

F A C O srl

OFFERTE 2752
Date: 16/06/04
DATA SHEET 8 15816(-1.2-N-7)

CUSTOMER: UNICA-EMMEN

Ref: H. TEN HOOR

Standard L		THERMODYNAMIC DATA				NL/1/4/37/0101	
FIN SIDE		Reqrd		Calcul.		TUBE SIDE	
Fluid: air						Fluid: WATER	
Quantity	m3/h	10000	10000	Quantity	l/s	2,29	
Dry air	kg/s		3,40	Inlet temp.	°C	14	14,0
Specific gravity	kg/m3		1,2250	Outlet temp.	°C	6	6,0
Inlet temp.	°C	-11	-11,0	Velocity	m/s		1,69
Outlet temp.	°C		11,4	Pressure drop	kPa		100,8
Face velocity	m/sec		2,3				
Pressure drop	Pa		126				
Capacity	kW		76,56				
COIL DATA							
Finned length	mm	1100	1100	Tube diameter	mm	16,50	
Finned heigth	mm	1120	1120	Tube thickness	mm	0,40	
Row number		8	8,00	Fin thickness	mm	0,13	
Est.td empty mass	kg		136	Surface	m2	241,9	
Fluid content	dm3		56,4				

COIL MODEL: P40-16 AC 8R-28T-1100A-2,5Pa Cu/Al

Date: 16/06/04

DATA SHEET 9 15817(-1.2-N-7)

Ref: H. TEN HOOR

COIL MODEL: P40-16 AC 8R-28T-1100A-2,5Pa Cu/Al

Date: 16/06/04

DATA SHEET 10 15818(-1.2-N-7)

Ref: H. TEN HOOR

COIL MODEL: P40-16 AC 8R-28T-1100A-2,5Pa Cu/Al

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OFFERTE 2752
Date: 16/06/04
DATA SHEET 11 15819(-1.2-N-7)

CUSTOMER: UNICA-EMMEN

Ref: H. TEN HOOR

Standard L		THERMODYNAMIC DATA		NL/1/4/37/0101	
FIN SIDE		Reqrd Calc.		TUBE SIDE	
Fluid: air				Fluid: WATER	
Quantity	m3/h	10000	10000	Quantity	l/s
Dry air	kg/s		3,40	Inlet temp.	°C
Specific gravity	kg/m3		1,2250	Outlet temp.	°C
Inlet temp.	°C	-8	-8,0	Velocity	m/s
Outlet temp.	°C		11,4	Pressure drop	kPa
Face velocity	m/sec		2,3		
Pressure drop	Pa		127		
Capacity	kW		66,31		
COIL DATA					
Finned length	mm	1100	1100	Tube diameter	mm
Finned heigth	mm	1120	1120	Tube thickness	mm
Row number		8	8,00	Fin thickness	mm
Est.td empty mass	kg		136	Surface	m2
Fluid content	dm3		56,4		

COIL MODEL: P40-16 AC 8R-28T-1100A-2,5Pa Cu/Al

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OFFERTE 2752
Date: 16/06/04

DATA SHEET 12 15820(-1.2-N-7)

CUSTOMER: UNICA-EMMEN

Ref: H. TEN HOOR

Standard L		THERMODYNAMIC DATA		NL/1/4/37/0101	
FIN SIDE		Reqrd	Calcul.	TUBE SIDE	
Fluid: air				Fluid: WATER	
Quantity	m3/h	10000	10000	Quantity	l/s 1,88
Dry air	kg/s		3,40	Inlet temp.	°C 14 14,0
Specific gravity	kg/m3		1,2250	Outlet temp.	°C 6 6,0
Inlet temp.	°C	-7	-7,0	Velocity	m/s 1,39
Outlet temp.	°C		11,4	Pressure drop	kPa 71,0
Face velocity	m/sec		2,3		
Pressure drop	Pa		127		
Capacity	kW		62,87		
COIL DATA					
Finned length	mm	1100	1100	Tube diameter	mm 16,50
Finned heigth	mm	1120	1120	Tube thickness	mm 0,40
Row number		8	8,00	Fin thickness	mm 0,13
Est.td empty mass	kg		136	Surface	m2 241,9
Fluid content	dm3		56,4		

COIL MODEL: P40-16 AC 8R-28T-1100A-2,5Pa Cu/Al

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OFFERTE 2752
Date: 16/06/04

DATA SHEET 13 15821(-1.2-N-7)

CUSTOMER: UNICA-EMMEN

Ref: H. TEN HOOR

Standard L		THERMODYNAMIC DATA		NL/1/4/37/0101	
FIN SIDE		Reqrd		TUBE SIDE	
Fluid: air		Calcul.		Reqrd	
Quantity	m3/h	10000	10000	Fluid: WATER	
Dry air	kg/s		3,40	Quantity	l/s
Specific gravity	kg/m3		1,2250	Inlet temp.	14
Inlet temp.	°C	-6	-6,0	Outlet temp.	6
Outlet temp.	°C		11,4	Velocity	m/s
Face velocity	m/sec		2,3	Pressure drop	kPa
Pressure drop	Pa		127		64,2
Capacity	kW		59,41		
COIL DATA					
Finned length	mm	1100	1100	Tube diameter	mm
Finned heigth	mm	1120	1120	Tube thickness	mm
Row number		8	8,00	Fin thickness	mm
Est.td empty mass	kg		136	Surface	m2
Fluid content	dm3		56,4		241,9
COIL MODEL: P40-16 AC 8R-28T-1100A-2,5Pa Cu/Al					

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OFFERTE 2752
Date: 16/06/04

DATA SHEET 14 15822(-1.2-N-7)

CUSTOMER: UNICA-EMMEN

Ref: H. TEN HOOR

Standard L		THERMODYNAMIC DATA		NL/1/4/37/0101	
FIN SIDE		Reqrd		TUBE SIDE	
Fluid: air		Calcul.		Reqrd	
Quantity	m3/h	10000	10000	Fluid: WATER	
Dry air	kg/s		3,40	Quantity	l/s
Specific gravity	kg/m3		1,2250	Inlet temp.	°C
Inlet temp.	°C	-5	-5,0	Outlet temp.	°C
Outlet temp.	°C		11,4	Velocity	m/s
Face velocity	m/sec		2,3	Pressure drop	kPa
Pressure drop	Pa		127		
Capacity	kW		55,93		
COIL DATA					
Finned length	mm	1100	1100	Tube diameter	mm
Finned heigth	mm	1120	1120	Tube thickness	mm
Row number		8	8,00	Fin thickness	mm
Est.td empty mass	kg		136	Surface	m2
Fluid content	dm3		56,4		

COIL MODEL: P40-16 AC 8R-28T-1100A-2,5Pa Cu/Al

Date: 16/06/04

DATA SHEET 15 15823(-1.2-N-7)

Ref: H. TEN HOOR

COIL MODEL: P40-16 AC 8R-28T-1100A-2,5Pa Cu/Al

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OFFERTE 2752
Date: 16/06/04

DATA SHEET 16 15824(-1.2-N-7)

CUSTOMER: UNICA-EMMEN

Ref: H. TEN HOOR

Standard L		THERMODYNAMIC DATA		NL/1/4/37/0101	
FIN SIDE		Reqrd	Calcul.	TUBE SIDE	
Fluid: air				Fluid: WATER	
Quantity	m3/h	10000	10000	Quantity	l/s 1,46
Dry air	kg/s		3,40	Inlet temp.	°C 14 14,0
Specific gravity	kg/m3		1,2250	Outlet temp.	°C 6 6,0
Inlet temp.	°C	-3	-3,0	Velocity	m/s 1,08
Outlet temp.	°C		11,3	Pressure drop	kPa 45,4
Face velocity	m/sec		2,3		
Pressure drop	Pa		128		
Capacity	kW		48,89		
COIL DATA					
Finned length	mm	1100	1100	Tube diameter	mm 16,50
Finned heigth	mm	1120	1120	Tube thickness	mm 0,40
Row number		8	8,00	Fin thickness	mm 0,13
Est.td empty mass	kg		136	Surface	m2 241,9
Fluid content	dm3		56,4		

COIL MODEL: P40-16 AC 8R-28T-1100A-2,5Pa Cu/Al

Date: 16/06/04

DATA SHEET 17 15825(-1.2-N-7)

