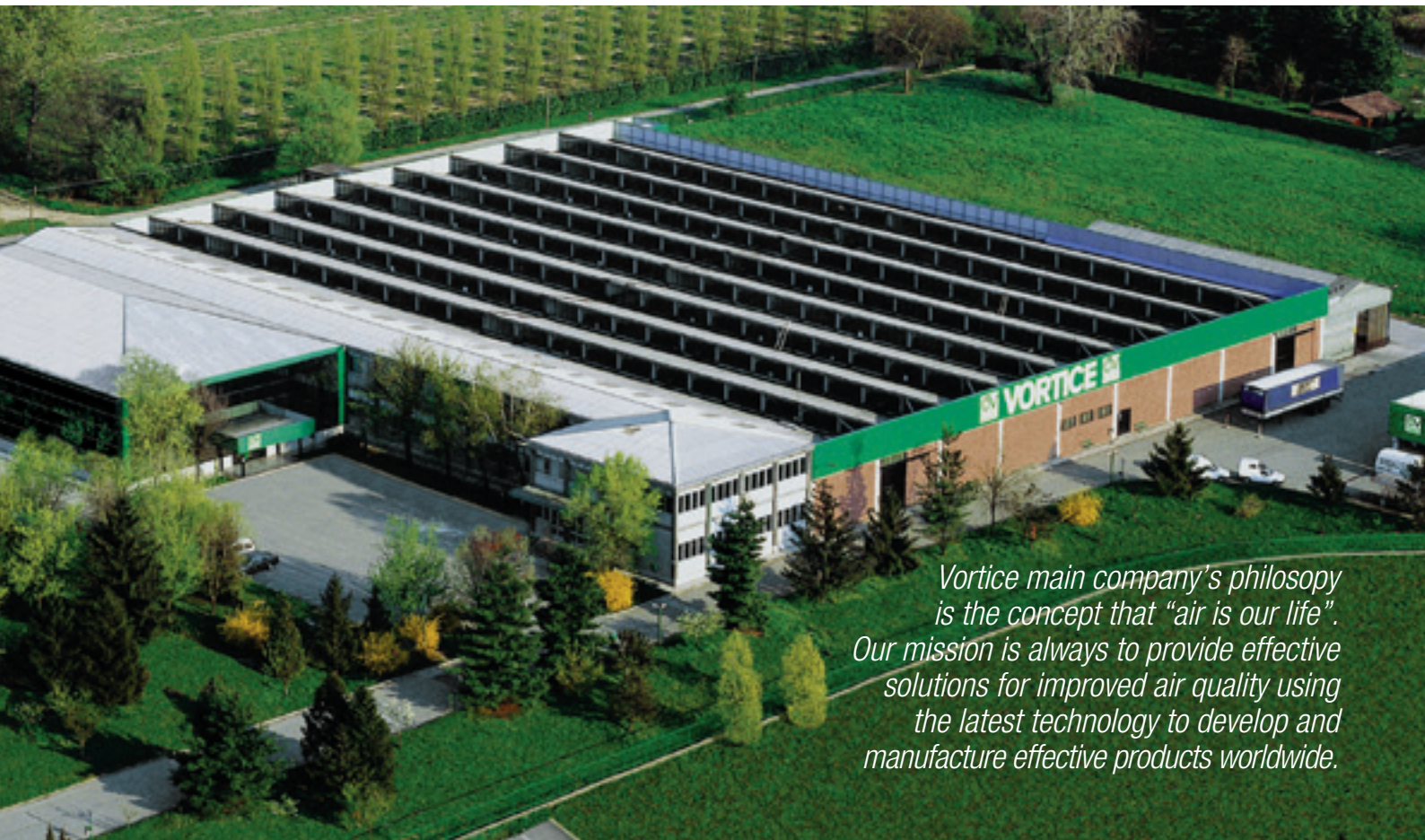


# Vortice

Air treatment





*Vortice main company's philosophy is the concept that "air is our life". Our mission is always to provide effective solutions for improved air quality using the latest technology to develop and manufacture effective products worldwide.*

*Our current Vortice Headquarters have been located in Tribiano (Milan) since 1972.*

Vortice has achieved European market leadership by dedicating their efforts to the production of products for ventilation, climate control, heating, extraction, purification and the treatment of air, for domestic, commercial and industrial applications. Since 1954 Vortice has been synonymous with quality and excellence and continues to make significant improvements by investing in continuous research to improve the efficiency and quality of its products.

## VORTICE IN THE WORLD

FRANCE



Founded in 1974, Vortice France is located at Créteil about 10 Km from Paris.

ENGLAND



Founded in 1977, Vortice Limited is located at Burton on Trent in the East Midlands.

CHINA



Founded in 2012, Vortice Ventilation System is located about 200 Km from Shanghai.

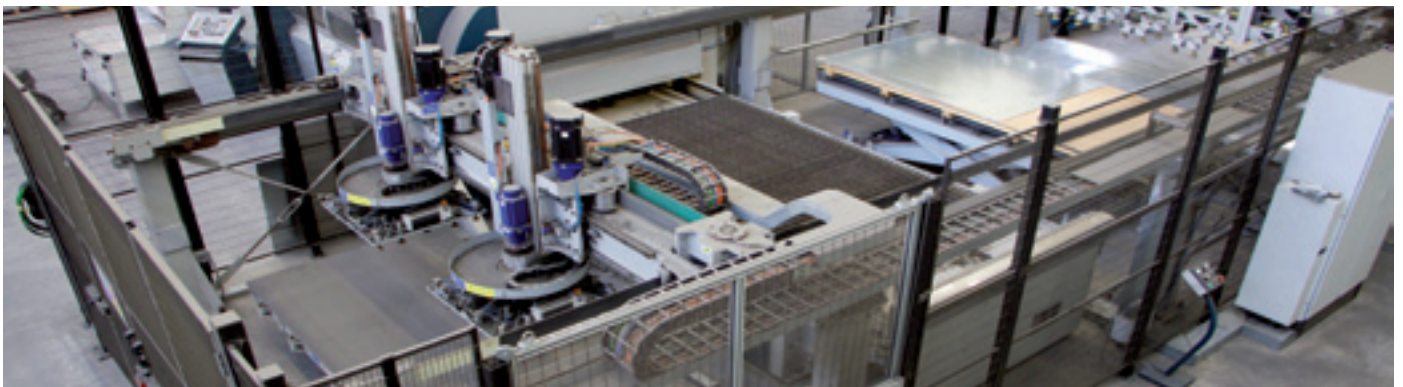
SOUTH AMERICA



Founded in 2012, Vortice Latam is located in San José, Costa Rica.



*In the industrial area of Isola della Scala, in the province of Verona. Surface: 12.000 m<sup>2</sup> Production unit: 6.000 m<sup>2</sup>*







# Better Air Better Life

*We are working to contribute  
well-being to people and  
also environmental protection  
by developing, manufacturing and  
supplying products fitted to commercial  
and industrial application in accordance  
of the environment and a people.*



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# CTL

Air handling units special execution for higher air volumes



## PRODUCT SPECIFICATIONS

- This catalogue represents a summary of the CTL series air handling units, illustrating their main characteristics.
- The purpose is to describe the standard range, while at the same time highlighting the flexibility and best technical solutions possible for meeting different needs on site.
- Loran air handling units make an important contribution to improving air quality and the environments we live in. The company is constantly committed to research and development of environmentally-sustainable products with maximum energy efficiency.
- Constructional quality and the components used guarantee reliability, functionality and efficiency that last over time.
- The CTL units are available in 32 sizes, covering a vast range of air flows, and are designed using a simple and flexible modular system.

## CERTIFICATION

- **CE marking**  
All VORTICE air handling units are built in compliance with Machinery Directive 2006/42/EC, Low Voltage Directive 2006/95/EC, and Electromagnetic Compatibility Directive 2004/108/EC, and consequently conform to the “essential health and safety requirements” defined by such Directives. The design work is developed respecting these standards and to this end the machines are equipped with a series of prevention and safety features suitable for satisfying the obligatory requirements:
  - accident prevention protection grills over moving parts;
  - safety micro-switches;
  - lights for illuminating the inside of the machines;
  - handles that open also from inside the machine;
  - rounded edges and no parts that cut.
 Adhesive signs - clearly visible because of their colour and size are applied to the external casings of the machine indicating possible dangers from moving parts and the electric current present.



CERTIFICATION

■ **EUROVENT certificate**

VORTICE S.p.A. adheres to the product certification programs run by Eurovent, the European association that brings together manufacturers of ventilation, air-conditioning refrigeration appliances from various different countries. The voluntary certification programs established and managed by Eurovent involve comparing the technician specifications declared by the manufacturer in its product documents and selection

software, against the results of tests conducted on working products. Eurovent represents a reference point for engineers, consultants, installers and end users, who can rely on Eurovent certification when choosing air-conditioning and refrigeration systems with certified performance. VORTICE S.p.A. has obtained Eurovent certification on its CTL series products, thus guaranteeing customers complete transparency and accuracy of declared performance.





## AIR TREATMENT

### SIZE

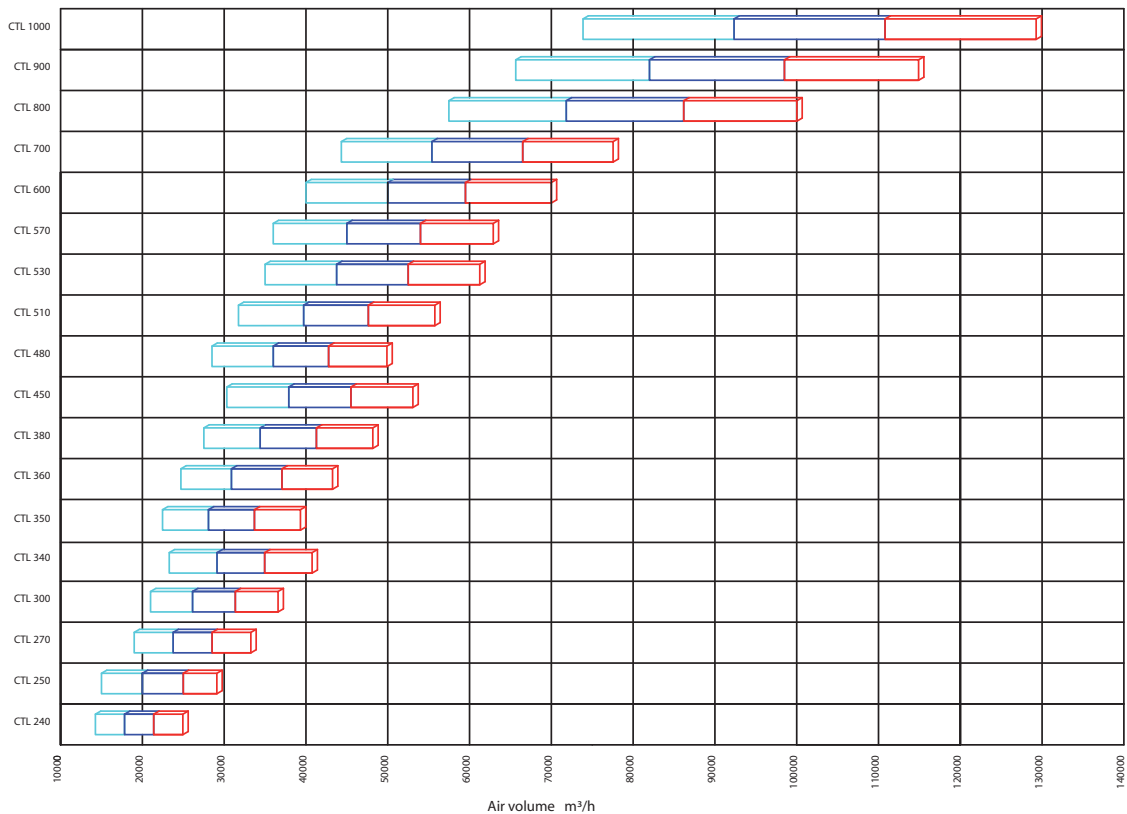
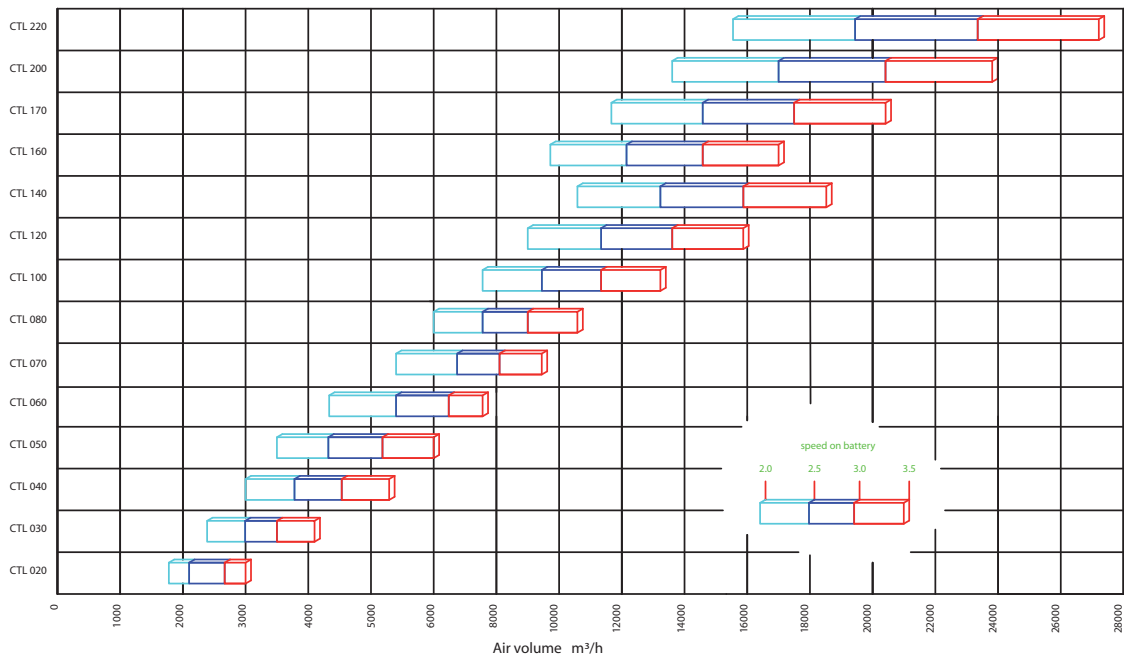
Air handling units are sized by selecting the components that meet the system's thermo-mechanical design requirements. The unit is selected according to air flow and air velocity through the coils.

The following values are recommended:

ventilation section (no filters, no heat exchangers)	max 4,0 m/sec
heating coil	max 3,5 m/sec
cooling coil	max 2,8 m/sec

The CTL range is available in 32 sizes for nominal air flow from 1,000 to 100,000 m<sup>3</sup>/h.

The tables show the possible choices based on these two main parameters.



## SIZE

For greater clarity, the table below illustrates:

CTL: CTL model

H: Unit height, excluding the base (add 95/150 mm)

L: Section width

Sb: Coil face surface area

V: Air flow m<sup>3</sup>/h

### Sections

SIZE	Dimensions L x H mm	Section Sb mq	Air flow x V (m/sec)									
			2	2,25	2,5	2,75	3	3,25	3,5	3,75	4	
CTL 20	800 x 650	0,24	1.754	1.973	2.192	2.412	2.631	2.850	3.069	3.289	3.508	
CTL 30	1050 x 650	0,33	2.389	2.688	2.986	3.285	3.583	3.882	4.181	4.479	4.778	
CTL 40	1300 x 700	0,42	3.024	3.402	3.780	4.158	4.536	4.914	5.292	5.670	6.048	
CTL 50	1050 x 800	0,48	3.456	3.888	4.320	4.752	5.184	5.616	6.048	6.480	6.912	
CTL 60	1300 x 800	0,60	4.320	4.860	5.400	5.940	6.480	7.020	7.560	8.100	8.640	
CTL 70	1550 x 800	0,75	5.400	6.075	6.750	7.425	8.100	8.775	9.450	10.125	10.800	
CTL 80	1300 x 1050	0,84	6.048	6.804	7.560	8.316	9.072	9.828	10.584	11.340	12.096	
CTL 100	1550 x 1050	1,05	7.560	8.505	9.450	10.395	11.340	12.285	13.230	14.175	15.120	
CTL 120	1800 x 1050	1,26	9.072	10.206	11.340	12.474	13.608	14.742	15.876	17.010	18.144	
CTL 140	2050 x 1050	1,47	10.584	11.907	13.230	14.553	15.876	17.199	18.522	19.845	21.168	
CTL 160	1550 x 1300	1,35	9.720	10.935	12.150	13.365	14.580	15.795	17.010	18.225	19.440	
CTL 170	1800 x 1300	1,62	11.664	13.122	14.580	16.038	17.496	18.954	20.412	21.870	23.328	
CTL 200	2050 x 1300	1,89	13.608	15.309	17.010	18.711	20.412	22.113	23.814	25.515	27.216	
CTL 220	2300 x 1300	2,16	15.552	17.496	19.440	21.384	23.328	25.272	27.216	29.160	31.104	
CTL 240	1800 x 1550	1,98	14.256	16.038	17.820	19.602	21.384	23.166	24.948	26.730	28.512	
CTL 250	2050 x 1550	2,31	16.632	18.711	20.790	22.869	24.948	27.027	29.106	31.185	33.264	
CTL 270	2300 x 1550	2,64	19.008	21.384	23.760	26.136	28.512	30.888	33.264	35.640	38.016	
CTL 300	2550 x 1550	2,90	20.909	23.522	26.136	28.750	31.363	33.977	36.590	39.204	41.818	
CTL 340	2800 x 1550	3,23	23.285	26.195	29.106	32.017	34.927	37.838	40.748	43.659	46.570	
CTL 350	2300 x 1800	3,12	22.464	25.272	28.080	30.888	33.696	36.504	39.312	42.120	44.928	
CTL 360	2550 x 1800	3,43	24.710	27.799	30.888	33.977	37.066	40.154	43.243	46.332	49.421	
CTL 380	2800 x 1800	3,82	27.518	30.958	34.398	37.838	41.278	44.717	48.157	51.597	55.037	
CTL 450	3050 x 1800	4,21	30.326	34.117	37.908	41.699	45.490	49.280	53.071	56.862	60.653	
CTL 480	2550 x 2050	3,96	28.512	32.076	35.640	39.204	42.768	46.332	49.896	53.460	57.024	
CTL 510	2800 x 2050	4,41	31.752	35.721	39.690	43.659	47.628	51.597	55.566	59.535	63.504	
CTL 530	3050 x 2050	4,86	34.992	39.366	43.740	48.114	52.488	56.862	61.236	65.610	69.984	
CTL 570	2800 x 2300	5,00	35.986	40.484	44.982	49.480	53.978	58.477	62.975	67.473	71.971	
CTL 600	3050 x 2300	5,51	39.658	44.615	49.572	54.529	59.486	64.444	69.401	74.358	79.315	
CTL 700	3050 x 2550	6,16	44.323	49.864	55.404	60.944	66.485	72.025	77.566	83.106	88.646	
CTL 800	3800 x 2550	7,98	57.456	64.638	71.820	79.002	86.184	93.366	100.548	107.730	114.912	
CTL 900	4300 x 2550	9,12	65.664	73.872	82.080	90.288	98.496	106.704	114.912	123.120	131.328	
CTL 1000	4800 x 2550	10,26	73.872	83.106	92.340	101.574	110.808	120.042	129.276	138.510	147.744	

DESCRIPTION OF THE UNIT

**Structure**

- The structural casing of the air handling units is made from anodised aluminium section bars with aluminium corner joints, sheet metal sandwich panels with thermal and acoustic insulation on the inside, and a thick press formed sheet metal base.
- **Base:** base made from thick press formed sheet metal longitudinal members, either galvanised or AISI 304 stainless steel. These are fastened to the four sides of each section, with the unit resting on the ground on the shorter sides. Each base comes complete with suitably sized holes for inserting lifting bars. The type of sections bars and the thickness of the sheet metal used ensure high structural rigidity both during transport and as regards safety when handling on site. The various sections can be joined together using the holes drilled on the longitudinal members.

- **Frame:** the frame is made using a modular system of extruded anodised aluminium alloy section bars (in accordance with UNI 9006/1), joined by die-cast aluminium corners, or for thermal break sections, fibreglass-reinforced nylon corners.

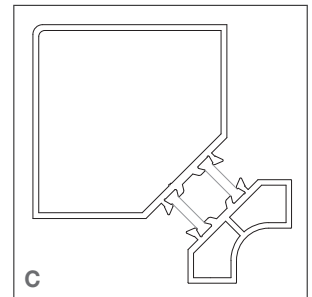
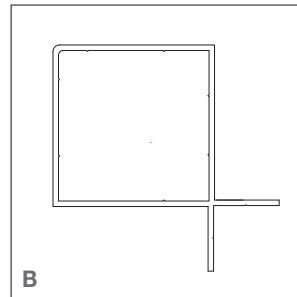
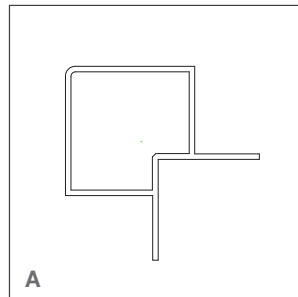
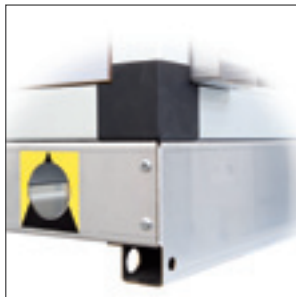
Three types of section bars are used to make the units.

A: 40 mm section bar for 23 mm panel

B: 50 mm section bar for 48 mm panel

C: Thermal break section bar for 48/63 mm panel.

The latter is used in special applications where the temperature difference or high humidity require absence of thermal bridges.



- **Panels:** different types of sandwich panels are available, both as regards overall thickness (23/48/63 mm), insulation materials and thickness of the sheet metal.

The following types of metal are used to make the panels:

- COATED SHEET METAL (EN 10169)

Hot galvanised steel base: reference standard EN 10327, Z100 coating. Standard protection involves application of a 25 micron dry film (tolerance  $\pm 3$  mm) on the top face and a 7/10 micron dry film on the bottom face, in accordance with EN 13523.

FEATURES: Gloss 30/35 - Condensation resistance 1000 h no blistering - Resistance to salt spray 360 h no blistering - Resistance to fluorescent UV light and water condensation 2000 h UVA residual gloss 50% no blistering. - Min. surface hardness F Thicknesses available: 6-8-10 /10 mm.

- GALVANISED SHEET METAL

DXD51-Z200 galvanised rolled sheet for cold forming and stamping (EN 10142). Thicknesses available:

6-8-10-15/10 mm.

- PERALUMAN SHEET METAL

5754 H111 aluminium magnesium alloy, featuring excellent corrosion resistance in marine environments.

Thicknesses available: 8-12/10 mm.

- STAINLESS STEEL SHEET

Cold rolled AISI 304 austenitic stainless steel sheet (EN 10088/97) with 2B gloss finish.

Mainly used in environments where sanitisation treatment is needed or with specific atmospheric characteristics.

AISI 316 can also be used.

Thicknesses available: 6-8-10/10 mm.



23 mm thickness



48 mm thickness



Thermal break profile  
48 mm thickness



Thermal break profile  
63 mm thickness

## DESCRIPTION OF THE UNIT

- **Internal insulation:** the following types of thermal and acoustic insulation can be used:
  - Polyurethane foam, density 40+/-5 kg/m<sup>3</sup>, thermal conductivity 0.022 (W/mk). Reaction to fire in accordance with ISO 3582 DIN 4102:B3.
  - Mineral wool, as well as being a natural material with good thermal insulation properties, has an open cell structure that makes it an excellent soundproofing material; indeed it combines five fundamental features, including thermal-acoustic insulation and excellent reaction to fire. Density 90/100 kg/m<sup>3</sup>, thermal conductivity 0.045 (W/mk).

### ■ Sound attenuation

23 mm polyurethane foam panel

Frequency	Hz	63	125	250	500	1000	2000	4000	8000
Sound attenuation	dB	2	9	9	11	12	12	22	30

48 mm polyurethane foam panel



Frequency	Hz	63	125	250	500	1000	2000	4000	8000
Sound attenuation	dB	3	9	9	11	13	12	26	32

23 mm mineral wool panel

Frequency	Hz	63	125	250	500	1000	2000	4000	8000
Sound attenuation	dB	2	13	16	24	23	23	22	30

48 mm mineral wool panel



Frequency	Hz	63	125	250	500	1000	2000	4000	8000
Sound attenuation	dB	4	13	18	24	24	23	26	30

63 mm mineral wool panel



Frequency	Hz	63	125	250	500	1000	2000	4000	8000
Sound attenuation	dB	4	16	21	27	27	28	31	39

- **Rain cover:** required for installations outside of the equipment room, made from:
  - coated sheet metal, 6/10 mm thick
  - galvanised sheet metal, 6/10 mm thick
  - Peraluman sheet metal, 8/10 mm thick
 Secured directly onto the sections using suitably insulated and sealed screws.

DESCRIPTION OF THE UNIT

**Dampers**

- In the standard version, these have an aluminium frame, aluminium louvers with airfoil blades, 100 mm pitch. The specially-shaped blades ensure tightness when closed. Upon request, these can be fitted with seal gaskets on the sides and on the louvers.

All dampers come with 12 mm diameter motor drive shaft for manual or electrical servo control. Can be installed both outside and inside the unit.


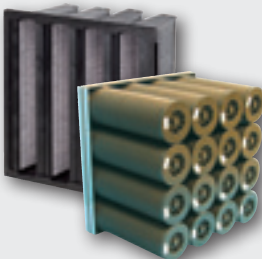

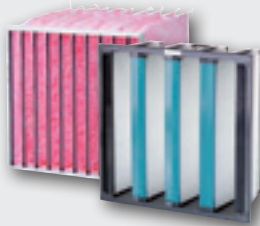



**Filters**

- The air filter section is a fundamental part of the air handling unit, as it removes any contaminants from the air flow. Before choosing a filter, several points need to be assessed, including:
  - type of application
- Filtration guide

- efficiency
- dust accumulation
- pressure drop

The following table helps select the best filter.

Molecular filtration	Final stage, Clean Room filters Class according to Fed. Std 209 E	Second stage and/or final stage for rooms without specific needs	First stage
		Pre-filter stage for HEPA/ULPA filters	
	Ultra high efficiency	High efficiency	Middle efficiency
	ULPA/HEPA NaCl - 0,65 um ≥ 95% ≥ 99,9% ≥ 99,97% ≥ 99,99% ≥ 99,999%	Fine filters	Coarse filters
	EN 1822	EN 779:2002, Dust spot on 0.4 um	EN 779:2002, Arrestance
Cartridge filters, deodorising filters, rigid or soft bags.	MMPS (Most penetrating Particle Size) H11 ≥ 95% H13 ≥ 99,95% H14 ≥ 99,995%	Fine filters F5 ≥ 40% F6 ≥ 60% F7 ≥ 80% F8 ≥ 90% F9 ≥ 95%	Coarse filters G2 ≥ 65% G3 ≥ 80% G4 ≥ 90%
			

## DESCRIPTION OF THE UNIT

- **Middle efficiency filters:** Middle efficiency or coarse filters are used as the first or second filter stage.

Filter class in accordance with EN 779-2002:

G2 Weighted average efficiency  $\geq 65\%$

G3 Weighted average efficiency  $\geq 80\%$

G4 Weighted average efficiency  $\geq 90\%$

Type of filters:

G2 Corrugated mesh filter cells (stainless/galvanised steel)

G3 Drum filter with progressive density synthetic media

G4 Corrugated filter cells with synthetic media, galvanised steel frame, welded galvanised steel wire protective grill.

- **High efficiency filters:** High efficiency filters or fine filters are used as the second or final filter stage in places without specific needs. Also used as pre-filters for HEPA / ULPA.

Filter class in accordance with EN 779-2002:

F5 Average dust spot efficiency  $\geq 40\%$

F6 Average dust spot efficiency  $\geq 60\%$

F7 Average dust spot efficiency  $\geq 80\%$

F8 Average dust spot efficiency  $\geq 90\%$

F9 Average dust spot efficiency  $\geq 95\%$

Type of filters:

F5

- Corrugated filter cells with synthetic media, galvanised steel frame, welded galvanised steel wire protective grill.

Recommended maximum pressure drop 200 Pa.

- Soft pocket filters with large glass fibre filtering surface. Galvanised steel frame.

Recommended maximum pressure drop 250 Pa.

F6 / F7 / F9 (fig. 2)

- Soft pocket filters with large glass fibre filtering surface. Galvanised steel frame Length 380 mm.

Upon request the filtering surface area can be increased by extending the length of the filter to 535 or 635 mm.

Recommended pressure drop 250 Pa.

- Rigid glass fibre pocket filter, polypropylene/ABS frame. Recommended maximum pressure drop 250 Pa (fig. 1).



fig. 1



fig. 2



fig. 3

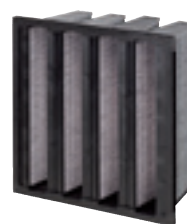


fig. 4

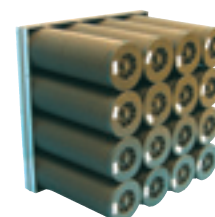


fig. 5

- **Ultra high efficiency filters:** Ultra high efficiency filters are used as the final stage to ensure high air purity. Mainly installed in places that need to remain aseptic, such as clean rooms, hospital environments, pharmaceutical or electronics facilities. The type of installation of these filters is essential, being housed in special galvanised or stainless steel frames fitted with gaskets to ensure the filter is not bypassed (fig. 3).

Filter class in accordance with EN 1822:

H 11 Efficiency  $\geq 95\%$

H 13 Efficiency  $\geq 99.95\%$

H 14 Efficiency  $\geq 99.995\%$

H 11 / 13 / 14

Absolute HEPA filter, galvanised steel frame and micron-sized glass fibre filter media.

Recommended maximum pressure drop 600 Pa.

- **Molecular filtration:** These filters were originally designed for trapping gaseous pollutants (molecules) such as vehicle exhausts, industrial emissions from combustion processes or simple cigarette smoke.

Their trapping capacity depends on the type of molecule being filtered.

Can be used in combination with dust filters.

Type:

- Soft pocket with activated carbon for double action: filtration of dust (EN 779 filtration class F7) and gaseous pollutants. Installed to replace existing pocket filters, with no further filtering systems required. Made from glass fibre media plus activated carbon.

- Rigid pocket with activated carbon for double action: filtration of dust (EN 779 filtration class F7) and gaseous pollutants. Installed to replace existing pocket filters, with no further filtering systems required. Made from glass fibre media plus activated carbon (fig. 4).

- Cartridges containing activated carbon, ideal for service and industrial applications where deodorising is required. Fitted on galvanised metal plates with bayonet mount (fig. 5).



DESCRIPTION OF THE UNIT

**Heat exchange coils**

- Heat exchange coils are the principal elements bringing about changes in air temperature and humidity. Heat exchange is indirect; a primary fluid such as hot or cold water, or hot or cold gas that flows through the coils interacts with the secondary fluid, in this case the process air. The coils are finned tubes made from different materials with continuous fins featuring a collar to adjust and evenly space the fins. The tubes are mechanically expanded to ensure perfect coupling between tube and fin and consequently perfect heat exchange. The fins have a corrugated surface to ensure rigidity and create air turbulence, increasing the heat exchange coefficient. All coils can be removed both from the side with fittings and the opposite side. The heat exchanger construction materials are chosen based on the primary and secondary fluids; the following options are available:

**Materials**

Copper tube	Aluminium fins
Copper tube	Copper fins
Copper tube	Tinned copper fins
Copper tube	Coated aluminium fins
Iron tube	Aluminium fins
Stainless steel tube	Aluminium fins
Stainless steel tube	Stainless steel fins

**Configurations**

PT 60	60x30 ø 5/8 tube
PT 30	30x30 ø 5/8 tube
PT 30	30x26 ø 3/8 tube
PT 40	40x30 ø 5/8 tube

- Fin pitch mm** 1,8 2,0 2,5 3,0 4,0 5,0 6,0

**Operation**

- Hot water
- Cold water
- Superheated water
- Steam
- Direct expansion of Freon
- Condensation of Freon

The number of rows, circuit configuration and materials can be easily determined using the VORTICE selection program and with the help of the company's technical department. When sizing the unit, as well as air velocity, a number of minimum and maximum limits also been to be taken into account, based on experience and practical considerations.

TYPE OF PROCESS	MINIMUM LIMIT	MAXIMUM LIMIT	
		m/sec	m/sec
Cooling and condensation without droplet separator	1.6	2.5	
Cooling and condensation with droplet separator	1.6	3.2	
Heating	1.6	4.1	





## DESCRIPTION OF THE UNIT

- **Electric coils:** electric coils are made from finned tubular air heating elements with single- or multi-stage operation.

The standard configuration features iron tubes and galvanised iron fins, the heating elements are fastened to a galvanised sheet metal sheath by insulated bushes complete with vibration-damping gasket.

Complete with mechanical thermoregulator with two changeover contacts, range 20°/120°C.

Power supply 400 V 3 Phase 50 Hz.

Terminal block protection IP 55.

For correct operation, air velocity must not be less than 2.6 m/sec.

The electric coil should be installed downstream of the fan to avoid overheating the motor.

If used in humid environments with steam production or frequent washing, the heater contacts can be sealed for protection.

A wide range of heat outputs is available, depending on the type of process performed.

- **Coil dimensions**

SIZE	Section dimensions base x height 50 mm thick	Coil dimensions		60x30 config. tubes	30x30 config. tubes	30x26 config. tubes	40x30 config. tubes
		W x H	section mq				
CTL 20	800 x 650	580 x 420	0,24	7	14	14	10
CTL 30	1050 x 650	790 x 420	0,33	7	14	14	10
CTL 40	1300 x 700	1000 x 420	0,42	7	14	14	10
CTL 50	1050 x 800	800 x 600	0,48	10	20	20	15
CTL 60	1300 x 800	1000 x 600	0,60	10	20	20	15
CTL 70	1550 x 800	1250 x 600	0,75	10	20	20	15
CTL 80	1300 x 1050	1000 x 840	0,84	14	28	28	21
CTL 100	1550 x 1050	1250 x 840	1,05	14	28	28	21
CTL 120	1800 x 1050	1500 x 840	1,26	14	28	28	21
CTL 140	2050 x 1050	1750 x 840	1,47	14	28	28	21
CTL 160	1550 x 1300	1250 x 1080	1,35	18	36	36	27
CTL 170	1800 x 1300	1500 x 1080	1,62	18	36	36	27
CTL 200	2050 x 1300	1750 x 1080	1,89	18	36	36	27
CTL 220	2300 x 1300	2000 x 1080	2,16	18	36	36	27
CTL 240	1800 x 1550	1500 x 1320	1,98	22	44	44	33
CTL 250	2050 x 1550	1750 x 1320	2,31	22	44	44	33
CTL 270	2300 x 1550	2000 x 1320	2,64	22	44	44	33
CTL 300	2550 x 1550	2200 x 1320	2,90	22	44	44	33
CTL 340	2800 x 1550	2450 x 1320	3,23	22	44	44	33
CTL 350	2300 x 1800	2000 x 1560	3,12	26	52	52	39
CTL 360	2550 x 1800	2200 x 1560	3,43	26	52	52	39
CTL 380	2800 x 1800	2450 x 1560	3,82	26	52	52	39
CTL 450	3050 x 1800	2700 x 1560	4,21	26	52	52	39
CTL 480	2550 x 2050	2200 x 1800	3,96	30	60	60	45
CTL 510	2800 x 2050	2450 x 1800	4,41	30	60	60	45
CTL 530	3050 x 2050	2700 x 1800	4,86	30	60	60	45
CTL 570	2800 x 2300	2450 x 2040	5,00	34	68	68	51
CTL 600	3050 x 2300	2700 x 2040	5,51	34	68	68	51
CTL 700	3050 x 2550	2700 x 2280	6,16	38	76	76	57
CTL 800	3800 x 2550	3500 x 2280	7,98	38	76	76	57
CTL 900	4300 x 2550	4000 x 2280	9,12	38	76	76	57
CTL 1000	4800 x 2250	4500 x 2280	10,26	38	76	76	57



DESCRIPTION OF THE UNIT

**Humidifier sections**

- Air humidification plays a fundamental role in normal air-conditioning processes, as the humidity level needs to be kept constant to ensure personal comfort in air-conditioned spaces. The most common solutions are:
  - Adiabatic humidification with wetted media
  - Water spray humidification with one or two nozzle racks
  - Steam humidification
 The features of each are described below.

**Wetted media humidifier**

Evaporative humidification uses specially-shaped wetted media with a honeycomb-like structure, made from sheets of resin-impregnated absorbent paper to ensure the right consistency and structural strength, protect against decomposition and prevent mould formation. The media is formed using sheets of cross corrugated cellulose glued together using atoxic adhesives; no phenolic resins are used. This arrangement ensures a large contact surface between the air and water, meaning high efficiency. The operating principle is simple, and involves uniformly wetting the media using a special distribution system to avoid dry areas that would cause a decline in efficiency. The air flowing through the media is humidified and cooled to an extent that varies depending on the conditions.

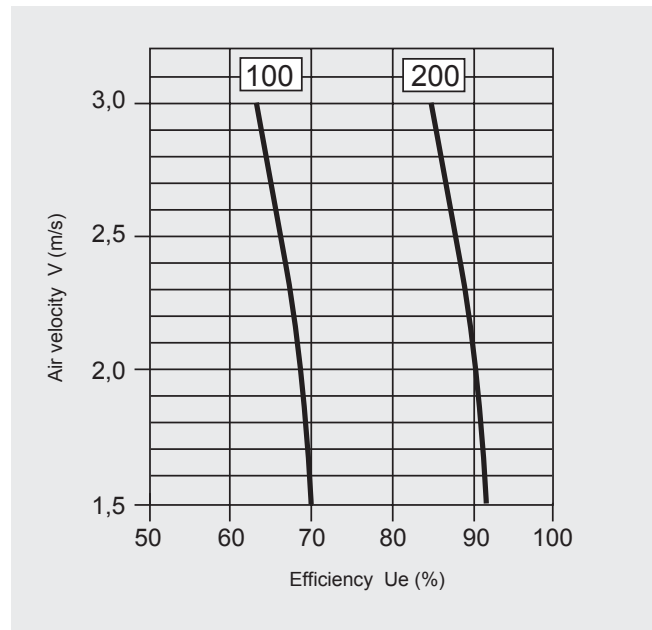
Main features of the cellulose media include:

- Excellent efficiency
- Low pressure drop
- Low running costs
- Fast installation

To achieve good efficiency and correct hygiene, the conditions of the humidifier sections in civil air-conditioning systems need to be checked periodically.

The following types of application are available:

- 100 mm honeycomb media with once-through water
- 200 mm honeycomb media with once-through water
- 100 mm honeycomb media with recirculating pump
- 200 mm honeycomb media with recirculating pump



■ **Water spray humidifier with one or two nozzle racks**

Adiabatic humidifier made up of a series of spray nozzles operating at low pressure, supplied via a manifold connected to the water mains or a pumping system. This type of humidifier can also be used for evaporative cooling or as a washer. In this case, two rows of nozzles are used with flow in both the same and the opposite directions, creating turbulence that causes the dust to precipitate. These systems have a multitude of applications; naturally, demineralised water must be used for sterile and aseptic environments. Main features of the spray system include:

- Reasonably good efficiency
- Low pressure drop
- Low running costs

The following types of application are available:

- Low pressure nozzles
- Humidifier with 1 low press. nozzle rack and once-through water
  - Humidifier with 2 low press. nozzle racks and once-through water
  - Humidifier with 1 low press. nozzle rack and recirculating pump
  - Humidifier with 2 low press. nozzle racks and recirculating pump



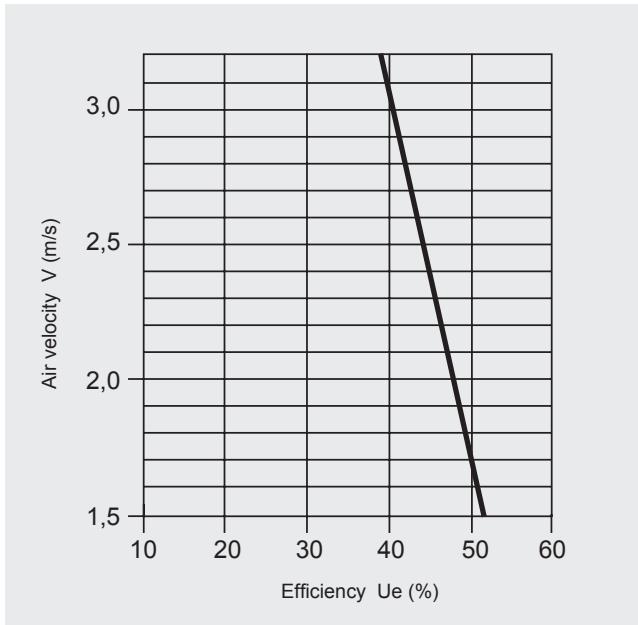
Wetted media humidifier



Water spray humidifier

## DESCRIPTION OF THE UNIT

### ■ Spray humidification efficiency



- Atomising humidifier** (fig. 6): this type of humidifier represents a new generation of economical appliances, with power consumption of just 4 watts for each l/h of water atomised. Ideal for all applications where high humidification capacities are required, up to 500 kg/h. The appliance uses a special pump to deliver water at high pressure through stainless steel nozzles and produce a very fine and uniform fog. The droplets generated then spontaneously evaporate, humidifying and cooling the air. This air/water system does not require the use of a compressor or installation of a compressed air line. In addition, as a further guarantee of hygiene, the appliance does not atomise recirculated water, in compliance with the main international guidelines and standards (ASHRAE 12-2000, VDI6022, VDI3803, L8).  
 EFFICIENCY: Absorption efficiency is 85-87%.

- Steam humidifier:** isothermal humidifier made using one or more perforated stainless steel steam pipes, complete with additional concentric pipes for draining condensate.



fig. 6



fig. 7

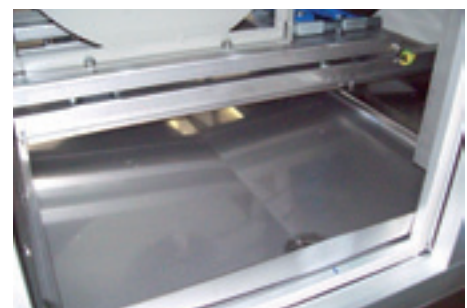


fig.8

The humidifier section is sized to ensure maximum air/steam interaction. Main features of the steam system include:

- Very high efficiency
- Low pressure drop
- Multiple applications
- Easy to install

Naturally, running costs are regards energy consumption are higher when compared against the systems described previously.

This type of humidifier can be supplied as follows:

- unit configured for humidifier installation by the customer
- steam distributor only (if a source of steam is already available)
- distribution system and immersed electrode steam generator

EFFICIENCY: Efficiency is around 90%.

### Droplet separators (fig. 7)

- These are designed to trap as many droplets of water as possible generated inside the unit by air dehumidification or humidification systems. These must be installed:
  - when the air velocity across the cooling coil exceeds 2.5 m/sec
  - downstream of all the humidification systems described previously
  - in certain applications downstream of plate heat recovery exchangers where a high amount of condensation takes place

The following materials and types can be selected:

- 2 changes in direction, extruded polypropylene
- 4 changes in direction, extruded polypropylene
- 2 changes in direction, extruded aluminium
- 3 changes in direction, press formed stainless steel sheet

### Drain tank

- Condensate collection tanks are provided near the following components: Cooling coil - Heat recovery coils - Cross-flow heat recovery units - Heat wheels - Humidifier sections - Droplet separators Made from thick press formed and welded AISI 304/316 stainless steel or galvanised iron sheet. Featuring drain opening and hose connector to simplify water connection on site. For sanitisable air handling units, tanks are provided with higher inclines to assist complete drainage of the water (fig. 8).



DESCRIPTION OF THE UNIT

**Heat recovery units**

- Heat recovery units are widely used to partially recover waste or exhaust energy, bringing significant savings in system running costs. The following types are available:
  - Plate heat recovery exchangers
  - Heat wheels
  - Heat recovery coils
  - Heat pipe heat exchangers
 (contact the technical department for sizing)

- **Plate heat recovery exchangers:** plate heat recovery units are heat exchangers that transfer heat between two air flows due to the difference in temperature. These units allow significant savings in running costs of air-conditioning systems by recovering energy that otherwise would be lost in the form of heat.

Essential features

- low installation and running costs
- complete separation of air flows
- no moving parts
- low pressure drop
- high efficiency
- easy cleaning and minimum maintenance
- effective noise abatement.

These can be made from aluminium, aluminium with atoxic corrosion-resistant coating or AISI 316L stainless steel.

- **Heat wheels** (fig. 10): rotary air-to-air heat exchangers consist of a rotating cylinder containing thousands of pockets with a very large surface area, a housing frame (comp. with brush gaskets to minimise leaks between ventilation and exhaust air flows), and a drive system made up of an electric motor with speed control where necessary.

Essential features

- The very high heat exchange surface in relation to the volume of air ensures much higher performance than other types of heat recovery units, reaching efficiency of up to 85%.
- This high efficiency plus the possibility to recovery moisture as well as heat (enthalpy wheel) mean the capacity of the units installed can be reduced considerably.
- Possibility to transfer heat latent.

- Low pressure drop.

Can be made from aluminium or aluminium with atoxic coating. Enthalpy wheels can be supplied for the recovery of latent heat.

- **Heat recovery coils:** these are made in the same way as normal heat exchange coils, installed in the exhaust air and fresh air sections and connected via a circulating pump, generally with a water-glycol mix, creating heat exchange with efficiency less than 50%. These units are mainly used in environments where there must be no contamination between air flows.
- **Heat pipe heat exchangers:** heat recovery units are made up of a heat exchanger, similar to a finned coil and generally with copper pipes and aluminium fins, divided into two adjacent sections. The pipes are filled with refrigerant (typically R134a) that changes state, from liquid to vapour and vice-versa, when the temperature changes. The partition between the sections, generally placed in the centre of the heat exchanger, separates the fresh air flow from the exhaust air. A tilt control device is available for seasonal changeover in operating mode.

**Silencers**

- Noise pollution is a problem that increasingly often needs to be faced during the design process. Sound emissions are generated by the fans, and the only noise abatement system involves placing silencers upstream or downstream, depending on requirements. These are made from 100/200 mm thick mineral wool, protected by a layer of fabric or, on request, heat shrink plastic film, to ensure a perfect seal. The mineral wool is housed in a galvanised metal frame, with galvanised iron retaining mesh.

- **Baffle lengths:** 700, 950, 1200, 1450, 1750, 1950 mm.

■ **Sound attenuation**

HZ/ Length	63	125	250	500	1000	2000	4000	8000
700	6	10	14	23	32	26	20	15
950	9	14	25	42	39	37	31	21
1200	9	15	27	44	40	39	32	21
1450	10	17	30	47	44	42	36	23
1750	12	19	35	48	47	47	42	26
1950	13	21	39	48	49	49	45	28

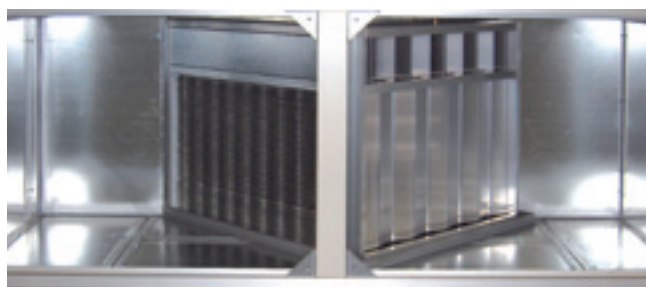


fig.9

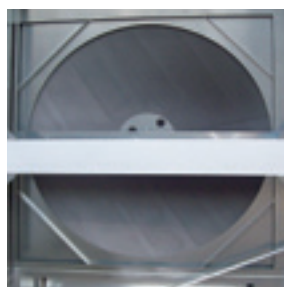


fig.10

## DESCRIPTION OF THE UNIT

### Ventilation sections

- These consist of: fan, motor, supports and dampers.
- Fans:** centrifugal fans can be installed with the following configurations:

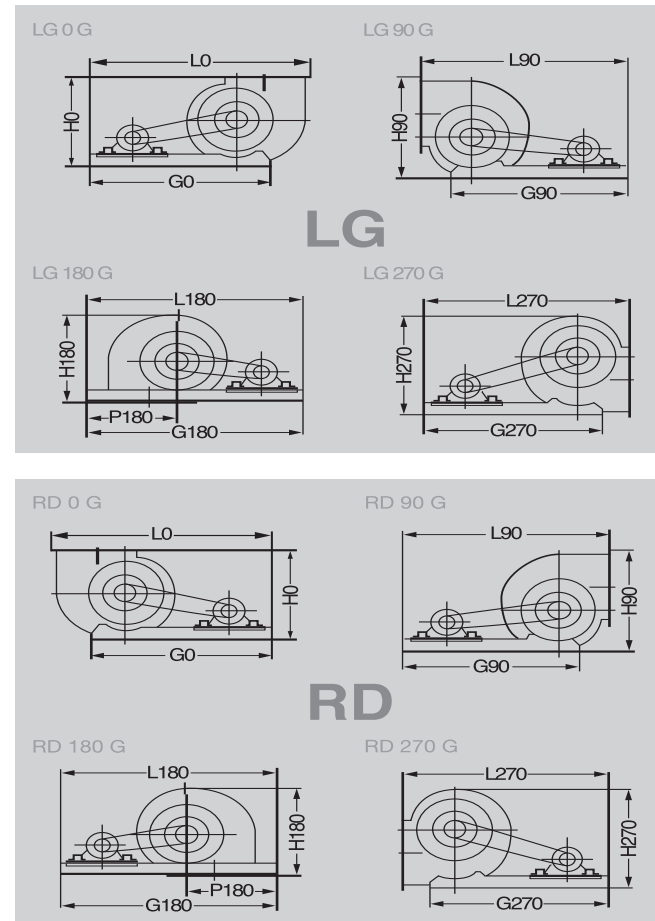
- forward curved blades
- backward curved blades
- backward curved without scroll (plug fan)
- backward curved airfoil blades

The impellers are statically and dynamically balanced in accordance with the standards in force. Series R uses an individual sealed ball bearing ring, with lifetime lubrication, while the other versions have bearings with grease nipples. The bearings are rated for a lifespan of at least 40,000 hours. The type is selected according to the required performance, efficiency and sound emissions.

