



شماره صفحه: 1 از 24

نسخه	سریال	نوع مدرک	رشته	تسهیلات	صادر کننده	بسته کاری	پروژه
D00	0002	CN	HV	120	PEDCO	GCS	BK

- Status:**

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

This document covers minimum necessary requirements for basis of design and main equipment's to be used for the Heating, Ventilating, Air-Conditioning and pressurizing and plumbing system for buildings for project

 NISOC	نگهداشت و افزایش تولید میدان نفتی بینک سطح الارض و ابنیه تحت الارض عمومی و مشترک								
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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 Namebink
 Location.....IRAN
 Latitude.....30.3
 Deg.Longitude.....-50.2
 Deg.Elevation.....10.0 m
 Summer Design Dry-Bulb.....41.0 °C
 Summer Coincident Wet-Bulb.....34.0 °C
 Summer Daily Range.....15.0
 °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).....-1.0 hours
 Consider Daylight Savings Time.....No
 Simulation Weather Data.....none N/A
 Current Data is.....User Modified
 Design Cooling Months.....January to December

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	BK	GCS	PEDCO	120	HV	CN	0002	D00

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	76.4	76.4	104.1	335.1	577.4	722.3	796.4	786.7	764.0
February	88.0	88.0	230.9	458.1	662.9	773.4	774.9	717.7	674.9
March	100.7	108.6	368.7	585.3	707.6	758.3	705.1	595.4	528.1
April	113.1	256.3	472.2	642.7	716.0	679.9	580.0	422.9	334.5
May	124.2	353.9	534.8	663.8	694.2	620.4	475.0	290.9	209.6
June	157.8	384.6	558.6	667.1	676.8	585.8	428.0	240.6	172.3
July	127.6	344.7	537.1	656.3	678.1	598.4	463.4	281.6	203.3
August	118.2	248.3	466.5	623.6	687.8	654.3	558.9	407.2	322.5
September	104.5	113.3	336.6	555.0	683.3	716.4	681.4	580.5	517.4
October	90.9	90.9	201.8	462.7	636.7	736.7	756.5	701.7	660.0
November	77.8	77.8	98.3	345.3	551.3	718.6	773.6	774.1	756.1
December	71.4	71.4	71.4	269.7	530.8	696.4	785.4	795.0	786.8
Month	SSW	SW	WSW	W	WNW	NW	NNW	HOR	Mult
January	789.5	796.9	721.1	569.2	354.1	83.2	76.4	579.3	1.00
February	722.0	781.4	766.3	669.5	467.5	224.5	88.0	702.0	1.00
March	596.6	704.4	761.1	720.6	569.4	368.1	116.6	809.9	1.00
April	421.4	576.3	689.2	714.5	631.4	476.0	257.9	863.7	1.00
May	289.5	470.8	624.0	691.1	655.0	542.6	355.7	877.6	1.00
June	238.3	421.9	590.9	670.1	656.4	565.4	389.3	873.7	1.00
July	278.1	456.2	609.2	671.7	644.3	540.2	353.4	863.9	1.00
August	405.5	554.8	664.2	689.2	610.9	463.3	256.0	845.0	1.00
September	580.7	681.6	714.0	684.8	554.4	333.4	114.2	785.9	1.00
October	698.5	750.4	744.7	624.3	458.7	216.5	90.9	693.3	1.00
November	770.3	775.6	718.6	559.7	335.4	103.0	77.8	579.1	1.00
December	796.5	774.3	701.4	517.9	296.9	71.4	71.4	527.6	1.00

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4.2 CONSTRUCTIONS U-VALUE:

External Wall

Wall Details

Outside Surface Color **Dark**
 Absorptivity **0.900**
 Overall U-Value **0.642** 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
concrete	300.000	2242.6	0.84	0.17334	672.8
insulation	50.000	32.0	0.92	1.13000	1.6
face brick	100.000	2002.3	0.92	0.07504	200.2
Outside surface resistance	0.000	0.0	0.00	0.05864	0.0
Totals	450.000	-		1.55766	874.6

External Roof

Roof Details

Outside Surface Color **Dark**
 Absorptivity **0.900**
 Overall U-Value **0.510** 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
concrete	400.00	2242.6	0.84	0.23112	897.0
Slat	20.000	4325.0	1.26	0.01387	86.5
cement mortar	30.480	608.7	0.84	0.04227	18.6
Outside surface resistance	0.000	0.0	0.00	0.05864	0.0
Totals	420.000	-		0.47	1002.1

