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ROTTERDAM SITE DEVELOPMENT – DEFINITION PHASE
NESTE

MNA GUARD HOUSE

HVAC CALCULATION REPORT

REV.	DATE	STATUS	WRITTEN BY (name & visa)	CHECKED BY (name & visa)	APPROV./AUTHOR. BY (name & visa)
			TechnipFMC Signed By Chiara Cassese	TechnipFMC Signed By Valerie Cavallari 2020.12.23 14:37:43 +01'00'	TechnipFMC Signed By Alessandro Frattini 2020.12.23 18:09:30 +01'00' TechnipFMC Signed By Olimpia Loiacono 2020.12.23 19:42:35 +01'00'
A	23/12/2020	ISSUE FOR REVIEW	M.P.	V.C.	A.F. / O.L.

DOCUMENT REVISIONS

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1. GENERAL

Scope of this document is to show the thermal calculations and the utilities consumptions as result of the basic design of the Heating, Ventilating and Air Conditioning (HVAC) system to be provided for MNA Guard House, one of the operational Buildings of the new plant, namely “ROTTERDAM SITE DEVELOPMENT”.

The HVAC systems performances, hereinafter shown, are based on preliminary thermal calculations and shall be updated during the detail design phase.
For any technical – economical evaluation to be correlated to the HVAC systems supply, said performances shall be verified by Supplier and assumed as valid, under their responsibility.

2. REFERENCE DOCUMENTS

This document is complementary to the “HVAC process flow diagram” and to the “HVAC layout” relevant to the HVAC system and complies with the following Technip Specifications:

a. 080871C-000-JSD-3400-001 “Job Design Specification for HVAC Systems”.
b. 080871C-000-JSS-3480-001 “General supply rules for HVAC Systems”.

Calculations are based on following drawings:

- 080871C-71-DW-2024-01-01 rev.A: “Guard House typical – Building architectural design – Plan views, sections and details”
- 080871C-71-DW-2024-01-02 rev.A: “Guard House typical – Building architectural design – Elevations and schedules”

3. THERMAL CALCULATIONS

3.1. General

The thermal calculations, shown in the attached printout, are to be considered preliminary and shall be checked/updated, taking into account the latest revision of architectural and structural drawings and the above mentioned Technip Specifications.
The used calculation software is the widely known and recognized Carrier HAP program v.5.11.

The figures used as input data are those shown in the above mentioned 080871C-000-JSD-3400-001 “Job Design Specification for HVAC Systems”.
Particularly, the internal heat gains due to equipment are preliminary: they shall be checked/updated during the Detail design phase.

3.2. Thermal calculations summary

The preliminary thermal calculation results are summarized in the following table: it shows the minimum required capacity for each equipment.

Equipment	*quantity (no.)*	*supply air (l/s)*	*fresh air (l/s)*	*exhaust air (l/s)*	*Cooling cap. (kW)*	*Heating cap. (kW)*
GH-SAC-01 – VRF reversible heat pump multi-split system for all rooms	1				48	39
GH-SSHP-01 – Back-up Split-system for Technical room (stand-by 100% tot. cap.)	1				12.5	3
GH-AHU-01 – Fresh air handling unit for all rooms	1	385	385		10.5	12
GH-AHU-02 – Air handling unit with heat recovery for Canteen	1	160	160	160	4.5	5
GH-EF-01 – Exhaust fan for Toilets	1			171		
Back-up Electrical radiators for all rooms						16 (electrical)

4. ELECTRICAL LOADS SUMMARY

The preliminary electrical consumptions for HVAC are summarized in the following table: it shows the maximum contemporary consumption for the duty units, during summer operation (worst case):

Equipment	*Tot. el. power input (kW)*
GH-SAC-01 – VRF reversible heat pump multi-split system for all rooms	25
GH-AHU-01 – Fresh air handling unit for all rooms	1.1
GH-AHU-02 – Air handling unit with heat recovery for Canteen	1.5
GH-EF-01 – Exhaust fan for Toilets	0.15
TOTAL	***28***

Back-up units are not considered, since they operate only in case of fault of main system.

5. CARRIER HAP THERMAL CALCULATIONS PRINTOUT

5.1. Design weather parameters

Design Weather Parameters & MSHGs

Rotterdam - MNA Guard House 10-12-20 — 12/21/2020
Ing. Mauro Petriccione — 12:32

Design Parameters:

City Name	Rotterdam	
Location	Netherlands	
Latitude	52,3	Deg.
Longitude	-4,8	Deg.
Elevation	5,0	m
Summer Design Dry-Bulb	28,0	°C
Summer Coincident Wet-Bulb	21,0	°C
Summer Daily Range	9,3	K
Winter Design Dry-Bulb	-10,0	°C
Winter Design Wet-Bulb	-10,0	°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	N/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	38,8	38,8	38,8	98,7	308,2	473,1	618,1	687,5	715,2
February	55,8	55,8	72,2	288,0	480,0	639,4	730,3	775,6	780,0
March	74,7	74,7	242,5	454,2	611,0	724,2	761,7	755,4	742,3
April	94,1	186,7	400,6	555,9	679,0	712,3	689,8	650,0	629,4
May	113,0	305,1	487,7	621,3	687,3	680,1	627,5	556,8	529,7
June	156,7	346,4	514,5	633,8	681,4	657,2	591,6	514,4	481,4
July	121,5	292,0	483,9	602,9	676,6	664,8	608,7	547,0	515,0
August	99,5	190,3	383,3	541,5	652,7	690,1	668,2	630,2	608,5
September	78,4	78,4	207,4	425,5	567,6	686,1	722,0	721,7	716,9
October	58,7	58,7	84,1	257,4	462,4	607,7	708,1	747,1	757,4
November	40,0	40,0	40,0	117,9	278,2	473,7	589,8	681,0	706,2
December	31,5	31,5	31,5	44,3	228,7	378,7	538,8	614,4	652,4
Month	**SSW**	**SW**	**WSW**	**W**	**WNW**	**NW**	**NNW**	**HOR**	**Mult**
January	695,2	617,9	473,7	306,6	106,1	38,8	38,8	185,7	1,00
February	770,8	727,7	643,5	465,5	291,7	68,1	55,8	353,1	1,00
March	752,0	759,6	711,4	622,6	440,4	251,6	74,7	526,9	1,00
April	649,4	697,7	714,0	674,0	564,6	399,0	191,9	661,6	1,00
May	559,0	630,7	685,8	678,1	624,4	477,2	311,6	738,6	1,00
June	516,8	595,8	664,1	679,6	633,7	511,7	348,8	760,6	1,00
July	548,1	616,6	672,1	670,4	611,6	473,1	308,7	731,3	1,00
August	629,1	674,2	688,9	648,8	544,4	385,3	190,6	652,5	1,00
September	719,3	718,7	685,0	574,3	424,7	206,4	78,4	511,0	1,00
October	748,8	707,9	596,6	464,8	253,0	86,0	58,7	352,7	1,00
November	679,4	594,2	473,7	285,1	117,6	40,0	40,0	189,4	1,00
December	623,5	529,5	397,8	216,4	62,0	31,5	31,5	128,0	1,00

Mult. = User-defined solar multiplier factor.

