   **IRAN**

    Latitude   **29.7** Deg.

    Longitude   **-50.4** Deg.

    Elevation   **26.2** m

    Summer Design Dry-Bulb   **41.0** °C

    Summer Coincident Wet-Bulb   **32.0** °C

    Summer Daily Range   **16.7** °K

    Winter Design Dry-Bulb   **6.0** °C

    Winter Design Wet-Bulb   **6.0** °C

    Atmospheric Clearness Number   **1.00**

    Average Ground Reflectance   **0.20**

    Soil Conductivity   **1.385** W/ (m-°K)

    Local Time Zone (GMT +/- N hours)   **-3.5** hours

    Consider Daylight Savings Time   **No**

    Simulation Weather Data   **noneN/A**

    Current Data is   **User Modified**

    Design Cooling Months  **January to December**

**Design Day Maximum Solar Heat Gains**

    (The MSHG values are expressed in W/m² )

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Month** | **N** | **NNE** | **NE** | **ENE** | **E** | **ESE** | **SE** | **SSE** | **S** |
| January | 77.5 | 77.5 | 95.1 | 360.4 | 561.2 | 730.9 | 794.1 | 786.3 | 762.3 |
| February | 89.1 | 89.1 | 206.7 | 484.1 | 668.9 | 760.8 | 782.0 | 718.9 | 671.9 |
| March | 101.4 | 120.5 | 367.4 | 576.2 | 723.5 | 759.6 | 702.5 | 590.8 | 520.1 |
| April | 113.0 | 252.7 | 487.2 | 636.6 | 705.1 | 688.3 | 568.6 | 408.7 | 322.0 |
| May | 124.3 | 351.1 | 551.9 | 666.3 | 679.9 | 619.4 | 469.6 | 279.8 | 199.5 |
| June | 161.0 | 389.1 | 570.0 | 664.8 | 662.8 | 586.8 | 421.4 | 228.9 | 165.7 |
| July | 128.9 | 355.9 | 541.6 | 644.7 | 671.3 | 606.9 | 452.1 | 270.2 | 196.1 |
| August | 118.3 | 256.1 | 470.7 | 606.2 | 686.0 | 663.8 | 546.8 | 395.4 | 311.9 |
| September | 104.3 | 109.2 | 354.3 | 538.8 | 681.8 | 728.9 | 670.0 | 569.4 | 503.5 |
| October | 91.2 | 91.2 | 226.5 | 441.2 | 642.7 | 746.9 | 748.8 | 692.4 | 650.8 |
| November | 78.1 | 78.1 | 103.7 | 341.8 | 572.3 | 707.9 | 785.7 | 774.1 | 747.8 |
| December | 71.9 | 71.9 | 71.9 | 306.4 | 524.4 | 699.0 | 788.1 | 799.2 | 780.7 |
| **Month** | **SSW** | **SW** | **WSW** | **W** | **WNW** | **NW** | **NNW** | **HOR** | **Mult** |
| January | 779.8 | 791.7 | 733.2 | 577.4 | 337.4 | 108.2 | 77.5 | 591.4 | 1.00 |
| February | 716.3 | 777.2 | 772.2 | 650.4 | 482.8 | 225.6 | 89.1 | 714.5 | 1.00 |
| March | 590.5 | 703.8 | 755.6 | 713.7 | 589.1 | 369.6 | 114.3 | 816.8 | 1.00 |
| April | 413.5 | 574.6 | 682.6 | 707.6 | 645.8 | 485.9 | 241.4 | 863.3 | 1.00 |
| May | 282.1 | 471.6 | 614.4 | 688.4 | 669.7 | 550.4 | 343.5 | 875.1 | 1.00 |
| June | 233.1 | 424.2 | 577.0 | 674.2 | 670.6 | 567.0 | 376.4 | 872.9 | 1.00 |
| July | 274.2 | 458.7 | 596.0 | 677.5 | 657.5 | 539.9 | 345.0 | 865.3 | 1.00 |
| August | 398.9 | 554.0 | 657.3 | 682.8 | 624.7 | 473.1 | 240.3 | 846.4 | 1.00 |
| September | 569.0 | 669.3 | 728.9 | 681.0 | 540.4 | 354.6 | 108.6 | 783.8 | 1.00 |
| October | 697.0 | 755.4 | 737.2 | 647.9 | 457.7 | 216.5 | 91.2 | 696.8 | 1.00 |
| November | 775.6 | 786.0 | 708.0 | 568.2 | 351.0 | 91.0 | 78.1 | 582.8 | 1.00 |
| December | 798.2 | 790.7 | 685.6 | 536.9 | 295.2 | 71.9 | 71.9 | 533.5 | 1.00 |

    Mult. = User-defined solar multiplier factor.

**Design Temperature Profile**



## CONSTRUCTIONS U-VALUE:

# CCTV CONTROL ROOM - BINAK GCS & DU

**Wall (Ceramic tile)**

**Wall Details**

    Outside Surface Color   **Medium**

    Absorptivity   **0.675**

    Overall U-Value   **0.217** W/(m²-°K)

**Wall Layers Details (Inside to Outside)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Thickness** | **Density** | **Specific Ht.** | **R-Value** | **Weight** |
| **Layers** | **mm** | **kg/m³** | **kJ / (kg - °K)** | **(m²-°K)/W** | **kg/m²** |
| Inside surface resistance | 0.000 | 0.0 | 0.00 | 0.12064 | 0.0 |
| Ceramic tile | 12.500 | 1000.0 | 0.34 | 0.03676 | 12.5 |
| Cement plaster | 25.000 | 1600.0 | 0.80 | 0.03125 | 40.0 |
| Wall brick | 200.000 | 2000.0 | 0.20 | 1.00000 | 400.0 |
| Rock wool | 50.000 | 25.0 | 0.05 | 1.00000 | 1.3 |
| Cement plaster | 30.000 | 1600.0 | 0.80 | 0.03750 | 48.0 |
| Face brick | 70.000 | 2000.0 | 0.03 | 2.33000 | 140.0 |
| Outside surface resistance | 0.000 | 0.0 | 0.00 | 0.05864 | 0.0 |
| **Totals** | **387.500** | **-** |  | **4.61479** | **641.8** |

**Wall (MDF)**

**Wall Details**

    Outside Surface Color   **Medium**

    Absorptivity   **0.675**

    Overall U-Value   **0.201** W/(m²-°K)

**Wall Layers Details (Inside to Outside)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Thickness** | **Density** | **Specific Ht.** | **R-Value** | **Weight** |
| **Layers** | **mm** | **kg/m³** | **kJ / (kg - °K)** | **(m²-°K)/W** | **kg/m²** |
| Inside surface resistance | 0.000 | 0.0 | 0.00 | 0.12064 | 0.0 |
| Wood siding | 40.000 | 400.0 | 1.17 | 0.40000 | 16.0 |
| Cement plaster | 25.000 | 1600.0 | 0.80 | 0.03125 | 40.0 |
| Wall brick | 200.000 | 2000.0 | 0.20 | 1.00000 | 400.0 |
| Rock wool | 50.000 | 25.0 | 0.05 | 1.00000 | 1.3 |
| Cement plaster | 30.000 | 1600.0 | 0.80 | 0.03750 | 48.0 |
| Face brick | 70.000 | 2000.0 | 0.03 | 2.33000 | 140.0 |
| Outside surface resistance | 0.000 | 0.0 | 0.00 | 0.05864 | 0.0 |
| **Totals** | **415.000** | **-** |  | **4.97803** | **645.3** |

**Wall (Stone)**

**Wall Details**

    Outside Surface Color   **Medium**

    Absorptivity   **0.675**

    Overall U-Value   **0.218** W/(m²-°K)

**Wall Layers Details (Inside to Outside)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Thickness** | **Density** | **Specific Ht.** | **R-Value** | **Weight** |
| **Layers** | **mm** | **kg/m³** | **kJ / (kg - °K)** | **(m²-°K)/W** | **kg/m²** |
| Inside surface resistance | 0.000 | 0.0 | 0.00 | 0.12064 | 0.0 |
| marble stone | 50.000 | 2700.0 | 1.26 | 0.01429 | 135.0 |
| Cement plaster | 25.000 | 1600.0 | 0.80 | 0.03125 | 40.0 |
| Wall brick | 200.000 | 2000.0 | 0.20 | 1.00000 | 400.0 |
| Rock wool | 50.000 | 25.0 | 0.05 | 1.00000 | 1.3 |
| Cement plaster | 30.000 | 1600.0 | 0.80 | 0.03750 | 48.0 |
| Face brick | 70.000 | 2000.0 | 0.03 | 2.33000 | 140.0 |
| Outside surface resistance | 0.000 | 0.0 | 0.00 | 0.05864 | 0.0 |
| **Totals** | **425.000** | **-** |  | **4.59232** | **764.3** |

**Roof**

**Roof Details**

    Outside Surface Color   **Medium**

    Absorptivity   **0.675**

    Overall U-Value   **0.479** W/(m²-°K)

**Roof Layers Details (Inside to Outside)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Thickness** | **Density** | **Specific Ht.** | **R-Value** | **Weight** |
| **Layers** | **mm** | **kg/m³** | **kJ / (kg - °K)** | **(m²-°K)/W** | **kg/m²** |
| Inside surface resistance | 0.000 | 0.0 | 0.00 | 0.12064 | 0.0 |
| HW concrete | 200.000 | 2242.6 | 0.84 | 0.11556 | 448.5 |
| Rock wool | 50.000 | 25.0 | 0.84 | 1.00000 | 1.3 |
| LW concrete | 100.000 | 640.7 | 0.84 | 0.57779 | 64.1 |
| Waterproofing/isogume or similar | 4.000 | 1000.0 | 1.67 | 0.17390 | 4.0 |
| Cement plaster | 25.000 | 1600.0 | 0.80 | 0.03750 | 40.0 |
| Terrazzo tile | 25.000 | 2000.0 | 0.84 | 0.00185 | 50.0 |
| Outside surface resistance | 0.000 | 0.0 | 0.00 | 0.05864 | 0.0 |
| **Totals** | **404.000** | **-** |  | **2.08588** | **607.8** |

**U.W.-1**

**Window Details:**

    Detailed Input   **Yes**

    Height   **1.20** m

    Width   **1.00** m

    Frame Type   **Vinyl**

    Internal Shade Type   **None**

    Overall U-Value   **2.819** W/(m²-°K)

    Overall Shade Coefficient   **0.700**

**Glass Details:**

    Gap Type   **6mm Argon**

| **Glazing** | **Glass Type** | **Transmissivity** | **Reflectivity** | **Absorptivity** |
| --- | --- | --- | --- | --- |
| Outer Glazing | 6mm clear | 0.792 | 0.079 | 0.129 |
| Glazing #2 | 6mm clear | 0.792 | 0.079 | 0.129 |
| Glazing #3 | not used | 1.000 | 0.000 | 0.000 |

**M.D.-1**

**Door Details:**

    Gross Area   **2.4** m²

    Door U-Value   **5.800** W/(m²-°K)

**Glass Details:**

    Glass Area   **0.0** m²

    Glass U-Value   **3.293** W/(m²-°K)

    Glass Shade Coefficient   **0.880**

    Glass Shaded All Day?   **No**

# CCTV CONTROL ROOM - BINAK pu

**Wall (gypsum plaster)**

**Wall Details**

    Outside Surface Color   **Medium**

    Absorptivity   **0.675**

    Overall U-Value   **0.200** W/(m²-°K)

