

Technical documentation

Comfort flat ventilation unit

CFL-WRG • CFL-EC



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Applications

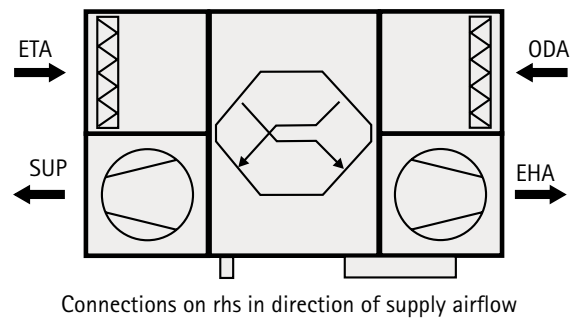
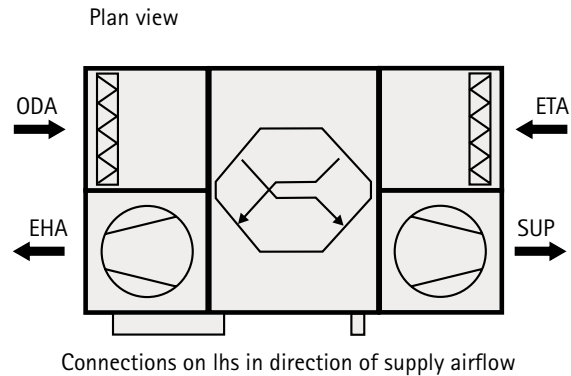
Wolf CFL Comfort flat ventilation units are designed as ceiling mounted versions of internal units for controlled ventilation in modern properties. Their compact installation height makes them ideally suitable for use in suspended ceilings. The components used and the structure of the unit meet the ever more stringent requirements concerning energy efficiency and hygiene.

CFL-WRG

Combined supply and extract air units with heat recovery

Standard version lphw (to control a lphw booster heater bank), optional version E (to control an electric booster heater bank)

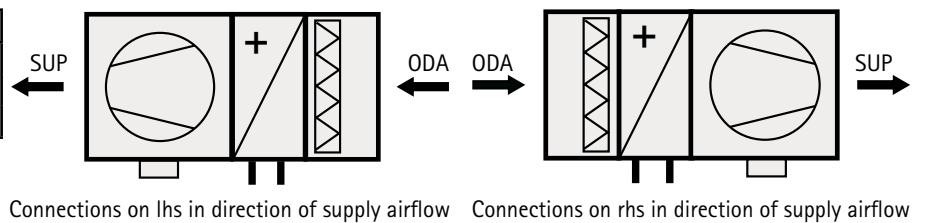
Size	Type	Max. air volume
CFL-10	WRG-lphw	1000 m ³ /h
	WRG-E	
CFL-15	WRG-lphw	1500 m ³ /h
	WRG-E	
CFL-22	WRG-lphw	2200 m ³ /h
	WRG-E	



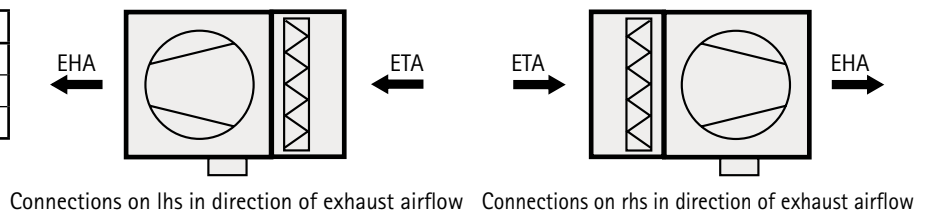
CFL-EC

Supply air units, extract air units

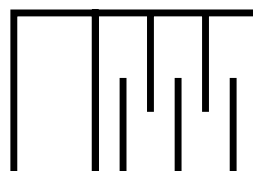
Size	Type	Max. air volume
CFL-10	EC-ZUL	1300 m ³ /h
CFL-15	EC-ZUL	1800 m ³ /h
CFL-22	EC-ZUL	2600 m ³ /h



Size	Type	Max. air volume
CFL-10	EC-ABL	1300 m ³ /h
CFL-15	EC-ABL	1800 m ³ /h
CFL-22	EC-ABL	2600 m ³ /h



Accessories	Example:
	Silencer extension module
	Complete accessories range from page 20

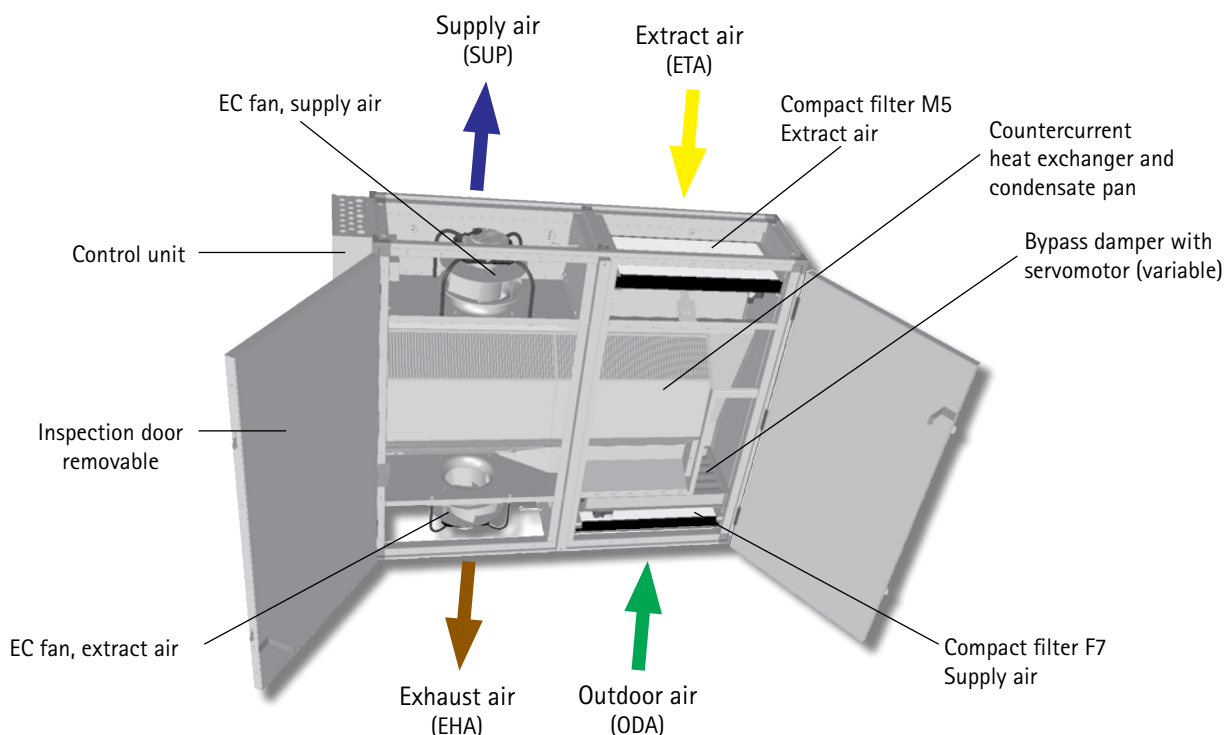


Due to the structure of the unit and the components used, the Wolf Comfort flat ventilation unit CFL-WRG with heat recovery meets the requirements of regulations regarding energy savings and air hygiene in buildings, which are becoming increasingly significant. CFL flat units with heat recovery provide rooms with filtered outdoor air in sufficient, infinitely variable amounts. At the same time, a corresponding volume of stale indoor air containing CO₂ is removed and disposed of as exhaust air. This results in other pollutants such as odours, fine dust, moisture etc. being removed effectively as well. Heat is recovered via an aluminium countercurrent plate heat exchanger (PWT) with efficiency levels up to and exceeding 90%. If used in combination with the latest EC motor technology, this can result in a significant reduction of primary energy costs.

CFL-WRG

Internal unit as ceiling mounted version

Fig. shows unit with connections on rhs in direction of supply airflow (connections on lhs mirror-inverted)



Benefits of the CFL-WRG combined supply and extract air unit at a glance:

- Combined supply and extract air unit as a slimline design for ceiling installation and control from below
- With high performance countercurrent heat exchanger made from corrosion-resistant aluminium alloy
- Fans designed with free-running impellers; infinitely variable with EC technology
- Compact unit dimensions up to 2200 m³/h
- Compliant with Hygiene Directive VDI 6022
- Unit is fully wired for fast, straight forward commissioning
- Control panel with WRS-K control unit mounted on the side of the unit; control unit for lphw or electric booster heater bank can be selected
- Optional: Repair switch integrated in wiring board
- BMK programming unit can also be used as remote control
- Broad range of accessories available

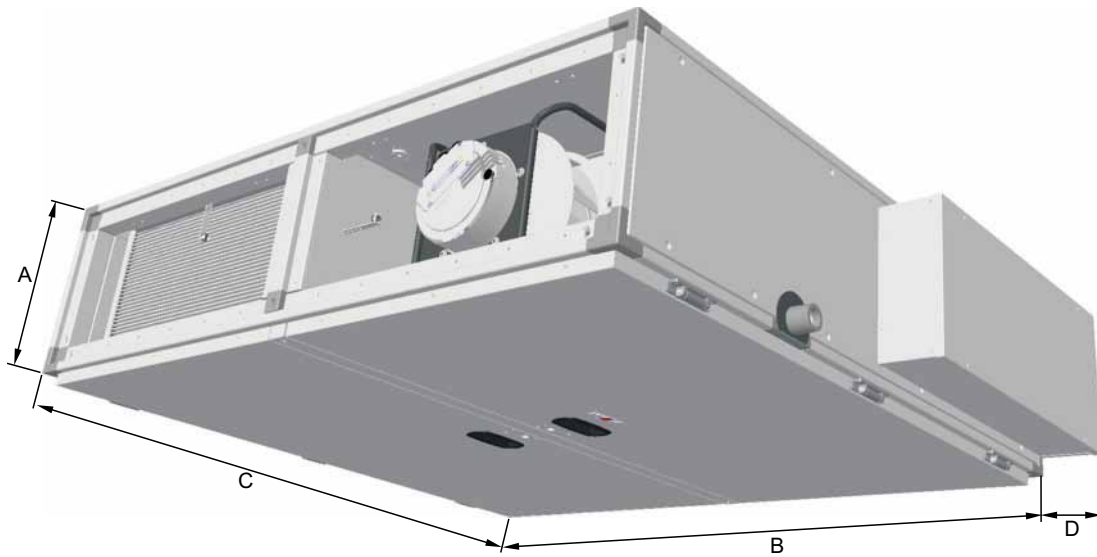


Fig. shows unit with connections on rhs in direction of supply airflow
(connections on lhs mirror-inverted)

Specification

Size	CFL	10-WRG	15-WRG	22-WRG
Max. air volume	m ³ /h	1000	1500	2200
at available ext. pressure of supply/extract air	Pa	270 / 295	380 / 395	220 / 170
Heat recovery factor	%	> 90	> 90	> 90
Height	A mm	367	367	411
Width	B mm	1017	1423	1830
Length	C mm	1322	1322	1525
Width of control panel D	D mm	115	115	115
Weight	kg	130	160	210

Motor data for each fan	CFL	10-WRG	15-WRG	22-WRG
Mains voltage	V	1 x 230 V	1 x 230 V	1 x 230 V
Frequency	Hz	50 / 60	50 / 60	50 / 60
Max. power consumption	W	480	700	715
Max. current consumption	A	2,1	3,0	3,1
Speed	r.p.m.	3000	3450	2800
Energy efficiency category		IE3	IE3	IE3
IP rating		IP54	IP54	IP54
Safety category		Iso B	Iso B	Iso B

Housing



- Compact, inherently stable housing
- Housing has a duplex design in zinc-plated sheet steel with thermal insulation sandwiched between walls
- Insulation material is 50 mm thick at the sides and 30 mm in the bottom/top areas
- Optimum sound and thermal insulation using mineral wool; building material category A1, non-combustible to DIN 4102
- 2 removable inspection doors covering the entire surface of the unit, giving optimum access for servicing the components from below; optional sind zwei zusätzliche Revisionstüren zur einfachen Filterrevision erhältlich
- Wiring via cable harness matched to the specific unit and routed in the panels to facilitate easy cleaning
- Mounting brackets for ceiling installation (1 set = 4 pce) are included as standard

Motor/fan unit for supply and extract air



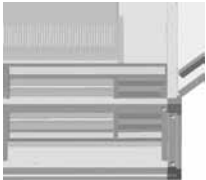
- Highly efficient (energy efficiency category IE3 to DIN EN 60034-30) free-running impeller fans with single sided intake, connected directly to the EC motor with low power consumption
- Infinitely variable (0-10 V)
- Complete motor/fan unit statically and dynamically balanced
- Fan/motor combination with very low noise level
- Fan front plate with integral installation aid for easier maintenance of the motor/fan unit

Heat recovery



- Heat recovery by means of high performance countercurrent plate heat exchanger (PWT)
- Heat exchanger made from high grade, corrosion-resistant aluminium
- Heat recovery factors up to and exceeding 90% with low air resistance
- Stainless steel pan with drain pipe (1¼" connection) for draining the generated condensate
- Using a convenient system of fixing rails, PWT can be completely removed for inspection

Bypass



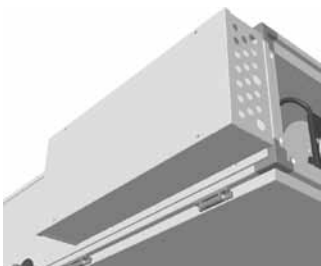
- Integral bypass on the air side as standard
- In summer, cooling energy can be saved with night ventilation by pre-cooling the rooms for the following day with cool outdoor air

Air filter



- Easily replaceable compact filters which can be removed from below, with large filter surface areas
Supply air: category F7 as standard (fine dust filter and pollen filter)
Extract air: category M5 as standard (fine dust filter)
- Differential pressure limiter for filter monitoring fitted and wired as standard

WRS-K control unit



- Equipped with WRS-K control unit as standard
- WRS-K control unit for booster heating with either lphw or electric heater bank
- Control unit WRS-K prepared for cooling with ch.w. or dx-coil as standard
- WRS-K control unit mounted on the side and wired at the factory
- The microprocessor control unit switches and regulates the fans, heat recovery, temperatures and runtimes, as well as a variety of internal functions and alarms
- BMK air conditioning programming module (can be used as a remote control) is supplied loose as standard
- Sensors for outdoor air, supply air and extract air, plus two differential pressure limiters for monitoring filters, fitted inside the unit and wired as standard
- Optional: Repair switch integrated in wiring board