Cooling Design Temperature Profiles

Rotterdam - MNA Guard House 10-12-20 — 12/21/2020 12:32
Ing. Mauro Petriccione

Location: Rotterdam, Netherlands

(Dry and Wet Bulb temperatures are expressed in °C)

Hr	January		February		March		April		May		June	
	DB	WB	DB	WB	DB	WB	DB	WB	DB	WB	DB	WB
0000	8,9	8,6	10,4	10,1	13,5	13,2	15,6	15,3	18,2	17,4	19,8	18,6
0100	8,4	8,1	9,9	9,6	13,0	12,8	15,1	14,8	17,7	17,2	19,4	18,5
0200	7,9	7,7	9,4	9,1	12,6	12,3	14,6	14,3	17,2	16,9	18,9	18,3
0300	7,6	7,3	9,0	8,8	12,2	11,9	14,2	14,0	16,8	16,6	18,5	18,2
0400	7,3	7,0	8,8	8,5	11,9	11,7	14,0	13,7	16,6	16,3	18,2	18,0
0500	7,2	6,9	8,7	8,4	11,8	11,6	13,9	13,6	16,5	16,2	18,1	17,9
0600	7,4	7,1	8,9	8,6	12,0	11,7	14,1	13,8	16,7	16,4	18,3	18,1
0700	7,8	7,6	9,3	9,1	12,5	12,2	14,5	14,3	17,1	16,9	18,8	18,3
0800	8,7	8,4	10,2	9,9	13,3	13,0	15,4	15,1	18,0	17,3	19,6	18,6
0900	9,9	9,6	11,4	11,1	14,5	14,3	16,6	16,3	19,2	17,7	20,8	18,9
1000	11,3	11,0	12,8	12,5	15,9	15,7	18,0	17,0	20,6	18,2	22,2	19,4
1100	12,9	12,6	14,4	14,1	17,5	16,4	19,6	17,6	22,2	18,7	23,8	19,9
1200	14,3	13,5	15,8	14,7	19,0	16,9	21,0	18,1	23,6	19,2	25,3	20,4
1300	15,5	13,9	17,0	15,1	20,1	17,3	22,2	18,5	24,8	19,6	26,4	20,7
1400	16,2	14,2	17,7	15,3	20,9	17,6	22,9	18,7	25,5	19,8	27,2	20,9
1500	16,5	14,3	18,0	15,4	21,1	17,7	23,2	18,8	25,8	19,9	27,4	21,0
1600	16,2	14,2	17,7	15,3	20,9	17,6	22,9	18,7	25,5	19,8	27,2	20,9
1700	15,6	14,0	17,0	15,1	20,2	17,4	22,2	18,5	24,8	19,6	26,5	20,7
1800	14,5	13,6	16,0	14,7	19,2	17,0	21,2	18,1	23,8	19,3	25,5	20,4
1900	13,3	13,1	14,8	14,3	18,0	16,6	20,0	17,7	22,6	18,9	24,3	20,0
2000	12,1	11,8	13,6	13,3	16,8	16,1	18,8	17,3	21,4	18,5	23,1	19,7
2100	11,1	10,8	12,6	12,3	15,7	15,5	17,8	17,0	20,4	18,2	22,1	19,3
2200	10,2	9,9	11,7	11,4	14,8	14,5	16,9	16,6	19,5	17,8	21,1	19,0
2300	9,4	9,1	10,9	10,6	14,1	13,8	16,1	15,8	18,7	17,6	20,4	18,8

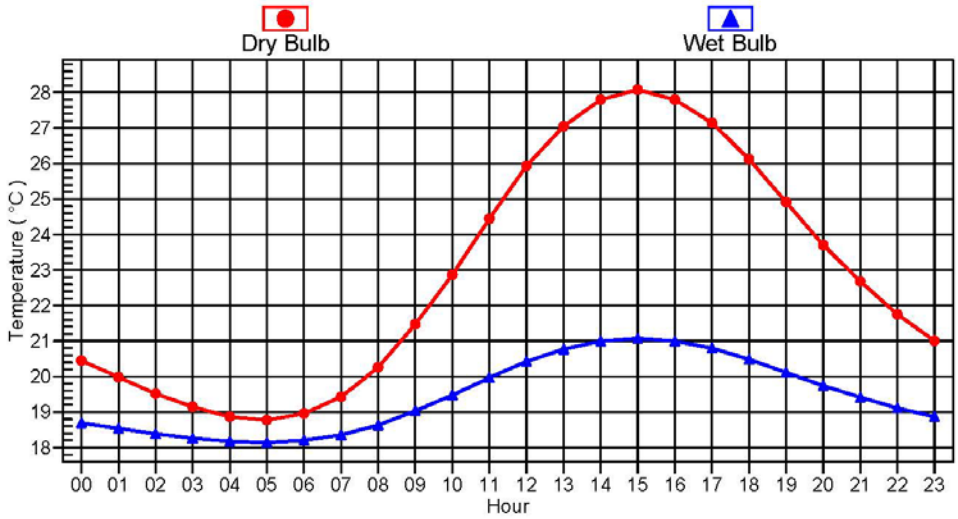
Hr	July		August		September		October		November		December	
	DB	WB	DB	WB	DB	WB	DB	WB	DB	WB	DB	WB
0000	20,4	18,6	20,4	18,6	19,3	18,0	16,7	16,4	13,0	12,7	9,8	9,5
0100	19,9	18,5	19,9	18,5	18,8	17,9	16,2	15,9	12,5	12,2	9,3	9,1
0200	19,4	18,3	19,4	18,3	18,3	17,7	15,7	15,5	12,0	11,7	8,9	8,6
0300	19,1	18,2	19,1	18,2	18,0	17,6	15,4	15,1	11,6	11,4	8,5	8,2
0400	18,8	18,1	18,8	18,1	17,7	17,4	15,1	14,8	11,4	11,1	8,2	7,9
0500	18,7	18,1	18,7	18,1	17,6	17,3	15,0	14,7	11,3	11,0	8,1	7,8
0600	18,9	18,1	18,9	18,1	17,8	17,5	15,2	14,9	11,5	11,2	8,3	8,0
0700	19,4	18,3	19,4	18,3	18,2	17,7	15,6	15,4	11,9	11,7	8,8	8,5
0800	20,2	18,6	20,2	18,6	19,1	17,9	16,5	16,2	12,8	12,5	9,6	9,3
0900	21,4	19,0	21,4	19,0	20,3	18,3	17,7	16,7	14,0	13,7	10,8	10,5
1000	22,8	19,4	22,8	19,4	21,7	18,8	19,1	17,2	15,4	15,1	12,2	11,9
1100	24,4	19,9	24,4	19,9	23,3	19,3	20,7	17,8	17,0	16,4	13,8	13,5
1200	25,9	20,4	25,9	20,4	24,7	19,8	22,1	18,3	18,4	16,9	15,3	14,7
1300	27,0	20,7	27,0	20,7	25,9	20,1	23,3	18,6	19,6	17,3	16,4	15,1
1400	27,7	20,9	27,7	20,9	26,6	20,4	24,0	18,9	20,3	17,6	17,1	15,3
1500	28,0	21,0	28,0	21,0	26,9	20,4	24,3	19,0	20,6	17,7	17,4	15,4
1600	27,7	20,9	27,7	20,9	26,6	20,4	24,0	18,9	20,3	17,6	17,1	15,3
1700	27,1	20,7	27,1	20,7	26,0	20,2	23,4	18,7	19,6	17,3	16,5	15,1
1800	26,0	20,4	26,0	20,4	24,9	19,8	22,3	18,3	18,6	17,0	15,5	14,7
1900	24,8	20,0	24,8	20,0	23,7	19,5	21,1	17,9	17,4	16,6	14,3	14,0
2000	23,6	19,7	23,6	19,7	22,5	19,1	19,9	17,5	16,2	15,9	13,1	12,8
2100	22,6	19,3	22,6	19,3	21,5	18,7	18,9	17,2	15,2	14,9	12,0	11,8
2200	21,7	19,0	21,7	19,0	20,6	18,4	18,0	16,8	14,3	14,0	11,1	10,8
2300	20,9	18,8	20,9	18,8	19,8	18,2	17,2	16,6	13,5	13,2	10,4	10,1