**Wall Layers Details (Inside to Outside)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Thickness** | **Density** | **Specific Ht.** | **R-Value** | **Weight** |
| **Layers** | **mm** | **kg/m³** | **kJ / (kg - °K)** | **(m²-°K)/W** | **kg/m²** |
| Inside surface resistance | 0.000 | 0.0 | 0.00 | 0.12064 | 0.0 |
| gypsum plaster | 20.000 | 1150.0 | 1.17 | 0.03509 | 23.0 |
| Wall brick | 200.000 | 2000.0 | 0.20 | 1.00000 | 400.0 |
| HDPU | 50.000 | 50.0 | 0.05 | 1.42857 | 2.5 |
| Cement plaster | 30.000 | 1600.0 | 0.80 | 0.03750 | 48.0 |
| Face brick | 70.000 | 2000.0 | 0.03 | 2.33000 | 140.0 |
| Outside surface resistance | 0.000 | 0.0 | 0.00 | 0.05864 | 0.0 |
| **Totals** | **370.000** | **-** |  | **5.01044** | **613.5** |

**Wall (marmarit stone)**

**Wall Details**

    Outside Surface Color   **Medium**

    Absorptivity   **0.675**

    Overall U-Value   **0.199** W/(m²-°K)

**Wall Layers Details (Inside to Outside)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Thickness** | **Density** | **Specific Ht.** | **R-Value** | **Weight** |
| **Layers** | **mm** | **kg/m³** | **kJ / (kg - °K)** | **(m²-°K)/W** | **kg/m²** |
| Inside surface resistance | 0.000 | 0.0 | 0.00 | 0.12064 | 0.0 |
| marmarit stone | 50.000 | 2700.0 | 1.26 | 0.01429 | 135.0 |
| Cement plaster | 25.000 | 1600.0 | 0.80 | 0.03125 | 40.0 |
| Wall brick | 200.000 | 2000.0 | 0.20 | 1.00000 | 400.0 |
| HDPU | 50.000 | 25.0 | 0.05 | 1.42857 | 1.3 |
| Cement plaster | 30.000 | 1600.0 | 0.80 | 0.03750 | 48.0 |
| Face brick | 70.000 | 2000.0 | 0.03 | 2.33000 | 140.0 |
| Outside surface resistance | 0.000 | 0.0 | 0.00 | 0.05864 | 0.0 |
| **Totals** | **425.000** | **-** |  | **5.02089** | **764.3** |

**Roof**

**Roof Details**

    Outside Surface Color   **Medium**

    Absorptivity   **0.675**

    Overall U-Value   **0.398** W/(m²-°K)

**Roof Layers Details (Inside to Outside)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Thickness** | **Density** | **Specific Ht.** | **R-Value** | **Weight** |
| **Layers** | **mm** | **kg/m³** | **kJ / (kg - °K)** | **(m²-°K)/W** | **kg/m²** |
| Inside surface resistance | 0.000 | 0.0 | 0.00 | 0.12064 | 0.0 |
| HW concrete | 200.000 | 2242.6 | 0.84 | 0.11556 | 448.5 |
| HDPU | 50.000 | 25.0 | 0.84 | 1.42857 | 1.3 |
| LW concrete | 100.000 | 640.7 | 0.84 | 0.57779 | 64.1 |
| Waterproofing/isogume or similar | 4.000 | 1000.0 | 1.67 | 0.17390 | 4.0 |
| Cement plaster | 25.000 | 1600.0 | 0.80 | 0.03750 | 40.0 |
| Terrazzo tile | 25.000 | 2000.0 | 0.84 | 0.00185 | 50.0 |
| Outside surface resistance | 0.000 | 0.0 | 0.00 | 0.05864 | 0.0 |
| **Totals** | **404.000** | **-** |  | **2.51445** | **607.8** |

**U.W.-1**

**Window Details:**

    Detailed Input   **Yes**

    Height   **1.20** m

    Width   **0.70** m

    Frame Type   **Vinyl**

    Internal Shade Type   **None**

    Overall U-Value   **2.819** W/(m²-°K)

    Overall Shade Coefficient   **0.700**

**Glass Details:**

    Gap Type   **6mm Argon**

| **Glazing** | **Glass Type** | **Transmissivity** | **Reflectivity** | **Absorptivity** |
| --- | --- | --- | --- | --- |
| Outer Glazing | 6mm clear | 0.792 | 0.079 | 0.129 |
| Glazing #2 | 6mm clear | 0.792 | 0.079 | 0.129 |
| Glazing #3 | not used | 1.000 | 0.000 | 0.000 |

**U.W.-2**

**Window Details:**

    Detailed Input   **Yes**

    Height   **1.20** m

    Width   **1.50** m

    Frame Type   **Vinyl**

    Internal Shade Type   **None**

    Overall U-Value   **2.845** W/(m²-°K)

    Overall Shade Coefficient   **0.700**

**Glass Details:**

    Gap Type   **6mm Argon**

| **Glazing** | **Glass Type** | **Transmissivity** | **Reflectivity** | **Absorptivity** |
| --- | --- | --- | --- | --- |
| Outer Glazing | 6mm clear | 0.792 | 0.079 | 0.129 |
| Glazing #2 | 6mm clear | 0.792 | 0.079 | 0.129 |
| Glazing #3 | not used | 1.000 | 0.000 | 0.000 |

**M.D.-1**

**Door Details:**

    Gross Area   **2.2** m²

    Door U-Value   **5.800** W/(m²-°K)

**Glass Details:**

    Glass Area   **0.0** m²

    Glass U-Value   **3.293** W/(m²-°K)

    Glass Shade Coefficient   **0.880**

    Glass Shaded All Day?   **No**

## SPACE INPUT DATA:

# CCTV CONTROL ROOM - BINAK GCS & DU

**00-Control Room**

**1. General Details:**

    Floor Area   **46.6** m²

    Avg. Ceiling Height   **3.2** m

    Building Weight   **341.8** kg/m²

**1.1. OA Ventilation Requirements:**

    Space Usage   **User-Defined**

    OA Requirement 1   **0.0** L/s/person

    OA Requirement 2   **0.00** L/(s-m²)

    Space Usage Defaults   **ASHRAE Standard 62.1-2010**

**2. Internals:**

**2.1. Overhead Lighting:**

    Fixture Type   **Recessed (Unvented)**

    Wattage   **11.90** W/m²

    Ballast Multiplier   **1.25**

    Schedule   **Lighting**

**2.2. Task Lighting:**

    Wattage   **0.00** W/m²

    Schedule   **None**

**2.3. Electrical Equipment:**

    Wattage   **500.0** Watts

    Schedule   **Electrical Eq.**

**2.4. People:**

    Occupancy   **5.0** People

    Activity Level   **Office Work**

    Sensible   **71.8** W/person

    Latent   **60.1** W/person

    Schedule   **People**

**2.5. Miscellaneous Loads:**

    Sensible   **0** W

    Schedule   **None**

    Latent   **0** W

    Schedule   **None**

**3. Walls, Windows, Doors:**

| **Exp.** | **Wall Gross Area (m²)** | **Window 1 Qty.** | **Window 2 Qty.** | **Door 1 Qty.** |
| --- | --- | --- | --- | --- |
| NNW | 18.9 | 0 | 0 | 0 |
| ENE | 24.6 | 0 | 0 | 0 |
| WSW | 24.6 | 0 | 0 | 0 |

**3.1. Construction Types for Exposure NNW**

    Wall Type   **Wall (MDF)**

**3.2. Construction Types for Exposure ENE**

    Wall Type   **Wall (MDF)**

**3.3. Construction Types for Exposure WSW**

    Wall Type   **Wall (MDF)**

**4. Roofs, Skylights:**

| **Exp.** | **Roof Gross Area (m²)** | **Roof Slope (deg.)** | **Skylight Qty.** |
| --- | --- | --- | --- |
| H | 46.6 | 0 | 0 |

**4.1. Construction Types for Exposure H**

    Roof Type   **Roof**

**5. Infiltration:**

    Design Cooling   **0.00** ACH

    Design Heating   **0.00** ACH

    Energy Analysis   **0.00** ACH

    Infiltration occurs at all hours.

**6. Floors:**

    Type   **Slab Floor On Grade**

    Floor Area   **46.6** m²

    Total Floor U-Value   **0.568** W/(m²-°K)

    Exposed Perimeter   **21.6** m

    Edge Insulation R-Value   **0.00** (m²-°K)/W

**7. Partitions:**

**7.1. 1st Partition Details:**

    Partition Type   **Wall Partition**

    Area   **6.6** m²

    U-Value   **0.761** W/(m²-°K)

    Uncondit. Space Max Temp   **35.0** °C

    Ambient at Space Max Temp   **41.0** °C

    Uncondit. Space Min Temp   **12.5** °C

    Ambient at Space Min Temp   **6.0** °C

**7.2. 2nd Partition Details:**

**(No partition data).**

**01-Rack Room**

**1. General Details:**

    Floor Area   **10.0** m²

    Avg. Ceiling Height   **3.2** m

    Building Weight   **341.8** kg/m²

**1.1. OA Ventilation Requirements:**

    Space Usage   **User-Defined**

    OA Requirement 1   **0.0** L/s/person

    OA Requirement 2   **0.00** L/(s-m²)

    Space Usage Defaults   **ASHRAE Standard 62.1-2010**

**2. Internals:**

**2.1. Overhead Lighting:**

    Fixture Type   **Recessed (Unvented)**

    Wattage   **10.20** W/m²

    Ballast Multiplier   **1.25**

    Schedule   **Lighting**

**2.2. Task Lighting:**

    Wattage   **0.00** W/m²

    Schedule   **None**

**2.3. Electrical Equipment:**

    Wattage   **2500.0** Watts

    Schedule   **Electrical Eq.**

**2.4. People:**

    Occupancy   **0.0** Person

    Activity Level   **Office Work**

    Sensible   **71.8** W/person

    Latent   **60.1** W/person

    Schedule   **None**

**2.5. Miscellaneous Loads:**

    Sensible   **0** W

    Schedule   **None**

    Latent   **0** W

    Schedule   **None**

**3. Walls, Windows, Doors:**

| **Exp.** | **Wall Gross Area (m²)** | **Window 1 Qty.** | **Window 2 Qty.** | **Door 1 Qty.** |
| --- | --- | --- | --- | --- |
| ENE | 12.6 | 0 | 0 | 0 |
| SSE | 7.9 | 0 | 0 | 0 |

**3.1. Construction Types for Exposure ENE**

    Wall Type   **Wall (Stone)**

**3.2. Construction Types for Exposure SSE**

    Wall Type   **Wall (Stone)**

**4. Roofs, Skylights:**

| **Exp.** | **Roof Gross Area (m²)** | **Roof Slope (deg.)** | **Skylight Qty.** |
| --- | --- | --- | --- |
| H | 10.0 | 0 | 0 |

**4.1. Construction Types for Exposure H**

    Roof Type   **Roof**

**5. Infiltration:**

    Design Cooling   **0.00** ACH

    Design Heating   **0.00** ACH

    Energy Analysis   **0.00** ACH

    Infiltration occurs at all hours.