1 x 2.2

Door Details:

Gross Area **3** m²
 Door U-Value **4.000** 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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4.3 SPACE INPUT DATA:

Capacitor Room

1. General Details:

Floor Area **42.6** m²
 Avg. Ceiling Height **4.1** m
 Building Weight **341.8** kg/m²

1.1. OA Ventilation Requirements:

Space Usage **User-Defined**
 OA Requirement 1 **0.00** L/s/person
 OA Requirement 2 **0.00** L/(s-m²)
 Space Usage Defaults **ASHRAE Standard 62.1-2007**

2. Internals:

2.1. Overhead Lighting:

Fixture Type **Free Hanging**
 Wattage **20.00** W/m²
 Ballast Multiplier **1.20**
 Schedule **Lighting**

2.2. Task Lighting:

Wattage **0.00** W/m²
 Schedule **None**

2.4. People:

Occupancy **0.00** Person
 Activity Level **User defined**
 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**

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2.3. Electrical Equipment:

Wattage 10000 W
 Schedule None

3. Walls, Windows, Doors:

Exp.	Wall Gross Area (m²)	Window 1 Qty.	Window 2 Qty.	Door 1 Qty.
N	39	0	0	0
E	20	0	0	1

3.1. Construction Types for Exposure E

Wall Type External Wall
 Door Type 1 x 2.2

4. Roofs, Skylights:

Exp.	Roof Gross Area (m²)	Roof Slope (deg.)	Skylight Qty.
H	42.6	0	0

4.1. Construction Types for Exposure H

Roof Type External Roof

5. Infiltration:

Design Cooling 97.03 L/s
 Design Heating 97.03 L/s
 Energy Analysis 0.00 L/s
 Infiltration occurs all hours.

6. Floors:

Type Slab Floor On Grade
 Floor Area 42.6 m²
 Total Floor U-Value 0.568 W/(m²·°K)
 Exposed Perimeter 14 m
 Edge Insulation R-Value 0.00 (m²·°K)/W

7. Partitions:

Wall Partition Slab Floor On Grade
 U- Value 18.0 m²
 Unconditioned Space Max Temp 37.0 °C
 Ambient at Space Max Temp 41.0 °C
 Unconditioned Space Min Temp 25.0 °C
 Ambient at Space Min Temp 6.0 °C

HV Room

1. General Details:

Floor Area 169.4 m²
 Avg. Ceiling Height 4.0 m
 Building Weight 341.8 kg/m²

1.1. OA Ventilation Requirements:

Space Usage User-Defined
 OA Requirement 1 0.0 L/s
 OA Requirement 2 0.00 L/(s·m²)
 Space Usage Defaults ASHRAE Standard 62.1-2007

2. Internals:

2.1. Overhead Lighting:

Fixture Type Free Hanging
 Wattage 0.00 W/m²
 Ballast Multiplier 1.20
 Schedule None

2.2. Task Lighting:

Wattage 0.00 W/m²
 Schedule None

2.3. Electrical Equipment:

Wattage 11000.0 Watts
 Schedule Equipment

3. Walls, Windows, Doors:

(No Wall, Window, Door data).

4. Roofs, Skylights:

(No Roof or Skylight data).

5. Infiltration:

Design Cooling 0.00 ACH
 Design Heating 0.00 L/s

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
 Energy Analysis 0.00 L/s
 Infiltration occurs at all hours.

6. Floors:

Type Floor Above Conditioned Space
 (No additional input required for this floor type).

7. Partitions:

(No partition data).

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LV ROOM

1. General Details:

Floor Area 145.2 m²
Avg. Ceiling Height 4.0 m
Building Weight 341.8 kg/m²

1.1. OA Ventilation Requirements:

Space Usage User-Defined
OA Requirement 1 0.0 L/s
OA Requirement 2 0.00 L/(s-m²)
Space Usage Defaults ASHRAE Standard 62.1-2007

2. Internals:

2.1. Overhead Lighting:

Fixture Type Free Hanging
Wattage 0.00 W/m²
Ballast Multiplier 1.20
Schedule None

Energy Analysis 0.00 L/s
Infiltration occurs only when the fan is off.