Design Temperature Profile

Rotterdam - MNA Guard House 10-12-20 — 12/21/2020
Ing. Mauro Petriccione — 12:32

Location: Rotterdam, Netherlands

Design Temperature Profiles for July



5.2. Walls, roof, windows, doors construction

Wall Constructions

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Ing. Mauro Petriccione 12:32

External insulated wall

Wall Details

Outside Surface Color ..... **Medium**
Absorptivity **0,675**
Overall U-Value ..... **0,480** W/(m²·K)

Wall Layers Details (Inside to Outside)

Layers	Thickness mm	Density kg/m³	Specific Ht. kJ / (kg K)	R-Value (m²·K)/W	Weight kg/m²
Inside surface resistance	0,000	0,0	0,00	0,12064	0,0
Gypsum board	16,000	750,0	0,84	0,03300	15,0
Min.wool insulation	50,000	80,0	0,84	1,25000	4,0
CMU wall	200,000	650,0	0,84	0,59200	130,0
Plaster	20,000	1400,0	0,84	0,03000	28,0
Outside surface resistance	0,000	0,0	0,00	0,05864	0,0
Totals	**286,000**	**-**		**2,08428**	**177,0**

Roof Constructions

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Insulated roof

Roof Details

Outside Surface Color ..... **Medium**
Absorptivity **0,675**
Overall U-Value ..... **0,226** W/(m²·K)

Roof Layers Details (Inside to Outside)

Layers	Thickness mm	Density kg/m³	Specific Ht. kJ / (kg K)	R-Value (m²·K)/W	Weight kg/m²
Inside surface resistance	0,000	0,0	0,00	0,12064	0,0
Reinforced concrete	200,000	1800,0	0,84	0,20000	360,0
Polystyrene insulation	150,000	30,0	1,25	3,75000	4,5
Water proofing membrane	5,000	1000,0	0,92	0,03000	5,0
Light concrete	50,000	800,0	0,88	0,17000	40,0
Concrete panel	50,000	1200,0	0,88	0,10000	60,0
Outside surface resistance	0,000	0,0	0,00	0,05864	0,0
Totals	**455,000**	-		**4,42928**	**469,5**

Window Constructions

Rotterdam - MNA Guard House 10-12-20 12/21/2020
Ing. Mauro Petriccione 12:32

Window SW01

Window Details:

Detailed Input	Vero	
Height	1,10	m
Width	1,40	m
Frame Type	Aluminum with thermal breaks	
Internal Shade Type	None	
Overall U-Value	3,676	W/(m²·K)
Overall Shade Coefficient	0,758	

Glass Details:

Gap Type ..... 6mm Air Space

Glazing	Glass Type	Transmissivity	Reflectivity	Absorptivity
Outer Glazing	6mm clear	0,792	0,079	0,129
Glazing #2	3mm clear	0,841	0,078	0,081
Glazing #3	Not Used	1,000	0,000	0,000

Window SW02

Window Details:

Detailed Input	Vero	
Height	2,00	m
Width	5,70	m
Frame Type	Aluminum with thermal breaks	
Internal Shade Type	None	
Overall U-Value	3,622	W/(m²·K)
Overall Shade Coefficient	0,758	

Glass Details:

Gap Type ..... 6mm Air Space

Glazing	Glass Type	Transmissivity	Reflectivity	Absorptivity
Outer Glazing	6mm clear	0,792	0,079	0,129
Glazing #2	3mm clear	0,841	0,078	0,081
Glazing #3	not used	1,000	0,000	0,000

Window SW03

Window Details:

Detailed Input	Vero	
Height	2,00	m
Width	2,24	m
Frame Type	Aluminum with thermal breaks	
Internal Shade Type	None	
Overall U-Value	3,637	W/(m²·K)
Overall Shade Coefficient	0,758	

Glass Details:

Gap Type ..... 6mm Air Space

Glazing	Glass Type	Transmissivity	Reflectivity	Absorptivity
Outer Glazing	6mm clear	0,792	0,079	0,129
Glazing #2	3mm clear	0,841	0,078	0,081
Glazing #3	not used	1,000	0,000	0,000

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Door Constructions

Rotterdam - MNA Guard House 10-12-20 12/21/2020
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Door SD 01

Door Details:

Gross Area	2,0	m²
Door U-Value	0,500	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	

Door SD 05

Door Details:

Gross Area	4,4	m²
Door U-Value	0,500	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	

5.3. Air system sizing summary

Dedicated Outdoor Air System (DOAS) Sizing Summary for VRF multi split system

Project Name: Rotterdam - MNA Guard House 10-12-20 — 12/10/2020
Prepared by: Ing. Mauro Petriccione — 12:31

Air System Information

Air System Name	VRF multi split system		Number of zones	7
Equipment Class	TERM		Floor Area	365,0 m²
Air System Type	VRF		Location	Rotterdam, Netherlands

Sizing Calculation Information

Calculation Months	Jan to Dec	Zone L/s Sizing	Sum of space airflow rates
Sizing Data	Calculated	Space L/s Sizing	Individual peak space loads

Cooling Coil Sizing Data

Total coil load	13,6	kW	Load occurs at	Jul 1500	
Total coil load	40,0	L/(s kW)	OA DB / WB	28,0 / 21,0	°C
Sensible coil load	8,8	kW	Entering DB / WB	28,0 / 21,0	°C
Coil L/s at Jul 1500	545	L/s	Leaving DB / WB	14,6 / 14,0	°C
Max coil L/s	545	L/s	Bypass Factor	0,100	
Sensible heat ratio	0,647				
Water flow @ 5,6 K rise	N/A				

Heating Coil Sizing Data

Max coil load	15,5	kW	Load occurs at	Des Htg	
Coil L/s at Des Htg	545	L/s	Ent. DB / Lvg DB	-10,0 / 13,6	°C
Max coil L/s	545	L/s			
Water flow @ 11,1 K drop	N/A				

Ventilation Fan Sizing Data

Actual max L/s	545	L/s	Fan motor BHP	0,34	BHP
Standard L/s	545	L/s	Fan motor kW	0,27	kW
Actual max L/(s·m²)	1,49	L/(s·m²)	Fan static	300	Pa

Outdoor Ventilation Air Data

Design airflow L/s	545	L/s	L/s/person	16,52	L/s/person
L/(s·m²)	1,49	L/(s·m²)			

Zone Sizing Summary for VRF multi split system

Project Name: Rotterdam - MNA Guard House 10-12-20 — 12/10/2020
Prepared by: Ing. Mauro Petriccione — 12:31

Air System Information

Air System Name ..... VRF multi split system
Equipment Class ..... TERM
Air System Type ..... VRF

Number of zones 7
Floor Area ..... 365,0 m²
Location ..... Rotterdam, Netherlands