**6. Floors:**

    Type   **Floor Above Unconditioned Space**

    Floor Area   **10.0** m²

    Total Floor U-Value   **0.568** W/(m²-°K)

    Unconditioned Space Max Temp.   **35.0** °C

    Ambient at Space Max Temp.   **41.0** °C

    Unconditioned Space Min Temp.   **12.5** °C

    Ambient at Space Min Temp.   **6.0** °C

**7. Partitions:**

**(No partition data).**

**02-Entrance**

**1. General Details:**

    Floor Area   **4.8** m²

    Avg. Ceiling Height   **3.2** m

    Building Weight   **341.8** kg/m²

**1.1. OA Ventilation Requirements:**

    Space Usage   **User-Defined**

    OA Requirement 1   **0.0** L/s/person

    OA Requirement 2   **0.00** L/(s-m²)

    Space Usage Defaults   **ASHRAE Standard 62.1-2010**

**2. Internals:**

**2.1. Overhead Lighting:**

    Fixture Type   **Recessed (Unvented)**

    Wattage   **7.00** W/m²

    Ballast Multiplier   **1.25**

    Schedule   **Lighting**

**2.2. Task Lighting:**

    Wattage   **0.00** W/m²

    Schedule   **None**

**2.3. Electrical Equipment:**

    Wattage   **500.0** Watts

    Schedule   **Electrical Eq.**

**2.4. People:**

    Occupancy   **0.0** Person

    Activity Level   **Office Work**

    Sensible   **71.8** W/person

    Latent   **60.1** W/person

    Schedule   **None**

**2.5. Miscellaneous Loads:**

    Sensible   **0** W

    Schedule   **None**

    Latent   **0** W

    Schedule   **None**

**3. Walls, Windows, Doors:**

| **Exp.** | **Wall Gross Area (m²)** | **Window 1 Qty.** | **Window 2 Qty.** | **Door 1 Qty.** |
| --- | --- | --- | --- | --- |
| SSE | 3.8 | 0 | 0 | 1 |

**3.1. Construction Types for Exposure SSE**

    Wall Type   **Wall (MDF)**

    Door Type   **M.D.-1**

**4. Roofs, Skylights:**

| **Exp.** | **Roof Gross Area (m²)** | **Roof Slope (deg.)** | **Skylight Qty.** |
| --- | --- | --- | --- |
| H | 4.8 | 0 | 0 |

**4.1. Construction Types for Exposure H**

    Roof Type   **Roof**

**5. Infiltration:**

    Design Cooling   **74.33** L/s

    Design Heating   **74.33** L/s

    Energy Analysis   **74.33** L/s

    Infiltration occurs at all hours.

**6. Floors:**

    Type   **Slab Floor On Grade**

    Floor Area   **4.8** m²

    Total Floor U-Value   **0.568** W/(m²-°K)

    Exposed Perimeter   **1.2** m

    Edge Insulation R-Value   **0.00** (m²-°K)/W

**7. Partitions:**

**7.1. 1st Partition Details:**

    Partition Type   **Wall Partition**

    Area   **6.0** m²

    U-Value   **0.761** W/(m²-°K)

    Uncondit. Space Max Temp   **35.0** °C

    Ambient at Space Max Temp   **41.0** °C

    Uncondit. Space Min Temp   **12.5** °C

    Ambient at Space Min Temp   **6.0** °C

**7.2. 2nd Partition Details:**

**(No partition data).**

**03-Pantry**

**1. General Details:**

    Floor Area   **4.2** m²

    Avg. Ceiling Height   **3.2** m

    Building Weight   **341.8** kg/m²

**1.1. OA Ventilation Requirements:**

    Space Usage   **User-Defined**

    OA Requirement 1   **0.0** L/s/person

    OA Requirement 2   **0.00** L/(s-m²)

    Space Usage Defaults   **ASHRAE Standard 62.1-2010**

**2. Internals:**

**2.1. Overhead Lighting:**

    Fixture Type   **Recessed (Unvented)**

    Wattage   **10.70** W/m²

    Ballast Multiplier   **1.25**

    Schedule   **Lighting**

**2.2. Task Lighting:**

    Wattage   **0.00** W/m²

    Schedule   **None**

**2.3. Electrical Equipment:**

    Wattage   **600.0** Watts

    Schedule   **Electrical Eq.**

**2.4. People:**

    Occupancy   **0.0** Person

    Activity Level   **Office Work**

    Sensible   **71.8** W/person

    Latent   **60.1** W/person

    Schedule   **None**

**2.5. Miscellaneous Loads:**

    Sensible   **1000** W

    Schedule   **Electrical Eq.**

    Latent   **700** W

    Schedule   **Electrical Eq.**

**3. Walls, Windows, Doors:**

| **Exp.** | **Wall Gross Area (m²)** | **Window 1 Qty.** | **Window 2 Qty.** | **Door 1 Qty.** |
| --- | --- | --- | --- | --- |
| WSW | 6.3 | 1 | 0 | 0 |
| SSE | 6.6 | 0 | 0 | 0 |

**3.1. Construction Types for Exposure WSW**

    Wall Type   **Wall (Ceramic tile)**

    1st Window Type   **U.W.-1**

**3.2. Construction Types for Exposure SSE**

    Wall Type   **Wall (Ceramic tile)**

**4. Roofs, Skylights:**

| **Exp.** | **Roof Gross Area (m²)** | **Roof Slope (deg.)** | **Skylight Qty.** |
| --- | --- | --- | --- |
| H | 4.2 | 0 | 0 |

**4.1. Construction Types for Exposure H**

    Roof Type   **Roof**

**5. Infiltration:**

    Design Cooling   **21.83** L/s

    Design Heating   **21.83** L/s

    Energy Analysis   **21.83** L/s

    Infiltration occurs at all hours.

**6. Floors:**

    Type   **Slab Floor On Grade**

    Floor Area   **4.2** m²

    Total Floor U-Value   **0.568** W/(m²-°K)

    Exposed Perimeter   **4.1** m

    Edge Insulation R-Value   **0.00** (m²-°K)/W

**7. Partitions:**

**7.1. 1st Partition Details:**

    Partition Type   **Wall Partition**

    Area   **6.6** m²

    U-Value   **0.761** W/(m²-°K)

    Uncondit. Space Max Temp   **35.0** °C

    Ambient at Space Max Temp   **41.0** °C

    Uncondit. Space Min Temp   **12.5** °C

    Ambient at Space Min Temp   **6.0** °C

**7.2. 2nd Partition Details:**

**(No partition data).**

# CCTV CONTROL ROOM - BINAK pu

**00-Guard House**

**1. General Details:**

    Floor Area   **4.7** m²

    Avg. Ceiling Height   **2.8** m

    Building Weight   **341.8** kg/m²

**1.1. OA Ventilation Requirements:**

    Space Usage   **User-Defined**

    OA Requirement 1   **0.0** L/s/person

    OA Requirement 2   **0.00** L/(s-m²)

    Space Usage Defaults   **ASHRAE Standard 62.1-2010**

**2. Internals:**

**2.1. Overhead Lighting:**

    Fixture Type   **Recessed (Unvented)**

    Wattage   **11.90** W/m²

    Ballast Multiplier   **1.25**

    Schedule   **Lighting**

**2.2. Task Lighting:**

    Wattage   **0.00** W/m²

    Schedule   **None**

**2.3. Electrical Equipment:**

    Wattage   **100.0** Watts

    Schedule  **Electrical Eq.**

**2.4. People:**

    Occupancy   **2.0** People

    Activity Level   **Office Work**

    Sensible   **71.8** W/person

    Latent   **60.1** W/person

    Schedule  **People**

**2.5. Miscellaneous Loads:**

    Sensible   **0** W

    Schedule   **None**

    Latent   **0** W

    Schedule   **None**

**3. Walls, Windows, Doors:**

| **Exp.** | **Wall Gross Area (m²)** | **Window 1 Qty.** | **Window 2 Qty.** | **Door 1 Qty.** |
| --- | --- | --- | --- | --- |
| N | 5.7 | 1 | 0 | 1 |
| S | 5.7 | 1 | 0 | 0 |
| E | 6.4 | 1 | 0 | 0 |

**3.1. Construction Types for Exposure N**

    Wall Type   **Wall (gypsum plaster)**

    1st Window Type   **U.W.-1**

    Door Type   **M.D.-1**

**3.2. Construction Types for Exposure S**

    Wall Type   **Wall (gypsum plaster)**

    1st Window Type   **U.W.-2**

**3.3. Construction Types for Exposure E**

    Wall Type   **Wall (gypsum plaster)**

    1st Window Type   **U.W.-2**

**4. Roofs, Skylights:**

| **Exp.** | **Roof Gross Area (m²)** | **Roof Slope (deg.)** | **Skylight Qty.** |
| --- | --- | --- | --- |
| H | 4.7 | 0 | 0 |

**4.1. Construction Types for Exposure H**

    Roof Type   **Roof**

**5. Infiltration:**

    Design Cooling   **2.00** ACH

    Design Heating   **2.00** ACH

    Energy Analysis   **2.00** ACH

    Infiltration occurs at all hours.

**6. Floors:**

    Type   **Slab Floor On Grade**

    Floor Area   **4.7** m²

    Total Floor U-Value   **0.568** W/(m²-°K)

    Exposed Perimeter   **10.5** m

    Edge Insulation R-Value   **0.00** (m²-°K)/W

**7. Partitions:**

**(No partition data).**

**01-Rack Room**

**1. General Details:**

    Floor Area   **2.6** m²

    Avg. Ceiling Height   **2.8** m

    Building Weight   **341.8** kg/m²

**1.1. OA Ventilation Requirements:**

    Space Usage   **User-Defined**

    OA Requirement 1   **0.0** L/s/person

    OA Requirement 2   **0.00** L/(s-m²)

    Space Usage Defaults   **ASHRAE Standard 62.1-2010**

**2. Internals:**

**2.1. Overhead Lighting:**

    Fixture Type   **Recessed (Unvented)**

    Wattage   **10.20** W/m²

    Ballast Multiplier   **1.25**

    Schedule   **Lighting**

**2.2. Task Lighting:**

    Wattage   **0.00** W/m²

    Schedule   **None**

**2.3. Electrical Equipment:**

    Wattage   **1000.0** Watts

    Schedule   **Electrical Eq.**

**2.4. People:**

    Occupancy   **0.0** Person

    Activity Level   **Office Work**

    Sensible   **71.8** W/person

    Latent   **60.1** W/person

    Schedule   **None**

**2.5. Miscellaneous Loads:**

    Sensible   **0** W

    Schedule   **None**

    Latent   **0** W

    Schedule   **None**

**3. Walls, Windows, Doors:**

| **Exp.** | **Wall Gross Area (m²)** | **Window 1 Qty.** | **Window 2 Qty.** | **Door 1 Qty.** |
| --- | --- | --- | --- | --- |
| N | 3.2 | 0 | 0 | 0 |
| W | 6.4 | 0 | 0 | 1 |
| S | 3.2 | 0 | 0 | 0 |

**3.1. Construction Types for Exposure N**

    Wall Type   **Wall (marmarit stone)**

**3.2. Construction Types for Exposure W**

    Wall Type   **Wall (marmarit stone)**

    Door Type   **M.D.-1**

**3.3. Construction Types for Exposure S**

    Wall Type   **Wall (marmarit stone)**

**4. Roofs, Skylights:**

| **Exp.** | **Roof Gross Area (m²)** | **Roof Slope (deg.)** | **Skylight Qty.** |
| --- | --- | --- | --- |
| H | 10.0 | 0 | 0 |

**4.1. Construction Types for Exposure H**

    Roof Type   **Roof**

**5. Infiltration:**

    Design Cooling   **0.00** ACH

    Design Heating   **0.00** L/(s-m²)

    Energy Analysis   **0.00** L/s

    Infiltration occurs at all hours.