Ref: H. TEN HOOR

COIL MODEL: P40-16 AC 8R-28T-1100A-2,5Pa Cu/Al

Date: 16/06/04

DATA SHEET 18 15826(-1.2-N-7)

Ref: H. TEN HOOR

COIL MODEL: P40-16 AC 8R-28T-1100A-2,5Pa Cu/Al

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OFFERTE 2752
Date: 16/06/04
DATA SHEET 19 15827(-1.2-N-7)

CUSTOMER: UNICA-EMMEN
Ref: H. TEN HOOR

Standard L		THERMODYNAMIC DATA		NL/1/4/37/0101	
FIN SIDE		Reqrd	Calcul.	TUBE SIDE	
Fluid: air				Fluid: WATER	
Quantity	m3/h	10000	10000	Quantity	l/s 1,13
Dry air	kg/s		3,40	Inlet temp.	°C 14 14,0
Specific gravity	kg/m3		1,2250	Outlet temp.	°C 6 6,0
Inlet temp.	°C	.00001	0,0	Velocity	m/s 0,84
Outlet temp.	°C		11,1	Pressure drop	kPa 29,0
Face velocity	m/sec		2,3		
Pressure drop	Pa		129		
Capacity	kW		37,99		
COIL DATA					
Finned length	mm	1100	1100	Tube diameter	mm 16,50
Finned heigth	mm	1120	1120	Tube thickness	mm 0,40
Row number		8	8,00	Fin thickness	mm 0,13
Est.td empty mass	kg		136	Surface	m2 241,9
Fluid content	dm3		56,4		

COIL MODEL: P40-16 AC 8R-28T-1100A-2,5Pa Cu/Al

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OFFERTE 2752

Date: 16/06/04

DATA SHEET 20 15828(-1.2-N-7)

CUSTOMER: UNICA-EMMEN

Ref: H. TEN HOOR

Standard L		THERMODYNAMIC DATA		NL/1/4/37/0101	
FIN SIDE		Reqrd	Calcul.	TUBE SIDE	
Fluid: air				Fluid: WATER	
Quantity	m3/h	10000	10000	Quantity	l/s 1,02
Dry air	kg/s		3,40	Inlet temp.	°C 14 14,0
Specific gravity	kg/m3		1,2250	Outlet temp.	°C 6 6,0
Inlet temp.	°C	1	1,0	Velocity	m/s 0,76
Outlet temp.	°C		11,0	Pressure drop	kPa 24,0
Face velocity	m/sec		2,3		
Pressure drop	Pa		129		
Capacity	kW		34,20		
COIL DATA					
Finned length	mm	1100	1100	Tube diameter	mm 16,50
Finned heigth	mm	1120	1120	Tube thickness	mm 0,40
Row number		8	8,00	Fin thickness	mm 0,13
Est.td empty mass	kg		136	Surface	m2 241,9
Fluid content	dm3		56,4		

COIL MODEL: P40-16 AC 8R-28T-1100A-2,5Pa Cu/Al

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CUSTOMER: UNICA-EMMEN

Ref: H. TEN HOOR

Standard L		THERMODYNAMIC DATA				NL/1/4/37/0101	
FIN SIDE		Reqrd		Calcul.		TUBE SIDE	
Fluid: air						Fluid: WATER	
Quantity	m3/h	10000		10000		Quantity	l/s
Dry air	kg/s			3,40		Inlet temp.	°C
Specific gravity	kg/m3			1,2250		Outlet temp.	°C
Inlet temp.	°C	2		2,0		Velocity	m/s
Outlet temp.	°C			10,9		Pressure drop	kPa
Face velocity	m/sec			2,3			
Pressure drop	Pa			129			
Capacity	kW			30,26			
COIL DATA							
Finned length	mm	1100		1100		Tube diameter	mm
Finned heigth	mm	1120		1120		Tube thickness	mm
Row number		8		8,00		Fin thickness	mm
Est.td empty mass	kg			136		Surface	m2
Fluid content	dm3			56,4			

COIL MODEL: P40-16 AC 8R-28T-1100A-2,5Pa Cu/Al

Date: 16/06/04

DATA SHEET 22 15830(-1.2-N-7)

Ref: H. TEN HOOR

COIL MODEL: P40-16 AC 8R-28T-1100A-2,5Pa Cu/Al

Date: 16/06/04

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DATA SHEET 23 15831(-1.2-N-7)

CUSTOMER: UNICA-EMMEN

Ref: H. TEN HOOR

Standard L		THERMODYNAMIC DATA		NL/1/4/37/0101	
FIN SIDE		Reqrd	Calcul.	TUBE SIDE	Reqrd Calcul.
Fluid: air				Fluid: WATER	
Quantity	m3/h	10000	10000	Quantity	l/s 0,64
Dry air	kg/s		3,40	Inlet temp.	°C 14 14,0
Specific gravity	kg/m3		1,2250	Outlet temp.	°C 6 6,0
Inlet temp.	°C	4	4,0	Velocity	m/s 0,48
Outlet temp.	°C		10,3	Pressure drop	kPa 10,6
Face velocity	m/sec		2,3		
Pressure drop	Pa		129		
Capacity	kW		21,59		
COIL DATA					
Finned length	mm	1100	1100	Tube diameter	mm 16,50
Finned heigth	mm	1120	1120	Tube thickness	mm 0,40
Row number		8	8,00	Fin thickness	mm 0,13
Est.td empty mass	kg		136	Surface	m2 241,9
Fluid content	dm3		56,4		

COIL MODEL: P40-16 AC 8R-28T-1100A-2,5Pa Cu/Al

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OFFERTE 2752
Date: 16/06/04
DATA SHEET 24 15832(-1.2-N-7)

CUSTOMER: UNICA-EMMEN

Ref: H. TEN HOOR

Standard L		THERMODYNAMIC DATA		NL/1/4/37/0101	
FIN SIDE		Reqrd	Calcul.	TUBE SIDE	
Fluid: air				Fluid: WATER	
Quantity	m3/h	10000	10000	Quantity	l/s 0,48
Dry air	kg/s		3,40	Inlet temp.	°C 14 14,0
Specific gravity	kg/m3		1,2250	Outlet temp.	°C 6 6,0
Inlet temp.	°C	5	5,0	Velocity	m/s 0,36
Outlet temp.	°C		9,7	Pressure drop	kPa 6,4
Face velocity	m/sec		2,3		
Pressure drop	Pa		129		
Capacity	kW		16,20		
COIL DATA					
Finned length	mm	1100	1100	Tube diameter	mm 16,50
Finned heigth	mm	1120	1120	Tube thickness	mm 0,40
Row number		8	8,00	Fin thickness	mm 0,13
Est.td empty mass	kg		136	Surface	m2 241,9
Fluid content	dm3		56,4		

COIL MODEL: P40-16 AC 8R-28T-1100A-2,5Pa Cu/Al

OFFERTE 2752

Date: 16/06/04

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DATA SHEET 25 15833(-1.2-N-7)

CUSTOMER: UNICA-EMMEN

Ref: H. TEN HOOR

Standard L		THERMODYNAMIC DATA				NL/1/4/37/0101	
FIN SIDE		Reqrd		Calcul.	TUBE SIDE		Reqrd
Fluid: air					Fluid: WATER		Calcul.
Quantity	m3/h	10000	10000		Quantity	l/s	0,60
Dry air	kg/s		3,40		Inlet temp.	°C	10
Specific gravity	kg/m3		1,2250		Outlet temp.	°C	20
Inlet temp.	°C	22	22,0		Velocity	m/s	0,44
Relative humid.	%	55	55		Pressure drop	kPa	11,6
Outlet temp.	°C		14,8				
Relative humid.	%		86				
Sensible heat ratio			1,00				
Face velocity	m/sec		2,3				
Pressure drop	Pa		134				
Capacity	kW		25,04				
COIL DATA							
Finned length	mm	1100	1100		Tube diameter	mm	16,50
Finned heigth	mm	1120	1120		Tube thickness	mm	0,40
Row number		8	8,00		Fin thickness	mm	0,13
Est.td empty mass	kg		136		Surface	m2	241,9
Fluid content	dm3		56,4				

COIL MODEL: P40-16 AR 8R-28T-1100A-2,5Pa Cu/Al

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OFFERTE 2752
Date: 16/06/04
DATA SHEET 26 15834(-1.2-N-7)

