

	نگهداشت و افزایش تولید میدان نفتی بینک سطح الارض و ابنیه تحت الارض عمومی و مشترک								
شماره پیمان: ۰۵۳ - ۰۷۳ - ۹۱۸۴	HVAC CALCULATION NOTE FOR SECURITY BUILDING – BK05								شماره صفحه ۱ از ۲۰
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	BK	BK05	PEDCO	110	HV	CN	0002	D00	

طرح نگهداشت و افزایش تولید ۲۷ مخزن

HVAC CALCULATION NOTE FOR SECURITY BUILDING – BK05

نگهداشت و افزایش تولید میدان نفتی بینک

D00	OCT. 2023	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-708441				

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

 NISOC	نگهداشت و افزایش تولید میدان نفتی بینک سطح الارض و ابنیه تحت الارض عمومی و مشترک								
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REVISION RECORD SHEET

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1.0 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.

2.0 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.

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3.0 NORMATIVE REFERENCES

3.1 LOCAL CODES AND STANDARDS

- IPS Iranian petroleum standards
- INBC Iranian National Building Code

3.2 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
- ASME The American Society of Mechanical Engineers

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

3.3 ENVIRONMENTAL DATA

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

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4.0 HVAC CALCULATION

4.1 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)

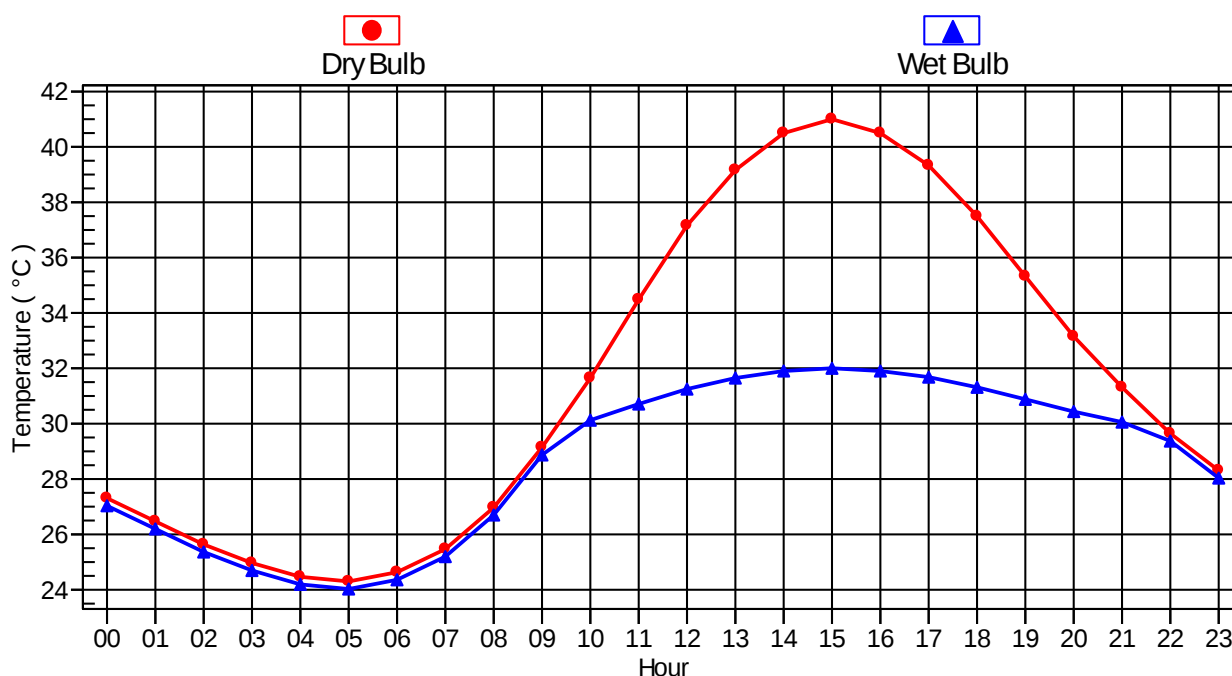
Month	N	NNE	NE	ENE	E	ESE	SE	SSE	S
January	77.5	77.5	95.1	360.4	561.2	730.9	794.1	786.3	762.3
February	89.1	89.1	206.7	484.1	668.9	760.8	782.0	718.9	671.9
March	101.4	120.5	367.4	576.2	723.5	759.6	702.5	590.8	520.1
April	113.0	252.7	487.2	636.6	705.1	688.3	568.6	408.7	322.0
May	124.3	351.1	551.9	666.3	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.