### Accessories:

- Painting, completely painted versions can be made upon request.
- Explosion proof configuration, with aluminium alloy, copper or raised copper edge intake openings.
- Condensate drain.
- Inspection opening.

### Orientation





DESCRIPTION OF THE UNIT

**Ventilation sections**

- The following tables illustrate the fans available with reference to the size of the unit.

Size	Fans with forward curved / backward curved / airfoil blades										
<b>CTL 20</b>	225*										
<b>CTL 30</b>	225*										
<b>CTL 40</b>	225*	250*									
<b>CTL 50</b>	225*	250*	315								
<b>CTL 60</b>	225*	250*	315								
<b>CTL 70</b>	225*	250*	315								
<b>CTL 80</b>		250*	315	450							
<b>CTL 100</b>		250*	315	450							
<b>CTL 120</b>		250*	315	450							
<b>CTL 140</b>		250*	315	450							
<b>CTL 160</b>		250*	315	450	560						
<b>CTL 170</b>		250*	315	450	560						
<b>CTL 200</b>		250*	315	450	560						
<b>CTL 220</b>		250*	315	450	560						
<b>CTL 240</b>		250*	315	450	560	710					
<b>CTL 250</b>		250*	315	450	560	710					
<b>CTL 270</b>		250*	315	450	560	710					
<b>CTL 300</b>		250*	315	450	560	710					
<b>CTL 340</b>		250*	315	450	560	710					
<b>CTL 350</b>		250*	315	450	560	710	800				
<b>CTL 360</b>		250*	315	450	560	710	800				
<b>CTL 380</b>		250*	315	450	560	710	800				
<b>CTL 450</b>		250*	315	450	560	710	800				
<b>CTL 480</b>		250*	315	450	560	710	800	900			
<b>CTL 510</b>		250*	315	450	560	710	800	900			
<b>CTL 530</b>		250*	315	450	560	710	800	900			
<b>CTL 570</b>		250*	315	450	560	710	800	900	1000		
<b>CTL 600</b>		250*	315	450	560	710	800	900	1000		
<b>CTL 700</b>		250*	315	450	560	710	800	900	1000	1120	
<b>CTL 800</b>										1120	
<b>CTL 900</b>		* not available in the airfoil version									1120
<b>CTL 1000</b>										1120	

## DESCRIPTION OF THE UNIT

- Sizes referring to plug fans.

Size	Plug fans							
<b>CTL 20</b>	315							
<b>CTL 30</b>	315							
<b>CTL 40</b>	315	355						
<b>CTL 50</b>	315	355	400					
<b>CTL 60</b>	315	355	400					
<b>CTL 70</b>	315	355	400					
<b>CTL 80</b>	315	355	400	630				
<b>CTL 100</b>	315	355	400	630				
<b>CTL 120</b>	315	355	400	630				
<b>CTL 140</b>	315	355	400	630				
<b>CTL 160</b>	315	355	400	630	800			
<b>CTL 170</b>	315	355	400	630	800			
<b>CTL 200</b>	315	355	400	630	800			
<b>CTL 220</b>	315	355	400	630	800			
<b>CTL 240</b>	315	355	400	630	800	1000		
<b>CTL 250</b>	315	355	400	630	800	1000		
<b>CTL 270</b>	315	355	400	630	800	1000		
<b>CTL 300</b>	315	355	400	630	800	1000		
<b>CTL 340</b>	315	355	400	630	800	1000		
<b>CTL 350</b>	315	355	400	630	800	1000	1100	
<b>CTL 360</b>	315	355	400	630	800	1000	1100	
<b>CTL 380</b>	315	355	400	630	800	1000	1100	
<b>CTL 450</b>	315	355	400	630	800	1000	1100	
<b>CTL 480</b>	315	355	400	630	800	1000	1100	
<b>CTL 510</b>	315	355	400	630	800	1000	1100	
<b>CTL 530</b>	315	355	400	630	800	1000	1100	
<b>CTL 570</b>	315	355	400	630	800	1000	1100	
<b>CTL 600</b>	315	355	400	630	800	1000	1100	
<b>CTL 700</b>	315	355	400	630	800	1000	1100	
<b>CTL 800</b>	315	355	400	630	800	1000	1100	
<b>CTL 900</b>	315	355	400	630	800	1000	1100	
<b>CTL 1000</b>	315	355	400	630	800	1000	1100	



DESCRIPTION OF THE UNIT

**Ventilation sections**

- **Motors:** the motors installed are three-phase asynchronous, with closed construction, fan cooled, squirrel cage rotor, compliant with IEC 60072-1, IEC 60034, and featuring:

- Index of protection	IP 55
- Insulation class	F
- Temperature limits compatible with class B	
- Max room temperature	40° C
- Construction	B3
- Single pole	2-4-6
- Two pole	2/4
	4/6
	4/8

- **Efficiency IE2**

- **Drive:** pulley and V-belt drive with conical tightening bush. Made from cast iron with galvanic surface treatment, SPB or SPA grooves. Variable speed pulleys can be selected for optimum system control. The motor is installed on a belt tensioner made from thick galvanised sheet metal, allowing correct belt tension to be adjusted; stainless steel tensioners are available on request.

- **Vibration-damping supports:** the fan-motor assembly is installed on a press formed sheet metal frame; this is in turn generally secured to the bottom of the unit via vibration-damping supports. As standard the vibration dampers are made from oil resistant synthetic rubber or natural rubber with high energy dissipation, created using compounds especially designed for this type of product; hardness is 60°Sh. Upon request vibration dampers with all-metal springs can be installed, suitably sized to eliminate all possible vibrations.

- **Standard components:** the following are installed as standard on all ventilation sections:

- Safety microswitch
- Specially-sized safety mesh made from welded galvanised wire, fixed to the inspection opening on the fan-motor assembly
- Earth wire between motor support and base frame
- Flexible joint suitable for connecting the fan to the system, reducing noise and vibrations, made from polyester fabric with galvanised metal flange





## ACCESSORIES

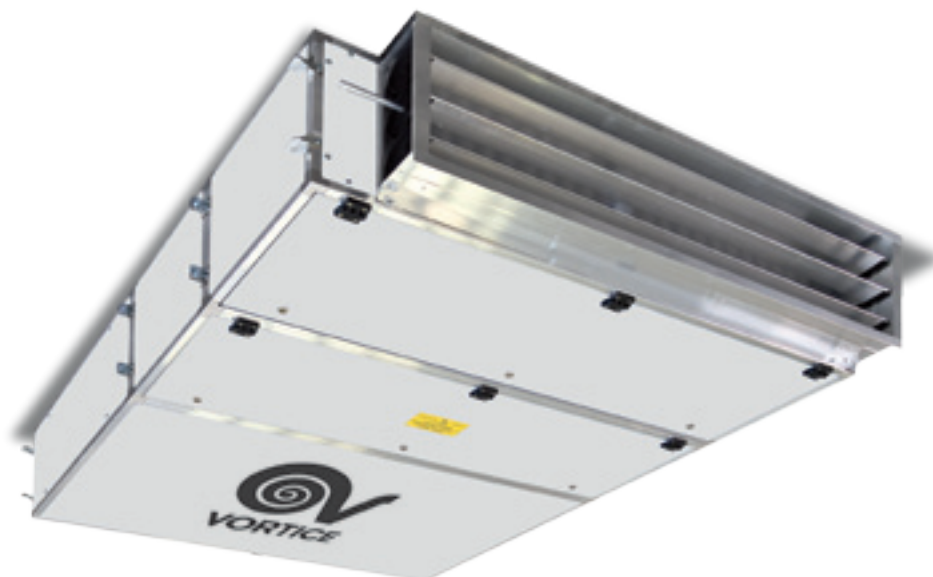
- All VORTICE air handling units can be installed with the following accessories, upon request:
    - External compartments for housing valves or electrical panels, made-to-measure where required. Made from the same 23 mm sandwich panel as the air handling unit.
    - Vibration damper joints on return air, fresh air inlet and ventilation air sections.
    - Fresh air and return air intake grills made from aluminium with fixed louvers.
    - Closed panels to be drilled on site.
    - IP 65 light fitting.
    - IP 65 light fitting with wiring.
    - Column pressure gauge, Magnehlic pressure gauge, differential pressure switch.
    - Pressure test points.
- Completely wired control systems and electrical panels can also be supplied. Testing can be performed directly on site.





# MCL

## Micro air handling units horizontal execution



### PRODUCT SPECIFICATIONS

- The MCL micro air handlers are designed to respond to special system requirements where installation space is restricted and low ceiling heights are unavoidable.
- Application in small and medium-sized spaces with special air-conditioning requirements.
- This series uses centrifugal fans coupled to electronically-controlled single-phase motors with constant flow-rate, covering a range of system flow-rates from 1000 m<sup>3</sup>/h to 6000 m<sup>3</sup>/h.
- **G4 filter**, synthetic filtering media, weighted average efficiency  $\geq 90\%$  with galvanised frame and retaining mesh.
- **Heat exchange coils** suitable for heating/cooling operation, 2/4/6 rows made from 5/8" copper tube with aluminium fins and turbulators. Coils and basin removable from below.
- **Condensate collection basin** made from galvanised sheet metal with drain at bottom and welded hose fitting.
- **Double suction centrifugal fans** with forward curved blades, complete with programmable electronically-controlled 6-pole motor for "sensorless" constant flow-rate control. High efficiency and low noise motor driven by a 16 KHz inverter to eliminate acoustic disturbance. Single-phase power supply, 230 V 50 Hz IP 54. Insulation class F. Programming by potentiometer. Control using 0/5 Volt potentiometric signal (+5 Volt). The correspondence between potentiometric signal and flow-rate is defined when programming each fan and is based on predefined flow-rates.

### KEY FEATURES

- **Frame**, made using a modular system of extruded anodised aluminium alloy section bars (in accordance with UNI 9006/1), joined by die-cast aluminium corners.
- **Sandwich panels**, insulated using polyurethane foam, density 40 kg/m<sup>3</sup>, 18 mm thick. Outside panel made from coated sheet metal, 6/10 thickness with protective film, inside panel made from galvanised sheet metal, 6/10 thickness.

**Warning: Maximum operating temperature between -20°C and +40°C with air-cooled motor.**

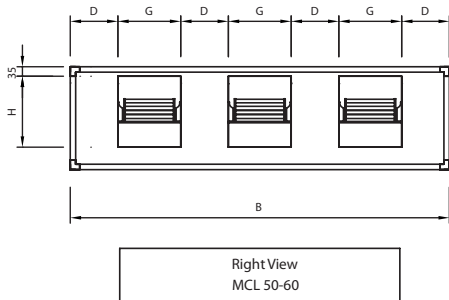
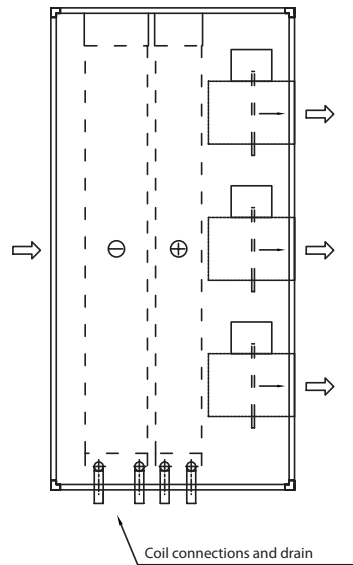
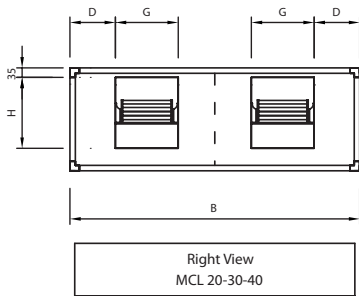
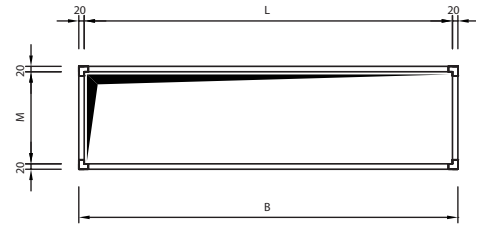
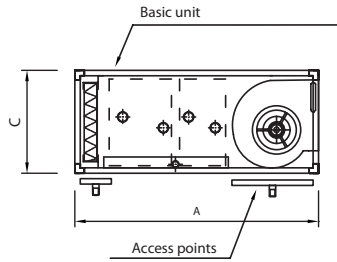
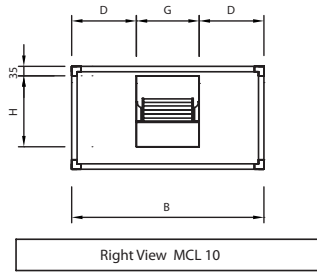
## CERTIFICATION

MODEL	MCL	10	20	30	40	50	60
Air flow rate (maximum speed)	m <sup>3</sup> /h	1000	2000	2800	4000	4800	6000
Static pressure (1)	Pa	452	452	396	452	532	452
Sound pressure level (2)	dB(A)	69	69	70	69	69	69
FAN	MCL	10	20	30	40	50	60
Power input	W	370	2x370	2x370	2x550	3x550	3x550
Max absorbed current	A	4,2	2x4,2	2x4,2	2x6,7	3x6,7	3x6,7
N. of fans	n°	1	2	2	2	3	3
Fan speeds	n°	variable					
Poles	n°	6	6	6	6	6	6
Enclosure protection	IP	54	54	54	54	54	54
Insulation class	B	F	F	F	F	F	F
Electrical supply	V / ph / Hz	230 / 1 / 50					
FILTER	MCL	10	20	30	40	50	60
Efficiency		G4	G4	G4	G4	G4	G4
Crossing speed	m/s	1,63	2,16	2,29	2,60	2,62	3,27
Average pressure drop	Pa	76	88	92	100	100	116
2R hot water coil	MCL	10	20	30	40	50	60
Heating capacity (3)	kW	14,6	28,86	41,59	61,8	68,4	84
Supply air temperature	°C	37,7	37,2	38,4	40,2	36,7	35,9
Water flow	dm <sup>3</sup> /h	1255	2482	3576	5319	5882	7221
Water pressure drop	kPa	3,2	6,5	13,8	20,2	5,4	8,1
Air pressure drop	Pa	29	36	35	30	38	43
Connection diameter	Gas	1"	1 1/4"	1 1/4"	1 1/2"	1 1/2"	1 1/2"
4R hot water coil	MCL	10	20	30	40	50	60
Heating capacity (3)	kW						
Supply air temperature	°C						
Water flow	dm <sup>3</sup> /h						
Water pressure drop	kPa						
Air pressure drop	Pa						
Connection diameter	Gas						
The outlet air temperature is too high with water at 70°/60°C, therefore the water temperature should be 45°							
4R cold water coil	MCL	10	20	30	40	50	60
Total cooling capacity (4)	kW	10,4	20,7	29,3	43,2	50	62,2
Supply air temperature	°C	15	15	14,9	14,5	14,9	15,1
Water flow	dm <sup>3</sup> /h	1784	3552	5039	7429	8597	10696
Water pressure drop	kPa	10,4	12,8	17,7	13,3	17,7	27,5
Air pressure drop	Pa	87	104	103	91	107	122
Connection diameter	Gas	-	-	-	-	-	-
6R cold water coil	MCL	10	20	30	40	50	60
Total cooling capacity (4)	kW	13,02	25,55	35,44	52,51	60,22	75,31
Supply air temperature	°C	11,3	11,6	11,7	11,2	11,9	12
Water flow	dm <sup>3</sup> /h	2240	4395	6095	9031	10359	12953
Water pressure drop	kPa	19,9	23,5	15,8	23,4	12	18,8
Air pressure drop	Pa	103	123	121	107	127	145
Connection diameter	Gas	-	-	-	-	-	-
Electric coil	MCL	10	20	30	40	50	60
Heating capacity (3)	kW	3,5	6,5	10	13	16,5	20
Air pressure drop	Pa	14	16	16	17	17	19
Stages	n°	1	1	2	2	2	2
Power consumption	A	8,5	12,8	13,6	25,5	34	34
Electrical supply	V / ph / Hz	400 / 3 / 50					

(1) Referred to the fan: deduct the pressure drop of the selected components in order to get the external static pressure; 2) Sound pressure level: data referred to 1,5 metres from inlet in free field. The actual operation noise level generally differs from the values shown in the table, depending on operating conditions, reflected noise and surrounding noise; (3) Inlet air Temp. -5°C, U.R. 80%, Water Temp. In/out 70/60°C. Air flow at max speed; (4) Inlet air Temp. 32°C, U.R. 50%, Water Temp. in/out 7/12°C. Air flow at max speed. **Warning, the fans are not suitable for operating temperatures exceeding 40°C**



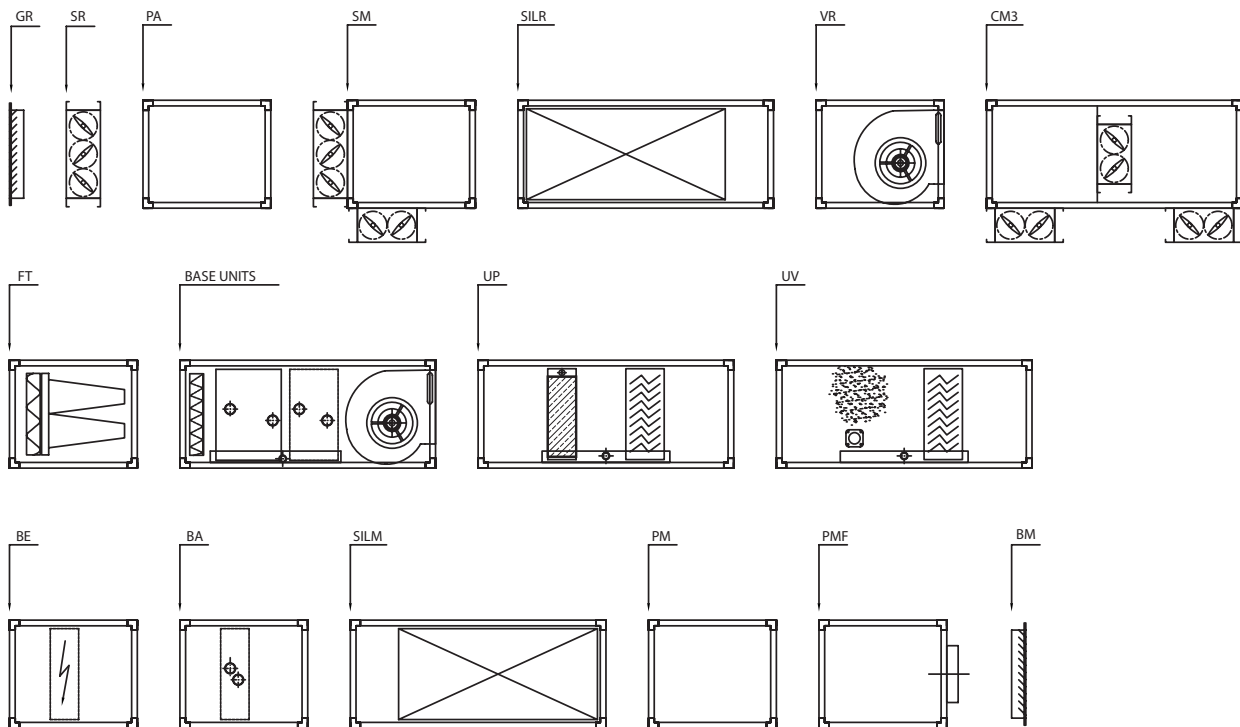
DIMENSIONS



MODEL	10	20	30	40	50	60
A	900	900	900	960	960	960
B	710	1070	1400	1680	1900	2000
C	380	380	380	450	450	450
D	239	168	244	308	272	336
G	232	232	232	232	232	232
H	262	262	262	262	262	262
L	670	1030	1360	1640	1740	1960
M	340	340	340	410	410	410

Dimensions (mm)

## COMPONENTS



## AVAILABLE ACCESSORIES

- GR** Intake grill with fixed aluminium blades
- SR** Control damper with motor drive shaft
- PA** Intake plenum
- SM** Mixing chamber complete with 2 control dampers featuring motor drive shaft
- SILR** Return air silencer
- VR** Return air fan
- CM3** Mixing chamber with 3 dampers featuring motor drive shaft
- FT** Rigid bag filter
- UP** Wetted media humidification compartment
- UV** Steam humidification compartment with nozzles
- BE** Electric coil for post-heating
- BA** Hot water coil for post-heating
- SILM** Outlet air silencer
- PM** Outlet plenum
- PMF** Outlet plenum for circular ducting
- BM** Outlet with two rows of aluminium blades
- MS** Safety microswitch
- CM** Manual damper control
- PR** Differential pressure switch
- MA** Water column differential pressure gauge



EFFICIENCY HEATING COILS

MCL 10

ROWS 2R	Air		Water 80/70°C			Water 70/60°C				Water 45/40°C				
	Volume	T.i.	T.u.	Pot.	Pw.	Dp W	T.u.	Pot.	Pw.	Dp W	T.u.	Pot.	Pw.	Dp W
	m³/h	°C	°C	kW	dm³/h	KPa	°C	kW	dm³/h	KPa	°C	kW	dm³/h	KPa
1000	-10	43,1	18,2	1561	4,7	36	15,7	1353	3,7	22,4	11,07	1904	6,7	
1000	-5	44,8	17,0	1463	4,2	37,7	14,6	1255	3,2	24,1	9,93	1708	5,6	
1000	0	46,4	15,87	1365	3,7	39,4	13,46	1157	2,8	1513	8,8	1513	4,5	
1000	5	48,1	14,73	1267	3,3	41	12,32	1059	2,4	27,4	7,66	1318	3,5	
1000	10	49,8	13,59	1169	2,8	42,7	11,18	962	2	29,1	6,53	1123	2,6	
1000	15	51,4	12,45	1071	2,4	44,4	10,05	864	1,7	30,8	5,4	929	1,9	

ROWS 4R	Air		Water 80/70°C			Water 70/60°C				Water 45/40°C				
	Volume	T.i.	T.u.	Pot.	Pw.	Dp W	T.u.	Pot.	Pw.	Dp W	T.u.	Pot.	Pw.	Dp W
	m³/h	°C	°C	kW	dm³/h	KPa	°C	kW	dm³/h	KPa	°C	kW	dm³/h	KPa
1000	-10	*	*	*	*	56,2	22,62	1945	9,7	36,1	15,75	2708	17,5	
1000	-5	*	*	*	*	*	*	*	*	36,6	14,23	2447	14,6	
1000	0	*	*	*	*	*	*	*	*	37,2	12,71	2185	11,9	
1000	5	*	*	*	*	*	*	*	*	37,7	11,19	1924	9,5	
1000	10	*	*	*	*	*	*	*	*	38,3	9,7	1662	7,3	
1000	15	*	*	*	*	*	*	*	*	38,8	8,14	1400	5,4	

MCL 20

ROWS 2R	Air		Water 80/70°C			Water 70/60°C				Water 45/40°C				
	Volume	T.i.	T.u.	Pot.	Pw.	Dp W	T.u.	Pot.	Pw.	Dp W	T.u.	Pot.	Pw.	Dp W
	m³/h	°C	°C	kW	dm³/h	KPa	°C	kW	dm³/h	KPa	°C	kW	dm³/h	KPa
2000	-10	42,2	35,7	3071	9,6	35,4	31,06	2671	7,5	21,9	21,82	3753	13,7	
2000	-5	44	33,49	2880	8,5	37,2	28,86	2482	6,5	23,7	19,61	3373	11,3	
2000	0	45,8	31,3	2690	7,6	39	26,65	2292	5,7	25,5	17,41	2994	9,1	
2000	5	47,5	29,08	2501	6,6	40,8	24,45	2103	4,9	27,2	15,21	2616	7,2	
2000	10	49,3	26,87	2311	5,8	42,5	22,25	1913	4,1	29	13,01	2238	5,4	
2000	15	51,1	24,66	2121	4,9	44,3	20,1	1724	3,4	30,8	10,8	1861	3,9	

ROWS 4R	Air		Water 80/70°C			Water 70/60°C				Water 45/40°C				
	Volume	T.i.	T.u.	Pot.	Pw.	Dp W	T.u.	Pot.	Pw.	Dp W	T.u.	Pot.	Pw.	Dp W
	m³/h	°C	°C	kW	dm³/h	KPa	°C	kW	dm³/h	KPa	°C	kW	dm³/h	KPa
2000	-10	*	*	*	*	54,9	44,4	3818	11,7	35,2	30,9	5318	21,1	
2000	-5	*	*	*	*	*	*	*	*	35,9	27,93	4805	17,6	
2000	0	*	*	*	*	*	*	*	*	36,5	24,95	4291	14,4	
2000	5	*	*	*	*	*	*	*	*	37,1	21,96	3777	11,5	
2000	10	*	*	*	*	*	*	*	*	37,7	18,97	3262	8,8	
2000	15	*	*	*	*	*	*	*	*	38,4	15,97	2748	6,5	

MCL 30

ROWS 2R	Air		Water 80/70°C			Water 70/60°C				Water 45/40°C				
	Volume	T.i.	T.u.	Pot.	Pw.	Dp W	T.u.	Pot.	Pw.	Dp W	T.u.	Pot.	Pw.	Dp W
	m³/h	°C	°C	kW	dm³/h	KPa	°C	kW	dm³/h	KPa	°C	kW	dm³/h	KPa
2800	-10	43,4	51,16	4400	19,9	36,7	44,7	3844	15,7	22,7	31,3	5387	28,6	
2800	-5	45,2	48,05	4132	17,8	38,4	41,59	3576	13,8	24,5	28,21	4853	23,7	
2800	0	46,9	44,93	3864	15,8	40,2	38,48	3309	12	26,2	25,11	4319	19,3	
2800	5	48,7	41,82	3597	13,9	41,9	35,37	3042	10,3	28	22	3785	15,2	
2800	10	50,4	38,71	3329	12,1	43,7	32,26	2774	8,8	29,7	18,9	3251	11,6	
2800	15	52,2	35,6	3061	10,4	45,5	29,15	2507	7,3	31,5	15,81	2719	8,5	

ROWS 4R	Air		Water 80/70°C			Water 70/60°C				Water 45/40°C				
	Volume	T.i.	T.u.	Pot.	Pw.	Dp W	T.u.	Pot.	Pw.	Dp W	T.u.	Pot.	Pw.	Dp W
	m³/h	°C	°C	kW	dm³/h	KPa	°C	kW	dm³/h	KPa	°C	kW	dm³/h	KPa
2800	-10	*	*	*	*	55,5	62,67	5389	15,9	35,6	43,61	7502	28,7	
2800	-5	*	*	*	*	*	*	*	*	36,2	39,42	6781	24	
2800	0	*	*	*	*	*	*	*	*	36,8	35,23	6060	29,6	
2800	5	*	*	*	*	*	*	*	*	37,4	31,08	5339	15,7	
2800	10	*	*	*	*	*	*	*	*	38	26,84	4617	12,1	
2800	15	*	*	*	*	*	*	*	*	38,7	22,64	3895	8,9	

\* Warning: the type of the fan installed does not allow operation at temperatures above 40°C

## EFFICIENCY HEATING COILS

## MCL 40

ROWS 2R	Air		Water 80/70°C			Water 70/60°C				Water 45/40°C				
	Volume	T.i.	T.u.	Pot.	Pw.	Dp W	T.u.	Pot.	Pw.	Dp W	T.u.	Pot.	Pw.	Dp W
	m³/h	°C	°C	kW	dm³/h	KPa	°C	kW	dm³/h	KPa	°C	kW	dm³/h	KPa
4000	-10	45,5	75,8	6523	29	38,6	66,41	5711	22,9	24	46,47	7993	41,6	
4000	-5	47,1	71,27	6129	26	40,2	61,8	5319	20,2	25,6	41,91	7208	34,6	
4000	0	48,8	66,7	5736	23,1	41,9	57,28	4926	17,6	27,3	37,35	6424	28,2	
4000	5	50,4	62,13	5343	20,3	43,5	52,71	4533	15,2	29	32,79	5640	22,4	
4000	10	52,1	57,56	4950	17,7	45,2	48,15	4141	12,9	30,6	28,23	4856	17,1	
4000	15	53,8	52,99	4557	15,3	46,9	43,58	3748	10,8	32,3	23,68	4072	12,5	

ROWS 4R	Air		Water 80/70°C			Water 70/60°C				Water 45/40°C				
	Volume	T.i.	T.u.	Pot.	Pw.	Dp W	T.u.	Pot.	Pw.	Dp W	T.u.	Pot.	Pw.	Dp W
	m³/h	°C	°C	kW	dm³/h	KPa	°C	kW	dm³/h	KPa	°C	kW	dm³/h	KPa
4000	-10	*	*	*	*	56,3	90,66	7797	11,6	36,1	63,08	10851	20,9	
4000	-5	*	*	*	*	*	*	*	*	36,7	57,02	9808	17,5	
4000	0	*	*	*	*	*	*	*	*	37,3	50,96	8765	14,3	
4000	5	*	*	*	*	*	*	*	*	37,8	44,89	7722	11,4	
4000	10	*	*	*	*	*	*	*	*	38,4	38,8	6678	8,8	
4000	15	*	*	*	*	*	*	*	*	38,9	32,75	5632	6,5	

## MCL 50

ROWS 2R	Air		Water 80/70°C			Water 70/60°C				Water 45/40°C				
	Volume	T.i.	T.u.	Pot.	Pw.	Dp W	T.u.	Pot.	Pw.	Dp W	T.u.	Pot.	Pw.	Dp W
	m³/h	°C	°C	kW	dm³/h	KPa	°C	kW	dm³/h	KPa	°C	kW	dm³/h	KPa
4800	-10	41,6	84,7	7288	7,9	34,9	73,66	6334	6,2	21,5	51,76	8903	11,3	
4800	-5	43,4	79,48	6835	7,1	36,7	68,4	5882	5,4	23,3	46,51	7999	9,4	
4800	0	45,2	74,21	6382	6,3	38,5	63,15	5431	4,7	25,1	41,26	7097	7,6	
4800	5	47	68,95	5930	5,5	40,3	57,9	4979	4	27	36,02	6196	5,9	
4800	10	48,8	63,69	5477	4,8	42,1	52,65	4528	3,4	28,8	30,79	5296	4,5	
4800	15	50,6	58,43	5025	4,1	43,9	47,41	4078	2,8	30,6	25,57	4398	3,2	

ROWS 4R	Air		Water 80/70°C			Water 70/60°C				Water 45/40°C				
	Volume	T.i.	T.u.	Pot.	Pw.	Dp W	T.u.	Pot.	Pw.	Dp W	T.u.	Pot.	Pw.	Dp W
	m³/h	°C	°C	kW	dm³/h	KPa	°C	kW	dm³/h	KPa	°C	kW	dm³/h	KPa
4800	-10	*	*	*	*	55,1	106,84	9188	15,9	35,3	74,37	12791	28,7	
4800	-5	*	*	*	*	*	*	*	*	36	67,22	11561	24	
4800	0	*	*	*	*	*	*	*	*	36,6	60,06	10331	19,6	
4800	5	*	*	*	*	*	*	*	*	37,2	52,91	9100	15,7	
4800	10	*	*	*	*	*	*	*	*	37,9	45,8	7869	12,1	
4800	15	*	*	*	*	*	*	*	*	38,5	38,59	6637	8,9	

## MCL 60

ROWS 2R	Air		Water 80/70°C			Water 70/60°C				Water 45/40°C				
	Volume	T.i.	T.u.	Pot.	Pw.	Dp W	T.u.	Pot.	Pw.	Dp W	T.u.	Pot.	Pw.	Dp W
	m³/h	°C	°C	kW	dm³/h	KPa	°C	kW	dm³/h	KPa	°C	kW	dm³/h	KPa
6000	-10	40,6	103,8	8928	11,8	34,1	90,36	7771	9,2	20,9	63,46	10916	16,9	
6000	-5	42,5	97,4	8376	10,5	35,9	84,0	7221	8,1	22,8	57,06	9815	14,0	
6000	0	44,4	90,98	7824	9,3	37,8	77,56	6671	7	24,7	50,67	8715	11,3	
6000	5	46,2	84,57	7273	8,2	39,7	71,17	6121	6	26,6	44,29	7617	8,9	
6000	10	48,1	78,17	6722	7,1	41,6	64,78	5571	5,1	28,5	37,91	6521	6,7	
6000	15	50	71,76	6172	6,1	43,5	58,39	5022	4,2	30,4	31,55	5426	4,9	

ROWS 4R	Air		Water 80/70°C			Water 70/60°C				Water 45/40°C				
	Volume	T.i.	T.u.	Pot.	Pw.	Dp W	T.u.	Pot.	Pw.	Dp W	T.u.	Pot.	Pw.	Dp W
	m³/h	°C	°C	kW	dm³/h	KPa	°C	kW	dm³/h	KPa	°C	kW	dm³/h	KPa
6000	-10	*	*	*	*	54,3	131,97	11349	24,5	34,8	91,85	15799	44,1	
6000	-5	*	*	*	*	*	*	*	*	35,5	83,04	14283	36,8	
6000	0	*	*	*	*	*	*	*	*	36,2	74,22	12766	30,2	
6000	5	*	*	*	*	*	*	*	*	36,9	65,4	11250	24,1	
6000	10	*	*	*	*	*	*	*	*	39,6	56,6	9732	18,6	
6000	15	*	*	*	*	*	*	*	*	38,3	47,75	8213	13,8	

\* Warning: the type of the fan installed does not allow operation at temperatures above 40°C



EFFICIENCY COOLING COILS

MCL 10

ROWS 4R	Air			Water 7/12°C			Water 8/13°				
	Volume m³/h	T.i. °C	U.R. %	T.u. °C	Pot. kW	Pw. dm³/h	Dp W KPa	T.u. °C	Pot. kW	Pw. dm³/h	Dp W KPa
1000	35	60		16,8	14,9	2559	19,7	17,5	14,3	2460	18,4
1000	32	50		15	10,4	1784	10,4	15,6	9,7	1672	9,3
1000	28	50		13,8	7,27	1251	5,5	14,4	6,73	1157	4,8
1000	26	50		13,1	5,98	1028	3,9	13,8	5,45	937	3,3

ROWS 6R	Air			Water 7/12°C			Water 8/13°				
	Volume m³/h	T.i. °C	U.R. %	T.u. °C	Pot. kW	Pw. dm³/h	Dp W KPa	T.u. °C	Pot. kW	Pw. dm³/h	Dp W KPa
1000	35	60		12,6	18,47	3177	37,1	13,5	17,68	3041	34,3
1000	32	50		11,3	13,02	2240	19,9	12,2	12,31	2118	18
1000	28	50		10,7	9,46	1626	11,3	11,5	8,81	1516	9,9
1000	26	50		10,3	7,91	1361	8,2	11,1	7,27	1250	7,0

MCL 20

ROWS 4R	Air			Water 7/12°C			Water 8/13°				
	Volume m³/h	T.i. °C	U.R. %	T.u. °C	Pot. kW	Pw. dm³/h	Dp W KPa	T.u. °C	Pot. kW	Pw. dm³/h	Dp W KPa
2000	35	60		17,2	29,1	5009	23,7	17,9	27,7	4762	21,6
2000	32	50		15	20,7	3552	12,8	15,8	19,5	3345	11,5
2000	28	50		13,8	14,73	2553	7	14,4	13,61	2341	6,1
2000	26	50		13,6	11,32	1946	4,4	14,3	10,2	1755	3,7

ROWS 6R	Air			Water 7/12°C			Water 8/13°				
	Volume m³/h	T.i. °C	U.R. %	T.u. °C	Pot. kW	Pw. dm³/h	Dp W KPa	T.u. °C	Pot. kW	Pw. dm³/h	Dp W KPa
2000	35	60		13,0	36,36	6254	44	13,8	34,8	5986	40,7
2000	32	50		11,6	25,55	4395	23,5	12,5	24,13	4151	21,2
2000	28	50		11	18,47	3176	13,2	11,8	17,1	2942	11,5
2000	26	50		10,7	15,2	2615	9,3	11,6	13,86	2385	7,9

MCL 30

ROWS 4R	Air			Water 7/12°C			Water 8/13°				
	Volume m³/h	T.i. °C	U.R. %	T.u. °C	Pot. kW	Pw. dm³/h	Dp W KPa	T.u. °C	Pot. kW	Pw. dm³/h	Dp W KPa
2800	35	60		35	41,9	7210	33,4	17,4	40,1	6900	30,9
2800	32	50		14,9	29,3	5039	17,7	15,5	27,7	4771	16
2800	28	50		13,6	20,94	3602	9,7	14,4	19,1	3284	8,3
2800	26	50		13,2	16,97	2919	6,7	13,9	15,38	2646	5,6

ROWS 6R	Air			Water 7/12°C			Water 8/13°				
	Volume m³/h	T.i. °C	U.R. %	T.u. °C	Pot. kW	Pw. dm³/h	Dp W KPa	T.u. °C	Pot. kW	Pw. dm³/h	Dp W KPa
2800	35	60		13,2	50,44	8675	29,7	13,9	48,39	8322	27,5
2800	32	50		11,7	35,44	6095	15,8	12,6	33,53	5768	14,3
2800	28	50		11,1	25,54	4393	8,8	11,9	23,66	4069	7,7
2800	26	50		10,8	21,21	3647	6,3	11,5	19,46	3347	5,4



## EFFICIENCY COOLING COILS

## MCL 40

ROWS 4R	Air			Water 7/12°C				Water 8/13°			
	Volume m³/h	T.i. °C	U.R. %	T.u. °C	Pot. kW	Pw. dm³/h	Dp W KPa	T.u. °C	Pot. kW	Pw. dm³/h	Dp W KPa
4000	35	60		16,5	60,4	10396	24,2	17,2	58,1	9985	22,5
4000	32	50		14,5	43,2	7429	13,3	15,1	40,6	6980	11,9
4000	28	50		13,3	31,01	5334	7,4	14	28,6	4919	6,4
4000	26	50		13	24,24	4169	4,8	13,8	21,7	3732	3,9

ROWS 6R	Air			Water 7/12°C				Water 8/13°			
	Volume m³/h	T.i. °C	U.R. %	T.u. °C	Pot. kW	Pw. dm³/h	Dp W KPa	T.u. °C	Pot. kW	Pw. dm³/h	Dp W KPa
4000	35	60		12,4	74,44	12803	43,5	13,2	71,62	12318	40,6
4000	32	50		11,2	52,51	9031	23,4	12	49,56	8525	21,1
4000	28	50		10,6	38,09	6552	13,2	11,4	35,35	6080	11,6
4000	26	50		10,3	31,75	5461	9,6	11,2	29,09	5004	8,2

## MCL 50

ROWS 4R	Air			Water 7/12°C				Water 8/13°			
	Volume m³/h	T.i. °C	U.R. %	T.u. °C	Pot. kW	Pw. dm³/h	Dp W KPa	T.u. °C	Pot. kW	Pw. dm³/h	Dp W KPa
4800	35	60		16,9	71,4	12272	33,3	17,6	67,9	11677	30,5
4800	32	50		14,9	50,0	8597	17,7	15,7	49,9	8069	15,8
4800	28	50		13,7	35,66	6134	9,7	14,5	32,82	5644	8,4
4800	26	50		13,2	29,27	5034	6,8	13,8	26,62	4579	5,8

ROWS 6R	Air			Water 7/12°C				Water 8/13°			
	Volume m³/h	T.i. °C	U.R. %	T.u. °C	Pot. kW	Pw. dm³/h	Dp W KPa	T.u. °C	Pot. kW	Pw. dm³/h	Dp W KPa
4800	35	60		13,6	84,56	14545	21,9	14,4	81,03	13937	20,3
4800	32	50		11,9	60,22	10359	12	12,8	57,1	9821	10,9
4800	28	50		11,3	43,49	7480	6,7	12	40,63	6988	5,9
4800	26	50		11,2	34,75	5978	4,5	12	31,46	5411	3,8

## MCL 60

ROWS 4R	Air			Water 7/12°C				Water 8/13°			
	Volume m³/h	T.i. °C	U.R. %	T.u. °C	Pot. kW	Pw. dm³/h	Dp W KPa	T.u. °C	Pot. kW	Pw. dm³/h	Dp W KPa
6000	35	60		17	88,3	15189	51,4	17,8	84,1	14469	47,1
6000	32	50		15,1	62,2	10696	27,5	15,7	58,9	10127	25
6000	28	50		13,8	44,52	7658	15,2	14,5	41,32	7107	13,3
6000	26	50		13,2	36,88	6343	10,9	13,9	33,61	5781	9,2

ROWS 6R	Air			Water 7/12°C				Water 8/13°			
	Volume m³/h	T.i. °C	U.R. %	T.u. °C	Pot. kW	Pw. dm³/h	Dp W KPa	T.u. °C	Pot. kW	Pw. dm³/h	Dp W KPa
6000	35	60		13,6	105,51	18148	34,3	14,4	101,18	17403	31,8
6000	32	50		12	75,31	12953	18,8	13,1	70,12	12061	16,6
6000	28	50		11,4	53,54	9210	10,2	12	51,17	8801	9,4
6000	26	50		11,3	43,66	7509	7,1	12,1	39,58	6807	6,0

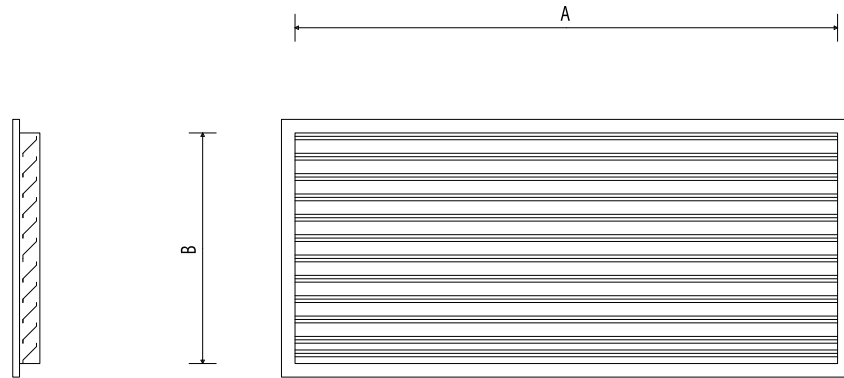


DESCRIPTION OF THE COMPONENTS

**GR - Intake grille**

The intake grille is made up of an aluminium frame and aluminium fixed fins.

Fin pitch: 25 mm.



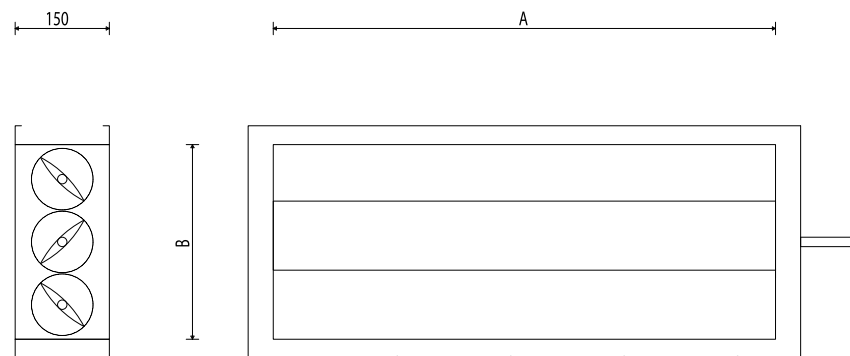
MODEL	10	20	30	40	50	60
<b>A</b>	640	990	1320	1600	1900	1920
<b>B</b>	300	300	300	300	370	370

Dimensions (mm)

**SR - E.A.I. damper**

This damper is made up of aluminium frame and aluminium fins. Opposite motion reinforced fins, nylon gears.

The reinforced fins are completed of a pin for the application of a manual control or an electric servo-control.



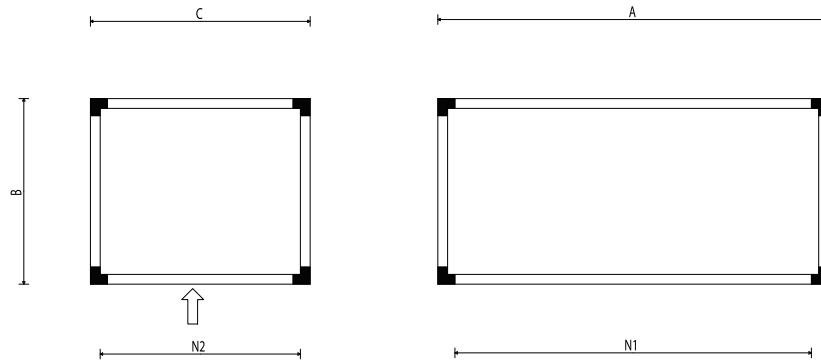
MODEL	10	20	30	40	50	60
<b>A</b>	640	1000	1330	1610	1900	1930
<b>B</b>	210	210	210	310	310	310

Dimensions (mm)

DESCRIPTION OF THE COMPONENTS

**PA - Inlet plenum**  
**PM - Outlet plenum**

This plenum is made up of 20 mm thick. Aluminium profile and panels as described before.



MODEL	10	20	30	40	50	60
<b>A</b>	710	1070	1400	1680	1900	2000
<b>B</b>	380	380	380	450	450	450
<b>C</b>	460	460	460	460	460	460
<b>N1</b>	670	1030	1360	1640	1740	1960
<b>N2</b>	420	420	420	420	420	420

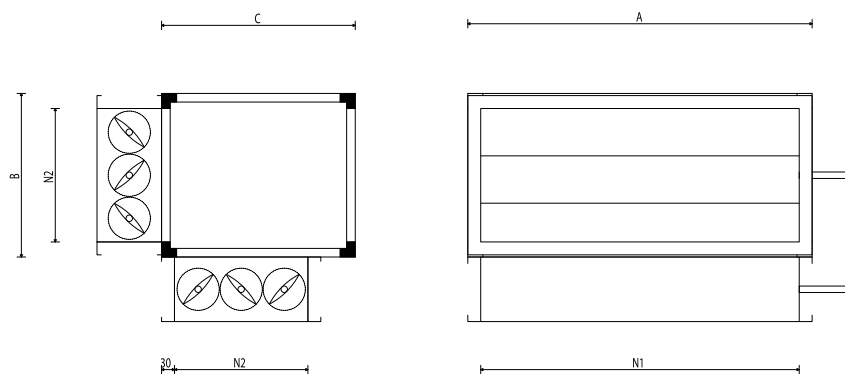
Dimensions (mm)

**SM - Mix chamber with 2 dampers**

The mix chamber is completed of 2 dampers (e.a.i. and room intake) that are made up of galvanised sheet frame and

aluminium

fans. The reinforced fins are completed of a pin for the application of a manual control or an electric servo-control.



MODEL	10	20	30	40	50	60
<b>A</b>	710	1070	1400	1680	1900	2000
<b>B</b>	380	380	380	450	450	450
<b>D</b>	460	460	460	460	460	460
<b>N1</b>	640	1000	1330	1610	1710	1930
<b>N2</b>	210	210	210	310	310	310

Dimensions (mm)

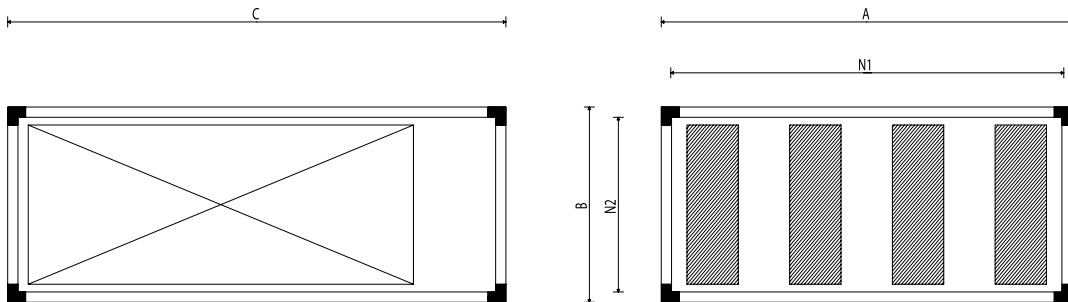
DESCRIPTION OF THE COMPONENTS

**SILR - Inlet silencer**

**SILM - Outlet silencer**

They are made up of an external shell with aluminium frame and 18 mm thick. Double panel. These silencers have in their internal side more than one 100 mm thick.