General functions

Function	Description
Languages	Language selection with menu prompts
Preheat program	When outside temperatures are low (adjustable setting), the heating circuit will heat up first when the system is started. This ensures that when there is a risk of frost the heater bank is not damaged and cold air is not blown in
Central backup mode	In off mode; minimum and maximum room temperature limits are maintained (unoccupied period)
Night ventilation	In summer, cooling energy can be saved with night ventilation by pre-cooling the rooms for the following day with cool outdoor air
Fault logging	Date and time of faults are recorded (10 messages)
CO ₂ or VOC control	The speed is matched as appropriate via the CO ₂ content of the air
Time program for the day	Independent time program for each day
5 switching times per day	5 start and stop times can be set
Filter monitor (contamination check)	Once a week (adjustable start time, service function), the barometric cells are checked for supply and extract air
Fire alarm connection	When fire alarm devices are triggered, the system shuts down (adjustable)
Fan on/off	On/Off via external contacts
Outdoor/exhaust air damper switching	230 V OPEN/CLOSE switching by controller
Outside temperature sensor	Outside sensor for direct connection to controller (always required)
Supply air temperature control	Supply air is controlled according to the set value
Supply air – indoor air control (accessory)	Room temperature control via room sensor
Supply air – extract air control	Room temperature control via extract air sensor
Floating central fault message contact	All accumulating faults are transferred via this contact
Transfer to DDC/BMS	Transfer of operating state (on/off) and central fault message (flashing)
Operating modes	Automatic mode, manual mode, off mode (unoccupied period), standby (off)
Infinitely variable motor control	Balance adjustment option for fans (extract air management)
HR (heat recovery)	PWT (bypass damper control), each with 0–10 V DC switching
Holiday program	Additional time program for the aforementioned operating modes
Summertime/wintertime changeover	Automatically in relation to date
PWT de-icing function (ice guard sensor on plate heat exchanger)	When there is a risk of icing-up, the bypass damper is opened and the PWT is de-iced by the flow of warm extract air
Supply air minimum limit	For all control unit versions; the supply air temperature does not fall below an adjustable limit
Cooling function demand via contact	Cooling function demand is issued via the floating contact
Anti-seizing protection for cooling circuit pump	To stop pump seizing up, it is run once a week (service function, adjustable start time)
Anti-seizing protection for cooling circuit mixer	To stop mixer seizing up, it is run once a week (service function, adjustable start time)
Variable valve control for cooling	Control of valve drives with 0–10 V DC
Constant operation for cooling circuit pump	For uninsulated/long pipe runs
Programming unit with FSTN graphics	The programming unit can also be used as a remote control, display, connections for BMS on controller

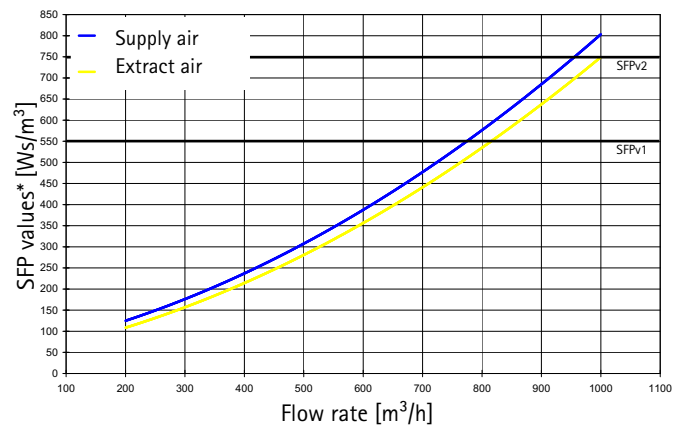
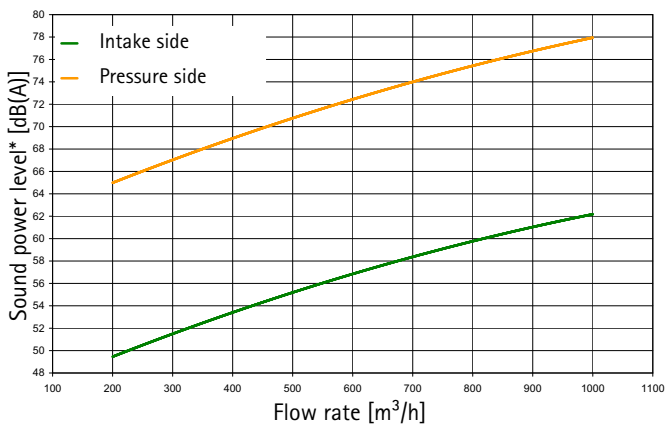
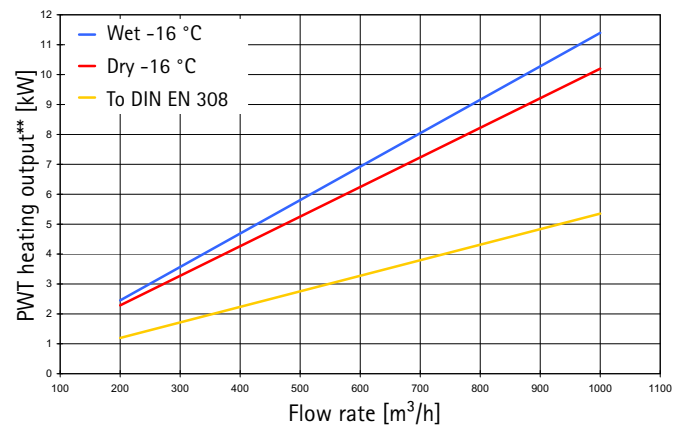
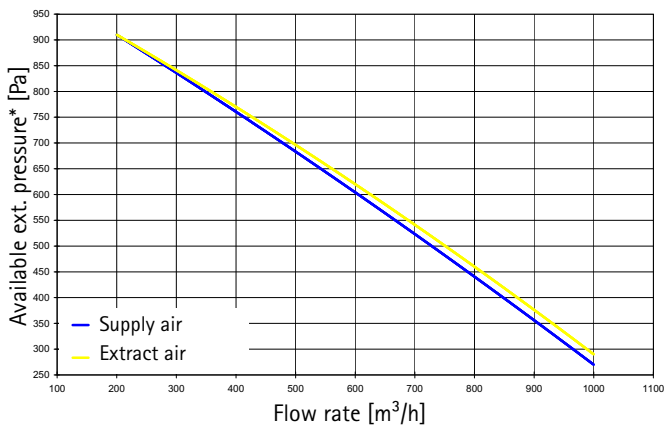
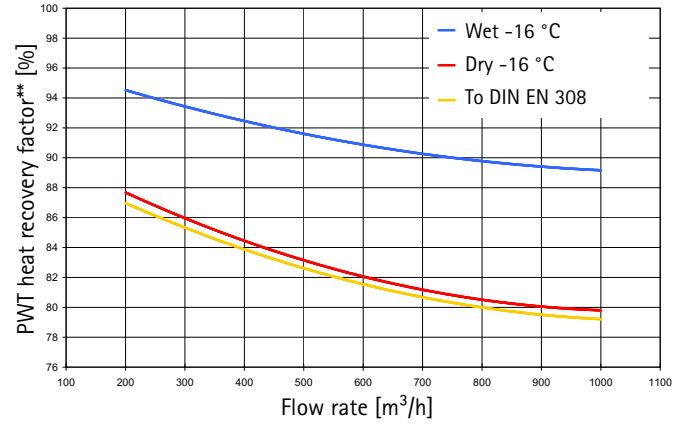
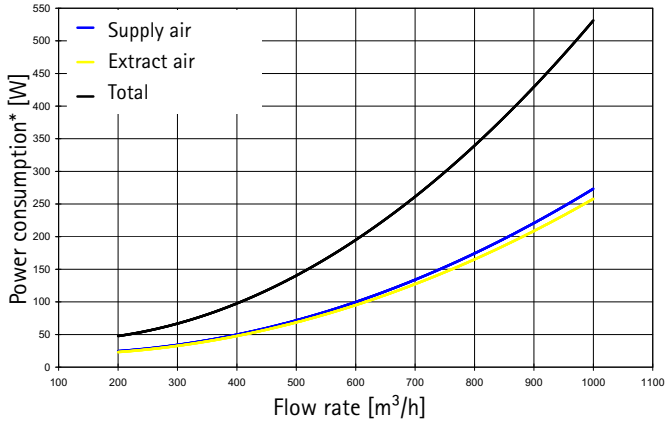
Specific functions for booster heating with lphw heater bank

Specific functions of lphw heater bank	Description
Burner demand via contact	Heat demand to Wolf boilers is issued via the floating contact
Anti-seizing pump protection	To stop pumps seizing up, they are run once a week (service function, adjustable start time)
Anti-seizing mixer protection	To stop mixers seizing up, they are run once a week (service function, adjustable start time)
Variable valve control for heating	Control of valve drives with 0–10 V DC
Constant operation for heating circuit pump	For uninsulated/long pipe runs
Frost protection, heater bank (lphw)	Frost stat on the heater bank; when triggered, the fan turns off and the heater bank is purged

Specific functions for booster heating with electric heater bank

Specific functions of electric heater bank	Description
Electric heater bank	Control of electric heater bank; variable via semiconductor relay (1 x 230 V/50 Hz for CFL 10-WRG-E, 3 x 400 V/50 Hz for CFL15/20-WRG-E)
Fan run-on time	To prevent the electric heater banks overheating

Exact technical data can only be supplied in relation to a specific project.



* with free intake and free discharge (without accessories)

** Operating conditions:

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ETA +22°C 40% rel. hum.

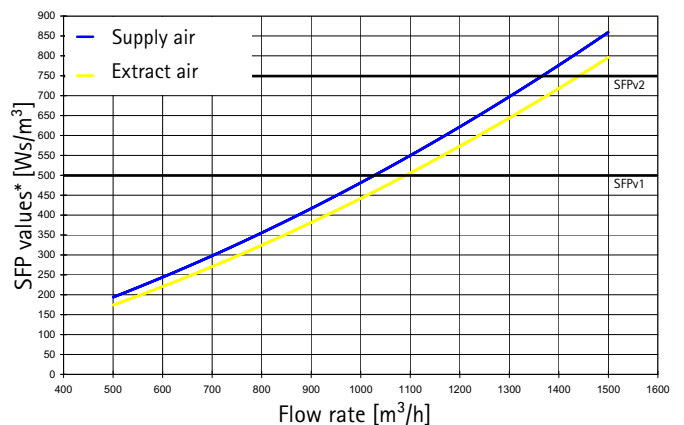
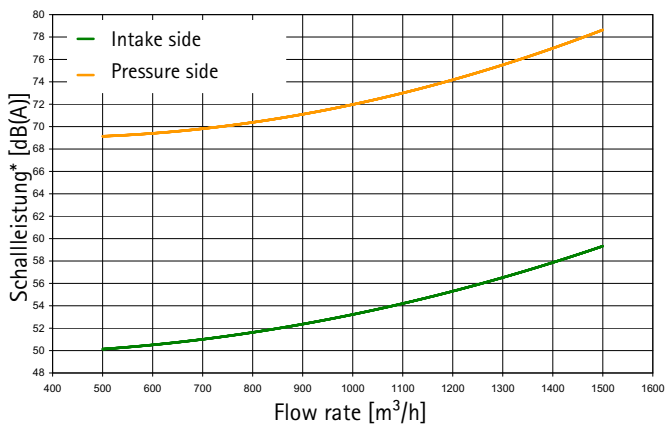
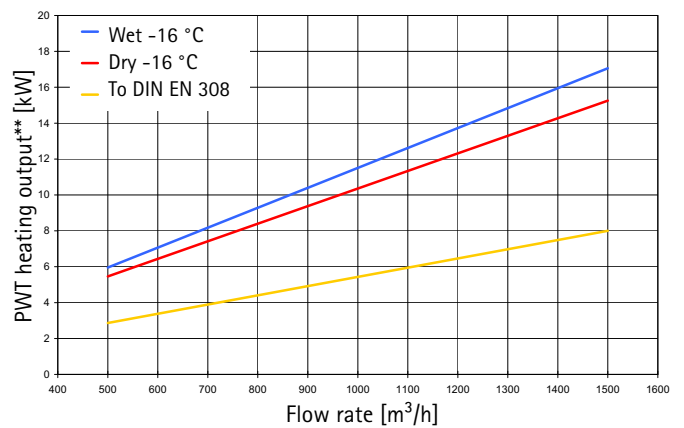
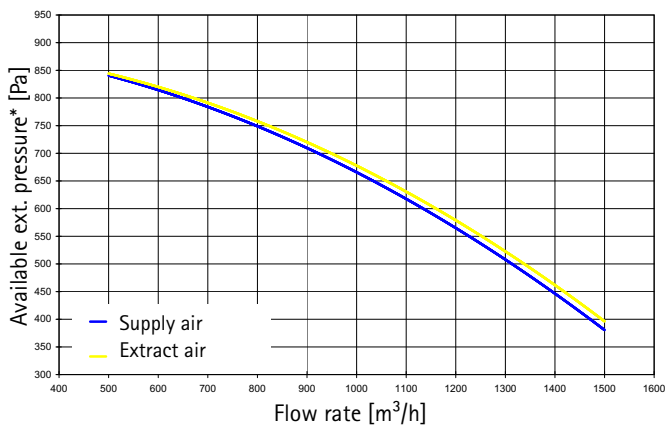
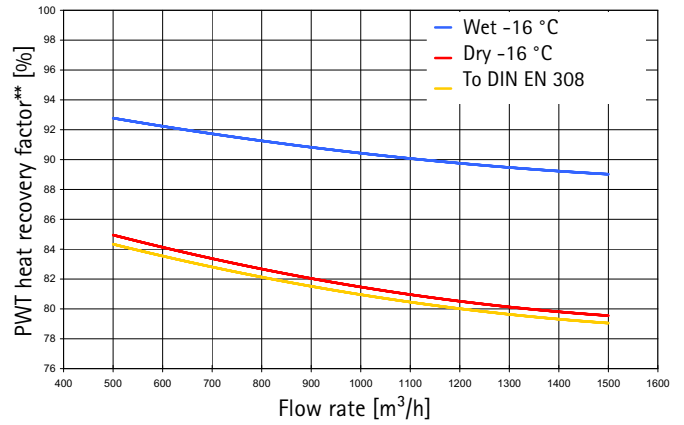
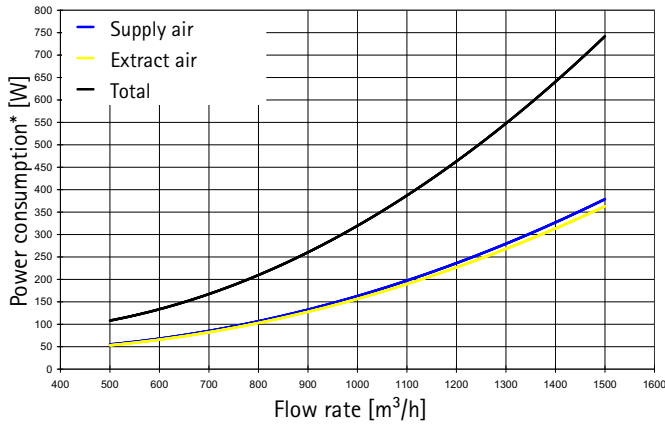
ODA -16°C

Conditions DIN EN 308

ETA +25°C, 25% rel. hum.