**6. Floors:**

    Type   **Floor Above Unconditioned Space**

    Floor Area   **2.6** m²

    Total Floor U-Value   **0.568** W/(m²-°K)

    Unconditioned Space Max Temp.   **35.0** °C

    Ambient at Space Max Temp.   **41.0** °C

    Unconditioned Space Min Temp.   **12.5** °C

    Ambient at Space Min Temp.   **6.0** °C

**7. Partitions:**

**(No partition data).**

## SYSTEM INPUT DATA:

# CCTV CONTROL ROOM - BINAK GCS & DU

**1. General Details:**

    Air System Name   **System**

    Equipment Type   **Terminal Units**

    Air System Type   **Split DX Fan Coil**

    Number of zones   **2**

    Ventilation   **Direct Ventilation**

**2. Ventilation System Components:**

(Common Ventilation System not used: no inputs)

**3. Zone Components:**

**Space Assignments:**

|  |  |
| --- | --- |
| **Zone 1: Zone 1** |  |
| 00-Control Room | x1 |
| 02-Entrance | x1 |
| 03-Pantry | x1 |
| **Zone 2: Zone 2** |  |
| 01-Rack Room | x1 |

**Thermostats and Zone Data:**

| **Zone** | **Cooling T-Stat Occ.** | **Cooling T-Stat Unocc.** | **Heating T-Stat Occ.** | **Heating T-Stat Unocc.** | **T-Stat Throttling Range** |
| --- | --- | --- | --- | --- | --- |
|  | **(°C)** | **(°C)** | **(°C)** | **(°C)** | **(°C)** |
| **1** | 24.0 | 27.0 | 22.0 | 18.0 | 0.83 |
| **2** | 30.0 | 30.0 | 10.0 | 10.0 | 0.83 |

    Thermostat Schedule   **Fan**

    Unoccupied Cooling is   **Available**

**Common Terminal Unit Data:**

**Cooling Coil:**

    Design Supply Temperature   **14.4** °C

    Coil Bypass Factor   **0.100**

    Cooling Source   **Air-Cooled DX**

    Schedule   **JFMAMJJASOND**

**Heating Coil:**

    Design Supply Temperature   **35.0** °C

    Heating Source   **Air Source Heat Pump**

    Schedule   **JFMAMJJASOND**

    Fan Control   **Fan On**

    Ventilation Sizing Method   **Sum of Space OA Airflows**

**Terminal Units Data:**

    Zone   **All**

    Terminal Type   **Fan Coil**

    Minimum Airflow   **0.00** L/s/person

    Fan Performance   **0** Pa

    Fan Overall Efficiency   **50** %

**4. Sizing Data (Computer-Generated):**

**System Sizing Data:**

**Sizing Data:**

    Cooling Supply Temperature   **14.4** °C

    Heating Supply Temperature   **35.0** °C

**Hydronic Sizing Specifications:**

    Chilled Water Delta-T   **5.6** °K

    Hot Water Delta-T   **11.1** °K

**Safety Factors:**

    Cooling Sensible   **10** %

    Cooling Latent   **10** %

    Heating   **10** %

# CCTV CONTROL ROOM - BINAK pu

**1. General Details:**

    Air System Name   **System**

    Equipment Type   **Terminal Units**

    Air System Type   **Split DX Fan Coil**

    Number of zones   **2**

    Ventilation   **Direct Ventilation**

**2. Ventilation System Components:**

(Common Ventilation System not used: no inputs)

**3. Zone Components:**

**Space Assignments:**

|  |  |
| --- | --- |
| **Zone 1: Zone 1** |  |
| 00-Guard House | x1 |
| **Zone 2: Zone 2** |  |
| 01-Rack Room | x1 |

**Thermostats and Zone Data:**

| **Zone** | **Cooling T-Stat Occ.** | **Cooling T-Stat Unocc.** | **Heating T-Stat Occ.** | **Heating T-Stat Unocc.** | **T-Stat Throttling Range** |
| --- | --- | --- | --- | --- | --- |
|  | **(°C)** | **(°C)** | **(°C)** | **(°C)** | **(°C)** |
| **1** | 24.0 | 27.0 | 22.0 | 18.0 | 0.83 |
| **2** | 30.0 | 30.0 | 10.0 | 10.0 | 0.83 |

    Thermostat Schedule   **Fan**

    Unoccupied Cooling is   **Available**

**Common Terminal Unit Data:**

**Cooling Coil:**

    Design Supply Temperature   **14.4** °C

    Coil Bypass Factor   **0.100**

    Cooling Source   **Air-Cooled DX**

    Schedule   **JFMAMJJASOND**

**Heating Coil:**

    Design Supply Temperature   **35.0** °C

    Heating Source   **Air Source Heat Pump**

    Schedule   **JFMAMJJASOND**

    Fan Control   **Fan On**

    Ventilation Sizing Method   **Sum of Space OA Airflows**

**Terminal Units Data:**

    Zone   **All**

    Terminal Type   **Fan Coil**

    Minimum Airflow   **0.00** L/s/person

    Fan Performance   **0** Pa

    Fan Overall Efficiency   **50** %

**4. Sizing Data (Computer-Generated):**

**System Sizing Data:**

**Sizing Data:**

    Cooling Supply Temperature   **14.4** °C

    Heating Supply Temperature   **35.0** °C

**Hydronic Sizing Specifications:**

    Chilled Water Delta-T   **5.6** °K

    Hot Water Delta-T   **11.1** °K

**Safety Factors:**

    Cooling Sensible   **10** %

    Cooling Latent   **10** %

    Heating   **10** %

## AIR SYSTEM SIZING SUMMARY:

# CCTV CONTROL ROOM - BINAK GCS & DU

**Air System Information**

    Air System Name   **System**

    Equipment Class   **TERM**

    Air System Type   **SPLT-FC**

Number of zones   **2**

Floor Area   **65.6** m²

Location   **Binak, IRAN**

**Sizing Calculation Information**

    Calculation Months   **Jan to Dec**

    Sizing Data   **Calculated** Zone L/s Sizing   **Sum of space airflow rates**

Space L/s Sizing   **Individual peak space loads**

**Zone Sizing Data**

|  | **Maximum** |  |  |  | **Maximum** | **Zone** |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Cooling** | **Design** | **Minimum** |  | **Heating** | **Floor** |  |
|  | **Sensible** | **Airflow** | **Airflow** | **Time of** | **Load** | **Area** | **Zone** |
| **Zone Name** | **(kW)** | **(L/s)** | **(L/s)** | **Peak Load** | **(kW)** | **(m²)** | **L/(s-m²)** |
| Zone 1 | 6.7 | 627 | 627 | Jul 1500 | 3.5 | 55.6 | 11.28 |
| Zone 2 | 2.9 | 155 | 155 | Jul 0800 | 0.0 | 10.0 | 15.51 |

**Terminal Unit Sizing Data - Cooling**

|  | **Total** | **Sens** | **Coil** | **Coil** | **Water** | **Time** |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Coil** | **Coil** | **Entering** | **Leaving** | **Flow** | **of** |
|  | **Load** | **Load** | **DB / WB** | **DB / WB** | **@ 5.6 °K** | **Peak** |
| **Zone Name** | **(kW)** | **(kW)** | **(°C)** | **(°C)** | **(L/s)** | **Load** |
| Zone 1 | 11.1 | 6.6 | 24.6 / 20.4 | 15.9 / 15.6 | - | Jul 1500 |
| Zone 2 | 3.7 | 2.9 | 30.5 / 21.1 | 15.2 / 14.3 | - | Aug 1700 |

**Terminal Unit Sizing Data - Heating, Fan, Ventilation**

|  |  | **Heating** | **Htg Coil** |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Heating** | **Coil** | **Water** | **Fan** |  |  | **OA Vent** |
|  | **Coil** | **Ent/Lvg** | **Flow** | **Design** | **Fan** | **Fan** | **Design** |
|  | **Load** | **DB** | **@11.1 °K** | **Airflow** | **Motor** | **Motor** | **Airflow** |
| **Zone Name** | **(kW)** | **(°C)** | **(L/s)** | **(L/s)** | **(BHP)** | **(kW)** | **(L/s)** |
| Zone 1 | 3.4 | 21.6 / 26.1 | - | 627 | 0.000 | 0.000 | 0 |
| Zone 2 | 0.2 | 22.0 / 23.2 | - | 155 | 0.000 | 0.000 | 0 |

**Space Loads and Airflows**

|  |  | **Cooling** | **Time** | **Air** | **Heating** | **Floor** |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Zone Name /** |  | **Sensible** | **of** | **Flow** | **Load** | **Area** | **Space** |
| **Space Name** | **Mult.** | **(kW)** | **Load** | **(L/s)** | **(kW)** | **(m²)** | **L/(s-m²)** |
| ***Zone 1*** |  |  |  |  |  |  |  |
| 00-Control Room | 1 | 2.0 | Jul 0800 | 176 | 0.9 | 46.6 | 3.78 |
| 02-Entrance | 1 | 2.5 | Jul 1500 | 220 | 1.9 | 4.8 | 45.74 |
| 03-Pantry | 1 | 2.7 | Aug 1600 | 232 | 0.7 | 4.2 | 55.17 |
| ***Zone 2*** |  |  |  |  |  |  |  |
| 01-Rack Room | 1 | 2.9 | Jul 0800 | 155 | 0.0 | 10.0 | 15.51 |

# CCTV CONTROL ROOM - BINAK pu

**Air System Information**

    Air System Name   **System**

    Equipment Class   **TERM**

    Air System Type   **SPLT-FC**

Number of zones   **2**

Floor Area   **7.3** m²

Location   **Binak, IRAN**

**Sizing Calculation Information**

    Calculation Months   **Jan to Dec**

    Sizing Data   **Calculated** Zone L/s Sizing   **Sum of space airflow rates**

Space L/s Sizing   **Individual peak space loads**

**Zone Sizing Data**

|  | **Maximum** |  |  |  | **Maximum** | **Zone** |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Cooling** | **Design** | **Minimum** |  | **Heating** | **Floor** |  |
|  | **Sensible** | **Airflow** | **Airflow** | **Time of** | **Load** | **Area** | **Zone** |
| **Zone Name** | **(kW)** | **(L/s)** | **(L/s)** | **Peak Load** | **(kW)** | **(m²)** | **L/(s-m²)** |
| Zone 1 | 1.4 | 121 | 121 | Sep 1400 | 0.7 | 4.7 | 25.85 |
| Zone 2 | 1.3 | 68 | 68 | Jul 1500 | 0.1 | 2.6 | 26.13 |