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

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 Coil Load	Zone L/(s·m²)
01 - Guard room	10,4	9,9	23,9 / 16,9	13,5 / 12,8	-	Sep 1400	11,01
02 - Waiting area	0,9	0,7	23,7 / 17,4	13,4 / 12,8	-	Jun 2200	2,97
03 - Corridor	0,9	0,8	23,1 / 17,3	13,5 / 13,0	-	Jun 1800	2,48
Toilets and Lockers	0,0	0,0	-17,8 / -17,8	-17,8 / -17,8	0,00	Des 0000	3,15
07 - Multipurpose room	6,5	5,9	23,2 / 16,8	13,3 / 12,7	-	Jun 1800	8,28
08 - Canteen	3,0	2,4	19,6 / 15,9	13,2 / 12,8	-	Jul 1000	4,86
09 - Technical room	11,9	11,2	22,8 / 16,4	13,1 / 12,4	-	Jul 2200	13,40

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)
01 - Guard room	6,1	21,2 / 27,7	-	779	0,196	0,156	50
02 - Waiting area	0,6	18,4 / 26,6	-	59	0,015	0,012	15
03 - Corridor	0,8	18,2 / 28,0	-	66	0,017	0,013	20
Toilets and Lockers	3,8	14,2 / 32,8	-	171	0,043	0,034	171
07 - Multipurpose room	2,5	21,0 / 25,1	-	498	0,126	0,100	70
08 - Canteen	3,4	17,9 / 27,0	-	304	0,077	0,061	160
09 - Technical room	2,9	21,7 / 24,3	-	949	0,239	0,190	59

VRF Outdoor Unit Sizing Data

	Cooling [kW]	Heating [kW]
Peak Coincident Indoor Unit Loads	30,4	20,1
Estimated Piping / Line Losses	0,0	0,0
Total Required ODU Capacity	30,4	20,1

Note: VRF piping / line losses are based on typical loss factors for this class of equipment. Actual line loss varies widely from one product to another. Therefore, when selecting equipment it is critical to consult manufacturer's guidance to utilize actual line loss data.

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (kW)	Time of Peak Sensible Cooling Load	Zone Heating Load (kW)	Zone Floor Area (m²)
01 - Guard room	10,3	Sep 1400	6,1	70,8
02 - Waiting area	0,9	Jun 2200	0,5	19,8
03 - Corridor	1,0	Jun 1800	0,7	26,5
Toilets and Lockers	0,7	Jun 2200	0,9	54,3
07 - Multipurpose room	6,6	Jun 1800	1,9	60,2
08 - Canteen	4,0	Jun 1000	1,9	62,6
09 - Technical room	11,4	Jun 2200	2,5	70,8

Zone Sizing Summary for VRF multi split system

Project Name: Rotterdam - MNA Guard House 10-12-20 — 12/10/2020
Prepared by: Ing. Mauro Petriccione — 12:31

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Peak Sensible Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m²)	Space L/(s·m²)
01 - Guard room							
01 - Guard room	1	10,3	Sep 1400	779	6,1	70,8	11,01
02 - Waiting area							
02 - Waiting area	1	0,9	Jun 2200	59	0,5	19,8	2,97
03 - Corridor							
03 - Corridor	1	1,0	Jun 1800	66	0,7	26,5	2,48
Toilets and Lockers							
04 - Disable toilet	1	0,1	Jun 0100	12	0,0	4,5	2,67
05 -Mail toilet & locker	1	0,4	Jun 0100	105	0,2	29,6	3,55
06-Femail toil. & locker	1	0,3	Jul 2000	54	0,6	20,2	2,67
07 - Multipurpose room							
07 - Multipurpose room	1	6,6	Jun 1800	498	1,9	60,2	8,28
08 - Canteen							
08 - Canteen	1	4,0	Jun 1000	304	1,9	62,6	4,86
09 - Technical room							
09 - Technical room	1	11,4	Jun 2200	949	2,5	70,8	13,40

Ventilation Sizing Summary for VRF multi split system

Project Name: Rotterdam - MNA Guard House 10-12-20 — 12/10/2020
Prepared by: Ing. Mauro Petriccione — 12:31

1. Summary

Ventilation Sizing Method ..... Sum of Space OA Airflows
Design Ventilation Airflow Rate ..... 545 L/s

2. Space Ventilation Analysis

2.1 Zone: 01 - Guard room

Zone Name / Space Name	Mult.	Floor Area (m²)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s·m²))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
01 - Guard room									
01 - Guard room	1	70,8	5,0	779,3	10,00	0,00	0,0	0,0	50,0
Totals (incl. Space Multipliers)				779,3					50,0

2.2 Zone: 02 - Waiting area

Zone Name / Space Name	Mult.	Floor Area (m²)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s·m²))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
02 - Waiting area									
02 - Waiting area	1	19,8	5,0	58,7	0,00	0,00	15,0	0,0	15,0
Totals (incl. Space Multipliers)				58,7					15,0

2.3 Zone: 03 - Corridor

Zone Name / Space Name	Mult.	Floor Area (m²)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s·m²))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
03 - Corridor									
03 - Corridor	1	26,5	0,0	65,8	0,00	0,00	20,0	0,0	20,0
Totals (incl. Space Multipliers)				65,8					20,0

2.4 Zone: Toilets and Lockers

Zone Name / Space Name	Mult.	Floor Area (m²)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s·m²))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
Toilets and Lockers									
04 - Disable toilet	1	4,5	0,0	12,0	0,00	0,00	12,0	0,0	12,0
05 -Mail toilet & locker	1	29,6	0,0	105,0	0,00	0,00	105,0	0,0	105,0
06-Femail toil. & locker	1	20,2	0,0	54,0	0,00	0,00	54,0	0,0	54,0
Totals (incl. Space Multipliers)				171,0					171,0

2.5 Zone: 07 - Multipurpose room

Zone Name / Space Name	Mult.	Floor Area (m²)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s·m²))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
07 - Multipurpose room									
07 - Multipurpose room	1	60,2	7,0	498,3	10,00	0,00	0,0	0,0	70,0
Totals (incl. Space Multipliers)				498,3					70,0

Ventilation Sizing Summary for VRF multi split system

Project Name: Rotterdam - MNA Guard House 10-12-20 — 12/10/2020
Prepared by: Ing. Mauro Petriccione — 12:31

2.6 Zone: 08 - Canteen

Zone Name / Space Name	Mult.	Floor Area (m²)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s-m²))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
08 - Canteen									
08 - Canteen	1	62,6	16,0	304,3	10,00	0,00	0,0	0,0	160,0
Totals (incl. Space Multipliers)				**304,3**					**160,0**

2.7 Zone: 09 - Technical room

Zone Name / Space Name	Mult.	Floor Area (m²)	Maximum Occupants	Maximum Supply Air (L/s)	Required Outdoor Air (L/s/person)	Required Outdoor Air (L/(s-m²))	Required Outdoor Air (L/s)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (L/s)
09 - Technical room									
09 - Technical room	1	70,8	0,0	948,9	0,00	0,00	59,0	0,0	59,0
Totals (incl. Space Multipliers)				**948,9**					**59,0**

Air System Design Load Summary for VRF multi split system

Project Name: Rotterdam - MNA Guard House 10-12-20 — 12/10/2020
Prepared by: Ing. Mauro Petriccione — 12:31