ODA +5 °C

Exact technical data can only be supplied in relation to a specific project.



* with free intake and free discharge (without accessories)

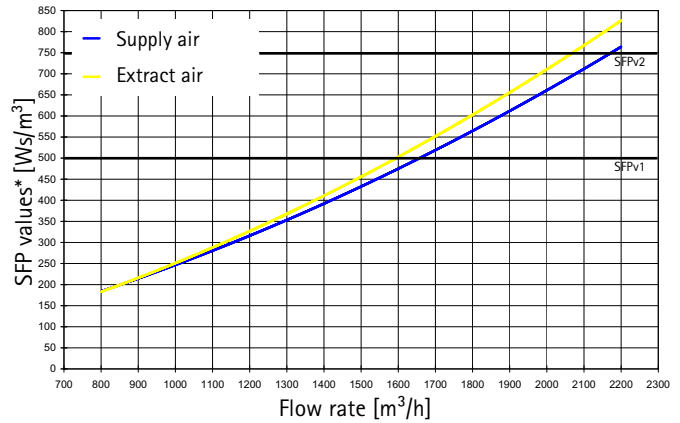
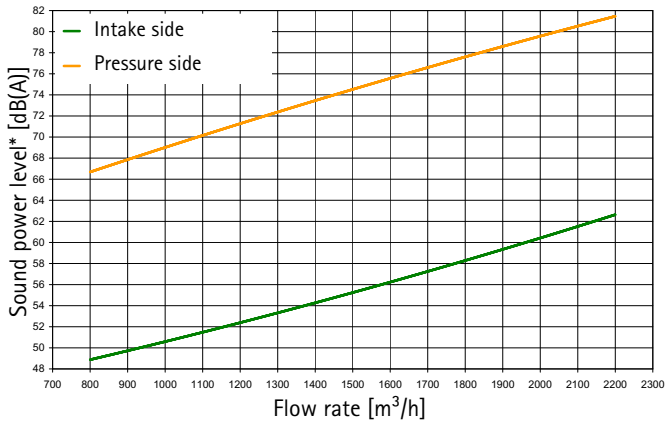
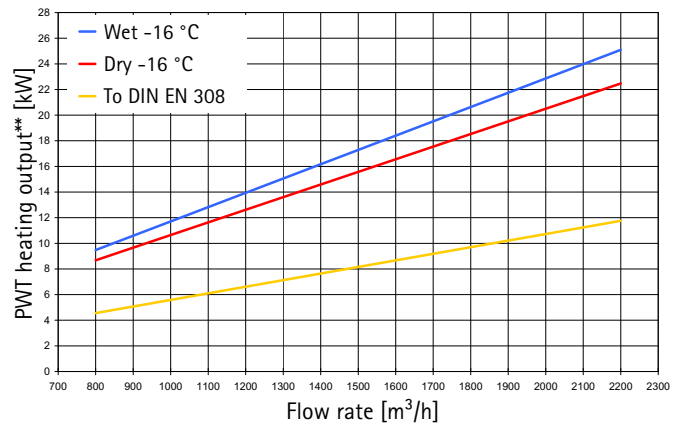
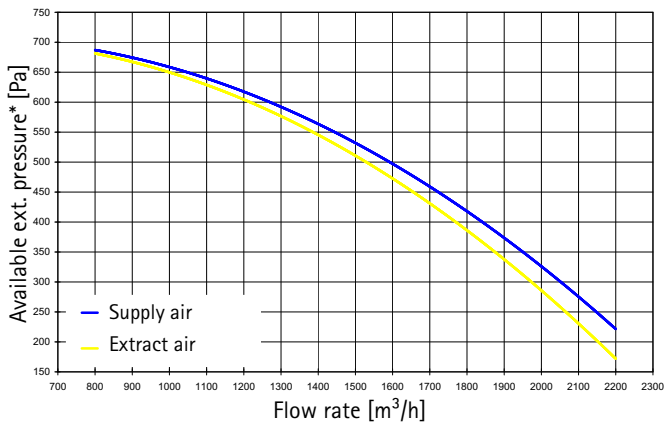
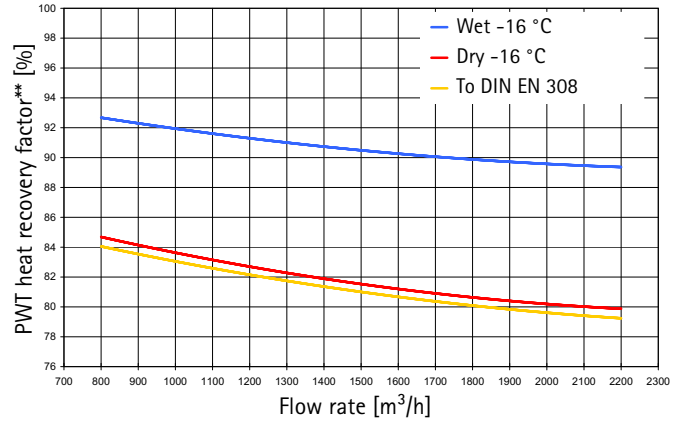
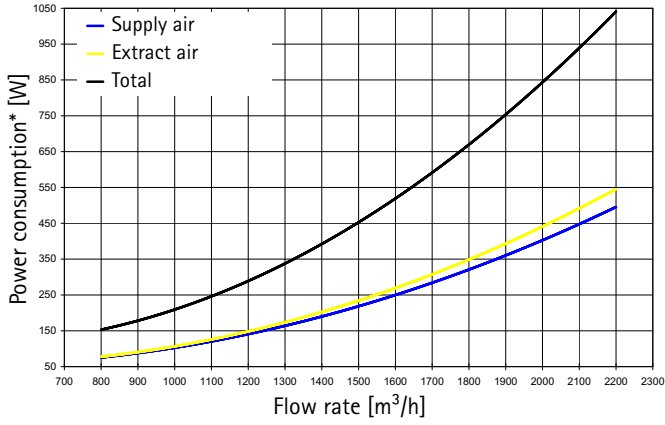
** Operating conditions:

\dot{m} 1:1
 ETA +22 °C 40% rel. hum.
 ODA -16 °C
 Conditions DIN EN 308
 ETA +25 °C, 25% rel. hum.
 ODA +5 °C

Output diagrams

CFL 22-WRG

Exact technical data can only be supplied in relation to a specific project.



* with free intake and free discharge (without accessories)

** Operating conditions:

\dot{m} 1:1

ETA +22 °C 40% rel. hum.

ODA -16 °C

Conditions DIN EN 308

ETA +25 °C, 25% rel. hum.

ODA +5 °C

CFL-EC units are supply air and extract air units with a slimline design for ceiling installation and control from below.

Due to the structure and the components used, the units meet the requirements of regulations regarding air hygiene in buildings, which are becoming increasingly significant.

CFL supply air units provide rooms with filtered outdoor air, in sufficient, infinitely variable amounts. Cu/Al lphw heaters ensure the required room temperatures are reached.

With the help of CFL extract air units, a volume – which can also be variably controlled – of stale indoor air containing CO₂ is removed and disposed of as exhaust air. This results in other pollutants such as odours, fine dust, moisture etc. being removed effectively as well.

By using the latest EC motor technology, Wolf CFL supply air and extract air units can achieve a significant reduction in energy costs.

CFL-EC-ZUL
Supply air unit

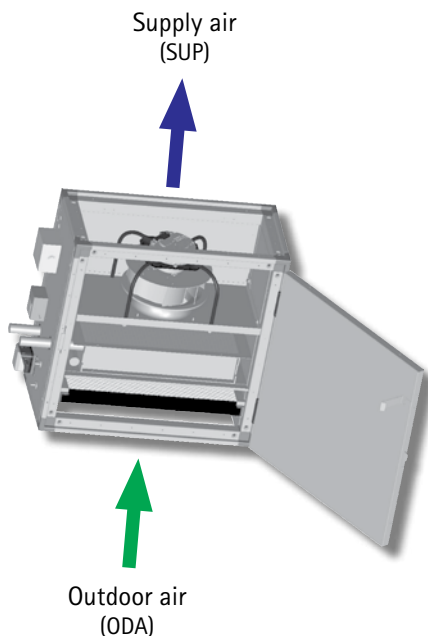


Fig. shows unit with connections on rhs in direction of supply airflow (connections on lhs mirror-inverted)

CFL-EC-ABL
Extract air unit

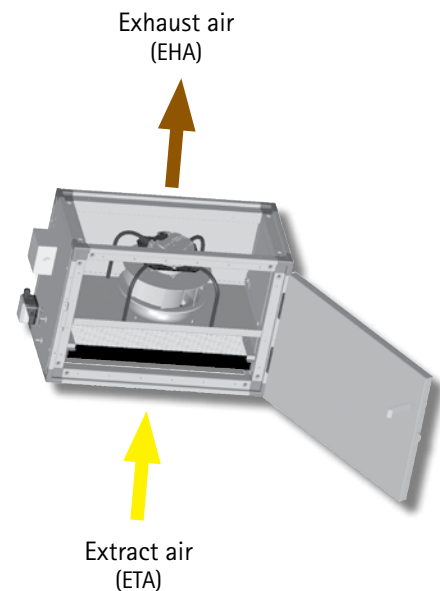


Fig. shows unit with connections on rhs in direction of exhaust airflow (connections on lhs mirror-inverted)

Benefits of the CFL-EC supply and extract air units at a glance

- Supply and extract air units with slimline design for ceiling installation and control from below
- Supply air units with Cu/Al lphw heater incl. frost protection
- Fans designed with free-running impellers; infinitely variable with EC technology
- Compact unit dimensions up to 2600 m³/h
- Compliant with Hygiene Directive VDI 6022
- Fans pre-wired to external terminal boxes for fast, straight forward commissioning
- Differential pressure limiter for filter monitoring fitted and wired as standard
- Control unit available as an option
- Wide range of accessories available

CFL-EC-ZUL
Supply air unit

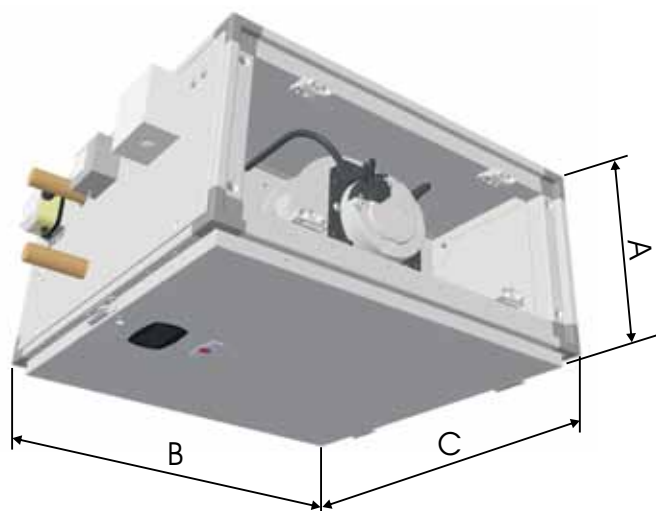


Fig. shows unit with connections on rhs in direction of supply airflow (connections on lhs mirror-inverted)

CFL-EC-ABL
Extract air unit

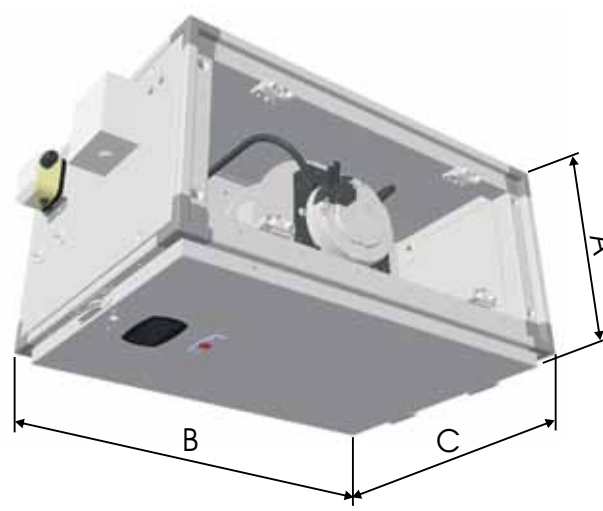


Fig. shows unit with connections on rhs in direction of exhaust airflow (connections on lhs mirror-inverted)

Specification

Size	CFL	10-EC-ZUL	15-EC-ZUL	22-EC-ZUL
Max. air volume	m ³ /h	1300	1800	2600
at available ext. pressure	Pa	310	375	115
Height	A mm	367	367	411
Width	B mm	508	712	915
Length	C mm	712	712	813
Width of terminal box	mm	61	61	61
Output of lphw (90/70; T _{LE} =0 °C)	kW	18	26	37
Weight	kg	47	50	64

Size	CFL	10-EC-ABL	15-EC-ABL	22-EC-ABL
Max. air volume	m ³ /h	1300	1800	2600
at available ext. pressure	Pa	530	565	305
Height	A mm	367	367	411
Width	B mm	508	712	915
Length	C mm	508	508	610
Width of terminal box	mm	61	61	61
Weight	kg	37	38	48