CUSTOMER: UNICA-EMMEN
Ref: H. TEN HOOR

Standard L		THERMODYNAMIC DATA		NL/1/4/37/0101	
FIN SIDE		Reqrd	Calcul.	TUBE SIDE	
Fluid: air				Fluid: WATER	
Quantity	m3/h	10000	10000	Quantity	l/s
Dry air	kg/s		3,40	Inlet temp.	°C
Specific gravity	kg/m3		1,2250	Outlet temp.	°C
Inlet temp.	°C	23	23,0	Velocity	m/s
Relative humid.	%	55	55	Pressure drop	kPa
Outlet temp.	°C		14,4		
Relative humid.	%		94		
Sensible heat ratio			1,00		
Face velocity	m/sec		2,3		
Pressure drop	Pa		135		
Capacity	kW		29,95		
COIL DATA					
Finned length	mm	1100	1100	Tube diameter	mm
Finned heigth	mm	1120	1120	Tube thickness	mm
Row number		8	8,00	Fin thickness	mm
Est.td empty mass	kg		136	Surface	m2
Fluid content	dm3		56,4		

COIL MODEL: P40-16 AR 8R-28T-1100A-2,5Pa Cu/Al

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OFFERTE 2752
Date: 16/06/04

DATA SHEET 27 15835(-1.2-N-7)

CUSTOMER: UNICA-EMMEN

Ref: H. TEN HOOR

Standard L		THERMODYNAMIC DATA		NL/1/4/37/0101	
FIN SIDE		Reqrd	Calcul.	TUBE SIDE	
Fluid: air				Fluid: WATER	
Quantity	m3/h	10000	10000	Quantity	l/s 0,89
Dry air	kg/s		3,40	Inlet temp.	°C 10 10,0
Specific gravity	kg/m3		1,2250	Outlet temp.	°C 20 20,0
Inlet temp.	°C	24	24,0	Velocity	m/s 0,66
Relative humid.	%	55	55	Pressure drop	kPa 23,4
Outlet temp.	°C		14,2		
Relative humid.	%		98		
Sensible heat ratio			0,92		
Condensed water	kg/s		0,0012		
Face velocity	m/sec		2,3		
Pressure drop	Pa		140		
Capacity	kW		37,20		
COIL DATA					
Finned length	mm	1100	1100	Tube diameter	mm 16,50
Finned heigth	mm	1120	1120	Tube thickness	mm 0,40
Row number		8	8,00	Fin thickness	mm 0,13
Est.td empty mass	kg		136	Surface	m2 241,9
Fluid content	dm3		56,4		
COIL MODEL: P40-16 AR 8R-28T-1100A-2,5Pa Cu/Al					

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OFFERTE 2752
Date: 16/06/04

DATA SHEET 28 15836(-1.2-N-7)

CUSTOMER: UNICA-EMMEN

Ref: H. TEN HOOR

Standard L		THERMODYNAMIC DATA		NL/1/4/37/0101	
FIN SIDE		Reqrd	Calcul.	TUBE SIDE	
Fluid: air				Fluid: WATER	
Quantity	m3/h	10000	10000	Quantity	l/s 1,14
Dry air	kg/s		3,40	Inlet temp.	°C 10 10,0
Specific gravity	kg/m3		1,2250	Outlet temp.	°C 20 20,0
Inlet temp.	°C	25	25,0	Velocity	m/s 0,84
Relative humid.	%	55	55	Pressure drop	kPa 36,3
Outlet temp.	°C		14,0		
Relative humid.	%		98		
Sensible heat ratio			0,81		
Condensed water	kg/s		0,0037		
Face velocity	m/sec		2,3		
Pressure drop	Pa		149		
Capacity	kW		47,55		
COIL DATA					
Finned length	mm	1100	1100	Tube diameter	mm 16,50
Finned heigth	mm	1120	1120	Tube thickness	mm 0,40
Row number		8	8,00	Fin thickness	mm 0,13
Est.td empty mass	kg		136	Surface	m2 241,9
Fluid content	dm3		56,4		

COIL MODEL: P40-16 AR 8R-28T-1100A-2,5Pa Cu/Al

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OFFERTE 2752
Date: 16/06/04
DATA SHEET 29 15837(-1.2-N-7)

CUSTOMER: UNICA-EMMEN

Ref: H. TEN HOOR

Standard L		THERMODYNAMIC DATA		NL/1/4/37/0101	
FIN SIDE		Reqrd	Calcul.	TUBE SIDE	
Fluid: air				Fluid: WATER	
Quantity	m3/h	10000	10000	Quantity	l/s 1,38
Dry air	kg/s		3,40	Inlet temp.	°C 10 10,0
Specific gravity	kg/m3		1,2250	Outlet temp.	°C 20 20,0
Inlet temp.	°C	26	26,0	Velocity	m/s 1,02
Relative humid.	%	55	55	Pressure drop	kPa 51,2
Outlet temp.	°C		13,9		
Relative humid.	%		98		
Sensible heat ratio			0,73		
Condensed water	kg/s		0,0062		
Face velocity	m/sec		2,3		
Pressure drop	Pa		154		
Capacity	kW		57,72		
COIL DATA					
Finned length	mm	1100	1100	Tube diameter	mm 16,50
Finned heigth	mm	1120	1120	Tube thickness	mm 0,40
Row number		8	7,98	Fin thickness	mm 0,13
Est.td empty mass	kg		136	Surface	m2 241,9
Fluid content	dm3		56,4		

COIL MODEL: P40-16 AR 8R-28T-1100A-2,5Pa Cu/Al

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OFFERTE 2752
Date: 16/06/04
DATA SHEET 30 15838(-1.2-N-7)

CUSTOMER: UNICA-EMMEN

Ref: H. TEN HOOR

Standard L		THERMODYNAMIC DATA		NL/1/4/37/0101	
FIN SIDE		Reqrd	Calcul.	TUBE SIDE	
Fluid: air				Fluid: WATER	
Quantity	m3/h	10000	10000	Quantity	l/s
Dry air	kg/s		3,40	Inlet temp.	°C
Specific gravity	kg/m3		1,2250	Outlet temp.	°C
Inlet temp.	°C	27	27,0	Velocity	m/s
Relative humid.	%	55	55	Pressure drop	kPa
Outlet temp.	°C		13,8		
Relative humid.	%		98		
Sensible heat ratio			0,68		
Condensed water	kg/s		0,0089		
Face velocity	m/sec		2,3		
Pressure drop	Pa		159		
Capacity	kW		68,13		
COIL DATA					
Finned length	mm	1100	1100	Tube diameter	mm
Finned heigth	mm	1120	1120	Tube thickness	mm
Row number		8	7,99	Fin thickness	mm
Est.td empty mass	kg		136	Surface	m2
Fluid content	dm3		56,4		

COIL MODEL: P40-16 AR 8R-28T-1100A-2,5Pa Cu/Al

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OFFERTE 2752
Date: 16/06/04
DATA SHEET 31 15839(-1.2-N-7)

CUSTOMER: UNICA-EMMEN
Ref: H. TEN HOOR

Standard L		THERMODYNAMIC DATA		NL/1/4/37/0101	
FIN SIDE		Reqrd	Calcul.	TUBE SIDE	
Fluid: air				Fluid: WATER	
Quantity	m3/h	10000	10000	Quantity	l/s 1,86
Dry air	kg/s		3,40	Inlet temp.	°C 10 10,0
Specific gravity	kg/m3		1,2250	Outlet temp.	°C 20 20,0
Inlet temp.	°C	28	28,0	Velocity	m/s 1,38
Relative humid.	%	55	55	Pressure drop	kPa 87,4
Outlet temp.	°C		13,9		
Relative humid.	%		98		
Sensible heat ratio			0,64		
Condensed water	kg/s		0,0113		
Face velocity	m/sec		2,3		
Pressure drop	Pa		162		
Capacity	kW		77,92		
COIL DATA					
Finned length	mm	1100	1100	Tube diameter	mm 16,50
Finned heigth	mm	1120	1120	Tube thickness	mm 0,40
Row number		8	8,01	Fin thickness	mm 0,13
Est.td empty mass	kg		136	Surface	m2 241,9
Fluid content	dm3		56,4		