2.2. Task Lighting:

Wattage 0.00 W/m²
Schedule None

2.3. Electrical Equipment:

Wattage 19000.0 Watts
Schedule Equipment

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:

(No Wall, Window, Door data).

4. Roofs, Skylights:

(No Roof or Skylight data).

5. Infiltration:

Design Cooling 0.00 ACH
Design Heating 0.00 L

6. Floors:

Type Floor Above Conditioned Space
(No additional input required for this floor type).

7. Partitions:

(No partition data).

 NISOC	نگهداشت و افزایش تولید میدان نفتی بینک سطح الارض و ابنیه تحت الارض عمومی و مشترک																									
شماره پیمان: 053 - 073- 9184	<table><tr><th colspan="8">HVAC Calculation Note For Extension of Existing Elect. Building</th></tr><tr><th>نسخه</th><th>سریال</th><th>نوع مدرک</th><th>رشته</th><th>تسهیلات</th><th>صادر کننده</th><th>بسته کاری</th><th>پروژه</th></tr><tr><td>D00</td><td>0002</td><td>CN</td><td>HV</td><td>120</td><td>PEDCO</td><td>GCS</td><td>BK</td></tr></table>	HVAC Calculation Note For Extension of Existing Elect. Building								نسخه	سریال	نوع مدرک	رشته	تسهیلات	صادر کننده	بسته کاری	پروژه	D00	0002	CN	HV	120	PEDCO	GCS	BK	شماره صفحه: 12 از 24
HVAC Calculation Note For Extension of Existing Elect. Building																										
نسخه	سریال	نوع مدرک	رشته	تسهیلات	صادر کننده	بسته کاری	پروژه																			
D00	0002	CN	HV	120	PEDCO	GCS	BK																			

4.4 SYSTEM INPUT DATA:

1. General Details:

Air System Name EXTENSION OF EXISTING ELECT. (1)
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	
HV ROOM	x1
LV ROOM	x1
Zone 2: Zone 2	
CAPACITOR ROOM	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	30.0	30.0	10.0	10.0	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 14.0 °C
Coil Bypass Factor 0.100
Cooling Source Air-Cooled DX
Schedule JFMAMJJASOND

Heating Coil:

Design Supply Temperature 35.0 °C
Heating Source Electric Resistance
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 14.0 °C
Heating Supply Temperature 35.0 °C

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شماره پیمان: 053 - 073- 9184	HVAC Calculation Note For Extension of Existing Elect. Building								شماره صفحه: 13 از 24
	پروژه	بسته کاری	صادر کننده	تسهیلات	رشته	نوع مدرک	سریال	نسخه	
	BK	GCS	PEDCO	120	HV	CN	0002	D00	

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 %

Zone Sizing Data:

Zone Airflow Sizing Method Sum of space airflow rates
Space Airflow Sizing Method Individual peak space loads

Zone	Supply Airflow (L/s)	Zone Htg Unit (kW)	Reheat Coil (kW)	Ventilation (L/s)
1	1726.8	-	-	0.0
2	829.1	-	-	0.0

5. Equipment Data

Terminal Cooling Units - Air-Cooled DX

Zone	Estimated Maximum Load (kW)	Design OAT (°C)	Equipment Sizing	Gross Cooling Capacity (kW)	Capacity Oversizing Factor (%)	Compressor + OD Fan Power (kW)	ARI Performance Rating	Units	Conventional Cutoff OAT (°C)
1	n/a	35.0	Auto-Sized	-	0	-	3.224	EER	-17.8
2	n/a	35.0	Auto-Sized	-	0	-	3.224	EER	-17.8

 NISOC	نگهداشت و افزایش تولید میدان نفتی بینک سطح الارض و ابنیه تحت الارض عمومی و مشترک								
شماره پیمان: 053 – 073– 9184	HVAC Calculation Note For Extension of Existing Elect. Building							شماره صفحه: 14 از 24	
	پروژه	بسته کاری	صادر کننده	تسهیلات	رشته	نوع مدرک	سریال		نسخه
	BK	GCS	PEDCO	120	HV	CN	0002		D00

4.5 ZONE SIZING SUMMARY:

Air System Information

Air System Name **EXTENSION OF EXISTING ELECT. (1)**
Equipment Class **TERM**
Air System Type **SPLT-FC**

Number of zones **2**
Floor Area **357.2** 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**

