

Datasheet: 02037296
Project: Mc Donalds DK
Ronnede
Location:
Unit: AHU 02

Position: 729601
Side: 1 by 14
Date: 21.08.2024
Tender Position:



Clerk: M.Leis **Quantity:** 1 Piece
Construction: HYD S Outside installation
Base Frame: inside galvanized 120 mm,
164,16 kg
Base Frame top unit: Without
Total Weight: 1690 kg
Thermal Decoupling: T2/TB4
CAL (R)@-400 Pa: 0,327 dm³/(sm²)
CAL (R)@+400 Pa: 0,403 dm³/(sm²)
Accessories: Roof overhang 100mm
Transport Steel Pipes
insulation strips

Cert. No: 02.03.036
Efficiency Factor Winter: 0,92
Efficiency Factor Summer: 0,92
Reference city: DK-Hvide Sande
Dry bulb temperature: 25,30
Wet bulb temperature: 20,20
Dew point temperature: 17,80



Software ALAG
[02.05.2024]
Version 1.23/4.2



Datasheet: 02037296 **Position:** 729601
Project: Mc Donalds DK **Side:** 2 by 14
 Ronnede
Location: **Date:** 21.08.2024
Unit: AHU 02 **Tender Position:**



Technical Data Supply Air

Outside Metal Sheet:	mm	1,0 galvanized coated, RAL 9002	Unit Size:	Special
Inside Metal Sheet:	mm	1,0 galvanized	Position of Access Side:	Left
Inside Floor Metal Sheet:	mm	53,0 galvanized	Position of Piping Side:	Left
Wall Thickness:	mm	53,0 galvanized	Insulation Roof/Floor:	Mineral Wool 99kg/m ³
Dimensions (L x W x H):	mm	4562x1121x825	Insulation Walls:	Mineral Wool 99kg/m ³
Air velocity:	m/sec	1,85	Class of Velocity:	V3
Weight:	kg	1100	Design:	Standard

(SUP) Air Inlet Section **GSC/GSC/GS** **Weight: 104 kg** **Length: 554 mm** **Pressure Drop: 24 Pa**

Connection:

Layer: Roof
Material: galvanized and painted
Design: Damping Connection VDI6022
Potential Equalisation: Yes

Damper Size:

Assembly: Inside
Material: Aluminium
Design: Gear
Tightness: Class 2
Shaft Position: Inside
Actuator: Open/Close 24V
Dimensions (W x H x D): 762 x 314 x 115

Dimensions (W x H) 762 x 314

Grating: Without

Design: Access Door
Lockers: Lockers
Hinges: 3D-Hinges

Condensate Trough: RAL/V2A (AISI304)

Accessories

Item Number	Description	Weight
	Siphon SN	
	Door locker	



Datasheet: 02037296
Project: Mc Donalds DK
 Ronnede
Location:
Unit: AHU 02

Position: 729601
Side: 3 by 14
Date: 21.08.2024
Tender Position:



(SUP) Filter	GSC/GSC/GS	Weight: 78 kg	Length: 555 mm	Pressure Drop: 142 Pa
Brand:	Rox	Filter Maintenance:	Clamp Rail	
Spare Filter:	No	Frame:	V2A (AISI304)	
		Manometer:	DPA2500 with display	
1st Filter step				
Filter Type:	Bag Filter short	Energy Efficiency Class:	C	
Filter Class EN779:2012:	F7	Filter Surface:	m ²	6,5
Filter Class ISO16890:	ePM1 60%	Medium:	Glass Fibre	
ΔP Initial:	Pa 85			
ΔP End:	Pa 200			
Max. Pressure Drop:	Pa 250			
ΔP Dim:	Pa 142			
Type/Size/Quantity	Hi-Flo XLT 7/370 50+	592*592*370 mm	1 Piece	
	Hi-Flo XLT 7/370 50+	287*592*370 mm	1 Piece	
Design:	Access Door	Condensate Trough:	RAL/V2A (AISI304)	
Lockers:	Lockers	Condensate Drain:	Yes	
Hinges:	3D-Hinges			
Accessories				
Item Number	Description	Weight		
	Siphon SN			
	Door locker			