COIL MODEL: P40-16 AR 8R-28T-1100A-2,5Pa Cu/Al

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OFFERTE 2752
Date: 16/06/04
DATA SHEET 32 15840(-1.2-N-7)

CUSTOMER: UNICA-EMMEN
Ref: H. TEN HOOR

Standard L		THERMODYNAMIC DATA		NL/1/4/37/0101	
FIN SIDE		Reqrd	Calcul.	TUBE SIDE	
Fluid: air				Fluid: WATER	
Quantity	m3/h	10000	10000	Quantity	l/s 2,09
Dry air	kg/s		3,40	Inlet temp.	°C 10 10,0
Specific gravity	kg/m3		1,2250	Outlet temp.	°C 20 20,0
Inlet temp.	°C	29	29,0	Velocity	m/s 1,55
Relative humid.	%	55	55	Pressure drop	kPa 107,7
Outlet temp.	°C		13,9		
Relative humid.	%		98		
Sensible heat ratio			0,60		
Condensed water	kg/s		0,0139		
Face velocity	m/sec		2,3		
Pressure drop	Pa		164		
Capacity	kW		87,63		
COIL DATA					
Finned length	mm	1100	1100	Tube diameter	mm 16,50
Finned heigth	mm	1120	1120	Tube thickness	mm 0,40
Row number		8	8,02	Fin thickness	mm 0,13
Est.td empty mass	kg		136	Surface	m2 241,9
Fluid content	dm3		56,4		

COIL MODEL: P40-16 AR 8R-28T-1100A-2,5Pa Cu/Al

F A C O srl

CUSTOMER: UNICA-EMMEN

Ref: H. TEN HOOR

Standard L		THERMODYNAMIC DATA			NL/1/4/37/0101		
FIN SIDE		Reqrd	Calcul.	TUBE SIDE		Reqrd	Calcul.
Fluid: air				Fluid: WATER			
Quantity	m3/h	10000	10000	Quantity	l/s		2,32
Dry air	kg/s		3,40	Inlet temp.	°C	10	10,0
Specific gravity	kg/m3		1,2250	Outlet temp.	°C	20	20,0
Inlet temp.	°C	30	30,0	Velocity	m/s		1,72
Relative humid.	%	55	55	Pressure drop	kPa		129,8
Outlet temp.	°C		14,1				
Relative humid.	%		98				
Sensible heat ratio			0,58				
Condensed water	kg/s		0,0165				
Face velocity	m/sec		2,3				
Pressure drop	Pa		167				
Capacity	kW		97,31				
COIL DATA							
Finned length	mm	1100	1100	Tube diameter	mm		16,50
Finned heigth	mm	1120	1120	Tube thickness	mm		0,40
Row number		8	7,98	Fin thickness	mm		0,13
Est.td empty mass	kg		136	Surface	m2		241,9
Fluid content	dm3		56,4				

COIL MODEL: P40-16 AR 8R-28T-1100A-2,5Pa Cu/Al

F A C O srl

OFFERTE 2752
Date: 16/06/04
DATA SHEET 34 15842(-1.2-N-7)

CUSTOMER: UNICA-EMMEN

Ref: H. TEN HOOR

Standard L		THERMODYNAMIC DATA				NL/1/4/37/0101	
FIN SIDE		Reqrd		Calcul.		TUBE SIDE	
Fluid: air						Fluid: WATER	
Quantity	m3/h	10000		10000		Quantity	l/s
Dry air	kg/s			3,40		Inlet temp.	°C
Specific gravity	kg/m3			1,2250		Outlet temp.	°C
Inlet temp.	°C	31		31,0		Velocity	m/s
Relative humid.	%	55		55		Pressure drop	kPa
Outlet temp.	°C			14,2			
Relative humid.	%			98			
Sensible heat ratio				0,55			
Condensed water	kg/s			0,0193			
Face velocity	m/sec			2,3			
Pressure drop	Pa			169			
Capacity	kW			107,58			
COIL DATA							
Finned length	mm	1100		1100		Tube diameter	mm
Finned heigth	mm	1120		1120		Tube thickness	mm
Row number		8		8,00		Fin thickness	mm
Est.td empty mass	kg			136		Surface	m2
Fluid content	dm3			56,4			

COIL MODEL: P40-16 AR 8R-28T-1100A-2,5Pa Cu/Al

F A C O srl

OFFERTE 2752
Date: 16/06/04
DATA SHEET 35 15843(-1.2-N-7)

CUSTOMER: UNICA-EMMEN
Ref: H. TEN HOOR

Standard L		THERMODYNAMIC DATA		NL/1/4/37/0101	
FIN SIDE		Reqrd	Calcul.	TUBE SIDE	
Fluid: air				Fluid: WATER	
Quantity	m3/h	10000	10000	Quantity	l/s 2,82
Dry air	kg/s		3,40	Inlet temp.	°C 10 10,0
Specific gravity	kg/m3		1,2250	Outlet temp.	°C 20 20,0
Inlet temp.	°C	32	32,0	Velocity	m/s 2,08
Relative humid.	%	55	55	Note: header dimension by water flow	
Outlet temp.	°C		14,3	Pressure drop	kPa 182,8
Relative humid.	%		98		
Sensible heat ratio			0,53		
Condensed water	kg/s		0,0221		
Face velocity	m/sec		2,3		
Pressure drop	Pa		170		
Capacity	kW		117,96		
COIL DATA					
Finned length	mm	1100	1100	Tube diameter	mm 16,50
Finned heigth	mm	1120	1120	Tube thickness	mm 0,40
Row number		8	8,00	Fin thickness	mm 0,13
Est.td empty mass	kg		138	Surface	m2 241,9
Fluid content	dm3		58,9		

COIL MODEL: P40-16 AR 8R-28T-1100A-2,5Pa Cu/Al

F A C O srl

OFFERTE 2752
Date: 16/06/04
DATA SHEET 36 15844(-1.2-N-7)

CUSTOMER: UNICA-EMMEN
Ref: H. TEN HOOR

Standard L		THERMODYNAMIC DATA		NL/1/4/37/0101	
FIN SIDE		Reqrd	Calcul.	TUBE SIDE	
Fluid: air				Fluid: WATER	
Quantity	m3/h	10000	10000	Quantity	l/s 3,08
Dry air	kg/s		3,40	Inlet temp.	°C 10 10,0
Specific gravity	kg/m3		1,2250	Outlet temp.	°C 20 20,0
Inlet temp.	°C	33	33,0	Velocity	m/s 2,28
Relative humid.	%	55	55	Note: header dimension by water flow	
Outlet temp.	°C		14,4	Pressure drop	kPa 213,9
Relative humid.	%		98		
Sensible heat ratio			0,51		
Condensed water	kg/s		0,0252		
Face velocity	m/sec		2,3		
Pressure drop	Pa		172		
Capacity	kW		128,83		
COIL DATA					
Finned length	mm	1100	1100	Tube diameter	mm 16,50
Finned heigth	mm	1120	1120	Tube thickness	mm 0,40
Row number		8	8,00	Fin thickness	mm 0,13
Est.td empty mass	kg		138	Surface	m2 241,9
Fluid content	dm3		58,9		

COIL MODEL: P40-16 AR 8R-28T-1100A-2,5Pa Cu/Al

F A C O srl

OFFERTE 2752
Date: 16/06/04
DATA SHEET 37 15845(-1.2-N-7)

CUSTOMER: UNICA-EMMEN

Ref: H. TEN HOOR

Standard L		THERMODYNAMIC DATA		NL/1/4/37/0101	
FIN SIDE		Reqrd	Calcul.	TUBE SIDE	
Fluid: air				Fluid: WATER	
Quantity	m3/h	10000	10000	Quantity	l/s 3,34
Dry air	kg/s		3,40	Inlet temp.	°C 10 10,0
Specific gravity	kg/m3		1,2250	Outlet temp.	°C 20 20,0
Inlet temp.	°C	34	34,0	Velocity	m/s 2,47
Relative humid.	%	55	55	Note: CHECK WATER VELOCITY !!!	
Outlet temp.	°C		14,5	Note: header dimension by water flow	
Relative humid.	%		99	Pressure drop	kPa 247,7
Sensible heat ratio			0,49		
Condensed water	kg/s		0,0283		
Face velocity	m/sec		2,3		
Pressure drop	Pa		173		
Capacity	kW		139,91		
COIL DATA					
Finned length	mm	1100	1100	Tube diameter	mm 16,50
Finned heigth	mm	1120	1120	Tube thickness	mm 0,40
Row number		8	8,01	Fin thickness	mm 0,13
Est.td empty mass	kg		138	Surface	m2 241,9
Fluid content	dm3		58,9		