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Aug 1600 COOLING OA DB / WB 27,7 °C / 20,9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB -10,0 °C / -10,0 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	43 m²	7400	-	43 m²	-	-
Wall Transmission	247 m²	598	-	247 m²	3742	-
Roof Transmission	365 m²	219	-	365 m²	2592	-
Window Transmission	43 m²	338	-	43 m²	4942	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	10 m²	10	-	10 m²	162	-
Floor Transmission	365 m²	0	-	365 m²	1765	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	6757 W	6757	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	12206 W	12205	-	0	0	-
People	33	2512	2163	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	10% / 10%	3004	216	10%	1320	0
>> Total Zone Loads	-	33042	2379	-	14523	0
Zone Conditioning	-	32916	2379	-	14247	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	545 L/s	0	-	545 L/s	0	-
Ventilation Load	545 L/s	1002	4143	545 L/s	20376	0
Ventilation Fan Load	545 L/s	273	-	545 L/s	-273	-
Space Fan Coil Fans	-	565	-	-	-565	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	-	34756	6522	-	33785	0
Cooling Coil	-	8637	4781	-	0	0
Heating Coil	-	0	-	-	15508	-
Terminal Unit Cooling	-	28586	1768	-	0	0
Terminal Unit Heating	-	0	-	-	20107	-
>> Total Conditioning	-	37223	6549	-	35615	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

Zone Design Load Summary for VRF multi split system

Project Name: Rotterdam - MNA Guard House 10-12-20 — 12/10/2020
Prepared by: Ing. Mauro Petriccione — 12:31

01 - Guard room	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Sep 1400 COOLING OA DB / WB 26,6 °C / 20,4 °C			HEATING DATA AT DES HTG HEATING OA DB / WB -10,0 °C / -10,0 °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	32 m²	6734	-	32 m²	-	-
Wall Transmission	54 m²	98	-	54 m²	824	-
Roof Transmission	71 m²	-11	-	71 m²	512	-
Window Transmission	32 m²	106	-	32 m²	3685	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	1	-	2 m²	32	-
Floor Transmission	71 m²	0	-	71 m²	455	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	1416 W	1416	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	700 W	700	-	0	0	-
People	5	359	300	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	10% / 10%	940	30	10%	551	0
>> Total Zone Loads	-	10342	330	-	6058	0

02 - Waiting area	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 2200 COOLING OA DB / WB 21,1 °C / 19,0 °C			HEATING DATA AT DES HTG HEATING OA DB / WB -10,0 °C / -10,0 °C		
	OCCUPIED T-STAT 26,0 °C			OCCUPIED T-STAT 20,0 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	0 m²	0	-	0 m²	-	-
Wall Transmission	14 m²	73	-	14 m²	206	-
Roof Transmission	20 m²	35	-	20 m²	134	-
Window Transmission	0 m²	0	-	0 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	-4	-	2 m²	30	-
Floor Transmission	20 m²	0	-	20 m²	97	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	396 W	396	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	5	337	176	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	10% / 10%	84	18	10%	47	0
>> Total Zone Loads	-	921	194	-	514	0

Zone Design Load Summary for VRF multi split system

Project Name: Rotterdam - MNA Guard House 10-12-20 — 12/10/2020
Prepared by: Ing. Mauro Petriccione — 12:31

03 - Corridor	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1800 COOLING OA DB / WB 25,5 °C / 20,4 °C			HEATING DATA AT DES HTG HEATING OA DB / WB -10,0 °C / -10,0 °C		
	OCCUPIED T-STAT 26,0 °C			OCCUPIED T-STAT 20,0 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	2 m²	359	-	2 m²	-	-
Wall Transmission	9 m²	27	-	9 m²	130	-
Roof Transmission	27 m²	31	-	27 m²	179	-
Window Transmission	2 m²	-7	-	2 m²	170	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	-1	-	2 m²	30	-
Floor Transmission	27 m²	0	-	27 m²	97	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	530 W	530	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	0	0	0	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	10% / 10%	94	0	10%	61	0
>> Total Zone Loads	-	1033	0	-	667	0

Toilets and Lockers	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 2200 COOLING OA DB / WB 21,1 °C / 19,0 °C			HEATING DATA AT DES HTG HEATING OA DB / WB -10,0 °C / -10,0 °C		
	OCCUPIED T-STAT 30,0 °C			OCCUPIED T-STAT 20,0 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	0 m²	0	-	0 m²	-	-
Wall Transmission	23 m²	23	-	23 m²	335	-
Roof Transmission	54 m²	47	-	54 m²	368	-
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	54 m²	0	-	54 m²	117	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	543 W	543	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	0	0	0	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	10% / 10%	61	0	10%	82	0
>> Total Zone Loads	-	674	0	-	903	0

Zone Design Load Summary for VRF multi split system

Project Name: Rotterdam - MNA Guard House 10-12-20 — 12/10/2020
Prepared by: Ing. Mauro Petriccione — 12:31

07 - Multipurpose room	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1800 COOLING OA DB / WB 25,5 °C / 20,4 °C			HEATING DATA AT DES HTG HEATING OA DB / WB -10,0 °C / -10,0 °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	5 m²	1078	-	5 m²	-	-
Wall Transmission	32 m²	107	-	32 m²	486	-
Roof Transmission	60 m²	98	-	60 m²	435	-
Window Transmission	5 m²	12	-	5 m²	543	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	60 m²	0	-	60 m²	269	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	1204 W	1204	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	3010 W	3010	-	0	0	-
People	7	503	421	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	10% / 10%	601	42	10%	173	0
>> Total Zone Loads	-	6612	463	-	1907	0

08 - Canteen	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1000 COOLING OA DB / WB 22,2 °C / 19,4 °C			HEATING DATA AT DES HTG HEATING OA DB / WB -10,0 °C / -10,0 °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	5 m²	982	-	5 m²	-	-
Wall Transmission	32 m²	67	-	32 m²	486	-
Roof Transmission	63 m²	93	-	63 m²	452	-
Window Transmission	5 m²	-36	-	5 m²	543	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	63 m²	0	-	63 m²	274	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	1252 W	1252	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	16	1314	1266	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	10% / 10%	367	127	10%	176	0
>> Total Zone Loads	-	4039	1392	-	1932	0

Zone Design Load Summary for VRF multi split system

Project Name: Rotterdam - MNA Guard House 10-12-20 — 12/10/2020
Prepared by: Ing. Mauro Petriccione — 12:31

09 - Technical room	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 2200 COOLING OA DB / WB 21,1 °C / 19,0 °C			HEATING DATA AT DES HTG HEATING OA DB / WB -10,0 °C / -10,0 °C		
	OCCUPIED T-STAT 23,0 °C			OCCUPIED T-STAT 22,0 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	0 m²	0	-	0 m²	-	-
Wall Transmission	83 m²	326	-	83 m²	1274	-
Roof Transmission	71 m²	172	-	71 m²	512	-
Window Transmission	0 m²	0	-	0 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	4 m²	-3	-	4 m²	70	-
Floor Transmission	71 m²	0	-	71 m²	455	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	1416 W	1416	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	8496 W	8496	-	0	0	-
People	0	0	0	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	10% / 10%	1041	0	10%	231	0
>> Total Zone Loads	-	11448	0	-	2543	0

Space Design Load Summary for VRF multi split system

Project Name: Rotterdam - MNA Guard House 10-12-20 — 12/10/2020
Prepared by: Ing. Mauro Petriccione — 12:31

TABLE 1.1.A. Component Loads For Space "01 - Guard room" In Zone "01 - Guard room"