Datasheet: 02037296 Position: 729601
 Project: Mc Donalds DK Side: 4 by 14
 Location: Ronnede Date: 21.08.2024
 Unit: AHU 02 Tender Position:



Plate Heat Exchanger		GSC/GS/GS	Weight: 382 kg	Length: 1497 mm	Pressure Drop: 146 Pa
Brand:	Rox		Type:	KV-100/P1/0990/BSK116,H	
Actuator:	Continuous 24V		Diagonal:	mm	1387
Technical Data			Supply Air		Extract Air
Operating Mode:			Winter		
Air Volume:	m³/h	4800			4300
Temp. In:	°C	-12			22
Rel. Humidity In:	%	90			30
Temp. Out:	°C	13,3			-1,9
Rel. Humidity out:	%	12,9			100
Heat Recovery dry:	%	69,3			77,1
Heat Recovery wet:	%	74,4			70,4
Humidification / Dehumidification:	g/kg				
Condensate:	kg/h	0			9
Pressure Drop dry:	Pa	145,99			124,19
Pressure Drop wet:	Pa	0			0
Pressure drop standard density:	Pa	159			132
Air velocity:	m/s	1,7			1,5
Sensible Heat Load:	kW	40,8			-34,7
Latent Heat Load:	kW	0			-6,1
Total Heat Load:	kW	40,8			-40,8
Operating Mode:			Summer		
Air Volume:	m³/h	4800			4300
Temp. In:	°C	34			26
Rel. Humidity In:	%	35			50
Temp. Out:	°C	28,4			32,2
Rel. Humidity out:	%	48			34,9
Heat Recovery dry:	%	69,7			77,6
Heat Recovery wet:	%	69,7			77,6
Humidification / Dehumidification:	g/kg				
Condensate:	kg/h	0			0
Pressure Drop dry:	Pa	165,09			136,07
Pressure Drop wet:	Pa	0			0
Pressure drop standard density:	Pa	159			132
Air velocity:	m/s	1,7			1,5
Sensible Heat Load:	kW	-9,2			9,1
Latent Heat Load:	kW	0			0,1
Total Heat Load:	kW	-9,2			9,2
<u>Operation Point according to EN13053:2012</u>					
Temp. In:	°C	5,00			25,00
relative humidity %:	%	0,00			0,00
Pressure Drop dry:	Pa	151			129
PeI HR:	kW	0,58			
Power Digit:	-	38,92			
Energy Efficiency:	%	71,70			
electrical Power (auxiliary power):	W	0,00			
Heat Recovery:	%	73,59			
Heat Recovery Class:	-	H1			

Design: Access Door
Lockers: Lockers

Condensate Trough: RAL/V2A (AISI304)
Condensate Drain: Yes

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 Version 1.23/4.2



Management System
 ISO 9001:2015
 www.tuv.com
 ID 0910083041

Datasheet: 02037296 **Position:** 729601
Project: Mc Donalds DK **Side:** 5 by 14
 Ronnede
Location: **Date:** 21.08.2024
Unit: AHU 02 **Tender Position:**



Hinges: 3D-Hinges

Accessories

Item Number	Description	Weight
	Siphon SN	
	Door locker	

(SUP) Cooler/Heater		GSC/GS/GS	Weight: 321 kg	Length: 153 mm	Pressure Drop: 114 Pa	
Brand:	Rox		Type:		DV / 24 / 818 / 6 R / 12 K / 3.0 Cu,9.5x0.50/Al-L1	
Pipes:	Copper 9.5x0.5		Weight Heat Exchanger:	kg	28,006	
Fin:	Aluminium		Medium			
Collector:	Copper		Refrigerant:		R32	
Frame:	Aluminium		Flow-Rate:	m³/h	12,61	
Separation (A x B):	mm 25x22		Evaporation temperature:	°C	8,5	
Quantity Pipe Rows:	6		Überhitzung:	°K	5	
Number of Circuits:	12		Charge:	l	7,6	
Fin Distance:	mm 3		Pressure Drop:	kPa	109	
Connections:	Straight		Air		Cooling	Heating
Connection Inlet:	2x 16mm		Air Volume:	m³/h	4800	
Connection Outlet:	2x 22 mm		Temp. In:	°C	29,4 10	
Finned height:	mm 600		Rel. Humidity In:	%	48	
Finned width:	mm 818		Temp. Out:	°C	18 24	
Freeze protection:	°C 0		Rel. Humidity out:	%	88,4	
			Pressure Drop:	Pa	114	
			Pressure Drop dry:	Pa	109	
			Air velocity:	m/s	2,72	
			Dehumidification:	kg/h	5,2	
			Surface Reserve:	%	10,40	
			Capacity:	kW	22,56 22,62	
			Latent Capacity:	kW	3,61	
			Sensible Capacity:	kW	18,95	