COIL MODEL: P40-16 AR 8R-28T-1100A-2,5Pa Cu/Al

Geproduceerde vermogens brandstofcellen in
periode van 07.00 tot 18.00 uur tijdens werkdagen

temp na changeover batterij [°C]	inblaas temperatuur [°C]	benodigd CV vermogen [kW]	aant. uren/jaar tijdens werkdagen**	geleverd elektr verm. [kW]***	geleverd elektr. [kWh]	
-18	10.5	22	40	0.04	26.7	1.0
-17	10.5	22	40	0.04	26.7	1.0
-16	10.5	22	40	0.14	26.7	3.8
-15	10.5	22	40	0.18	26.7	4.8
-14	10.5	22	40	0.46	26.7	12.4
-13	10.5	22	40	0.61	26.7	16.2
-12	10.5	22	40	0.89	26.7	23.8
-11	10.5	22	40	2.25	26.7	60.0
-10	10.5	22	40	2.57	26.7	68.6
-9	10.5	22	40	4.96	26.7	132.4
-8	10.5	22	40	6.39	26.7	170.5
-7	10.5	22	40	9.82	26.7	261.9
-6	10.5	22	40	11.79	26.7	314.3
-5	10.5	22	40	17.21	26.7	459.0
-4	10.5	22	40	22.32	26.7	595.2
-3	10.5	22	40	30.04	26.7	801.0
-2	10.5	22	40	40.39	26.7	1077.1
-1	10.5	22	40	58.29	26.7	1554.3
0	10.5	22	40	79.61	26.7	2122.9
1	10.5	22	40	88.79	26.7	2367.6
2	10.5	22	40	99.68	26.7	2658.1
3	10.5	22	40	118.96	26.7	3172.4
4	10.5	22	40	133.82	26.7	3568.6
5	10.5	22	40	148.64	26.7	3963.8
6	10.5	22	40	159.75	26.7	4260.0
7	7	22	52.8	151.57	35.2	5335.3
8	8	22	49.1	142.21	32.7	4655.1
9	9	22	45.5	132.89	30.3	4031.1
10	10	22	41.8	122.07	27.9	3401.7
11	11	22	38.2	124.61	25.5	3173.3
12	12	22	34.6	131.25	23.1	3027.5

* Koelvermogens zijn berekend middels: Air Humid Handling version 5.1
 ** Draaiuren zijn bepaald aan de hand van temperatuurgegevens KNMI
 *** Elektr. vermogen is bepaald op basis van verhouding P therm. : P elektr. is 1.5 : 1

temp na changeover batterij [°C]	inblaas temperatuur [°C]	benodigd CV vermogen [kW]*	aant. uren/jaar tijdens werkdagen**	geleverd elektr. verm. [kW]***	geleverd elektr. [kWh]	geleverd elektr. [kWh]
13	13	22	31	143.64	20.7	2968.6
14	14	22	27.5	154.00	18.3	2823.3
15	15	22	23.9	157.68	15.9	2512.3
16	16	22	20.5	156.32	13.7	2136.4
17	17	22	17	141.21	11.3	1600.4
18	18	22	13.6	124.64	9.1	1130.1
19	19	22	10.1	96.07	6.7	646.9

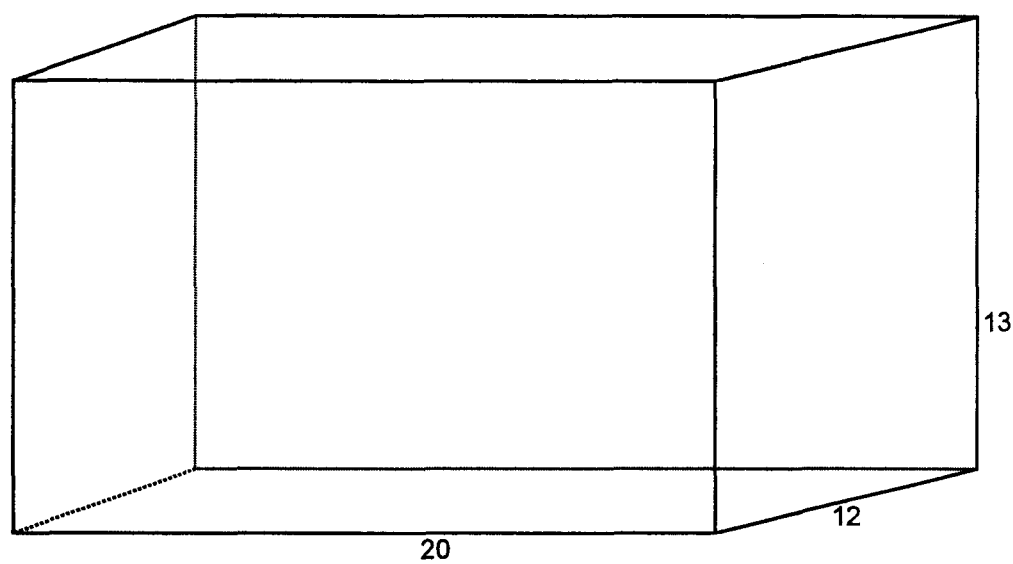
geleverd elektr. 65112.7

* Koelvermogens zijn berekend middels: Air Humid Handling version 5.1

** Draaiuren zijn bepaald aan de hand van temperatuurgegevens KNMI

*** Elektr. vermogen is bepaald op basis van verhouding P therm. : P elektr. is 1.5 : 1

Transmissieverlies kantoorgebouw
(Grove schilberekening)



vlak	lengte	breedte / hoogte	oppervlak
dak	20	12	240
voorgevel	20	13	260
achtergevel	20	13	260
linkerzijgevel	12	13	156
rechterzijgevel	12	13	156
grondvlak	20	12	240

Transmissie aan buitenlucht grenzende vlakken

$\phi_{tr} = e \cdot U \cdot A \cdot \Delta T$

ϕ_{tr} transmissieverlies
e correctiefactor
U warmte doorg. coeff.
A oppervlak
 ΔT binnen t.o.v buiten

$e = 1 / (1 - 0.04 \cdot U)$		1.01
$U = 1 / (R_i + R_c + R_e)$		0.27 W/(m2.K)
Ri	0.04 m2.K/W	Warmte overgangsweerstand binnenzijde
Rc	3.5 m2.K/W	Warmteweerstand constructie
Re	0.13 m2.K/W	Warmte overgangsweerstand buitenzijde

tijdens werkdagen van 18.00 tot 07.00

totaal benodigd vermogen per jaar 12551.5

Gasverbruik brandstofcel, gedurende gehele jaar

	P therm	gasverbruik per uur	draaiuren	totaal gasverbruik
Gasverbruik periode 1	40.0	7.9	1036.8	8202.866
Gasverbruik periode 2	52.8	10.4	151.6	1582.988
" "	49.1	9.7	142.2	1381.182
" "	45.5	9.0	132.9	1196.022
" "	41.8	8.3	122.1	1009.291
" "	38.2	7.6	124.6	941.5266
" "	34.6	6.8	131.3	898.2593
" "	31.0	6.1	143.6	880.7893
" "	27.5	5.4	154.0	837.683
" "	23.9	4.7	157.7	745.4128
" "	20.5	4.1	156.3	633.8678
" "	17.0	3.4	141.2	474.8472
" "	13.6	2.7	124.6	335.2993
" "	10.1	2.0	96.1	191.9296
Gasverbruik periode 3	10.4	2.1	2874.0	5912.163

totaal gasverbruik per jaar 25224.13

- periode 1 Het aardgasverbruik in de periode tussen 07.00 en 18.00 tijdens werkdagen waarbij de buitentemperatuur lager is dan 6°C
- periode 2 Het aardgas verbruik in de periode tussen 07.00 en 18.00 tijdens werkdagen waarbij de buitentemperatuur hoger is dan 6°C en lager dan 20°C
- periode 3 Het aardgas verbruik in de periode tussen 18.00 en 07.00 tijdens werkdagen waarbij de de brandstofcellen het minimum benodigde thermisch vermogen leveren