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Design Temperature Profile

Design Temperature Profiles for July



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D00	0002	CN	HV	110	PEDCO	BK05	BK																			

4.2 CONSTRUCTIONS U-VALUE:

Wall

Wall Details

Outside Surface Color Medium
Absorptivity 0.675
Overall U-Value 0.199 W/(m²-°K)

Wall Layers Details (Inside to Outside)

Layers	Thickness mm	Density kg/m ³	Specific Ht. kJ / (kg - °K)	R-Value (m ² -°K)/W	Weight kg/m ²
Inside surface resistance	0.000	0.0	0.00	0.12064	0.0
gypsum plaster	12.500	1200.0	1.09	0.02193	15.0
cement plaster	12.500	1600.0	0.80	0.01563	20.0
wall brick	200.000	2000.0	0.20	1.00000	400.0
high density PU	50.000	50.0	0.04	1.42857	2.5
cement plaster	30.000	1600.0	0.80	0.03750	48.0
face brick	70.000	2000.0	0.03	2.33330	140.0
Outside surface resistance	0.000	0.0	0.00	0.05864	0.0
Totals	375.000	-		5.01621	625.5

Roof

Roof Details

Outside Surface Color Medium
Absorptivity 0.675
Overall U-Value 0.404 W/(m²-°K)

Roof Layers Details (Inside to Outside)

Layers	Thickness mm	Density kg/m ³	Specific Ht. kJ / (kg - °K)	R-Value (m ² -°K)/W	Weight kg/m ²
Inside surface resistance	0.000	0.0	0.00	0.12064	0.0
gypsum Board	30.000	800.9	1.09	0.18638	24.0
ceiling air space	670.000	0.0	0.00	0.17611	0.0
HW concrete	300.000	2242.6	0.84	0.17368	672.8
high density PU	50.000	45.0	0.90	1.25000	2.3
LW concrete	90.000	608.7	0.84	0.23637	54.8
Asphalt sheathing	10.000	1121.3	1.47	0.19924	11.2
sand cement mortar	25.000	600.0	0.84	0.05500	15.0
terrazzo tile	25.000	4325.0	1.26	0.01734	108.1
Outside surface resistance	0.000	0.0	0.00	0.05864	0.0
Totals	1200.000	-		2.47340	888.2

U.W.-1

Window Details:

Detailed Input Yes
Height 2.00 m
Width 1.20 m
Frame Type Vinyl
Internal Shade Type None
Overall U-Value 2.789 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

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D00	0002	CN	HV	110	PEDCO	BK05	BK																			

U.W.-2

Window Details:

Detailed Input Yes
 Height 1.20 m
 Width 1.20 m
 Frame Type Vinyl
 Internal Shade Type None
 Overall U-Value 2.808 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

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D00	0002	CN	HV	110	PEDCO	BK05	BK																			

4.3 SPACE INPUT DATA:

00-Security Guard Room

1. General Details:

Floor Area 13.6 m²
Avg. Ceiling Height 3.0 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 250.0 Watts
Schedule Electrical Eq.

3. Walls, Windows, Doors:

Exp.	Wall Gross Area (m ²)	Window 1 Qty.	Window 2 Qty.	Door 1 Qty.
NE	9.3	1	0	1
NW	13.2	2	0	0
SW	9.3	1	0	1

3.1. Construction Types for Exposure NE

Wall Type Wall
1st Window Type U.W.-1
Door Type M.D.-1

3.2. Construction Types for Exposure NW

Wall Type Wall
1st Window Type U.W.-1

3.3. Construction Types for Exposure SW

Wall Type Wall
1st Window Type U.W.-1
Door Type M.D.-1

4. Roofs, Skylights:

Exp.	Roof Gross Area (m ²)	Roof Slope (deg.)	Skylight Qty.
H	13.6	0	0

4.1. Construction Types for Exposure H

Roof Type Roof

5. Infiltration:

Design Cooling 3.00 ACH
Design Heating 3.00 ACH
Energy Analysis 3.00 ACH

Infiltration occurs at all hours.