**Terminal Unit Sizing Data - Cooling**

|  | **Total** | **Sens** | **Coil** | **Coil** | **Water** | **Time** |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Coil** | **Coil** | **Entering** | **Leaving** | **Flow** | **of** |
|  | **Load** | **Load** | **DB / WB** | **DB / WB** | **@ 5.6 °K** | **Peak** |
| **Zone Name** | **(kW)** | **(kW)** | **(°C)** | **(°C)** | **(L/s)** | **Load** |
| Zone 1 | 1.7 | 1.4 | 24.8 / 18.9 | 15.4 / 14.9 | - | Sep 1400 |
| Zone 2 | 1.4 | 1.3 | 30.6 / 20.3 | 15.2 / 14.3 | - | Aug 1600 |

**Terminal Unit Sizing Data - Heating, Fan, Ventilation**

|  |  | **Heating** | **Htg Coil** |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Heating** | **Coil** | **Water** | **Fan** |  |  | **OA Vent** |
|  | **Coil** | **Ent/Lvg** | **Flow** | **Design** | **Fan** | **Fan** | **Design** |
|  | **Load** | **DB** | **@11.1 °K** | **Airflow** | **Motor** | **Motor** | **Airflow** |
| **Zone Name** | **(kW)** | **(°C)** | **(L/s)** | **(L/s)** | **(BHP)** | **(kW)** | **(L/s)** |
| Zone 1 | 0.7 | 21.7 / 26.4 | - | 121 | 0.000 | 0.000 | 0 |
| Zone 2 | 0.3 | 19.6 / 23.0 | - | 68 | 0.000 | 0.000 | 0 |

**Space Loads and Airflows**

|  |  | **Cooling** | **Time** | **Air** | **Heating** | **Floor** |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Zone Name /** |  | **Sensible** | **of** | **Flow** | **Load** | **Area** | **Space** |
| **Space Name** | **Mult.** | **(kW)** | **Load** | **(L/s)** | **(kW)** | **(m²)** | **L/(s-m²)** |
| ***Zone 1*** |  |  |  |  |  |  |  |
| 00-Guard House | 1 | 1.4 | Sep 1400 | 121 | 0.7 | 4.7 | 25.85 |
| ***Zone 2*** |  |  |  |  |  |  |  |
| 01-Rack Room | 1 | 1.3 | Jul 1500 | 68 | 0.1 | 2.6 | 26.13 |

## ventilation sizing summary

# CCTV CONTROL ROOM - BINAK GCS & DU

**1. Summary**

    Ventilation Sizing Method   **Sum of Space OA Airflows**

**2. Space Ventilation Analysis Table**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **Floor** |  | **Maximum** | **Required** | **Required** | **Required** | **Required** | **Uncorrected** |
|  |  | **Area** | **Maximum** | **Supply Air** | **Outdoor Air** | **Outdoor Air** | **Outdoor Air** | **Outdoor Air** | **Outdoor Air** |
| **Zone Name / Space Name** | **Mult.** | **(m²)** | **Occupants** | **(L/s)** | **(L/s/person)** | **(L/(s-m²))** | **(L/s)** | **(% of supply)** | **(L/s)** |
| **Zone 1** |  |  |  |  |  |  |  |  |  |
| 00-Control Room | 1 | 46.6 | 5.0 | 176.2 | 0.00 | 0.00 | 0.0 | 0.0 | 0.0 |
| 02-Entrance | 1 | 4.8 | 0.0 | 219.6 | 0.00 | 0.00 | 0.0 | 0.0 | 0.0 |
| 03-Pantry | 1 | 4.2 | 0.0 | 231.7 | 0.00 | 0.00 | 0.0 | 0.0 | 0.0 |
| **Zone 2** |  |  |  |  |  |  |  |  |  |
| 01-Rack Room | 1 | 10.0 | 0.0 | 155.1 | 0.00 | 0.00 | 0.0 | 0.0 | 0.0 |
| **Totals (incl. Space Multipliers)** |  |  |  | **782.6** |  |  |  |  | **0.0** |

# CCTV CONTROL ROOM - BINAK pu

**1. Summary**

    Ventilation Sizing Method   **Sum of Space OA Airflows**

**2. Space Ventilation Analysis Table**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **Floor** |  | **Maximum** | **Required** | **Required** | **Required** | **Required** | **Uncorrected** |
|  |  | **Area** | **Maximum** | **Supply Air** | **Outdoor Air** | **Outdoor Air** | **Outdoor Air** | **Outdoor Air** | **Outdoor Air** |
| **Zone Name / Space Name** | **Mult.** | **(m²)** | **Occupants** | **(L/s)** | **(L/s/person)** | **(L/(s-m²))** | **(L/s)** | **(% of supply)** | **(L/s)** |
| **Zone 1** |  |  |  |  |  |  |  |  |  |
| 00-Guard House | 1 | 4.7 | 2.0 | 121.5 | 0.00 | 0.00 | 0.0 | 0.0 | 0.0 |
| **Zone 2** |  |  |  |  |  |  |  |  |  |
| 01-Rack Room | 1 | 2.6 | 0.0 | 67.9 | 0.00 | 0.00 | 0.0 | 0.0 | 0.0 |
| **Totals (incl. Space Multipliers)** |  |  |  | **189.4** |  |  |  |  | **0.0** |

## air system design load summary:

# CCTV CONTROL ROOM - BINAK GCS & DU

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **DESIGN COOLING** | | | **DESIGN HEATING** | | |
|  | **COOLING DATA AT Jul 1500** | | | **HEATING DATA AT DES HTG** | | |
|  | **COOLING OA DB / WB 41.0 °C / 32.0 °C** | | | **HEATING OA DB / WB 6.0 °C / 6.0 °C** | | |
|  |  | **Sensible** | **Latent** |  | **Sensible** | **Latent** |
| **ZONE LOADS** | **Details** | **(W)** | **(W)** | **Details** | **(W)** | **(W)** |
| Window & Skylight Solar Loads | 1 m² | 199 | - | 1 m² | - | - |
| Wall Transmission | 102 m² | 253 | - | 102 m² | 282 | - |
| Roof Transmission | 66 m² | 434 | - | 66 m² | 446 | - |
| Window Transmission | 1 m² | 47 | - | 1 m² | 54 | - |
| Skylight Transmission | 0 m² | 0 | - | 0 m² | 0 | - |
| Door Loads | 2 m² | 195 | - | 2 m² | 223 | - |
| Floor Transmission | 66 m² | 17 | - | 66 m² | 220 | - |
| Partitions | 19 m² | 133 | - | 19 m² | 139 | - |
| Ceiling | 0 m² | 0 | - | 0 m² | 0 | - |
| Overhead Lighting | 0 W | 22 | - | 0 | 0 | - |
| Task Lighting | 0 W | 0 | - | 0 | 0 | - |
| Electric Equipment | 4100 W | 4100 | - | 0 | 0 | - |
| People | 5 | 359 | 300 | 0 | 0 | 0 |
| Infiltration | - | 1967 | 3804 | - | 1852 | 0 |
| Miscellaneous | - | 1000 | 700 | - | 0 | 0 |
| Safety Factor | 10% / 10% | 873 | 480 | 10% | 321 | 0 |
| **>> Total Zone Loads** | **-** | **9599** | **5285** | **-** | **3536** | **0** |
| Zone Conditioning | - | 9423 | 5285 | - | 3593 | 0 |
| Plenum Wall Load | 0% | 0 | - | 0 | 0 | - |
| Plenum Roof Load | 0% | 0 | - | 0 | 0 | - |
| Plenum Lighting Load | 0% | 0 | - | 0 | 0 | - |
| Exhaust Fan Load | 0 L/s | 0 | - | 0 L/s | 0 | - |
| Ventilation Load | 0 L/s | 0 | 0 | 0 L/s | 0 | 0 |
| Ventilation Fan Load | 0 L/s | 0 | - | 0 L/s | 0 | - |
| Space Fan Coil Fans | - | 0 | - | - | 0 | - |
| Duct Heat Gain / Loss | 0% | 0 | - | 0% | 0 | - |
| **>> Total System Loads** | **-** | **9423** | **5285** | **-** | **3593** | **0** |
| Terminal Unit Cooling | - | 9423 | 5350 | - | 0 | 0 |
| Terminal Unit Heating | - | 0 | - | - | 3593 | - |
| **>> Total Conditioning** | **-** | **9423** | **5350** | **-** | **3593** | **0** |
| **Key:** | **Positive values are clg loads** | | | **Positive values are htg loads** | | |
|  | **Negative values are htg loads** | | | **Negative values are clg loads** | | |

# CCTV CONTROL ROOM - BINAK pu

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **DESIGN COOLING** | | | **DESIGN HEATING** | | |
|  | **COOLING DATA AT Aug 1400** | | | **HEATING DATA AT DES HTG** | | |
|  | **COOLING OA DB / WB 40.5 °C / 31.9 °C** | | | **HEATING OA DB / WB 6.0 °C / 6.0 °C** | | |
|  |  | **Sensible** | **Latent** |  | **Sensible** | **Latent** |
| **ZONE LOADS** | **Details** | **(W)** | **(W)** | **Details** | **(W)** | **(W)** |
| Window & Skylight Solar Loads | 4 m² | 436 | - | 4 m² | - | - |
| Wall Transmission | 22 m² | 40 | - | 22 m² | 44 | - |
| Roof Transmission | 15 m² | 58 | - | 15 m² | 46 | - |
| Window Transmission | 4 m² | 170 | - | 4 m² | 202 | - |
| Skylight Transmission | 0 m² | 0 | - | 0 m² | 0 | - |
| Door Loads | 4 m² | 267 | - | 4 m² | 255 | - |
| Floor Transmission | 7 m² | 4 | - | 7 m² | 29 | - |
| Partitions | 0 m² | 0 | - | 0 m² | 0 | - |
| Ceiling | 0 m² | 0 | - | 0 m² | 0 | - |
| Overhead Lighting | 0 W | 3 | - | 0 | 0 | - |
| Task Lighting | 0 W | 0 | - | 0 | 0 | - |
| Electric Equipment | 1100 W | 1100 | - | 0 | 0 | - |
| People | 2 | 144 | 120 | 0 | 0 | 0 |
| Infiltration | - | 145 | 331 | - | 141 | 0 |
| Miscellaneous | - | 0 | 0 | - | 0 | 0 |
| Safety Factor | 10% / 10% | 237 | 45 | 10% | 72 | 0 |
| **>> Total Zone Loads** | **-** | **2603** | **497** | **-** | **789** | **0** |
| Zone Conditioning | - | 2568 | 497 | - | 970 | 0 |
| Plenum Wall Load | 0% | 0 | - | 0 | 0 | - |
| Plenum Roof Load | 0% | 0 | - | 0 | 0 | - |
| Plenum Lighting Load | 0% | 0 | - | 0 | 0 | - |
| Exhaust Fan Load | 0 L/s | 0 | - | 0 L/s | 0 | - |
| Ventilation Load | 0 L/s | 0 | 0 | 0 L/s | 0 | 0 |
| Ventilation Fan Load | 0 L/s | 0 | - | 0 L/s | 0 | - |
| Space Fan Coil Fans | - | 0 | - | - | 0 | - |
| Duct Heat Gain / Loss | 0% | 0 | - | 0% | 0 | - |
| **>> Total System Loads** | **-** | **2568** | **497** | **-** | **970** | **0** |
| Terminal Unit Cooling | - | 2568 | 506 | - | 0 | 0 |
| Terminal Unit Heating | - | 0 | - | - | 970 | - |
| **>> Total Conditioning** | **-** | **2568** | **506** | **-** | **970** | **0** |
| **Key:** | **Positive values are clg loads** | | | **Positive values are htg loads** | | |
|  | **Negative values are htg loads** | | | **Negative values are clg loads** | | |