Sound absorbing baffles, which are made up of multiple layers of mineral fibres that are enclosed in a perforated galvanized steel sheet (L 700 mm).



MODEL	10	20	30	40	50	60
<b>A</b>	710	1070	1400	1680	1900	2000
<b>B</b>	380	380	380	450	450	450
<b>C</b>	900	900	900	960	960	960
<b>N1</b>	670	1030	1360	1640	1740	1960
<b>N2</b>	340	340	340	410	410	410

Dimensions (mm)

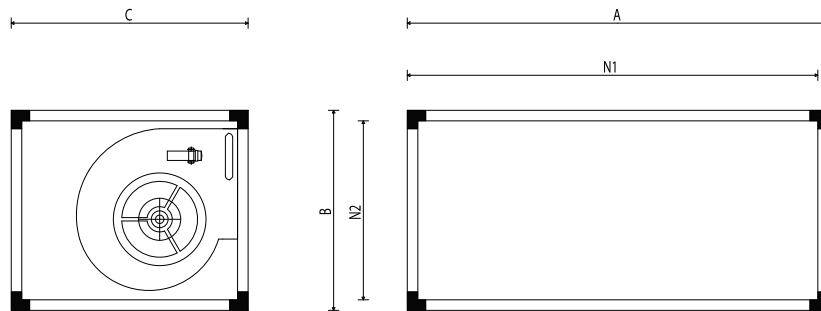
**Acoustic attenuation**

	Frequency Hz						
	63	125	250	500	1000	2000	4000
Attenuation	5	9	16	30	39	39	31

## DESCRIPTION OF THE COMPONENTS

**VR - Inlet fan**

Plenum with inlet fan in a 18 mm thick. Double panel and fan as indicated in the basic unit.



MODEL	10	20	30	40	50	60
<b>A</b>	710	1070	1400	1680	1900	2000
<b>B</b>	380	380	380	450	450	450
<b>C</b>	460	460	460	460	460	460
<b>N1</b>	670	1030	1360	1640	1740	1960
<b>N2</b>	420	420	420	420	420	420

Dimensions (mm)

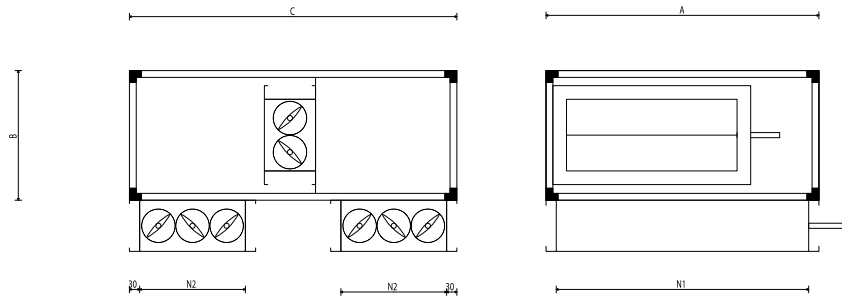
MODEL	10	20	30	40	50	60
Air flow - m <sup>3</sup> /h	1000	2000	2800	4000	4800	6000
Power at axle - W	370	740	740	1110	1110	1650
N. of fans - n.	1	2	2	2	3	3
Poles - n.	6	6	6	6	6	6
Max. sound pressure - dB(A)	69,3	69,3	70,3	69,1	69,1	69,1
Max. absorbed current - A	4,2	8,4	8,4	12	18	18
Engine speed	variable	variable	variable	variable	variable	variable
Protection grade - IP	54	54	54	54	54	54
Insulation class	F	F	F	F	F	F
Electric stoking - V/Ph/Hz	240/1/50	240/1/50	240/1/50	240/1/50	240/1/50	240/1/50

DESCRIPTION OF THE COMPONENTS

**CM3 - Mix chamber with 3 dampers**

This mix chamber is completed of n. 3 dampers (e.a.i. + by-pass + expulsion) which are made up of a galvanised sheet frame and aluminium fins. The opposite motion reinforced fins, nylon gears,

are completed of a pin for the application of a manual control or an electric servo-control.



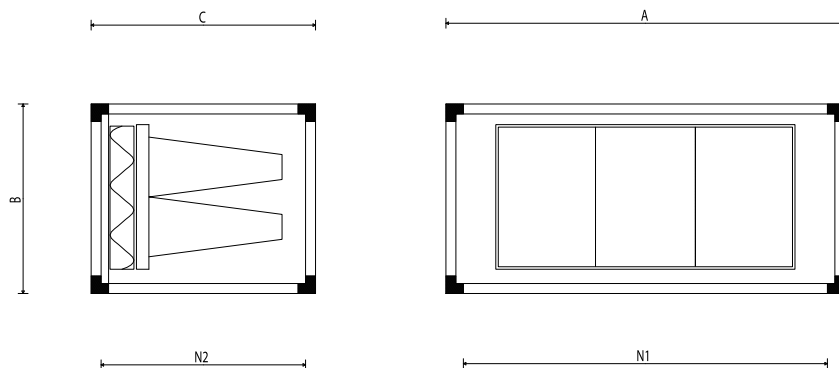
MODEL	10	20	30	40	50	60
<b>A</b>	710	1070	1400	1680	1900	2000
<b>B</b>	380	380	380	450	450	450
<b>C</b>	900	900	900	960	960	960
<b>N1</b>	640	1000	1330	1610	1710	1930
<b>N2</b>	210	210	210	310	310	310

Dimensions (mm)

**FT - Bag filter**

This section has been realised as first filtering stage, with corrugated filtering cells which are made up of polyester fibre, class G4 (min. Eff. 90% ponderal), of a metal frame and of an

electro welded control net. The second filtering stage includes hard bags filters, high efficiency, class F7 (medium eff. EN779 60%) which are made up of glass microfibre paper and plastic frame.



MODEL	10	20	30	40	50	60
<b>A</b>	710	1070	1400	1680	1900	2000
<b>B</b>	380	380	380	450	450	450
<b>C</b>	500	500	500	500	500	500
<b>N1</b>	670	1030	1360	1640	1740	1960
<b>N2</b>	390	390	390	460	460	460

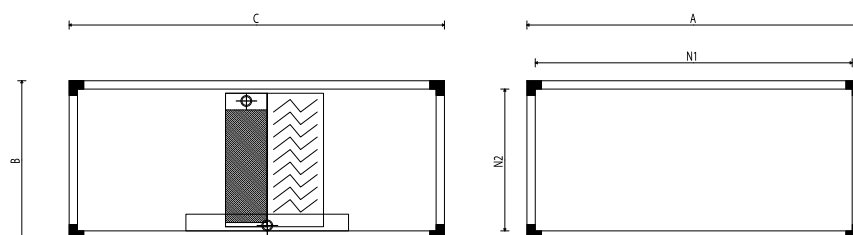
Dimensions (mm)

## DESCRIPTION OF THE COMPONENTS

**UP - Honeycombing pack humidifier**

Humidification with not-returnable water and evaporating pack which is made up of cellulose that is impregnated with 10 mm

thick, phenolic resins. This section is completed of a 2 folds PVC drops separator and a galvanized steel sheet collection tank.



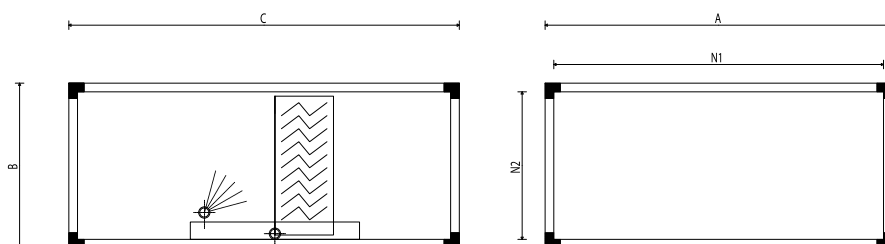
MODEL	10	20	30	40	50	60
<b>A</b>	710	1070	1400	1680	1900	2000
<b>B</b>	380	380	380	450	450	450
<b>C</b>	900	900	900	960	960	960
<b>N1</b>	670	1030	1360	1640	1740	1960
<b>N2</b>	340	340	340	410	410	410

Dimensions (mm)

**UV - Steam humidification**

This section is prearranged for steam humidification; this predisposition consists of the supplying of a stainless steel distribution lance ( $\varnothing 30$ ; suitable length) for each unit.

This section is completed of a 2 folds PVC drops separator and a galvanized steel sheet collection tank.

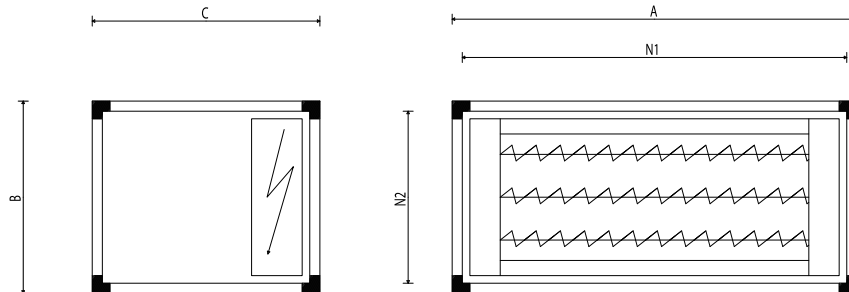


MODEL	10	20	30	40	50	60
<b>A</b>	710	1070	1400	1680	1900	2000
<b>B</b>	380	380	380	450	450	450
<b>C</b>	900	900	900	960	960	960
<b>N1</b>	670	1030	1360	1640	1740	1960
<b>N2</b>	340	340	340	410	410	410

Dimensions (mm)

## DESCRIPTION OF THE COMPONENTS

### BE - Electric after-heating



MODEL	10	20	30	40	50	60
<b>A</b>	710	1070	1400	1680	1900	2000
<b>B</b>	380	380	380	450	450	450
<b>C</b>	450	450	450	450	450	450
<b>N1</b>	670	1030	1360	1640	1740	1960
<b>N2</b>	340	340	340	410	410	410

Dimensions (mm)

### Coil data

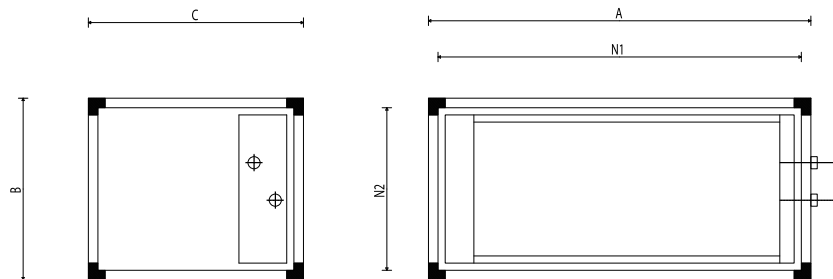
The electric coil are constructed with armoured resistances, with galvanised sheet frame, connection board and safety thermostat.

MODEL	10	20	30	40	50	60
Nominal power - kW	3,5	6,5	10	13	16,5	20
Phases	1	1	2	2	2	2
Elec. stoking - V/Ph/Hz	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
Leaving air temperature	25	25	25	25	25	25

It is calculated with entering air temperature = 15°C



## DESCRIPTION OF THE COMPONENTS

**BA - Water after-heating**

MODEL	10	20	30	40	50	60
<b>A</b>	710	1070	1400	1680	1900	2000
<b>B</b>	380	380	380	450	450	450
<b>C</b>	450	450	450	450	450	450
<b>N1</b>	670	1030	1360	1640	1740	1960
<b>N2</b>	340	340	340	410	410	410

Dimensions (mm)

**Coil data**

The Copper - Aluminium extractable water heating coil is mechanically expanded. Its frame is made up of galvanised steel sheet and its manifolds are made of steel with threaded connections. This coil is tested in water with dry air at a 30 Ate pressure.

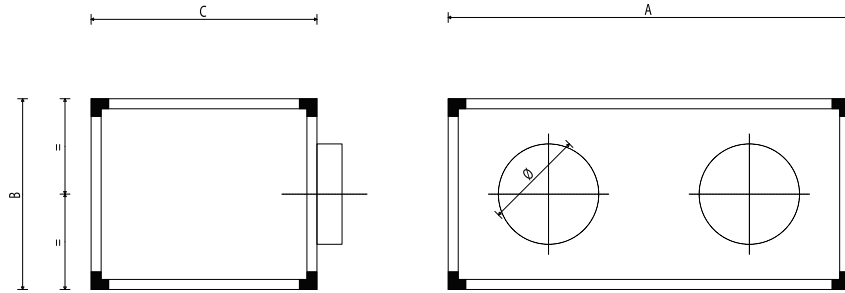
MODEL	10	20	30	40	50	60
Water flow - m <sup>3</sup> /h	1000	2000	2800	4000	4800	6000
Rows	2 2	2 2	2 2	2 2	2 2	2 2
In/out water temp. - °C	70/60 45/40	70/60 45/40	70/60 45/40	70/60 45/40	70/60 45/40	70/60 45/40
Entering air temp. = 15°C						
Out air temp. °C	43,7 30,4	43,8 30,6	43,4 30,4	45,6 31,6	42,1 29,6	42,6 29,9
Water flow l/h	810 869	1602 1728	2586 2802	3674 3991	4107 4425	4799 5180
Power kW	9,4 5,04	18,6 10,0	30,0 16,3	42,6 23,1	47,6 25,7	55,7 30,0

DESCRIPTION OF THE COMPONENTS

**PMV/PMF - Outlet plenum for flexible ducts**

It is made up of a 20 mm thick aluminium frame and panel as indicated before.

The plenum is completed of galvanised sheet collars for the connection to flexible ducts Ø 200 mm.



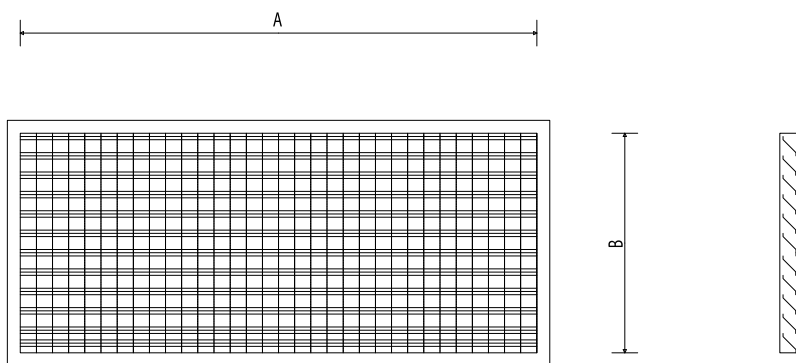
MODEL	10	20	30	40	50	60
<b>A</b>	710	1070	1400	1680	1900	2000
<b>B</b>	380	380	380	450	450	450
<b>C</b>	450	450	450	450	450	450
<b>N. of collars</b>	2	3	3	4	5	6
<b>Diametre</b>	200	200	200	200	200	200

Dimensions (mm)

**BM - Outlet small opening**

The outlet small opening is composed of an aluminium frame and aluminium double row fins.

Fin pitch: 25 mm



MODEL	10	20	30	40	50	60
<b>A</b>	640	990	1320	1600	1700	1920
<b>B</b>	300	300	300	300	370	370

Dimensions (mm)

## DESCRIPTION OF THE COMPONENTS

## MCL 10

PERFORMANCE CURVES		A	B	C	D	E	F (2)	G (2)	H (2)
Air flow rate	m <sup>3</sup> /h	650	750	850	950	1000	1200	1400	1600
Static pressure (1)	Pa	620	567	526	517	491	469	431	392
Signal to inverter	Volt	0,28	1,4	1,9	2,5	3	3,6	4,2	4,8
Sound pressure level (2)	dB(A)	69	69	70	69	69	70	69	69

LOAD DROP		A	B	C	D	E	F	G	H
Basic Unit 2R	Pa	74	82	90	99	106	124	144	165
Basic Unit 4R	Pa	89	100	113	126	134	164	195	228
Basic Unit 6R	Pa	103	122	142	150	161	200	243	288
Basic Unit 2R+4R	Pa	103	118	135	153	164	204	247	293
Basic Unit 2R+6R	Pa	117	136	156	177	191	240	295	353
Basic Unit 4R+6R	Pa	132	154	179	204	219	280	346	n.d.
<b>GR</b> Grid	Pa	10	10	12	12	15	17	25	35
<b>SR</b> Damper	Pa	10	10	12	12	15	17	25	35
<b>SM</b> Mixing box 2 dampers	Pa	11	11	13	13	16	18	26	37
<b>SILR/SILM</b> Sound attenuator	Pa	10	14	18	22	24	32	40	48
<b>CM3</b> Mixing box 3 dampers	Pa	12	12	14	14	17	20	29	40
<b>FT</b> Bag Filter	Pa	20	30	35	40	45	55	65	75
<b>UP</b> Honeycomb pack humidifier	Pa	14	14	21	28	35	47	60	82
<b>UV</b> Steam humidification	Pa	4	4	6	8	10	12	15	27
<b>BE</b> Re-heating electric coil	Pa	10	11	12	13	14	15	16	17
<b>BA</b> Re-heating water coil	Pa	14	18	22	27	30	40	52	65
<b>PMF</b> Supply plenum	Pa	10	10	11	11	11	12	13	14
<b>BM</b> Supply small opening	Pa	11	11	13	13	16	18	26	37

## MCL 20

PERFORMANCE CURVES		A	B	C	D	E	F (2)	G (2)	H (2)
Air flow rate	m <sup>3</sup> /h	1300	1500	1700	1900	2000	2400	2800	3200
Static pressure (1)	Pa	569	522	482	475	452	430	396	360
Signal to inverter	Volt	0,28	1,4	1,9	2,5	3	3,6	4,2	4,8
Sound pressure level (2)	dB(A)	69	69	70	69	69	70	69	69

LOAD DROP		A	B	C	D	E	F	G	H
Basic Unit 2R	Pa	85	98	107	121	124	149	175	199
Basic Unit 4R	Pa	122	144	162	184	192	236	284	330
Basic Unit 6R	Pa	132	155	176	202	211	263	324	388
Basic Unit 2R+4R	Pa	139	166	189	217	228	285	347	409
Basic Unit 2R+6R	Pa	149	177	203	235	247	312	387	n.d.
Basic Unit 4R+6R	Pa	186	223	258	298	315	399	n.d.	n.d.
<b>GR</b> Grid	Pa	10	12	15	20	20	30	40	50
<b>SR</b> Damper	Pa	10	12	15	20	20	30	40	50
<b>SM</b> Mixing box 2 dampers	Pa	11	13	16	21	21	32	42	53
<b>SILR/SILM</b> Sound attenuator	Pa	12	16	20	24	26	34	42	52
<b>CM3</b> Mixing box 3 dampers	Pa	12	14	17	23	23	35	46	58
<b>FT</b> Bag Filter	Pa	35	40	50	55	60	70	85	100
<b>UP</b> Honeycomb pack humidifier	Pa	21	28	35	42	49	63	92	110
<b>UV</b> Steam humidification	Pa	6	8	10	12	14	18	27	30
<b>BE</b> Re-heating electric coil	Pa	12	14	15	15	16	17	18	20
<b>BA</b> Re-heating water coil	Pa	17	22	27	33	36	49	63	79
<b>PMF</b> Supply plenum	Pa	13	14	15	15	16	17	19	20
<b>BM</b> Supply small opening	Pa	11	13	16	21	21	32	42	53

(1) The external static pressure will be determined subtracting to the total static pressure, the pressure drops of the various components;

(2) Don't use this airflow on units with cooling coil



LOAD DROP

MCL 30

PERFORMANCE CURVES	A	B	C	D	E	F	G	H (2)	
Air flow rate	m <sup>3</sup> /h	1300	1500	1700	1900	2000	2400	2800	3200
Static pressure (1)	Pa	569	522	482	475	452	430	396	360
Signal to inverter	Volt	0,28	1,4	1,9	2,5	3	3,6	4,2	4,8
Sound pressure level (2)	dB(A)	69	69	70	69	69	70	70	69

LOAD DROP	A	B	C	D	E	F	G	H	
Basic Unit 2R	Pa	70	76	83	91	96	112	128	145
Basic Unit 4R	Pa	91	103	115	129	138	166	195	225
Basic Unit 6R	Pa	98	111	125	139	149	180	213	249
Basic Unit 2R+4R	Pa	101	115	130	148	158	194	231	270
Basic Unit 2R+6R	Pa	108	123	140	158	169	208	249	294
Basic Unit 4R+6R	Pa	129	150	172	196	211	262	316	n.d.
<b>GR</b> Grid	Pa	10	10	10	12	12	17	25	30
<b>SR</b> Damper	Pa	10	10	10	12	12	17	25	30
<b>SM</b> Mixing box 2 dampers	Pa	11	11	11	13	13	18	26	32
<b>SILR/SILM</b> Sound attenuator	Pa	10	16	20	24	26	34	42	50
<b>CM3</b> Mixing box 3 dampers	Pa	12	12	12	14	14	20	29	35
<b>FT</b> Bag Filter	Pa	20	30	35	40	45	55	65	75
<b>UP</b> Honeycomb pack humidifier	Pa	14	21	28	35	42	55	71	102
<b>UV</b> Steam humidification	Pa	4	6	8	10	12	15	21	27
<b>BE</b> Re-heating electric coil	Pa	10	11	12	13	14	15	16	17
<b>BA</b> Re-heating water coil	Pa	10	12	15	19	20	28	36	45
<b>PMF</b> Supply plenum	Pa	10	10	10	11	11	12	13	14
<b>BM</b> Supply small opening	Pa	11	11	11	13	13	18	26	32

MCL 40

PERFORMANCE CURVES	A	B	C	D	E	F (2)	G (2)	H (2)	
Air flow rate	m <sup>3</sup> /h	1600	2600	3200	3600	4200	4600	4900	5200
Static pressure (1)	Pa	604	588	580	570	452	411	350	335
Signal to inverter	Volt	0,28	1,4	1,9	2,5	3	3,6	4,2	4,8
Sound pressure level (2)	dB(A)	67	67	68	68	69	70	69	72

LOAD DROP	Ai	B	C	D	E	F	G	H	
Basic Unit 2R	Pa	67	91	110	119	132	152	161	170
Basic Unit 4R	Pa	81	122	153	169	191	224	239	254
Basic Unit 6R	Pa	87	132	164	183	207	244	261	280
Basic Unit 2R+4R	Pa	88	137	175	196	223	264	284	304
Basic Unit 2R+6R	Pa	94	147	186	210	239	284	306	n.d.
Basic Unit 4R+6R	Pa	108	178	229	260	298	356	n.d.	n.d.
<b>GR</b> Grid	Pa	10	10	12	15	15	20	20	25
<b>SR</b> Damper	Pa	10	10	12	15	15	20	20	25
<b>SM</b> Mixing box 2 dampers	Pa	11	11	13	16	16	21	21	26
<b>SILR/SILM</b> Sound attenuator	Pa	10	12	20	24	28	34	38	42
<b>CM3</b> Mixing box 3 dampers	Pa	12	12	14	17	17	23	23	29
<b>FT</b> Bag Filter	Pa	20	45	55	65	70	85	92	100
<b>UP</b> Honeycomb pack humidifier	Pa	14	21	33	42	49	60	68	82
<b>UV</b> Steam humidification	Pa	4	6	8	12	14	15	18	27
<b>BE</b> Re-heating electric coil	Pa	10	14	15	16	17	18	19	19
<b>BA</b> Re-heating water coil	Pa	7	15	22	27	32	40	45	50
<b>PMF</b> Supply plenum	Pa	10	11	13	13	13	14	14	15
<b>BM</b> Supply small opening	Pa	11	11	13	16	16	21	21	26

(1) The external static pressure will be determined subtracting to the total static pressure, the pressure drops of the various components

(2) Don't use this airflow on units with cooling coil

## LOAD DROP

## MCL 50

PERFORMANCE CURVES		A	B	C	D	E	F (2)	G (2)	H (2)
Air flow rate	m <sup>3</sup> /h	2400	3900	4800	5400	6200	6900	7350	7800
Static pressure (1)	Pa	555	540	532	523	452	378	321	308
Signal to inverter	Volt	0,28	1,4	1,9	2,5	3	3,6	4,2	4,8
Sound pressure level (2)	dB(A)	67	67	69	68	69	70	70	72

LOAD DROP		A	B	C	D	E	F	G	H
Basic Unit 2R	Pa	80	115	139	155	172	194	202	210
Basic Unit 4R	Pa	104	167	207	236	266	309	n.d.	n.d.
Basic Unit 6R	Pa	112	180	227	260	296	354	n.d.	n.d.
Basic Unit 2R+4R	Pa	116	194	246	283	322	n.d.	n.d.	n.d.
Basic Unit 2R+6R	Pa	124	207	266	307	352	n.d.	n.d.	n.d.
Basic Unit 4R+6R	Pa	148	259	334	388	446	n.d.	n.d.	n.d.
<b>GR</b> Grid	Pa	10	12	17	25	30	40	45	45
<b>SR</b> Damper	Pa	10	12	17	25	30	40	45	45
<b>SM</b> Mixing box 2 dampers	Pa	11	13	18	26	32	42	47	47
<b>SILR/SILM</b> Sound attenuator	Pa	10	26	34	42	48	58	62	66
<b>CM3</b> Mixing box 3 dampers	Pa	12	14	20	29	35	46	52	52
<b>FT</b> Bag Filter	Pa	35	60	75	85	100	130	130	145
<b>UP</b> Honeycomb pack humidifier	Pa	14	42	55	68	92	110	118	129
<b>UV</b> Steam humidification	Pa	4	12	15	18	27	30	33	39
<b>BE</b> Re-heating electric coil	Pa	12	15	17	18	19	20	21	22
<b>BA</b> Re-heating water coil	Pa	12	27	39	47	56	70	78	86
<b>PMF</b> Supply plenum	Pa	11	13	14	14	15	15	16	16
<b>BM</b> Supply small opening	Pa	11	13	18	26	32	42	47	47

## MCL 60

PERFORMANCE CURVES		A	B	C	D	E	F (2)	G (2)	H (2)
Air flow rate	m <sup>3</sup> /h	2400	3900	4800	5400	6000	6900	7350	7800
Static pressure (1)	Pa	555	540	532	523	452	378	321	308
Signal to inverter	Volt	0,28	1,4	1,9	2,5	3	3,6	4,2	4,8
Sound pressure level (2)	dB(A)	67	67	68	68	69	70	70	72

LOAD DROP		A	B	C	D	E	F	G	H
Basic Unit 2R	Pa	77	110	131	145	161	180	186	193
Basic Unit 4R	Pa	97	152	188	213	238	274	290	305
Basic Unit 6R	Pa	104	163	203	231	261	305	n.d.	n.d.
Basic Unit 2R+4R	Pa	106	174	219	250	283	330	n.d.	n.d.
Basic Unit 2R+6R	Pa	113	185	234	268	306	361	n.d.	n.d.
Basic Unit 4R+6R	Pa	133	227	291	336	383	n.d.	n.d.	n.d.
<b>GR</b> Grid	Pa	10	12	15	20	25	30	35	40
<b>SR</b> Damper	Pa	10	12	15	20	25	30	35	40
<b>SM</b> Mixing box 2 dampers	Pa	11	13	16	21	26	32	37	42
<b>SILR/SILM</b> Sound attenuator	Pa	10	22	30	36	42	50	54	60
<b>CM3</b> Mixing box 3 dampers	Pa	12	14	17	23	29	35	40	46
<b>FT</b> Bag Filter	Pa	35	60	75	85	100	130	130	145
<b>UP</b> Honeycomb pack humidifier	Pa	14	35	49	55	68	92	105	118
<b>UV</b> Steam humidification	Pa	4	10	14	15	18	27	30	33
<b>BE</b> Re-heating electric coil	Pa	12	15	17	18	19	20	21	22
<b>BA</b> Re-heating water coil	Pa	9	22	31	37	45	56	62	69
<b>PMF</b> Supply plenum	Pa	11	13	14	14	15	15	16	16
<b>BM</b> Supply small opening	Pa	11	13	16	21	26	32	37	42

(1) The external static pressure will be determined subtracting to the total static pressure, the pressure drops of the various components

(2) Don't use this airflow on units with cooling coil



ELECTRIC CONNECTIONS

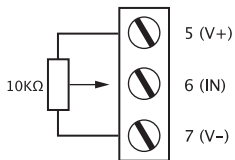
**Fan with directly coupled engine constant air flow**

The electronic motor is equipped with inverter programmed to maintain a constant flow selectable between 8 preset values depending on the model.

**Controls**

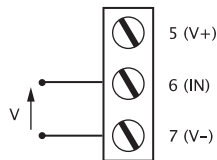
- Standard Control through the signal +5 volts this on the engine modulated through the potentiometer supplied as standard with which it is possible to select the range between the 8 available.
- At the request in the send order phase, possibility of control through signal 0-10 Volts or 4-20 mA supplied by thermoregulation Score, with which manage the automatic flow between the 8 available.

**Connection outline of control signal**



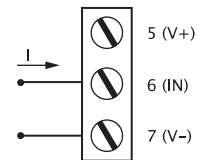
Dip 1 = ON; Dip 2 = OFF; Dip 3 = OFF

Fig. 1



Dip 1 = OFF; Dip 2 = ON; Dip 3 = OFF

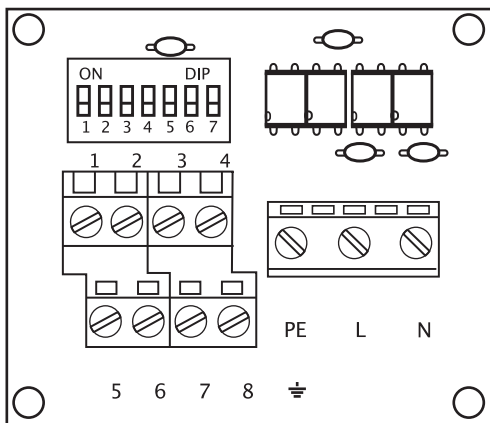
Fig. 2



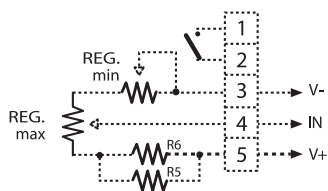
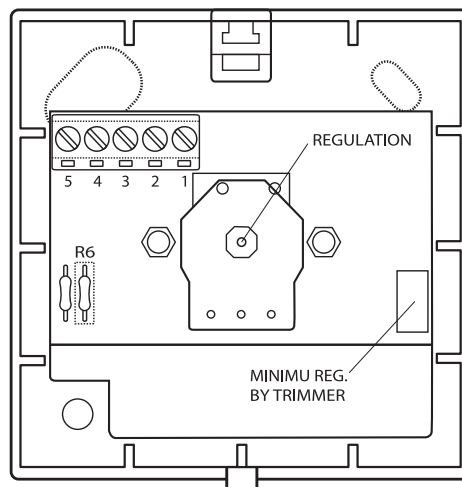
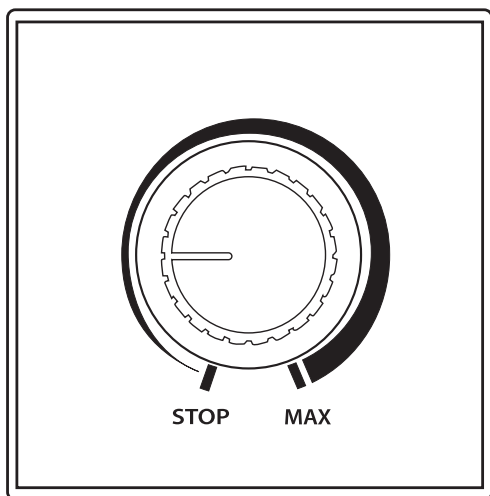
Dip 1 = OFF; Dip 2 = OFF; Dip 3 = ON

Fig. 3

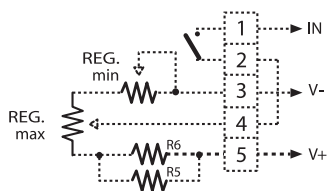
**Electric connections schedule**



CONNECTION OUTLINE WITH POTENTIOMETER



WITHOUT STOP FUNCTION



WITH STOP FUNCTION

CONTROL	CONTROL	STATE OF R6
SUPPLY	V+ 10V max	
MINIMUM REGULATOR	Vmin 0 + 0.5 V+	CONNECT
MAXIMUM REGULATOR	Vmax 0.5 V+	
REGULATOR	IN 0 + Vmax	OPEN

- IN and V+ are referred to V-  
- Impedance between IN and V- must be bigger than 50 Kohn



SAMPLE UNIT SELECTION



### MCL Quotation Table

Air volume [m<sup>3</sup>/h]  T.S.P. [Pa]

INDICATE CONFIGURATION:  Connections side:

SELECT COMPONENTS AND ACCESSORIES:

			Pressure drops [Pa]	Price List [€]
[BAC] Heating coil	<input type="text"/>	Rows	<input type="text"/>	<input type="text"/>
[BAF] Cooling coil	<input type="text"/>	Rows	<input type="text"/>	<input type="text"/>

[GR] Grid	<input type="text" value="YES"/>	<input type="text" value="NO"/>	<input type="text"/>	<input type="text"/>
[SR] Damper	<input type="text" value="YES"/>	<input type="text" value="NO"/>	<input type="text"/>	<input type="text"/>
[SM] Mixing box with 2 dampers	<input type="text" value="YES"/>	<input type="text" value="NO"/>	<input type="text"/>	<input type="text"/>
[SILR] Return sound attenuator	<input type="text" value="YES"/>	<input type="text" value="NO"/>	<input type="text"/>	<input type="text"/>
[SILM] Supply sound attenuator	<input type="text" value="YES"/>	<input type="text" value="NO"/>	<input type="text"/>	<input type="text"/>
[CM3] Mixing box with 3 dampers	<input type="text" value="YES"/>	<input type="text" value="NO"/>	<input type="text"/>	<input type="text"/>
[FT] Bag filter	<input type="text" value="YES"/>	<input type="text" value="NO"/>	<input type="text"/>	<input type="text"/>
[UP] Honeycomb pack humidifier	<input type="text" value="YES"/>	<input type="text" value="NO"/>	<input type="text"/>	<input type="text"/>
[UV] Steam humidification	<input type="text" value="YES"/>	<input type="text" value="NO"/>	<input type="text"/>	<input type="text"/>
[BE] Re-heating electric coil	<input type="text" value="YES"/>	<input type="text" value="NO"/>	<input type="text"/>	<input type="text"/>
[BA] Re-heating water coil	<input type="text" value="YES"/>	<input type="text" value="NO"/>	<input type="text"/>	<input type="text"/>
[PMF] Supply plenum	<input type="text" value="YES"/>	<input type="text" value="NO"/>	<input type="text"/>	<input type="text"/>
[BM] Supply small opening	<input type="text" value="YES"/>	<input type="text" value="NO"/>	<input type="text"/>	<input type="text"/>
[CM] Manual control for damper	<input type="text"/>	[n° pieces]	<input type="text"/>	<input type="text"/>

EXTERNAL STATIC PRESSURE (\*): Pa

TOTAL PRICE LIST: €

(\*) The external static pressure is determined subtracting to the total static pressure, the pressure drops of the various components







# STEEL CLEAN

## Sanitary units



### PRODUCT SPECIFICATIONS

- STEEL CLEAN is designed to meet plant engineering demands of industrial or commercial sectors such as:
  - food industry
  - pharmaceutical industry
  - hospitals
  - electronic industry
  - clean rooms

### KEY FEATURES

- VORTICE offers an extremely versatile product, which is also easy to sterilize. It is drawn up for those spaces where cleanliness is required every day, and where air quality is a guarantee of protection for the customer.
- The internal chamber is made of high thickness stainless steel AISI 304 sheet with rounded corners. Each section is completely TIG welded in order to ensure the absence of sharp edges.
- Thermal and noise insulation is warranted by an aluminium structure with sandwich panels having thickness of 100 mm.
- The panels are shell shaped and contain expanded polyurethane with density 40 kg/m<sup>3</sup>. Components are easy to access for cleaning and washing operations.



## CONSTRUCTIONAL FEATURES

- **Baseframe** realized in galvanized or stainless steel AISI 304/316 high thickness sheets suitably bended to assure rigidity and strenghtness to the unit.
  - **Adjustable feet**, made of stainless or galvanized steel, with a plastic support.
  - **Internal chamber** in stainless steel AISI 304, or on request AISI 316, with rounded corners. The lower part of the chamber functions as a drip tray, with great slopes and an appropriate outlet to allow condensation flow (fig. 1).
  - **Internal guides, supports and locks** are in stainless steel AISI 304, or on request AISI 316.
  - **Sandwich paneling** is 100 mm thick, external paneling is realized in: prepainted sheet, aluminium, stainless steel.
  - **Centrifugal fan without scroll, flanged motor**, including three cold wires. Motor rotor with bushing, support unit, motor support and solid base frame with adjustable modular construction. Centrifugal impeller with backward curved blades made from welded and painted steel sheet metal, secured to the shaft of a flanged motor, statically and dynamically balanced in accordance with DIN ISO 1940.
- The fans can be fitted with a measuring device to determine flow-rate. Square connection fitting on the intake side, with elastic joint element. Performance (without actuator) included in accuracy class 1 in accordance with DIN 24166 (Fig. 2).
- **Filter sections** are installed over stainless steel frames. The range includes prefilter G2 metallic or G4 synthetic, softbag filters, rigid-bag filters eff. F5/F6/F7/F9 and absolute filters H14 (fig. 3).
  - **Coils** made of:
    - Copper tube - Aluminium fins
    - Copper tube - Aluminium prepainted fins
    - Copper tube - Copper fins
    - Copper tube - Copper tinned fins
    - Stainless steel AISI 304 tube - Aluminium fins
    - Stainless steel AISI 304 tube - Aluminium prepainted fins
    - Stainless steel AISI 304 tube - Stainless steel AISI 304 fins
    - Stainless steel AISI 316 tube - Stainless steel AISI 304 fins



fig. 1

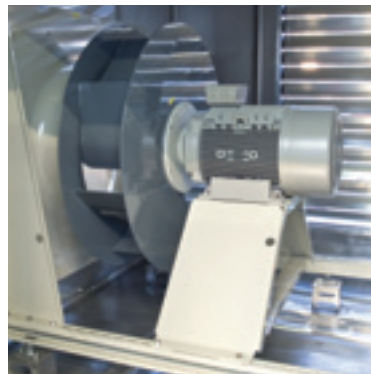


fig. 2



### Available sections

1. Fresh air damper
2. Mixing box with 2 or 3 dampers
3. Return section
4. Panel filters, soft-bag filters, rigid-bag filters, absolute filters
5. Heating, cooling and after-heating coils
6. Electric coils
7. Adiabatic or steam humidification
8. Supply section



# PRO-CLEAN

Sanitary units for food industry



## PRODUCT SPECIFICATIONS

- The air handling units series HPU have been designed in order to satisfy all requirements coming from the plant engineering for very special applications such as:
  - food industry,
  - pharmaceutical laboratories
  - clean rooms
 and offer a high cleanliness level and a perfect washability.

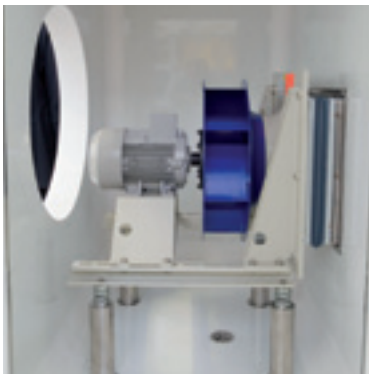
## KEY FEATURES

- These features are proper of those productive industries where air quality and absence of contaminants are the absolute priority as a warrant of the final product.
- The special configuration of the structure made of glassfiber reinforced plastic, with internal rounded corners (coplanar and without junctions) and inspectionable in each section makes the optimum structure in order to meet a high cleanliness level which is necessary in order to prevent any bacterial proliferation.
- The whole bottom of the unit is supplied with stainless steel drain pan.
- All the internal components are removable and easily accessible for maintenance and cleaning operations.



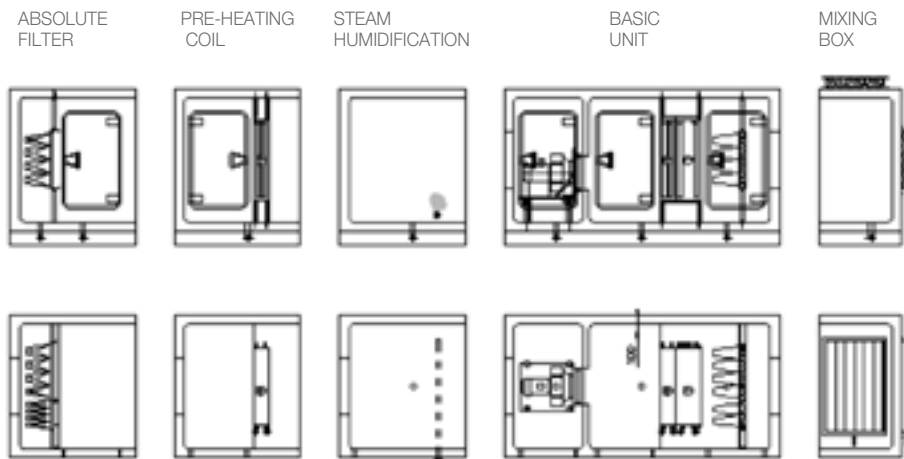
CONSTRUCTIONAL FEATURES

- **Sandwich panels** made from composite material: fibreglass laminate on the outside with isophthalic gelcoat finish; extruded polystyrene foam insulation ( $\lambda = 0.030$  W/mK); fibreglass laminate on the inside with isophthalic gelcoat finish.
- **Floor with plywood reinforcement on the inside** and aluminium plates for fastening the components.
- **Floor with aluminium reinforcing plates** on the outside for fastening the support feet.
- Floor thickness 90/60 mm.
- Roof thickness 83 mm.
- Front and rear panel thickness 83 mm.
- Side wall thickness 83 mm, **with vertical aluminium reinforcement for fastening various components.**
- Rounded inside edges, 15 mm radius.
- 1 opening on front panel and 2 openings on rear panel.
- **Stainless steel outside doors** with lever handle and key.
- Outside edges with grey anodised aluminium protective strips and grey plastic corner covers.
- Floor sloping in the direction of water drain to ensure liquid is collected on the drain side.
- **Rounded inside edges with isophthalic gelcoat finish** and 15 mm radius of curvature.
- 2" diameter stainless steel **drain pipes** with external thread, partially embedded in the floor to ensure perfect collection of drain liquids.
- **Side doors** with stainless steel closing mechanisms and hinges and airtight perimeter gaskets.



Options on request

- Fresh air damper
- Mixing box with two dampers
- Re-heating coil
- Humidification with immersed electrodes steam producer
- Spayed water humidification (without steam producer)
- Absolute filters
- Electric control panel





# TVL

Thermoventilating units horizontal and vertical execution



## PRODUCT SPECIFICATIONS

- The TVL fan coils can fulfil heating and cooling requirements in medium and large civil and industrial environments.
- This series uses double suction centrifugal fans with forward curved blades and features 9 models with flow-rates from 1.700 m<sup>3</sup>/h to 25.000 m<sup>3</sup>/h, offering extremely simple installation and flexibility.
- **Coarse filtering** by: corrugated filters with large surface area, class G4, synthetic filter media with weighted efficiency  $\geq 90\%$ , galvanised frame and retaining mesh.
- **Heat exchange coils:** water-cooled, made from 5/8" copper tubes with continuous aluminium fins, 2.5 mm pitch. The tubes are mechanically expanded to ensure perfect coupling between tube and fin and consequently perfect heat exchange. The fins have a corrugated surface to ensure rigidity and create air turbulence, increasing the heat exchange coefficient. All coils can be removed both from the side with fittings and the opposite side.
- **Electric coils:** made using finned tubular air heaters with one or more stages. Dimensioned as post-heating to a  $\Delta t$  of 8°C. For other powers, contact the Sales Office.
- **Fan assembly:** the fan assembly is supported by a press formed galvanised sheet metal base with special rubber vibration dampers. Double suction centrifugal fans with

forward curved blades can be installed. The impellers are statically and dynamically balanced in accordance with the relevant standards in force. The units use an individual sealed ball bearing ring with lifetime lubrication, rated for a minimum of 40,000 operating hours. The motors installed are three-phase asynchronous, with closed construction, fan cooled, squirrel cage rotor, compliant with IEC 60072-1, IEC 60034.

## KEY FEATURES

- **Frame** made using a modular system of extruded anodised aluminium alloy section bars (in accordance with UNI 9006/1), joined by die-cast aluminium corners. Sandwich panels, insulated using polyurethane foam, density 40 kg/m<sup>3</sup>, 23 mm thick.
- **Outside panel** made from coated sheet metal, 6/10 thickness, inside panel made from galvanised sheet metal, 6/10 thickness. *(variants such as 50 mm thick panelling or different materials such as: AISI 304 stainless steel, Peraluman... will be quoted on specific request by our technical-sales department).*

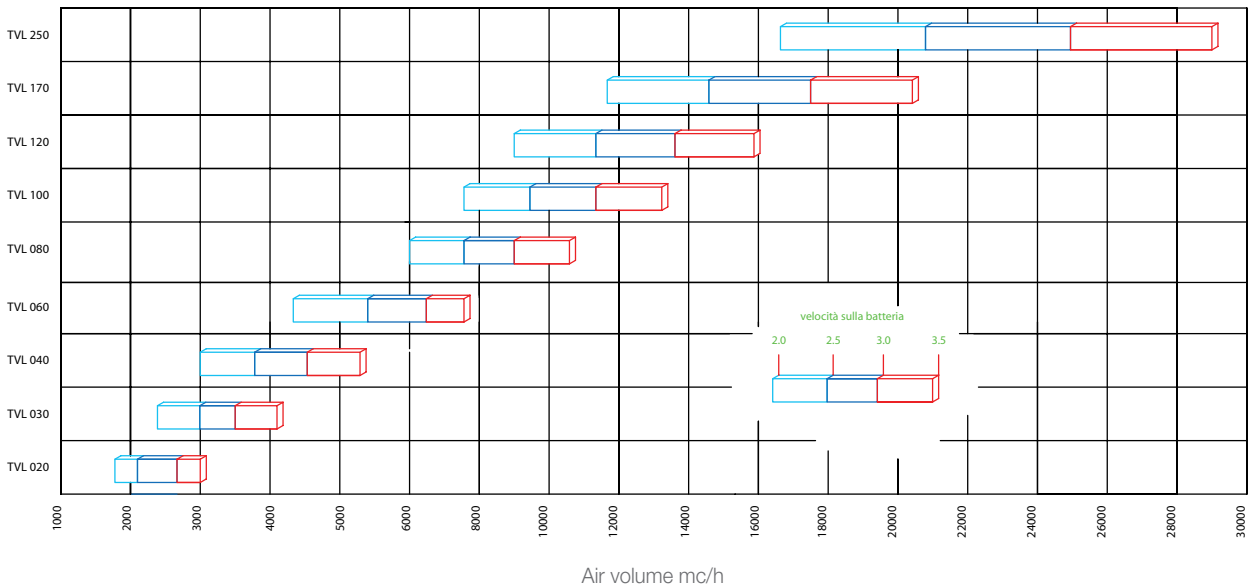
## TVL SERIES

The TVL series units are selected according to:

- Air flow-rate
- Type of system: 2- or 4-pipe (heating/cooling or both)
- Vertical or horizontal configuration

The following tables help determine the most suitable model for the system in question.

The flow-rates are represented in the following diagram in m<sup>3</sup>/h, highlighting the velocity across the coil at 2 - 2.5 - 3.0 m/sec.