Specificatie kruisstroomwisselaar

Bijlage 14-a



HEATEX AB Sweden, Fax : +46 410 36 35 29

28-7-2004

Version: 3.0.0

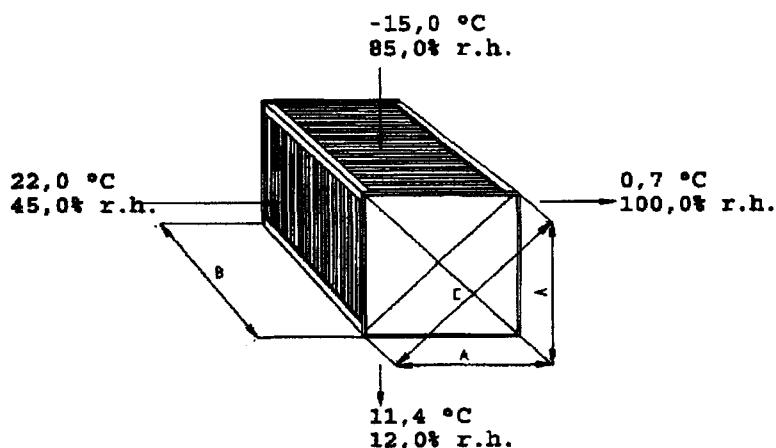
Customer:
Object:

DESCRIPTION

Heat Exchanger:	H1500/7.5/E		
Plates:	Aluminium with turbulence surface.		
Frames:	Angle end plate 20 mm. 90° Profile		
Sealing:	Silicone free (max 90°C)		
Consists of:	2 Modules	Nominal plate distance:	7.5 mm
Number of steps:	1	Total Width:	1380 mm
Total Exchanger Weight:	387,8 kg		

RESULT

(Winter)	Exhaust Air	Supply Air
Air flow:	2,99 m3/s	2,99 m3/s
Pressure drop:	72 Pa	85 Pa
Efficiency:	58%	72%
Condensate:	44,6 l/h, tcond 9,5 °C	tfrost < -7,0 °C
Transferred Power:	107 kW	



The calculations are made in accordance with the European norm EN 308 and its sub documents.



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28-7-2004

Version: 3.0.0

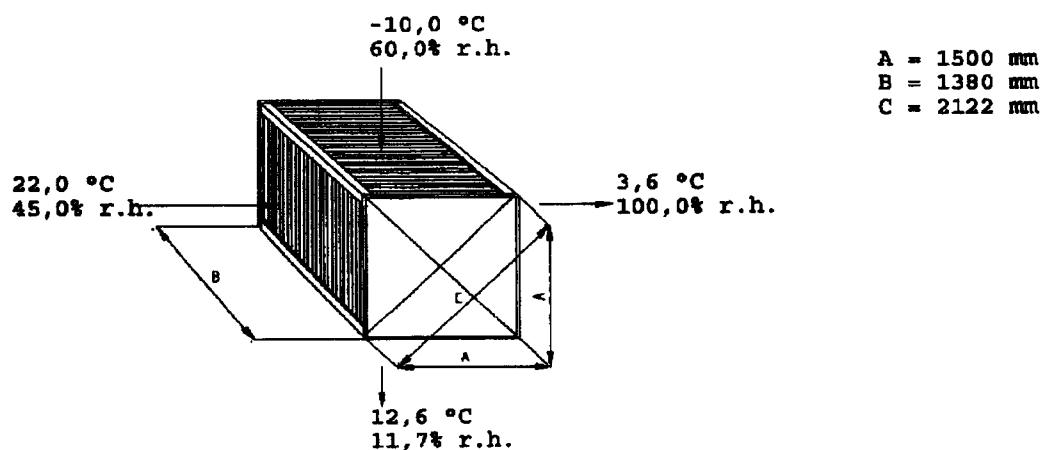
Customer:
Object:

DESCRIPTION

Heat Exchanger:	H1500/7.5/E		
Plates:	Aluminium with turbulence surface.		
Frames:	Angle end plate 20 mm. 90° Profile		
Sealing:	Silicone free (max 90°C)		
Consists of:	2 Modules	Nominal plate distance:	7.5 mm
Number of steps:	1	Total Width:	1380 mm
Total Exchanger Weight:	387,8 kg		

RESULT

(Winter)	Exhaust Air	Supply Air
Air flow:	2,99 m ³ /s	2,99 m ³ /s
Pressure drop:	72 Pa	84 Pa
Efficiency:	58%	71%
Condensate:	34,3 l/h, t _{cond} 9,5 °C	t _{frost} < -7,0 °C
Transferred Power:	90 kW	



The calculations are made in accordance with the European norm EN 308 and its sub documents.



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28-7-2004

Version: 3.0.0

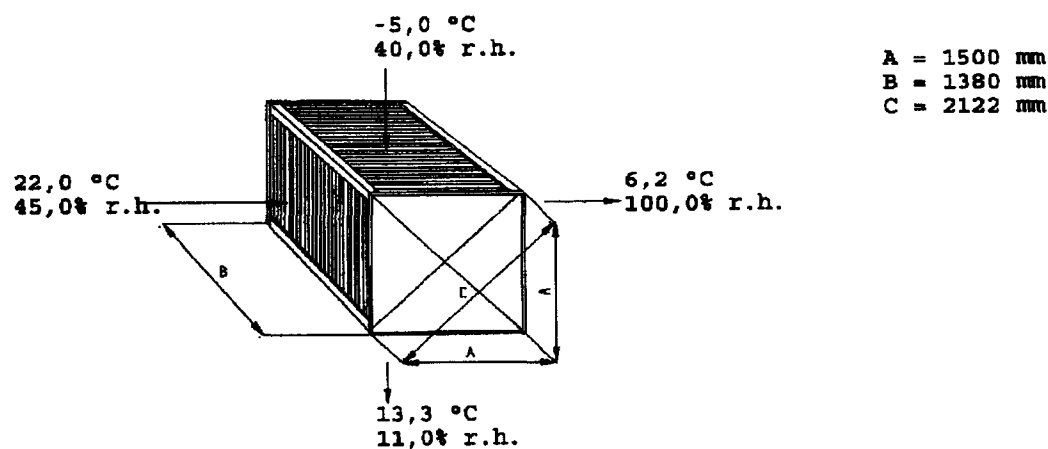
Customer:
Object:

DESCRIPTION

Heat Exchanger:	H1500/7.5/E		
Plates:	Aluminium with turbulence surface.		
Frames:	Angle end plate 20 mm. 90° Profile		
Sealing:	Silicone free (max 90°C)		
Consists of:	2 Modules	Nominal plate distance:	7.5 mm
Number of steps:	1	Total Width:	1380 mm
Total Exchanger Weight:	387,8 kg		

RESULT

(Winter)	Exhaust Air	Supply Air
Air flow:	2,99 m ³ /s	2,99 m ³ /s
Pressure drop:	73 Pa	82 Pa
Efficiency:	59%	68%
Condensate:	21,5 l/h, tcond 9,5 °C	
Transferred Power:	72 kW	



The calculations are made in accordance with the European norm EN 308 and its sub documents.