## ZONE DESIGN LOAD SUMMARY:

# CCTV CONTROL ROOM - BINAK GCS & DU

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Zone 1** | **DESIGN COOLING** | | | **DESIGN HEATING** | | |
|  | **COOLING DATA AT Jul 1500** | | | **HEATING DATA AT DES HTG** | | |
|  | **COOLING OA DB / WB 41.0 °C / 32.0 °C** | | | **HEATING OA DB / WB 6.0 °C / 6.0 °C** | | |
|  | **OCCUPIED T-STAT 24.0 °C** | | | **OCCUPIED T-STAT 22.0 °C** | | |
|  |  | **Sensible** | **Latent** |  | **Sensible** | **Latent** |
| **ZONE LOADS** | **Details** | **(W)** | **(W)** | **Details** | **(W)** | **(W)** |
| Window & Skylight Solar Loads | 1 m² | 199 | - | 1 m² | - | - |
| Wall Transmission | 81 m² | 221 | - | 81 m² | 264 | - |
| Roof Transmission | 56 m² | 392 | - | 56 m² | 426 | - |
| Window Transmission | 1 m² | 47 | - | 1 m² | 54 | - |
| Skylight Transmission | 0 m² | 0 | - | 0 m² | 0 | - |
| Door Loads | 2 m² | 195 | - | 2 m² | 223 | - |
| Floor Transmission | 56 m² | 0 | - | 56 m² | 220 | - |
| Partitions | 19 m² | 133 | - | 19 m² | 139 | - |
| Ceiling | 0 m² | 0 | - | 0 m² | 0 | - |
| Overhead Lighting | 0 W | 19 | - | 0 | 0 | - |
| Task Lighting | 0 W | 0 | - | 0 | 0 | - |
| Electric Equipment | 1600 W | 1600 | - | 0 | 0 | - |
| People | 5 | 359 | 300 | 0 | 0 | 0 |
| Infiltration | - | 1967 | 3804 | - | 1852 | 0 |
| Miscellaneous | - | 1000 | 700 | - | 0 | 0 |
| Safety Factor | 10% / 10% | 613 | 480 | 10% | 318 | 0 |
| **>> Total Zone Loads** | **-** | **6746** | **5285** | **-** | **3496** | **0** |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Zone 2** | **DESIGN COOLING** | | | **DESIGN HEATING** | | |
|  | **COOLING DATA AT Jul 0800** | | | **HEATING DATA AT DES HTG** | | |
|  | **COOLING OA DB / WB 27.0 °C / 26.7 °C** | | | **HEATING OA DB / WB 6.0 °C / 6.0 °C** | | |
|  | **OCCUPIED T-STAT 30.0 °C** | | | **OCCUPIED T-STAT 10.0 °C** | | |
|  |  | **Sensible** | **Latent** |  | **Sensible** | **Latent** |
| **ZONE LOADS** | **Details** | **(W)** | **(W)** | **Details** | **(W)** | **(W)** |
| Window & Skylight Solar Loads | 0 m² | 0 | - | 0 m² | - | - |
| Wall Transmission | 21 m² | 35 | - | 21 m² | 18 | - |
| Roof Transmission | 10 m² | 54 | - | 10 m² | 19 | - |
| Window Transmission | 0 m² | 0 | - | 0 m² | 0 | - |
| Skylight Transmission | 0 m² | 0 | - | 0 m² | 0 | - |
| Door Loads | 0 m² | 0 | - | 0 m² | 0 | - |
| Floor Transmission | 10 m² | -20 | - | 10 m² | 0 | - |
| Partitions | 0 m² | 0 | - | 0 m² | 0 | - |
| Ceiling | 0 m² | 0 | - | 0 m² | 0 | - |
| Overhead Lighting | 128 W | 71 | - | 0 | 0 | - |
| Task Lighting | 0 W | 0 | - | 0 | 0 | - |
| Electric Equipment | 2500 W | 2500 | - | 0 | 0 | - |
| People | 0 | 0 | 0 | 0 | 0 | 0 |
| Infiltration | - | 0 | 0 | - | 0 | 0 |
| Miscellaneous | - | 0 | 0 | - | 0 | 0 |
| Safety Factor | 10% / 10% | 264 | 0 | 10% | 4 | 0 |
| **>> Total Zone Loads** | **-** | **2904** | **0** | **-** | **41** | **0** |

# CCTV CONTROL ROOM - BINAK pu

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Zone 1** | **DESIGN COOLING** | | | **DESIGN HEATING** | | |
|  | **COOLING DATA AT Sep 1400** | | | **HEATING DATA AT DES HTG** | | |
|  | **COOLING OA DB / WB 39.4 °C / 31.4 °C** | | | **HEATING OA DB / WB 6.0 °C / 6.0 °C** | | |
|  | **OCCUPIED T-STAT 24.0 °C** | | | **OCCUPIED T-STAT 22.0 °C** | | |
|  |  | **Sensible** | **Latent** |  | **Sensible** | **Latent** |
| **ZONE LOADS** | **Details** | **(W)** | **(W)** | **Details** | **(W)** | **(W)** |
| Window & Skylight Solar Loads | 4 m² | 530 | - | 4 m² | - | - |
| Wall Transmission | 11 m² | 25 | - | 11 m² | 36 | - |
| Roof Transmission | 5 m² | 22 | - | 5 m² | 30 | - |
| Window Transmission | 4 m² | 156 | - | 4 m² | 202 | - |
| Skylight Transmission | 0 m² | 0 | - | 0 m² | 0 | - |
| Door Loads | 2 m² | 158 | - | 2 m² | 204 | - |
| Floor Transmission | 5 m² | 0 | - | 5 m² | 29 | - |
| Partitions | 0 m² | 0 | - | 0 m² | 0 | - |
| Ceiling | 0 m² | 0 | - | 0 m² | 0 | - |
| Overhead Lighting | 0 W | 2 | - | 0 | 0 | - |
| Task Lighting | 0 W | 0 | - | 0 | 0 | - |
| Electric Equipment | 100 W | 100 | - | 0 | 0 | - |
| People | 2 | 144 | 120 | 0 | 0 | 0 |
| Infiltration | - | 135 | 319 | - | 141 | 0 |
| Miscellaneous | - | 0 | 0 | - | 0 | 0 |
| Safety Factor | 10% / 10% | 127 | 44 | 10% | 64 | 0 |
| **>> Total Zone Loads** | **-** | **1397** | **483** | **-** | **706** | **0** |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Zone 2** | **DESIGN COOLING** | | | **DESIGN HEATING** | | |
|  | **COOLING DATA AT Jul 1500** | | | **HEATING DATA AT DES HTG** | | |
|  | **COOLING OA DB / WB 41.0 °C / 32.0 °C** | | | **HEATING OA DB / WB 6.0 °C / 6.0 °C** | | |
|  | **OCCUPIED T-STAT 30.0 °C** | | | **OCCUPIED T-STAT 10.0 °C** | | |
|  |  | **Sensible** | **Latent** |  | **Sensible** | **Latent** |
| **ZONE LOADS** | **Details** | **(W)** | **(W)** | **Details** | **(W)** | **(W)** |
| Window & Skylight Solar Loads | 0 m² | 0 | - | 0 m² | - | - |
| Wall Transmission | 11 m² | 13 | - | 11 m² | 8 | - |
| Roof Transmission | 10 m² | 35 | - | 10 m² | 16 | - |
| Window Transmission | 0 m² | 0 | - | 0 m² | 0 | - |
| Skylight Transmission | 0 m² | 0 | - | 0 m² | 0 | - |
| Door Loads | 2 m² | 102 | - | 2 m² | 51 | - |
| Floor Transmission | 3 m² | 5 | - | 3 m² | 0 | - |
| Partitions | 0 m² | 0 | - | 0 m² | 0 | - |
| Ceiling | 0 m² | 0 | - | 0 m² | 0 | - |
| Overhead Lighting | 0 W | 1 | - | 0 | 0 | - |
| Task Lighting | 0 W | 0 | - | 0 | 0 | - |
| Electric Equipment | 1000 W | 1000 | - | 0 | 0 | - |
| People | 0 | 0 | 0 | 0 | 0 | 0 |
| Infiltration | - | 0 | 0 | - | 0 | 0 |
| Miscellaneous | - | 0 | 0 | - | 0 | 0 |
| Safety Factor | 10% / 10% | 116 | 0 | 10% | 8 | 0 |
| **>> Total Zone Loads** | **-** | **1272** | **0** | **-** | **83** | **0** |