Motor data for each fan	CFL	10-EC	15-EC	22-EC
Mains voltage	V	1 x 230 V	1 x 230 V	1 x 230 V
Frequency	Hz	50 / 60	50 / 60	50 / 60
Max. power consumption	W	480	700	715
Max. current consumption	A	2,1	3,0	3,1
Speed	r.p.m.	3000	3450	2800
Energy efficiency category		IE3	IE3	IE3
IP rating		IP54	IP54	IP54
Safety category		Iso B	Iso B	Iso B

Housing



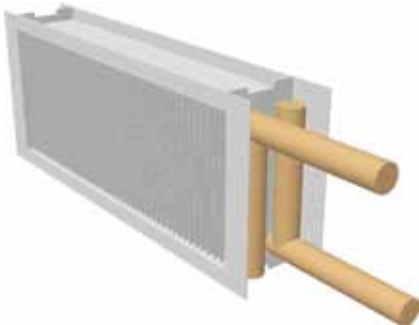
- Compact, inherently stable housing
- Housing has a duplex design in zinc-plated sheet steel with thermal insulation sandwiched between walls
- Insulation material is 50 mm thick at the sides and 30 mm in the bottom/top areas
- Optimum sound and thermal insulation using mineral wool; building material category A1, non-combustible to DIN 4102
- Removable inspection door covering the entire surface of the unit, giving optimum access for servicing the components from below
- Mounting brackets for ceiling installation (1 set = 4 pce) are included as standard

Motor/fan unit for supply and extract air



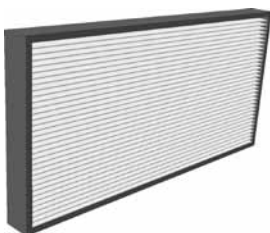
- Highly efficient (energy efficiency category IE3 to DIN EN 60034-30) free-running impeller fans with single sided intake, connected directly to the EC motor with low power consumption
- Infinitely variable (0-10 V)
- Complete motor/fan unit statically and dynamically balanced
- Fan/motor combination with very low noise level
- Fan front plate with integral installation aid for easier maintenance of the motor/fan unit

Air heater (only with supply air unit)



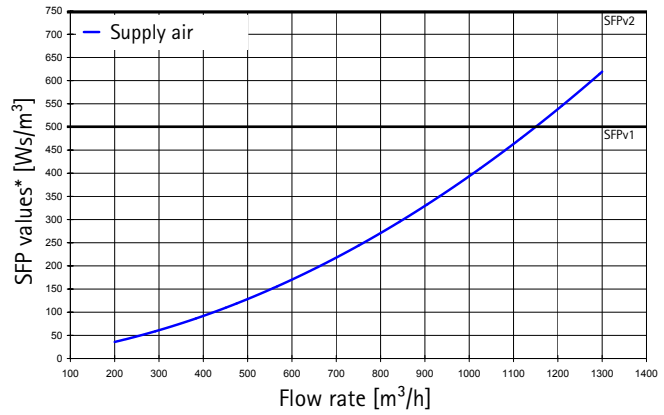
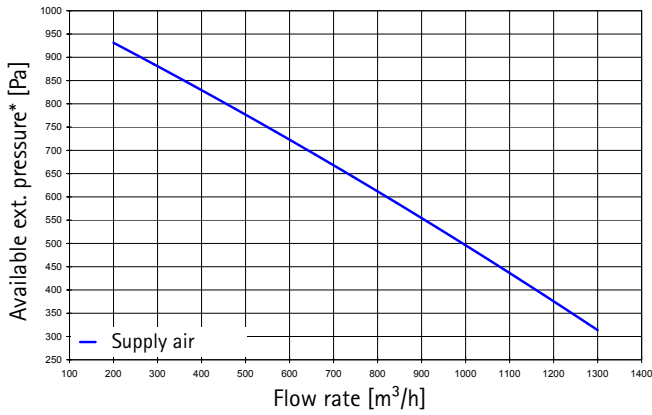
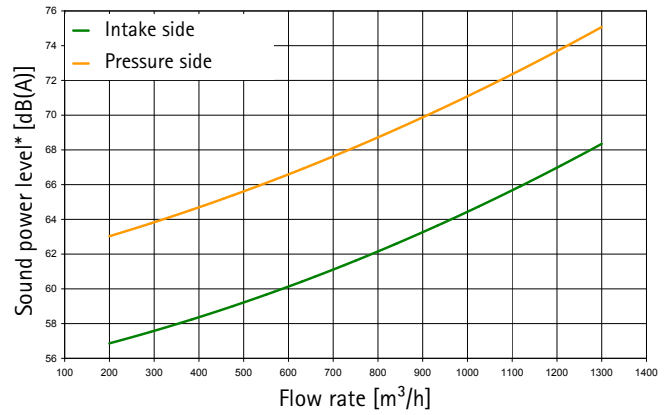
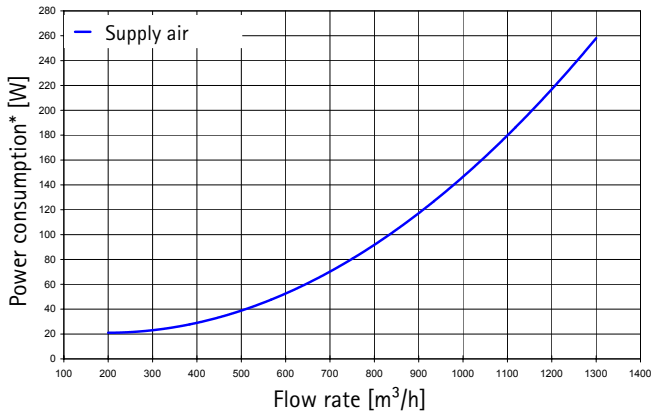
- Co/Al air heater for lphw can be removed from the side
- Connections with 1" thread
- Incl. frost stat fitted as standard

Air filter



- Easily replaceable compact filters which can be removed from below, with large filter surface areas
CFL-EC-ZUL: category F7 as standard (fine dust filter and pollen filter)
CFL-EC-ABL: category M5 as standard (fine dust filter)
- Differential pressure limiter for filter monitoring fitted and wired as standard

Exact technical data can only be supplied in relation to a specific project.



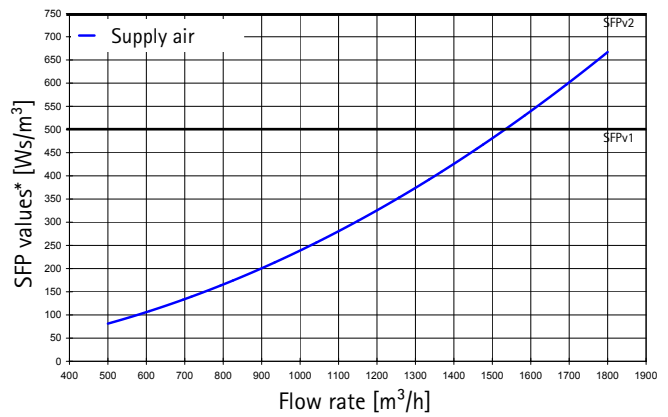
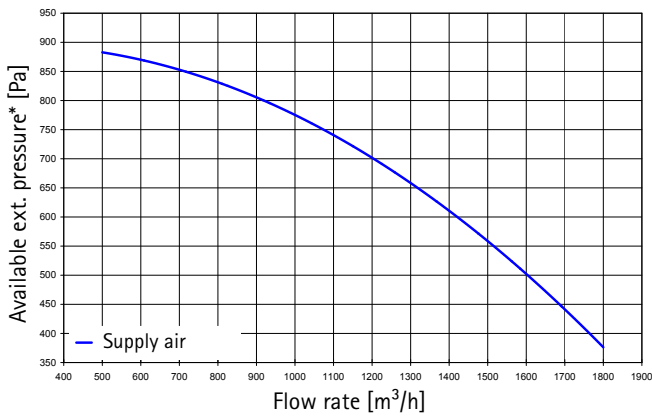
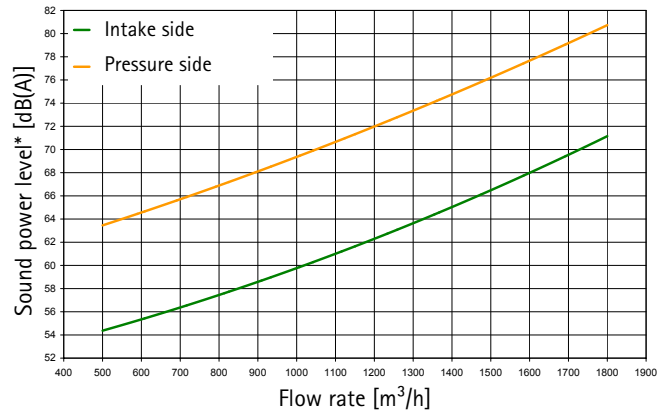
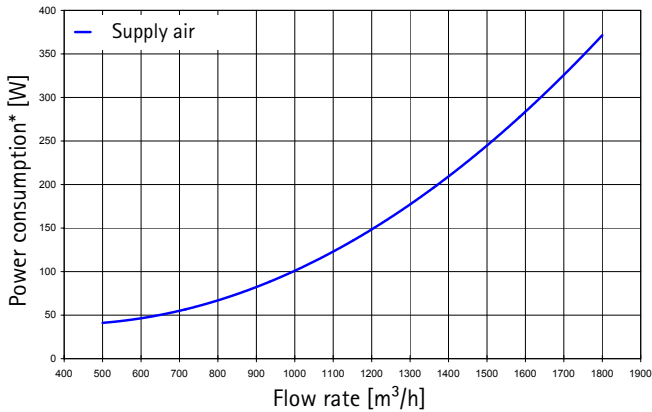
Flow rate		400 m³/h		600 m³/h		800 m³/h		1000 m³/h		1300 m³/h	
lphw	t _{ON} [°C]	Output [kW]	t _{OFF} [°C]	Output [kW]	t _{OFF} [°C]	Output [kW]	t _{OFF} [°C]	Output [kW]	t _{OFF} [°C]	Output [kW]	t _{OFF} [°C]
50/40	-15	6.12	25.5	8.21	21.3	10.03	18.2	11.67	15.9	13.89	13.3
	-10	5.54	27.4	7.43	23.5	9.07	20.6	10.54	18.5	12.54	16.1
	-5	4.97	29.2	6.66	25.6	8.12	23.0	9.43	21.0	11.21	18.7
	0	4.41	30.9	5.90	27.6	7.18	25.2	8.34	23.4	9.90	21.4
	5	3.86	32.5	5.15	29.5	6.26	27.4	7.26	25.7	8.60	23.9
	10	3.31	34.1	4.41	31.3	5.35	29.4	6.19	28.0	7.33	26.4
	15	2.77	35.5	3.67	33.1	4.45	31.5	5.14	30.2	6.08	28.8
	20	2.24	36.8	2.95	34.8	3.56	33.4	4.11	32.4	4.84	31.2
60/50	-15	7.19	32.6	9.69	27.8	11.88	24.4	13.85	21.7	16.51	18.7
	-10	6.61	34.6	8.90	30.1	10.90	26.8	12.71	24.3	15.15	21.5
	-5	6.03	36.6	8.12	32.3	9.95	29.2	11.58	26.9	13.80	24.2
	0	5.47	38.4	7.36	34.4	9.00	31.6	10.48	29.4	12.47	26.9
	5	4.92	40.1	6.60	36.4	8.07	33.8	9.39	31.8	11.17	29.5
	10	4.37	41.8	5.86	38.4	7.15	36.0	8.31	34.2	9.88	32.1
	15	3.83	43.3	5.12	40.3	6.24	38.1	7.25	36.4	8.61	34.6
	20	3.29	44.8	4.40	42.0	5.35	40.1	6.20	38.7	7.35	37.0
90/70	-15	9.55	48.3	12.88	41.9	15.79	37.3	18.41	33.8	21.95	29.8
	-10	8.97	50.6	12.09	44.4	14.81	40.0	17.25	36.6	20.56	32.8
	-5	8.39	52.8	11.30	46.9	13.84	42.6	16.12	39.4	19.20	35.7
	0	7.82	54.9	10.53	49.2	12.88	45.2	14.99	42.1	17.85	38.5
	5	7.26	56.9	9.76	51.5	11.94	47.6	13.89	44.7	16.53	41.3
	10	6.71	58.8	9.01	53.7	11.00	50.0	12.80	47.2	15.22	44.0
	15	6.16	60.6	8.26	55.7	10.09	52.3	11.72	49.7	13.92	46.7
	20	5.63	62.3	7.53	57.8	9.18	54.5	10.65	52.1	12.65	49.3

* with free intake and free discharge (without accessories)

Output diagrams

CFL 15-EC-ZUL

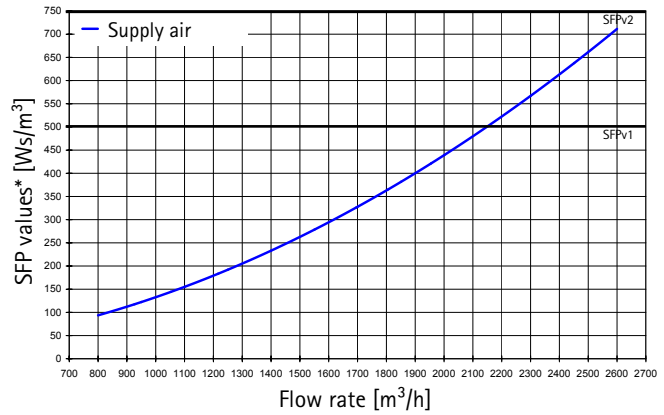
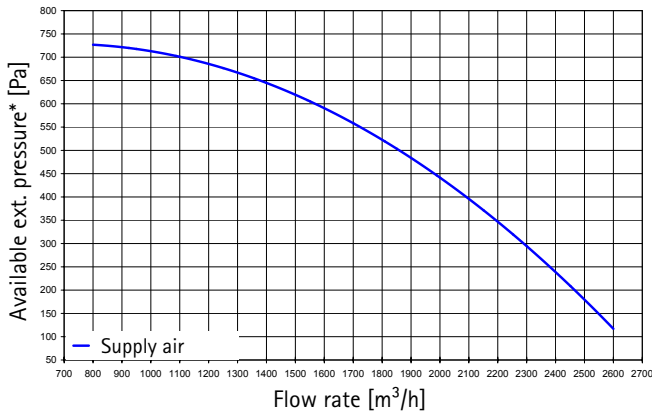
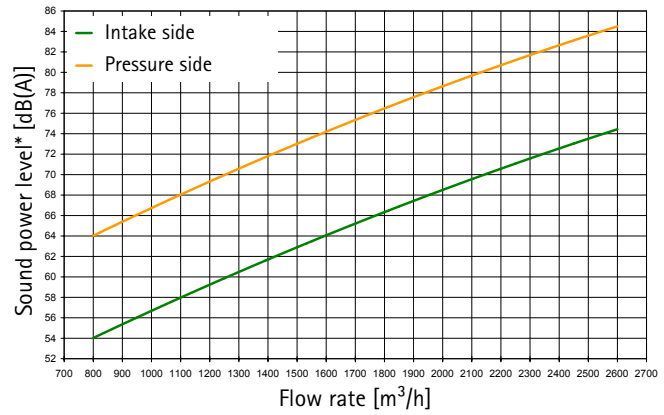
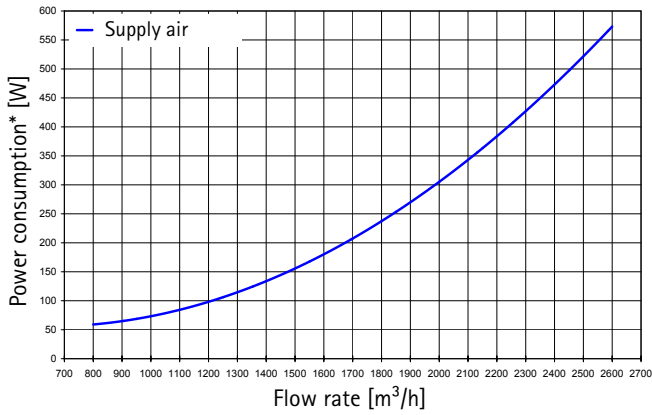
Exact technical data can only be supplied in relation to a specific project.