 NISOC	نگهداشت و افزایش تولید میدان نفتی بینک سطح الارض و ابنیه تحت الارض عمومی و مشترک								
شماره پیمان: 053 - 073- 9184	HVAC Calculation Note For Extension of Existing Elect. Building								شماره صفحه: 15 از 24
	پروژه	بسته کاری	صادر کننده	تسهیلات	رشته	نوع مدرک	سریال	نسخه	
	BK	GCS	PEDCO	120	HV	CN	0002	D00	

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 (m²)	Zone L/(s-m²)
Zone 1	33.3	1727	1727	Jan 2300	0.0	314.6	5.49
Zone 2	16.0	828	828	Jul 1500	1.4	42.6	19.44

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	39.9	33.8	30.7 / 20.2	14.5 / 13.5	-	Jun 1100
Zone 2	16.7	15.8	30.6 / 19.6	14.8 / 13.8	-	Jul 1500

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	0.0	-17.8 / -17.8	0.00	1727	0.000	0.000	0
Zone 2	1.5	10.1 / 11.7	-	828	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 (m²)	Space L/(s-m²)
Zone 1							
HV ROOM	1	12.3	Jan 2300	635	0.0	169.4	3.75
LV ROOM	1	21.1	Jan 2300	1091	0.0	145.2	7.52
Zone 2							
CAPACITOR ROOM	1	16.0	Jul 1500	828	1.4	42.6	19.44

 NISOC	نگهداشت و افزایش تولید میدان نفتی بینک سطح الارض و ابنیه تحت الارض عمومی و مشترک								
شماره پیمان: 053 - 073- 9184	HVAC Calculation Note For Extension of Existing Elect. Building								شماره صفحه: 16 از 24
	پروژه	بسته کاری	صادر کننده	تسهیلات	رشته	نوع مدرک	سریال	نسخه	
	BK	GCS	PEDCO	120	HV	CN	0002	D00	

4.6 VENTILATION SIZING SAMMARY:

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									
HV ROOM	1	169.4	2.0	635.4	0.00	0.00	0.0	0.0	0.0
LV ROOM	1	145.2	2.0	1091.5	0.00	0.00	0.0	0.0	0.0
Zone 2									
CAPACITOR ROOM	1	42.6	0.0	828.3	0.00	0.00	0.0	0.0	0.0
Totals (incl. Space Multipliers)				2555.2					0.0

	نگهداشت و افزایش تولید میدان نفتی بینک سطح الارض و ابنیه تحت الارض عمومی و مشترک									
شماره پیمان:	HVAC Calculation Note For Extension of Existing Elect. Building								شماره صفحه: 17 از 24	
053 - 073- 9184	پروژه	بسته کاری	صادر کننده	تسهیلات	رشته	نوع مدرک	سریال	نسخه		
	BK	GCS	PEDCO	120	HV	CN	0002	D00		

4.7 AIR SYSTEM DESIGN LOAD SAMMARY:

ZONE LOADS	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jul 1500			HEATING DATA AT DES HTG		
	COOLING OA DB / WB 41.0 °C / 34.0 °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	0 m ²	0	-	0 m ²	-	-
Wall Transmission	56 m ²	976	-	56 m ²	480	-
Roof Transmission	43 m ²	957	-	43 m ²	242	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	3 m ²	100	-	3 m ²	48	-
Floor Transmission	43 m ²	0	-	43 m ²	36	-
Partitions	18 m ²	186	-	18 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	1022 W	1022	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	40000 W	39998	-	0	0	-
People	4	287	240	0	0	0
Infiltration	-	1287	6195	-	468	2
Miscellaneous	-	0	0	-	0	0
Safety Factor	10% / 10%	4481	644	10%	127	0
>> Total Zone Loads	-	49295	7079	-	1402	2
Zone Conditioning	-	49583	7079	-	1544	2
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	-	49583	7079	-	1544	2
Terminal Unit Cooling	-	49583	6910	-	0	0
Terminal Unit Heating	-	0	-	-	1544	-
>> Total Conditioning	-	49583	6910	-	1544	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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	پروژه	بسته کاری	صادرکننده	تسهیلات	رشته	نوع مدرک	سریال	نسخه	
	BK	GCS	PEDCO	120	HV	CN	0002	D00	