6. Floors:

Type Slab Floor On Grade
Floor Area 13.6 m²
Total Floor U-Value 0.568 W/(m²-°K)
Exposed Perimeter 10.6 m
Edge Insulation R-Value 0.00 (m²-°K)/W

7. Partitions:

7.1. 1st Partition Details:

Partition Type Wall Partition
Area 4.5 m²
U-Value 0.761 W/(m²-°K)

7.2. 2nd Partition Details:

(No partition data).

2.4. People:

Occupancy 3.0 People
Activity Level Sedentary Work
Sensible 82.1 W/person
Latent 79.1 W/person
Schedule People

2.5. Miscellaneous Loads:

Sensible 0 W
Schedule None
Latent 0 W
Schedule None

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

 NISOC	نگهداشت و افزایش تولید میدان نفتی بینک سطح الارض و ابنیه تحت الارض عمومی و مشترک	 شرکت توسعه و پارس																								
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HVAC CALCULATION NOTE FOR SECURITY BUILDING – BK05																										
نسخه	سریال	نوع مدرک	رشته	تسهیلات	صادر کننده	بسته کاری	پروژه																			
D00	0002	CN	HV	110	PEDCO	BK05	BK																			

01-Resting Area & Pantry

1. General Details:

Floor Area	20.0	m ²
Avg. Ceiling Height	3.0	m
Building Weight	341.8	kg/m ²

1.1. OA Ventilation Requirements:

Space Usage	User-Defined
OA Requirement 1	0.0 L/s/person
OA Requirement 2	0.00 L/(s-m ²)
Space Usage Defaults	ASHRAE Standard 62.1-2010

2. Internals:

2.1. Overhead Lighting:

Fixture Type	Recessed (Unvented)
Wattage	11.90 W/m ²
Ballast Multiplier	1.25
Schedule	Lighting

2.2. Task Lighting:

Wattage	0.00 W/m ²
Schedule	None

2.3. Electrical Equipment:

Wattage	600.0 Watts
Schedule	Electrical Eq.

3. Walls, Windows, Doors:

Exp.	Wall Gross Area (m ²)	Window 1 Qty.	Window 2 Qty.	Door 1 Qty.
NE	10.8	1	0	0
SE	13.2	1	0	0
SW	15.3	0	0	0

3.1. Construction Types for Exposure NE

Wall Type	Wall
1st Window Type	U.W.-2

3.2. Construction Types for Exposure SE

Wall Type	Wall
1st Window Type	U.W.-2

3.3. Construction Types for Exposure SW

Wall Type	Wall
-----------------	------

4. Roofs, Skylights:

Exp.	Roof Gross Area (m ²)	Roof Slope (deg.)	Skylight Qty.
H	20.0	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	20.0 m ²
Total Floor U-Value	0.568 W/(m ² -°K)
Exposed Perimeter	13.1 m
Edge Insulation R-Value	0.00 (m ² -°K)/W

7. Partitions:

7.1. 1st Partition Details:

Partition Type	Wall Partition
Area	9.0 m ²
U-Value	0.761 W/(m ² -°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).

2.4. People:

Occupancy	3.0 People
Activity Level	Sedentary Work
Sensible	82.1 W/person
Latent	79.1 W/person
Schedule	People

2.5. Miscellaneous Loads:

Sensible	1000 W
Schedule	Electrical Eq.
Latent	700 W
Schedule	Electrical Eq

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	BK	BK05	PEDCO	110	HV	CN	0002	D00	

4.4 SYSTEM INPUT DATA:

1. General Details:

Air System Name System
Equipment Type Terminal Units
Air System Type Split DX Fan Coil
Number of zones 1
Ventilation Direct Ventilation

2. Ventilation System Components:

(Common Ventilation System not used: no inputs)

3. Zone Components:

Space Assignments:

Zone 1: Zone 1	
00-Security Guard Room	x1
01-Resting Area & Pantry	x1

Thermostats and Zone Data:

Zone	Cooling T-Stat Occ. (°C)	Cooling T-Stat Unocc. (°C)	Heating T-Stat Occ. (°C)	Heating T-Stat Unocc. (°C)	T-Stat Throttling Range (°C)
1	24.0	27.0	22.0	18.0	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 %