## SPACE DESIGN LOAD SUMMARY:

# CCTV CONTROL ROOM - BINAK GCS & DU

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **TABLE 1.1.A. COMPONENT LOADS FOR SPACE '' 00-Control Room '' IN ZONE '' Zone 1 ''** | | | | | | |
|  | **DESIGN COOLING** | | | **DESIGN HEATING** | | |
|  | **COOLING DATA AT Jul 0800** | | | **HEATING DATA AT DES HTG** | | |
|  | **COOLING OA DB / WB 27.0 °C / 26.7 °C** | | | **HEATING OA DB / WB 6.0 °C / 6.0 °C** | | |
|  | **OCCUPIED T-STAT 24.0 °C** | | | **OCCUPIED T-STAT 22.0 °C** | | |
|  |  | **Sensible** | **Latent** |  | **Sensible** | **Latent** |
| **SPACE LOADS** | **Details** | **(W)** | **(W)** | **Details** | **(W)** | **(W)** |
| Window & Skylight Solar Loads | 0 m² | 0 | - | 0 m² | - | - |
| Wall Transmission | 68 m² | 198 | - | 68 m² | 219 | - |
| Roof Transmission | 47 m² | 385 | - | 47 m² | 357 | - |
| Window Transmission | 0 m² | 0 | - | 0 m² | 0 | - |
| Skylight Transmission | 0 m² | 0 | - | 0 m² | 0 | - |
| Door Loads | 0 m² | 0 | - | 0 m² | 0 | - |
| Floor Transmission | 47 m² | 0 | - | 47 m² | 184 | - |
| Partitions | 7 m² | 13 | - | 7 m² | 48 | - |
| Ceiling | 0 m² | 0 | - | 0 m² | 0 | - |
| Overhead Lighting | 693 W | 387 | - | 0 | 0 | - |
| Task Lighting | 0 W | 0 | - | 0 | 0 | - |
| Electric Equipment | 500 W | 500 | - | 0 | 0 | - |
| People | 5 | 359 | 300 | 0 | 0 | 0 |
| Infiltration | - | 0 | 0 | - | 0 | 0 |
| Miscellaneous | - | 0 | 0 | - | 0 | 0 |
| Safety Factor | 10% / 10% | 184 | 30 | 10% | 81 | 0 |
| **>> Total Zone Loads** | **-** | **2026** | **330** | **-** | **889** | **0** |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **TABLE 1.1.B. ENVELOPE LOADS FOR SPACE '' 00-Control Room '' IN ZONE '' Zone 1 ''** | | | | | | |
|  |  |  |  | **COOLING** | **COOLING** | **HEATING** |
|  | **Area** | **U-Value** | **Shade** | **TRANS** | **SOLAR** | **TRANS** |
|  | **(m²)** | **(W/(m²-°K))** | **Coeff.** | **(W)** | **(W)** | **(W)** |
| **NNW EXPOSURE** |  |  |  |  |  |  |
| WALL | 19 | 0.201 | - | 48 | - | 61 |
| **ENE EXPOSURE** |  |  |  |  |  |  |
| WALL | 25 | 0.201 | - | 74 | - | 79 |
| **WSW EXPOSURE** |  |  |  |  |  |  |
| WALL | 25 | 0.201 | - | 76 | - | 79 |
| **H EXPOSURE** |  |  |  |  |  |  |
| ROOF | 47 | 0.479 | - | 385 | - | 357 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **TABLE 1.2.A. COMPONENT LOADS FOR SPACE '' 02-Entrance '' IN ZONE '' Zone 1 ''** | | | | | | |
|  | **DESIGN COOLING** | | | **DESIGN HEATING** | | |
|  | **COOLING DATA AT Jul 1500** | | | **HEATING DATA AT DES HTG** | | |
|  | **COOLING OA DB / WB 41.0 °C / 32.0 °C** | | | **HEATING OA DB / WB 6.0 °C / 6.0 °C** | | |
|  | **OCCUPIED T-STAT 24.0 °C** | | | **OCCUPIED T-STAT 22.0 °C** | | |
|  |  | **Sensible** | **Latent** |  | **Sensible** | **Latent** |
| **SPACE LOADS** | **Details** | **(W)** | **(W)** | **Details** | **(W)** | **(W)** |
| Window & Skylight Solar Loads | 0 m² | 0 | - | 0 m² | - | - |
| Wall Transmission | 1 m² | 3 | - | 1 m² | 4 | - |
| Roof Transmission | 5 m² | 34 | - | 5 m² | 37 | - |
| Window Transmission | 0 m² | 0 | - | 0 m² | 0 | - |
| Skylight Transmission | 0 m² | 0 | - | 0 m² | 0 | - |
| Door Loads | 2 m² | 195 | - | 2 m² | 223 | - |
| Floor Transmission | 5 m² | 0 | - | 5 m² | 14 | - |
| Partitions | 6 m² | 41 | - | 6 m² | 43 | - |
| Ceiling | 0 m² | 0 | - | 0 m² | 0 | - |
| Overhead Lighting | 0 W | 1 | - | 0 | 0 | - |
| Task Lighting | 0 W | 0 | - | 0 | 0 | - |
| Electric Equipment | 500 W | 500 | - | 0 | 0 | - |
| People | 0 | 0 | 0 | 0 | 0 | 0 |
| Infiltration | - | 1521 | 2941 | - | 1431 | 0 |
| Miscellaneous | - | 0 | 0 | - | 0 | 0 |
| Safety Factor | 10% / 10% | 230 | 294 | 10% | 175 | 0 |
| **>> Total Zone Loads** | **-** | **2525** | **3235** | **-** | **1928** | **0** |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **TABLE 1.2.B. ENVELOPE LOADS FOR SPACE '' 02-Entrance '' IN ZONE '' Zone 1 ''** | | | | | | |
|  |  |  |  | **COOLING** | **COOLING** | **HEATING** |
|  | **Area** | **U-Value** | **Shade** | **TRANS** | **SOLAR** | **TRANS** |
|  | **(m²)** | **(W/(m²-°K))** | **Coeff.** | **(W)** | **(W)** | **(W)** |
| **SSE EXPOSURE** |  |  |  |  |  |  |
| WALL | 1 | 0.201 | - | 3 | - | 4 |
| DOOR | 2 | 5.800 | - | 195 | - | 223 |
| **H EXPOSURE** |  |  |  |  |  |  |
| ROOF | 5 | 0.479 | - | 34 | - | 37 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **TABLE 1.3.A. COMPONENT LOADS FOR SPACE '' 03-Pantry '' IN ZONE '' Zone 1 ''** | | | | | | |
|  | **DESIGN COOLING** | | | **DESIGN HEATING** | | |
|  | **COOLING DATA AT Aug 1600** | | | **HEATING DATA AT DES HTG** | | |
|  | **COOLING OA DB / WB 40.5 °C / 31.9 °C** | | | **HEATING OA DB / WB 6.0 °C / 6.0 °C** | | |
|  | **OCCUPIED T-STAT 24.0 °C** | | | **OCCUPIED T-STAT 22.0 °C** | | |
|  |  | **Sensible** | **Latent** |  | **Sensible** | **Latent** |
| **SPACE LOADS** | **Details** | **(W)** | **(W)** | **Details** | **(W)** | **(W)** |
| Window & Skylight Solar Loads | 1 m² | 235 | - | 1 m² | - | - |
| Wall Transmission | 12 m² | 32 | - | 12 m² | 41 | - |
| Roof Transmission | 4 m² | 28 | - | 4 m² | 32 | - |
| Window Transmission | 1 m² | 47 | - | 1 m² | 54 | - |
| Skylight Transmission | 0 m² | 0 | - | 0 m² | 0 | - |
| Door Loads | 0 m² | 0 | - | 0 m² | 0 | - |
| Floor Transmission | 4 m² | 0 | - | 4 m² | 22 | - |
| Partitions | 7 m² | 45 | - | 7 m² | 48 | - |
| Ceiling | 0 m² | 0 | - | 0 m² | 0 | - |
| Overhead Lighting | 0 W | 1 | - | 0 | 0 | - |
| Task Lighting | 0 W | 0 | - | 0 | 0 | - |
| Electric Equipment | 600 W | 600 | - | 0 | 0 | - |
| People | 0 | 0 | 0 | 0 | 0 | 0 |
| Infiltration | - | 433 | 846 | - | 420 | 0 |
| Miscellaneous | - | 1000 | 700 | - | 0 | 0 |
| Safety Factor | 10% / 10% | 242 | 155 | 10% | 62 | 0 |
| **>> Total Zone Loads** | **-** | **2665** | **1701** | **-** | **678** | **0** |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **TABLE 1.3.B. ENVELOPE LOADS FOR SPACE '' 03-Pantry '' IN ZONE '' Zone 1 ''** | | | | | | |
|  |  |  |  | **COOLING** | **COOLING** | **HEATING** |
|  | **Area** | **U-Value** | **Shade** | **TRANS** | **SOLAR** | **TRANS** |
|  | **(m²)** | **(W/(m²-°K))** | **Coeff.** | **(W)** | **(W)** | **(W)** |
| **WSW EXPOSURE** |  |  |  |  |  |  |
| WALL | 5 | 0.217 | - | 14 | - | 18 |
| WINDOW 1 | 1 | 2.819 | 0.700 | 47 | 235 | 54 |
| **SSE EXPOSURE** |  |  |  |  |  |  |
| WALL | 7 | 0.217 | - | 18 | - | 23 |
| **H EXPOSURE** |  |  |  |  |  |  |
| ROOF | 4 | 0.479 | - | 28 | - | 32 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **TABLE 2.1.A. COMPONENT LOADS FOR SPACE '' 01-Rack Room '' IN ZONE '' Zone 2 ''** | | | | | | |
|  | **DESIGN COOLING** | | | **DESIGN HEATING** | | |
|  | **COOLING DATA AT Jul 0800** | | | **HEATING DATA AT DES HTG** | | |
|  | **COOLING OA DB / WB 27.0 °C / 26.7 °C** | | | **HEATING OA DB / WB 6.0 °C / 6.0 °C** | | |
|  | **OCCUPIED T-STAT 30.0 °C** | | | **OCCUPIED T-STAT 10.0 °C** | | |
|  |  | **Sensible** | **Latent** |  | **Sensible** | **Latent** |
| **SPACE LOADS** | **Details** | **(W)** | **(W)** | **Details** | **(W)** | **(W)** |
| Window & Skylight Solar Loads | 0 m² | 0 | - | 0 m² | - | - |
| Wall Transmission | 21 m² | 35 | - | 21 m² | 18 | - |
| Roof Transmission | 10 m² | 54 | - | 10 m² | 19 | - |
| Window Transmission | 0 m² | 0 | - | 0 m² | 0 | - |
| Skylight Transmission | 0 m² | 0 | - | 0 m² | 0 | - |
| Door Loads | 0 m² | 0 | - | 0 m² | 0 | - |
| Floor Transmission | 10 m² | -20 | - | 10 m² | 0 | - |
| Partitions | 0 m² | 0 | - | 0 m² | 0 | - |
| Ceiling | 0 m² | 0 | - | 0 m² | 0 | - |
| Overhead Lighting | 128 W | 71 | - | 0 | 0 | - |
| Task Lighting | 0 W | 0 | - | 0 | 0 | - |
| Electric Equipment | 2500 W | 2500 | - | 0 | 0 | - |
| People | 0 | 0 | 0 | 0 | 0 | 0 |
| Infiltration | - | 0 | 0 | - | 0 | 0 |
| Miscellaneous | - | 0 | 0 | - | 0 | 0 |
| Safety Factor | 10% / 10% | 264 | 0 | 10% | 4 | 0 |
| **>> Total Zone Loads** | **-** | **2904** | **0** | **-** | **41** | **0** |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **TABLE 2.1.B. ENVELOPE LOADS FOR SPACE '' 01-Rack Room '' IN ZONE '' Zone 2 ''** | | | | | | |
|  |  |  |  | **COOLING** | **COOLING** | **HEATING** |
|  | **Area** | **U-Value** | **Shade** | **TRANS** | **SOLAR** | **TRANS** |
|  | **(m²)** | **(W/(m²-°K))** | **Coeff.** | **(W)** | **(W)** | **(W)** |
| **ENE EXPOSURE** |  |  |  |  |  |  |
| WALL | 13 | 0.218 | - | 24 | - | 11 |
| **SSE EXPOSURE** |  |  |  |  |  |  |
| WALL | 8 | 0.218 | - | 11 | - | 7 |
| **H EXPOSURE** |  |  |  |  |  |  |
| ROOF | 10 | 0.479 | - | 54 | - | 19 |