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Sep 1400 COOLING OA DB / WB 26,6 °C / 20,4 °C OCCUPIED T-STAT 24,0 °C			HEATING DATA AT DES HTG HEATING OA DB / WB -10,0 °C / -10,0 °C OCCUPIED T-STAT 22,0 °C		
		Sensible	Latent		Sensible	Latent
SPACE LOADS	Details	(W)	(W)	Details	(W)	(W)
Window & Skylight Solar Loads	32 m²	6734	-	32 m²	-	-
Wall Transmission	54 m²	98	-	54 m²	824	-
Roof Transmission	71 m²	-11	-	71 m²	512	-
Window Transmission	32 m²	106	-	32 m²	3685	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	1	-	2 m²	32	-
Floor Transmission	71 m²	0	-	71 m²	455	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	1416 W	1416	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	700 W	700	-	0	0	-
People	5	359	300	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	10% / 10%	940	30	10%	551	0
>> Total Zone Loads	-	10342	330	-	6058	0

TABLE 1.1.B. Envelope Loads For Space "01 - Guard room" In Zone "01 - Guard room"

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m²)	(W/(m²·K))	Coeff.	(W)	(W)	(W)
S EXPOSURE						
WALL	25	0,480	-	73	-	378
WINDOW 1	23	3,622	0,758	76	5782	2643
E EXPOSURE						
WALL	14	0,480	-	29	-	208
WINDOW 1	4	3,637	0,758	15	450	521
DOOR	2	0,500	-	1	-	32
W EXPOSURE						
WALL	16	0,480	-	-4	-	238
WINDOW 1	4	3,637	0,758	15	502	521
H EXPOSURE						
ROOF	71	0,226	-	-11	-	512

Space Design Load Summary for VRF multi split system

Project Name: Rotterdam - MNA Guard House 10-12-20 — 12/10/2020
Prepared by: Ing. Mauro Petriccione — 12:31

TABLE 2.1.A. Component Loads For Space "02 - Waiting area" In Zone "02 - Waiting area"

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 2200 COOLING OA DB / WB 21,1 °C / 19,0 °C OCCUPIED T-STAT 26,0 °C			HEATING DATA AT DES HTG HEATING OA DB / WB -10,0 °C / -10,0 °C OCCUPIED T-STAT 20,0 °C		
		Sensible	Latent		Sensible	Latent
SPACE LOADS	Details	(W)	(W)	Details	(W)	(W)
Window & Skylight Solar Loads	0 m²	0	-	0 m²	-	-
Wall Transmission	14 m²	73	-	14 m²	206	-
Roof Transmission	20 m²	35	-	20 m²	134	-
Window Transmission	0 m²	0	-	0 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	-4	-	2 m²	30	-
Floor Transmission	20 m²	0	-	20 m²	97	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	396 W	396	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	5	337	176	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	10% / 10%	84	18	10%	47	0
>> Total Zone Loads	-	921	194	-	514	0

TABLE 2.1.B. Envelope Loads For Space "02 - Waiting area" In Zone "02 - Waiting area"

	Area	U-Value	Shade	COOLING TRANS	COOLING SOLAR	HEATING TRANS
	(m²)	(W/(m²·K))	Coeff.	(W)	(W)	(W)
W EXPOSURE						
WALL	14	0,480	-	73	-	206
DOOR	2	0,500	-	-4	-	30
H EXPOSURE						
ROOF	20	0,226	-	35	-	134

Space Design Load Summary for VRF multi split system

Project Name: Rotterdam - MNA Guard House 10-12-20 12/10/2020
Prepared by: Ing. Mauro Petriccione 12:31

TABLE 3.1.A. Component Loads For Space "03 - Corridor" In Zone "03 - Corridor"

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1800 COOLING OA DB / WB 25,5 °C / 20,4 °C OCCUPIED T-STAT 26,0 °C			HEATING DATA AT DES HTG HEATING OA DB / WB -10,0 °C / -10,0 °C OCCUPIED T-STAT 20,0 °C		
		Sensible	Latent		Sensible	Latent
SPACE LOADS	Details	(W)	(W)	Details	(W)	(W)
Window & Skylight Solar Loads	2 m²	359	-	2 m²	-	-
Wall Transmission	9 m²	27	-	9 m²	130	-
Roof Transmission	27 m²	31	-	27 m²	179	-
Window Transmission	2 m²	-7	-	2 m²	170	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	2 m²	-1	-	2 m²	30	-
Floor Transmission	27 m²	0	-	27 m²	97	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	530 W	530	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	0	0	0	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	10% / 10%	94	0	10%	61	0
>> Total Zone Loads	-	1033	0	-	667	0

TABLE 3.1.B. Envelope Loads For Space "03 - Corridor" In Zone "03 - Corridor"

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m²)	(W/(m²·K))	Coeff.	(W)	(W)	(W)
E EXPOSURE						
WALL	4	0,480	-	16	-	62
DOOR	2	0,500	-	-1	-	30
W EXPOSURE						
WALL	5	0,480	-	12	-	69
WINDOW 1	2	3,676	0,758	-7	359	170
H EXPOSURE						
ROOF	27	0,226	-	31	-	179

Space Design Load Summary for VRF multi split system

Project Name: Rotterdam - MNA Guard House 10-12-20 — 12/10/2020
Prepared by: Ing. Mauro Petriccione — 12:31

TABLE 4.1.A. Component Loads For Space "04 - Disable toilet" In Zone "Toilets and Lockers"

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 0100 COOLING OA DB / WB 19,4 °C / 18,5 °C OCCUPIED T-STAT 30,0 °C			HEATING DATA AT DES HTG HEATING OA DB / WB -10,0 °C / -10,0 °C OCCUPIED T-STAT 20,0 °C		
		Sensible	Latent		Sensible	Latent
SPACE LOADS	Details	(W)	(W)	Details	(W)	(W)
Window & Skylight Solar Loads	0 m²	0	-	0 m²	-	-
Wall Transmission	0 m²	0	-	0 m²	0	-
Roof Transmission	5 m²	5	-	5 m²	30	-
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	5 m²	0	-	5 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	45 W	45	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	0	0	0	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	10% / 10%	5	0	10%	3	0
>> Total Zone Loads	-	55	0	-	34	0

TABLE 4.1.B. Envelope Loads For Space "04 - Disable toilet" In Zone "Toilets and Lockers"

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m²)	(W/(m²·K))	Coeff.	(W)	(W)	(W)
H EXPOSURE						
ROOF	5	0,226	-	5	-	30

Space Design Load Summary for VRF multi split system

Project Name: Rotterdam - MNA Guard House 10-12-20 — 12/10/2020
Prepared by: Ing. Mauro Petriccione — 12:31

TABLE 4.2.A. Component Loads For Space "05 -Mail toilet & locker" In Zone "Toilets and Lockers"

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 0100 COOLING OA DB / WB 19,4 °C / 18,5 °C OCCUPIED T-STAT 30,0 °C			HEATING DATA AT DES HTG HEATING OA DB / WB -10,0 °C / -10,0 °C OCCUPIED T-STAT 20,0 °C		
		Sensible	Latent		Sensible	Latent
SPACE LOADS	Details	(W)	(W)	Details	(W)	(W)
Window & Skylight Solar Loads	0 m²	0	-	0 m²	-	-
Wall Transmission	0 m²	0	-	0 m²	0	-
Roof Transmission	30 m²	30	-	30 m²	200	-
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	30 m²	0	-	30 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	296 W	296	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	0	0	0	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	10% / 10%	33	0	10%	20	0
>> Total Zone Loads	-	359	0	-	221	0

TABLE 4.2.B. Envelope Loads For Space "05 -Mail toilet & locker" In Zone "Toilets and Lockers"

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m²)	(W/(m²·K))	Coeff.	(W)	(W)	(W)
H EXPOSURE						
ROOF	30	0,226	-	30	-	200