Flow rate		750 m³/h		1000 m³/h		1250 m³/h		1500 m³/h		1800 m³/h	
lphw	t _{ON} [°C]	Output [kW]	t _{OFF} [°C]	Output [kW]	t _{OFF} [°C]	Output [kW]	t _{OFF} [°C]	Output [kW]	t _{OFF} [°C]	Output [kW]	t _{OFF} [°C]
50/40	-15	11.02	23.9	13.55	20.9	15.82	18.6	17.91	16.7	20.24	14.8
	-10	9.97	25.9	12.25	23.1	14.30	20.9	16.18	19.2	18.27	17.4
	-5	8.94	27.8	10.97	25.2	12.80	23.2	14.48	21.6	16.34	20.0
	0	7.93	29.7	9.72	27.3	11.32	25.4	12.80	23.9	14.43	22.5
	5	6.93	31.4	8.47	29.2	9.87	27.5	11.14	26.2	12.55	24.9
	10	5.94	33.0	7.25	31.1	8.43	29.6	9.51	28.4	10.70	27.3
	15	4.96	34.6	6.04	32.9	7.01	31.6	7.90	30.6	8.87	29.6
	20	3.99	36.0	4.85	34.6	5.61	33.5	6.30	32.6	7.07	31.8
60/50	-15	12.97	30.9	16.00	27.4	18.73	24.7	21.25	22.6	24.05	20.4
	-10	11.92	33.0	14.69	29.7	17.20	27.2	19.50	25.1	22.06	23.1
	-5	10.88	35.0	13.41	31.9	15.68	29.6	17.78	27.6	20.10	25.8
	0	9.86	36.9	12.14	34.1	14.19	31.9	16.08	30.1	18.17	28.3
	5	8.86	38.7	10.89	36.1	12.72	34.1	14.40	32.4	16.27	30.8
	10	7.86	40.5	9.66	38.1	11.27	36.2	12.75	34.7	14.40	33.3
	15	6.88	42.1	8.44	40.0	9.84	38.3	11.12	36.9	12.55	35.6
	20	5.91	43.7	7.24	41.8	8.43	40.3	9.52	39.1	10.72	37.9
90/70	-15	17.24	45.9	21.26	41.4	24.90	37.8	28.24	34.9	31.96	32.1
	-10	16.18	48.3	19.95	43.9	23.35	40.5	26.47	37.7	29.94	35.0
	-5	15.13	50.6	18.65	46.4	21.82	43.1	24.73	40.4	27.96	37.8
	0	14.10	52.8	17.37	48.7	20.31	45.6	23.01	43.0	26.01	40.5
	5	13.09	54.8	16.10	51.0	18.82	48.0	21.31	45.6	24.08	43.2
	10	12.08	56.8	14.85	53.2	17.35	50.3	19.64	48.1	22.17	45.8
	15	11.09	58.7	13.62	55.3	15.90	52.6	17.98	50.5	20.29	48.4
	20	10.11	60.6	12.40	57.3	14.46	54.8	16.35	52.8	18.44	50.8

* with free intake and free discharge (without accessories)

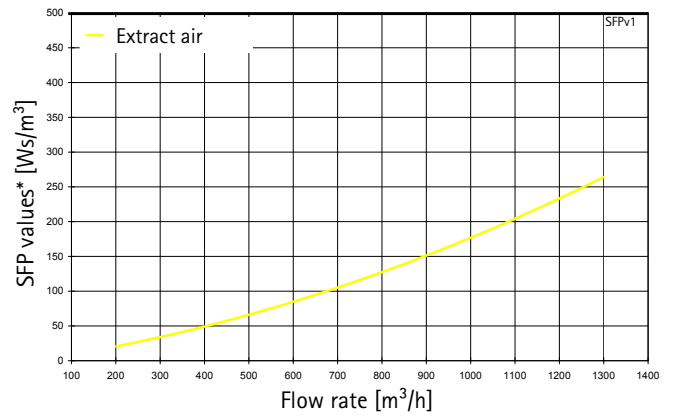
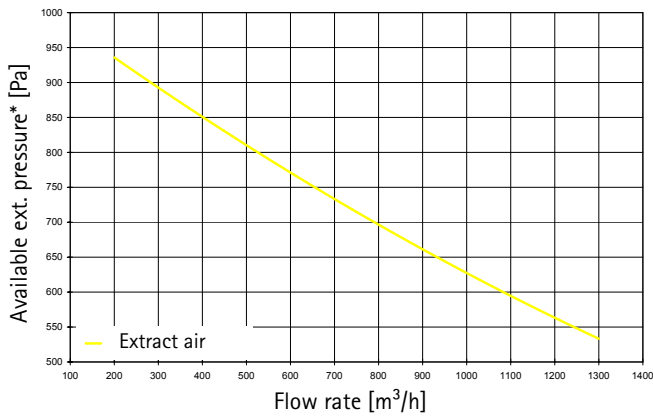
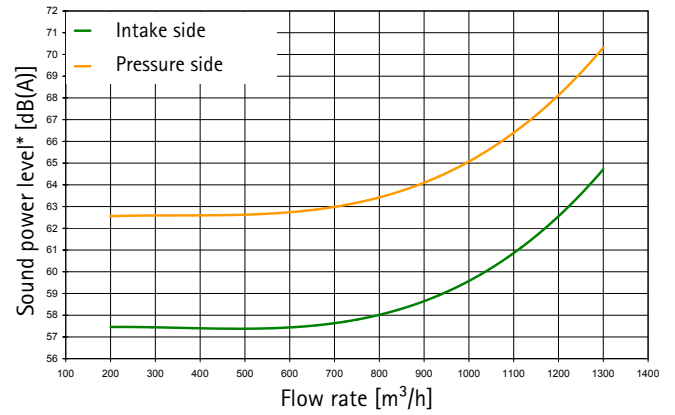
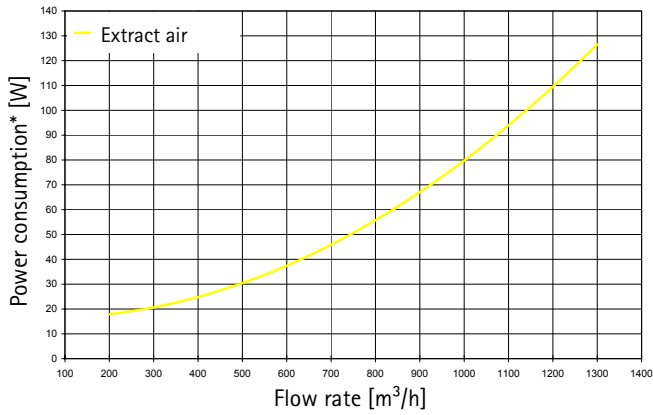
Exact technical data can only be supplied in relation to a specific project.



Flow rate		1000 m³/h		1400 m³/h		1800 m³/h		2200 m³/h		2600 m³/h	
lphw	t _{ON} [°C]	Output [kW]	t _{OFF} [°C]	Output [kW]	t _{OFF} [°C]	Output [kW]	t _{OFF} [°C]	Output [kW]	t _{OFF} [°C]	Output [kW]	t _{OFF} [°C]
50/40	-15	14.81	24.3	18.84	20.7	22.40	18.0	25.65	15.9	28.64	14.2
	-10	13.43	26.3	17.07	23.0	20.29	20.5	23.22	18.5	25.93	16.9
	-5	12.07	28.3	15.33	25.2	18.21	22.9	20.83	21.1	23.24	19.6
	0	10.74	30.1	13.62	27.3	16.16	25.2	18.47	23.6	20.60	22.2
	5	9.41	31.9	11.92	29.3	14.14	27.4	16.15	26.0	18.00	24.8
	10	8.11	33.6	10.25	31.3	12.14	29.6	13.85	28.3	15.43	27.3
	15	6.82	35.2	8.60	33.2	10.17	31.7	11.59	30.6	12.89	29.7
20	5.55	36.7	6.97	35.0	8.22	33.7	9.35	32.8	10.38	32.0	
60/50	-15	17.35	31.0	22.14	26.9	26.39	23.9	30.26	21.5	33.84	19.5
	-10	15.96	33.1	20.36	29.3	24.26	26.4	27.81	24.2	31.09	22.3
	-5	14.60	35.2	18.61	31.6	22.16	28.9	25.40	26.8	28.38	25.1
	0	13.25	37.2	16.88	33.8	20.09	31.3	23.02	29.4	25.72	27.8
	5	11.93	39.1	15.18	36.0	18.05	33.7	20.67	31.8	23.08	30.4
	10	10.62	40.9	13.49	38.0	16.04	35.9	18.35	34.3	20.49	32.9
	15	9.32	42.6	11.84	40.0	14.05	38.1	16.07	36.6	17.92	35.4
20	8.05	44.2	10.20	41.9	12.09	40.2	13.81	38.9	15.39	37.8	
90/70	-15	23.12	46.3	29.52	40.9	35.20	36.8	40.36	33.6	45.14	31.0
	-10	21.72	48.7	27.72	43.5	33.04	39.6	37.88	36.5	42.35	34.0
	-5	20.34	51.0	25.95	46.0	30.92	42.3	35.43	39.4	39.60	37.0
	0	18.99	53.3	24.20	48.5	28.82	44.9	33.02	42.1	36.89	39.8
	5	17.65	55.4	22.47	50.9	26.75	47.5	30.63	44.8	34.22	42.6
	10	16.32	57.5	20.77	53.1	24.71	49.9	28.29	47.4	31.58	45.3
	15	15.02	59.4	19.09	55.3	22.69	52.3	25.96	49.9	28.98	48.0
20	13.72	61.3	17.43	57.5	20.70	54.6	23.67	52.4	26.40	50.6	

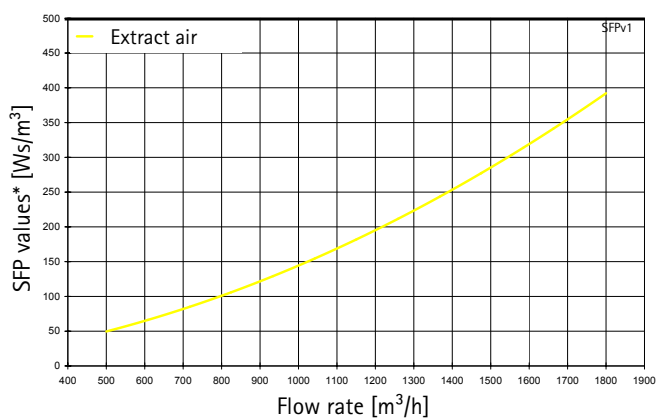
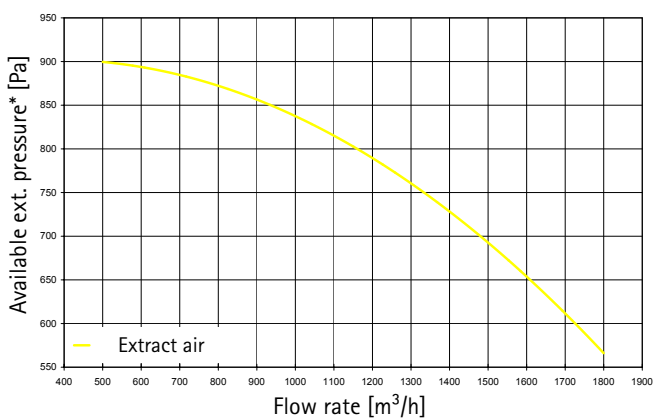
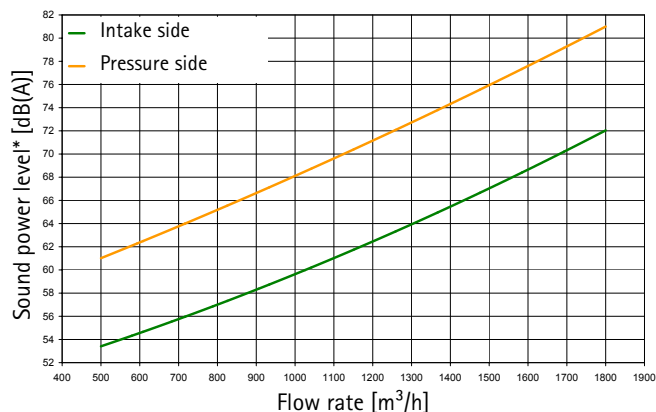
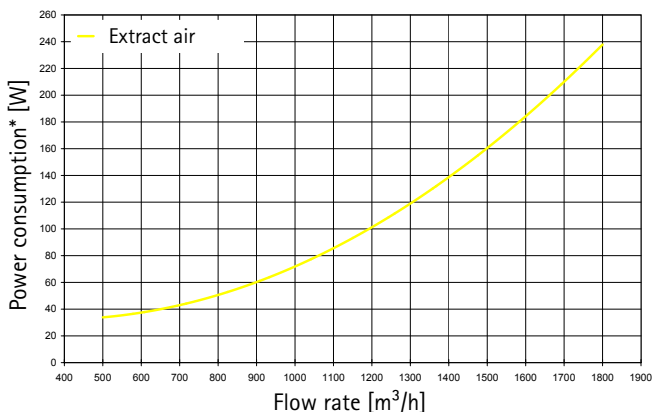
* with free intake and free discharge (without accessories)

Exact technical data can only be supplied in relation to a specific project.