## TVL SERIES

- GR** Intake grille with fixed aluminium fins
- SR** Control damper with motor drive shaft
- PA** Intake plenum
- SM** Mixing chamber complete with 2 control dampers featuring motor drive shaft
- PM** Outlet plenum complete with three outlets featuring two rows of adjustable aluminium blades
- MS** Safety micro-switch

- VB** Variable pitch pulleys
- CM** Manual damper control
- TPV** Coated sheet metal rain cover for vertical units
- TPH** Coated sheet metal rain cover for horizontal units
- XXX** Additional soundproofing on fan compartment
- PR** Differential pressure switch
- MA** Water column differential pressure gauge



TECHNICAL DATA

MODEL	TVL	20	30	40	60	80	100	120	170	250
Nom. air flow rate (v=2,5 m/sec)	m <sup>3</sup> /h	2200	2900	3600	5400	7600	9500	11300	14500	20800
Static pressure	Pa	600	600	600	600	600	600	600	600	600

FAN	TVL	20	30	40	60	80	100	120	170	250
Model fan		AT 9/7	AT 9/9	AT 10/10	AT 12/12	AT 15/15	AT 18/18	ADH 450	ADH 500	ADH 630
Max. motor power installed	kW	1,1	1,1	1,5	2,2	3	4	5,5	7,5	11
Poles	n°	4	4	4	4	4	4	4	4	4
Enclosure protection	IP	55	55	55	55	55	55	55	55	55
Insulation class	F	F	F	F	F	F	F	F	F	F
Electrical supply	V / ph / Hz	230-400 / 3 / 50						400 / 3 / 50		

FILTER	TVL	20	30	40	60	80	100	120	170	250
Efficiency		G4	G4	G4	G4	G4	G4	G4	G4	G4
Crossing speed	m/s	2,55	2,40	1,74	2,07	1,93	2,02	2,08	2,21	2,31
Average pressure drop	Pa	80	80	80	80	80	80	80	80	80

2R hot water coil	TVL	20	30	40	60	80	100	120	170	250
Heating capacity (1)	kW	18,59	24,68	31,33	45,56	63,97	76,94	93,35	114,76	173,54
Supply air temperature	°C	20,1	20,3	20,9	20,1	20	19,1	19,5	19,6	19,8
Water flow	dm <sup>3</sup> /h	1629	2163	2746	3994	5607	6744	6957	10510	15212
Water pressure drop	kPa	11,6	7,9	12,9	9,6	9,3	5,7	7,3	6	9,2
Air pressure drop	Pa	23,5	15,4	21,7	23,4	23,4	23,6	20,4	23,3	23,4
Connection diameter	Gas	3/4"	3/4"	3/4"	1"	1"1/4	1"1/2	1"1/2	2"	2"

3R hot water coil	TVL	20	30	40	60	80	100	120	170	250
Heating capacity (1)	kW	26,21	34,39	43,8	64,5	90,46	108,56	131,63	169,05	244,7
Supply air temperature	°C	30,4	30,3	31,1	30,5	30,4	28,9	29,6	29,6	29,9
Water flow	dm <sup>3</sup> /h	1964	3023	3840	5654	7929	9516	11538	14818	21450
Water pressure drop	kPa	10,4	6,2	8,9	12	15,8	5	6,2	5,3	7,8
Air pressure drop	Pa	32,7	30,8	30,1	34,1	34,4	34,4	33,9	33,8	34,1
Connection diameter	Gas	3/4"	3/4"	1"	1"1/4	1"1/4	2"	2"	2"1/2	2"1/2

4R hot water coil	TVL	20	30	40	60	80	100	120	170	250
Heating capacity (1)	kW	31,49	41,27	52,38	77,17	108,38	137,12	165,01	211,88	305,17
Supply air temperature	°C	37,5	37,3	38,2	37,5	37,4	37,9	38,4	38,4	38,6
Water flow	dm <sup>3</sup> /h	2760	3617	4592	6764	9500	12716	14465	18573	26750
Water pressure drop	kPa	9,2	5,1	7	9,5	9,7	16,3	24,8	19,5	35,5
Air pressure drop	Pa	44,2	42	41	46,5	46,9	54	46,3	46,1	46,6
Connection diameter	Gas	3/4"	1"	1"	1"1/4	1"1/2	1"1/2	1"1/2	2"	2"

4R cold water coil	TVL	20	30	40	60	80	100	120	170	250
Total cooling capacity (2)	kW	12,77	17,11	22,15	31,43	41,03	53,61	65,98	84,51	123,26
Supply air temperature	°C	20	19,9	19,6	20	20,4	20,1	19,9	19,9	19,9
Water flow	dm <sup>3</sup> /h	2195	2940	3807	5402	7053	9213	11341	14525	21185
Water pressure drop	kPa	13,6	14,3	26,6	13,3	7,7	11,7	18,6	15	27,4
Air pressure drop	Pa	46,3	67,7	66	74,3	74,9	74,9	73,9	73,7	74,4
Connection diameter	Gas	3/4"	1"	1"	1"1/4	1"1/2	1"1/2	1"1/2	2"	2"

6R cold water coil	TVL	20	30	40	60	80	100	120	170	250
Total cooling capacity (2)	kW	16,85	22,72	28	41,06	57,46	73,93	85,55	115,56	159,78
Supply air temperature	°C	17,2	17	17	17,3	17,3	17,8	17,3	16,9	17,6
Water flow	dm <sup>3</sup> /h	2896	3906	4813	7056	9875	12706	15481	19861	27461
Water pressure drop	kPa	16,5	20,5	10,8	14,7	14,9	26,4	13	35,5	19,3
Air pressure drop	Pa	58,4	84,3	82	92,5	93,2	106,7	92	91,8	92,6
Connection diameter	Gas	1"	1"	1"1/4	1"1/4	1"1/2	1"1/2	2"	2"	2"1/2

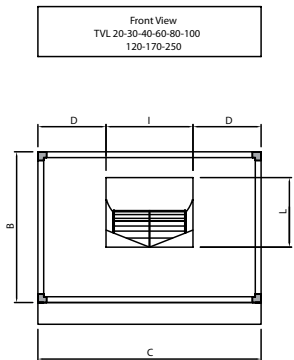
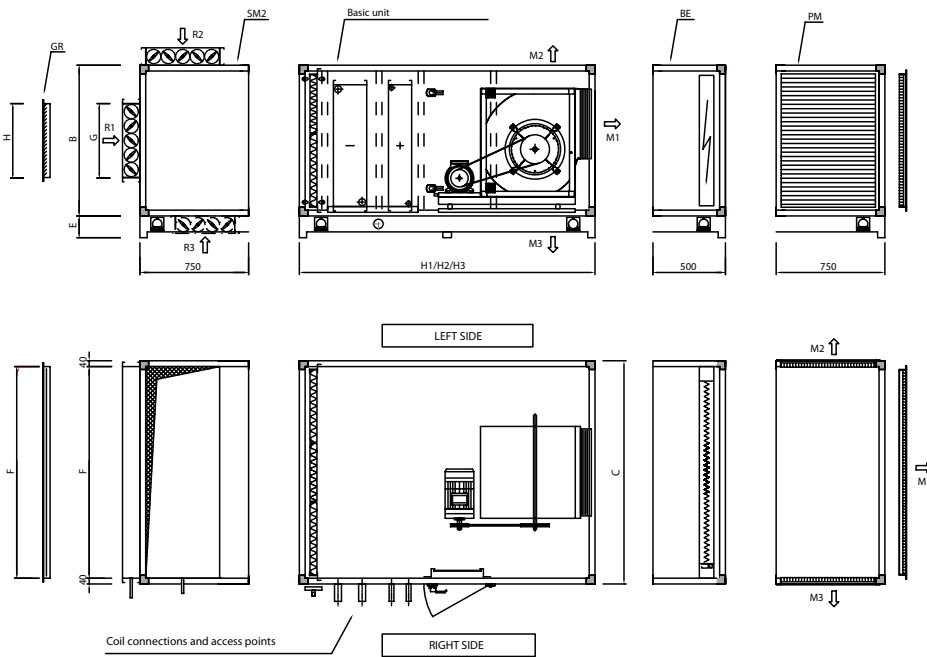
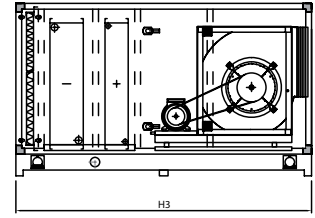
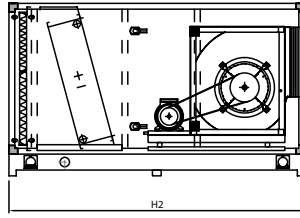
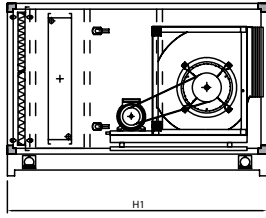
Electric coil	TVL	20	30	40	60	80	100	120	170	250
Electric capacity	kW	6	7,5	9	15	20	25	30	38	55
Electrical supply	V / ph / Hz	400 / 3 / 50								

Electric coil: for sizing and quotations contact the Technical Department.  
 (1) Inlet air Temp. -5°C, UR 90%, Water Temp. In/out 70/60°C. Air flow at 2,5 m/sec  
 (2) Inlet air Temp. 32°C, UR 50%, Water Temp. in/out 7/12°C. Air flow at max speed. 2,5 m/sec



POSSIBLE DIMENSIONS AND CONFIGURATION

HORIZONTAL UNIT (H)

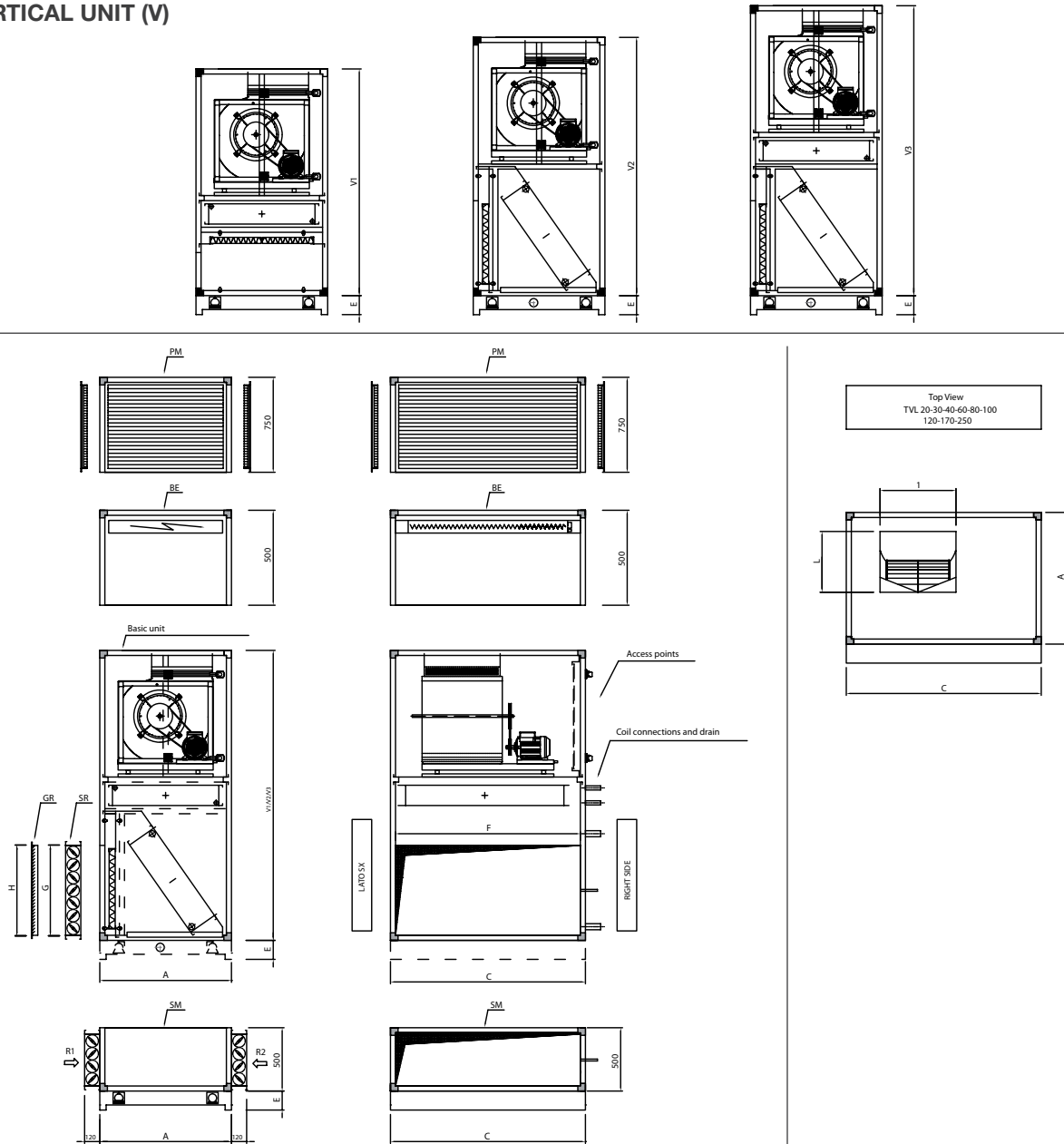


MODEL	20	30	40	60	80	100	120	170	250
H1	1290	1290	1290	1540	1540	1790	1790	2040	2290
H2	1540	1540	1540	1790	1790	2040	2040	2540	2790
H3	1540	1540	1540	1790	1790	2040	2040	2540	2790
B	600	600	650	790	1040	1040	1040	1290	1540
C	790	1040	1290	1290	1290	1540	1790	1790	2040
D	290	415	540	440	390	465	590	540	565
E	95	95	95	95	150	150	150	150	150
F	710	960	1210	1210	1210	1460	1710	1710	1960
G	210	210	210	410	510	610	610	710	910
H	210	310	310	510	710	710	710	910	1110
I	230	300	330	395	470	600	610	680	840
L	265	265	290	340	405	480	570	640	800

Dimensions (mm)

POSSIBLE DIMENSIONS AND CONFIGURATION

VERTICAL UNIT (V)



MODEL	20	30	40	60	80	100	120	170	250
<b>A</b>	600	600	650	790	1040	1040	1040	1290	1540
<b>V1</b>	1290	1290	1290	1540	1540	1790	1790	2040	2290
<b>V2</b>	1540	1540	1540	1790	1790	2040	2040	2290	2540
<b>V3</b>	1790	1790	1790	2040	2040	2290	2290	2540	2790
<b>C</b>	790	1040	1290	1290	1290	1540	1790	1790	2040
<b>E</b>	95	95	95	95	150	150	150	150	150
<b>F</b>	710	960	1210	1210	1210	1460	1710	1710	1960
<b>G</b>	210	210	210	410	510	610	610	710	910
<b>H</b>	210	310	310	510	710	710	710	910	1110
<b>I</b>	230	300	330	395	470	600	610	680	840
<b>L</b>	265	265	290	340	405	480	570	640	800

## EFFICIENCY HEATING COILS

Coil performance in heating mode for each size of unit at different air flows and with different air and water inlet temperatures.

## TVL 20 heating

	Air		Water 70/60°C			Water 45/40°C				
	Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa
	1700	-10	20,1	17,23	1510	10,1	11,2	12,11	2098	19,7
	1700	-5	22,3	15,6	1368	9,1	14,1	10,94	1893	16,3
	1700	0	26	14,89	1305	8,2	17	9,75	1688	13,1
	1700	5	29	13,71	1202	7,4	20	8,56	1482	10,3
	1700	10	31,9	12,53	1098	6,7	22,9	7,37	1275	8,3
	1700	15	34,8	11,34	997	6	25,8	6,17	1068	6,7
	Air		Water 70/60°C			Water 45/40°C				
	Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa
	2200	-10	16,9	19,94	1748	13,3	8,9	14,03	2429	26
	2200	-5	20,1	18,59	1629	11,6	12,1	12,66	2192	21,4
	2200	0	23,3	17,23	1510	10,1	15,2	11,26	1954	17,3
	2200	5	26,4	15,86	1390	8,9	18,4	9,91	1715	13,5
	2200	10	29,6	14,49	1270	8	21,5	8,52	1475	8,52
	2200	15	32,7	13,1	1149	7	24,6	7,13	1234	8
	Air		Water 70/60°C			Water 45/40°C				
	Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa
	2400	-10	15,9	20,92	1834	14,5	8,2	14,72	2549	28,5
	2400	-5	19,1	19,5	1709	12,7	11,4	13,28	2300	23,5
	2400	0	22,4	18,07	1584	11	14,7	11,84	2050	18,9
	2400	5	25,6	16,64	1458	9,6	17,9	10,39	1799	14,8
	2400	10	28,8	15,19	1332	8,4	21,1	8,93	1547	11,2
	2400	15	32	13,74	1204	7,4	24,3	7,47	1294	8,5
	Air		Water 70/60°C			Water 45/40°C				
	Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa
	2600	-10	14,9	21,85	1915	15,8	7,6	15,38	2662	30,9
	2600	-5	18,3	20,36	1785	13,8	10,9	13,87	2402	25,5
	2600	0	21,6	18,87	1654	12	14,1	12,37	2141	20,5
	2600	5	24,8	17,37	1522	10,3	17,4	10,85	1878	16,1
	2600	10	28,1	15,86	1390	8,9	20,7	9,33	1615	12,1
	2600	15	31,4	14,34	1257	7,8	23,9	7,8	1350	9



EFFICIENCY HEATING COILS

TVL 20 heating

<b>ROWS 3R</b>	Air		Water 70/60°C			Water 45/40°C				
	Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa
	1700	-10	32	24,03	2106	9,1	19,4	16,85	2918	17,3
	1700	-5	34,1	22,4	1964	8,3	21,6	15,21	2634	14,3
	1700	0	36,3	20,77	1820	7,5	23,7	13,57	2349	11,5
	1700	5	38,4	19,13	1677	6,8	25,8	11,91	2063	9,2
	1700	10	40,5	17,47	1532	6,2	27,9	10,26	1776	7,6
	1700	15	42,6	15,82	1387	5,5	30	8,59	1488	6,2
	Air		Water 70/60°C			Water 45/40°C				
	Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa
	2200	-10	28	28,12	2465	11,9	16,6	19,73	3416	23,2
	2200	-5	30,4	26,21	2297	10,4	19,1	17,81	3084	19,1
	2200	0	32,8	24,29	2129	9,3	21,4	15,88	2749	15,4
	2200	5	35,2	22,36	1960	8,3	23,8	13,94	2413	12,1
	2200	10	37,6	20,42	1790	7,4	26,2	11,99	2076	9,3
	2200	15	40	18,48	1620	6,6	28,6	10,04	1738	7,4
	Air		Water 70/60°C			Water 45/40°C				
	Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa
	2400	-10	26,6	29,59	2594	13,1	15,7	20,78	3957	25,6
	2400	-5	29,1	27,58	2418	11,5	18,2	18,75	3247	21,1
	2400	0	31,6	25,56	2241	10	20,7	16,72	2894	17
	2400	5	34,1	23,53	2063	8,9	23,2	14,67	2540	13,3
	2400	10	36,6	21,49	1884	7,9	25,6	12,62	2185	10
	2400	15	39,1	19,45	1705	7	28,1	10,56	1829	7,9
	Air		Water 70/60°C			Water 45/40°C				
Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	
2600	-10	25,4	31	2718	14,3	14,9	21,77	3769	27,9	
2600	-5	28	28,89	2532	12,5	17,4	19,65	3402	23	
2600	0	30,6	26,77	2347	10,9	20	17,51	3032	18,6	
2600	5	33,2	24,64	2160	9,4	22,6	15,37	2661	14,5	
2600	10	35,7	22,51	1973	8,4	25,1	13,22	2289	10,9	
2600	15	38,3	20,36	1785	7,4	27,6	11,06	1919	8,4	

## EFFICIENCY HEATING COILS

## TVL 20 heating

ROWS4R	Air		Water 70/60°C			Water 45/40°C				
	Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa
	1700	-10	40	28,61	2508	8,1	25	20,02	3467	14,6
	1700	-5	41,6	26,68	2339	7,4	26,6	18,08	3130	12
	1700	0	43,2	24,73	2168	6,8	28,2	16,12	2792	9,8
	1700	5	44,8	22,78	1997	6,2	29,8	14,17	2454	8,2
	1700	10	46,4	20,83	1826	5,6	31,3	12,21	2114	6,8
	1700	15	48	18,86	1654	5,1	32,9	10,24	1773	5,6
	Air		Water 70/60°C			Water 45/40°C				
	Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa
2200	-10	35,6	33,78	2961	10,3	21,9	23,66	4097	19,9	
2200	-5	37,5	31,49	2760	9,2	23,8	21,36	3697	16,4	
2200	0	39,4	29,19	2558	8,3	25,7	19,04	3297	13,3	
2200	5	41,3	26,88	2356	7,5	27,6	16,73	2896	10,4	
2200	10	43,2	24,56	2153	6,7	29,4	14,4	2494	8,4	
2200	15	45	22,24	1949	6	31,3	12,07	2090	6,8	
Air		Water 70/60°C			Water 45/40°C					
Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	
2400	-10	34,1	35,66	3126	11,4	20,9	24,99	4326	22,1	
2400	-5	36,1	33,24	2914	10	22,9	22,55	3904	18,2	
2400	0	38,1	30,8	2700	8,9	24,9	20,11	3481	14,7	
2400	5	40,1	28,36	2486	8	26,9	17,66	3057	11,5	
2400	10	42,1	25,92	2272	7,2	28,8	15,2	2633	9	
2400	15	44	23,45	2056	6,4	30,8	12,74	2205	7,2	
Air		Water 70/60°C			Water 45/40°C					
Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	
2600	-10	32,8	37,46	3283	12,5	20	26,25	4546	24,3	
2600	-5	34,9	34,9	3059	10,9	22,1	23,69	4101	20	
2600	0	37	32,35	2835	9,6	24,1	21,12	3656	16,1	
2600	5	39	29,78	2610	8,6	26,2	18,55	3211	12,6	
2600	10	41,1	27,2	2385	7,6	28,2	15,96	2764	9,6	
2600	15	43,1	24,62	2158	6,8	30,3	13,37	2315	7,6	



EFFICIENCY HEATING COILS

Coil performance in heating mode for each size of unit at different air flows and with different air and water inlet temperatures.

TVL 20 cooling

ROWS 4R	Air		Water 7/12°C			Water 8/13°C				
	Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa
	1700	22 / 50%	15,1	3,99	685	3,7	16,5	3,18	547	3,3
	1700	24 / 50%	15,5	5,09	876	4,4	16,2	4,56	784	4,1
	1700	26 / 50%	16,3	6,25	1074	5,3	16,7	5,7	980	4,8
	1700	28 / 50%	17,2	7,59	1304	6,4	17,7	6,89	1184	5,8
	1700	32 / 50%	19	11,15	1917	10,6	19,5	10,3	1770	9,3
	1700	35 / 60%	21,4	17,17	2951	23,6	21,9	16,25	2793	21,2
	Air		Water 7/12°C			Water 8/13°C				
	Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa
2200	22 / 50%	15,6	4,85	833	4,3	16,2	4,34	746	3,9	
2200	24 / 50%	16,2	5,94	1022	5	16,9	5,38	925	4,6	
2200	26 / 50%	17	7,24	1245	6,1	17,6	6,57	1129	5,5	
2200	28 / 50%	17,9	8,76	1506	7,6	18,5	7,99	1373	6,8	
2200	32 / 50%	20	12,77	2195	13,6	20,4	11,78	2025	11,7	
2200	35 / 60%	22,6	19,72	3390	30,5	23,1	18,65	3205	27,4	
Air		Water 7/12°C			Water 8/13°C					
Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	
2400	22 / 50%	15,8	5,12	880	4,4	16,4	4,61	792	4,1	
2400	24 / 50%	16,4	6,26	1077	5,3	17,1	5,67	974	4,8	
2400	26 / 50%	17,2	7,6	1306	6,4	17,8	6,9	1186	5,8	
2400	28 / 50%	18,3	9,07	1559	7,9	18,7	8,39	1442	7,2	
2400	32 / 50%	20,3	13,35	2294	14,8	20,7	12,3	2114	12,6	
2400	35 / 60%	23	20,63	3546	33,1	23,4	19,5	3351	29,7	
Air		Water 7/12°C			Water 8/13°C					
Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	
2600	22 / 50%	15,9	5,37	924	4,6	16,5	4,85	834	4,3	
2600	24 / 50%	16,8	6,45	1108	5,4	17,3	5,94	1021	5	
2600	26 / 50%	17,6	7,83	1346	6,6	18,1	7,22	1240	6,1	
2600	28 / 50%	18,6	9,49	1631	8,4	19	8,7	1502	7,5	
2600	32 / 50%	20,6	13,9	2389	15,9	21,1	12,6	2166	13,2	
2600	35 / 60%	23,4	21,5	3695	35,8	23,7	20,31	3491	32,1	

## EFFICIENCY HEATING COILS

## TVL 20 cooling

ROWS 6R	Air		Water 7/12°C			Water 8/13°C				
	Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa
	1700	22 / 50%	13,2	5,13	881	3,9	14,7	4,24	728	3,5
	1700	24 / 50%	13,4	6,58	1132	4,7	14,1	5,91	1016	4,3
	1700	26 / 50%	14	8,14	1399	5,8	14,7	7,37	1267	5,2
	1700	28 / 50%	14,7	9,98	1715	7,2	15,4	9,08	1560	6,5
	1700	32 / 50%	16,1	14,53	2498	12,6	16,7	13,48	2316	10,9
	1700	35 / 60%	17,2	18,5	3180	19,6	18,8	21,02	3612	24,7
	Air		Water 7/12°C			Water 8/13°C				
	Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa
2200	22 / 50%	13,6	6,31	1084	4,6	14,4	5,68	975	4,2	
2200	24 / 50%	14,1	7,79	1338	5,5	14,8	7,06	1213	5	
2200	26 / 50%	14,9	9,48	1629	6,8	15,4	8,64	1485	6,1	
2200	28 / 50%	15,7	11,53	1982	8,6	16,2	10,54	1812	7,7	
2200	32 / 50%	17,2	16,85	2896	16,5	17,8	15,6	2680	14,2	
2200	35 / 60%	19,5	25,74	4425	36,2	20,1	24,41	4196	32,6	
Air		Water 7/12°C			Water 8/13°C					
Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	
2400	22 / 50%	13,8	6,69	1150	4,8	14,6	6,05	1040	4,4	
2400	24 / 50%	14,4	8,21	1411	5,8	15	7,45	1281	5,3	
2400	26 / 50%	15,1	9,98	1715	7,2	15,7	9,07	1560	6,5	
2400	28 / 50%	15,9	12,12	2083	9,2	16,5	11,08	1904	8,2	
2400	32 / 50%	17,6	17,68	3040	18	18,1	16,36	2812	15,6	
2400	35 / 60%	20	27,04	4647	39,6	20,5	25,62	4404	35,7	
Air		Water 7/12°C			Water 8/13°C					
Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	
2600	22 / 50%	14,1	7,05	1212	5	14,8	6,39	1098	4,6	
2600	24 / 50%	14,6	8,61	1476	6,1	15,3	7,83	1346	5,5	
2600	26 / 50%	15,4	10,45	1795	7,6	16	9,52	1636	6,8	
2600	28 / 50%	16,2	12,66	2176	9,8	16,8	11,52	1979	8,6	
2600	32 / 50%	17,9	18,46	3173	19,5	18,5	16,93	2909	16,6	
2600	35 / 60%	20,4	28,26	4857	43	20,9	26,79	4604	38,8	



EFFICIENCY HEATING COILS

Coil performance in heating mode for each size of unit at different air flows and with different air and water inlet temperatures.

TVL 30 heating

<b>ROWS 2R</b>	Air		Water 70/60°C			Water 45/40°C				
	Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa
	2300	-10	20	23,22	2035	7,3	11,1	16,33	2828	12,5
	2300	-5	22,9	21,63	1896	6,7	14	14,75	2551	10,4
	2300	0	25,9	20,05	1757	6,2	17	13,13	2274	8,8
	2300	5	28,8	18,45	1617	5,7	19,9	11,52	1994	7,4
	2300	10	31,8	16,84	477	5,2	22,8	9,9	1714	6,2
	2300	15	34,7	15,23	1335	4,7	25,7	8,27	1433	5,2
	Air		Water 70/60°C			Water 45/40°C				
	Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa
	2900	-10	17,1	26,48	2321	8,6	9,1	18,64	3228	16
	2900	-5	20,3	24,68	2163	7,9	12,2	16,82	2912	13,2
	2900	0	23,4	22,86	2004	7,2	15,3	14,98	2594	10,7
	2900	5	26,5	21,03	1844	6,5	18,5	13,14	2274	8,8
	2900	10	29,7	19,2	1683	5,9	21,6	11,28	1954	7,3
	2900	15	32,8	17,35	1521	5,3	24,7	9,43	1632	5,9
	Air		Water 70/60°C			Water 45/40°C				
	Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa
	3200	-10	15,9	27,96	2451	9,2	8,3	19,69	3409	17,7
	3200	-5	19,2	26,05	2284	8,4	11,5	17,76	3074	14,6
	3200	0	22,4	24,13	2115	7,6	14,7	15,82	2738	11,8
	3200	5	25,6	22,2	1946	6,9	17,9	13,87	2401	9,4
	3200	10	28,8	20,26	1776	6,2	21,1	11,91	2062	7,7
	3200	15	32	18,31	1605	5,6	24,2	9,95	1722	6,3
	Air		Water 70/60°C			Water 45/40°C				
Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	
3500	-10	14,9	29,35	2573	9,9	7,5	20,67	2579	19,4	
3500	-5	18,2	27,35	2397	9	10,8	18,64	3228	16	
3500	0	21,5	25,33	2220	8,1	14,1	16,6	2875	12,9	
3500	5	24,8	23,3	2043	7,3	17,4	14,56	2520	10,1	
3500	10	28	21,26	1864	6,6	20,6	12,5	2164	8,2	
3500	15	31,3	19,21	1684	5,9	23,9	10,44	1807	6,6	



## EFFICIENCY HEATING COILS

## TVL 30 heating

ROWS 3R	Air		Water 70/60°C			Water 45/40°C				
	Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa
	2300	-10	31,5	32,16	2819	5,7	19,2	22,58	3909	8,8
	2300	-5	33,7	29,95	2626	5,3	21,3	2037	3526	7,7
	2300	0	35,8	27,74	2432	5	23,4	18,14	3140	6,7
	2300	5	38	25,52	2237	4,6	25,5	15,9	2753	5,8
	2300	10	40,1	23,29	2041	4,3	27,6	13,66	2366	5
	2300	15	42,2	21,05	1846	4	29,7	11,41	1976	4,3
	Air		Water 70/60°C			Water 45/40°C				
	Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa
2900	-10	27,9	3703	3246	6,7	16,6	26,03	4506	11	
2900	-5	30,3	34,39	3023	6,2	19	23,47	4063	9,3	
2900	0	32,7	31,93	2799	5,7	21,4	20,89	3617	7,9	
2900	5	35,1	29,37	2574	5,2	23,8	18,31	3170	6,8	
2900	10	37,4	26,79	2348	4,8	26,1	15,72	2722	5,7	
2900	15	39,8	24,21	2122	4,4	28,4	13,12	2272	4,8	
Air		Water 70/60°C			Water 45/40°C					
Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	
3200	-10	26,4	39,25	3441	7,2	15,6	27,59	4777	12,2	
3200	-5	28,9	36,55	3204	6,6	18,1	24,88	4307	10,1	
3200	0	31,4	33,84	2966	6,1	20,6	22,15	3834	8,6	
3200	5	33,9	31,11	2727	5,5	23	19,41	3360	7,3	
3200	10	36,4	28,38	2488	5,1	25,5	16,66	2884	6,1	
3200	15	38,8	25,64	2247	4,6	27,9	13,9	2407	5,1	
Air		Water 70/60°C			Water 45/40°C					
Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	
3500	-10	25,1	41,35	3624	7,7	14,7	29,07	5033	13,5	
3500	-5	27,7	38,5	3375	7	17,2	26,26	4538	11,1	
3500	0	30,3	35,64	3124	6,4	19,8	23,33	4039	9,2	
3500	5	32,8	32,77	2872	5,9	22,4	20,44	2539	7,7	
3500	10	35,4	29,88	2619	5,3	24,9	17,54	3037	6,4	
3500	15	37,9	26,99	2366	4,8	27,4	14,63	2534	5,3	



EFFICIENCY HEATING COILS

TVL 30 heating

<b>ROWS 4R</b>	Air		Water 70/60°C			Water 45/40°C				
	Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa
	2300	-10	39,3	38,18	3346	4,8	24,6	26,76	4633	6,8
	2300	-5	40,9	35,56	3117	4,5	26,2	24,13	4177	6,1
	2300	0	42,5	32,93	2886	4,2	27,8	21,49	3720	5,4
	2300	5	44,1	30,3	2656	4	29,4	18,85	3264	4,8
	2300	10	45,7	27,65	2424	3,8	30,9	16,2	2805	4,2
	2300	15	47,3	25	2192	3,6	32,5	13,54	2345	3,8
	Air		Water 70/60°C			Water 45/40°C				
	Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa
	2900	-10	35,4	44,31	3884	5,5	21,8	31,09	5383	8,2
	2900	-5	37,3	41,27	3617	5,1	23,7	28,02	4852	7,2
	2900	0	39,1	38,2	3349	4,8	25,6	24,95	4319	6,3
	2900	5	41	35,14	3080	4,4	27,4	21,8	3788	5,5
	2900	10	42,8	32,06	2810	4,2	29,2	18,79	3253	4,8
	2900	15	44,7	28,97	2539	3,9	31,1	15,69	2717	4,2
	Air		Water 70/60°C			Water 45/40°C				
	Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa
	3200	-10	33,7	47,12	4130	5,8	20,7	33,07	5726	8,9
	3200	-5	35,7	43,87	3845	5,4	22,7	29,81	5161	7,8
	3200	0	37,7	40,61	3560	5	24,6	26,53	4593	6,8
	3200	5	39,7	37,34	3273	4,7	26,6	23,26	4027	5,9
	3200	10	41,6	34,07	2986	4,3	28,5	19,97	3458	5
	3200	15	43,6	30,78	2698	4	30,5	16,67	2886	4,3
	Air		Water 70/60°C			Water 45/40°C				
Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	
3500	-10	32,2	49,77	4363	6,2	19,7	34,95	6051	9,6	
3500	-5	34,3	46,34	4062	5,7	21,7	31,49	5453	8,4	
3500	0	36,4	42,9	3760	5,3	23,8	28,03	4853	7,2	
3500	5	38,5	39,43	3457	4,9	25,9	24,57	4254	6,2	
3500	10	40,5	35,97	3153	4,5	27,9	21,09	3651	5,3	
3500	15	42,6	32,49	2848	4,2	29,9	17,6	3047	4,5	

## EFFICIENCY COOLING COILS

Coil performance in cooling mode for each size of unit at different air flows and with different air and water inlet temperatures.

## TVL 30 cooling

ROWS 4R	Air		Water 7/12°C			Water 8/13°C					
	Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	
	2300	22 / 50%	15,1	5,41	930	3,9	16,2	4,21	723	3,4	
	2300	24 / 50%	15,4	6,92	1189	4,6	16,6	6,18	1061	4,2	
	2300	26 / 50%	16,2	8,47	1456	5,5	16,7	7,74	1331	5	
	2300	28 / 50%	17,1	10,3	1771	6,8	17,7	9,35	1607	6	
	2300	32 / 50%	19	15,13	2601	11,4	19,5	2403	2403	9,8	
	2300	35 / 60%	21,4	23,3	4005	25,3	21,9	22,07	3793	22,8	
	Air		Water 7/12°C			Water 8/13°C					
Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa		
2900	22 / 50%	15,5	6,47	1112	4,3	16,2	5,78	997	4		
2900	24 / 50%	16,1	7,94	1365	5,2	16,8	7,19	1235	4,7		
2900	26 / 50%	16,9	9,69	1665	6,3	17,5	8,78	1510	5,7		
2900	28 / 50%	18,4	11,08	1904	7,8	18,4	10,69	1838	7		
2900	32 / 50%	19,9	17,11	2940	14,3	20,3	15,79	2714	12,3		
2900	35 / 60%	22,5	26,4	4537	31,8	22,9	24,97	4291	28,6		
Air		Water 7/12°C			Water 8/13°C						
Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa		
3200	22 / 50%	15,7	6,88	1183	4,6	16,3	6,19	1064	4,2		
3200	24 / 50%	16,3	8,43	1450	5,5	17	7,63	1311	5		
3200	26 / 50%	17,2	10,24	1761	6,7	17,8	9,29	1596	6		
3200	28 / 50%	18,3	12,2	2098	8,3	18,7	11,28	1939	7,5		
3200	32 / 50%	20,2	17,99	3092	15,7	20,6	16,59	2851	13,5		
3200	35 / 60%	22,9	27,79	4766	35	23,3	26,28	4517	31,4		
Air		Water 7/12°C			Water 8/13°C						
Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa		
3500	22 / 50%	15,9	7,27	1250	4,8	16,5	6,57	1128	4,4		
3500	24 / 50%	16,7	8,73	1500	5,7	17,3	8,04	1382	5,2		
3500	26 / 50%	17,6	10,59	1821	7	18	9,77	1679	6,3		
3500	28 / 50%	18,5	12,84	2206	8,8	18,9	11,82	2032	7,9		
3500	32 / 50%	20,5	18,83	3236	17,1	21,1	17,07	2934	14,2		
3500	35 / 50%	23,3	29,11	5003	38,1	23,7	27,5	4727	34,1		



EFFICIENCY COOLING COILS

TVL 30 cooling

<b>ROWS 6R</b>	Air		Water 7/12°C				Water 8/13°C			
	Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa
	2300	22 / 50%	12,8	7,24	1244	4,4	13,8	6,42	1103	4,1
	2300	24 / 50%	13,3	9,06	1557	5,4	13,9	8,21	1410	4,9
	2300	26 / 50%	13,9	11,17	1920	6,7	14,6	10,12	1736	9
	2300	28 / 50%	14,6	13,69	2353	8,6	15,3	12,46	2141	7,6
	2300	32 / 50%	16	19,88	3418	16,1	16,6	18,46	3173	14
	2300	35 / 60%	18,1	30,2	5191	34,7	18,7	28,7	4933	31,4
	Air		Water 7/12°C				Water 8/13°C			
	Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa
	2900	22 / 50%	13,4	8,54	1468	5,1	14,2	7,73	1329	4,7
	2900	24 / 50%	13,9	10,51	1806	6,3	14,6	9,53	1638	5,6
	2900	26 / 50%	14,7	12,79	2199	7,9	15,3	11,67	2005	7
	2900	28 / 50%	15,5	15,57	2676	10,3	16	14,27	2453	9
	2900	32 / 50%	17	22,72	3906	20,5	17,6	21,07	3621	17,8
	2900	35 / 50%	19,3	34,64	5954	44,7	19,8	32,86	5648	40,4
	Air		Water 7/12°C				Water 8/13°C			
	Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa
	3200	22 / 50%	13,7	9,12	1568	5,4	14,4	8,28	1423	5
	3200	24 / 50%	14,2	11,17	1920	6,7	14,9	10,15	1744	6
	3200	26 / 50%	15	13,56	2331	8,5	15,5	12,4	2131	7,5
	3200	28 / 50%	15,8	16,47	2831	11,4	16,4	15,08	2592	9,7
	3200	32 / 50%	17,4	24,02	4128	22,7	18	22,24	3823	19,6
	3200	35 / 60%	19,8	36,62	6294	49,5	20,3	34,75	5972	44,7
	Air		Water 7/12°C				Water 8/13°C			
Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	
3500	22 / 50%	13,9	9,66	1660	5,7	14,7	8,77	1508	5,2	
3500	24 / 50%	14,5	11,8	2028	7,1	15,1	10,72	1843	6,4	
3500	26 / 50%	15,3	14,27	2453	9	15,9	13,002	2238	8	
3500	28 / 50%	16,1	17,32	2977	12,5	16,6	15,85	2724	10,6	
3500	32 / 50%	17,8	25,22	4336	24,9	18,3	23,34	4012	21,5	
3500	35 / 50%	20,2	38,51	6619	54,3	20,8	36,49	6271	49	

## EFFICIENCY HEATING COILS

Coil performance in heating mode for each size of unit at different air flows and with different air and water inlet temperatures.

## TVL 40 heating

Air		Water 70/60°C				Water 45/40°C			
Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa
2900	-10	20,4	29,7	2603	11,7	11,4	20,87	3613	22,8
2900	-5	23,4	27,7	2428	10,3	14,3	18,85	3263	18,9
2900	0	26,3	25,68	2251	9,2	17,2	16,81	2911	15,3
2900	5	29,2	23,66	2074	8,2	20,1	14,77	2557	12,1
2900	10	32,1	21,63	1896	7,4	23	12,72	2202	9,4
2900	15	35,1	19,58	1717	6,6	25,9	10,66	1846	7,5

Air		Water 70/60°C				Water 45/40°C			
Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa
3600	-10	17,7	33,6	2945	14,7	9,5	23,62	4089	28,7
3600	-5	20,9	31,33	2746	12,9	12,6	21,33	3693	23,8
3600	0	24	29,05	2547	11,2	15,7	19,02	3294	19,3
3600	5	27,1	26,76	2346	9,7	18,8	16,71	2893	15,
3600	10	30,2	24,45	2143	8,6	21,9	14,38	2490	11,5
3600	15	33,3	22,14	1941	7,6	24,9	12,05	2086	8,7

Air		Water 70/60°C				Water 45/40°C			
Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa
4000	-10	1,4	35,62	3122	16,4	7,5	23,58	4083	30
4000	-5	19,7	33,21	2911	14,4	11,8	22,62	3915	26,5
4000	0	22,9	30,8	2699	12,5	15	20,17	3492	21,4
4000	5	26,1	28,36	2486	10,7	18,1	17,71	3067	16,9
4000	10	29,3	25,92	2272	9,3	21,3	15,25	2640	12,8
4000	15	32,4	23,46	2056	8,2	24,5	12,77	2211	9,4

Air		Water 70/60°C				Water 45/40°C			
Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa
4300	-10	15,6	37,06	3248	17,6	6,7	24,22	4194	32
4300	-5	18,9	34,55	3028	15,4	11,3	23,53	4073	28,5
4300	0	22,1	32,03	2807	13,4	14,5	20,98	3633	23,1
4300	5	25,4	29,5	2586	11,5	17,7	18,43	3190	18,2
4300	10	28,6	26,95	2363	9,8	20,9	15,86	2745	13,8
4300	15	31,9	24,39	2138	8,6	24,2	13,28	2299	9,9



EFFICIENCY HEATING COILS

TVL 40 heating

<b>ROWS 3R</b>	Air		Water 70/60°C			Water 45/40°C				
	Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa
	2900	-10	32,2	41,16	3608	8,2	19,6	28,86	4997	14,9
	2900	-5	34,3	38,37	3363	7,5	21,7	26,06	4512	12,3
	2900	0	36,4	35,57	3118	6,9	23,8	23,24	4023	10
	2900	5	38,6	32,76	2872	6,3	25,9	20,41	3534	8,4
	2900	10	40,7	29,93	2624	5,7	28	17,57	3042	7
	2900	15	42,8	27,1	2375	5,2	30,1	14,72	2549	5,7
	Air		Water 70/60°C			Water 45/40°C				
	Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa
	3600	-10	28,8	47	4119	9,8	17,2	32,97	5708	19,1
	3600	-5	31,1	43,8	3840	8,9	19,6	29,76	5153	15,8
	3600	0	33,5	40,6	3559	8,1	21,9	26,54	4594	12,8
	3600	5	35,8	37,88	3276	7,3	24,2	23,3	4034	10
	3600	10	38,2	34,14	2993	6,6	26,5	20,05	3471	8,2
	3600	15	40,5	30,9	2708	5,9	28,9	16,79	2906	6,6
	Air		Water 70/60°C			Water 45/40°C				
	Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa
	4000	-10	27,1	50,03	4385	11	16,1	35,11	6079	21,5
	4000	-5	29,6	46,63	4087	9,7	18,5	31,7	5488	17,8
	4000	0	32,1	43,21	3788	8,8	21	28,25	4892	14,3
	4000	5	34,5	39,78	3487	7,9	23,4	24,8	4294	11,3
	4000	10	37	36,33	3185	7	25,9	21,34	3695	8,9
	4000	15	39,4	32,87	2882	6,3	28,3	17,86	3092	7,1
Air		Water 70/60°C			Water 45/40°C					
Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	
4300	-10	26	52,18	4754	11,9	15,3	36,64	6343	23,3	
4300	-5	28,6	48,64	4263	10,4	17,8	33,07	5726	19,2	
4300	0	31,1	45,08	3951	9,3	20,4	29,48	5104	15,5	
4300	5	33,7	41,5	3637	8,3	22,9	25,87	4479	12,	
4300	10	36,2	37,89	3322	7,4	25,4	22,25	3853	9,4	
4300	15	38,7	24,28	3005	6,6	27,9	18,63	3225	7,5	

## EFFICIENCY HEATING COILS

## TVL 40 heating

Air		Water 70/60°C				Water 45/40°C			
Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa
2900	-10	40	48,86	4283	6,5	25	34,2	5922	10,3
2900	-5	41,6	45,54	3992	6	26,6	30,87	5345	8,9
2900	0	43,2	42,22	3700	5,5	28,2	27,53	4766	7,7
2900	5	44,8	38,89	3409	5,1	29,8	24,19	4188	6,6
2900	10	46,4	35,54	3115	4,7	31,3	20,83	3606	5,6
2900	15	48	32,18	2821	4,4	32,9	17,47	3025	4,8

Air		Water 70/60°C				Water 45/40°C			
Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa
3600	-10	36,4	56,2	4926	7,7	22,5	39,37	6816	13,4
3600	-5	38,2	52,38	4592	7	24,3	35,53	6151	11,1
3600	0	40	48,54	4255	6,4	26,1	31,67	5484	9,2
3600	5	41,9	44,69	3917	5,9	27,9	27,82	4816	7,8
3600	10	43,7	40,83	3579	5,4	29,8	23,95	4146	6,5
3600	15	45,5	36,95	3239	4,9	31,6	20,06	3473	5,4

Air		Water 70/60°C				Water 45/40°C			
Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa
4000	-10	34,6	60,04	5263	8,3	21,2	42,08	7285	15,2
4000	-5	36,5	55,95	4905	7,6	23,2	37,97	6573	12,5
4000	0	38,5	51,85	4545	7	25,1	33,84	5859	10,1
4000	5	40,5	47,73	4184	6,3	27,1	29,72	5146	8,4
4000	10	42,4	43,6	3822	5,7	29	25,57	4428	7
4000	15	44,3	39,45	3458	5,2	30,9	21,42	3708	5,8

Air		Water 70/60°C				Water 45/40°C			
Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa
4300	-10	33,4	62,78	5503	8,8	20,4	44,01	7620	16,5
4300	-5	35,4	58,49	5127	8,1	22,4	39,71	6874	13,6
4300	0	37,4	54,21	4751	7,3	24,4	35,38	6126	11
4300	5	39,5	49,9	4374	6,7	26,5	31,07	5380	8,9
4300	10	41,5	45,57	3995	6	28,5	26,73	4629	7,4
4300	15	43,5	41,24	3615	5,4	30,5	22,39	3876	6



EFFICIENCY COOLING COILS

Coil performance in cooling mode for each size of unit at different air flows and with different air and water inlet temperatures.

TVL 40 cooling

Air		Water 7/12°C				Water 8/13°C			
Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa
2900	22 / 50%	14,5	7,45	1280	5,3	15,2	6,76	1162	4,8
2900	24 / 50%	15,2	9,13	1570	6,5	15,7	8,31	1429	5,9
2900	26 / 50%	16	11,12	1911	8,2	16,5	10,18	1750	7,3
2900	28 / 50%	16,9	13,51	2322	10,8	18,7	10,22	1757	3,7
2900	32 / 50%	18,7	19,75	3394	21,6	19,2	18,28	3142	18,7
2900	35 / 50%	20,2	25,16	4325	33,6	20,7	23,64	4064	29,8

Air		Water 7/12°C				Water 8/13°C			
Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa
3600	22 / 50%	15,1	8,52	1465	6	15,7	7,75	1331	5,5
3600	24 / 50%	15,8	10,39	1786	7,5	16,4	9,36	1608	6,7
3600	26 / 50%	16,6	12,59	2164	9,6	17,2	11,42	1963	8,4
3600	28 / 50%	17,6	15,24	2619	13,5	18,1	13,86	2382	11,3
3600	32 / 50%	19,6	22,15	3807	26,6	20	20,51	3524	23
3600	35 / 50%	21,2	28,27	4859	41,6	21,6	26,55	4563	36,9

Air		Water 7/12°C				Water 8/13°C			
Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa
4000	22 / 50%	15,4	9,08	1560	6,5	16	8,25	1418	5,8
4000	24 / 50%	16,1	11	1891	8,1	16,7	9,98	1714	7,2
4000	26 / 50%	16,9	13,38	2299	10,6	17,5	12,14	2086	9,1
4000	28 / 50%	17,9	16,15	2776	15	18,4	14,74	2533	12,6
4000	32 / 50%	20	23,42	4024	29,5	20,4	21,64	3719	25,4
4000	35 / 50%	22,2	27,56	4737	8,3	22,6	25,72	4421	7,6

Air		Water 7/12°C				Water 8/13°C			
Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa
4300	22 / 50%	15,6	9,47	1628	6,8	16,1	8,61	1480	6,1
4300	24 / 50%	16,3	11,47	1971	8,5	16,9	10,41	1789	7,5
4300	26 / 50%	17,1	13,94	2396	11,4	17,7	12,63	2170	9,6
4300	28 / 50%	18,1	16,78	2885	16,1	18,7	15,33	2634	13,5
4300	32 / 50%	20,3	24,29	4175	31,5	20,7	22,45	3858	27,1
4300	35 / 50%	22,5	28,58	4912	8,7	22,9	26,67	4584	8

ROWS  
4R



## EFFICIENCY COOLING COILS

## TVL 40 cooling

	Air		Water 7/12°C			Water 8/13°C				
	Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa
<b>ROWS 6R</b>	2900	22 / 50%	12,4	9,67	1663	6,3	13,2	8,74	1502	5,6
	2900	24 / 50%	13	11,88	2043	8	13,7	10,77	1850	7
	2900	26 / 50%	13,7	14,58	2506	10,6	14,3	13,23	2273	9,1
	2900	28 / 50%	14,4	17,85	3068	15,3	15	16,24	2791	12,8
	2900	32 / 50%	15,7	25,76	4427	29,8	16,4	23,96	4117	26
	2900	35 / 50%	17,2	31,52	5418	13,4	17,8	29,66	5097	11,9
	Air		Water 7/12°C			Water 8/13°C				
	Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa
	3600	22 / 50%	13	11,15	1917	7,4	13,8	10,12	1740	6,6
	3600	24 / 50%	13,6	13,62	2341	9,5	14,2	12,39	2130	8,4
	3600	26 / 50%	14,4	16,62	2856	13,4	15	15,14	2601	11,3
	3600	28 / 50%	15,1	20,25	3481	19,2	15,8	18,43	3168	16,1
	3600	32 / 50%	17	28	4813	10,8	17,6	25,95	4459	9,5
	3600	35 / 50%	18,3	35,77	6148	16,8	18,9	33,62	5777	15
	Air		Water 7/12°C			Water 8/13°C				
	Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa
	4000	22 / 50%	13,3	11,93	2050	8	14,1	10,82	1859	7,1
	4000	24 / 50%	14	14,52	2496	10,5	14,6	13,17	2264	9
	4000	26 / 50%	14,8	17,6	3025	14,9	15,3	16,1	2766	12,6
	4000	28 / 50%	15,5	21,46	3689	21,4	16,1	19,62	3372	18,1
	4000	32 / 50%	17,5	29,7	5105	12	18	27,49	4724	10,4
	4000	35 / 50%	18,8	37,95	6523	18,8	19,4	35,65	6128	16,6
	Air		Water 7/12°C			Water 8/13°C				
	Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa
	4300	22 / 50%	13,5	12,43	2137	8,4	14,3	11,34	1948	7,5
	4300	24 / 50%	14,2	15,16	2606	11,4	14,8	13,79	2370	9,6
	4300	26 / 50%	15	18,39	3160	16,1	15,5	16,83	2892	13,7
	4300	28 / 50%	15,8	22,25	3824	22,8	16,4	20,43	3511	19,4
	4300	32 / 50%	17,8	30,92	5314	12,9	18,4	28,35	4872	11
	4300	35 / 50%	19,1	39,51	6790	20,2	19,7	37,09	6375	17,9



EFFICIENCY HEATING COILS

Coil performance in heating mode for each size of unit at different air flows and with different air and water inlet temperatures.