Space Design Load Summary for VRF multi split system

Project Name: Rotterdam - MNA Guard House 10-12-20 — 12/10/2020
Prepared by: Ing. Mauro Petriccione — 12:31

TABLE 4.3.A. Component Loads For Space "06-Femail toil. & locker" In Zone "Toilets and Lockers"

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jul 2000 COOLING OA DB / WB 23,6 °C / 19,7 °C OCCUPIED T-STAT 30,0 °C			HEATING DATA AT DES HTG HEATING OA DB / WB -10,0 °C / -10,0 °C OCCUPIED T-STAT 20,0 °C		
		Sensible	Latent		Sensible	Latent
SPACE LOADS	Details	(W)	(W)	Details	(W)	(W)
Window & Skylight Solar Loads	0 m²	0	-	0 m²	-	-
Wall Transmission	23 m²	37	-	23 m²	335	-
Roof Transmission	20 m²	10	-	20 m²	137	-
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	20 m²	0	-	20 m²	117	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	202 W	202	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	0	0	0	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	10% / 10%	25	0	10%	59	0
>> Total Zone Loads	-	273	0	-	649	0

TABLE 4.3.B. Envelope Loads For Space "06-Femail toil. & locker" In Zone "Toilets and Lockers"

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m²)	(W/(m²·K))	Coeff.	(W)	(W)	(W)
E EXPOSURE						
WALL	23	0,480	-	37	-	335
H EXPOSURE						
ROOF	20	0,226	-	10	-	137

Space Design Load Summary for VRF multi split system

Project Name: Rotterdam - MNA Guard House 10-12-20 — 12/10/2020
Prepared by: Ing. Mauro Petriccione — 12:31

TABLE 5.1.A. Component Loads For Space "07 - Multipurpose room" In Zone "07 - Multipurpose room"

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1800 COOLING OA DB / WB 25,5 °C / 20,4 °C OCCUPIED T-STAT 24,0 °C			HEATING DATA AT DES HTG HEATING OA DB / WB -10,0 °C / -10,0 °C OCCUPIED T-STAT 22,0 °C		
		Sensible	Latent		Sensible	Latent
SPACE LOADS	Details	(W)	(W)	Details	(W)	(W)
Window & Skylight Solar Loads	5 m²	1078	-	5 m²	-	-
Wall Transmission	32 m²	107	-	32 m²	486	-
Roof Transmission	60 m²	98	-	60 m²	435	-
Window Transmission	5 m²	12	-	5 m²	543	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	60 m²	0	-	60 m²	269	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	1204 W	1204	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	3010 W	3010	-	0	0	-
People	7	503	421	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	10% / 10%	601	42	10%	173	0
>> Total Zone Loads	-	6612	463	-	1907	0

TABLE 5.1.B. Envelope Loads For Space "07 - Multipurpose room" In Zone "07 - Multipurpose room"

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m²)	(W/(m²·K))	Coeff.	(W)	(W)	(W)
W EXPOSURE						
WALL	32	0,480	-	107	-	486
WINDOW 1	5	3,676	0,758	12	1078	543
H EXPOSURE						
ROOF	60	0,226	-	98	-	435

Space Design Load Summary for VRF multi split system

Project Name: Rotterdam - MNA Guard House 10-12-20 — 12/10/2020
Prepared by: Ing. Mauro Petriccione — 12:31

TABLE 6.1.A. Component Loads For Space "08 - Canteen" In Zone "08 - Canteen"

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1000 COOLING OA DB / WB 22,2 °C / 19,4 °C OCCUPIED T-STAT 24,0 °C			HEATING DATA AT DES HTG HEATING OA DB / WB -10,0 °C / -10,0 °C OCCUPIED T-STAT 22,0 °C		
		Sensible	Latent		Sensible	Latent
SPACE LOADS	Details	(W)	(W)	Details	(W)	(W)
Window & Skylight Solar Loads	5 m²	982	-	5 m²	-	-
Wall Transmission	32 m²	67	-	32 m²	486	-
Roof Transmission	63 m²	93	-	63 m²	452	-
Window Transmission	5 m²	-36	-	5 m²	543	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	63 m²	0	-	63 m²	274	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	1252 W	1252	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	16	1314	1266	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	10% / 10%	367	127	10%	176	0
>> Total Zone Loads	-	4039	1392	-	1932	0

TABLE 6.1.B. Envelope Loads For Space "08 - Canteen" In Zone "08 - Canteen"

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m²)	(W/(m²·K))	Coeff.	(W)	(W)	(W)
E EXPOSURE						
WALL	32	0,480	-	67	-	486
WINDOW 1	5	3,676	0,758	-36	982	543
H EXPOSURE						
ROOF	63	0,226	-	93	-	452

Space Design Load Summary for VRF multi split system

Project Name: Rotterdam - MNA Guard House 10-12-20 — 12/10/2020
Prepared by: Ing. Mauro Petriccione — 12:31

TABLE 7.1.A. Component Loads For Space "09 - Technical room" In Zone "09 - Technical room"

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 2200 COOLING OA DB / WB 21,1 °C / 19,0 °C OCCUPIED T-STAT 23,0 °C			HEATING DATA AT DES HTG HEATING OA DB / WB -10,0 °C / -10,0 °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	83 m²	326	-	83 m²	1274	-
Roof Transmission	71 m²	172	-	71 m²	512	-
Window Transmission	0 m²	0	-	0 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	4 m²	-3	-	4 m²	70	-
Floor Transmission	71 m²	0	-	71 m²	455	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	1416 W	1416	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	8496 W	8496	-	0	0	-
People	0	0	0	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	10% / 10%	1041	0	10%	231	0
>> Total Zone Loads	-	11448	0	-	2543	0

TABLE 7.1.B. Envelope Loads For Space "09 - Technical room" In Zone "09 - Technical room"

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m²)	(W/(m²·K))	Coeff.	(W)	(W)	(W)
N EXPOSURE						
WALL	43	0,480	-	107	-	660
DOOR	4	0,500	-	-3	-	70
E EXPOSURE						
WALL	20	0,480	-	88	-	307
W EXPOSURE						
WALL	20	0,480	-	132	-	307
H EXPOSURE						
ROOF	71	0,226	-	172	-	512

System Psychrometrics for VRF multi split system

Project Name: Rotterdam - MNA Guard House 10-12-20 12/10/2020
Prepared by: Ing. Mauro Petriccione 12:31

August DESIGN COOLING DAY, 1600

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	27,7	0,01272	545	400	1002	4143
Vent - Return Mixing	Outlet	27,7	0,01272	545	0	-	-
Vent. Cooling Coil	Outlet	14,6	0,00974	545	400	8637	4781
Vent. Heating Coil	Outlet	14,6	0,00974	545	400	0	-
Ventilation Fan	Outlet	15,0	0,00974	545	400	273	-
Cold Supply Duct	Outlet	15,0	0,00974	545	400	0	-
Zone Air	-	26,2	0,01014	545	768	32916	2379
Return Plenum	Outlet	26,2	0,01014	545	768	0	-

System Psychrometrics for VRF multi split system

Project Name: Rotterdam - MNA Guard House 10-12-20 12/10/2020
Prepared by: Ing. Mauro Petriccione 12:31