Design: Access Panel **Condensate Trough:** RAL/V2A (AISI304)
Lockers: Lockers

Accessories

Item Number	Description	Weight
Heat Pump	2x Samsung AM 040DXMDNG	
EEV-Kit	2x Samsung MXD K 050AN	
	The heat pump will be mounted on a base frame extension and delivered piped and pre-filled at the Rox factory.	



Datasheet: 02037296
Project: Mc Donalds DK
Ronnede
Location:
Unit: AHU 02

Position: 729601
Side: 6 by 14
Date: 21.08.2024
Tender Position:



**(SUP) Droplet
Eliminator**

GSC/GS/GS	Weight: 65 kg	Length: 462 mm	Pressure Drop: 22 Pa
Brand: Rox			
Material: PPTV	Guiding Rail: V2A (AISI304)		
Design: Access Panel	Condensate Trough: RAL/V2A (AISI304)		
Lockers: Lockers	Condensate Drain: Yes		

Accessories

Item Number	Description	Weight
	Siphon SN	



Datasheet: 02037296 **Position:** 729601
Project: Mc Donalds DK **Side:** 7 by 14
 Ronnede
Location: **Date:** 21.08.2024
Unit: AHU 02 **Tender Position:**



(SUP) Fan		GSC/GS/GS	Weight: 118 kg	Length: 765 mm	Pressure Drop: 0 Pa
Brand:		Rox	Construction:		Free Running
Fan Type:		1 x GKHM 355-CII.118.6FF IE Gen3	Drivetrain:		Motor in Airstream
SFP-Data with FC:	m³/s	1309	SFP-Class with FC:		SFP3
Air Volume:	m³/h	4800	Motor type:		EC
ΔP ext.:	Pa	300	Voltage / Frequency:	V/Hz	3~200-240 / 50/60
Dyn. Pressure Drop:	Pa	47	Nominal Power:	kW	2,77
Installation loss:	Pa	28	Nominal Current:	A	7,25
Static Pressure Drop:	Pa	795	Nominal Rotation Speed:	1/min	3115
Total Pressure Drop:	Pa	842	Frequency Converter:		Integrated
electrical Power Input:	kW	1,74 / P1	Nozzle Pressure Difference:	Pa	1045,29
Reference Power Input:	kW	2,27	k-Factor:	m²s/h	115
Nominal Rotation Speed:	1/min	2642			
Maximum Rotation Speed:	1/min	3115			
Rotation Speed Spare:	%	15,14			
Total Efficiency:	%	64,40			
Static System Efficiency:	%	60,80			
Total Efficiency in Efficiency Optimum:	%	69			
Air Volume Measuring Point:		Air Volume Measuring Point with Pressure Sensor DPA 2500			
Total Sound Power level:	dB(A)	80,3			

f	125	250	500	1000	2000	4000	8000	Hz
Lw o	53	77	77	78	76	75	72	dB
Lw i	47	73	74	73	72	71	68	dB

Design: Access Door
Lockers: Lockers
Hinges: 3D-Hinges

Accessories

Item Number	Description	Weight
	Door locker	

Hints: The Installation losses of the fan are considered in the Fan Performances
 Designed for wet conditions
 Motor wired to Repair Switch



Datasheet: 02037296 **Position:** 729601
Project: Mc Donalds DK **Side:** 8 by 14
 Ronnede
Location: **Date:** 21.08.2024
Unit: AHU 02 **Tender Position:**



(SUP) Air Outlet Section

GSC/GS/GS **Weight: 32 kg** **Length: 1 mm** **Pressure Drop: 19 Pa**

Connection:

Layer: Front Side
Material: galvanized
Design: Damping Connection
 VDI6022
Potential Equalisation: Yes
Dimensions (W x H): 956 x 360

Grating: Without

Design: Fixed Panel

Supply Air Acoustic Data

Supply Air Connector

Frequency f in Hz	125	250	500	1k	2k	4k	8k	Sum
Residue Sound Power in dB	52	76	76	77	75	74	71	83
Residue Sound Power in dB(A)	36	68	73	77	77	75	70	82

Outside Air Connector

Frequency f in Hz	125	250	500	1k	2k	4k	8k	Sum
Residue Sound Power in dB	31	51	53	48	39	39	35	56
Residue Sound Power in dB(A)	15	42	49	48	40	40	34	53

Surrounding Acoustic Emission (Casing Emission)

Wall Thickness: 53 mm

Frequency f in Hz	125	250	500	1k	2k	4k	8k	Sum
Residue Sound Power in dB	39	68	65	57	49	39	32	70
Residue Sound Power in dB(A)	23	59	62	57	50	40	31	65

The Acoustic Data refer only on the inside fan
 Possibly the Supply Air and Extract Air Data have to be added together



Datasheet:	02037296	Position:	729601
Project:	Mc Donalds DK Ronnede	Side:	9 by 14
Location:		Date:	21.08.2024
Unit:	AHU 02	Tender Position:	



Technical Data Extract Air

Outside Metal Sheet:	mm	1,0 galvanized coated, RAL 9002	Unit Size:	Special
Inside Metal Sheet:	mm	1,0 galvanized	Position of Access Side:	Right
Inside Floor Metal Sheet:	mm	53,0 galvanized	Position of Piping Side:	Right
Wall Thickness:	mm	53,0 galvanized	Insulation Roof/Floor:	Mineral Wool 99kg/m ³
Dimensions (L x W x H):	mm	2300x1121x825	Insulation Walls:	Mineral Wool 99kg/m ³
Air velocity:	m/sec	1,66	Class of Velocity:	V2
Weight:	kg	346	Design:	Standard

(EXT) Air Inlet Section GSC/GS/GS Weight: 32 kg Length: 1 mm Pressure Drop: 1 Pa

Connection:

Layer	Front Side
Material:	galvanized
Design:	Damping Connection VDI6022
Potential Equalisation:	Yes
Dimensions (W x H)	956 x 759
Grating:	Without
Design:	Fixed Panel

Datasheet: 02037296 **Position:** 729601
Project: Mc Donalds DK **Side:** 10 by 14
 Ronnede
Location: **Date:** 21.08.2024
Unit: AHU 02 **Tender Position:**



(EXT) Filter		GSC/GS/GS	Weight: 68 kg	Length: 650 mm	Pressure Drop: 138 Pa
Brand:	Rox		Filter Maintenance:	Clamp Rail	
Spare Filter:	No		Frame:	galvanized	
			Manometer:	DPA2500 with display	
1st Filter step					
Filter Type:	Bag Filter short		Energy Efficiency Class:	C	
Filter Class EN779:2012:	F7		Filter Surface:	m ²	6,5
Filter Class ISO16890:	ePM1 60%		Medium:	Glass Fibre	
ΔP Initial:	Pa	76			
ΔP End:	Pa	200			
Max. Pressure Drop:	Pa	250			
ΔP Dim:	Pa	138			
Type/Size/Quantity	Hi-Flo XLT 7/370 50+		592*592*370 mm		1 Piece
	Hi-Flo XLT 7/370 50+		287*592*370 mm		1 Piece
Design:	Access Door				
Lockers:	Lockers				
Hinges:	3D-Hinges				
Accessories					
Item Number	Description			Weight	
	Door locker				

Datasheet: 02037296 **Position:** 729601
Project: Mc Donalds DK **Side:** 11 by 14
 Ronnede
Location: **Date:** 21.08.2024
Unit: AHU 02 **Tender Position:**