TVL 60 heating

Air		Water 70/60°C				Water 45/40°C			
Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa
5000	-10	17,8	46,84	4106	10	9,6	32,95	5705	19,5
5000	-5	20,9	43,65	3826	9	12,7	29,73	5148	16,1
5000	0	24	40,45	3545	8,2	15,7	26,5	4588	13
5000	5	27,1	37,23	3263	7,4	18,8	23,25	4026	10,2
5000	10	30,2	33,99	2980	6,6	21,9	19,99	3461	8,3
5000	15	33,3	30,75	2696	5,9	24,9	16,71	2894	6,7

Air		Water 70/60°C				Water 45/40°C			
Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa
5400	-10	16,9	48,9	4285	10,8	8,9	34,4	5956	21,1
5400	-5	20,1	45,56	3994	9,6	12,1	31,04	5374	17,5
5400	0	23,2	42,22	3701	8,6	15,2	27,66	4789	14,1
5400	5	26,4	38,86	3406	7,8	18,4	24,27	4202	11,1
5400	10	29,5	35,48	3110	7	21,5	20,86	3612	8,7
5400	15	32,6	32,08	2812	6,2	24,6	17,44	3020	7

Air		Water 70/60°C				Water 45/40°C			
Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa
5900	-10	15,8	51,33	4499	11,8	8,2	36,13	6255	23,2
5900	-5	19,1	47,83	4193	10,4	11,4	32,59	5643	19,1
5900	0	22,3	44,32	3885	9,2	14,6	29,04	5028	15,4
5900	5	25,5	40,78	3575	8,3	17,8	25,48	4411	12,1
5900	10	28,8	37,23	3264	7,4	21	21,9	3791	9,3
5900	15	31,9	33,67	2952	6,5	24,2	18,3	3169	7,4

Air		Water 70/60°C				Water 45/40°C			
Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa
6500	-10	14,7	54,08	4741	13	7,4	38,08	6592	25,6
6500	-5	18	50,4	4418	11,4	10,7	34,35	5947	21,1
6500	0	21,3	46,69	4093	9,9	14	30,6	5299	17
6500	5	24,6	42,97	3766	8,8	17,3	26,84	4647	13,3
6500	10	27,9	39,23	3439	7,9	20,5	23,07	3994	10,1
6500	15	31,2	35,46	31,08	7	23,8	19,27	3337	7,9

ROWS  
2R

## EFFICIENCY HEATING COILS

## TVL 60 heating

Air	Water 70/60°C					Water 45/40°C			
	Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h
5000	-10	29,3	66,08	5792	12,5	17,5	46,36	8026	24,4
5000	-5	31,6	61,59	5399	11	19,9	41,85	7245	20,2
5000	0	33,9	57,09	5004	9,6	22,2	37,32	6461	16,3
5000	5	36,2	52,57	4608	8,6	24,5	32,76	5672	12,8
5000	10	38,5	48,03	4210	7,7	26,8	28,21	4883	9,8
5000	15	40,8	43,47	3810	6,8	29	23,63	4091	7,8

Air	Water 70/60°C					Water 45/40°C			
	Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h
5400	-10	28,1	69,19	6065	13,6	16,7	48,55	8405	26,6
5400	-5	30,5	64,5	5654	12	19,1	43,83	7589	22
5400	0	32,9	59,79	5292	10,4	21,5	39,08	6767	17,8
5400	5	35,3	55,04	4825	9,2	23,9	34,31	5940	14
5400	10	37,7	50,29	4408	8,1	26,2	29,53	5112	10,6
5400	15	40	45,5	3988	7,2	28,6	24,73	4281	8,2

Air	Water 70/60°C					Water 45/40°C			
	Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h
5900	-10	26,7	72,92	6392	15	15,8	51,17	8859	29,3
5900	-5	29,2	67,97	5957	13,2	18,3	46,19	7998	24,2
5900	0	31,7	62,98	5521	11,4	20,7	41,18	7130	19,6
5900	5	34,2	57,98	5083	9,8	23,2	36,15	6259	15,4
5900	10	36,7	52,96	4642	8,7	25,7	31,1	5385	11,7
5900	15	39,1	47,95	4200	7,7	28,1	26,04	4509	8,8

Air	Water 70/60°C					Water 45/40°C			
	Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h
6500	-10	25,2	77,11	6759	16,6	14,7	54,14	9374	30,9
6500	-5	27,8	71,88	6300	14,6	17,3	48,88	8462	26,9
6500	0	30,4	66,6	5838	12,7	19,9	43,57	7543	21,7
6500	5	33	61,32	5375	10,9	22,5	38,24	6621	17,1
6500	10	35,6	56	4909	9,4	25	32,89	5695	12,9
6500	15	38,1	50,67	4442	8,2	27,6	27,53	4767	9,5



EFFICIENCY HEATING COILS

TVL 60 heating

Air		Water 70/60°C				Water 45/40°C			
Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa
5000	-10	36,8	78,85	6911	9,8	22,8	55,23	9563	18,9
5000	-5	38,7	73,5	6443	8,8	24,6	49,85	8631	15,5
5000	0	40,5	68,12	5971	8	26,4	44,44	7694	12,5
5000	5	42,3	62,71	5497	7,2	28,2	39,04	6759	9,8
5000	10	44	57,31	5024	6,5	30	33,6	5818	8
5000	15	45,8	51,87	4547	5,8	31,7	28,15	4874	6,5

Air		Water 70/60°C				Water 45/40°C			
Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa
5400	-10	35,5	82,79	7257	10,7	21,9	58,01	10044	20,7
5400	-5	37,5	77,17	6764	9,5	23,8	52,35	9063	17,1
5400	0	39,3	71,5	6267	8,5	25,7	46,67	8080	13,7
5400	5	41,2	65,83	5771	7,7	27,5	40,97	7094	10,7
5400	10	43,1	60,15	5272	7,7	29,4	35,27	6107	8,6
5400	15	44,9	54,44	4772	6,1	31,3	29,55	5116	6,8

Air		Water 70/60°C				Water 45/40°C			
Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa
5900	-10	34	87,49	7669	11,8	20,9	61,32	10617	23
5900	-5	36	81,53	7146	10,4	22,9	55,32	9578	18,9
5900	0	38	75,54	6622	9,2	24,8	49,31	8537	15,2
5900	5	40	69,55	6097	8,2	26,8	43,31	7499	11,9
5900	10	42	63,53	5568	7,3	28,8	37,27	6452	9,2
5900	15	43,9	57,47	5038	6,5	30,7	31,2	5402	7,3

Air		Water 70/60°C				Water 45/40°C			
Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa
6500	-10	32,4	92,81	8135	13,2	19,7	65,09	11269	25,7
6500	-5	34,5	86,5	7583	11,6	21,8	57,72	10166	21,2
6500	0	36,6	80,13	7024	10	23,9	52,33	9060	17
6500	5	38,7	73,78	6467	8,9	26,4	5,94	7954	13,3
6500	10	40,8	67,36	5905	7,9	28,1	39,53	6843	10
6500	15	42,9	60,94	5342	7	30,1	33,09	5729	7,9

ROWS  
4R

## EFFICIENCY COOLING COILS

Coil performance in cooling mode for each size of unit at different air flows and with different air and water inlet temperatures.

## TVL 60 cooling

	Air		Water 7/12°C			Water 8/13°C				
	Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa
ROWS 4R	5000	22 / 50%	15,3	11,4	1959	4,1	16	10,22	1757	3,8
	5000	24 / 50%	15,9	14,02	2410	4,8	16,6	12,68	2178	4,5
	5000	26 / 50%	16,8	17,13	2944	5,8	17,3	15,49	2662	5,3
	5000	28 / 50%	17,7	20,66	3551	7,2	18,2	18,86	3242	6,4
	5000	32 / 50%	19,7	30,22	5194	12,4	20,1	27,88	4792	10,7
	5000	35 / 50%	21,3	38,74	6658	19,5	21,7	36,62	6242	17,3
	Air		Water 7/12°C			Water 8/13°C				
	Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa
	5400	22 / 50%	15,5	11,99	2061	4,3	16,2	10,78	1852	4
	5400	24 / 50%	16,1	14,67	2522	5	16,8	13,29	2284	4,6
	5400	26 / 50%	17	17,87	3072	6,1	17,6	16,21	2786	5,5
	5400	28 / 50%	17,9	21,58	3709	7,5	18,4	19,7	3386	6,8
	5400	32 / 50%	20	31,43	5402	13,3	20,4	29	4983	11,5
	5400	35 / 50%	21,6	40,24	6933	21	22	37,8	6497	18,6
	Air		Water 7/12°C			Water 8/13°C				
	Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa
	5900	22 / 50%	15,7	12,68	2179	4,5	16,3	11,44	1967	4,1
	5900	24 / 50%	16,4	15,47	2659	5,3	17,1	14,01	2408	4,8
	5900	26 / 50%	17,2	18,78	3228	6,4	17,8	17,05	2930	5,8
	5900	28 / 50%	18,3	22,38	3846	7,9	18,7	20,69	3556	7,2
	5900	32 / 50%	20,3	32,88	5652	14,5	20,7	30,31	5208	12,4
	5900	35 / 50%	22	42,22	7256	22,9	22,4	39,56	6798	20,2
	Air		Water 7/12°C			Water 8/13°C				
	Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa
	6500	22 / 50%	15,9	13,43	2308	4,7	16,5	12,14	2086	4,3
	6500	24 / 50%	16,8	16,08	2765	5,5	17,3	14,83	2548	5,1
	6500	26 / 50%	17,6	19,51	3353	6,7	18,1	17,99	3092	6,1
	6500	28 / 50%	18,6	23,6	4056	8,4	19	21,74	3736	7,6
	6500	32 / 50%	20,6	34,52	5932	15,8	21,2	31,31	5381	13,2
	6500	35 / 50%	22,4	44,36	7624	25	22,8	41,53	7137	22,1



EFFICIENCY COOLING COILS

TVL 60 cooling

Air		Water 7/12°C				Water 8/13°C			
Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa
5000	22 / 50%	13,6	14,32	2462	4,1	14,4	12,39	2129	3,8
5000	24 / 50%	13,9	18,02	3097	5	14,6	16,29	2800	4,5
5000	26 / 50%	14,7	22,03	3787	6	15,2	20,1	3455	5,5
5000	28 / 50%	15,4	26,86	4616	7,5	16	24,56	4221	6,8
5000	32 / 50%	16,9	39,32	6758	13,6	17,5	36,38	6253	11,7
5000	35 / 50%	18,2	50,2	8627	21,3	18,7	47,15	8104	18,9

Air		Water 7/12°C				Water 8/13°C			
Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa
5400	22 / 50%	13,8	15,23	2618	4,3	14,7	13,53	2326	4
5400	24 / 50%	14,2	18,95	3257	5,2	14,8	17,16	2950	4,7
5400	26 / 50%	14,9	23,08	3966	6,3	15,5	20,94	3599	5,7
5400	28 / 50%	15,7	28,07	4825	8	16,3	25,65	4410	7,1
5400	32 / 50%	17,3	41,06	7056	14,7	17,8	37,99	6529	12,7
5400	35 / 50%	18,5	52,43	9012	23,1	19,1	49,26	8465	20,5

Air		Water 7/12°C				Water 8/13°C			
Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa
5900	22 / 50%	13,9	16,24	2791	4,5	14,8	14,61	2511	4,2
5900	24 / 50%	14,4	20,01	3438	5,5	15,1	18,16	3121	5
5900	26 / 50%	15,2	24,32	4181	6,7	15,8	22,1	3798	6
5900	28 / 50%	16	29,54	5076	8,5	16,5	26,98	4638	7,5
5900	32 / 50%	17,6	43,1	7407	16,1	18,2	39,88	6853	13,9
5900	35 / 50%	19	55,11	9472	25,4	19,5	51,71	8887	22,4

Air		Water 7/12°C				Water 8/13°C			
Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa
6500	22 / 50%	14,2	17,34	2980	4,8	14,9	15,66	2691	4,4
6500	24 / 50%	14,7	21,09	3625	5,8	15,4	19,28	3314	5,3
6500	26 / 50%	15,5	25,7	4417	7,2	16,1	23,43	4027	6,4
6500	28 / 50%	16,3	31,16	5355	9,1	16,9	28,37	4876	8
6500	32 / 50%	18	45,43	7809	17,7	18,6	41,68	7164	15,1
6500	35 / 50%	19,4	58,1	9985	28	19,9	54,53	9371	24,8

ROWS  
6R

## EFFICIENCY HEATING COILS

Coil performance in heating mode for each size of unit at different air flows and with different air and water inlet temperatures.

## TVL 80 heating

Air		Water 70/60°C				Water 45/40°C			
Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa
7000	-10	17,8	65,57	5748	9,7	9,6	46,13	7987	18,8
7000	-5	20,9	61,11	5356	8,8	12,7	41,63	7207	15,5
7000	0	24	56,63	4964	8	15,7	37,1	6426	12,5
7000	5	27,1	52,12	4569	7,2	18,8	32,55	5636	9,8
7000	10	30,2	47,59	4172	6,5	21,9	27,98	4845	8,1
7000	15	33,3	4305	3774	5,8	24,9	23,4	4051	6,5

Air		Water 70/60°C				Water 45/40°C			
Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa
7600	-10	16,8	68,64	6017	10,4	8,9	48,3	8363	20,5
7600	-5	20	63,97	5607	9,3	12	43,58	7546	16,9
7600	0	23,2	59,28	5196	8,4	15,2	38,84	6725	13,7
7600	5	26,3	54,56	4782	7,6	15,2	38,84	6725	13,7
7600	10	29,5	49,82	4367	6,8	21,4	29,29	5071	8,5
7600	15	32,6	45,05	3949	6,1	24,6	24,49	4240	6,9

Air		Water 70/60°C				Water 45/40°C			
Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa
8300	-10	15,8	72,05	6316	11,4	8,1	50,71	8780	22,4
8300	-5	19	67,14	5886	10	11,4	45,75	7921	18,5
8300	0	22,3	62,21	5453	9	14,6	40,77	7058	14,9
8300	5	25,5	57,25	5019	8,1	17,8	35,76	6192	11,7
8300	10	28,7	52,27	4582	7,2	21	30,74	5322	9,1
8300	15	31,9	47,26	4142	6,4	24,2	25,69	4448	7,3

Air		Water 70/60°C				Water 45/40°C			
Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa
9100	-10	14,7	75,72	6637	12,5	7,4	53,31	9229	24,6
9100	-5	18	70,56	6185	11	10,7	48,09	8326	20,3
9100	0	21,3	65,37	5730	9,6	14	42,85	7418	16,4
9100	5	24,6	60,15	5272	8,6	17,3	37,58	6506	12,8
9100	10	27,9	54,95	4814	7,7	20,5	32,29	5591	9,7
9100	15	31,2	49,64	4351	6,8	23,8	26,98	4672	7,7



EFFICIENCY HEATING COILS

TVL 80 heating

Air		Water 70/60°C				Water 45/40°C			
Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa
7000	-10	29,2	92,41	8101	16,4	17,5	64,82	11223	32
7000	-5	31,5	86,12	7549	14,4	19,8	58,52	10132	26,4
7000	0	33,9	79,83	6997	12,5	22,1	52,18	9035	21,3
7000	5	36,2	73,5	6443	10,7	24,4	45,81	7931	16,7
7000	10	38,5	67,15	5866	9,2	26,7	39,42	6825	12,6
7000	15	40,8	60,77	5327	8,1	29	33,02	5716	9,3

Air		Water 70/60°C				Water 45/40°C			
Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa
7600	-10	27,9	97,08	8509	18	16,6	68,11	11792	35,1
7600	-5	30,4	90,46	7929	15,8	19	61,49	10647	29
7600	0	32,8	83,84	7349	13,7	21,4	54,81	9490	23,4
7600	5	35,2	77,2	6767	11,7	23,8	48,12	8331	18,3
7600	10	37,6	70,51	6181	9,9	26,2	41,41	7169	13,8
7600	15	39,9	63,82	5594	8,6	28,6	34,66	6002	9,9

Air		Water 70/60°C				Water 45/40°C			
Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa
8300	-10	26,6	102,23	8961	19,9	15,7	71,76	12424	38,7
8300	-5	29,1	95,28	8352	17,4	18,2	64,78	11216	32
8300	0	31,6	88,29	7739	15,1	20,7	57,75	9998	25,8
8300	5	34,1	81,28	7124	12,9	23,1	50,68	8775	20,2
8300	10	36,6	74,25	6509	10,9	25,6	43,6	7549	15,2
8300	15	39	67,18	5889	9,3	28,1	36,5	6319	10,8

Air		Water 70/60°C				Water 45/40°C			
Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa
9100	-10	25,2	107,84	9453	22	14,7	75,72	13109	42,9
9100	-5	27,8	100,5	8810	19,2	17,3	68,35	11833	35,3
9100	0	30,4	93,12	8162	16,7	19,9	60,91	10546	28,5
9100	5	33	85,72	7514	14,3	22,4	53,46	9256	22,4
9100	10	35,5	78,29	6862	12	25	45,98	7960	16,8
9100	15	38,1	70,8	6206	10	27,6	38,48	6662	12,1

ROWS  
3R



## EFFICIENCY HEATING COILS

## TVL 80 heating

Air	Water 70/60°C					Water 45/40°C			
	Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h
7000	-10	36,8	110,39	9676	10	22,8	77,33	13388	19,4
7000	-5	38,7	102,9	9020	9	24,6	69,79	12083	16
7000	0	40,5	95,36	8359	8,2	26,4	62,22	10772	12,9
7000	5	42,3	87,8	7696	7,4	28,2	54,66	9463	10,1
7000	10	44	80,24	7034	6,6	30	47,05	8146	8,2
7000	15	45,8	72,62	6366	5,9	31,7	39,41	6824	6,6

Air	Water 70/60°C					Water 45/40°C			
	Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h
7600	-10	35,5	116,3	10195	11,1	21,9	81,49	14109	21,5
7600	-5	37,4	108,38	9500	9,7	23,7	73,53	12732	17,7
7600	0	39,3	100,44	8805	8,8	25,6	65,54	11348	14,2
7600	5	41,1	92,48	8107	7,8	27,5	57,57	9967	11,1
7600	10	43	84,46	7403	7	29,4	49,55	8578	8,8
7600	15	44,9	76,44	6701	6,3	31,2	41,5	7186	7

Air	Water 70/60°C					Water 45/40°C			
	Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h
8300	-10	34	122,86	10769	12,3	20,8	86,11	14908	23,8
8300	-5	36	114,48	10036	10,7	22,8	77,69	13451	19,6
8300	0	38	106,08	9299	9,4	24,8	69,24	11988	15,8
8300	5	39,9	97,65	8559	8,4	26,8	60,8	10526	12,3
8300	10	41,9	89,21	7820	7,5	28,7	52,32	9057	9,4
8300	15	43,9	80,71	7075	6,7	30,7	43,81	7586	7,5

Air	Water 70/60°C					Water 45/40°C			
	Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h
9100	-10	32,4	129,94	11390	13,6	19,7	91,12	15777	26,5
9100	-5	34,5	121,1	10616	11,9	21,8	82,2	14232	21,8
9100	0	36,6	112,19	9834	10,3	23,8	73,26	12685	17,6
9100	5	38,7	103,29	9054	9,1	26	64,32	11135	13,7
9100	10	40,8	94,31	8267	8,1	28,1	55,34	9581	10,3
9100	15	42,9	85,32	7479	7,1	30,1	46,32	8020	8



EFFICIENCY COOLING COILS

Coil performance in cooling mode for each size of unit at different air flows and with different air and water inlet temperatures.

TVL 80 cooling

Air	Water 7/12°C					Water 8/13°C			
	Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h
7000	22 / 50%	18,4	8,67	1490	2,8	18,7	7,82	1345	2,7
7000	24 / 50%	19,6	10,44	1794	2,9	20	9,56	1644	2,8
7000	26 / 50%	17,4	21,29	3660	4	18,4	18,21	3130	3,6
7000	28 / 50%	18,2	26,5	4554	4,7	18,6	24,34	4182	4,4
7000	32 / 50%	20,1	39,36	6766	7	20,6	35,7	6135	6,2
7000	35 / 50%	21,7	51,06	8776	9,7	22,1	47,68	8195	8,8

Air	Water 7/12°C					Water 8/13°C			
	Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h
7600	22 / 50%	18,6	8,9	1530	2,8	18,9	8,03	1380	2,7
7600	24 / 50%	19,9	10,72	1843	2,9	20,2	9,82	1688	2,8
7600	26 / 50%	17,6	22,47	3862	4,1	18,4	19,8	3403	3,8
7600	28 / 50%	18,4	27,77	4773	4,9	18,9	25,53	4387	4,5
7600	32 / 50%	20,4	41,03	7053	7,7	20,9	37,25	6401	6,5
7600	35 / 50%	22	53,25	9152	10,5	22,4	49,73	8546	9,4

Air	Water 7/12°C					Water 8/13°C			
	Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h
8300	22 / 50%	18,8	9,14	1571	2,8	19,1	8,24	1416	2,8
8300	24 / 50%	17,7	17,99	3093	3,6	20,4	10,1	1735	2,8
8300	26 / 50%	17,9	23,83	4096	4,3	18,6	21,25	3651	4
8300	28 / 50%	18,7	29,17	5014	5,1	19,1	26,81	4608	4,7
8300	32 / 50%	20,7	42,84	7364	7,7	21,2	38,95	6694	6,9
8300	35 / 50%	22,4	55,67	9569	11,4	22,8	51,96	8929	10

Air	Water 7/12°C					Water 8/13°C			
	Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h
9100	22 / 50%	19	9,39	1615	2,8	19,3	8,46	1454	2,8
9100	24 / 50%	17,6	18,82	3406	3,8	20,7	10,37	1783	2,8
9100	26 / 50%	18,1	25,17	4326	4,5	18,8	22,56	3877	4,1
9100	28 / 50%	19	30,66	5270	5,3	19,6	27,66	4754	4,8
9100	32 / 50%	21,2	44,01	7563	8	21,5	80,83	7,016	7,3
9100	35 / 50%	22,8	58,28	10017	12,4	23,1	54,37	9343	10,9

ROWS  
4R

## EFFICIENCY HEATING COILS

## TVL 80 cooling

Air		Water 7/12°C				Water 8/13°C			
Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa
7000	22 / 50%	13,6	20,05	3447	4,1	14,8	17,34	2980	3,8
7000	24 / 50%	13,9	25,21	4333	5	14,6	22,8	3919	4,5
7000	26 / 50%	14,7	30,81	5295	6	15,2	28,12	4832	5,5
7000	28 / 50%	15,4	37,57	6457	7,6	16	34,33	5900	6,8
7000	32 / 50%	16,9	54,9	9436	13,7	17,5	50,84	8738	11,8
7000	35 / 50%	18,2	70,07	12044	21,5	18,8	65,83	11313	19

Air		Water 7/12°C				Water 8/13°C			
Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa
7600	22 / 50%	13,8	21,4	3678	4,3	14,7	19,01	2367	4
7600	24 / 50%	14,2	26,57	4567	5,2	14,9	24,09	4141	4,8
7600	26 / 50%	14,9	32,38	5566	6,4	15,5	29,4	5053	5,7
7600	28 / 50%	15,7	39,37	6799	8	16,3	35,98	6184	7,2
7600	32 / 50%	17,3	57,46	9875	14,9	17,9	53,2	9143	12,8
7600	35 / 50%	18,6	73,42	12619	23,4	19,1	68,97	11853	20,8

Air		Water 7/12°C				Water 8/13°C			
Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa
8300	22 / 50%	13,9	22,83	3924	4,6	14,8	20,52	3526	4,2
8300	24 / 50%	14,4	28,08	4826	5,5	15,1	25,5	4382	5
8300	26 / 50%	15,2	34,07	5856	6,7	15,8	31,02	5331	6,1
8300	28 / 50%	16	41,4	7115	8,6	16,6	37,83	6501	7,6
8300	32 / 50%	17,7	60,33	10369	16,3	18,2	55,78	9586	14
8300	35 / 50%	19	77,13	13256	25,7	19,6	72,38	12436	22,7

Air		Water 7/12°C				Water 8/13°C			
Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa
9100	22 / 50%	14,2	24,28	4172	4,8	14,9	21,92	3767	4,4
9100	24 / 50%	14,7	29,52	5073	5,8	15,4	26,99	4638	5,3
9100	26 / 50%	15,5	35,94	6177	7,2	16,1	32,78	5634	6,4
9100	28 / 50%	16,4	43,54	7484	9,1	16,9	39,67	6817	8,1
9100	32 / 50%	18,1	63,42	10900	17,8	18,6	58,21	10004	15,2
9100	35 / 50%	19,5	81,08	13935	28,2	20	76,1	13078	24,9



EFFICIENCY HEATING COILS

Coil performance in heating mode for each size of unit at different air flows and with different air and water inlet temperatures.

TVL 100 heating

<b>ROWS 2R</b>	Air		Water 70/60°C			Water 45/40°C				
	Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa
	8700	-10	16,9	78,82	6908	5,8	9	55,66	9637	9
	8700	-5	20	73,3	6425	5,4	12,1	50,08	8671	7,8
	8700	0	23,1	67,75	5939	5	15,2	44,48	7700	6,7
	8700	5	26,2	62,18	5450	4,6	18,3	38,85	6726	5,8
	8700	10	29,3	56,58	4960	4,3	21,3	33,21	5749	5
	8700	15	32,4	50,97	4468	4	24,4	27,56	4772	4,2
	Air		Water 70/60°C			Water 45/40°C				
	Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa
	9500	-10	15,9	82,74	7253	6,1	8,3	58,45	10119	9,6
	9500	-5	19,1	76,94	6744	5,7	11,4	52,58	9104	8,3
	9500	0	22,2	71,11	6234	5,2	14,6	46,7	8085	7,2
	9500	5	25,4	65,26	5721	4,8	17,8	40,77	7059	6,1
	9500	10	28,6	59,38	5205	4,5	20,9	34,85	6034	5,2
	9500	15	31,7	53,48	4687	53,48	24	28,91	5006	4,4
	Air		Water 70/60°C			Water 45/40°C				
	Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa
	10400	-10	14,8	86,92	7619	6,5	7,5	61,4	10631	10,4
	10400	-5	18,1	80,82	7085	6	10,8	55,24	9565	8,9
	10400	0	21,3	74,69	6547	5,5	14	49,06	8494	7,6
	10400	5	24,6	68,54	6008	5	17,2	42,84	7416	6,5
	10400	10	27,8	62,35	5465	4,6	20,4	36,59	6335	5,4
	10400	15	31	56,14	4921	4,3	23,7	30,36	5256	4,6
	Air		Water 70/60°C			Water 45/40°C				
Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	
11300	-10	13,9	90,87	7966	6,8	6,9	64,22	11119	11,4	
11300	-5	17,2	84,5	7407	6,3	10,2	57,76	10001	9,4	
11300	0	20,5	78,08	6844	5,8	13,5	51,28	8878	8	
11300	5	23,8	71,63	6279	5,3	16,8	44,77	7751	6,8	
11300	10	27,1	65,16	5712	4,8	20,1	38,24	6621	5,7	
11300	15	30,4	58,66	5142	4,4	23,3	31,71	5491	4,8	

## EFFICIENCY HEATING COILS

## TVL 100 heating

Air		Water 70/60°C				Water 45/40°C			
Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa
8700	-10	27,8	110,82	9713	5	16,6	78,06	13514	7,5
8700	-5	30,2	103,5	9033	4,7	19	70,26	12164	6,6
8700	0	32,5	95,26	8350	4,4	21,3	62,39	10803	5,8
8700	5	34,9	87,44	7664	4,1	23,6	54,53	9442	5
8700	10	37,2	79,59	6977	3,9	25,9	46,66	8078	4,4
8700	15	39,5	71,72	6287	3,6	28,2	38,76	6711	3,9

Air		Water 70/60°C				Water 45/40°C			
Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa
9500	-10	26,5	116,75	10234	5,3	15,7	82,26	13451	7,8
9500	-5	28,9	108,56	9516	5	18,1	74,04	12818	7
9500	0	31,4	100,34	8795	4,6	20,6	65,75	11384	6,1
9500	5	33,8	92,09	8072	4,3	23	57,44	9945	5,3
9500	10	36,2	83,81	7347	4	25,4	49,14	8508	4,6
9500	15	38,6	75,51	6619	3,8	27,8	40,8	7064	4

Air		Water 70/60°C				Water 45/40°C			
Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa
10400	-10	25,1	123,09	10789	5,6	14,8	86,74	15018	8,5
10400	-5	27,7	114,44	10031	5,2	17,3	78,06	13515	7,5
10400	0	30,2	105,76	9270	4,8	19,8	69,32	12002	6,5
10400	5	32,7	97,05	8507	4,5	22,3	60,56	10485	5,6
10400	10	35,2	88,31	7741	4,2	24,8	51,78	8965	4,8
10400	15	37,7	79,55	6973	3,9	27,3	42,98	7442	4,1

Air		Water 70/60°C				Water 45/40°C			
Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa
11300	-10	23,9	129,09	11316	5,9	13,9	90,99	15754	9,1
11300	-5	26,6	12,01	10520	5,5	16,5	81,89	14177	7,9
11300	0	29,1	110,9	9721	5	19,1	72,72	12590	6,8
11300	5	31,8	101,75	8919	4,7	21,7	63,49	10993	5,9
11300	10	34,3	92,58	8115	4,3	24,3	54,28	9398	5
11300	15	36,9	83,38	7308	4	26,8	45,04	7799	4,3



EFFICIENCY HEATING COILS

TVL 100 heating

<b>ROWS 4R</b>	Air		Water 70/60°C			Water 45/40°C				
	Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa
	8700	-10	37,5	139,06	12189	16,8	23,2	88,23	15275	5,6
	8700	-5	39,3	129,68	11367	14,7	22,1	79,41	13749	5,1
	8700	0	41,1	120,26	10541	12,7	24,1	70,56	12216	4,6
	8700	5	42,8	110,84	9716	10,9	26,1	61,73	10688	4,2
	8700	10	44,6	101,39	8888	9,4	28,1	52,86	9152	3,8
	8700	15	46,4	91,87	8052	8,2	30	43,96	7611	3,5
	Air		Water 70/60°C			Water 45/40°C				
	Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa
	9500	-10	36	147,03	12888	18,6	22,2	102,91	17816	36,1
	9500	-5	37,9	137,12	12716	16,3	24,1	92,94	16090	29,8
	9500	0	39,8	127,16	11147	14,2	25,9	82,93	14358	24
	9500	5	41,6	117,17	10270	12,1	27,8	72,94	12629	18,9
	9500	10	43,5	107,18	9395	10,3	29,7	62,89	10888	14,3
	9500	15	45,4	97,11	8512	8,8	31,5	52,79	9140	10,3
	Air		Water 70/60°C			Water 45/40°C				
	Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa
	10400	-10	34,4	155,58	13638	20,7	21	108	18600	55
	10400	-5	36,4	14506	12716	18,1	23,1	98,37	17031	33,1
	10400	0	38,4	134,53	11792	15,7	25,1	87,76	15194	26,7
	10400	5	40,4	123,96	10866	13,5	27	77,15	13357	21
	10400	10	42,4	113,34	9935	11,4	29	66,54	11520	15,9
	10400	15	44,3	102,69	9001	9,6	30,9	55,82	9665	11,4
	Air		Water 70/60°C			Water 45/40°C				
Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	
11300	-10	33	163,7	14350	22,8	-	-	-	-	
11300	-5	35,1	152,61	13377	20	22,2	103,5	17920	36,5	
11300	0	37,2	141,52	12405	17,3	24,3	92,35	15988	29,4	
11300	5	39,3	130,4	11430	14,8	26,4	81,2	14058	23,1	
11300	10	41,3	119,23	10452	12,5	28,4	69,98	12116	17,4	
11300	15	43,4	108,03	9469	10,4	30,4	58,73	10168	12,5	

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## EFFICIENCY COOLING COILS

Coil performance in cooling mode for each size of unit at different air flows and with different air and water inlet temperatures.

## TVL 100 cooling

	Air		Water 7/12°C			Water 8/13°C				
	Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa
<b>ROWS 4R</b>	<b>8700</b>	22 / 50%	-	-	-	-	-	-	-	-
	<b>8700</b>	24 / 50%	16,1	23,53	4045	4,4	16,9	21,06	3620	4,1
	<b>8700</b>	26 / 50%	16,9	28,92	4971	5,3	17,5	26,2	4502	4,8
	<b>8700</b>	28 / 50%	17,9	34,59	5946	6,4	18,4	31,98	5496	5,9
	<b>8700</b>	32 / 50%	19,8	51,22	8803	10,7	20,3	47,2	8111	9,3
	<b>8700</b>	35 / 50%	22,4	79,45	13656	24,3	22,9	75,11	12908	21,8
	Air		Water 7/12°C			Water 8/13°C				
	Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa
	<b>9500</b>	22 / 50%	16,1	19,08	3279	3,8	18,9	10,03	1724	2,9
	<b>9500</b>	24 / 50%	16,5	24,51	4213	4,6	17,1	22,4	3850	4,3
	<b>9500</b>	26 / 50%	17,3	29,97	5150	5,5	17,8	27,59	4747	5,1
	<b>9500</b>	28 / 50%	18,2	36,37	6250	6,8	18,6	33,59	5773	6,2
	<b>9500</b>	32 / 50%	20,1	53,61	9213	11,7	20,7	48,62	8355	9,7
	<b>9500</b>	35 / 50%	22,8	83,2	14300	26,4	23,2	78,62	13511	23,7
	Air		Water 7/12°C			Water 8/13°C				
	Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa
	<b>10400</b>	22 / 50%	16,4	19,8	3404	4,2	19,3	9,73	1673	3
	<b>10400</b>	24 / 50%	17,1	24,47	4206	4,8	17,7	22,46	3861	4,5
	<b>10400</b>	26 / 50%	18	29,8	5122	5,8	18,4	27,45	4718	5,3
	<b>10400</b>	28 / 50%	19	36,13	6209	7,1	19,4	33,25	5714	6,5
	<b>10400</b>	32 / 50%	21,1	52,98	9106	12,1	21,6	48,1	8266	10,2
	<b>10400</b>	35 / 50%	23,2	87,17	14982	28,9	23,6	82,32	14148	25,8
	Air		Water 7/12°C			Water 8/13°C				
	Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa
	<b>11300</b>	22 / 50%	16,1	20,97	3604	4,1	-	-	-	-
	<b>11300</b>	24 / 50%	16,7	25,91	4453	4,8	17,3	23,78	4088	4,5
	<b>11300</b>	26 / 50%	17,5	31,56	5424	5,8	18	29,07	4998	5,3
	<b>11300</b>	28 / 50%	18,5	38,25	6575	7,2	18,9	35,2	6050	6,5
	<b>11300</b>	32 / 50%	20,5	56,1	9642	12,7	21	50,92	8752	10,6
	<b>11300</b>	35 / 50%	23,6	90,9	15623	31,2	23,9	85,82	14749	27,9

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EFFICIENCY COOLING COILS

TVL 100 cooling

Air		Water 7/12°C				Water 8/13°C			
Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa
8700	22 / 50%	13,1	26,72	4592	5,6	13,9	24,18	4155	5,1
8700	24 / 50%	13,7	32,65	5611	6,9	14,3	29,62	5090	6,2
8700	26 / 50%	14,4	39,9	6857	8,8	15	36,31	6241	7,8
8700	28 / 50%	15,2	48,59	8352	12,2	15,8	44,32	7617	
8700	32 / 50%	16,7	70,38	12096	24,1	17,3	65,31	11223	20,9
8700	35 / 50%	17,9	89,38	15363	37,5	18,5	84,13	14458	33,4

Air		Water 7/12°C				Water 8/13°C			
Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa
9500	22 / 50%	13,3	28,15	4839	5,9	14,1	25,66	4410	5,3
9500	24 / 50%	13,9	34,52	5933	7,4	14,6	31,34	5386	6,6
9500	26 / 50%	14,7	41,88	7198	9,4	15,3	38,29	6581	8,4
9500	28 / 50%	15,5	50,87	8744	13,3	16,1	46,6	8009	11,2
9500	32 / 50%	17,8	73,93	12706	26,4	17,6	68,65	11798	22,9
9500	35 / 50%	18,4	93,98	16152	41,2	18,9	88,49	15207	36,7

Air		Water 7/12°C				Water 8/13°C			
Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa
10400	22 / 50%	13,6	29,9	5139	6,3	14,4	27,2	4675	5,7
10400	24 / 50%	14,2	34,47	6267	7,9	14,8	33,15	5696	7
10400	26 / 50%	15	44,14	7587	10,2	15,5	40,43	6949	9
10400	28 / 50%	15,8	53,58	9210	14,6	16,4	49,05	8429	12,3
10400	32 / 50%	17,5	77,77	13367	29	18	72,1	12390	25,1
10400	35 / 50%	18,8	98,88	16995	45,3	19,4	93,03	15988	40,2

Air		Water 7/12°C				Water 8/13°C			
Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa
11300	22 / 50%	13,8	31,51	5416	6,6	14,6	28,65	4925	6
11300	24 / 50%	14,4	38,3	6584	8,4	15,1	34,89	5996	7,5
11300	26 / 50%	15,3	46,42	7978	11,2	15,8	42,31	7272	9,5
11300	28 / 50%	16,1	56,14	9649	15,9	16,6	51,46	8844	13,5
11300	32 / 50%	17,8	81,4	13990	31,6	18,3	75,4	12958	27,3
11300	35 / 50%	19,2	103,59	17804	49,3	19,7	97,31	16727	43,8

ROWS  
6R



## EFFICIENCY HEATING COILS

Coil performance in heating mode for each size of unit at different air flows and with different air and water inlet temperatures.

## TVL 120 heating

Air		Water 70/60°C				Water 45/40°C			
Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa
10400	-10	17,4	95,78	8396	7,5	9,3	67,53	11692	13,2
10400	-5	20,5	89,15	7815	6,9	12,4	60,84	10533	10,8
10400	0	23,6	82,5	7231	6,3	15,5	54,11	9369	8,9
10400	5	26,6	75,8	6645	5,7	18,5	47,36	8200	7,5
10400	10	29,7	69,08	6055	5,2	21,6	40,57	7025	6,3
10400	15	32,8	62,33	5464	4,8	24,6	33,78	5849	5,2

Air		Water 70/60°C				Water 45/40°C			
Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa
11300	-10	16,4	100,3	8792	8	8,6	70,74	12247	14,4
11300	-5	19,5	93,35	8183	7,3	11,8	63,72	11032	11,8
11300	0	22,7	86,38	7571	6,6	14,9	56,67	9811	9,5
11300	5	25,9	79,36	6957	6	18	49,58	8584	8
11300	10	29	72,31	6339	5,5	21,2	42,48	7355	6,6
11300	15	32,1	65,24	5718	4,9	24,3	35,36	6121	5,4

Air		Water 70/60°C				Water 45/40°C			
Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa
12400	-10	15,3	105,53	9250	8,5	7,8	74,43	12887	15,8
12400	-5	18,5	98,21	8609	7,8	11,1	67,05	11609	13
12400	0	21,8	90,86	7695	7	14,3	59,61	10321	10,4
12400	5	25	83,48	7317	6,4	17,5	52,16	9030	8,5
12400	10	28,2	76,05	6667	5,8	20,7	44,67	7735	7
12400	15	31,4	68,6	6013	5,2	23,9	37,17	6436	5,7

Air		Water 70/60°C				Water 45/40°C			
Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa
13600	-10	14,2	110,91	9722	9,1	7,1	78,24	13546	17,4
13600	-5	17,5	103,21	9047	8,3	10,4	70,48	12202	14,3
13600	0	20,9	85,48	8369	7,5	13,7	62,66	10848	11,4
13600	5	24,2	87,7	7688	6,7	17	54,8	9488	9,1
13600	10	27,4	79,9	7003	6,1	20,3	46,94	8126	7,4
13600	15	30,7	72,05	6316	5,4	23,5	39,03	6758	6



EFFICIENCY HEATING COILS

TVL 120 heating

<b>ROWS 3R</b>	Air		Water 70/60°C			Water 45/40°C				
	Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa
	10400	-10	28,4	134,6	11799	6,4	17	94,67	16390	10,1
	10400	-5	30,8	125,29	10982	5,9	19,4	85,3	14769	8,7
	10400	0	33,1	115,93	10161	5,4	21,7	75,88	13137	7,5
	10400	5	35,4	106,54	9339	5	24	66,44	11502	6,4
	10400	10	37,7	97,12	8513	4,6	26,3	56,96	9862	5,4
	10400	15	40	87,66	7684	4,3	28,6	47,46	8218	4,6
	Air		Water 70/60°C			Water 45/40°C				
	Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa
	11300	-10	27,2	141,43	12397	6,8	14,7	93,97	16270	10,6
	11300	-5	29,6	131,63	11538	6,2	17,3	84,66	14658	9,1
	11300	0	32	121,78	10675	5,7	19,8	75,3	13038	7,8
	11300	5	34,4	111,92	9810	5,3	22,3	65,91	11412	6,7
	11300	10	36,8	102	8941	4,8	24,9	56,5	9783	5,7
	11300	15	39,2	92,05	8069	4,4	27,4	47,07	8150	4,8
	Air		Water 70/60°C			Water 45/40°C				
	Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa
	12400	-10	23,8	141,05	12364	7,1	13,8	99,26	17186	11,7
	12400	-5	26,4	131,27	11506	6,6	16,4	89,42	15482	9,8
	12400	0	29,1	121,44	10645	6	19,1	79,53	13769	8,4
	12400	5	31,7	111,57	9780	5,5	21,7	69,61	12051	7,1
	12400	10	34,4	101,68	8913	5,1	24,3	59,65	10327	6
	12400	15	37	91,75	8043	4,7	26,9	49,67	8600	5
	Air		Water 70/60°C			Water 45/40°C				
Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	
13600	-10	22,5	148,77	13040	7,6	12,9	104,72	18131	13	
13600	-5	25,2	138,43	12134	7	15,6	94,33	16332	10,6	
13600	0	28	128,06	11225	6,4	18,3	83,89	14524	9	
13600	5	30,7	117,64	10312	5,8	21	73,4	12709	7,6	
13600	10	33,4	107,19	9395	5,3	23,7	62,89	10888	6,4	
13600	15	36,1	96,7	8476	4,9	26,4	52,36	9065	5,3	

## EFFICIENCY HEATING COILS

Coil performance in heating mode for each size of unit at different air flows and with different air and water inlet temperatures.

## TVL 120 heating

Air		Water 70/60°C				Water 45/40°C			
Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa
10400	-10	33,5	152,38	13357	5	24	126	21600	45
10400	-5	35,5	141,85	12434	4,7	25,3	105,98	18349	41
10400	0	37,5	131,29	11509	4,5	27	94,66	16389	33,1
10400	5	39,5	120,7	10580	4,2	28,8	83,34	14428	26,1
10400	10	41,4	110,06	9647	4	30,5	71,92	12452	19,8
10400	15	43,4	99,4	8713	3,7	32,3	60,49	10473	14,3

Air		Water 70/60°C				Water 45/40°C			
Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa
11300	-10	36,5	176,87	15504	28,3	-	-	-	-
11300	-5	38,4	165,01	14465	24,8	-	-	-	-
11300	0	40,2	153,1	14320	21,6	26,2	99,82	17282	36,6
11300	5	42,1	141,19	12376	18,5	28,1	87,87	15214	28,8
11300	10	44	129,23	11328	15,7	29,9	75,84	13130	21,8
11300	15	45,8	117,17	10271	13	31,8	63,75	11037	15,8

Air		Water 70/60°C				Water 45/40°C			
Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa
12400	-10	34,9	187,43	16429	31,6	-	-	-	-
12400	-5	36,9	174,89	15330	27,7	-	-	-	-
12400	0	38,9	162,3	14227	24,1	25,3	105,79	18316	40,8
12400	5	40,8	149,58	13111	20,6	27,3	93,15	16127	32,1
12400	10	42,8	136,89	11999	17,5	29,3	80,35	13911	24,3
12400	15	44,7	124,16	10883	14,5	31,2	67,57	11698	17,6

Air		Water 70/60°C				Water 45/40°C			
Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa
13600	-10	33,3	198,36	17387	35,2	-	-	-	-
13600	-5	35,4	185,11	16227	30,9	-	-	-	-
13600	0	37,5	171,74	15055	26,8	-	-	-	-
13600	5	39,6	158,32	13878	23	26,5	98,54	17060	35,7
13600	10	41,6	144,83	12695	19,4	28,6	85,03	14721	27,1
13600	15	43,7	131,34	11513	16,2	30,6	71,51	12382	19,6

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EFFICIENCY COOLING COILS

Coil performance in cooling mode for each size of unit at different air flows and with different air and water inlet temperatures.

TVL 120 cooling

<b>ROWS 4R</b>	Air		Water 7/12°C			Water 8/13°C				
	Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa
	10400	22 / 50%	15,2	24,03	4130	4,7	15,9	21,56	3705	4,3
	10400	24 / 50%	15,9	29,44	5059	5,7	16,5	26,63	4577	5,1
	10400	26 / 50%	16,7	35,94	6178	7	17,3	32,53	5591	6,3
	10400	28 / 50%	17,6	43,35	7452	8,9	18,2	39,53	6794	7,9
	10400	32 / 50%	19,6	63,2	10863	17,2	20,1	58,4	10036	14,8
	10400	35 / 60%	21,2	81	13923	27,3	21,7	75,96	13055	24,1
	Air		Water 7/12°C			Water 8/13°C				
	Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa
	11300	22 / 50%	15,4	25,36	4358	4,9	16,1	22,88	3932	4,5
	11300	24 / 50%	16,1	30,92	5314	6	16,8	28,02	4815	5,4
	11300	26 / 50%	16,9	37,61	6464	7,4	17,5	34,14	5867	6,6
	11300	28 / 50%	17,9	45,35	7795	9,5	18,4	41,46	7125	8,4
	11300	32 / 50%	19,9	65,98	11341	18,6	20,4	60,93	10472	16
	11300	35 / 60%	21,6	84,61	14542	29,6	22	79,3	13629	26,1
	Air		Water 7/12°C			Water 8/13°C				
	Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa
	12400	22 / 50%	15,7	26,83	4612	5,2	16,3	24,26	4170	4,7
	12400	24 / 50%	16,3	32,69	5619	6,3	17	29,61	5089	5,7
	12400	26 / 50%	17,2	39,59	6805	7,9	17,8	35,98	6183	7
	12400	28 / 50%	18,3	47,18	8110	10	18,7	43,62	7497	8,9
	12400	32 / 50%	20,3	69,18	11889	20,3	20,7	63,87	10976	17,5
	12400	35 / 60%	22	88,79	15260	32,3	22,4	83,17	14294	28,5
Air		Water 7/12°C			Water 8/13°C					
Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	
13600	22 / 50%	15,9	28,34	4870	5,5	16,5	25,65	4408	5	
13600	24 / 50%	16,7	33,9	5826	6,6	17,3	31,25	5371	6	
13600	26 / 50%	17,6	41,04	7054	8,3	18,1	37,88	6511	7,5	
13600	28 / 50%	18,6	49,64	8532	11	19	45,8	7870	9,6	
13600	32 / 50%	20,6	72,48	12457	22,2	21,1	65,81	11311	18,5	
13600	35 / 60%	22,4	93,02	15987	35,3	22,7	87,15	14977	31,1	

## EFFICIENCY COOLING COILS

## TVL 120 cooling

Air		Water 7/12°C				Water 8/13°C			
Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa
10400	22 / 50%	13,8	29,35	5045	3,9	-	-	-	-
10400	24 / 50%	13,9	37,42	6432	4,7	14,7	33,77	5804	4,3
10400	26 / 50%	14,7	45,81	7874	5,6	15,2	41,72	7171	5,1
10400	28 / 50%	16	51,11	8787	6,3	16	51,11	8784	6,3
10400	32 / 50%	16,9	81,66	14035	11,9	17,5	75,6	12933	10,3
10400	35 / 60%	18,2	104,27	17921	18,7	18,7	98,05	16851	16,6

Air		Water 7/12°C				Water 8/13°C			
Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa
11300	22 / 50%	13,8	31,51	5416	4,1	14,9	27,33	4697	3,7
11300	24 / 50%	14,2	39,49	6787	4,9	14,9	35,76	6145	4,5
11300	26 / 50%	14,9	48,12	8270	5,9	15,5	43,74	7517	5,3
11300	28 / 50%	15,7	58,62	10075	7,3	16,3	53,59	9210	6,6
11300	32 / 50%	17,3	85,55	15481	13	17,9	79,15	13603	11,2
11300	35 / 60%	18,6	109,3	18786	20,4	19,1	102,72	17653	18,1

Air		Water 7/12°C				Water 8/13°C			
Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa
12400	22 / 50%	14	33,88	5823	4,3	14,9	30,24	5197	4,9
12400	24 / 50%	14,4	41,83	7189	5,1	15,1	37,98	6527	4,7
12400	26 / 50%	15,2	50,86	8742	6,2	15,8	46,3	7957	5,6
12400	28 / 50%	16	61,74	10611	7,8	16,6	56,39	9692	7
12400	32 / 50%	17,7	90,07	15481	14,3	18,3	82,63	14200	12,1
12400	35 / 60%	19	115,15	19791	22,4	19,6	113,62	18584	19,9

Air		Water 7/12°C				Water 8/13°C			
Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa
13600	22 / 50%	14,2	36,14	6211	4,5	15	32,55	5594	4,2
13600	24 / 50%	14,8	44,01	7564	5,4	15,4	40,22	6912	4,9
13600	26 / 50%	15,5	53,65	9221	6,6	16,1	48,88	8400	6
13600	28 / 50%	16,4	64,95	11163	8,3	16,9	59,16	10168	7,4
13600	32 / 50%	18,1	94,65	16268	15,6	18,7	86,87	14929	13,3
13600	35 / 50%	19,5	121,07	20809	24,6	20	113,62	19526	21,8

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EFFICIENCY HEATING COILS

Coil performance in heating mode for each size of unit at different air flows and with different air and water inlet temperatures.