# CCTV CONTROL ROOM - BINAK pu

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **TABLE 1.1.A. COMPONENT LOADS FOR SPACE '' 00-Guard House '' IN ZONE '' Zone 1 ''** | | | | | | |
|  | **DESIGN COOLING** | | | **DESIGN HEATING** | | |
|  | **COOLING DATA AT Sep 1400** | | | **HEATING DATA AT DES HTG** | | |
|  | **COOLING OA DB / WB 39.4 °C / 31.4 °C** | | | **HEATING OA DB / WB 6.0 °C / 6.0 °C** | | |
|  | **OCCUPIED T-STAT 24.0 °C** | | | **OCCUPIED T-STAT 22.0 °C** | | |
|  |  | **Sensible** | **Latent** |  | **Sensible** | **Latent** |
| **SPACE LOADS** | **Details** | **(W)** | **(W)** | **Details** | **(W)** | **(W)** |
| Window & Skylight Solar Loads | 4 m² | 530 | - | 4 m² | - | - |
| Wall Transmission | 11 m² | 25 | - | 11 m² | 36 | - |
| Roof Transmission | 5 m² | 22 | - | 5 m² | 30 | - |
| Window Transmission | 4 m² | 156 | - | 4 m² | 202 | - |
| Skylight Transmission | 0 m² | 0 | - | 0 m² | 0 | - |
| Door Loads | 2 m² | 158 | - | 2 m² | 204 | - |
| Floor Transmission | 5 m² | 0 | - | 5 m² | 29 | - |
| Partitions | 0 m² | 0 | - | 0 m² | 0 | - |
| Ceiling | 0 m² | 0 | - | 0 m² | 0 | - |
| Overhead Lighting | 0 W | 2 | - | 0 | 0 | - |
| Task Lighting | 0 W | 0 | - | 0 | 0 | - |
| Electric Equipment | 100 W | 100 | - | 0 | 0 | - |
| People | 2 | 144 | 120 | 0 | 0 | 0 |
| Infiltration | - | 135 | 319 | - | 141 | 0 |
| Miscellaneous | - | 0 | 0 | - | 0 | 0 |
| Safety Factor | 10% / 10% | 127 | 44 | 10% | 64 | 0 |
| **>> Total Zone Loads** | **-** | **1397** | **483** | **-** | **706** | **0** |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **TABLE 1.1.B. ENVELOPE LOADS FOR SPACE '' 00-Guard House '' IN ZONE '' Zone 1 ''** | | | | | | |
|  |  |  |  | **COOLING** | **COOLING** | **HEATING** |
|  | **Area** | **U-Value** | **Shade** | **TRANS** | **SOLAR** | **TRANS** |
|  | **(m²)** | **(W/(m²-°K))** | **Coeff.** | **(W)** | **(W)** | **(W)** |
| **N EXPOSURE** |  |  |  |  |  |  |
| WALL | 3 | 0.200 | - | 4 | - | 8 |
| WINDOW 1 | 1 | 2.819 | 0.700 | 29 | 32 | 38 |
| DOOR | 2 | 5.800 | - | 158 | - | 204 |
| **S EXPOSURE** |  |  |  |  |  |  |
| WALL | 4 | 0.200 | - | 10 | - | 12 |
| WINDOW 1 | 2 | 2.845 | 0.700 | 63 | 296 | 82 |
| **E EXPOSURE** |  |  |  |  |  |  |
| WALL | 5 | 0.200 | - | 11 | - | 15 |
| WINDOW 1 | 2 | 2.845 | 0.700 | 63 | 202 | 82 |
| **H EXPOSURE** |  |  |  |  |  |  |
| ROOF | 5 | 0.398 | - | 22 | - | 30 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **TABLE 2.1.A. COMPONENT LOADS FOR SPACE '' 01-Rack Room '' IN ZONE '' Zone 2 ''** | | | | | | |
|  | **DESIGN COOLING** | | | **DESIGN HEATING** | | |
|  | **COOLING DATA AT Jul 1500** | | | **HEATING DATA AT DES HTG** | | |
|  | **COOLING OA DB / WB 41.0 °C / 32.0 °C** | | | **HEATING OA DB / WB 6.0 °C / 6.0 °C** | | |
|  | **OCCUPIED T-STAT 30.0 °C** | | | **OCCUPIED T-STAT 10.0 °C** | | |
|  |  | **Sensible** | **Latent** |  | **Sensible** | **Latent** |
| **SPACE LOADS** | **Details** | **(W)** | **(W)** | **Details** | **(W)** | **(W)** |
| Window & Skylight Solar Loads | 0 m² | 0 | - | 0 m² | - | - |
| Wall Transmission | 11 m² | 13 | - | 11 m² | 8 | - |
| Roof Transmission | 10 m² | 35 | - | 10 m² | 16 | - |
| Window Transmission | 0 m² | 0 | - | 0 m² | 0 | - |
| Skylight Transmission | 0 m² | 0 | - | 0 m² | 0 | - |
| Door Loads | 2 m² | 102 | - | 2 m² | 51 | - |
| Floor Transmission | 3 m² | 5 | - | 3 m² | 0 | - |
| Partitions | 0 m² | 0 | - | 0 m² | 0 | - |
| Ceiling | 0 m² | 0 | - | 0 m² | 0 | - |
| Overhead Lighting | 0 W | 1 | - | 0 | 0 | - |
| Task Lighting | 0 W | 0 | - | 0 | 0 | - |
| Electric Equipment | 1000 W | 1000 | - | 0 | 0 | - |
| People | 0 | 0 | 0 | 0 | 0 | 0 |
| Infiltration | - | 0 | 0 | - | 0 | 0 |
| Miscellaneous | - | 0 | 0 | - | 0 | 0 |
| Safety Factor | 10% / 10% | 116 | 0 | 10% | 8 | 0 |
| **>> Total Zone Loads** | **-** | **1272** | **0** | **-** | **83** | **0** |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **TABLE 2.1.B. ENVELOPE LOADS FOR SPACE '' 01-Rack Room '' IN ZONE '' Zone 2 ''** | | | | | | |
|  |  |  |  | **COOLING** | **COOLING** | **HEATING** |
|  | **Area** | **U-Value** | **Shade** | **TRANS** | **SOLAR** | **TRANS** |
|  | **(m²)** | **(W/(m²-°K))** | **Coeff.** | **(W)** | **(W)** | **(W)** |
| **N EXPOSURE** |  |  |  |  |  |  |
| WALL | 3 | 0.199 | - | 3 | - | 3 |
| **W EXPOSURE** |  |  |  |  |  |  |
| WALL | 4 | 0.199 | - | 7 | - | 3 |
| DOOR | 2 | 5.800 | - | 102 | - | 51 |
| **S EXPOSURE** |  |  |  |  |  |  |
| WALL | 3 | 0.199 | - | 3 | - | 3 |
| **H EXPOSURE** |  |  |  |  |  |  |
| ROOF | 10 | 0.398 | - | 35 | - | 16 |

1. **Equipment Selection**

## Air Conditioning Unit

# CCTV CONTROL ROOM - BINAK GCS & DU

|  |  |  |  |
| --- | --- | --- | --- |
| Item | Service Area | | |
| Control Room & Entrance | Rack Room | Pantry |
| Calculated Sensible Cooling Load(w) | 2026+2525 | 2904 | 2665 |
| Calculated Latent Cooling Load(w) | 330+3235 | 0 | 1701 |
| Calculated Total Cooling Load(w) | 2356+5760 | 2904 | 4366 |
| Calculated Total Cooling Load (btu/hr) | 8046+19671 | 9918 | 14911 |
| Calculated Sensible Heating Load(w) | 889+1928 | 41 | 678 |
| Calculated Sensible Heating Load (btu/hr) | 3036+6584 | 140 | 2315 |
| Split Unit ID Indoor Unit ID | 1202-SUI-…-01 | 1202-SUI-…-02 | 1202-SUI-…-03 |
| Split Unit Outdoor Unit ID | 1202-SUO-…-01 | 1202-SUO-…-02 | 1202-SUO-…-03 |
| Equipment QTY. | 1 | 1 | 1 |
| Equipment Type | Wall Mounted Split Unit | Wall Mounted Split Unit | Wall Mounted Split Unit |
| Calculated Cooling Load+ 10% Over Cap. (btu/hr) Each | 30489 | 10909 | 16402 |
| Calculated Heating Load+ 10% Over Cap. (btu/hr) Each | 10583 | - | 2547 |
| Selected Eq. Nominal Cooling Cap. (btu/hr) Each | By Vendor | By Vendor | By Vendor |
| Selected Eq. Actual Cooling Cap. (btu/hr) Each | By Vendor | By Vendor | By Vendor |
| Selected Eq. Actual Heating Cap. (btu/hr) Each | By Vendor | By Vendor | By Vendor |
| Power Supply (V/PH/Hz) | 230/1/50 | 230/1/50 | 230/1/50 |
| Max. Power Consumption (w) Each Eq. (Cooling/Heating) | By Vendor | By Vendor | By Vendor |
| REMARKE | Outdoor and Indoor Unit (With Thermostat & All Standard Accessory)-T3 | Outdoor and Indoor Unit (With Thermostat & All Standard Accessory)-T3 | Outdoor and Indoor Unit (With Thermostat & All Standard Accessory)-T3 |

# CCTV CONTROL ROOM - BINAK pu

|  |  |  |
| --- | --- | --- |
| Item | Service Area | |
| Guard House | Rack Room |
| Calculated Sensible Cooling Load(w) | 1397 | 1272 |
| Calculated Latent Cooling Load(w) | 483 | 0 |
| Calculated Total Cooling Load(w) | 1880 | 1272 |
| Calculated Total Cooling Load (btu/hr) | 6421 | 4344 |
| Calculated Sensible Heating Load(w) | 706 | 83 |
| Calculated Sensible Heating Load (btu/hr) | 2411 | 283 |
| Split Unit ID Indoor Unit ID | 1202-SUI-…-01 | 1202-SUI-…-02 |
| Split Unit Outdoor Unit ID | 1202-SUO-…-01 | 1202-SUO-…-02 |
| Equipment QTY. | 1 | 1 |
| Equipment Type | Wall Mounted Split Unit | Wall Mounted Split Unit |
| Calculated Cooling Load+ 10% Over Cap. (btu/hr) Each | 7063 | 4779 |
| Calculated Heating Load+ 10% Over Cap. (btu/hr) Each | 2652 | 312 |
| Selected Eq. Nominal Cooling Cap. (btu/hr) Each | By Vendor | By Vendor |
| Selected Eq. Actual Cooling Cap. (btu/hr) Each | By Vendor | By Vendor |
| Selected Eq. Actual Heating Cap. (btu/hr) Each | By Vendor | By Vendor |
| Power Supply (V/PH/Hz) | 230/1/50 | 230/1/50 |
| Max. Power Consumption (w) Each Eq. (Cooling/Heating) | By Vendor | By Vendor |
| REMARKE | Outdoor and Indoor Unit (With Thermostat & All Standard Accessory)-T3 | Outdoor and Indoor Unit (With Thermostat & All Standard Accessory)-T3 |

## Exhaust fan selection

# CCTV CONTROL ROOM - BINAK GCS & DU

**WC**

Air Flow = 4 (area, m²) × 3.15 (height, m) × 15 ACH ÷ 60 min

=3.15 m³/min

=52.5 L/S ~ 75 L/S

=160 cfm

**Pantry**

Air Flow = 4.16 (area, m²) × 3.15 (height, m) × 6 ACH ÷ 60 min

=1.31 m³/min

=21.83 L/S ~ 100 L/S

=212 cfm

|  |  |  |  |
| --- | --- | --- | --- |
| Item | | Service Area | |
| WC | Pantry |
| Equipment QTY. | | 1 | 1 |
| Air Flow(L/S) | | 75 | 100 |
| Air Flow(CFM) | | 160 | 212 |
| Component Pressure Drop | Diffuser (In.WG.) | 0.00 | 0.00 |
| Sand Trap Louver (In.WG.) | 0.00 | 0.00 |
| Door Louver (In.WG.) | 0.00 | 0.00 |
| Ducting (In.WG.) | 0.0025 | 0.00 |
| Total External Pressure Drop \* | (In.WG.) | 0.03936 | 0.00 |
| (Pa) | 0.6221 | 0.00 |
| Exhaust Fan ID | | 1202-EF-…-01 | 1202-EF-…-02 |
| Exhaust Fan type | | Ceiling Mounted | Wall Mounted/Axial |
| Power Supply (V/PH/Hz) | | 230/1/50 | 230/1/50 |
| Power Consumption (w) Each Eq. | | By Vendor | By Vendor |
| REMARKE | | (∅=200 mm) | Equipped With Exhaust Air Louver |

\*Total Pressure Drop Include Louver and etc. Should Be Specified By Vendor.