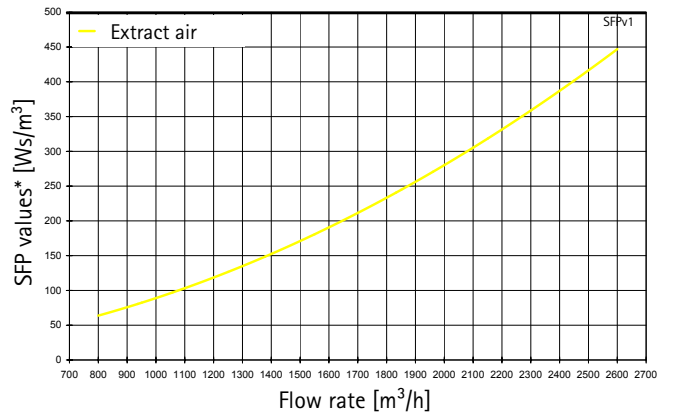
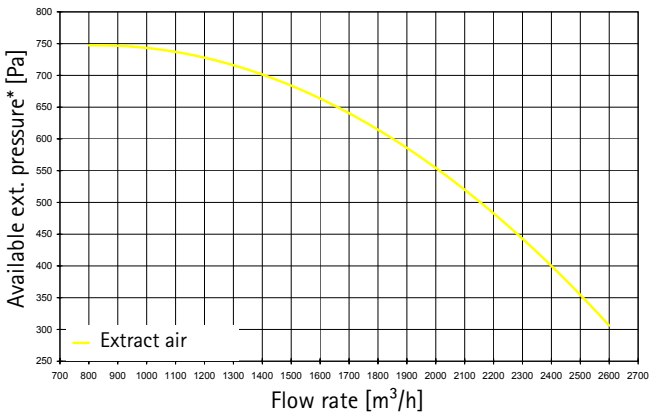
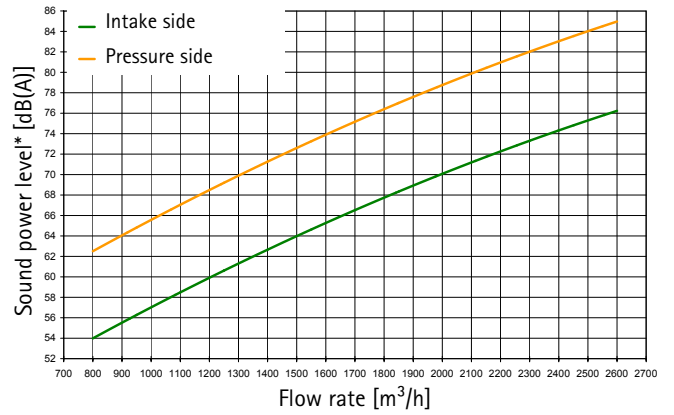
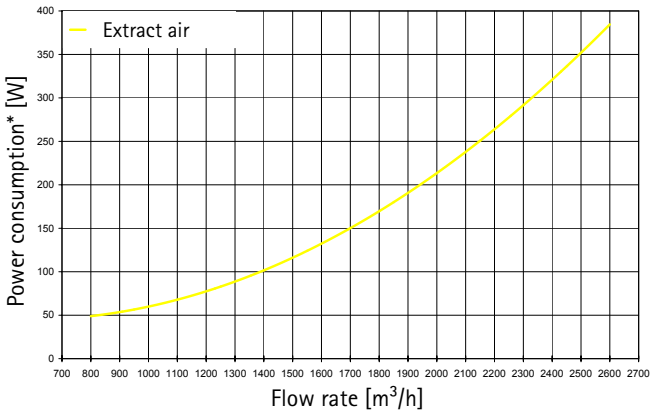
* with free intake and free discharge (without accessories)

Exact technical data can only be supplied in relation to a specific project.



* with free intake and free discharge (without accessories)

Exact technical data can only be supplied in relation to a specific project.



* with free intake and free discharge (without accessories)



Extension module cooling coil for ch.w. (chilled water)

- optional unit extension with separate casing, available with lhs or rhs connections in direction of airflow
- may be combined with CFL-WRG, CFL-EC-ZUL and CFL-EC-ABL
- Cooling coil Co/Al for ch.w. and lateral withdrawal
- Threaded connections 3/4"
- supply air sensor optional (loose)
- incl. one set of suspension angles (2 pcs.)
- Filter insert facility for compact filters category M5 / F7 / F9 (fine dust quality)
- Filter access from below via access door

Unit size	CFL	10	15	22
Dimensions (LxWxH)	mm	712 x 508 x 367	712 x 712 x 367	712 x 915 x 411
max. airflow	m ³ /h	1.000	1.800	2.600

CFL 10

ch.w.	Airflow		400 m ³ /h		550 m ³ /h		700 m ³ /h		850 m ³ /h		1000 m ³ /h	
	t _{ON} [°C]	r. h. [%]	Output [kW]	t _{OFF} [°C]	Output [kW]	t _{OFF} [°C]	Output [kW]	t _{OFF} [°C]	Output [kW]	t _{OFF} [°C]	Output [kW]	t _{OFF} [°C]
4/8	32	40	3,5	13,8	4,4	15,2	5,2	16,3	6,0	17,2	6,7	17,9
	30	45	3,3	13,6	4,1	15,0	4,9	16,0	5,6	16,8	6,2	17,5
	28	50	3,1	13,4	3,8	14,6	4,5	15,6	5,1	16,3	5,7	16,9
	26	50	2,7	12,3	3,3	13,5	4,0	14,3	4,5	15,0	5,0	15,5
	24	50	2,3	11,3	2,9	12,3	3,4	13,1	3,9	13,7	4,3	14,2
5/10	32	40	3,2	14,8	4,0	16,1	4,7	17,2	5,4	18,0	6,0	18,7
	30	45	3,0	14,7	3,7	15,9	4,4	16,9	5,0	17,6	5,5	18,3
	28	50	2,7	14,4	3,4	15,6	4,0	16,5	4,5	17,1	5,0	17,7
	26	50	2,3	13,3	2,9	14,4	3,4	15,2	3,9	15,8	4,4	16,3
	24	50	2,0	12,3	2,5	13,2	2,9	13,9	3,3	14,4	3,7	14,9
6/12	32	40	2,9	15,7	3,6	17,0	4,2	17,9	4,8	18,7	5,3	19,3
	30	45	2,6	15,6	3,3	16,8	3,9	17,7	4,4	18,4	4,9	18,9
	28	50	2,4	15,4	3,0	16,5	3,5	17,3	4,0	17,9	4,4	18,4
	26	50	2,0	14,3	2,5	15,2	2,9	15,9	3,3	16,5	3,7	16,9
	24	50	1,6	13,1	2,0	13,9	2,4	14,5	2,7	15,0	3,0	15,4

CFL 15

ch.w.	Airflow		750 m ³ /h		1000 m ³ /h		1250 m ³ /h		1500 m ³ /h		1800 m ³ /h	
	t _{ON} [°C]	r. h. [%]	Output [kW]	t _{OFF} [°C]	Output [kW]	t _{OFF} [°C]	Output [kW]	t _{OFF} [°C]	Output [kW]	t _{OFF} [°C]	Output [kW]	t _{OFF} [°C]
4/8	32	40	6,9	13,0	8,6	14,3	10,0	15,3	11,4	16,2	12,9	17,0
	30	45	6,5	12,9	8,0	14,1	9,4	15,1	10,6	15,8	12,0	16,6
	28	50	6,0	12,7	7,4	13,8	8,7	14,7	9,8	15,4	11,1	16,1
	26	50	5,3	11,7	6,5	12,7	7,6	13,5	8,6	14,2	9,7	14,8
	24	50	4,5	10,7	5,6	11,7	6,5	12,4	7,4	13,0	8,4	13,5
5/10	32	40	6,3	14,0	7,8	15,2	9,1	16,2	10,3	17,0	11,7	17,8
	30	45	5,9	13,9	7,2	15,1	8,4	16,0	9,6	16,7	10,8	17,5
	28	50	5,4	13,8	6,6	14,8	7,7	15,6	8,7	16,3	9,8	17,0
	26	50	4,6	12,7	5,7	13,7	6,7	14,4	7,5	15,0	8,5	15,6
	24	50	3,9	11,7	4,8	12,6	5,6	13,2	6,3	13,8	7,2	14,3
6/12	32	40	5,7	15,0	7,0	16,1	8,1	17,0	9,2	17,8	10,4	18,5
	30	45	5,2	14,9	6,4	16,0	7,5	16,8	8,5	17,5	9,6	18,2
	28	50	4,8	14,7	5,8	15,7	6,8	16,5	7,7	17,1	8,6	17,7
	26	50	4,0	13,7	4,9	14,5	5,7	15,2	6,5	15,8	7,3	16,3
	24	50	3,3	12,6	4,0	13,4	4,7	13,9	5,3	14,4	5,9	14,9

CFL 22

ch.w.	Airflow		1000 m ³ /h		1400 m ³ /h		1800 m ³ /h		2200 m ³ /h		2600 m ³ /h	
	t _{ON} [°C]	r. h. [%]	Output [kW]	t _{OFF} [°C]	Output [kW]	t _{OFF} [°C]	Output [kW]	t _{OFF} [°C]	Output [kW]	t _{OFF} [°C]	Output [kW]	t _{OFF} [°C]
4/8	32	40	9,3	12,9	12,0	14,5	14,3	15,6	16,4	16,6	18,4	17,3
	30	45	8,8	12,8	11,2	14,3	13,4	15,3	15,3	16,2	17,1	16,9
	28	50	8,1	12,6	10,3	13,9	12,3	14,9	14,1	15,7	15,8	16,3
	26	50	7,1	11,6	9,1	12,8	10,9	13,7	12,5	14,4	13,9	15,0
	24	50	6,2	10,7	7,9	11,7	9,4	12,6	10,8	13,2	12,1	13,7
5/10	32	40	8,5	13,9	10,9	15,4	13,0	16,5	15,0	17,4	16,8	18,1
	30	45	8,0	13,9	10,2	15,2	12,1	16,2	13,9	17,0	15,5	17,7
	28	50	7,3	13,7	9,3	14,9	11,1	15,8	12,7	16,6	14,2	17,2
	26	50	6,3	12,6	8,1	13,8	9,6	14,6	11,0	15,3	12,3	15,8
	24	50	5,4	11,6	6,9	12,6	8,2	13,4	9,4	14,0	10,5	14,5
6/12	32	40	7,7	14,9	10,0	16,3	11,8	17,3	13,5	18,1	15,1	18,8
	30	45	7,2	14,8	9,1	16,1	10,9	17,0	12,4	17,8	13,9	18,4
	28	50	6,5	14,6	8,3	15,8	9,9	16,6	11,3	17,3	12,6	17,9
	26	50	5,5	13,6	7,0	14,6	8,4	15,4	9,6	16,0	10,7	16,5
	24	50	4,6	12,5	5,8	13,4	6,9	14,1	7,9	14,6	8,8	15,1



Extension module cooling coil for dx-coil (chilled water)

- optional unit extension with separate casing, available with lhs or rhs connections in direction of airflow
- may be combined with CFL-WRG, CFL-EC-ZUL and CFL-EC-ABL
- Dx-coil Co/Al for lateral withdrawal
- supply air sensor optional (loose)
- incl. one set of suspension angles (2 pcs.)
- Filter insert facility for compact filters category M5 / F7 / F9 (fine dust quality)
- Filter access from below via access door

Unit size	CFL	10	15	22
Dimensions (LxWxH)	mm	712 x 508 x 367	712 x 712 x 367	712 x 915 x 411
max. airflow	m ³ /h	1.000	1.800	2.600

CFL 10

Airflow			400 m ³ /h		550 m ³ /h		700 m ³ /h		850 m ³ /h		1000 m ³ /h	
t _{evap.}	t _{ON} [°C]	r. h. [%]	Output [kW]	t _{OFF} [°C]	Output [kW]	t _{OFF} [°C]	Output [kW]	t _{OFF} [°C]	Output [kW]	t _{OFF} [°C]	Output [kW]	t _{OFF} [°C]
2 °C	32	40	3,4	14,7	4,0	16,7	4,5	18,2	4,9	19,3	5,2	20,3
	30	45	3,2	14,1	3,8	16,0	4,3	17,3	4,7	18,4	5,0	19,3
	28	50	3,1	13,4	3,7	15,1	4,1	16,4	4,5	17,4	4,8	18,2
	26	50	2,7	12,4	3,2	14,0	3,6	15,2	4,0	16,1	4,2	16,9
5 °C	24	50	2,4	11,4	2,8	12,9	3,2	14,0	3,5	14,9	3,7	15,5
	32	40	3,0	15,9	3,6	17,7	4,0	19,0	4,4	20,1	4,7	20,9
	30	45	2,9	15,3	3,4	16,9	3,9	18,2	4,2	19,1	4,5	19,9
	28	50	2,7	14,6	3,3	16,1	3,7	17,3	4,0	18,2	4,3	18,9
8 °C	26	50	2,4	13,7	2,8	15,1	3,2	16,1	3,5	16,9	3,7	17,6
	24	50	2,0	12,7	2,4	14,0	2,7	14,9	3,0	15,7	3,2	16,2
	32	40	2,6	17,2	3,1	18,8	3,5	20,0	3,8	20,9	4,1	21,6
	30	45	2,5	16,6	3,0	18,1	3,3	19,1	3,7	20,0	3,9	20,7
8 °C	28	50	2,3	15,9	2,8	17,3	3,1	18,2	3,4	19,0	3,7	19,6
	26	50	2,0	15,0	2,3	16,2	2,6	17,1	2,9	17,8	3,1	18,3
	24	50	1,6	14,2	1,9	15,2	2,2	16,0	2,4	16,6	2,5	17,1