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	BK	BK05	PEDCO	110	HV	CN	0002	D00	

4.5 AIR SYSTEM SIZING SUMMARY

Air System Information

Air System Name **System**
 Equipment Class **TERM**
 Air System Type **SPLT-FC**

Number of zones **2**
 Floor Area **33.6** 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

Zone Name	Maximum Cooling Sensible (kW)	Design Airflow (L/s)	Minimum Airflow (L/s)	Time of Peak Load	Maximum Heating Load (kW)	Zone Floor Area (m ²)	Zone L/(s-m ²)
Zone 1	7.2	626	626	Jul 1600	3.2	33.6	18.62

Terminal Unit Sizing Data – Cooling

Zone Name	Total Coil Load (kW)	Sens Coil Load (kW)	Coil Entering DB / WB (°C)	Coil Leaving DB / WB (°C)	Water Flow @ 5.6 °K (L/s)	Time of Peak Load
Zone 1	11.3	7.0	24.7 / 20.1	15.4 / 15.0	-	Jul 1600

Terminal Unit Sizing Data - Heating, Fan, Ventilation

Zone Name	Heating Coil Load (kW)	Heating Coil Ent/Lvg DB (°C)	Htg Coil Water Flow @11.1 °K (L/s)	Fan Design Airflow (L/s)	Fan Motor (BHP)	Fan Motor (kW)	OA Vent Design Airflow (L/s)
Zone 1	3.2	21.9 / 26.2	-	626	0.000	0.000	0

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m ²)	Space L/(s-m ²)
Zone 1							
00-Security Guard Room	1	3.7	Jul 1600	320	1.9	13.6	23.54
01-Resting Area & Pantry	1	3.5	Jul 1500	305	1.3	20.0	15.27

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HVAC CALCULATION NOTE FOR SECURITY BUILDING – BK05																										
نسخه	سریال	نوع مدرک	رشته	تسهیلات	صادر کننده	بسته کاری	پروژه																			
D00	0002	CN	HV	110	PEDCO	BK05	BK																			

4.6 VENTILATION SIZING SUMMARY

1. Summary

Ventilation Sizing Method Sum of Space OA Airflows

2. Space Ventilation Analysis Table

Zone Name / Space Name	Mult.	Floor Area (m ²)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s-m ²))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Zone 1									
00-Security Guard Room	1	13.6	3.0	320.1	0.00	0.00	0.0	0.0	0.0
01-Resting Area & Pantry	1	20.0	3.0	305.5	0.00	0.00	0.0	0.0	0.0
Totals (incl. Space Multipliers)				625.6					0.0

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	BK	BK05	PEDCO	110	HV	CN	0002		D00

4.7 AIR SYSTEM DESIGN LOAD SUMMARY:

ZONE LOADS	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jul 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		
	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	12 m ²	1569	-	12 m ²	-	-
Wall Transmission	54 m ²	135	-	54 m ²	173	-
Roof Transmission	34 m ²	179	-	34 m ²	217	-
Window Transmission	12 m ²	483	-	12 m ²	558	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	4 m ²	354	-	4 m ²	408	-
Floor Transmission	34 m ²	0	-	34 m ²	156	-
Partitions	14 m ²	92	-	14 m ²	98	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	0 W	11	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	850 W	850	-	0	0	-
People	6	493	475	0	0	0
Infiltration	-	1337	2755	-	1297	0
Miscellaneous	-	1000	700	-	0	0
Safety Factor	10% / 10%	650	393	10%	291	0
>> Total Zone Loads	-	7154	4323	-	3197	0
Zone Conditioning	-	6983	4323	-	3223	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	-	6983	4323	-	3223	0
Terminal Unit Cooling	-	6983	4327	-	0	0
Terminal Unit Heating	-	0	-	-	3223	-
>> Total Conditioning	-	6983	4327	-	3223	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

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	BK	BK05	PEDCO	110	HV	CN	0002	D00