TVL 170 heating

Air		Water 70/60°C				Water 45/40°C			
Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa
13400	-10	17,3	123,29	10807	6,2	8	81,29	14074	4,8
13400	-5	20,4	114,76	10060	5,7	12,4	78,31	13558	8,4
13400	0	23,5	106,19	9308	5,3	15,4	69,65	12060	7,3
13400	5	26,6	97,58	8553	4,9	18,5	60,97	10555	6,2
13400	10	29,7	88,92	7795	4,5	21,6	52,23	9043	5,3
13400	15	32,8	80,23	7033	4,2	24,6	43,48	7528	4,5

Air		Water 70/60°C				Water 45/40°C			
Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa
14500	-10	16,4	128,81	11291	6,5	7,4	84,93	14704	5
14500	-5	19,6	114,76	10510	6	11,8	81,83	14167	8,9
14500	0	22,7	110,93	9724	5,5	14,9	72,76	12598	7,7
14500	5	25,9	101,93	8395	5,1	18,1	63,68	11025	6,5
14500	10	29	92,88	8141	4,7	21,2	54,55	9444	5,5
14500	15	32,2	83,79	7345	4,3	24,3	45,41	7892	4,7

Air		Water 70/60°C				Water 45/40°C			
Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa
16000	-10	15,2	135,94	11916	6,9	6,6	89,55	15504	5,2
16000	-5	18,5	126,52	11091	6,3	9,9	80,21	13888	4,7
16000	0	21,7	117,05	10260	5,8	14,3	76,79	13295	8,2
16000	5	25	107,53	9426	5,3	17,5	67,2	11635	7
16000	10	28,2	97,97	8588	4,9	20,7	54,35	9410	5,8
16000	15	31,4	88,37	7746	4,5	23,9	47,88	8290	4,9

Air		Water 70/60°C				Water 45/40°C			
Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa
17500	-10	14,2	142,65	12505	7,3	5,9	93,91	16260	5,5
17500	-5	17,5	132,76	11637	6,7	9,3	84,14	14567	4,9
17500	0	20,9	122,81	10765	6,2	13,7	80,59	13953	8,7
17500	5	24,1	112,81	9888	5,6	17	70,49	12204	7,4
17500	10	27,4	102,77	9008	5,1	20,3	6037	10453	6,2
17500	15	30,7	92,68	8124	4,7	23,5	50,21	8693	5,1

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## EFFICIENCY HEATING COILS

## TVL 170 heating

Air	Water 70/60°C					Water 45/40°C			
	Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h
13400	-10	28,4	173,28	15190	5,5	17	121,87	21100	8,2
13400	-5	30,8	161,28	14137	5,1	19,3	109,81	19013	7,2
13400	0	33,1	149,24	13082	4,8	21,7	97,7	16914	6,3
13400	5	25,4	137,16	12023	4,4	24	85,53	14807	5,5
13400	10	37,7	125,02	10958	4,1	26,3	73,33	12695	4,8
13400	15	40	112,84	9891	3,9	28,6	61,11	10580	4,1

Air	Water 70/60°C					Water 45/40°C			
	Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h
14500	-10	27,2	181,63	15920	5,7	16,2	127,78	22123	8,8
14500	-5	29,6	169,05	14818	5,3	18,6	115,12	19932	7,7
14500	0	32	156,41	13711	5	21	102,39	17728	6,7
14500	5	34,4	143,72	12599	4,6	23,4	89,63	15518	5,8
14500	10	36,8	130,99	11483	4,3	25,7	76,83	13302	5
14500	15	39,2	118,22	10363	4	28,1	64,01	11082	4,3

Air	Water 70/60°C					Water 45/40°C			
	Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h
16000	-10	25,7	192,43	16897	6,1	15,1	135,4	23442	9,5
16000	-5	28,2	179,07	15696	5,6	17,6	121,99	21120	8,3
16000	0	30,8	165,67	14522	5,2	20,1	108,49	18784	7,1
16000	5	33,3	152,21	13342	4,8	22,6	94,96	16440	6,1
16000	10	35,8	138,71	12159	4,5	25,1	81,37	14088	5,2
16000	15	38,2	125,315	10970	4,1	27,6	67,77	11733	4,5

Air	Water 70/60°C					Water 45/40°C			
	Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h
17500	-10	24,4	202,62	17761	6,5	14,2	142,63	24694	10,3
17500	-5	27	188,54	16527	6	16,8	128,49	22247	8,8
17500	0	29,6	174,41	15288	5,5	19,4	114,25	19781	7,6
17500	5	32,2	160,22	14044	5,1	22	99,98	17309	6,5
17500	10	34,8	145,98	12796	4,7	24,5	85,65	14830	5,5
17500	15	37,4	131,7	11544	4,3	27,1	71,31	12346	4,6



EFFICIENCY HEATING COILS

TVL 170 heating

Air	Water 70/60°C					Water 45/40°C			
	Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h
13400	-10	37,9	215,96	18930	20,2	-	-	-	-
13400	-5	39,7	201,52	17665	17,8	25,3	136,45	23625	32,4
13400	0	41,5	187,03	16394	15,5	27	121,88	21102	26,3
13400	5	43,2	172,48	15119	13,3	28,8	107,26	18570	20,7
13400	10	45	157,87	13839	11,3	30,5	92,6	16033	15,8
13400	15	46,7	143,21	12554	9,5	32,3	77,89	13485	11,5

Air	Water 70/60°C					Water 45/40°C			
	Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h
14500	-10	36,5	2227,11	19908	22,2	-	-	-	-
14500	-5	38,4	211,88	18573	19,5	-	-	-	-
14500	0	40,3	196,59	17232	17	26,3	128,17	22191	28,9
14500	5	42,1	181,29	15891	14,6	28,1	112,83	19536	22,8
14500	10	44	165,93	14545	12,4	29,9	97,68	16860	17,3
14500	15	45,8	150,45	13188	10,3	31,8	81,91	14182	12,6

Air	Water 70/60°C					Water 45/40°C			
	Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h
16000	-10	34,8	241,53	21172	24,9	-	-	-	-
16000	-5	36,8	225,37	19756	21,9	-	-	-	-
16000	0	38,8	209,05	18324	19	25,3	136,33	23604	32,4
16000	5	40,8	192,76	16897	16,4	27,3	120,03	20782	25,5
16000	10	42,8	176,42	15464	13,9	29,2	103,55	17927	19,4
16000	15	44,7	160	14026	11,6	31,2	87,07	15075	14,1

Air	Water 70/60°C					Water 45/40°C			
	Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h
17500	-10	33,3	255,17	22367	27,6	-	-	-	-
17500	-5	35,4	238,04	20865	24,2	-	-	-	-
17500	0	37,5	220,93	19366	21,1	-	-	-	-
17500	5	39,6	203,66	17852	18,1	26,5	126,76	21946	28,3
17500	10	41,6	186,31	16331	15,4	28,6	109,38	18936	21,5
17500	15	43,7	168,96	14810	12,8	30,6	91,99	15927	15,6

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## EFFICIENCY COOLING COILS

Coil performance in cooling mode for each size of unit at different air flows and with different air and water inlet temperatures.

## TVL 170 cooling

	Air		Water 7/12°C			Water 8/13°C					
	Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	
	13400	22 / 50%	-	-	-	-	-	-	-	-	
	13400	24 / 50%	15,9	37,88	6511	5,1	-	-	-	-	
	13400	26 / 50%	16,7	46,19	7939	6,3	17,3	41,86	7194	5,6	
	13400	28 / 50%	17,6	55,7	9573	7,8	18,2	50,82	8734	6,9	
	13400	32 / 50%	21	92	15822	17,5	20,1	74,93	12877	6,6	
	13400	35 / 50%	21,3	103,95	17867	22	21,7	97,48	16754	19,4	
ROWS 4R	Air		Water 7/12°C			Water 8/13°C					
	Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	
		14500	22 / 50%	-	-	-	-	-	-	-	-
		14500	24 / 50%	16,1	39,69	6821	5,4	-	-	-	-
		14500	26 / 50%	16,9	48,29	8300	6,6	17,5	43,81	7529	5,9
		14500	28 / 50%	17,9	58,29	10011	8,2	18,4	53,16	9136	7,3
		14500	32 / 50%	19,9	84,51	14525	15	20,4	78	13406	12,9
	14500	35 / 50%	21,6	108,3	18613	23,7	22	101,54	17450	20,9	
ROWS 4R	Air		Water 7/12°C			Water 8/13°C					
	Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	
		16000	22 / 50%	-	-	-	-	-	-	-	-
		16000	24 / 50%	16,3	42,09	7233	5,7	-	-	-	-
		16000	26 / 50%	17,2	50,94	8756	7	17,8	46,33	7962	6,3
		16000	28 / 50%	18,3	60,7	10433	8,6	18,7	56,12	9645	7,8
		16000	32 / 50%	20,3	88,84	15269	16,5	20,7	81,95	14083	14,1
	16000	35 / 50%	22	113,95	19586	26	22,4	106,75	18346	23	
ROWS 4R	Air		Water 7/12°C			Water 8/13°C					
	Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	
		17500	22 / 50%	-	-	-	-	-	-	-	-
		17500	24 / 50%	16,7	43,6	7494	5,9	-	-	-	-
		17500	26 / 50%	17,6	52,75	9067	7,3	18,1	48,7	8369	6,6
		17500	28 / 50%	18,6	63,75	10957	9,2	19	58,83	10110	8,3
		17500	32 / 50%	20,6	92,93	15973	17,9	21,2	84,42	14508	14,9
	17500	35 / 50%	22,4	119,2	20487	28,3	22,8	111,67	19192	24,9	

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EFFICIENCY COOLING COILS

TVL 170 cooling

Air	Water 7/12°C					Water 8/13°C			
	Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h
13400	22 / 50%	12,9	42,34	7276	6,8	13,6	38,41	6601	6,1
13400	24 / 50%	13,5	51,56	8862	8,6	14,1	46,98	8075	7,7
13400	26 / 50%	14,3	62,9	10811	11,7	14,8	57,34	9855	9,8
13400	28 / 50%	15	76,69	13181	16,8	15,6	69,95	12022	14,1
13400	32 / 50%	16,5	110,42	18978	32,5	17,1	102,69	17648	28,3
13400	35 / 50%	17,8	139,75	24019	50	18,4	131,71	22636	44,6

Air	Water 7/12°C					Water 8/13°C			
	Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h
14500	22 / 50%	13,1	44,54	7655	7,2	13,8	40,43	6948	6,4
14500	24 / 50%	13,7	54,27	9328	9,2	14,3	49,41	8491	8,1
14500	26 / 50%	14,5	65,98	1341	12,8	15,1	60,1	10329	10,7
14500	28 / 50%	15,3	80,13	13772	18,1	15,9	73,24	12586	15,3
14500	32 / 50%	16,9	115,56	19861	35,5	17,4	107,38	18454	30,7
14500	35 / 50%	18,2	146,39	25161	54,4	18,7	137,74	23672	48,4

Air	Water 7/12°C					Water 8/13°C			
	Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h
16000	22 / 50%	13,4	47,33	8134	7,8	14,1	43007	7402	6,9
16000	24 / 50%	14	57,51	9887	10	14,7	52,33	8933	8,7
16000	26 / 50%	14,8	69,65	11971	14,1	15,4	63,86	10975	12
16000	28 / 50%	15,7	84,35	14497	19,9	16,2	77,45	13311	17
16000	32 / 50%	17,3	122,09	20985	39	17,9	113,32	19475	33,9
16000	35 / 50%	18,7	154,6	26571	60	19,2	145,65	250,31	53,6

Air	Water 7/12°C					Water 8/13°C			
	Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h
17500	22 / 50%	13,7	49,94	8584	8,3	14,4	45,56	7830	7,4
17500	24 / 50%	14,3	60,72	10437	11	14,9	55,38	9518	9,4
17500	26 / 50%	15,1	73,48	12629	15,5	15,6	67,18	11546	13,1
17500	28 / 50%	16	88,73	15250	21,8	17,5	71,78	12336	6,6
17500	32 / 50%	17,7	128,22	22037	42,7	16,5	81,4	13989	18,6
17500	35 / 50%	19,1	162,57	27941	65,9	19,6	152,9	26277	58,6

ROWS  
6R

## EFFICIENCY HEATING COILS

Coil performance in heating mode for each size of unit at different air flows and with different air and water inlet temperatures.

## TVL 250 heating

Air		Water 70/60°C				Water 45/40°C			
Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa
19100	-10	17,6	177,7	15577	9,6	9,5	125,14	21667	18,5
19100	-5	20,7	165,52	14509	8,7	12,6	112,84	19536	15,2
19100	0	23,8	153,26	13434	7,8	15,6	100,47	17395	12,2
19100	5	26,9	140,96	12356	7,1	18,7	88,05	15244	9,6
19100	10	30	128,6	11273	6,3	21,8	75,57	13084	7,8
19100	15	33,1	116,17	10183	5,7	24,8	63,06	10918	6,3

Air		Water 70/60°C				Water 45/40°C			
Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa
20800	-10	16,6	186,33	16332	10,3	8,7	131,27	22727	20,3
20800	-5	19,8	173,54	15212	9,2	11,9	118,37	20489	16,7
20800	0	22,9	160,71	14087	8,3	15,1	105,36	18241	13,4
20800	5	26,1	147,79	12955	7,5	18,2	92,32	15983	10,4
20800	10	29,3	134,8	11817	6,7	21,3	79,23	13717	8,3
20800	15	32,4	121,76	10673	6	24,4	66,09	11443	6,7

Air		Water 70/60°C				Water 45/40°C			
Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa
22800	-10	15,5	195,95	17176	11,4	8	138,06	23904	22,3
22800	-5	18,8	182,5	15997	9,9	11,2	124,46	21549	18,4
22800	0	22	168,97	14811	8,9	14,4	110,8	19183	14,7
22800	5	25,2	155,37	13620	8	17,6	97,07	16806	11,5
22800	10	28,5	141,72	12423	7,1	20,9	83,29	14420	8,9
22800	15	31,7	127,98	11218	6,6	24,1	69,47	12027	7,1

Air		Water 70/60°C				Water 45/40°C			
Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa
25000	-10	14,5	205,94	18052	12,5	7,2	145,13	25127	24,6
25000	-5	17,8	191,77	16810	10,9	10,5	130,81	22648	20,2
25000	0	21,1	177,55	15564	9,5	13,8	116,44	20160	16,2
25000	5	24,4	163,25	14310	8,5	17,1	101,99	17658	12,6
25000	10	27,7	148,87	13049	7,6	20,4	87,51	15150	9,5
25000	15	31	134,42	11783	6,7	23,7	72,96	12631	7,5



EFFICIENCY HEATING COILS

TVL 250 heating

Air		Water 70/60°C				Water 45/40°C			
Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa
19100	-10	28,8	249,88	21886	8	17,3	175,42	30371	14,4
19100	-5	31,2	232,55	20384	7,3	19,6	158,19	27388	11,9
19100	0	33,5	215,35	18877	6,7	21,9	140,87	24389	9,6
19100	5	35,8	198,08	17363	6,1	24,2	123,49	21379	8,1
19100	10	38,1	180,74	15843	5,5	26,5	106,5	18361	6,7
19100	15	40,4	163,33	14317	5	28,8	88,58	15335	5,5

Air		Water 70/60°C				Water 45/40°C			
Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa
20800	-10	27,5	262,76	23033	8,6	16,4	184,64	31968	15,9
20800	-5	29,9	244,7	21450	7,8	18,8	166,5	28826	13,1
20800	0	32,4	226,56	19860	7,1	21,3	148,25	25666	10,5
20800	5	34,8	208,39	18267	6,4	23,6	129,93	22496	8,6
20800	10	37,1	190,11	16664	5,8	25,9	111,57	19317	7,1
20800	15	39,5	171,8	15059	5,3	28,3	93,16	16129	5,8

Air		Water 70/60°C				Water 45/40°C			
Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa
22800	-10	26,1	277,31	24308	9,2	15,4	194,91	33745	17,6
22800	-5	28,6	258,25	22637	8,4	17,9	175,77	30431	14,5
22800	0	31,1	239,1	20959	7,6	20,4	156,48	27092	11,6
22800	5	33,6	219,88	19274	6,9	22,9	137,13	23742	9,3
22800	10	36,1	200,58	17582	6,2	25,3	117,72	20382	7,6
22800	15	38,6	181,21	15884	5,5	27,8	98,26	17,012	6,1

Air		Water 70/60°C				Water 45/40°C			
Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa
25000	-10	24,7	292,47	25637	10	14,4	205,63	35601	19,5
25000	-5	27,4	272,32	23870	9	17	185,42	32102	16
25000	0	30	252,12	22100	8,1	19,6	165,5	28575	12,9
25000	5	32,5	231,83	20322	7,3	22,2	144,61	25037	10
25000	10	35,1	211,44	18534	6,5	24,8	124,12	21489	8,1
25000	15	37,7	191	16743	5,8	27,3	103,57	17932	6,5

## EFFICIENCY HEATING COILS

## TVL 250 heating

	Air		Water 70/60°C			Water 45/40°C				
	Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa
<b>ROWS 4R</b>	19100	-10	38,1	309,64	27141	36,5	-	-	-	-
	19100	-5	39,9	289,01	25333	32,1	-	-	-	-
	19100	0	41,7	268,29	23517	27,9	-	-	-	-
	19100	5	43,5	247,5	21694	24	29	154,06	26674	37,3
	19100	10	45,3	226,7	19871	20,3	30,7	133,12	23048	28,4
	19100	15	47	205,83	18042	17	32,4	112,11	19410	20,6
	Air		Water 70/60°C			Water 45/40°C				
	Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa
	20800	-10	36,7	326,9	28656	40,4	-	-	-	-
	20800	-5	38,6	305,17	26750	35,5	-	-	-	-
	20800	0	40,5	283,36	24839	30,9	-	-	-	-
	20800	5	42,3	261,33	22907	26,6	28,2	162,59	28149	41,3
	20800	10	44,2	239,26	20982	22,5	30,1	140,52	24329	31,4
	20800	15	46	217,12	19032	18,8	31,9	118,24	20470	22,8
	Air		Water 70/60°C			Water 45/40°C				
	Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa
	22800	-10	-	-	-	-	-	-	-	-
	22800	-5	37,1	323,23	28333	39,6	-	-	-	-
	22800	0	39,1	300,4	26300	34,4	-	-	-	-
	22800	5	41	276,75	24259	29,6	-	-	-	-
	22800	10	43	253,37	22209	25,1	29,4	148,84	25770	35
	22800	15	44,9	229,88	20150	20,9	31,3	125,29	21693	25,4
	Air		Water 70/60°C			Water 45/40°C				
	Volume m <sup>3</sup> /h	T. in °C	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa	T. out °C	Power kW	Water flow dm <sup>3</sup> /h	Δp W KPa
	25000	-10	-	-	-	-	-	-	-	-
	25000	-5	-	-	-	-	-	-	-	-
	25000	0	37,7	317,48	27829	38,3	-	-	-	-
	25000	5	39,8	292,88	25673	32,9	-	-	-	-
	25000	10	41,8	268	23493	27,8	28,7	157,43	27256	38,9
	25000	15	43,9	243,23	21320	23,2	30,8	132,52	22944	28,2

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EFFICIENCY COOLING COILS

TVL 250 cooling

<b>ROWS 4R</b>	Air		Water 7/12°C			Water 8/13°C					
	Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	
	19100	22 / 50%	15	45,67	7850	5,8	15,7	41,47	7128	5,3	
	19100	24 / 50%	15,7	55,59	9554	7,3	16,3	50,15	8620	6,4	
	19100	26 / 50%	16,6	67,4	11585	9,2	17,1	61,08	10497	8,1	
	19100	28 / 50%	17,5	81,29	13971	12,7	18	74,16	12745	10,7	
	19100	32 / 50%	19,5	117,93	20268	25,3	20	109,7	18744	21,8	
	19100	35 / 50%	21,1	150,51	25868	39,6	21,6	141,35	24292	35,1	
	Air		Water 7/12°C			Water 8/13°C					
	Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	
	20800	22 / 50%	15,2	48,09	8265	6,2	15,9	43,67	7506	5,6	
	20800	24 / 50%	15,9	58,3	10020	7,7	16,6	52,82	9078	6,8	
	20800	26 / 50%	16,8	70,86	12179	9,9	17,4	64,25	11043	8,7	
	20800	28 / 50%	17,8	85,22	14648	13,9	18,3	77,84	13372	11,7	
	20800	32 / 50%	19,9	123,26	21185	27,4	20,3	114	19591	23,6	
	20800	35 / 50%	21,5	157,45	27062	43,1	21,9	147,8	25401	38,2	
	Air		Water 7/12°C			Water 8/13°C					
	Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	
	22800	22 / 50%	15,5	50,79	8730	6,5	16,1	46,15	7931	5,9	
	22800	24 / 50%	16,2	61,51	10572	8,2	16,9	5,81	9591	7,3	
	22800	26 / 50%	17,1	74,52	12809	10,9	17,6	67,68	1163	29,3	
	22800	28 / 50%	18,1	89,71	15419	15,3	18,6	81,92	14079	12,9	
	22800	32 / 50%	20,2	129,2	22205	29,9	20,6	119,35	20511	25,7	
22800	35 / 50%	21,9	165,07	28371	47	22,3	154,86	26614	41,6		
Air		Water 7/12°C			Water 8/13°C						
Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa		
25000	22 / 50%	15,7	53,6	9212	7	16,3	48,68	8367	6,2		
25000	24 / 50%	16,4	64,89	11152	8,8	17,1	58,89	10121	7,8		
25000	26 / 50%	17,4	78,37	13470	11,9	17,9	71,26	12247	9,9		
25000	28 / 50%	18,5	92,99	15982	16,3	18,9	86,2	14815	14,1		
25000	32 / 50%	20,5	135,23	23243	32,5	21,1	122,98	21136	27,2		
25000	35 / 50%	22,3	172,96	29729	51,3	22,7	162,17	27870	45,3		

## EFFICIENCY COOLING COILS

## TVL 250 cooling

Air		Water 7/12°C				Water 8/13°C			
Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa
19100	22 / 50%	13,2	57,63	9905	4,8	14	51,98	8933	4,4
19100	24 / 50%	13,8	70,78	12165	5,8	14,4	64,17	11029	5,2
19100	26 / 50%	14,5	86,17	14810	7,2	15,1	78,59	13506	6,4
19100	28 / 50%	15,3	105,07	18059	9,2	15,9	96	16499	8,1
19100	32 / 50%	16,8	152,33	26180	17,6	17,4	141,28	24280	15,3
19100	35 / 50%	18,1	193,77	33304	27,5	18,6	182,22	31317	24,4

Air		Water 7/12°C				Water 8/13°C			
Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa
20800	22 / 50%	13,4	60,87	10462	5	14,2	55,19	9485	4,6
20800	24 / 50%	14	74,63	12828	6,1	14,7	67,78	11648	5,5
20800	26 / 50%	14,8	90,48	15551	7,6	15,3	82,64	14203	6,8
20800	28 / 50%	15,6	109,92	18892	9,7	16,1	100,69	17304	8,7
20800	32 / 50%	17,6	159,78	27461	19,3	17,7	148,06	25446	16,7
20800	5 / 50%	18,5	203,38	34956	30	19	191,24	32867	26,7

Air		Water 7/12°C				Water 8/13°C			
Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa
22800	22 / 50%	13,7	64,65	11111	5,3	14,5	58,77	10101	4,8
22800	24 / 50%	14,3	78,86	13554	6,5	14,9	71,81	12341	5,8
22800	26 / 50%	15,1	95,64	16437	8,1	15,6	87,04	14959	7,2
22800	28 / 50%	15,9	115,8	19903	10,7	16,4	105,99	18215	9,2
22800	32 / 50%	17,6	168,1	28892	21,1	18,1	155,66	26751	18,3
22800	35 / 50%	18,9	214,04	36787	33	19,5	201,31	34596	29,3

Air		Water 7/12°C				Water 8/13°C			
Volume m³/h	T. in °C	T. out °C	Power kW	Water flow dm³/h	Δp W KPa	T. out °C	Power kW	Water flow dm³/h	Δp W KPa
25000	22 / 50%	14	65,88	11783	5,6	14,7	62,32	10711	5,1
25000	24 / 50%	14,6	83,42	14337	6,9	15,2	76,01	13064	6,2
25000	26 / 50%	15,4	100,86	17335	8,7	15,9	91,99	15810	7,7
25000	28 / 50%	16,2	121,92	20954	11,7	16,7	111,79	19211	10
25000	32 / 50%	17,9	176,74	30377	23,2	18,5	162,24	27883	19,7
25000	35 / 50%	19,4	225,1	38688	36,2	19,9	211,55	36357	32,2



## AIR TREATMENT

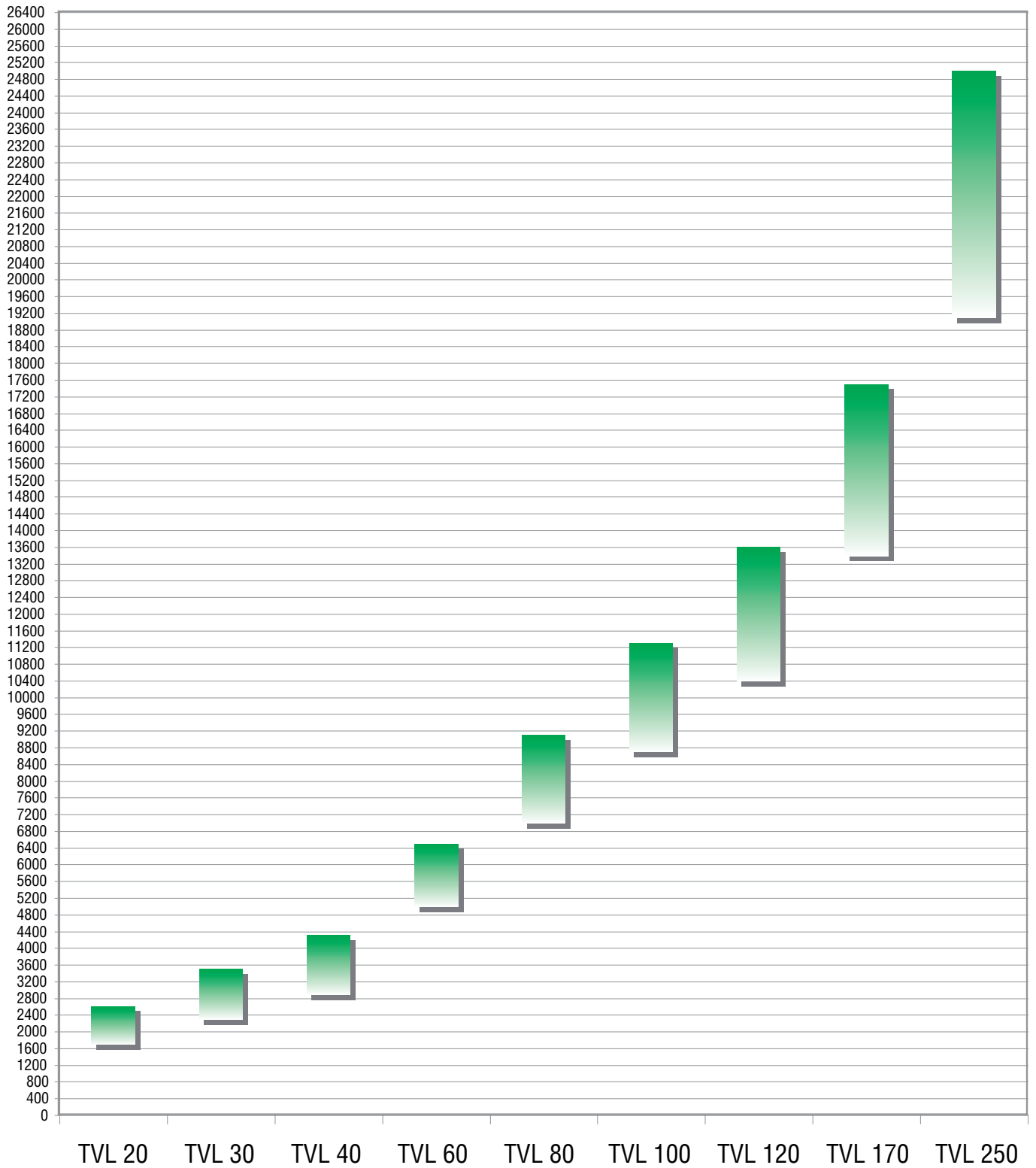
### PRESSURE DROP

	m³/h	V = m/s	Coils				Panel filters	Damper	Grill
			2R	3R	4R	6R			
<b>TVL 20</b>	<b>1700</b>	2	15,9	23	30,8	39,7	80	30	21
	<b>2200</b>	2,5	23,5	32,7	46,3	58,4	96	50	49
	<b>2400</b>	2,75	26,9	37,2	53,1	66,6	104	55	88
	<b>2600</b>	3	30,5	43,2	60,3	75,1	104	65	90
<b>TVL 30</b>	<b>2300</b>	2	15,4	21,4	30,6	60	72	30	21
	<b>2900</b>	2,5	22,1	30,8	67,7	84,3	84	45	49
	<b>3200</b>	2,75	24,5	36	82,4	98	92	55	68
	<b>3500</b>	3	28,3	43,7	94,3	112	96	65	90
<b>TVL 40</b>	<b>2900</b>	2	15,4	22,6	49,9	62,5	64	30	21
	<b>3600</b>	2,5	21,7	30,1	66	82	76	45	49
	<b>4000</b>	2,75	25	37,3	80,9	100,7	80	55	68
	<b>4300</b>	3	28,6	41,7	90,2	107	84	60	90
<b>TVL 60</b>	<b>5000</b>	2,3	20,7	30,3	66,2	82,5	80	25	21
	<b>5400</b>	2,5	23,4	34,1	74,3	92,5	84	30	35
	<b>5900</b>	2,75	26,9	39,2	84,9	105,5	88	35	49
	<b>6500</b>	3	31,3	45,6	90,4	121,8	96	40	68
<b>TVL 80</b>	<b>7000</b>	2,3	20,7	30,3	66,2	82,5	76	30	21
	<b>7600</b>	2,5	23,4	34,4	74,9	93,2	80	35	35
	<b>8300</b>	2,75	26,9	39,5	85,5	106,3	84	40	49
	<b>9100</b>	3	31,3	45,6	98,2	121,8	92	50	68
<b>TVL 100</b>	<b>8700</b>	2,3	20,5	30	65,6	81,8	80	25	21
	<b>9500</b>	2,5	23,6	34,4	74,9	93,3	84	25	49
	<b>10400</b>	2,75	27,2	39,6	85,8	106,7	88	30	49
	<b>11300</b>	3	30,9	45,1	97,2	120,7	92	40	88
<b>TVL 120</b>	<b>10400</b>	2,3	20,4	29,8	65,2	81,4	80	2,77	35
	<b>11300</b>	2,5	23,3	33,9	73,9	92	84	3,01	49
	<b>12400</b>	2,75	26,9	39,2	85	105,6	88	3,30	49
	<b>13600</b>	3	31,1	43,5	97,6	121,2	96	3,62	88
<b>TVL 170</b>	<b>13400</b>	2,3	20,5	29,9	65,4	81,6	84	30	35
	<b>14500</b>	2,5	23,3	33,8	73,7	91,8	88	35	49
	<b>16000</b>	2,75	27	39,4	85,4	106,2	92	40	68
	<b>17000</b>	3	31,1	45,4	97,8	121,3	100	50	88
<b>TVL 250</b>	<b>19100</b>	2,3	20,5	29,9	65,4	81,6	84	25	35
	<b>20800</b>	2,5	23,4	34,1	74,4	92,6	92	30	49
	<b>22800</b>	2,75	27	39,4	85,4	106,1	96	40	68
	<b>25000</b>	3	31,2	45,5	98	121,6	104	45	90

NOTE: The 4-row coils show the pressure drop on the cooling side.



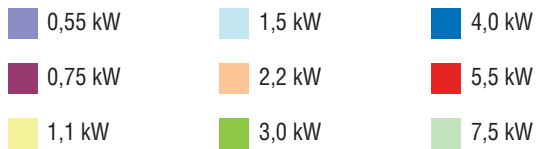
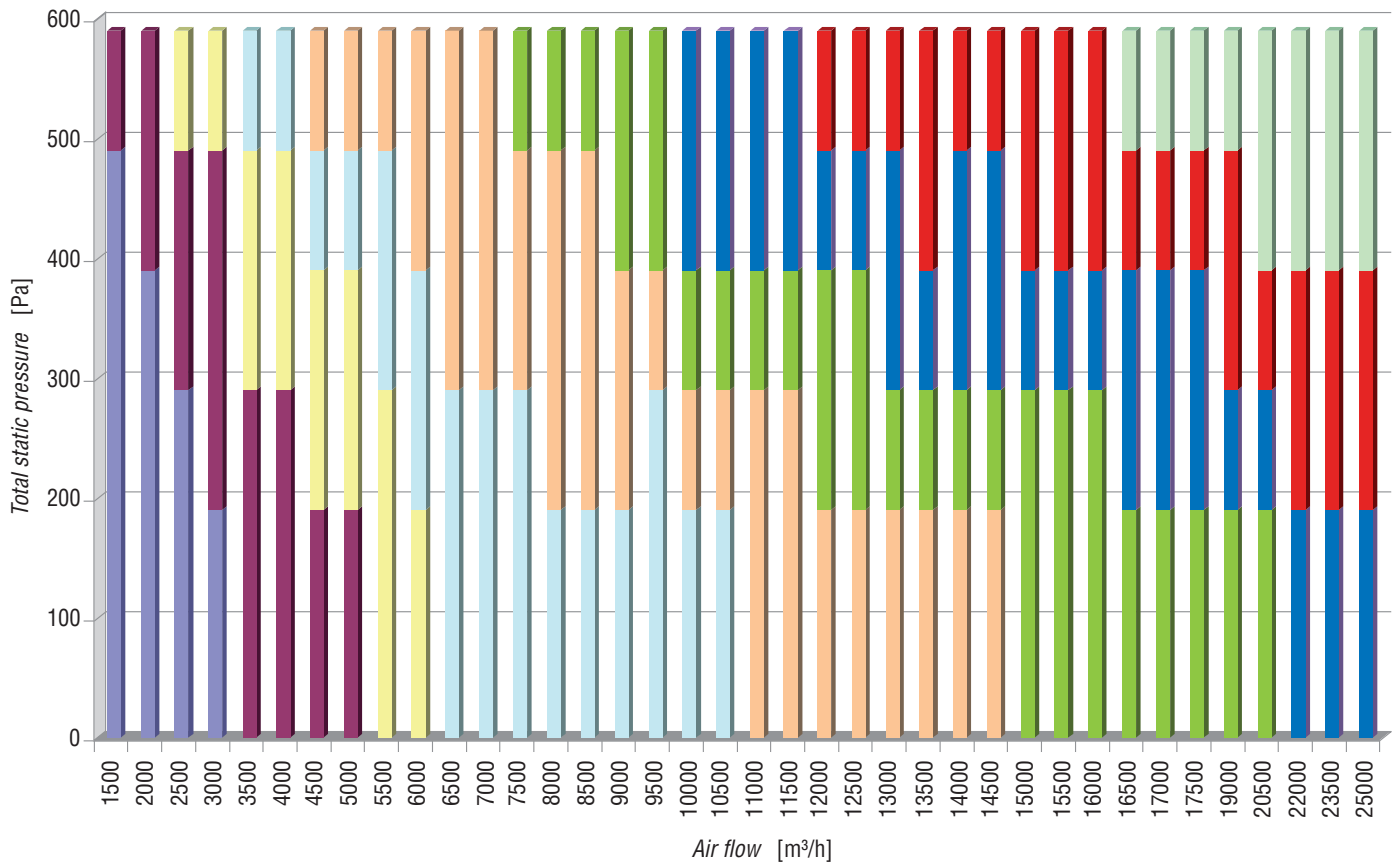
TVL SELECTION





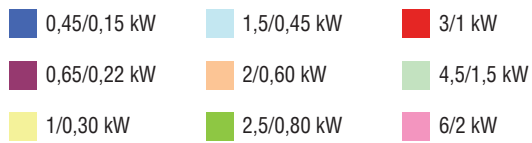
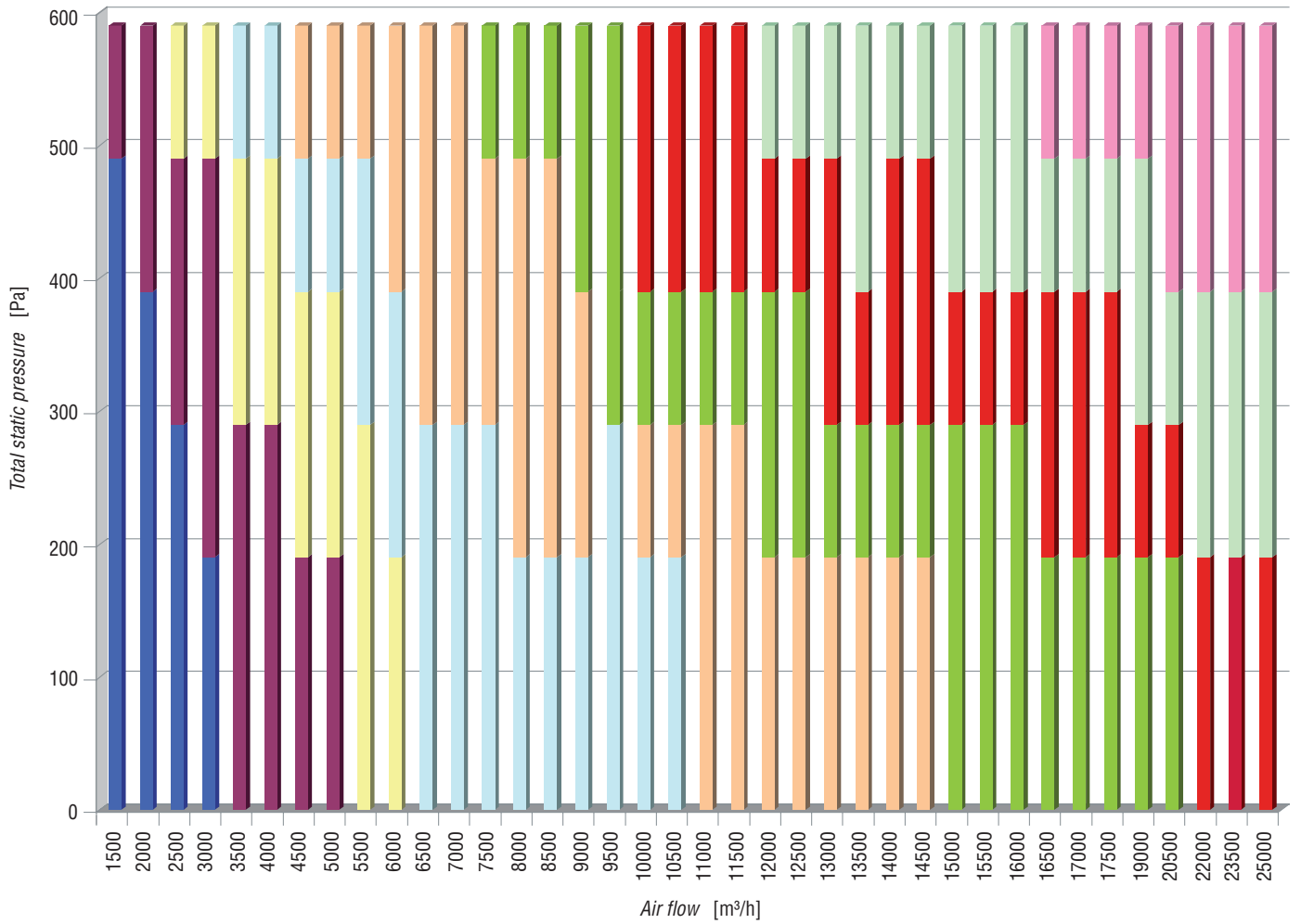
TVL SELECTION

Single speed motor



## TVL SELECTION

## 4/6 pole motors





SAMPLE UNIT SELECTION

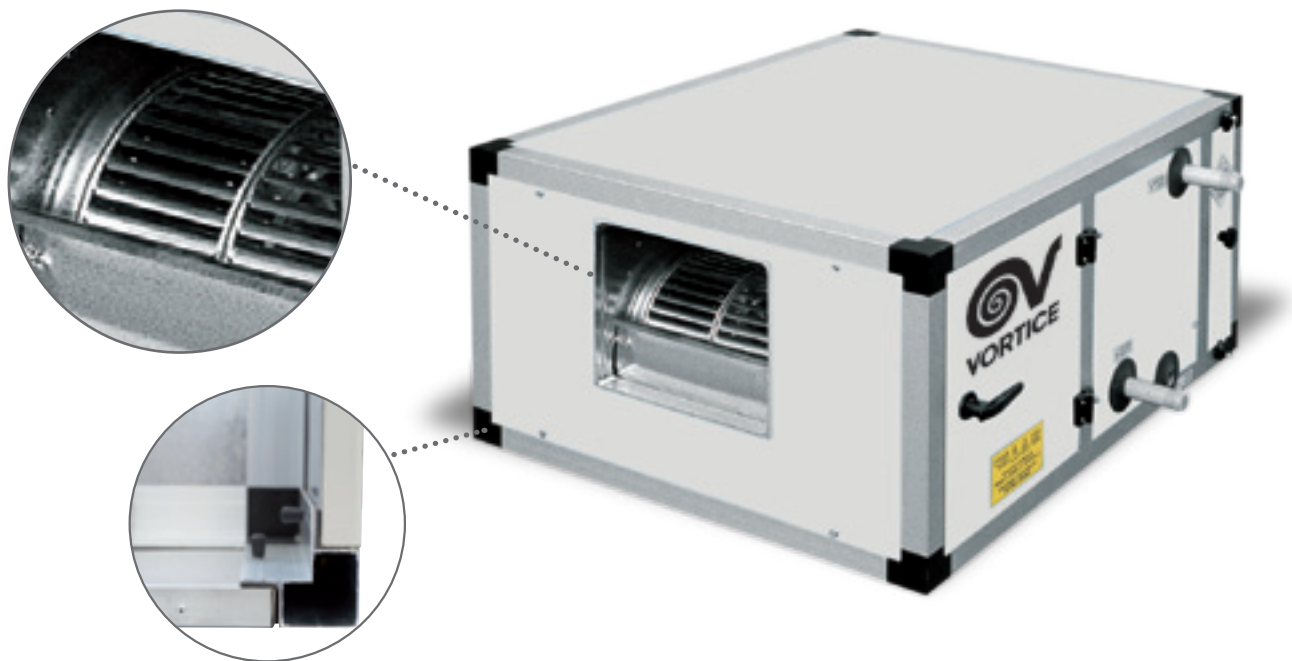
<h3>TVL Quotation Table</h3>									
Air flow rate [m³/h] <input style="width: 80px;" type="text"/>	ASP [Pa] <input style="width: 80px;" type="text"/>								
INDICATE CONFIGURATION:									
Fitting side:	<input type="checkbox"/> R	<input type="checkbox"/> L	Intake:						
Inspection side:	<input type="checkbox"/> R	<input type="checkbox"/> L	Outlet:						
			<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33.33%; text-align: center;">R1</td> <td style="width: 33.33%; text-align: center;">R2</td> <td style="width: 33.33%; text-align: center;">R3</td> </tr> <tr> <td style="width: 33.33%; text-align: center;">M1</td> <td style="width: 33.33%; text-align: center;">M2</td> <td style="width: 33.33%; text-align: center;">M3</td> </tr> </table>	R1	R2	R3	M1	M2	M3
R1	R2	R3							
M1	M2	M3							
COMPONENTS and ACCESSORIES:		Pressure drop [Pa]	Price List [€]						
<b>BASIC UNIT</b>	<input type="checkbox"/> H1	<input type="checkbox"/> H2	<input type="checkbox"/> H3						
	<input type="checkbox"/> V1	<input type="checkbox"/> V2	<input type="checkbox"/> V3						
[FI] Pleated synthetic filter		<input style="width: 80px;" type="text"/>	<input style="width: 80px;" type="text"/>						
[BAC] Heating coil	<input style="width: 40px;" type="text"/>	Rows	<input style="width: 80px;" type="text"/>						
[BAF] Cooling coil	<input style="width: 40px;" type="text"/>	Rows	<input style="width: 80px;" type="text"/>						
[GR] Intake grill	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input style="width: 80px;" type="text"/>						
[SR] Control damper	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input style="width: 80px;" type="text"/>						
[PA] Intake plenum	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input style="width: 80px;" type="text"/>						
[SM] Mixing chamber with 2 dampers	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input style="width: 80px;" type="text"/>						
[PM] Outlet plenum	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input style="width: 80px;" type="text"/>						
[MS] Safety microswitch	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input style="width: 80px;" type="text"/>						
[VB] Variable pitch pulleys	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input style="width: 80px;" type="text"/>						
[TPV] Rain cover for vert. Unit	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input style="width: 80px;" type="text"/>						
[TPH] Rain cover for horiz. Unit	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input style="width: 80px;" type="text"/>						
[XXX] Extra soundproofing	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input style="width: 80px;" type="text"/>						
[PR] Differential pressure switch	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input style="width: 80px;" type="text"/>						
[MA] Water column differential pressure gauge	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input style="width: 80px;" type="text"/>						
[VB] Variable pitch pulley	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input style="width: 80px;" type="text"/>						
[CM] Manual damper control	<input style="width: 40px;" type="text"/>	[number of items]	<input style="width: 80px;" type="text"/>						
<b>TOTAL STATIC PRESSURE:</b>		Pa	<input style="width: 80px;" type="text"/>						
<b>MOTOR</b>	<input style="width: 40px;" type="text"/>	kW - N°	<input style="width: 40px;" type="text"/>						
		Poles	<input style="width: 40px;" type="text"/>						
<b>TOTAL PRICE LIST:</b>		€	<input style="width: 80px;" type="text"/>						

A series of 25 horizontal dashed lines spanning the width of the page, intended for writing or drawing.



## TVL-DD

Directly coupled thermoventilating units horizontal and vertical execution + accessories



### PRODUCT SPECIFICATIONS

- The TVL-DD fan coils stand out for their operating versatility in different environments. They feature compact dimensions, with excellent air flow and thermal performance and low noise.
- Ideal for small or medium-sized environments such as: offices, agencies, homes and shops, offering extremely simple installation even in restricted spaces.
- This series uses centrifugal fans directly coupled to single-phase three-speed motors, covering a range of flow-rates from 1000 m<sup>3</sup>/h to 4000 m<sup>3</sup>/h.