4.8 ZOON DESIGN LOAD SAMMARY

Zone 1	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 2300			HEATING DATA AT DES HTG		
	COOLING OA DB / WB 20.3 °C / 20.0 °C			HEATING OA DB / WB 6.0 °C / 6.0 °C		
	OCCUPIED T-STAT 30.0 °C			OCCUPIED T-STAT 10.0 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	0 m ²	0	-	0 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	0 W	0	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	30000 W	29999	-	0	0	-
People	4	287	240	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	10% / 10%	3029	24	10%	0	0
>> Total Zone Loads	-	33314	264	-	0	0

Zone 2	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jul 1500			HEATING DATA AT DES HTG		
	COOLING OA DB / WB 41.0 °C / 34.0 °C			HEATING OA DB / WB 6.0 °C / 6.0 °C		
	OCCUPIED T-STAT 30.0 °C			OCCUPIED T-STAT 10.0 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	56 m ²	976	-	56 m ²	480	-
Roof Transmission	43 m ²	957	-	43 m ²	242	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	3 m ²	100	-	3 m ²	48	-
Floor Transmission	43 m ²	0	-	43 m ²	36	-
Partitions	18 m ²	186	-	18 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	1022 W	1022	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	10000 W	10000	-	0	0	-
People	0	0	0	0	0	0
Infiltration	-	1287	6195	-	468	2
Miscellaneous	-	0	0	-	0	0
Safety Factor	10% / 10%	1453	619	10%	127	0
>> Total Zone Loads	-	15981	6814	-	1402	2

 NISOC	نگهداشت و افزایش تولید میدان نفتی بینک سطح الارض و ابنیه تحت الارض عمومی و مشترک																									
شماره پیمان: 053 - 073- 9184	<table><tr><th colspan="8">HVAC Calculation Note For Extension of Existing Elect. Building</th></tr><tr><th>نسخه</th><th>سریال</th><th>نوع مدرک</th><th>رشته</th><th>تسهیلات</th><th>صادر کننده</th><th>بسته کاری</th><th>پروژه</th></tr><tr><td>D00</td><td>0002</td><td>CN</td><td>HV</td><td>120</td><td>PEDCO</td><td>GCS</td><td>BK</td></tr></table>	HVAC Calculation Note For Extension of Existing Elect. Building								نسخه	سریال	نوع مدرک	رشته	تسهیلات	صادر کننده	بسته کاری	پروژه	D00	0002	CN	HV	120	PEDCO	GCS	BK	شماره صفحه: 19 از 24
HVAC Calculation Note For Extension of Existing Elect. Building																										
نسخه	سریال	نوع مدرک	رشته	تسهیلات	صادر کننده	بسته کاری	پروژه																			
D00	0002	CN	HV	120	PEDCO	GCS	BK																			

4.9 SPACE DESIGN LOAD SAMMARY

TABLE 1.1.A. COMPONENT LOADS FOR SPACE " HV ROOM " IN ZONE " Zone 1 "						
	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 2300 COOLING OA DB / WB 20.3 °C / 20.0 °C OCCUPIED T-STAT 30.0 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 6.0 °C / 6.0 °C OCCUPIED T-STAT 10.0 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	0 m ²	0	-	0 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	0 W	0	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	11000 W	11000	-	0	0	-
People	2	144	120	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	10% / 10%	1114	12	10%	0	0
>> Total Zone Loads	-	12257	132	-	0	0

TABLE 1.1.B. ENVELOPE LOADS FOR SPACE " HV ROOM " IN ZONE " Zone 1 "						
				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)

 NISOC	نگهداشت و افزایش تولید میدان نفتی بینک سطح الارض و ابنیه تحت الارض عمومی و مشترک								
شماره پیمان: 053 - 073- 9184	HVAC Calculation Note For Extension of Existing Elect. Building								شماره صفحه: 20 از 24
	پروژه	بسته کاری	صادر کننده	تسهیلات	رشته	نوع مدرک	سریال	نسخه	
	BK	GCS	PEDCO	120	HV	CN	0002	D00	

TABLE 1.2.A. COMPONENT LOADS FOR SPACE " LV ROOM " IN ZONE " Zone 1 "						
	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 2300 COOLING OA DB / WB 20.3 °C / 20.0 °C OCCUPIED T-STAT 30.0 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 6.0 °C / 6.0 °C OCCUPIED T-STAT 10.0 °C		
		Sensible	Latent		Sensible	Latent
SPACE LOADS	Details	(W)	(W)	Details	(W)	(W)
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	0 m ²	0	-	0 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	0 W	0	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	19000 W	18999	-	0	0	-
People	2	144	120	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	10% / 10%	1914	12	10%	0	0
>> Total Zone Loads	-	21057	132	-	0	0