(EXT) Fan		GSC/GS/GS	Weight: 120 kg	Length: 730 mm	Pressure Drop: 0 Pa
Brand:	Rox		Construction:	Free Running	
Fan Type:	1 x GKHM 355-CII.118.6FF IE Gen3		Drivetrain:	Motor in Airstream	
SFP-Data with FC:	m³/s 1070		SFP-Class with FC:	SFP2	
Air Volume:	m³/h 4300		Motor type:	EC	
ΔP ext.:	Pa 300		Voltage / Frequency:	V/Hz 3~380-480 / 50/60	
Dyn. Pressure Drop:	Pa 38		Nominal Power:	kW 4,44	
Installation loss:	Pa 23		Nominal Current:	A 6,8	
Static Pressure Drop:	Pa 623		Nominal Rotation Speed:	1/min 3650	
Total Pressure Drop:	Pa 661		Frequency Converter:	Integrated	
electrical Power Input:	kW 1,28 / P1		Nozzle Pressure Difference:	Pa 838,87	
Reference Power Input:	kW 1,64		k-Factor:	m²s/h 115	
Nominal Rotation Speed:	1/min 2348				
Maximum Rotation Speed:	1/min 3650				
Rotation Speed Spare:	% 35,55				
Total Efficiency:	% 61,80				
Static System Efficiency:	% 58,20				
Total Efficiency in Efficiency Optimum:	% 69				
Air Volume Measuring Point:	Air Volume Measuring Point with Pressure Sensor DPA 2500				
Total Sound Power level:	dB(A) 77,4				

f	125	250	500	1000	2000	4000	8000	Hz
Lw o	50	74	74	75	73	72	69	dB
Lw i	44	70	71	70	69	68	65	dB

Design: Access Door
Lockers: Lockers
Hinges: 3D-Hinges

Accessories

Item Number	Description	Weight
	Door locker	

Hints: The Installation losses of the fan are considered in the Fan Performances
 Designed for wet conditions
 Motor wired to Repair Switch



Datasheet: 02037296 **Position:** 729601
Project: Mc Donalds DK **Side:** 12 by 14
 Ronnede
Location: **Date:** 21.08.2024
Unit: AHU 02 **Tender Position:**



(EXT) Air Outlet Section **GSC/GS/GS** **Weight:** 126 kg **Length:** 534 mm **Pressure Drop:** 37 Pa

Connection:		Damper Size:	
Layer	Roof	Assembly:	Inside
Material:	galvanized and painted	Material:	Aluminium
Design:	Throwing Nozzle, rainproof	Design:	Gear
Potential Equalisation:	Yes	Tightness:	Class 2
		Shaft Position:	Inside
		Actuator:	Open/Close 24V
Dimensions (W x H)	715 x 314	Dimensions (W x H x D):	715 x 314 x 115
Grating:	Without		

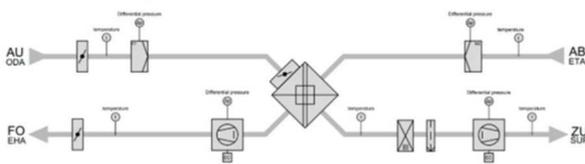
Design:	Access Door	Condensate Trough:	RAL/V2A (AISI304)
Lockers:	Lockers	Condensate Drain:	Yes
Hinges:	3D-Hinges		

Accessories

Item Number	Description	Weight
	Siphon DS	
	Door locker	

Electrical Cabinet **GSC/GS/GS** **Weight:** 126 kg **Length:** 534 mm **Pressure Drop:** 0Pa

Air handling Unit AHU 2



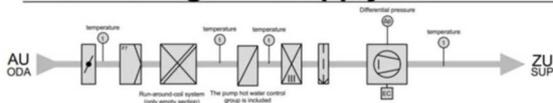
control strategy:

- AHU 2 = supply air temperature control
- Kitchen = supply air temperature control

control of additional components:

- Required sensors for device control - included in the Rox delivery (Including 1 S+S RTM-CO2-SD-U-Lobby combination sensor für the lobby, 1 Thermokon NOVOS 3 LM2352 kitchen room sensor, 2 S+S Premasgard 2121-SD-1000 Pa sensor for the air pipe system) sensor für the lobby,
- 2 Roof fan (exhaust air Kitchen and Dish)
- 1 Tablet Display incl. 1 Frame
- 2 LED's
- BACnet interface for connection to Schneider Electric System controller
- Remote control by vpn including email for maintenance and error messages