### KEY FEATURES

- **Frame**, made using a modular system of extruded anodised aluminium alloy section bars (in accordance with UNI 9006/1), joined by die-cast aluminium corners, sandwich panels, insulated using polyurethane foam, density 40 kg/m<sup>3</sup>, 23 mm thick.
- **Outside panel** made from coated sheet metal, 6/10 thickness, inside panel made from galvanised sheet metal, 6/10 thickness.
- **G4 filter**, synthetic filtering media, weighted average efficiency  $\geq 90\%$  with galvanised frame and retaining mesh.
- **Heat exchange coils** suitable for cooling and heating operation (according to the number of rows R installed) made from 5/8" copper tube with aluminium fins and turbulators.
- **Electric coils** with finned tubular air heaters, one or more stages.
- **Condensate collection basin** made from galvanised sheet metal complete with front drain and welded hose fitting.
- **Double suction centrifugal fans** with forward curved blades, complete with 4-pole, external rotor motor.

**Warning: Maximum operating temperature between -20°C and +40°C.**

## TECHNICAL DATA

<b>MODEL</b>	<b>TVL-DD</b>	<b>10</b>	<b>15</b>	<b>20</b>	<b>30</b>	<b>40</b>
Air flow rate (maximum speed)	m <sup>3</sup> /h	1000	1500	2000	3000	4000
Static pressure (1)	Pa	230	365	340	365	340
Sound pressure level (2)	dB(A)	59	62	64	62	64

<b>FAN</b>	<b>TVL-DD</b>	<b>10</b>	<b>15</b>	<b>20</b>	<b>30</b>	<b>40</b>
Power input	W	184	350	350	2x350	2x350
Max absorbed current	A	1,7	3,1	3	2x3,1	2x3
N. of fans	n°	1	1	1	2	2
Fan speeds	n°	3	3	3	3	3
Poles	n°	4	4	4	4	4
Enclosure protection	IP	55	55	55	55	55
Insulation class		B	F	F	F	F
Electrical supply	V / ph / Hz	230 / 1 / 50				

<b>FILTER</b>	<b>TVL-DD</b>	<b>10</b>	<b>15</b>	<b>20</b>	<b>30</b>	<b>40</b>
Efficiency		G4	G4	G4	G4	G4
Crossing speed	m/s	1,11	1,67	2,22	2,08	2,22
Average pressure drop	Pa	25	45	60	55	60

<b>2R hot water coil</b>	<b>TVL-DD</b>	<b>10</b>	<b>15</b>	<b>20</b>	<b>30</b>	<b>40</b>
Heating capacity (3)	kW	8,1	10,3	12,2	17,4	27,8
Supply air temperature	°C	35,9	32,5	30	29,2	32,6
Water flow	dm <sup>3</sup> /h	707	906	1069	1520	2451
Water pressure drop	kPa	1,6	2,6	3,5	2,8	7,6
Air pressure drop	Pa	8	14	21	24	26
Connection diameter	Gas	3/4"	3/4"	3/4"	3/4"	3/4"

<b>4R hot water coil</b>	<b>TVL-DD</b>	<b>10</b>	<b>15</b>	<b>20</b>	<b>30</b>	<b>40</b>
Heating capacity (3)	kW	14,8	20	24,5	35,6	55
Supply air temperature	°C	55,9	51,6	48,4	47,2	52,8
Water flow	dm <sup>3</sup> /h	1296	1755	2147	3120	4848
Water pressure drop	kPa	3,5	6,1	9	9	5,7
Air pressure drop	Pa	15	28	42	49	53
Connection diameter	Gas	3/4"	3/4"	3/4"	3/4"	1"

<b>4R cold water coil</b>	<b>TVL-DD</b>	<b>10</b>	<b>15</b>	<b>20</b>	<b>30</b>	<b>40</b>
Total cooling capacity (4)	kW	8,6	11,6	13,3	19,1	23,4
Supply air temperature	°C	15,9	17,4	18,7	19,1	19,6
Sensible cooling capacity	kW	5,1	6,96	9,31	13,3	16,3
Water flow	dm <sup>3</sup> /h	1485	1995	2287	3288	4015
Water pressure drop	kPa	2,2	8,8	11,3	11,6	4,7
Air pressure drop	Pa	28	52	70	81	88
Connection diameter	Gas	3/4"	3/4"	3/4"	3/4"	1"

<b>6R cold water coil</b>	<b>TVL-DD</b>	<b>10</b>	<b>15</b>	<b>20</b>	<b>30</b>	<b>40</b>
Total cooling capacity (4)	kW	10,8	14,2	17	24,8	30
Supply air temperature	°C	13,6	15,2	16,2	16,5	17,3
Sensible cooling capacity	kW	6,48	8,5	10,2	14,88	21
Water flow	dm <sup>3</sup> /h	1861	2438	2926	4263	5155
Water pressure drop	kPa	5,2	8,5	11,9	16,1	5,6
Air pressure drop	Pa	43	73	112	130	140
Connection diameter	Gas	1"	1"	1"	1"	1" / 1/4

<b>Electric coil</b>	<b>TVL-DD</b>	<b>10</b>	<b>15</b>	<b>20</b>	<b>30</b>	<b>40</b>
Heating capacity (4)	kW	5	7,5	10	15	20
Air pressure drop	Pa	6,48	8,5	10,2	14,88	21
Stages	n°	1	1	2	2	2
Power consumption	A	8,5	12,8	13,6	25,5	34
Electrical supply	V / ph / Hz	400 / 3 / 50				

(1) Referred to the fan: deduct the pressure drop of the selected components in order to get the external static pressure.

(2) Sound pressure level: data referred to 1,5 metres from inlet in free field. The actual operation noise level generally differs from the values shown in the table, depending on operating conditions, reflected noise and surrounding noise.

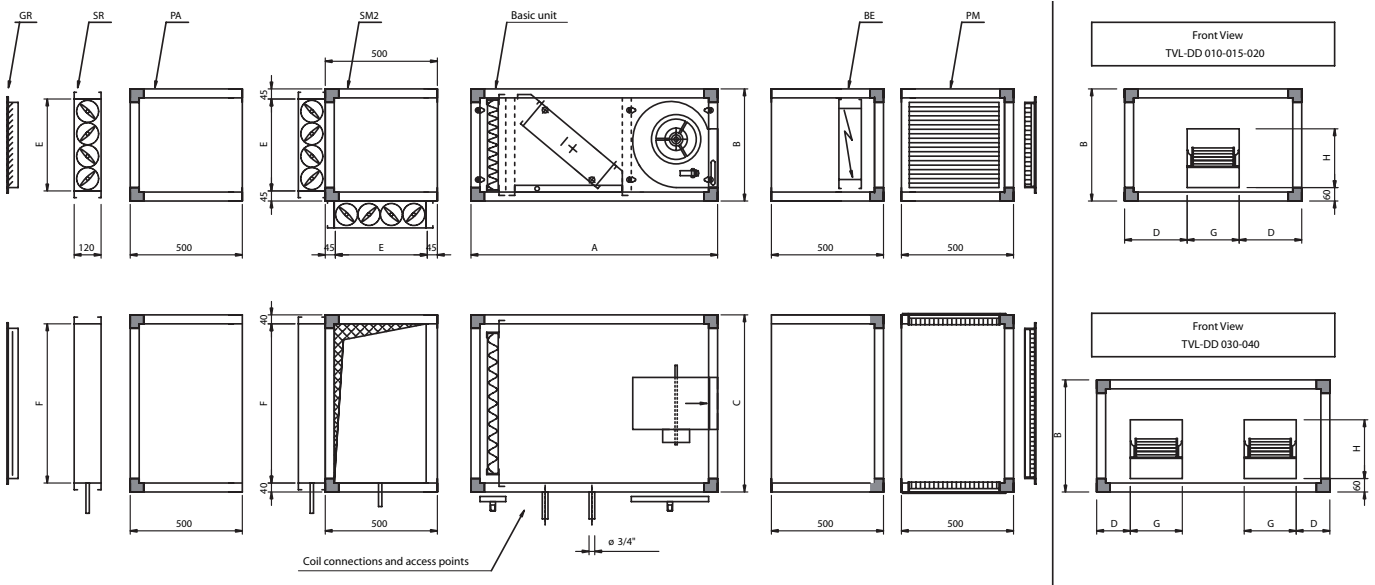
(3) Inlet air temperature 12°C, UR 0%, water temp. in/out 70/60°C. Air flow at max speed.

(4) Inlet air temperature 32°C, UR 50%, water temp. in/out 7/12°C. Air flow at max speed.

WARNING - The fans are not suitable for operation at temperatures above 40°C

## POSSIBLE DIMENSIONS AND CONFIGURATION

Horizontal version



MODEL		10	15	20	30	40
A	mm	1100	1100	1100	1100	1100
B	mm	500	500	500	500	500
C	mm	790	790	790	1040	1290
D	mm	279	279	246	150	200
E	mm	410	410	410	410	410
F	mm	710	710	710	960	1210
G	mm	232	232	298	232	298
H	mm	208	262	262	262	262

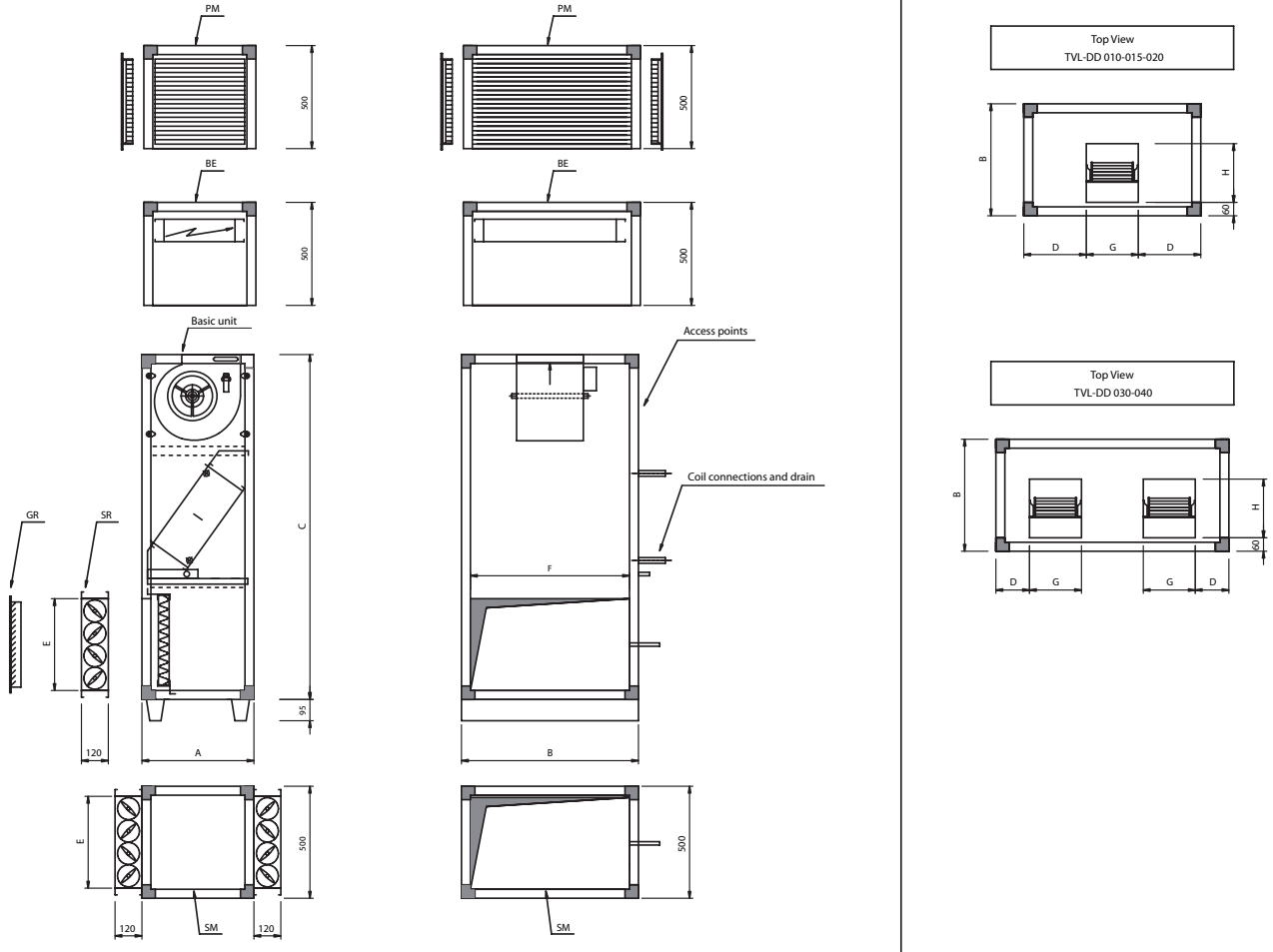
## AVAILABLE ACCESSORIES

- GR** Intake grille with fixed aluminium fins
- SR** Control damper with motor drive shaft
- PA** Intake plenum
- SM** Mixing chamber complete with 2 control dampers featuring motor drive shaft
- BE** Electric coil with tubular heaters, three-phase power supply
- PM** Outlet plenum complete with three outlets featuring two rows of adjustable aluminium blades
- MS** Safety micro-switch
- CP** Speed selector
- TPV** Galvanised plate rain cover for VERTICAL unit
- TPH** Galvanised plate rain cover for HORIZONTAL unit



POSSIBLE DIMENSIONS AND CONFIGURATION

Vertical version



MODEL		10	15	20	30	40
A	mm	500	500	500	500	500
B	mm	790	790	790	1040	1290
C	mm	1290	1540	1540	1540	1540
D	mm	279	279	246	150	200
E	mm	210	310	310	410	410
F	mm	710	710	710	960	1210
G	mm	232	232	298	232	298
H	mm	208	262	262	262	262



EFFICIENCY HEATING COILS

Coil performance in heating mode at rated flow with different air and water inlet temperatures.

TVL-DD 10

ROWS 2R	Air		Water 70/60°C				Water 45/40°C			
	Volume m³/h	T. in °C	T. out °C	Power kW	Delivery dm³/h	Δp W KPa	T. out °C	Power kW	Delivery dm³/h	Δp W KPa
	1000	-10	28,7	13,0	1139	3,7	17,1	9,1	1581	7,3
	1000	-5	31,1	12,0	1062	3,3	19,5	8,3	1427	6,0
	1000	0	33,4	11,3	984	2,9	21,9	7,4	1273	4,9
	1000	5	35,8	10,4	906	2,5	24,2	6,5	1118	3,9
	1000	10	38,1	9,5	828	2,1	26,5	5,6	962	2,9
	1000	15	40,5	8,6	750	1,7	28,9	4,7	806	2,1

ROWS 4R	Air		Water 70/60°C				Water 45/40°C			
	Volume m³/h	T. in °C	T. out °C	Power kW	Delivery dm³/h	Δp W KPa	T. out °C	Power kW	Delivery dm³/h	Δp W KPa
	1000	-10	52,5	21,1	1840	6,3	33,5	14,6	2533	12,2
	1000	-5	53,4	19,7	1719	5,6	34,4	13,3	2292	10,1
	1000	0	54,2	18,3	1596	4,9	35,2	11,9	2049	8,2
	1000	5	55,1	16,9	1473	4,2	36,0	10,4	1806	6,5
	1000	10	55,9	15,4	1350	3,6	36,9	9,0	1564	5,0
	1000	15	56,7	14,0	1227	3,0	37,6	7,6	1319	3,6

TVL-DD 15

ROWS 2R	Air		Water 70/60°C				Water 45/40°C			
	Volume m³/h	T. in °C	T. out °C	Power kW	Delivery dm³/h	Δp W KPa	T. out °C	Power kW	Delivery dm³/h	Δp W KPa
	1500	-10	23,3	16,8	1470	6,0	13,4	11,8	2043	11,8
	1500	-5	26,0	15,7	1370	5,3	16,1	10,7	1844	9,7
	1500	0	28,8	14,5	1269	4,6	18,8	9,5	1643	7,8
	1500	5	31,5	13,4	1168	3,9	21,5	8,3	1442	6,2
	1500	10	34,2	12,2	1067	3,3	24,2	7,2	1240	4,7
	1500	15	36,9	11,0	965	2,8	26,9	6,0	1038	3,4

ROWS 4R	Air		Water 70/60°C				Water 45/40°C			
	Volume m³/h	T. in °C	T. out °C	Power kW	Delivery dm³/h	Δp W KPa	T. out °C	Power kW	Delivery dm³/h	Δp W KPa
	1500	-10	46,7	28,7	2505	11,3	29,5	20,0	3454	21,8
	1500	-5	47,9	26,7	2337	9,9	30,7	18,1	3122	18,1
	1500	0	49,1	24,8	2169	8,6	31,9	16,1	2789	14,6
	1500	5	50,3	22,9	2000	7,4	33,1	14,2	2458	11,5
	1500	10	51,5	21,0	1832	6,3	34,3	12,3	2123	8,8
	1500	15	52,7	19,0	1663	5,3	35,5	10,3	1788	6,4

## TVL-DD 20

ROWS 2R	Air		Water 70/60°C				Water 45/40°C			
	Volume m³/h	T. in °C	T. out °C	Power kW	Delivery dm³/h	Δp W KPa	T. out °C	Power kW	Delivery dm³/h	Δp W KPa
	2000	-10	19,6	19,9	1741	8,3	10,8	14,0	2423	16,2
2000	-5	22,6	18,6	1622	7,2	13,8	12,6	2185	13,4	
2000	0	25,5	17,2	1503	6,3	16,7	11,3	1947	10,8	
2000	5	28,5	15,8	1383	5,4	19,7	9,9	1708	8,4	
2000	10	31,4	14,4	1262	4,5	22,6	8,5	1468	6,4	
2000	15	34,4	13,1	1141	3,8	25,5	7,1	1228	4,6	

ROWS 4R	Air		Water 70/60°C				Water 45/40°C			
	Volume m³/h	T. in °C	T. out °C	Power kW	Delivery dm³/h	Δp W KPa	T. out °C	Power kW	Delivery dm³/h	Δp W KPa
	2000	-10	42,2	35,2	3073	16,6	26,4	24,5	4243	32,1
2000	-5	43,7	32,8	2867	14,6	27,9	22,2	3835	26,6	
2000	0	45,2	30,4	2660	12,7	29,4	19,7	3424	21,5	
2000	5	46,7	28,1	2452	10,9	30,9	17,4	3014	16,9	
2000	10	48,1	25,7	2244	9,2	32,4	15,1	2602	12,8	
2000	15	49,6	23,3	2036	7,7	33,8	12,7	2190	9,3	

## TVL-DD 30

ROWS 2R	Air		Water 70/60°C				Water 45/40°C			
	Volume m³/h	T. in °C	T. out °C	Power kW	Delivery dm³/h	Δp W KPa	T. out °C	Power kW	Delivery dm³/h	Δp W KPa
	3000	-10	18,2	28,4	2487	6,7	9,8	20,0	3464	13,1
3000	-5	21,2	26,5	2316	5,9	12,9	18,1	3122	10,8	
3000	0	24,3	24,5	2144	5,1	15,9	16,1	2780	8,7	
3000	5	27,3	22,6	1971	4,3	18,9	14,1	2436	6,8	
3000	10	30,4	20,6	1798	3,7	22,0	12,1	2091	5,2	
3000	15	33,4	18,6	1624	3,0	25,0	10,1	1745	3,7	

ROWS 4R	Air		Water 70/60°C				Water 45/40°C			
	Volume m³/h	T. in °C	T. out °C	Power kW	Delivery dm³/h	Δp W KPa	T. out °C	Power kW	Delivery dm³/h	Δp W KPa
	3000	-10	40,7	51,2	4472	16,9	25,4	35,7	6179	32,7
3000	-5	42,3	47,7	4171	14,8	26,9	32,3	5582	27,1	
3000	0	43,8	44,3	3868	12,9	28,5	28,8	4984	21,9	
3000	5	45,4	40,8	3566	11,1	30,1	25,4	4387	17,3	
3000	10	47	37,3	3264	9,4	31,7	21,9	3784	13,2	
3000	15	48,5	33,9	2959	7,8	33,2	18,4	3183	9,6	

## TVL-DD 40

ROWS 2R	Air		Water 70/60°C				Water 45/40°C			
	Volume m³/h	T. in °C	T. out °C	Power kW	Delivery dm³/h	Δp W KPa	T. out °C	Power kW	Delivery dm³/h	Δp W KPa
	4000	-10	17,9	37,6	3286	12,8	9,6	26,4	4571	25,2
4000	-5	21,0	35,0	3062	11,3	12,7	23,9	4124	20,8	
4000	0	24,1	32,5	2838	9,8	15,8	21,3	3676	16,8	
4000	5	27,2	29,9	2612	8,4	18,9	18,7	3227	13,2	
4000	10	30,3	27,3	2385	7,1	21,9	16,1	2776	10,0	
4000	15	33,3	24,7	2158	5,9	25,0	13,4	2323	7,2	

ROWS 4R	Air		Water 70/60°C				Water 45/40°C			
	Volume m³/h	T. in °C	T. out °C	Power kW	Delivery dm³/h	Δp W KPa	T. out °C	Power kW	Delivery dm³/h	Δp W KPa
	4000	-10	39,0	65,9	5762	7,6	24,3	46,1	7978	14,9
4000	-5	40,6	61,4	5367	6,7	25,9	41,6	7196	12,3	
4000	0	42,3	56,9	4973	5,8	27,5	37,1	6415	9,9	
4000	5	43,9	52,4	4577	5,0	29,2	32,6	5632	7,8	
4000	10	45,5	47,8	4181	4,2	30,8	28,0	4847	5,9	
4000	15	47,1	43,3	3783	3,5	32,4	23,5	4060	4,2	



EFFICIENCY COOLING COILS

Coil performance in cooling mode at rated flow with different air and water inlet temperatures.

TVL-DD 10

ROWS 4R	Air			Water 7/12°C					Water 8/13°C				
	Volume m³/h	T. in °C	U.R. %	T. out °C	Power kW	S/T	Delivery dm³/h	Δp W KPa	T. out °C	Power kW	S/T	Delivery dm³/h	Δp W KPa
	1000	35	60	17,5	13,8	0,4	2376	12,1	18,2	13,1	0,4	2259	11,0
	1000	32	50	15,9	9,1	0,6	1559	5,6	16,6	8,4	0,6	1447	4,8
	1000	28	50	14,7	6,2	0,7	1060	2,7	15,3	5,6	0,8	966	2,3
	1000	26	50	14,1	5,0	0,8	850	1,8	14,7	4,5	0,8	771	1,5

ROWS 6R	Air			Water 7/12°C					Water 8/13°C				
	Volume m³/h	T. in °C	U.R. %	T. out °C	Power kW	S/T	Delivery dm³/h	Δp W KPa	T. out °C	Power kW	S/T	Delivery dm³/h	Δp W KPa
	1000	35	60	14,9	16,3	0,4	2798	10,9	15,7	15,5	0,4	2670	10,0
	1000	32	50	13,6	10,8	0,6	1861	5,2	14,5	10,1	0,6	1733	4,5
	1000	28	50	12,7	7,58	0,7	1307	2,7	13,5	6,9	0,7	1190	2,3
	1000	26	50	12,2	6,2	0,8	1066	1,9	13,0	5,6	0,8	962	1,5

TVL-DD 15

ROWS 4R	Air			Water 7/12°C					Water 8/13°C				
	Volume m³/h	T. in °C	U.R. %	T. out °C	Power kW	S/T	Delivery dm³/h	Δp W KPa	T. out °C	Power kW	S/T	Delivery dm³/h	Δp W KPa
	1500	35	60	17,5	13,8	0,4	2376	12,1	20,1	16,9	0,5	2901	17,4
	1500	32	50	17,4	11,6	0,6	1995	8,8	18,2	10,5	0,7	1806	7,3
	1500	28	50	15,9	7,9	0,8	1359	4,3	16,6	7,1	0,8	1220	3,5
	1500	26	50	15,1	6,4	0,9	1101	2,9	15,7	5,8	0,9	997	2,4

ROWS 6R	Air			Water 7/12°C					Water 8/13°C				
	Volume m³/h	T. in °C	U.R. %	T. out °C	Power kW	S/T	Delivery dm³/h	Δp W KPa	T. out °C	Power kW	S/T	Delivery dm³/h	Δp W KPa
	1500	35	60	16,9	21,6	0,4	3705	18,4	17,6	20,5	0,4	3523	16,6
	1500	32	50	15,2	14,2	0,6	2438	8,5	15,9	13,3	0,6	2277	7,4
	1500	28	50	13,9	9,9	0,7	1710	4,4	14,5	9,1	0,8	1569	3,8
	1500	26	50	13,2	8,2	0,7	1408	3,1	13,8	7,5	0,8	1281	2,6

## EFFICIENCY COOLING COILS

## TVL-DD 20

ROWS 4R	Air			Water 7/12°C					Water 8/13°C				
	Volume m³/h	T. in °C	U.R. %	T. out °C	Power kW	S/T	Delivery dm³/h	Δp W KPa	T. out °C	Power kW	S/T	Delivery dm³/h	Δp W KPa
	2000	35	60	20,9	21,0	0,5	3615	26,4	21,4	19,9	0,5	3423	23,7
	2000	32	50	18,7	13,3	0,7	2287	11,3	19,1	12,4	0,7	2130	9,8
	2000	28	50	16,9	9,2	0,8	1573	5,7	17,4	8,4	0,9	1446	4,8
	2000	26	50	15,9	7,6	0,9	1303	4,0	16,5	6,8	0,9	1177	3,3

ROWS 6R	Air			Water 7/12°C					Water 8/13°C				
	Volume m³/h	T. in °C	U.R. %	T. out °C	Power kW	S/T	Delivery dm³/h	Δp W KPa	T. out °C	Power kW	S/T	Delivery dm³/h	Δp W KPa
	2000	35	60	18,3	25,9	0,4	4455	25,9	18,9	24,6	0,5	4231	23,4
	2000	32	50	16,2	17,0	0,6	2926	11,9	16,8	15,9	0,7	2728	10,4
	2000	28	50	14,7	12,0	0,8	2057	6,2	15,3	11,0	0,8	1885	5,3
	2000	26	50	13,9	9,9	0,8	1697	4,3	14,4	9,0	0,9	1547	3,6

## TVL-DD 30

ROWS 4R	Air			Water 7/12°C					Water 8/13°C				
	Volume m³/h	T. in °C	U.R. %	T. out °C	Power kW	S/T	Delivery dm³/h	Δp W KPa	T. out °C	Power kW	S/T	Delivery dm³/h	Δp W KPa
	3000	35	60	21,3	30,2	0,5	5198	26,8	21,8	28,6	0,5	4918	24,1
	3000	32	50	19,0	19,1	0,7	3288	11,6	19,5	17,8	0,7	3060	10,1
	3000	28	50	17,1	13,2	0,8	2263	5,8	17,6	12,1	0,9	2082	5,0
	3000	26	50	16,1	10,9	0,9	1877	4,2	16,8	9,9	0,9	1700	3,5

ROWS 6R	Air			Water 7/12°C					Water 8/13°C				
	Volume m³/h	T. in °C	U.R. %	T. out °C	Power kW	S/T	Delivery dm³/h	Δp W KPa	T. out °C	Power kW	S/T	Delivery dm³/h	Δp W KPa
	3000	35	60	18,6	37,7	0,5	6480	34,9	19,2	35,8	0,5	6154	31,6
	3000	32	50	16,5	24,8	0,6	4263	16,1	17,1	23,1	0,7	3975	14,1
	3000	28	50	14,9	17,5	0,8	3005	8,5	15,4	16,0	0,8	2757	7,2
	3000	26	50	14,1	14,5	0,8	2486	6,0	14,6	13,2	0,9	2265	5,0

## TVL-DD 40

ROWS 4R	Air			Water 7/12°C					Water 8/13°C				
	Volume m³/h	T. in °C	U.R. %	T. out °C	Power kW	S/T	Delivery dm³/h	Δp W KPa	T. out °C	Power kW	S/T	Delivery dm³/h	Δp W KPa
	4000	35	60	21,9	37,5	0,5	6449	11,3	22,4	35,4	0,5	6084	10,1
	4000	32	50	19,6	23,4	0,7	4015	4,7	20,0	21,6	0,8	3722	4,1
	4000	28	50	17,7	15,9	0,9	2740	2,4	18,3	14,2	0,9	2448	1,9
	4000	26	50	16,9	13,0	0,9	2235	1,6	17,4	11,9	1,0	2053	1,4

ROWS 6R	Air			Water 7/12°C					Water 8/13°C				
	Volume m³/h	T. in °C	U.R. %	T. out °C	Power kW	S/T	Delivery dm³/h	Δp W KPa	T. out °C	Power kW	S/T	Delivery dm³/h	Δp W KPa
	4000	35	60	19,5	46,5	0,5	7995	12,7	20,1	44,0	0,5	7564	11,4
	4000	32	50	17,3	30,0	0,7	5155	5,6	17,9	27,6	0,7	4740	4,8
	4000	28	50	15,7	20,7	0,8	3562	2,8	16,2	19,0	0,8	3273	2,4
	4000	26	50	14,8	17,1	0,9	2932	2,0	15,3	15,6	0,9	2678	1,6



FAN PERFORMANCE

Residual pressure available at the fans at different speeds and with different coils.

TVL-DD 10

Model		Outlet fan (BAC 2R)			Outlet fan (BAC 4R)			Outlet fan (BAF 4R)			Outlet fan (BAF 6R)		
Flow-rate	Air vel.	Available static pressure (Pa)			Available static pressure (Pa)			Available static pressure (Pa)			Available static pressure (Pa)		
m <sup>3</sup> /h	m/s	Vel. 1°	Vel. 2°	Vel. 3°	Vel. 1°	Vel. 2°	Vel. 3°	Vel. 1°	Vel. 2°	Vel. 3°	Vel. 1°	Vel. 2°	Vel. 3°
500	0,57	230	212	183	228	210	181	223	205	176	218	200	171
600	0,68	224	201	161	221	198	158	215	192	152	208	185	145
700	0,80	215	180	135	211	176	131	203	168	123	195	160	115
800	0,91	209	169	104	204	164	99	195	155	90	184	144	79
900	1,03	201	153	-	195	147	-	184	136	-	171	123	-
1000	1,14	196	119	-	189	112	-	176	99	-	161	84	-
1100	1,25	189	-	-	181	-	-	165	-	-	148	-	-
1200	1,37	180	-	-	170	-	-	153	-	-	133	-	-
1300	1,48	154	-	-	143	-	-	123	-	-	101	-	-

TVL-DD 15

Model		Outlet fan (BAC 2R)			Outlet fan (BAC 4R)			Outlet fan (BAF 4R)			Outlet fan (BAF 6R)		
Flow-rate	Air vel.	Available static pressure (Pa)			Available static pressure (Pa)			Available static pressure (Pa)			Available static pressure (Pa)		
m <sup>3</sup> /h	m/s	Vel. 1°	Vel. 2°	Vel. 3°	Vel. 1°	Vel. 2°	Vel. 3°	Vel. 1°	Vel. 2°	Vel. 3°	Vel. 1°	Vel. 2°	Vel. 3°
900	1,03	318	308	223	312	302	217	301	291	206	288	278	193
1050	1,20	312	290	182	304	282	174	289	267	159	274	252	144
1200	1,37	322	270	-	312	260	-	295	243	-	275	223	-
1350	1,54	318	246	-	306	234	-	286	214	-	268	196	-
1500	1,71	304	-	-	290	205	-	266	181	-	245	160	-
1650	1,88	289	-	-	273	-	-	245	-	-	221	-	-
1800	2,05	262	-	-	243	-	-	212	-	-	184	-	-
1950	2,22	220	-	-	199	-	-	163	-	-	132	-	-

TVL-DD 20

Model		Outlet fan (BAC 2R)			Outlet fan (BAC 4R)			Outlet fan (BAF 4R)			Outlet fan (BAF 6R)		
Flow-rate	Air vel.	Available static pressure (Pa)			Available static pressure (Pa)			Available static pressure (Pa)			Available static pressure (Pa)		
m <sup>3</sup> /h	m/s	Vel. 1°	Vel. 2°	Vel. 3°	Vel. 1°	Vel. 2°	Vel. 3°	Vel. 1°	Vel. 2°	Vel. 3°	Vel. 1°	Vel. 2°	Vel. 3°
1000	1,14	327	277	137	320	270	130	307	257	117	292	242	102
1200	1,37	290	235	-	280	225	-	263	208	-	243	188	-
1400	1,60	267	202	-	255	190	-	233	168	-	214	149	-
1600	1,82	260	195	-	244	179	-	218	153	-	195	130	-
1800	2,05	262	-	-	243	118	-	212	87	-	184	59	-
2000	2,28	257	-	-	235	-	-	208	-	-	166	-	-
2200	2,51	211	-	-	186	-	-	154	-	-	105	-	-

## FAN PERFORMANCE

## TVL-DD 30

Model		Outlet fan (BAC 2R)			Outlet fan (BAC 4R)			Outlet fan (BAF 4R)			Outlet fan (BAF 6R)		
Flow-rate	Air vel.	Available static pressure (Pa)			Available static pressure (Pa)			Available static pressure (Pa)			Available static pressure (Pa)		
m <sup>3</sup> /h	m/s	Vel. 1°	Vel. 2°	Vel. 3°	Vel. 1°	Vel. 2°	Vel. 3°	Vel. 1°	Vel. 2°	Vel. 3°	Vel. 1°	Vel. 2°	Vel. 3°
<b>1000</b>	<b>0,84</b>	345	325	290	340	320	285	332	312	277	323	303	268
<b>1500</b>	<b>1,26</b>	308	301	223	299	292	214	284	277	199	267	260	182
<b>2000</b>	<b>1,67</b>	292	272	177	278	258	163	255	235	140	234	214	119
<b>2500</b>	<b>2,09</b>	296	238	-	277	219	-	245	187	-	216	158	-
<b>3000</b>	<b>2,51</b>	266	181	-	241	156	-	209	124	-	160	75	-
<b>3250</b>	<b>2,72</b>	243	-	-	214	84	-	178	48	-	124	-	-
<b>3500</b>	<b>2,93</b>	216	-	-	183	-	-	143	-	-	81	-	-

## TVL-DD 40

Model		Outlet fan (BAC 2R)			Outlet fan (BAC 4R)			Outlet fan (BAF 4R)			Outlet fan (BAF 6R)		
Flow-rate	Air vel.	Available static pressure (Pa)			Available static pressure (Pa)			Available static pressure (Pa)			Available static pressure (Pa)		
m <sup>3</sup> /h	m/s	Vel. 1°	Vel. 2°	Vel. 3°	Vel. 1°	Vel. 2°	Vel. 3°	Vel. 1°	Vel. 2°	Vel. 3°	Vel. 1°	Vel. 2°	Vel. 3°
<b>1500</b>	<b>0,99</b>	354	314	239	348	308	233	337	297	222	325	285	210
<b>2000</b>	<b>1,32</b>	315	265	125	306	256	116	290	240	100	275	225	85
<b>2500</b>	<b>1,65</b>	277	217	-	263	203	-	241	181	-	221	161	-
<b>3000</b>	<b>1,98</b>	250	185	-	232	167	-	210	145	-	176	111	-
<b>3500</b>	<b>2,31</b>	248	158	-	226	136	-	198	108	-	155	65	-
<b>4000</b>	<b>2,65</b>	234	-	-	207	-	-	172	-	-	120	-	-
<b>4500</b>	<b>2,98</b>	169	-	-	136	-	-	95	-	-	32	-	-

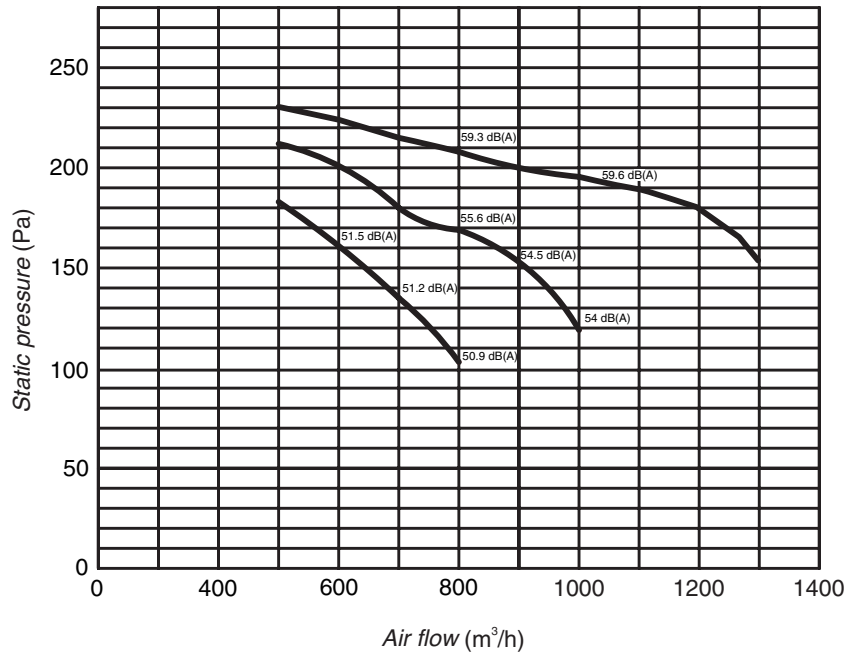
## SAMPLE ORDER

MODEL	CONFIGURATION	EXCHANGER	ACCESSORIES
<b>TVL 10 DD</b>	<b>H</b>	<b>4 COILS</b>	<b>MS, CP...</b>

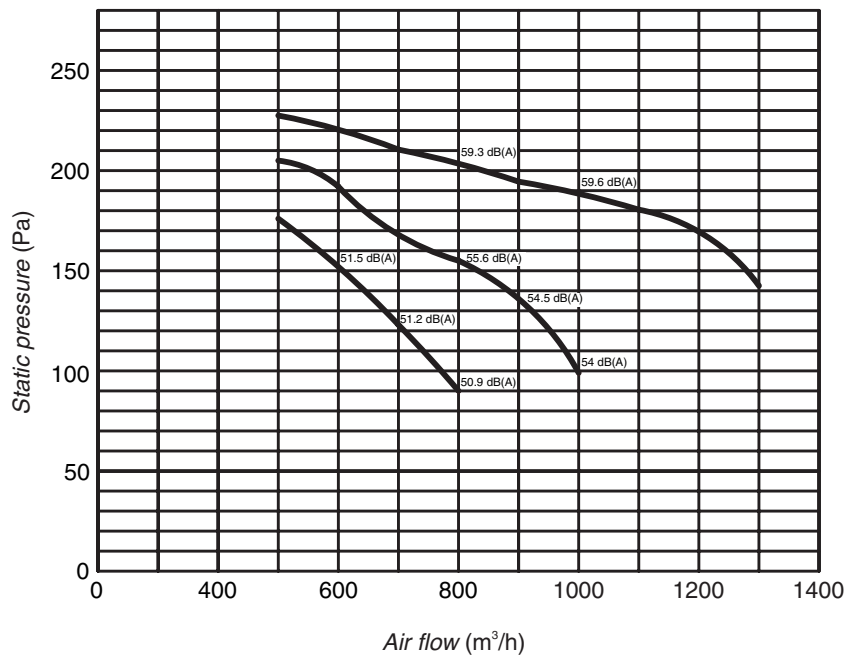


CHARACTERISTIC CURVES

TLV 10 + 2-row coil



TLV 10 + 4-row coil

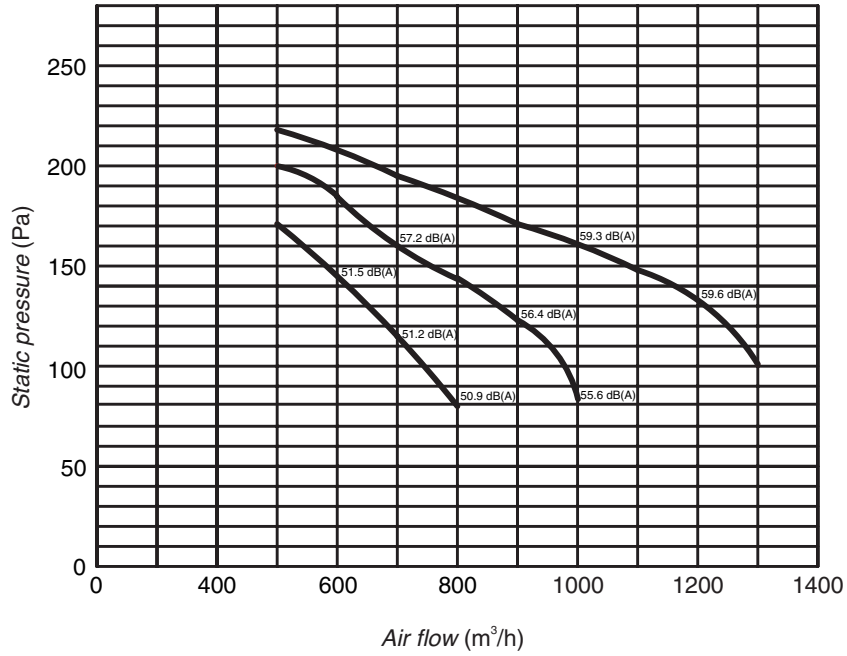


The curves take into consideration pressure drop due to the coil and the filters

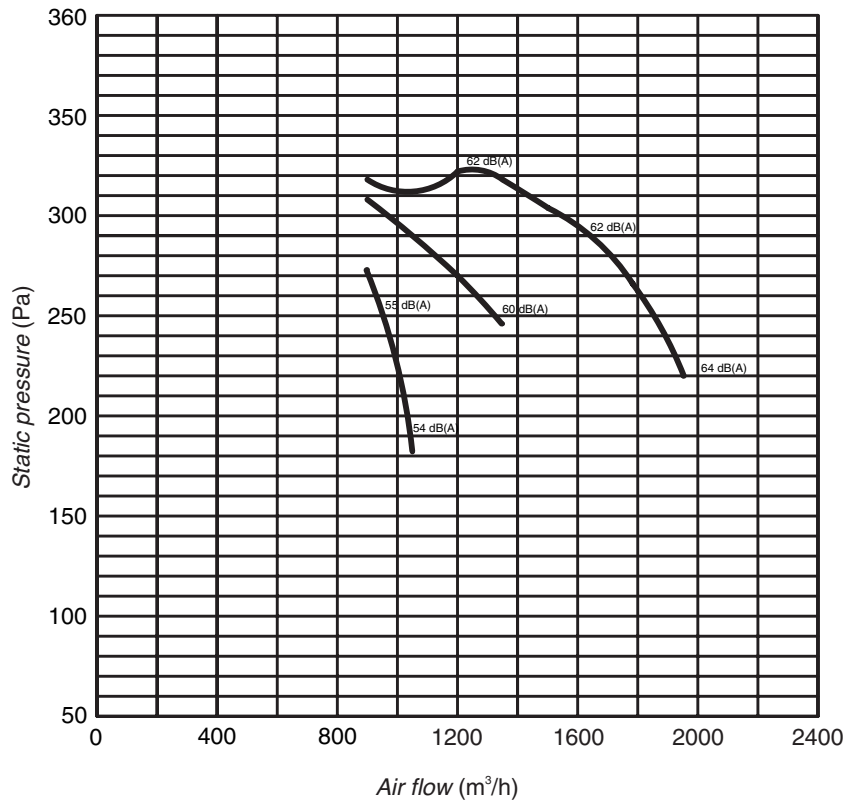


CHARACTERISTIC CURVES

**TLV 10 + 6-row coil**



**TLV 15 + 2-row coil**

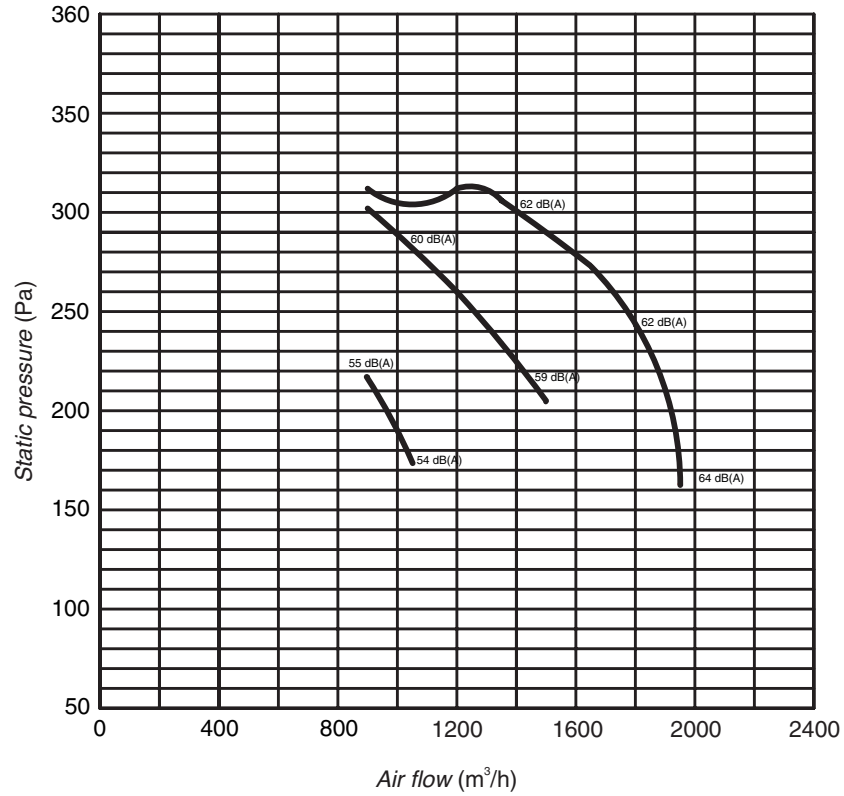


The curves take into consideration pressure drop due to the coil and the filters

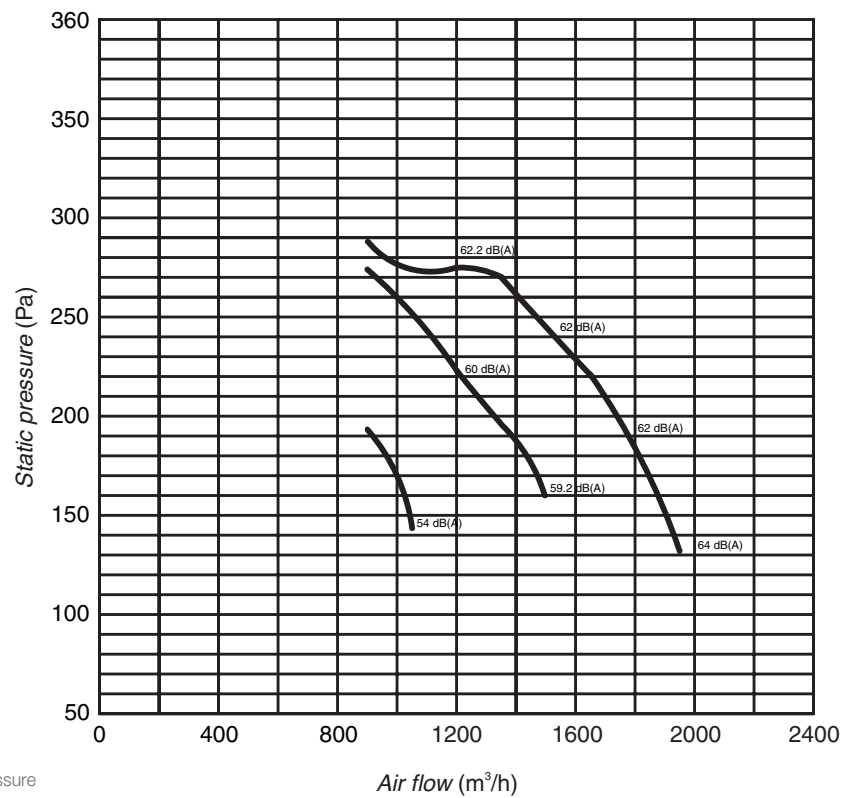


CHARACTERISTIC CURVES

TLV 15 + 4-row coil



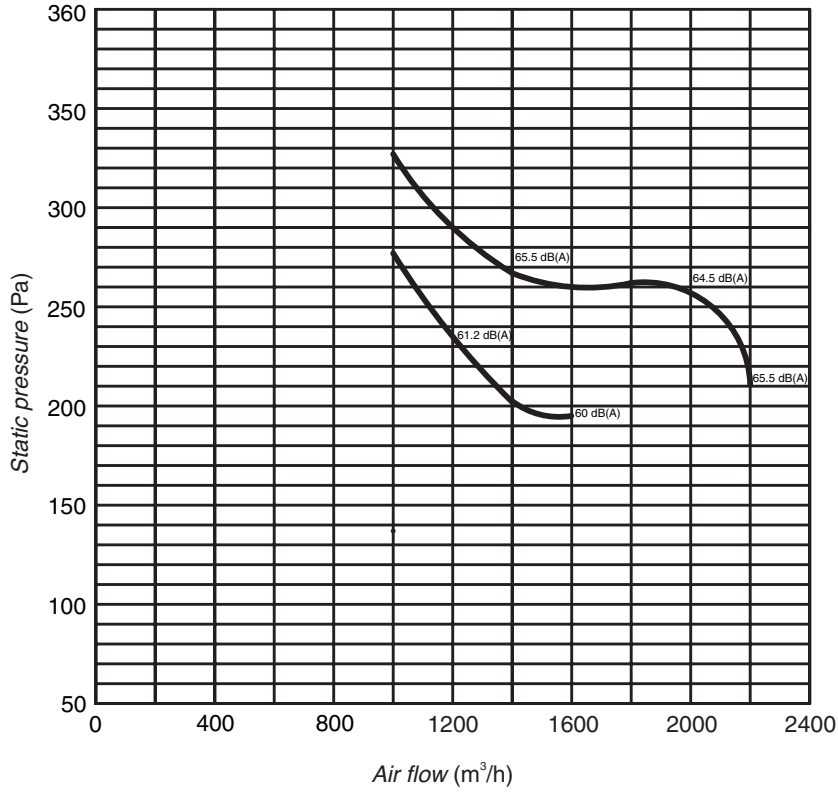
TLV 15 + 6-row coil



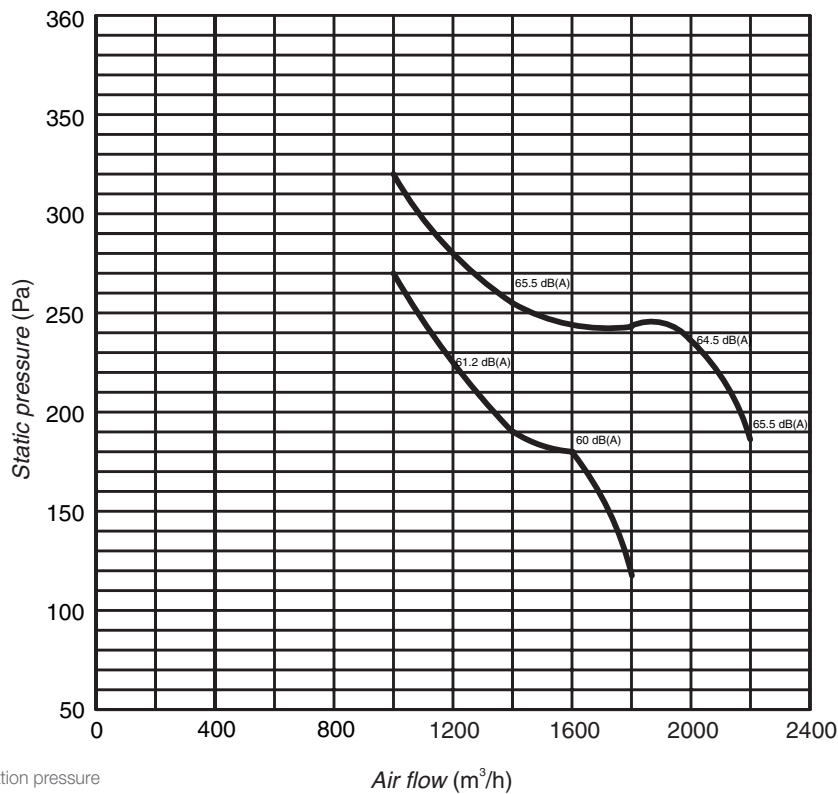
The curves take into consideration pressure drop due to the coil and the filters