HEATEX AB Sweden, Fax : +46 410 36 35 29

30-7-2004

Version: 3.0.0

Customer:

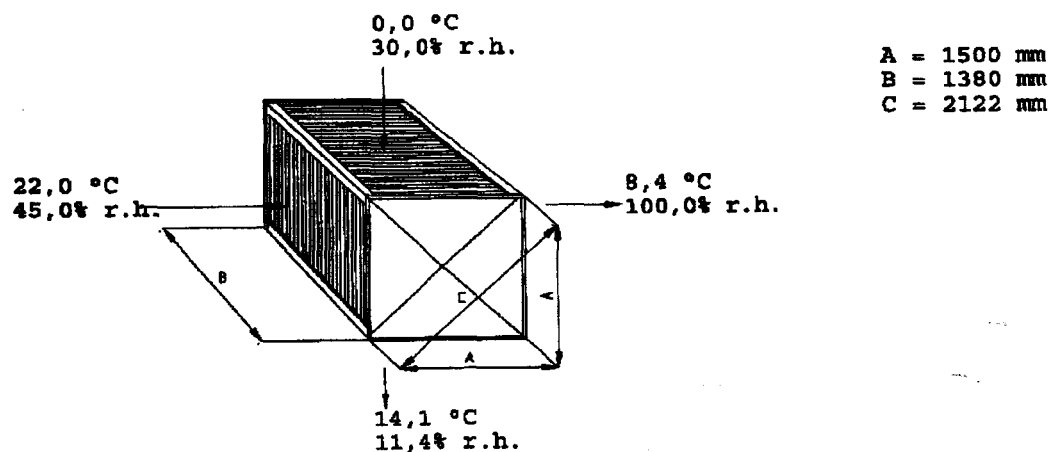
Object:

DESCRIPTION

Heat Exchanger:	H1500/7.5/E		
Plates:	Aluminium with turbulence surface.		
Frames:	Angle end plate 20 mm. 90° Profile		
Sealing:	Silicone free (max 90°C)		
Consists of:	2 Modules	Nominal plate distance:	7.5 mm
Number of steps:	1	Total Width:	1380 mm
Total Exchanger Weight:	387,8 kg		

RESULT

(Winter)	Exhaust Air	Supply Air
Air flow:	2,99 m ³ /s	2,99 m ³ /s
Pressure drop:	73 Pa	80 Pa
Efficiency:	62%	64%
Condensate:	7,5 l/h, tcond 9,5 °C	
Transferred Power:	54 kW	



The calculations are made in accordance with the European norm EN 308 and its sub documents.



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30-7-2004

Version: 3.0.0

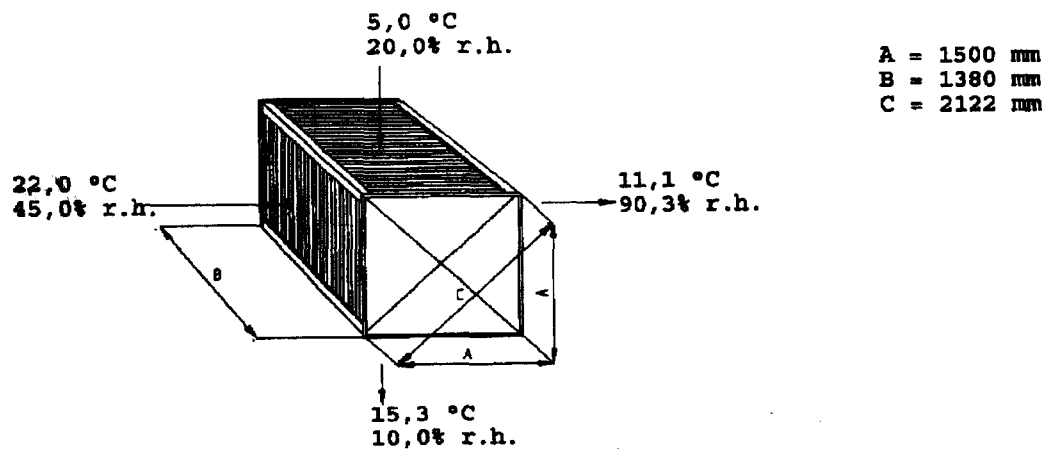
Customer:
Object:

DESCRIPTION

Heat Exchanger:	H1500/7.5/E		
Plates:	Aluminium with turbulence surface.		
Frames:	Angle end plate 20 mm. 90° Profile		
Sealing:	Silicone free (max 90°C)		
Consists of:	2 Modules	Nominal plate distance:	7.5 mm
Number of steps:	1	Total Width:	1380 mm
Total Exchanger Weight:	387,8 kg		

RESULT

(Winter)	Exhaust Air	Supply Air
Air flow:	2,99 m ³ /s	2,99 m ³ /s
Pressure drop:	73 Pa	79 Pa
Efficiency:	64%	61%
Condensate:	0,0 l/h, tcond 9,5 °C	
Transferred Power:	39 kW	



The calculations are made in accordance with the European norm EN 308 and its sub documents.



HEATEX AB Sweden, Fax : +46 410 36 35 29

28-7-2004

Version: 3.0.0

Customer:
Object:

DESCRIPTION

Heat Exchanger:	H1500/7.5/E		
Plates:	Aluminium with turbulence surface.		
Frames:	Angle end plate 20 mm. 90° Profile		
Sealing:	Silicone free (max 90°C)		
Consists of:	2 Modules	Nominal plate distance:	7.5 mm
Number of steps:	1	Total Width:	1380 mm
Total Exchanger Weight:	387,8 kg		

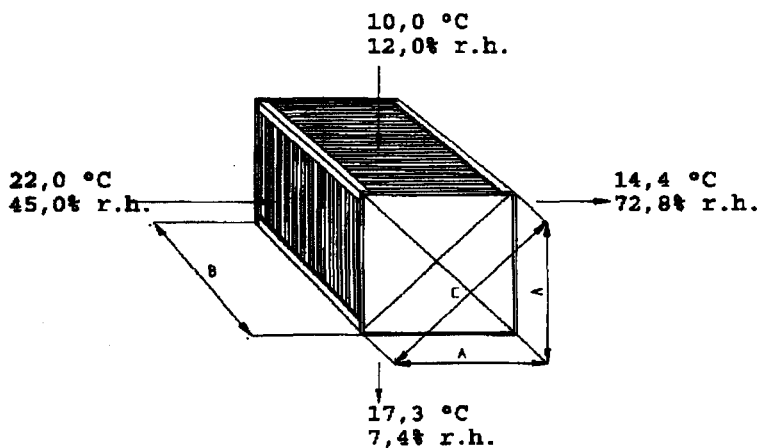
RESULT

(Winter)

Exhaust Air

Supply Air

Air flow:	2,99 m3/s	2,99 m3/s
Pressure drop:	74 Pa	78 Pa
Efficiency:	64%	62%
Condensate:	0,0 l/h, tcond 9,5 °C	
Transferred Power:	27 kW	



The calculations are made in accordance with the European norm EN 308 and its sub documents.



HEATEX AB Sweden, Fax : +46 410 36 35 29

28-7-2004

Version: 3.0.0

Customer:
Object:

DESCRIPTION

Heat Exchanger:	H1500/7.5/E		
Plates:	Aluminium with turbulence surface.		
Frames:	Angle end plate 20 mm. 90° Profile		
Sealing:	Silicone free (max 90°C)		
Consists of:	2 Modules	Nominal plate distance:	7.5 mm
Number of steps:	1	Total Width:	1380 mm
Total Exchanger Weight:	387,8 kg		

RESULT

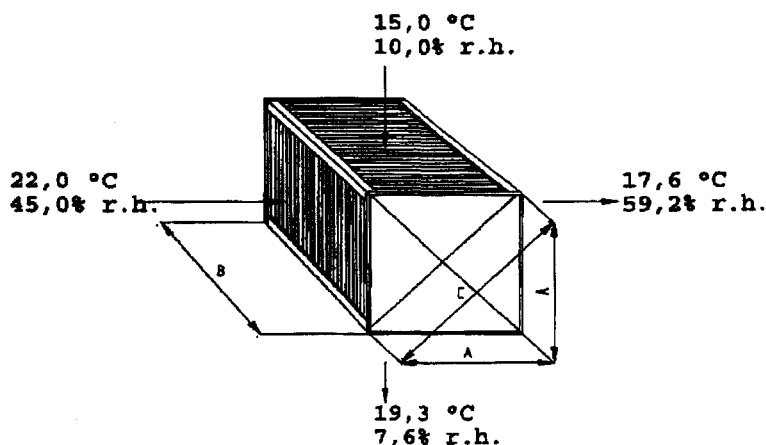
(Winter)

Exhaust Air

Supply Air

Air flow:	2,99 m ³ /s
Pressure drop:	74 Pa
Efficiency:	64%
Condensate:	0,0 l/h, t _{cond} 9,5 °C
Transferred Power:	16 kW

Air flow:	2,99 m ³ /s
Pressure drop:	76 Pa
Efficiency:	62%



The calculations are made in accordance with the European norm EN 308 and its sub documents.