TABLE 1.2.B. ENVELOPE LOADS FOR SPACE " LV ROOM " IN ZONE " Zone 1 "						
				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² ·°K))	Coeff.	(W)	(W)	(W)

 NISOC	نگهداشت و افزایش تولید میدان نفتی بینک سطح الارض و ابنیه تحت الارض عمومی و مشترک								
شماره پیمان: 053 - 073- 9184	HVAC Calculation Note For Extension of Existing Elect. Building								شماره صفحه: 21 از 24
	پروژه	بسته کاری	صادرکننده	تسهیلات	رشته	نوع مدرک	سریال	نسخه	
	BK	GCS	PEDCO	120	HV	CN	0002	D00	

TABLE 2.1.A. COMPONENT LOADS FOR SPACE " CAPACITOR ROOM " IN ZONE " Zone 2 "						
	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jul 1500 COOLING OA DB / WB 41.0 °C / 34.0 °C OCCUPIED T-STAT 30.0 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 6.0 °C / 6.0 °C OCCUPIED T-STAT 10.0 °C		
		Sensible	Latent		Sensible	Latent
SPACE LOADS	Details	(W)	(W)	Details	(W)	(W)
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	56 m ²	976	-	56 m ²	480	-
Roof Transmission	43 m ²	957	-	43 m ²	242	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	3 m ²	100	-	3 m ²	48	-
Floor Transmission	43 m ²	0	-	43 m ²	36	-
Partitions	18 m ²	186	-	18 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	1022 W	1022	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	10000 W	10000	-	0	0	-
People	0	0	0	0	0	0
Infiltration	-	1287	6195	-	468	2
Miscellaneous	-	0	0	-	0	0
Safety Factor	10% / 10%	1453	619	10%	127	0
>> Total Zone Loads	-	15981	6814	-	1402	2

TABLE 2.1.B. ENVELOPE LOADS FOR SPACE " CAPACITOR ROOM " IN ZONE " Zone 2 "						
				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² ·°K))	Coeff.	(W)	(W)	(W)
N EXPOSURE						
WALL	39	2.143	-	521	-	334
E EXPOSURE						
WALL	17	2.143	-	454	-	146
DOOR	3	4.000	-	100	-	48
H EXPOSURE						
ROOF	43	1.421	-	957	-	242

	نگهداشت و افزایش تولید میدان نفتی بینک سطح الارض و ابنیه تحت الارض عمومی و مشترک																									
شماره پیمان: 053 - 073- 9184	<table><tr><th colspan="8">HVAC Calculation Note For Extension of Existing Elect. Building</th></tr><tr><th>نسخه</th><th>سریال</th><th>نوع مدرک</th><th>رشته</th><th>تسهیلات</th><th>صادر کننده</th><th>بسته کاری</th><th>پروژه</th></tr><tr><td>D00</td><td>0002</td><td>CN</td><td>HV</td><td>120</td><td>PEDCO</td><td>GCS</td><td>BK</td></tr></table>	HVAC Calculation Note For Extension of Existing Elect. Building								نسخه	سریال	نوع مدرک	رشته	تسهیلات	صادر کننده	بسته کاری	پروژه	D00	0002	CN	HV	120	PEDCO	GCS	BK	شماره صفحه 22: از 24
HVAC Calculation Note For Extension of Existing Elect. Building																										
نسخه	سریال	نوع مدرک	رشته	تسهیلات	صادر کننده	بسته کاری	پروژه																			
D00	0002	CN	HV	120	PEDCO	GCS	BK																			

4.10 SYSTEM PSYCHROMETRIC:

June DESIGN COOLING DAY, 1500

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	41.0	0.03144	0	400	0	0
Vent - Return Mixing	Outlet	-17.8	0.00000	0	0	-	-
Ventilation Fan	Outlet	-17.8	0.00000	0	0	0	-
Zone Air	-	30.7	0.01022	2555	22	49583	7079
Return Plenum	Outlet	-17.8	0.01022	2555	22	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1.207; At site altitude = 1.206 W/(L/s-K)

Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947.6; At site altitude = 2944.1 W/(L/s)

Site Altitude = 10.0 m

TABLE 2: ZONE DATA

Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Zone 1 (Cooling)							
Ventilation Air	-	-	-	0	-	-	-
Cooling Coil Inlet	-	30.7	0.01045	1727	0	-	-
Cooling Coil Outlet	-	14.5	0.00926	1727	0	33787	6049
Heating Coil Inlet	-	14.5	0.00926	1727	0	-	-
Heating Coil Outlet	-	14.5	0.00926	1727	0	0	-
Zone Air	-	30.7	0.01044	1727	0	33787	-
Zone 2 (Cooling)							
Ventilation Air	-	-	-	0	-	-	-
Cooling Coil Inlet	-	30.6	0.00976	828	0	-	-
Cooling Coil Outlet	-	14.8	0.00941	828	0	15796	862
Heating Coil Inlet	-	14.8	0.00941	828	0	-	-
Heating Coil Outlet	-	14.8	0.00941	828	0	0	-
Zone Air	-	30.6	0.00975	828	0	15796	-

	نگهداشت و افزایش تولید میدان نفتی بینک سطح الارض و ابنیه تحت الارض عمومی و مشترک																									
شماره پیمان: 053 - 073- 9184	<table><tr><th colspan="8">HVAC Calculation Note For Extension of Existing Elect. Building</th></tr><tr><th>نسخه</th><th>سریال</th><th>نوع مدرک</th><th>رشته</th><th>تسهیلات</th><th>صادر کننده</th><th>بسته کاری</th><th>پروژه</th></tr><tr><td>D00</td><td>0002</td><td>CN</td><td>HV</td><td>120</td><td>PEDCO</td><td>GCS</td><td>BK</td></tr></table>	HVAC Calculation Note For Extension of Existing Elect. Building								نسخه	سریال	نوع مدرک	رشته	تسهیلات	صادر کننده	بسته کاری	پروژه	D00	0002	CN	HV	120	PEDCO	GCS	BK	شماره صفحه: 23 از 24
HVAC Calculation Note For Extension of Existing Elect. Building																										
نسخه	سریال	نوع مدرک	رشته	تسهیلات	صادر کننده	بسته کاری	پروژه																			
D00	0002	CN	HV	120	PEDCO	GCS	BK																			

WINTER DESIGN HEATING

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	6.0	0.00580	0	400	0	0
Vent - Return Mixing	Outlet	-17.8	0.00000	0	0	-	-
Ventilation Fan	Outlet	-17.8	0.00000	0	0	0	-
Zone Air	-	10.0	0.00580	2555	0	-1544	-2
Return Plenum	Outlet	-17.8	0.00580	2555	0	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1.207; At site altitude = 1.206 W/(L/s-K)

Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947.6; At site altitude = 2944.1 W/(L/s)

Site Altitude = 10.0 m

TABLE 2: ZONE DATA

Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Zone 1 (Deadband)							
Ventilation Air	-	-	-	0	-	-	-
Cooling Coil Inlet	-	10.0	0.00581	1727	0	-	-
Cooling Coil Outlet	-	10.0	0.00581	1727	0	0	0
Heating Coil Inlet	-	10.0	0.00581	1727	0	-	-
Heating Coil Outlet	-	10.0	0.00581	1727	0	0	-
Zone Air	-	10.0	0.00580	1727	0	0	-
Zone 2 (Deadband)							
Ventilation Air	-	-	-	0	-	-	-
Cooling Coil Inlet	-	10.1	0.00581	828	0	-	-
Cooling Coil Outlet	-	10.1	0.00581	828	0	0	0
Heating Coil Inlet	-	10.1	0.00581	828	0	-	-
Heating Coil Outlet	-	11.7	0.00581	828	0	1544	-
Zone Air	-	10.1	0.00581	828	0	-1544	-

The psychrometric graph cannot be generated for this type of system



نگهداشت و افزایش تولید میدان نفتی بینک
سطح الارض و ابنیه تحت الارض
عمومی و مشترک



شماره پیمان:

053 - 073 - 9184

HVAC Calculation Note For Extension of Existing Elect. Building

نسخه	سریال	نوع مدرک	رشته	تسهیلات	صادر کننده	بسته کاری	پروژه
D00	0002	CN	HV	120	PEDCO	GCS	BK

شماره صفحه: 24 از 24