Air handling Unit Supply Air Kitchen



Design:	Access Door
Lockers:	Lockers
Hinges:	3D-Hinges
Accessories	Schaltschrankdach

Software ALAG
 [02.05.2024]
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Management System
 ISO 9001:2015
 www.tuv.com
 ID 0910083041

Datasheet: 02037296
Project: Mc Donalds DK
Location: Ronnede
Unit: AHU 02

Position: 729601
Side: 13 by 14
Date: 21.08.2024
Tender Position:



Extract Air Acoustic Data

Exhaust Air Connection

Frequency f in Hz	125	250	500	1k	2k	4k	8k	Sum
Residue Sound Power in dB	44	66	70	72	70	69	66	78
Residue Sound Power in dB(A)	28	58	67	72	72	70	65	77

Extract Air Connection

Frequency f in Hz	125	250	500	1k	2k	4k	8k	Sum
Residue Sound Power in dB	38	62	61	55	48	46	41	65
Residue Sound Power in dB(A)	22	53	57	55	49	47	40	61

Surrounding Acoustic Emission (Casing Emission)

Wall Thickness: 53 mm

Frequency f in Hz	125	250	500	1k	2k	4k	8k	Sum
Residue Sound Power in dB	36	65	62	55	46	36	29	67
Residue Sound Power in dB(A)	20	56	59	55	47	37	28	62

The Acoustic Data refer only on the inside fan
Possibly the Supply Air and Extract Air Data have to be added together

Datasheet: 02037296
 Project: Mc Donalds DK
 Location: Ronnede
 Unit: AHU 02

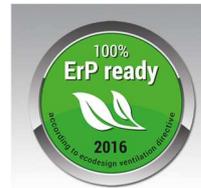
Position: 729601
 Side: 14 by 14
 Date: 21.08.2024
 Tender Position:



Unit Type	NRVU	Construction of Unit	BVU
Non residential ventilation unit		Bidirectional ventilation unit	

Total unit characteristics:	
Type of HR:	Plate Heat Exchanger
Temperature ratio dry:	73,59 %
Highest External Leakage rate (+400Pa/-400Pa):	0,27 %
Highest Internal Leakage rate (250Pa):	0,03 %

SFPint:	768,18 [W/(m ³ /s)]
SFPint max. 2016:	1208,12 [W/(m ³ /s)]
SFPint max. 2018:	928,12 [W/(m ³ /s)]



Supply air features		Extract air features	
Air Volume:	1,33 m ³ /s	Air Volume:	1,19 m ³ /s
ΔP ext:	300 Pa	ΔP ext:	300 Pa
ΔP s, add:	231 Pa	ΔP s, add:	95 Pa
ΔP s, int:	283 Pa	ΔP s, int:	243 Pa
Filter:	ePM1 60% (F7)	Filter:	ePM1 60% (F7)
Filter pressure drop beginning:	85 Pa	Filter pressure drop beginning:	76 Pa
Heat recovery pressure drop dry:	151 Pa	Heat recovery pressure drop dry:	129 Pa
Fan pressure drop total:	814 Pa	Fan pressure drop total:	638 Pa
Fan pressure drop dynamic:	47 Pa	Fan pressure drop dynamic:	38 Pa
Fan electric power input:	1,74 kW	Fan electric power input:	1,28 kW
Fan efficiency static:	60,80 %	Fan efficiency static:	58,20 %
SFPv:	1167,76 [W/(m ³ /s)]	SFPv:	924,40 [W/(m ³ /s)]

Hints	
Filter warn indication	The Filter warn indication is realized by a differential pressure manometer. According to the guideline 1253/2014/EU the filter monitoring has to be mounted onsite if it is not contained in the equipment.
Thermal Bypass	The required thermal bypass of the HRS according to the guideline 1253/2014/EU is realized by a bypass of the HR-System.
Drivetrain	If the unit is ordered and delivered without DDC, a governor or a cascade drive is provided to fulfil the requirements of the guideline 1253/2014/EU.
Disposal note	Further information under www.rox-online.de