Gasverbruik CV ketel t.g.v. ventilatie, conventioneel systeem in de periode vanaf 07.00 tot 18.00 tijdens werkdagen

Uitgangspunten:
Luchttemperatuur na verwarmers batterij 22°C
Gasverbruik 7.33 kW/m3/h (Gegevens Remeha)

T buiten	T naWTW*	P CV**	draaiuren**	m3
-18	8.96	41.96	0.04	0.0
-17	9.20	44.74	0.04	0.0
-16	11.16	37.62	0.14	0.0
-15	11.40	36.70	0.18	0.0
-14	11.64	35.90	0.46	0.1
-13	11.88	35.03	0.61	0.1
-12	12.12	34.17	0.89	0.2
-11	12.36	33.32	2.25	0.5
-10	12.60	32.46	2.57	0.6
-9	12.75	31.93	4.96	1.1
-8	12.88	31.47	6.39	1.5
-7	13.02	30.97	9.82	2.3
-6	13.16	30.47	11.79	2.8
-5	13.30	29.97	17.21	4.2
-4	13.46	29.40	22.32	5.6
-3	13.62	28.83	30.04	7.6
-2	13.78	28.27	40.39	10.5
-1	13.94	27.71	58.29	15.4
0	14.10	27.14	79.61	21.5
1	14.34	26.29	88.79	24.8
2	14.58	25.45	99.68	28.7
3	14.82	24.60	118.96	35.4
4	15.02	23.90	133.82	41.0
5	15.30	22.93	148.64	47.5
6	15.70	21.53	159.75	54.4
7	16.10	20.13	151.57	55.2
8	16.50	18.74	142.21	55.6
9	16.90	17.35	132.89	56.1
10	17.30	15.97	122.07	56.0
11	17.70	14.59	124.61	62.6
12	18.10	13.20	131.25	72.9
13	18.50	11.58	143.64	90.9
14	18.90	10.47	154.00	107.8
15	19.30	9.11	157.68	126.9
16	19.70	7.75	156.32	147.8
17	20.00	6.73	141.21	153.8
18	20.10	6.30	124.64	145.0

totaal gasgebruik 1436.8

* Gegevens Verhulst Luchtbehandeling (toepassing kruisstroomwisselaar Heatex AB Sweden)

** Verwarmingsvermogens zijn berekend middels: Air Humid Handling version 5.1

*** Draaiuren zijn bepaald aan de hand van temperatuurgegevens KNMI

Bijlage 14-b

Gasverbruik CV ketel t.g.v. transmissieverliezen
gedurende gehele jaar van 18.00 tot 07.00

Uitgangspunten:
Luchttemperatuur na verwarmers batterij 22°C
Gasverbruik 7.33 kW/m3/h (Gegevens Remeha)

P CV*	draaiuren**	m3
10.2	0.0	0.0
9.9	0.3	0.2
9.6	0.6	0.5
9.4	1.0	0.8
9.1	1.7	1.3
8.8	1.7	1.4
8.5	3.1	2.6
8.2	5.5	4.9
7.9	9.4	8.7
7.6	12.4	12.0
7.3	16.7	16.7
7.0	19.8	20.6
6.7	23.8	25.9
6.4	32.1	36.5
6.1	48.5	57.9
5.8	65.3	81.8
5.6	99.9	131.8
5.3	134.7	187.6
5.0	160.9	237.2
4.7	176.7	276.8
4.4	192.1	321.1
4.1	229.6	411.1
3.8	240.3	463.4
3.5	255.5	533.8
3.2	251.3	572.7
2.9	233.3	585.0
2.6	232.8	648.6
2.3	228.7	716.6
2.0	245.7	880.1
1.8	247.9	1035.8
1.5	235.2	1179.2
1.2	233.6	1464.3
0.9	214.4	1792.0
0.6	170.3	2134.4

totaal gasgebruik 13843

* Gegevens volgens schil transmissieverlies berekening
** Draaiuren n.a.v. klimaatgegevens KNMI

Bepaling elektrisch gebruik koelmachine
07.00 tot 18.00 tijdens werkdagen

Uitgangspunten:

Luchttemperatuur na koeler 18°C
RV buitenlucht 65%
C.O.P. = 3

T buiten	P koel*	P elektr	draaiuren**	kWh
21	16.10	5.37	45.86	344.54
22	22.05	7.35	36.07	371.18
23	28.29	9.43	26.93	355.51
24	34.79	11.60	19.68	319.49
25	41.58	13.86	13.82	268.19
26	48.65	16.22	9.46	214.87
27	56.10	18.70	6.86	179.52
28	63.65	21.22	4.86	144.27
29	71.60	23.87	3.64	121.72
30	79.80	26.60	2.82	105.07
31	88.40	29.47	1.43	58.93
32	106.47	35.49	0.11	5.32
				2488.62

* Koelvermogens zijn berekend middels: Air Humid Handling version 5.1
** Draaiuren zijn bepaald aan de hand van temperatuurgegevens KNMI

Kosten Concept Brandstofcel

Investeringskosten			afschrijving
Kosten LBK	€	18,950.00	15 jaar
Kosten Bronnensysteem incl TSA	€	80,000.00	20 jaar
Kosten Leidingw. en append. gebouwz.	€	1,530.00	15 jaar
Brandstofcellen	€	19,950.00	15 jaar
totaal	€	120,430.00	

afschrijving per jaar € 6,695.33

Onderhoud installatie excl. bronnen	€	1,400.00
Onderhoud bronnensysteem	€	2,400.00
Onderhoud per jaar	€	3,800.00

Afschrijving en onderhoud € 10,495.33

Energie kosten

energie kosten (elektrisch)	kW	draai-uren	prijs/kWh	bedrag
energie pomp bronnen	2.2	6,257	€ 0.13	€ 1,844.03
energie pomp hoofd circuit	1.5	6,257	€ 0.13	€ 1,257.29
energie LBK	1.5	2,867	€ 0.13	€ 576.10
energie regeltechniek	1	6,257	€ 0.13	€ 838.19

€ 4,515.61-

energie kosten (aardgas)	verbruik m3	prijs/m3	bedrag
energie brandstofcel	25224	€ 0.35	€ 8,702.28-

€ 8,702.28-

baten energie (elektriciteit)	geleverde kWh's	prijs/kWh	bedrag
energie eigen gebr (piek 07.00-18.00)	65089	€ 0.13	€ 8,719.41
energie eigen gebr (piek 18.00-23.00)	6500	€ 0.13	€ 845.00
energie eigen gebr (piek 18.00-23.00)	10400	€ 0.07	€ 728.00
energie terug lev. net (piek 18.00-23.00)	3572	€ 0.05	€ 182.15
energie terug lev. net (dal 23.00-07.00)	3061	€ 0.02	€ 70.41

€ 10,544.98

totaal kosten/baten energie € 2,672.91-

afschrijving en onderhoud per jaar	€	10,495.33
totaal kosten/baten energie	€	2,672.91
totale kosten per jaar	€	13,168.25

Kosten Conventioneel systeem

Investeringskosten			afschrijving
Kosten LBK	€	17,350.00	15 jaar
Koelmachine	€	22,500.00	10 jaar
CV Ketel	€	2,750.00	15 jaar
Kosten Leidingw. en append. gebouwz.	€	1,400.00	15 jaar
totaal		€	44,000.00

afschrijving per jaar € 2,933.33

Onderhoud koelmachine	€	550.00
Onderhoud install. excl. koelmachine	€	760.00
Onderhoud per jaar	€	1,310.00

Afschrijving en onderhoud € 4,243.33

Energie kosten

energie kosten (elektrisch)	kW	draai-uren	prijs E/kWh	bedrag
energie LBK	1.5	2,867	€ 0.13	€ 576.10
energie regeltechniek	1	2,867	€ 0.13	€ 384.07

€ 960.17-

energie kosten (elektriciteit)	geleverde kWh's	prijs/kWh	bedrag
energie koelmachine	2489	€ 0.13	€ 333.38

€ 333.38-

energie kosten (aardgas)	verbruik m3	prijs/m3	bedrag
energie CV ketel ventilatie	1437	€ 0.35	€ 495.69
energie CV ketel transmissie	13843	€ 0.35	€ 4,775.99

€ 5,271.68-

totaal kosten energie € 6,565.23-

afschrijving en onderhoud per jaar	€	4,243.33
totaal kosten energie	€	6,565.23
totale kosten per jaar	€	10,808.56