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 = 2945,8 W/(L/s)
Site Altitude = 5,0 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)
01 - Guard room (Cooling)							
Ventilation Air	-	-	-	50	-	-	-
Cooling Coil Inlet	-	24,0	0,00985	779	0	-	-
Cooling Coil Outlet	-	14,5	0,00966	779	0	8929	449
Heating Coil Inlet	-	14,5	0,00966	779	0	-	-
Heating Coil Outlet	-	14,5	0,00966	779	0	0	-
Zone Air	-	24,5	0,00986	779	966	9345	-
02 - Waiting area (Cooling)							
Ventilation Air	-	-	-	15	-	-	-
Cooling Coil Inlet	-	23,7	0,01050	59	0	-	-
Cooling Coil Outlet	-	15,0	0,01002	59	0	618	83
Heating Coil Inlet	-	15,0	0,01002	59	0	-	-
Heating Coil Outlet	-	15,0	0,01002	59	0	0	-
Zone Air	-	26,4	0,01076	59	1868	813	-
03 - Corridor (Cooling)							
Ventilation Air	-	-	-	20	-	-	-
Cooling Coil Inlet	-	23,1	0,01046	66	0	-	-
Cooling Coil Outlet	-	14,7	0,00989	66	0	665	111
Heating Coil Inlet	-	14,7	0,00989	66	0	-	-
Heating Coil Outlet	-	14,7	0,00989	66	0	0	-
Zone Air	-	26,4	0,01077	66	400	926	-
Toilets and Lockers (Cooling)							
Ventilation Air	-	-	-	171	-	-	-
Cooling Coil Inlet	-	15,2	0,00974	171	0	-	-
Cooling Coil Outlet	-	15,2	0,00974	171	0	0	0
Heating Coil Inlet	-	15,2	0,00974	171	0	-	-
Heating Coil Outlet	-	15,2	0,00974	171	0	0	-
Zone Air	-	30,0	0,01044	171	400	595	-
07 - Multipurpose room (Cooling)							
Ventilation Air	-	-	-	70	-	-	-
Cooling Coil Inlet	-	23,2	0,00957	498	0	-	-
Cooling Coil Outlet	-	13,9	0,00928	498	0	5614	439
Heating Coil Inlet	-	13,9	0,00928	498	0	-	-
Heating Coil Outlet	-	13,9	0,00928	498	0	0	-
Zone Air	-	24,4	0,00954	498	966	6307	-
08 - Canteen (Cooling)							
Ventilation Air	-	-	-	160	-	-	-
Cooling Coil Inlet	-	19,6	0,01004	304	0	-	-
Cooling Coil Outlet	-	14,5	0,00991	304	0	1903	112
Heating Coil Inlet	-	14,5	0,00991	304	0	-	-
Heating Coil Outlet	-	14,5	0,00991	304	0	0	-
Zone Air	-	24,5	0,01037	304	1092	3667	-
09 - Technical room (Cooling)							
Ventilation Air	-	-	-	59	-	-	-
Cooling Coil Inlet	-	23,0	0,00925	949	0	-	-
Cooling Coil Outlet	-	13,5	0,00905	949	0	10857	573
Heating Coil Inlet	-	13,5	0,00905	949	0	-	-
Heating Coil Outlet	-	13,5	0,00905	949	0	0	-
Zone Air	-	23,4	0,00921	949	400	11265	-

System Psychrometrics for VRF multi split system

Project Name: Rotterdam - MNA Guard House 10-12-20 12/10/2020
Prepared by: Ing. Mauro Petriccione 12:31

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	-10,0	0,00160	545	400	-20376	0
Vent - Return Mixing	Outlet	-10,0	0,00160	545	0	-	-
Vent. Cooling Coil	Outlet	-10,0	0,00160	545	400	0	0
Vent. Heating Coil	Outlet	13,6	0,00160	545	400	15508	-
Ventilation Fan	Outlet	14,0	0,00160	545	400	273	-
Cold Supply Duct	Outlet	14,0	0,00160	545	400	0	-
Zone Air	-	21,0	0,00160	545	400	-14247	0
Return Plenum	Outlet	21,0	0,00160	545	400	0	-

System Psychrometrics for VRF multi split system

Project Name: Rotterdam - MNA Guard House 10-12-20 12/10/2020
Prepared by: Ing. Mauro Petriccione 12:31

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 = 2945,8 W/(L/s)
Site Altitude = 5,0 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)
01 - Guard room (Heating)							
Ventilation Air	-	-	-	50	-	-	-
Cooling Coil Inlet	-	21,2	0,00160	779	0	-	-
Cooling Coil Outlet	-	21,2	0,00160	779	0	0	0
Heating Coil Inlet	-	21,2	0,00160	779	0	-	-
Heating Coil Outlet	-	27,7	0,00160	779	0	6123	-
Zone Air	-	21,5	0,00160	779	400	-5825	-
02 - Waiting area (Heating)							
Ventilation Air	-	-	-	15	-	-	-
Cooling Coil Inlet	-	18,4	0,00161	59	0	-	-
Cooling Coil Outlet	-	18,4	0,00161	59	0	0	0
Heating Coil Inlet	-	18,4	0,00161	59	0	-	-
Heating Coil Outlet	-	26,6	0,00161	59	0	578	-
Zone Air	-	19,7	0,00160	59	400	-487	-
03 - Corridor (Heating)							
Ventilation Air	-	-	-	20	-	-	-
Cooling Coil Inlet	-	18,2	0,00161	66	0	-	-
Cooling Coil Outlet	-	18,2	0,00161	66	0	0	0
Heating Coil Inlet	-	18,2	0,00161	66	0	-	-
Heating Coil Outlet	-	28,0	0,00161	66	0	784	-
Zone Air	-	19,7	0,00160	66	400	-659	-
Toilets and Lockers (Heating)							
Ventilation Air	-	-	-	171	-	-	-
Cooling Coil Inlet	-	14,2	0,00161	171	0	-	-
Cooling Coil Outlet	-	14,2	0,00161	171	0	0	0
Heating Coil Inlet	-	14,2	0,00161	171	0	-	-
Heating Coil Outlet	-	32,8	0,00161	171	0	3838	-
Zone Air	-	19,6	0,00160	171	400	-890	-
07 - Multipurpose room (Heating)							
Ventilation Air	-	-	-	70	-	-	-
Cooling Coil Inlet	-	21,0	0,00160	498	0	-	-
Cooling Coil Outlet	-	21,0	0,00160	498	0	0	0
Heating Coil Inlet	-	21,0	0,00160	498	0	-	-
Heating Coil Outlet	-	25,1	0,00160	498	0	2479	-
Zone Air	-	21,9	0,00160	498	400	-1909	-
08 - Canteen (Heating)							
Ventilation Air	-	-	-	160	-	-	-
Cooling Coil Inlet	-	17,9	0,00161	304	0	-	-
Cooling Coil Outlet	-	17,9	0,00161	304	0	0	0
Heating Coil Inlet	-	17,9	0,00161	304	0	-	-
Heating Coil Outlet	-	27,0	0,00161	304	0	3365	-
Zone Air	-	21,8	0,00160	304	400	-1923	-
09 - Technical room (Deadband)							
Ventilation Air	-	-	-	59	-	-	-
Cooling Coil Inlet	-	21,7	0,00160	949	0	-	-
Cooling Coil Outlet	-	21,7	0,00160	949	0	0	0
Heating Coil Inlet	-	21,7	0,00160	949	0	-	-
Heating Coil Outlet	-	24,3	0,00160	949	0	2939	-
Zone Air	-	22,1	0,00160	949	400	-2554	-

System Psychrometrics for VRF multi split system

Project Name: Rotterdam - MNA Guard House 10-12-20
Prepared by: Ing. Mauro Petricciolone

12/10/2020
12:31

The psychrometric graph cannot be generated for this type of system.

Hourly Analysis Program 5.11

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