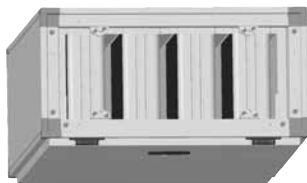
CFL 15

Airflow			750 m ³ /h		1000 m ³ /h		1250 m ³ /h		1500 m ³ /h		1800 m ³ /h	
t _{evap.}	t _{ON} [°C]	r. h. [%]	Output [kW]	t _{OFF} [°C]	Output [kW]	t _{OFF} [°C]	Output [kW]	t _{OFF} [°C]	Output [kW]	t _{OFF} [°C]	Output [kW]	t _{OFF} [°C]
2 °C	32	40	6,4	14,2	7,5	16,1	8,3	17,5	9,0	18,6	9,7	19,7
	30	45	6,2	13,6	7,2	15,4	8,0	16,7	8,7	17,7	9,4	18,7
	28	50	5,9	13,0	6,9	14,6	7,6	15,8	8,3	16,8	8,9	17,8
	26	50	5,2	12,0	6,1	13,5	6,8	14,7	7,3	15,6	7,9	16,4
5 °C	24	50	4,6	11,1	5,3	12,5	5,9	13,5	6,4	14,3	6,9	15,1
	32	40	5,8	15,4	6,7	17,1	7,5	18,3	8,2	19,3	8,8	20,3
	30	45	5,5	14,8	6,5	16,4	7,2	17,5	7,8	18,5	8,5	19,4
	28	50	5,2	14,2	6,1	15,6	6,8	16,7	7,4	17,6	8,0	18,4
8 °C	26	50	4,5	13,3	5,3	14,6	5,9	15,6	6,4	16,3	6,9	17,1
	24	50	3,9	12,4	4,5	13,5	5,0	14,4	5,5	15,1	5,9	15,8
	32	40	5,0	16,8	5,9	18,2	6,6	19,3	7,1	20,2	7,7	21,0
	30	45	4,8	16,2	5,6	17,5	6,2	18,5	6,8	19,3	7,3	20,1
8 °C	28	50	4,5	15,6	5,2	16,8	5,8	17,7	6,4	18,5	6,9	19,2
	26	50	3,7	14,7	4,4	15,8	4,9	16,6	5,3	17,3	5,8	17,9
	24	50	3,1	13,8	3,6	14,8	4,0	15,5	4,4	16,1	4,7	16,7

CFL 22

Airflow			1000 m ³ /h		1400 m ³ /h		1800 m ³ /h		2200 m ³ /h		2600 m ³ /h	
t _{evap.}	t _{ON} [°C]	r. h. [%]	Output [kW]	t _{OFF} [°C]	Output [kW]	t _{OFF} [°C]	Output [kW]	t _{OFF} [°C]	Output [kW]	t _{OFF} [°C]	Output [kW]	t _{OFF} [°C]
2 °C	32	40	8,8	13,9	10,6	16,1	12,1	17,6	13,2	18,8	14,2	19,8
	30	45	8,5	13,3	10,2	15,3	11,6	16,8	12,7	17,9	13,7	18,8
	28	50	8,1	12,7	9,8	14,6	11,1	15,9	12,1	17,0	13,0	17,8
	26	50	7,1	11,8	8,6	13,5	9,8	14,8	10,7	15,7	11,5	16,5
5 °C	24	50	6,3	10,9	7,6	12,4	8,6	13,6	9,4	14,5	10,0	15,2
	32	40	7,9	15,2	9,6	17,1	10,9	18,5	12,0	19,6	12,9	20,5
	30	45	7,6	14,6	9,2	16,4	10,4	17,7	11,5	18,7	12,3	19,5
	28	50	7,2	14,0	8,7	15,6	9,9	16,8	10,9	17,8	11,7	18,5
8 °C	26	50	6,2	13,1	7,5	14,6	8,6	15,7	9,4	16,5	10,1	17,2
	24	50	5,3	12,2	6,4	13,6	7,3	14,6	8,0	15,3	8,6	15,9
	32	40	6,8	16,6	8,3	18,3	9,5	19,5	10,4	20,5	11,2	21,2
	30	45	6,5	16,0	7,9	17,6	9,0	18,7	9,9	19,6	10,7	20,3
8 °C	28	50	6,1	15,4	7,4	16,8	8,4	17,9	9,3	18,7	10,0	19,3
	26	50	5,1	14,6	6,2	15,8	7,1	16,7	7,8	17,5	8,4	18,1
	24	50	4,2	13,7	5,1	14,8	5,8	15,6	6,4	16,3	6,9	16,8

Outputs based on refrigerant R407C. Outputs for different refrigerants are on request. The max. operating pressure with R410A is limited to 28 bar.



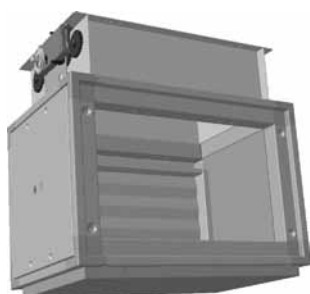
Silencer extension module

- Optionally fitted to the unit
- Mineral fibre splitters in a zinc-plated sheet steel frame, abrasion-resistant surface with non-combustible design
- Optional filter cartridge for compact filters with fine dust quality M5 / F7 / F9
- Inspection door provides access to the filter; panel below the silencer splitters can be removed for inspection
- Incl. 1 set of mounting brackets (2 pce)

Size	CFL	10	15	22
Dimensions (LxWxH)	mm	1017 x 508 x 367	1017 x 712 x 367	1017 x 915 x 411

Insertion loss D_e [dB(A)]

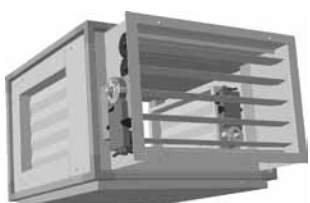
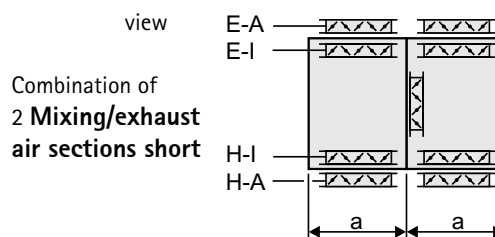
Frequency		63	125	250	500	1000	2000	4000	8000
CFL 10	Hz	4	11	15	17	25	31	27	21
CFL 15	Hz	4	10	13	15	23	28	24	18
CFL 22	Hz	4	9	11	14	21	26	21	16



Mixing/exhaust air section short

- can be fitted to the unit as an option
- incl. 1 set of mounting brackets (2 items)
- Intake and discharge position („E” or „H”) and option (external „A” or internal „I”) free selectable

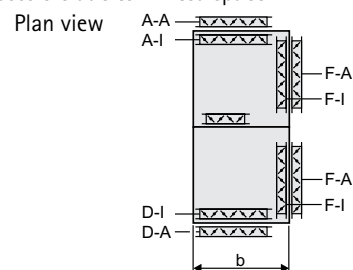
Size	Dimensions (LxWxH)
CFL-10	347 x 508 x 367
CFL-15	347 x 712 x 367
CFL-22	391 x 915 x 411



Mixing / exhaust air section long

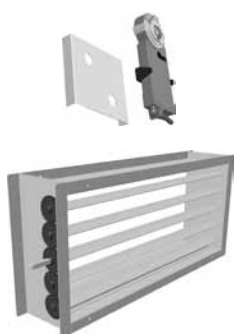
- can be fitted to the unit as an option
- incl. 1 set of mounting brackets (2 items)
- Intake and discharge position („A”, „D” oder „F”) and option (external „A” or internal „I”) free selectable. Exception: AI and FI or DI and FI not possible due to limited space!

Size	Dimensions (LxWxH)
CFL-10	508 x 508 x 367
CFL-15	712 x 712 x 367
CFL-22	915 x 915 x 411



Actuator 24 V stepless for louvre damper in mixed-air mode

incl. mounting bracket



Louvre damper, for duct, zinc-plated sheet steel

Tightness categories 1 and 2 to DIN EN 1751

Size	CFL	10	15	22
Dimensions (LxWxH)	mm	140 x 409 x 256	140 x 612 x 256	140 x 815 x 306

230 V servomotor for opening/closing louvre damper, loose

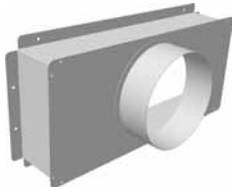
Incl. mounting bracket





Canvas flange, 4-hole profile frame, for connection to duct

Size	CFL	10	15	22
Dimensions (LxWxH)	mm	130 x 405 x 243	130 x 608 x 243	130 x 811 x 287



Adaptor module, for square to round connection

Size	CFL	10	15	22
Dimensions (LxWxH)	mm	130 x 409 x 247	130 x 612 x 247	130 x 815 x 297
Connection diameter	mm	250	250	315



Filter module with integrated insulation function

- Kompakt filter with fine dust quality M5 / F7 / F9 (depth 96 mm) available
- Measures for structure-borne sound attenuation are functionally integrated.
- Differential pressure gauge for filter monitoring and indicator manometer are optionally available.

Size	CFL	10	15	22
Dimensions (LxWxH)	mm	190 x 409 x 247	190 x 612 x 247	190 x 815 x 291



Insulating frame

Size	CFL	10	15	22
Dimensions (LxWxH)	mm	140 x 409 x 247	140 x 612 x 247	140 x 815 x 297



Siphon with non-return device

- 1¼", suitable for intake and pressure sides, supplied loose



External, ceiling or room temperature sensor

Wall mounted, 2-pole, terminals up to 1.5 mm²

Sensor: NTC5K
 Measuring range: -30 °C to +50 °C
 IP rating: IP54
 Dimensions: 100 x 60 x 33 mm



Supply/extract air temperature sensor, duct, loose



Repair switch AR6 / 1N/C+1N/O for all poles, loose

- lockable, 5.5 kW,
- with CFL 15 / 22 in combination with extension module electric heater bank 18,5 kW



Mixing valve for lphw heat exchanger, loose

type acc.to coil selection

- DN 10 KVS 0.63
- DN 10 KVS 1.0
- DN 10 KVS 1.6
- DN 15 KVS 2.5
- DN 20 KVS 4.0
- DN 25 KVS 6.3



Screwing kit for mixing valve for lphw heat exchanger

consisting of:

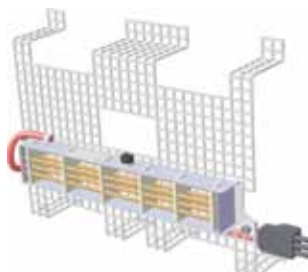
3 union nuts, 3 inlay nuts
and 3 flat gaskets

1/2"	DN 10 KVS 0.63
	DN 10 KVS 1.0
	DN 10 KVS 1.6
3/4"	DN 15 KVS 2.5
	DN 20 KVS 4.0
1"	DN 25 KVS 6.3



Actuator for mixing valve, loose

control signal 24 V DC; 0-10 V



Electric preheater bank

- Single stage; can be integrated into the unit as an option; electrical plug-in design
- with integrated manually resettable safety temperature limiter (STB)

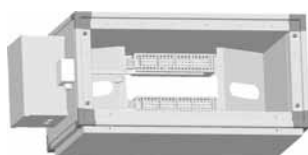
Size	CFL	10-WRG	15-WRG	22-WRG
Output	kW	1	2	2
Voltage		230 V/50 Hz	230 V/50 Hz	230 V/50 Hz



Electric booster heater bank

- Variable control (0-10 V)
- Can be integrated into the unit as an option; electrical plug-in design
- with integrated manually resettable safety temperature limiter (STB)

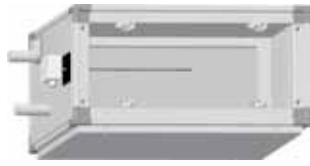
Size	CFL	10-WRG	15-WRG	22-WRG
Output	kW	1	-	-
Voltage		230 V/50 Hz	-	-



Electric heater bank extension module

- Mains supply 3 x 400V
- Terminal box fitted on the outside of the module
- Can be fitted to the unit as an option, available with lhs or rhs connections in direction of airflow
- Fitted as standard with supply air sensor
- Variable control (0-10 V)
- Incl. 1 set of mounting brackets (2 pce)
- Bottom panel can be removed for inspection
- with integrated manually resettable safety temperature limiter (STB)

Size	CFL	10-WRG	15-WRG	22-WRG
Output	kW	-	4	6
Voltage		-	3 x 400 V/50 Hz	3 x 400 V/50 Hz
Dimensions (LxWxH)	mm	-	407 x 712 x 367	407 x 915 x 411



Iphw heater extension module

- Optionally fitted to the unit, available with lhs or rhs connections in direction of airflow
- Fitted as standard with supply air sensor and frost stat
- Incl. 1 set of mounting brackets (2 pce)
- Cu/Al air heater for Iphw can be removed from the side
- Connections with 1" thread
- Bottom panel can be removed for inspection

Size	CFL	10-WRG	15-WRG	22-WRG
Output (90/70; T _{LE} =0 °C)	kW	15	23	33
Dimensions (LxWxH)	mm	407 x 508 x 367	407 x 712 x 367	407 x 915 x 411



Compact filter M5 , depth 48mm

Fine dust filter

Unit size	CFL	10-WRG	15-WRG	22-WRG
Dimensions (BxH)	mm	389 x 287	592 x 287	795 x 333



Compact filter F7 , depth 48mm

Fine dust and pollen filter

Unit size	CFL	10-WRG	15-WRG	22-WRG
Dimensions (BxH)	mm	389 x 287	592 x 287	795 x 333



Air quality filter

Plug-in design; mixed gas sensor for detecting air quality in offices, hotels, homes, businesses, restaurants etc.