4.8 ZONE DESIGN LOAD SUMMARY:

Zone 1				DESIGN COOLING			DESIGN HEATING		
				COOLING DATA AT Jul 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		
ZONE LOADS				Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads				12 m ²	1569	-	12 m ²	-	-
Wall Transmission				54 m ²	135	-	54 m ²	173	-
Roof Transmission				34 m ²	179	-	34 m ²	217	-
Window Transmission				12 m ²	483	-	12 m ²	558	-
Skylight Transmission				0 m ²	0	-	0 m ²	0	-
Door Loads				4 m ²	354	-	4 m ²	408	-
Floor Transmission				34 m ²	0	-	34 m ²	156	-
Partitions				14 m ²	92	-	14 m ²	98	-
Ceiling				0 m ²	0	-	0 m ²	0	-
Overhead Lighting				0 W	11	-	0	0	-
Task Lighting				0 W	0	-	0	0	-
Electric Equipment				850 W	850	-	0	0	-
People				6	493	475	0	0	0
Infiltration				-	1337	2755	-	1297	0
Miscellaneous				-	1000	700	-	0	0
Safety Factor				10% / 10%	650	393	10%	291	0
>> Total Zone Loads				-	7154	4323	-	3197	0

 NISOC	نگهداشت و افزایش تولید میدان نفتی بینک سطح الارض و ابنیه تحت الارض عمومی و مشترک																									
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HVAC CALCULATION NOTE FOR SECURITY BUILDING – BK05																										
نسخه	سریال	نوع مدرک	رشته	تسهیلات	صادر کننده	بسته کاری	پروژه																			
D00	0002	CN	HV	110	PEDCO	BK05	BK																			

4.9 SPACE DESIGN LOAD SUMMARY:

TABLE 1.1.A. COMPONENT LOADS FOR SPACE " 00-Security Guard Room " IN ZONE " Zone 1 "						
	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jul 1600 COOLING OA DB / WB 40.5 °C / 31.9 °C OCCUPIED T-STAT 24.0 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 6.0 °C / 6.0 °C OCCUPIED T-STAT 22.0 °C		
		Sensible	Latent		Sensible	Latent
SPACE LOADS	Details	(W)	(W)	Details	(W)	(W)
Window & Skylight Solar Loads	10 m ²	1298	-	10 m ²	-	-
Wall Transmission	18 m ²	44	-	18 m ²	57	-
Roof Transmission	14 m ²	73	-	14 m ²	88	-
Window Transmission	10 m ²	371	-	10 m ²	428	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	4 m ²	354	-	4 m ²	408	-
Floor Transmission	14 m ²	0	-	14 m ²	65	-
Partitions	5 m ²	31	-	5 m ²	33	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	0 W	5	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	250 W	250	-	0	0	-
People	3	246	237	0	0	0
Infiltration	-	675	1391	-	655	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	10% / 10%	335	163	10%	173	0
>> Total Zone Loads	-	3681	1792	-	1908	0

TABLE 1.1.B. ENVELOPE LOADS FOR SPACE " 00-Security Guard Room " IN ZONE " Zone 1 "						
	Area	U-Value	Shade	COOLING	COOLING	HEATING
	(m ²)	(W/(m ² ·°K))	Coeff.	TRANS	SOLAR	TRANS
				(W)	(W)	(W)
NE EXPOSURE						
WALL	5	0.199	-	12	-	15
WINDOW 1	2	2.789	0.700	93	224	107
DOOR	2	5.800	-	177	-	204
NW EXPOSURE						
WALL	8	0.199	-	21	-	27
WINDOW 1	5	2.789	0.700	186	728	214
SW EXPOSURE						
WALL	5	0.199	-	11	-	15
WINDOW 1	2	2.789	0.700	93	347	107
DOOR	2	5.800	-	177	-	204
H EXPOSURE						
ROOF	14	0.404	-	73	-	88

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TABLE 1.2.A. COMPONENT LOADS FOR SPACE " 01-Resting Area & Pantry " IN ZONE " Zone 1 "						
	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jul 1500 COOLING OA DB / WB 41.0 °C / 32.0 °C OCCUPIED T-STAT 24.0 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 6.0 °C / 6.0 °C OCCUPIED T-STAT 22.0 °C		
		Sensible	Latent		Sensible	Latent
SPACE LOADS	Details	(W)	(W)	Details	(W)	(W)
Window & Skylight Solar Loads	3 m ²	284	-	3 m ²	-	-
Wall Transmission	36 m ²	91	-	36 m ²	116	-
Roof Transmission	20 m ²	107	-	20 m ²	129	-
Window Transmission	3 m ²	113	-	3 m ²	129	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	20 m ²	0	-	20 m ²	91	-
Partitions	9 m ²	62	-	9 m ²	65	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	0 W	7	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	600 W	600	-	0	0	-
People	3	246	237	0	0	0
Infiltration	-	682	1336	-	642	0
Miscellaneous	-	1000	700	-	0	0
Safety Factor	10% / 10%	319	227	10%	117	0
>> Total Zone Loads	-	3513	2500	-	1290	0

TABLE 1.2.B. ENVELOPE LOADS FOR SPACE " 01-Resting Area & Pantry " IN ZONE " Zone 1 "						
	Area	U-Value	Shade	COOLING	COOLING	HEATING
	(m ²)	(W/(m ² -°K))	Coeff.	TRANS	SOLAR	TRANS
				(W)	(W)	(W)
NE EXPOSURE						
WALL	9	0.199	-	24	-	30
WINDOW 1	1	2.808	0.700	57	141	65
SE EXPOSURE						
WALL	12	0.199	-	30	-	38
WINDOW 1	1	2.808	0.700	57	143	65
SW EXPOSURE						
WALL	15	0.199	-	38	-	49
H EXPOSURE						
ROOF	20	0.404	-	107	-	129

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5.0 Equipment Selection

5.1 AIR CONDITIONING UNIT

Item	Service Area	
	Security Guard Room	Resting Area & Pantry
Calculated Sensible Cooling Load(w)	3681	3513
Calculated Latent Cooling Load(w)	1792	2500
Calculated Total Cooling Load(w)	5473	6013
Calculated Total Cooling Load (btu/hr)	18691	20535
Calculated Sensible Heating Load(w)	1908	1290
Calculated Sensible Heating Load (btu/hr)	6516	4406
Split Unit ID Indoor Unit ID	1101-SUI-BK05-01	1101-SUI-BK05-02
Split Unit Outdoor Unit ID	1101-SUO-BK05-01	1101-SUO-BK05-02
Equipment QTY.	1	1
Equipment Type	Wall Mounted Split Unit	Wall Mounted Split Unit
Calculated Cooling Load+ 10% Over Cap. (btu/hr) Each	20560	22589
Calculated Heating Load+ 10% Over Cap. (btu/hr) Each	7168	4847
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

 NISOC	نگهداشت و افزایش تولید میدان نفتی بینک سطح الارض و ابنیه تحت الارض عمومی و مشترک								
شماره پیمان: ۰۵۳ - ۰۷۳ - ۹۱۸۴	HVAC CALCULATION NOTE FOR SECURITY BUILDING – BK05								شماره صفحه: ۲۰ از ۲۰
	پروژه	بسته کاری	صادر کننده	تسهیلات	رشته	نوع مدرک	سریال	نسخه	
	BK	BK05	PEDCO	110	HV	CN	0002	D00	

5.2 EXHAUST FAN SELECTION

WC

$$\text{Air Flow} = 1.9 (\text{area, m}^2) \times 2.6 (\text{height, m}) \times 15 \text{ ACH} \div 60 \text{ min}$$

$$= 1.235 \text{ m}^3/\text{min}$$

$$= 20.58 \text{ L/S}$$

$$= 43.61 \text{ cfm}$$

Pantry

$$\text{Air Flow} = 3.78 (\text{area, m}^2) \times 3.00 (\text{height, m}) \times 6 \text{ ACH} \div 60 \text{ min}$$

$$= 1.134 \text{ m}^3/\text{min}$$

$$= 18.9 \text{ L/S}$$

$$= 40.05 \text{ cfm}$$

Item		Service Area	
		WC	Pantry
Equipment QTY.		1	1
Air Flow(L/S)		20.58	18.9
Air Flow(CFM)		43.61	40.05
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.)	0.0037	0.0061
Total External Pressure Drop *	(In.WG.)	0.0037	0.0061
	(Pa)	0.9207	1.5179
Exhaust Fan ID		1101-EF-BK05-01	1101-EF-BK05-02
Exhaust Fan type		Ceiling Mounted	Ceiling Mounted
Power Supply (V/PH/Hz)		230/1/50	230/1/50
Power Consumption (w) Each Eq.		By Vendor	By Vendor
REMARKE		-	-

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