Supply voltage: 24 V AC/DC
 Permiss. ambient temperature: 0-50 °C
 IP rating: IP30
 Dimensions: 81 x 79 x 26 mm



CO₂ sensor (as an alternative to the air quality sensor)

Plug-in design; used to capture the CO₂ content
 Supply voltage: 24 V AC/DC
 Permiss. ambient temperature: 0-50 °C
 IP rating: IP30
 Dimensions: 95 x 97 x 30 mm



Fig: LON interface for WRS-K

LON interface for WRS-K

To be plugged into the controller

BacNet interface for WRS-K

To be plugged into the controller

Modbus interface for WRS-K

To be plugged into the controller

Ethernet interface for WRS-K

To be plugged into the controller



Remote control unit BMK-F
for wall mounting



Room / Duct hygrometer
for registration of the air humidity
Switching capacity 24 - 250 VAC 2A
Setting range 35 - 100 % r. F
Protection class IP 30 / 65



Touchpanel BMK-T10

- Operation of several CFL-WRG-units
- Front insert
- on request

Additional module for the control of several fire protection dampers
on request

Control of CFL-EC-ZUL or CFL-EC-ABL (in combination with extension module cooling or dx-coil)



BML ventilation programming module

- Room temperature-dependent control
- Backlit graphic display
- Easy user prompts for the plain text display
- Control by rotary selector with key function
- 4 function keys for frequently used functions
- Installation either in the ventilation module or in the wall mounting base as a remote control
- Only one BML ventilation programming module required to control up to 7 zones
- Demand-optimised boiler water temperature demand via eBUS
- eBUS interface



Wall mounting base for BML

- Wall mounting base for using the BML ventilation programming module as a remote control



LM2 ventilation module

- LM2 ventilation module to control the room temperature via speed or mixer
- Variable motor control in conjunction with EC motor
- Easy controller configuration by selecting one of the pre-defined system schemes
- Control of one heat source
- Demand-optimised boiler water temperature demand via eBUS
- eBUS interface with automatic energy management
- BML ventilation programming module can be clipped in



ISM5 - LON-Interface module

- Connection of the LM2 ventilation module to BMS using LON-Standard network variables



Outside or room temperature sensor

Control of CFL-EC-ZUL (in combination with extension module cooling or dx-coil)

Wiring board

- Room temperature control via mixing valve control for lphw and ch.w.
- Control of a boiler (lphw) and a chiller (ch.w.)



Compact filter M5, depth 96mm

Fine dust filter

Unit size	CFL	10-WRG	15-WRG	22-WRG
Dimensions (BxH)	mm	389 x 287	592 x 287	795 x 333



Compact filter F7, depth 96mm

Fine dust and pollen filter

Unit size	CFL	10-WRG	15-WRG	22-WRG
Dimensions (BxH)	mm	389 x 287	592 x 287	795 x 333



Variable speed controller, loose

- 0-10 V



Analogue time switch

- For setback mode with 7-day program

Indoor air quality

The indoor air quality is influenced by the following factors (see also DIN EN 15251 and DIN EN 13779):

- **Emissions from people and their activities**
Carbon dioxide emissions from people breathing, biological vapours, smoking, personal hygiene products etc.
- **Emissions from the room**
Vapours from furniture, carpets, paints, adhesives etc.
- **Outdoor air conditions**
Rural areas, urban areas, dust, fine dust, pollen etc.

Design criteria

In accordance with DIN EN 15251, various categories are used for indoor air quality and ventilation rate criteria.

Description of the applicability of the various categories

Category	Description
1	High level of expectation is recommended for spaces occupied by very sensitive and fragile persons with special needs like disabled, sick, very young children and elderly persons.
2	Standard level of expectation should be applied to new and renovated buildings.
3	An acceptable, moderate level of expectation may be applied to existing buildings.
4	Values outside the criteria for the above categories: This category should only be accepted for a limited part of the year.

As carbon dioxide concentration rises, the ability to concentrate and perform declines, tiredness increases and people feel uncomfortable.

Carbon dioxide is a natural constituent of the earth's atmosphere and is found in outdoor air in concentrations ranging from around 350 ppm (rural areas) to around 500 ppm (urban areas).

CO₂ level in indoor environments to DIN EN 15251 and DIN EN 13779

The following table from DIN EN 13779 shows the recommended minimum values for the outdoor air flow rate per person. The design air flow rate also takes emissions from other sources into account, such as building materials and furniture.

Category	Unit		Outdoor air flow rate							
			Non-smoking area				Smoking area			
			Standard area		Standard value		Standard area		Standard value	
1	l/s/person	m ³ /h/person	> 15	> 54	20	72	> 30	> 108	40	144
2	l/s/person	m ³ /h/person	10 – 15	36 – 54	12.5	45	20 – 30	72 – 108	25	90
3	l/s/person	m ³ /h/person	6 – 10	21.6 – 36	8	28.8	12 – 30	43.2 – 108	16	57.6
4	l/s/person	m ³ /h/person	< 6	< 21.6	5	18	< 12	< 43.2	10	36

Minimum air volumes per person (based on max. CO₂ requirement)

Age-dependent rates			
For approx. age	Target 1200 ppm	Target 1000 ppm	Target group
0 – 6	19 m ³ /h	25 m ³ /h	Kindergarten
6 – 10	19 m ³ /h	25 m ³ /h	Primary school
10 – 14	23 m ³ /h	30 m ³ /h	Secondary school
14 – 19	24 m ³ /h	33 m ³ /h	Technical college
Adults	28 m ³ /h	37 m ³ /h	

Example calculations

$$\boxed{l/s \times 3.6 = m^3/h}$$

Example 1:

School, 2 classrooms, each with 30 children aged 14 – 19 and one teacher

Required air volume per room, according to max. CO₂ requirement of 1200 ppm

$$\text{Calculation: } 2 \times 30 \text{ people} \times 24 \text{ m}^3/\text{h} = 1440 \text{ m}^3/\text{h}$$

$$2 \times 1 \text{ teacher} \times 28 \text{ m}^3/\text{h} = 56 \text{ m}^3/\text{h}$$

$$\text{Required outdoor air volume: } = 1496 \text{ m}^3/\text{h}$$

Example 2:

Required interior category: 1 - smoking area (standard value)

15 people

Air volume per room:

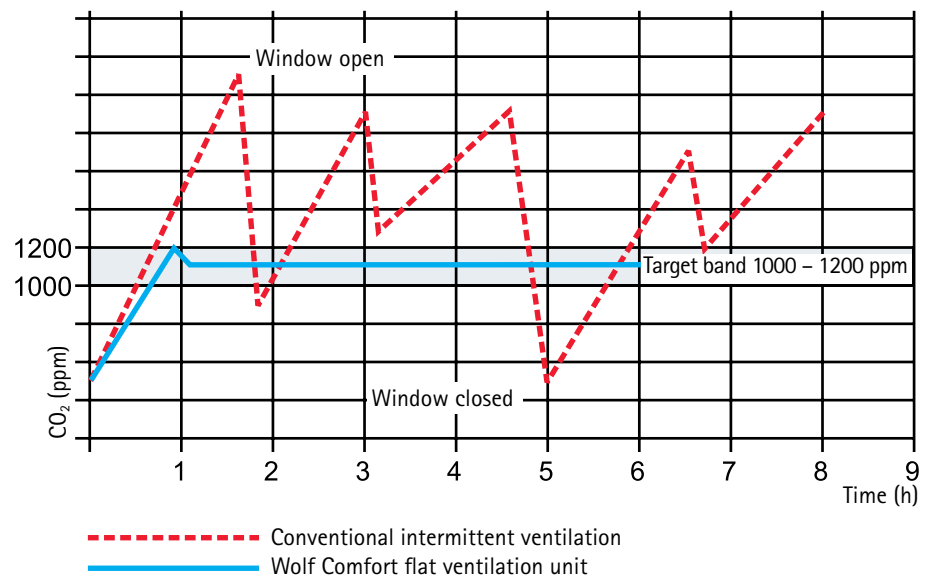
$$\text{Calculation: } 15 \text{ people} \times 40 \text{ l/s} = 600 \text{ l/s}$$

$$\text{Required outdoor air volume: } = 600 \text{ l/s} = 2160 \text{ m}^3/\text{h}$$

Note

If greater air volumes are required, models from our KG Compact or KG Top range of air handling units can be used.

Comparison with intermittent ventilation



Noise level in indoor environments according to DIN 15251 and DIN EN 13779

Type of building/room	Recommended sound pressure range (dB(A))
Open-plan office	35 – 45
Conference room	30 – 40
Classroom, kindergarten	35 – 45
Cafeterias/Restaurants	35 – 50
Shops	35 – 50

View of air intake function

Dimensions of connection flange:

Unit size	CFL	10	15	22
Height	H1 mm	247	247	291
Height	H2 mm	311	311	355
Width	B1 mm	408	612	815
Width	B2 mm	472	676	879

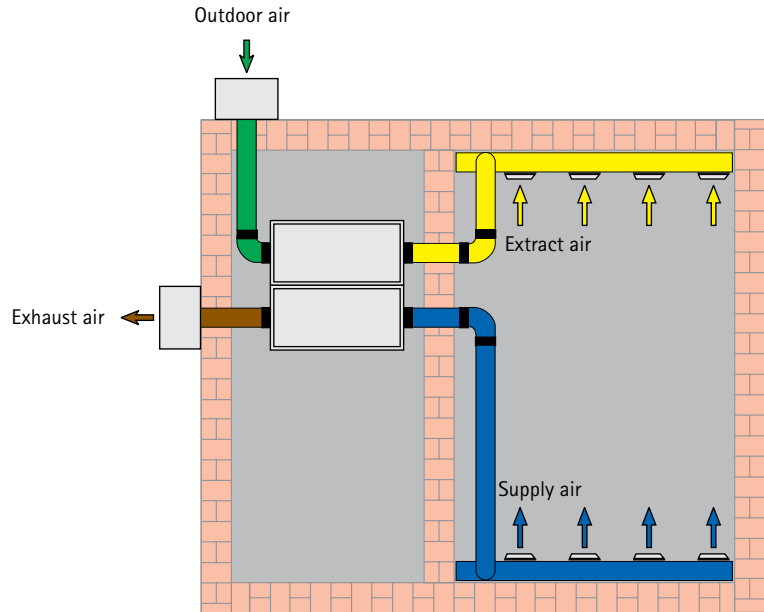
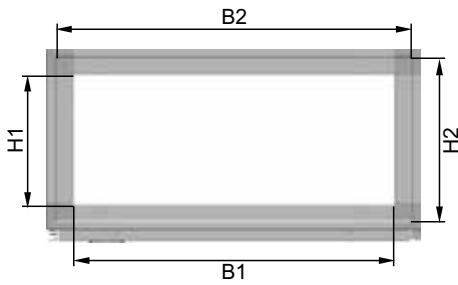


Fig: CFL-WRG plan view

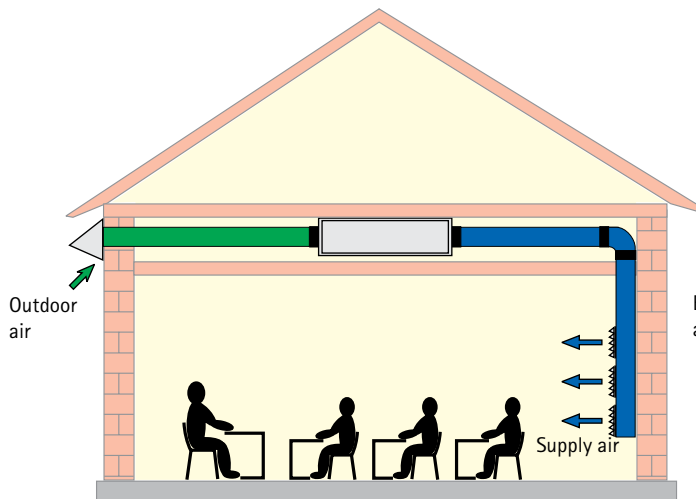


Fig: CFL-EC-ZUL side view

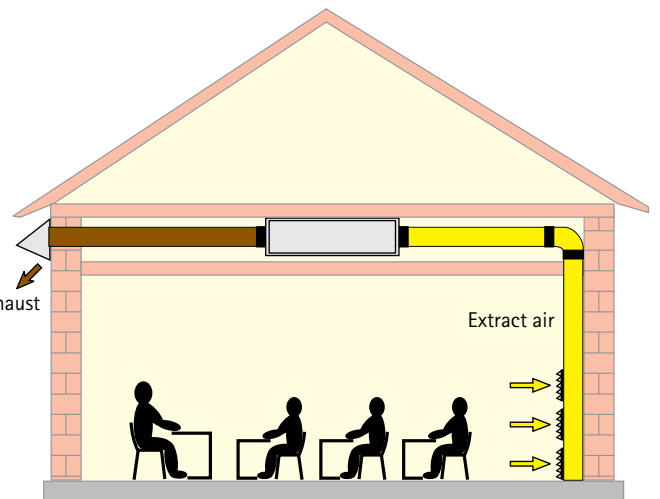
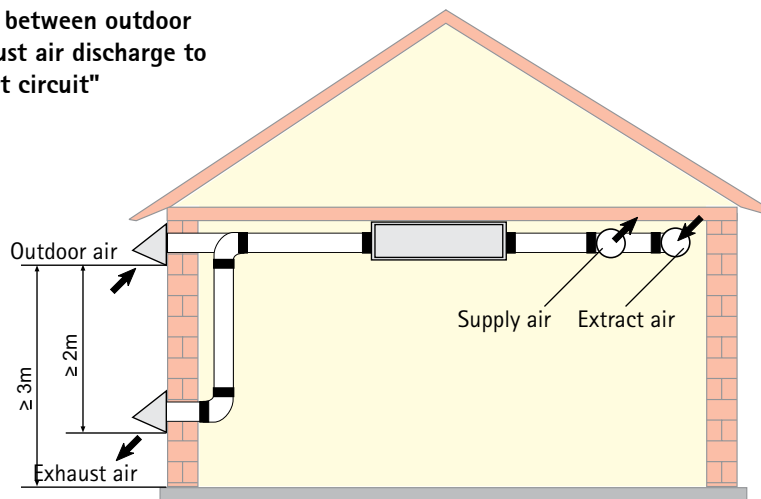


Fig: CFL-EC-ABL side view

Minimum clearance between outdoor air intake and exhaust air discharge to prevent an "air short circuit" (DIN 13779)





The comprehensive equipment range from system supplier Wolf offers the ideal solution for commercial and industrial buildings, for new build and for modernisation projects alike. The range of Wolf control units fulfils every need where heating convenience is concerned. The products are easy to operate, energy-efficient and reliable. Solar heating systems can be quickly integrated into existing systems. All Wolf products can be easily and rapidly commissioned and maintained.

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