CHARACTERISTIC CURVES

TLV 20 + 2-row coil



TLV 20 + 4-row coil

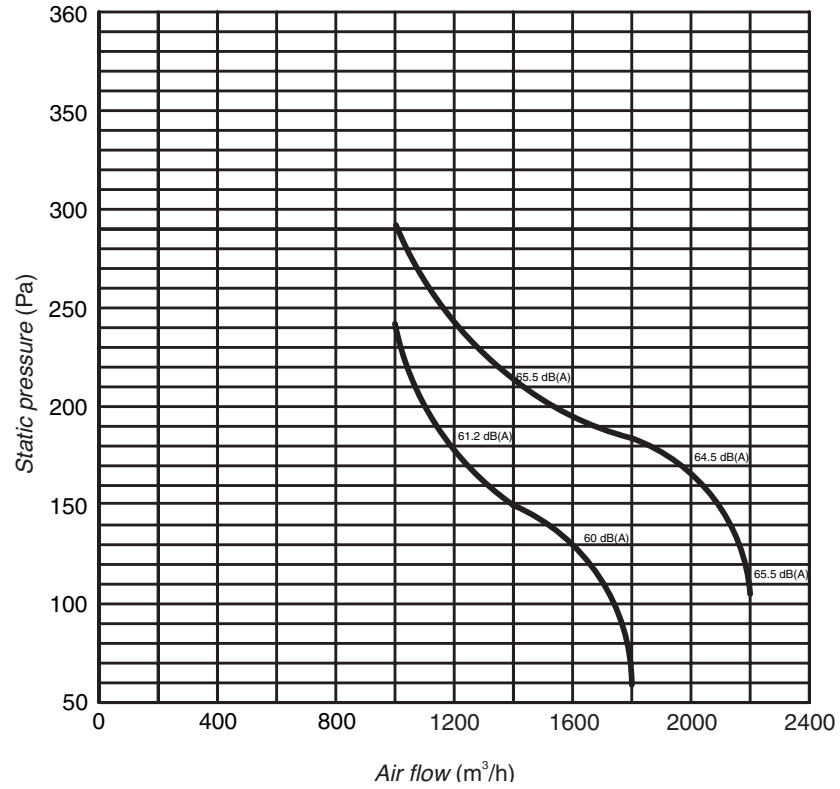


The curves take into consideration pressure drop due to the coil and the filters

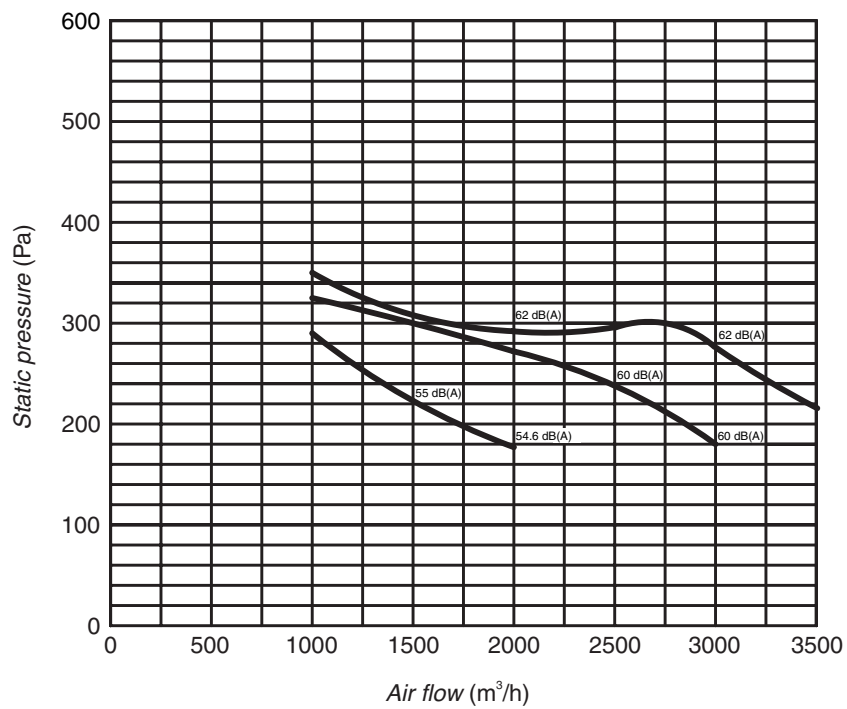


CHARACTERISTIC CURVES

TLV 20 + 6-row coil



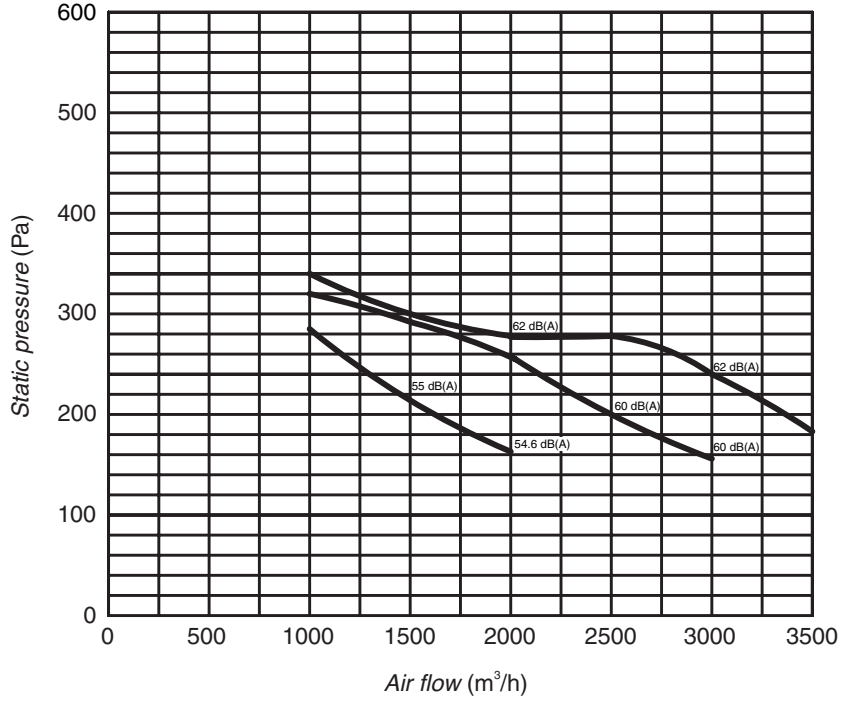
TLV 30 DD + 2-row coil



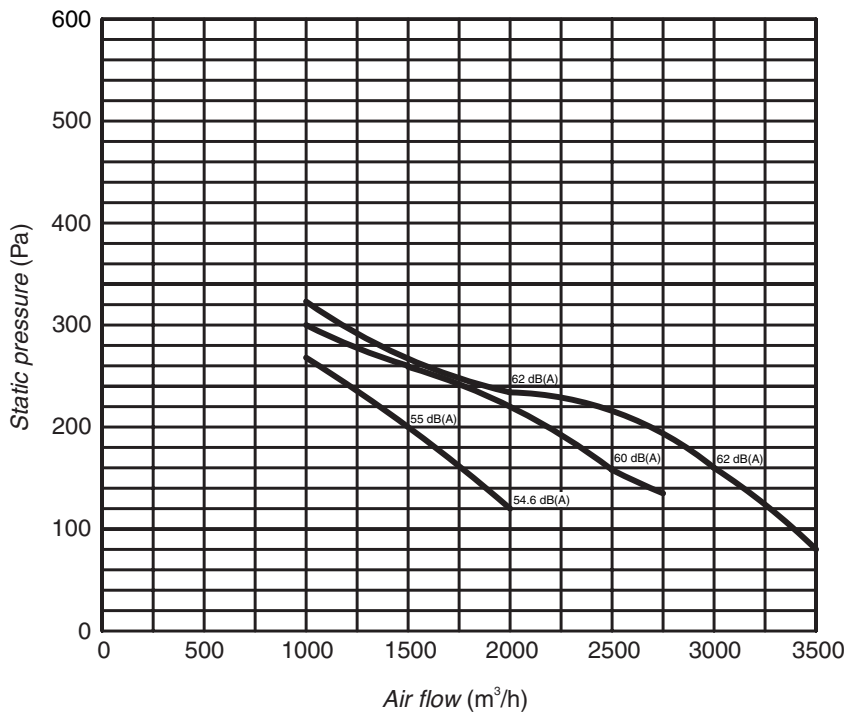
The curves take into consideration pressure drop due to the coil and the filters

CHARACTERISTIC CURVES

TLV 30 DD + 4-row coil



TLV 30 DD + 6-row coil

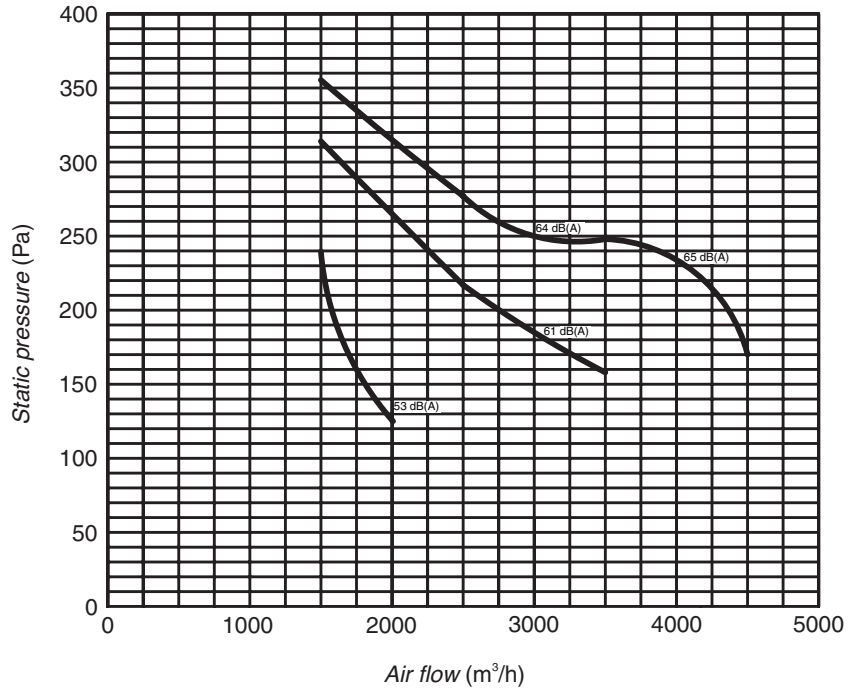


The curves take into consideration pressure drop due to the coil and the filters

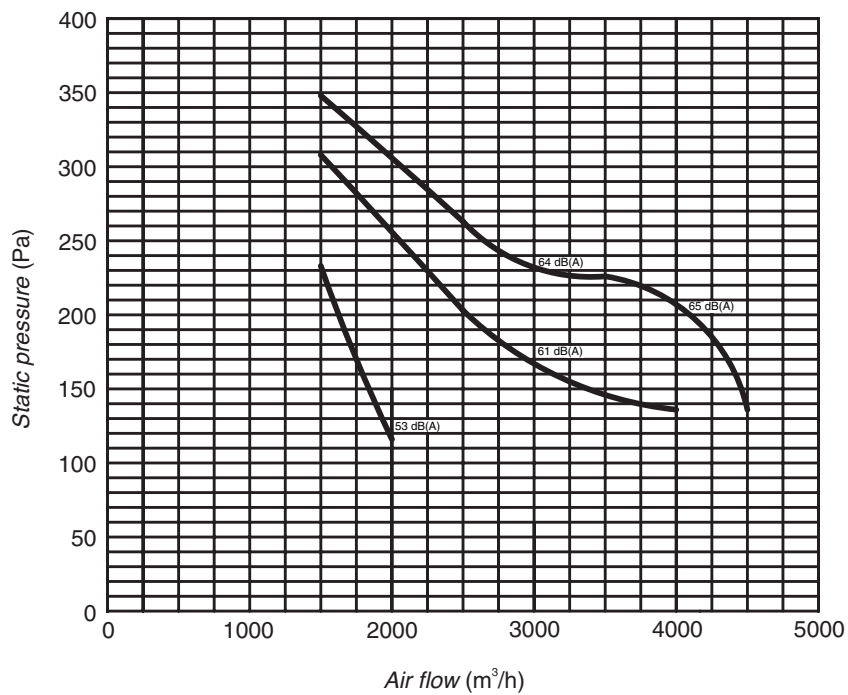


CHARACTERISTIC CURVES

TLV 40 DD + 2-row coil



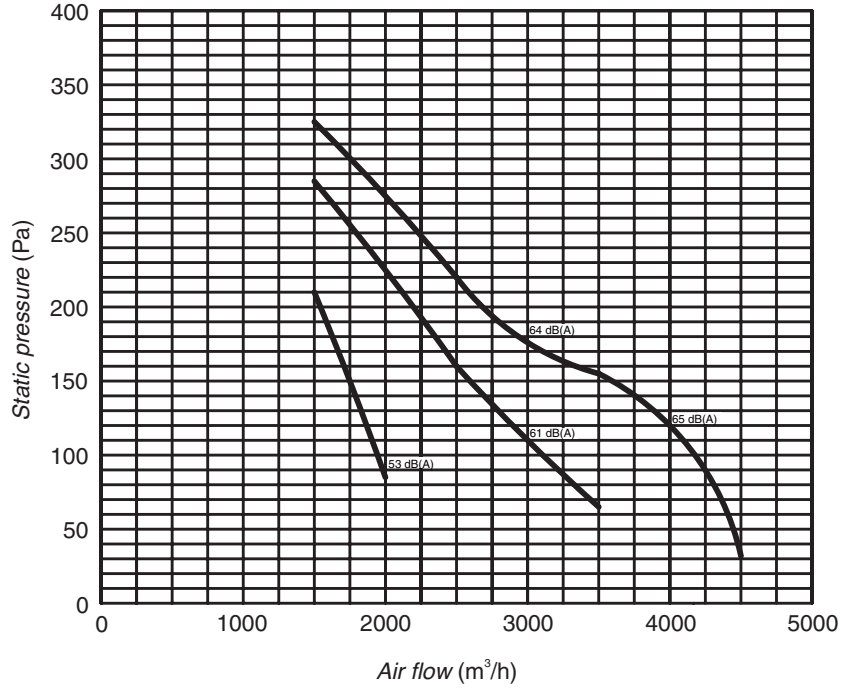
TLV 40 DD + 4-row coil



The curves take into consideration pressure drop due to the coil and the filters

CHARACTERISTIC CURVES

TLV 40 DD + 6-row coil

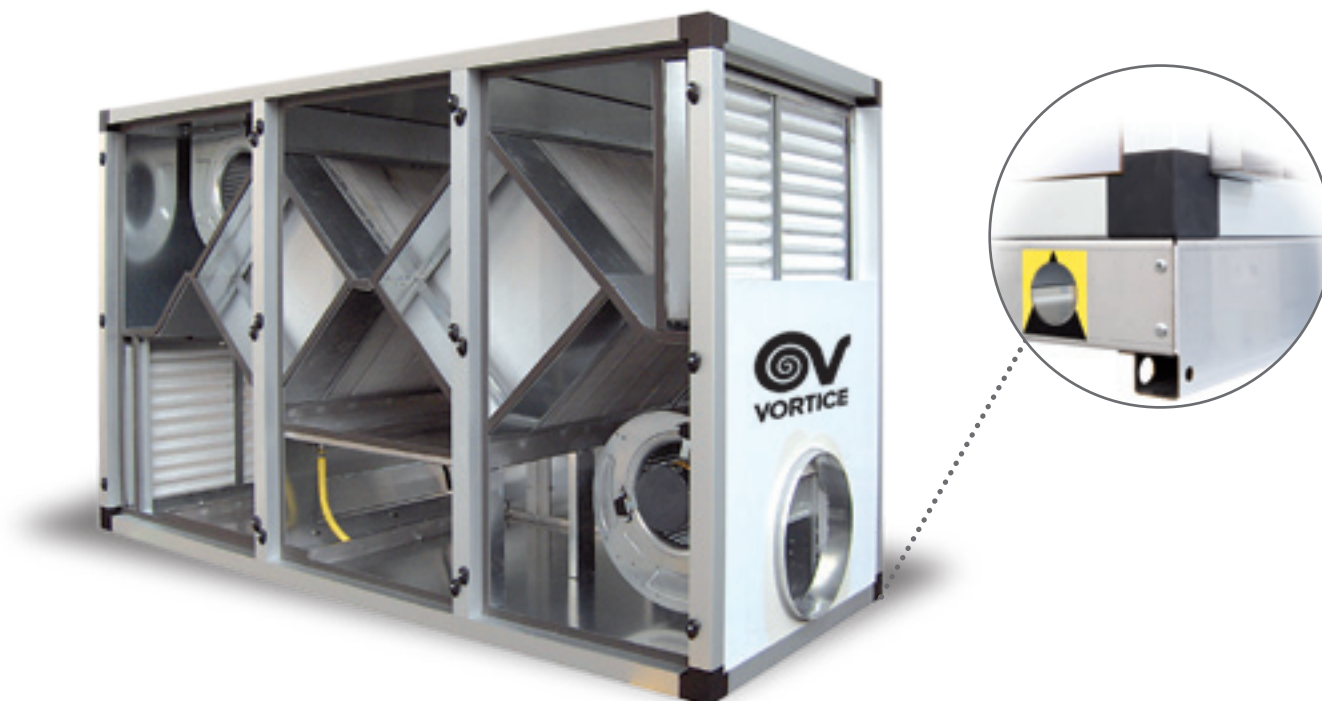


The curves take into consideration pressure drop due to the coil and the filters



# HRL

High efficiency units



## PRODUCT SPECIFICATIONS

- The HRL high efficiency energy recovery units are wdesigned for systems operating with 100% outside air, bringing cost savings while at the same time guaranteeing excellent air-conditioning performance in environments such as schools, offices, banks, swimming pools and public premises.
- Their main feature is the use of two static heat recovery units in series, made from aluminium or coated aluminium, ensuring significant savings in running costs by recovering energy that would otherwise be lost as heat, with efficiency exceeding 90%.
- There are 7 models, with range of flow-rates from 1,000 m<sup>3</sup>/h to 15,000 m<sup>3</sup>/h, offering extremely simple installation and flexibility.
- This series uses centrifugal fans directly coupled to the latest generation EC motors.

## KEY FEATURES

- **Base:** made from thick press formed galvanised sheet metal longitudinal members. These are fastened to the four sides of each section, with the unit resting on the ground on the shorter sides. Each base comes complete with suitably sized holes for inserting lifting bars. The type wof section bars and the thickness of the sheet metal used ensure high structural rigidity during transport and safety when handling on site.
- **Frame:** frame made using a modular system of extruded anodised aluminium alloy section bars (in accordance with UNI 9006/1), joined by die-cast aluminium corners.
- **Sandwich panels:** sandwich panels, insulated with polyurethane foam, density 40 kg/m, 48 mm thick.  
Construction:  
OUTSIDE SHELL  
Coated sheet metal (EN 10169)  
Hot galvanised steel base: reference standard EN 10327, Z100 coating. Standard protection involves application of a 25 micron dry film (tolerance  $\pm 3$  mm) on the top face and a 7/10 micron dry film on the bottom face, in accordance with EN 13523.  
Specifications:  
- Gloss 30/35  
- Condensation resistance 1000 h no blistering



- Resistance to salt spray 360 h no blistering
- Resistance to fluorescent UV light and water condensation  
2000 h UVA residual gloss 50% no blistering
- Min. surface hardness F
- Thicknesses available 6/10 mm

#### INSIDE SHELL

Galvanised sheet metal

DXD51-Z200 galvanised rolled sheet for cold forming and stamping (EN 10142). 6/10 mm thick. Specially treated sheet metal available on request, such as Peraluman or AISI 304/316 stainless steel.

- **Heat recovery units:** static heat recovery units featuring plate heat exchangers, cross flow and counterflow units. The use of these units brings significant savings in the running costs of air-conditioning systems by recovering energy that would otherwise be lost as heat. These units are made from aluminium or coated aluminium for aggressive environments. Efficiency exceeding 90%.
- **Middle efficiency filters:** middle efficiency or coarse filters are used as the first or second filter stage.

#### Filter class in accordance with EN 779-2002:

- G2 Weighted average efficiency  $\geq 65\%$
- G3 Weighted average efficiency  $\geq 80\%$
- G4 Weighted average efficiency  $\geq 90\%$

#### Type of filters

- G2 Corrugated mesh filter cells (stainless/galvanised steel)
- G3 Drum filter with progressive density synthetic media
- G4 Corrugated filter cells with synthetic media, galvanised steel frame, welded galvanised steel wire protective grill.

- **High efficiency filters:** high efficiency filters or fine filters are used as the second or final filter stage in places without specific needs. Also used as pre-filters for HEPA / ULPA.

#### Filter class in accordance with EN 779-2002:

- F5 Average dust spot efficiency  $\geq 40\%$
- F6 Average dust spot efficiency  $\geq 60\%$
- F7 Average dust spot efficiency  $\geq 80\%$
- F8 Average dust spot efficiency  $\geq 90\%$
- F9 Average dust spot efficiency  $\geq 95\%$

#### Type of filters

F5

- Corrugated filter cells with synthetic media, galvanised steel frame, welded galvanised steel wire protective grill. Recommended maximum pressure drop 200 Pa
- Soft pocket filters with large glass fibre filtering surface. Galvanised steel frame. Recommended maximum pressure drop 250 Pa F6 / F7 / F9 (fig. 2)

- Soft pocket filters with large glass fibre filtering surface. Galvanised steel frame Length 380 mm  
Upon request the filtering surface area can be increased by extending the length of the filter to 535 or 635 mm  
Recommended pressure drop 250 Pa
- Rigid glass fibre pocket filter, polypropylene/ABS frame. Recommended maximum pressure drop 250 Pa (fig. 1)

- **Fan:** impeller with 7 backward curved blades. Aluminium impellers, diameter 250 to 560. Driven by premium energy efficient motor with integrated EC technology. Features and specifications:

High power density, wide range with high efficiency, low noise levels. The technical advantages of these high efficiency centrifugal impellers are due to their construction, with optimised rotating diffuser.

- Index of protection IP 54
- Insulation class F
- Thermal class 155
- Max room temperature 60°C

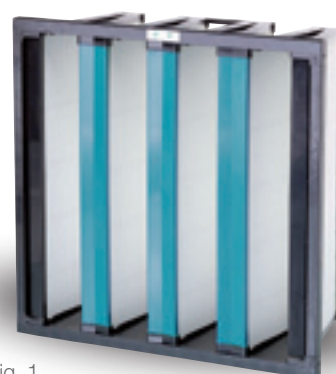


fig. 1



fig. 2



- Heat exchange coils** are the principal elements bringing about changes in air temperature and humidity. Heat exchange is indirect; a primary fluid such as hot or cold water, or hot or cold gas that flows through the coils interacts with the secondary fluid, in this case the process air.

The coils are finned tubes made from different materials with continuous fins featuring a collar to adjust and evenly space the fins.

The tubes are mechanically expanded to ensure perfect coupling between tube and fin and consequently perfect heat exchange.

The fins have a corrugated surface to ensure rigidity and create air turbulence, increasing the heat exchange coefficient.

All coils can be removed both from the side with fittings and the opposite side.

The heat exchanger construction materials are chosen based on the primary and secondary fluids; the following options are available:

Materials	Copper tube	Aluminium fins
	Copper tube	Copper fins
	Copper tube	Tinned copper fins
	Copper tube	Coated aluminium fins
	Iron tube	Aluminium fins
	Stainless steel tube	Aluminium fins
	Stainless steel tube	Stainless steel fins

Configurations	PT 60		60x30 ø 5/8 tube					
		PT 30	30x30 ø 5/8 tube					
	PT 30	30x26 ø 3/8 tube						
	PT 40	40x30 ø 5/8 tube						
Fin pitch	mm	1,8	2,0	2,5	3,0	4,0	5,0	6,0

- Operation**

Hot water

Cold water

Superheated water

Steam

Direct expansion of Freon

Condensation of Freon

The number of rows, circuit configuration and materials can be easily determined using the VORTICE selection program and with the help of the company's technical department.

When sizing the unit, as well as air velocity, a number of minimum and maximum limits also been to be taken into account, based on experience and practical considerations.



## TECHNICAL DATA

MODEL	HRL	20	30	40	60	90	120	150
Air flow rate m <sup>3</sup> /h	2000	3000	4000	6000	9000	12000	15000	
External Static pressure (Δ)	Pa	402	494	951	785	548	860	546
Sound power level (*)	dB(A)	86	84	86	89	88	89	90

EFFICIENCY	HRL	20	30	40	60	90	120	150
Winter Efficiency (♣)	%	91,3	90,9	91,9	91,3	90,1	90,2	91,5
Heating recovery capacity	kW	19,6	29,2	39,4	58,6	86,9	115,9	147,0
Supply air temperature	°C	19,2	19,1	19,4	19,2	18,8	18,8	19,3
Summer Efficiency (♣♣)	%	73,8	73,6	74,3	73,8	73,8	73,0	73,9
Heating recovery capacity	kW	2,0	3,0	4,0	5,9	8,9	11,7	14,8
Supply air temperature	°C	29,0	29,1	29,0	29,0	29,1	29,1	29,0
RH of conditioned air	%	59,2	59,2	59,3	59,2	59,1	59,1	59,2

FAN	HRL	20	30	40	60	90	120	150
N. of fans	n°	2	2	2	2	2	4	4
Total Power input	kW	2x0,9	2x1,35	2x2,5	2x3,6	2x3,8	4x3,6	4x3,6
Max absorbed current	A	2x3,9	2x6,9	2x4,0	2x5,8	2x6,1	4x5,8	4x5,8
Enclosure protection	IP	54	54	54	54	54	54	54
Insulation class		F	F	F	F	F	F	F
Electrical supply	V / ph / Hz	220/1/50			380/3/50			

FILTER	HRL	20	30	40	60	90	120	150
Classification in accord. with EN 779		G4	G4	G4	G4	G4	G4	G4
Efficiency	%	90	90	90	90	90	90	90

2R hot water coil (α)	HRL	20	30	40	60	90	120	150
Heating capacity	kW	10,8	16,1	23,4	35,8	57,1	73,7	85,6
Supply air temperature	°C	34,0	34,1	36,8	35,5	36,8	36,3	34,5
Water flow	dm <sup>3</sup> /h	943	1428	2224	3138	5003	6463	7322
Water pressure drop	kPa	5,1	9,5	4,9	7,6	9,4	5,9	6,8
Connection diameter	Gas	3/4"	3/4"	1"	1"	1" 1/4	1" 1/2	1" 1/2

4R hot water coil (β)	HRL	20	30	40	60	90	120	150
Cooling capacity	kW	10,7	16,0	23,1	30,1	49,1	68,4	76,9
Supply air temperature	°C	18,0	18,0	17,5	18,4	17,9	17,6	18,4
Supply air humidity	%	93,2	93,0	94,0	92,8	93,6	93,6	92,1
Water flow	dm <sup>3</sup> /h	1842	2793	3698	5171	8439	11759	13217
Water pressure drop	kPa	11,2	11,5	14,8	8,0	10,8	23,1	28,6
Connection diameter	Gas	1"	1"	1"	1" 1/4	1" 1/2	1" 1/2	2" 1/2

(♣) Air inlet -10°C, UR 80%; exhaust air 22°C, UR 50%.

(♣♣) Air inlet 32°C, UR 50%; exhaust air 28°C, UR 50%.

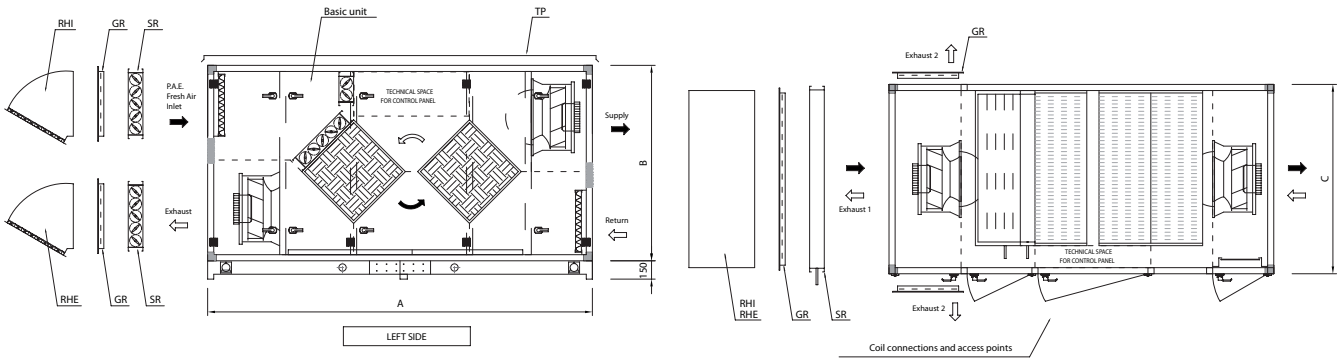
(\*) Sound power level: data referred to 1,0 metres from inlet in free field. The actual operation noise level generally differs from the values shown in the table, depending on operating conditions, reflected noise and surrounding noise.

(Δ) E.S.P. considering the pressure drops of plate heat recovery, panel filters and damper/ Referred to the fan.

(α) Air inlet 18°C; Water 70/60°C

(β) Air inlet 28°C, UR 60%; Water 7/12°C

## UNIT DIMENSIONS AND WEIGHTS

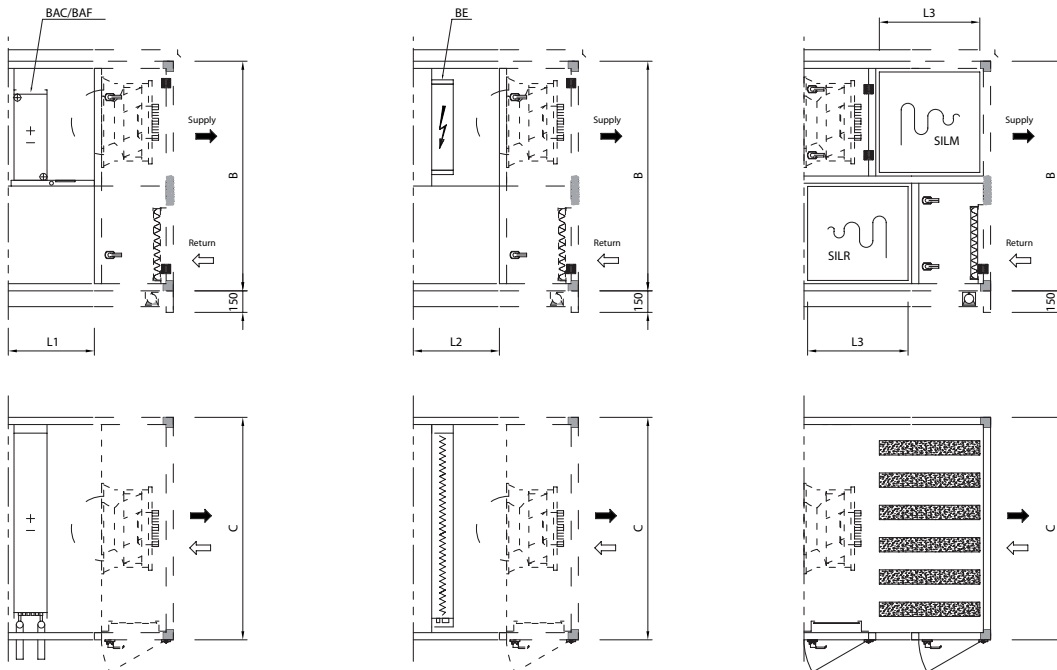


MODEL		20	30	40	60	90	120	150
A	mm	2350 *	2350 *	3200	3200	4200	4200	4550
B	mm	1550	1550	1450	1600	1800	1800	2050
C	mm	800	1050	1300	1550	1800	2300	2300
	kg	427	505	673	831	1318	1619	1812

MODEL		20	30	40	60	90	120	150
L1	mm	500	500	500	500	500	500	500
L2	mm	300	300	300	300	300	300	300
L3	mm	**	**	**	**	**	**	**

\* with bag filters: A=2450 mm

\*\* dimension varies based on the length of the silencer used



## AVAILABLE ACCESSORIES

<b>BAC/BAF</b>	Heating/cooling coil.
<b>BE</b>	Electric coil with tubular heater and three-phase power supply.
<b>SILR</b>	Intake silencer (dimensions available: length 700 / 950 mm).
<b>SILM</b>	Outlet silencer (dimensions available: length 700 / 950 mm).
<b>TP</b>	Coated sheet metal rain cover.
<b>SR</b>	Control damper with motor drive shaft.
<b>GR</b>	Grill with fixed aluminium blades.
<b>RHI</b>	Rain hood on fresh air inlet made from galvanised sheet metal with bird netting.
<b>RHE</b>	Rain hood on exhaust air outlet made from galvanised sheet metal with bird netting.
<b>MS</b>	Safety microswitch.

Frequency (Hz)		63	125	250	500	1000	2000	4000	8000
<b>Silencers Length [L3]</b>	700 mm	6	10	14	23	32	26	20	15
	950 mm	9	14	25	42	39	37	31	21



HEAT RECOVERY UNIT PERFORMANCE

Heat recovery unit performance at rated flow and different temperatures.

HRL 20

Flow-rate	Inside air		Fresh air		Conditioned air		Efficiency	Capacity	
	m <sup>3</sup> /h	°C	UR	°C	UR %	°C	UR	%	kW
<b>1000</b>	22	50%	50%	-15	80%	20,3	5,6	95,5	11,8
<b>1000</b>	22	50%	50%	-10	80%	20,0	0,9	93,8	10,0
<b>1000</b>	22	50%	50%	-5	80%	19,7	14,0	91,4	8,3
<b>1000</b>	22	50%	50%	0	80%	19,2	22,0	87,5	6,4
<b>1000</b>	22	50%	50%	5	80%	18,7	32,3	80,7	4,6
<b>1500</b>	22	50%	50%	-15	80%	19,8	5,7	93,9	17,5
<b>1500</b>	22	50%	50%	-10	80%	19,6	9,1	92,4	14,8
<b>1500</b>	22	50%	50%	-5	80%	19,3	14,4	89,9	12,2
<b>1500</b>	22	50%	50%	0	80%	18,9	22,4	85,9	9,5
<b>1500</b>	22	50%	50%	5	80%	18,5	32,9	79,1	6,8
<b>2000w</b>	22	50%	50%	-15	80%	19,3	5,9	92,8	23,0
<b>2000</b>	22	50%	50%	-10	80%	19,2	9,3	91,3	19,6
<b>2000</b>	22	50%	50%	-5	80%	19,0	14,7	88,8	16,0
<b>2000</b>	22	50%	50%	0	80%	18,6	22,8	84,7	12,5
<b>2000</b>	22	50%	50%	5	80%	18,3	33,3	78,0	8,9

## HEAT RECOVERY UNIT PERFORMANCE

## HRL 30

Flow-rate	Inside air		Fresh air		Conditioned air		Efficiency	Capacity
	m <sup>3</sup> /h	°C	UR	°C	UR %	°C	UR	%
2000	22	50%	-15	80%	19,8	5,7	94,0	23,3
2000	22	50%	-10	80%	19,6	9,1	92,4	19,6
2000	22	50%	-5	80%	19,3	14,4	90,0	16,3
2000	22	50%	0	80%	18,9	22,4	86,0	12,7
2000	22	50%	5	80%	18,5	32,8	79,3	9,0
2500	22	50%	-15	80%	19,5	5,8	93,2	28,9
2500	22	50%	-10	80%	19,3	9,3	91,6	24,5
2500	22	50%	-5	80%	19,1	14,6	89,1	20,1
2500	22	50%	0	80%	18,7	22,6	85,2	15,7
2500	22	50%	5	80%	18,3	33,1	78,4	11,2
3000	22	50%	-15	80%	19,2	5,9	92,5	34,4
3000	22	50%	-10	80%	19,1	9,4	90,9	29,2
3000	22	50%	-5	80%	18,9	14,7	88,4	24,0
3000	22	50%	0	80%	18,6	22,9	84,4	18,6
3000	22	50%	5	80%	18,2	33,4	77,7	13,3

## HRL 40

Flow-rate	Inside air		Fresh air		Conditioned air		Efficiency	Capacity
	m <sup>3</sup> /h	°C	UR	°C	UR %	°C	UR	%
3500	22	50%	-15	80%	19,8	5,7	94,0	40,7
3500	22	50%	-10	80%	19,6	9,1	92,4	34,6
3500	22	50%	-5	80%	19,3	14,4	89,9	28,4
3500	22	50%	0	80%	18,9	22,4	86,0	22,2
3500	22	50%	5	80%	18,5	32,8	79,3	15,8
4000	22	50%	-15	80%	19,6	5,8	93,5	46,3
4000	22	50%	-10	80%	19,4	9,2	91,9	39,4
4000	22	50%	-5	80%	19,1	14,5	89,4	32,3
4000	22	50%	0	80%	18,8	22,5	85,5	25,2
4000	22	50%	5	80%	18,4	33,0	78,7	17,9
4500	22	50%	-15	80%	19,4	5,9	93,0	51,8
4500	22	50%	-10	80%	19,3	9,3	91,5	44,1
4500	22	50%	-5	80%	19,0	14,6	89,0	36,2
4500	22	50%	0	80%	18,7	22,7	85,0	28,2
4500	22	50%	5	80%	18,3	33,2	78,3	20,0



HEAT RECOVERY UNIT PERFORMANCE

Heat recovery unit performance at rated flow and different temperatures.

HRL 60

Flow-rate	Inside air		Fresh air		Conditioned air		Efficiency	Capacity	
	m <sup>3</sup> /h	°C	UR	°C	UR %	°C	UR	%	kW
5000	22	50%	50%	-15	80%	19,6	5,8	93,5	57,9
5000	22	50%	50%	-10	80%	19,4	9,2	91,9	49,2
5000	22	50%	50%	-5	80%	19,2	14,5	89,5	40,4
5000	22	50%	50%	0	80%	18,8	22,5	95,5	31,5
5000	22	50%	50%	5	80%	18,4	33,0	78,7	22,4
5500	22	50%	50%	-15	80%	19,5	5,8	93,2	63,5
5500	22	50%	50%	-10	80%	19,3	9,3	91,6	53,9
5500	22	50%	50%	-5	80%	19,0	14,6	89,1	44,3
5500	22	50%	50%	0	80%	18,7	22,6	85,2	34,5
5500	22	50%	50%	5	80%	18,3	33,1	78,4	24,5
6000	22	50%	50%	-15	80%	19,3	5,9	92,8	69,0
6000	22	50%	50%	-10	80%	19,2	9,3	91,3	58,6
6000	22	50%	50%	-5	80%	19,0	14,7	88,7	48,1
6000	22	50%	50%	0	80%	18,6	22,8	84,7	37,4
6000	22	50%	50%	5	80%	18,3	33,3	78,0	26,6

HRL 90

Flow-rate	Inside air		Fresh air		Conditioned air		Efficiency	Capacity	
	m <sup>3</sup> /h	°C	UR	°C	UR %	°C	UR	%	kW
7000	22	50%	50%	-15	80%	19,7	5,8	93,7	81,2
7000	22	50%	50%	-10	80%	19,5	9,2	92,1	69,1
7000	22	50%	50%	-5	80%	19,2	14,4	89,6	56,7
7000	22	50%	50%	0	80%	18,8	22,5	85,6	44,1
7000	22	50%	50%	5	80%	18,4	32,9	78,9	31,4
8000	22	50%	50%	-15	80%	19,3	5,9	92,6	91,8
8000	22	50%	50%	-10	80%	19,1	9,4	91,0	78,0
8000	22	50%	50%	-5	80%	18,9	14,7	88,5	64,0
8000	22	50%	50%	0	80%	18,6	22,8	84,6	49,8
8000	22	50%	50%	5	80%	18,2	33,4	77,8	35,4
9000	22	50%	50%	-15	80%	18,9	6,0	91,7	102,2
9000	22	50%	50%	-10	80%	18,8	9,6	90,1	86,9
9000	22	50%	50%	-5	80%	18,6	15,0	87,6	71,2
9000	22	50%	50%	0	80%	18,4	23,1	83,6	55,4
9000	22	50%	50%	5	80%	18,1	33,7	76,9	39,4



## HEAT RECOVERY UNIT PERFORMANCE

## HRL 120

Flow-rate	Inside air		Fresh air		Conditioned air		Efficiency	Capacity
	m <sup>3</sup> /h	°C	UR	°C	UR %	°C		
10000	22	50%	-15	80%	19,5	5,6	93,2	115,4
10000	22	50%	-10	80%	19,3	9,3	91,6	98,1
10000	22	50%	-5	80%	19,1	14,6	89,1	80,5
10000	22	50%	0	80%	18,7	22,6	85,2	62,7
10000	22	50%	5	80%	18,3	33,1	78,4	44,6
11000	22	50%	-15	80%	19,2	5,9	92,4	125,9
11000	22	50%	-10	80%	19,1	9,4	90,8	107,0
11000	22	50%	-5	80%	18,9	14,8	88,4	87,9
11000	22	50%	0	80%	18,6	22,9	84,4	68,3
11000	22	50%	5	80%	18,2	33,4	77,6	48,6
12000	22	50%	-15	80%	18,9	6,0	91,7	136,3
12000	22	50%	-10	80%	18,8	9,6	90,2	115,9
12000	22	50%	-5	80%	18,7	14,9	87,6	95,0
12000	22	50%	0	80%	18,4	23,1	83,7	73,9
12000	22	50%	5	80%	18,1	33,7	76,9	52,5

## HRL 150

Flow-rate	Inside air		Fresh air		Conditioned air		Efficiency	Capacity
	m <sup>3</sup> /h	°C	UR	°C	UR %	°C		
13000	22	50%	-15	80%	19,8	5,7	94,1	151,5
13000	22	50%	-10	80%	19,6	9,1	92,6	128,9
13000	22	50%	-5	80%	19,3	14,3	90,1	105,9
13000	22	50%	0	80%	19,0	22,3	86,2	82,5
13000	22	50%	5	80%	18,5	32,8	79,4	58,7
14000	22	50%	-15	80%	19,6	5,8	93,5	162,2
14000	22	50%	-10	80%	19,4	9,2	91,9	137,9
14000	22	50%	-5	80%	19,2	14,5	89,5	113,3
14000	22	50%	0	80%	18,8	22,5	85,6	88,2
14000	22	50%	5	80%	18,4	33,0	78,8	62,7
15000	22	50%	-15	80%	19,4	5,9	93,0	172,8
15000	22	50%	-10	80%	19,3	9,3	91,5	147,0
15000	22	50%	-5	80%	19,0	14,6	89,0	120,6
15000	22	50%	0	80%	18,7	22,7	85,0	93,5
15000	22	50%	5	80%	18,3	33,2	78,3	64,8



HEAT RECOVERY UNIT PERFORMANCE - VERIFICATION IN COOLING MODE

HRL 20

Flow-rate	Inside air		Fresh air		Conditioned air		Efficiency	Capacity
	m <sup>3</sup> /h	°C	UR	°C	UR %	°C	UR	%
1000	28	50%	30	50%	28,5	54,6	75,7	0,5
1000	28	50%	32	50%	29,0	59,6	75,7	1,0
1000	28	50%	35	50%	29,7	67,4	75,7	1,8
1000	26	50%	30	50%	27,0	59,6	75,7	1,0
1000	26	50%	32	50%	27,5	64,9	75,7	1,5
1000	26	50%	35	50%	28,2	73,6	75,7	2,3
1500	28	50%	30	50%	28,5	54,5	74,6	0,7
1500	28	50%	32	50%	29,0	59,3	74,6	1,5
1500	28	50%	35	50%	29,8	67,1	74,6	2,6
1500	26	50%	30	50%	27,0	59,5	74,6	1,5
1500	26	50%	32	50%	27,5	64,7	74,6	2,2
1500	26	50%	35	50%	28,3	73,2	74,6	3,4
2000	28	50%	30	50%	28,5	54,4	73,8	1,0
2000	28	50%	32	50%	29,0	59,2	73,8	2,0
2000	28	50%	35	50%	29,8	66,9	73,8	3,5
2000	26	50%	30	50%	27,0	59,3	73,8	2,0
2000	26	50%	32	50%	27,6	64,5	73,8	3,0
2000	26	50%	35	50%	28,4	72,9	73,8	4,4

HRL 30

Flow-rate	Inside air		Fresh air		Conditioned air		Efficiency	Capacity
	m <sup>3</sup> /h	°C	UR	°C	UR %	°C	UR	%
2000	28	50%	30	50%	28,5	54,5	74,7	1,0
2000	28	50%	32	50%	29,0	59,3	74,7	2,0
2000	28	50%	35	50%	29,8	67,1	74,7	3,5
2000	26	50%	30	50%	27,0	59,5	74,7	2,0
2000	26	50%	32	50%	27,5	64,7	74,7	3,0
2000	26	50%	35	50%	28,3	73,2	74,7	4,5
2500	28	50%	30	50%	28,5	54,5	74,1	1,2
2500	28	50%	32	50%	29,0	59,2	74,1	2,5
2500	28	50%	35	50%	29,8	67,0	74,1	4,3
2500	26	50%	30	50%	27,0	59,4	74,1	2,5
2500	26	50%	32	50%	27,6	64,6	74,1	3,7
2500	26	50%	35	50%	28,3	73,0	74,1	5,6
3000	28	50%	30	50%	28,5	54,4	73,6	1,5
3000	28	50%	32	50%	29,1	59,2	73,6	3,0
3000	28	50%	35	50%	29,9	66,8	73,6	5,2
3000	26	50%	30	50%	27,1	59,3	73,6	3,0
3000	26	50%	32	50%	27,6	64,4	73,6	4,4
3000	26	50%	35	50%	28,4	72,8	73,6	6,6

## HEAT RECOVERY UNIT PERFORMANCE - VERIFICATION IN COOLING MODE

## HRL 40

Flow-rate	Inside air		Fresh air		Conditioned air		Efficiency	Capacity
	m <sup>3</sup> /h	°C	UR	°C	UR %	°C		
3500	28	50%	30	50%	28,5	54,5	74,6	1,7
3500	28	50%	32	50%	29,0	59,3	74,6	3,5
3500	28	50%	35	50%	29,8	67,1	74,6	6,1
3500	26	50%	30	50%	27,0	59,5	74,6	3,5
3500	26	50%	32	50%	27,5	64,7	74,6	5,2
3500	26	50%	35	50%	28,3	73,2	74,6	7,9
4000	28	50%	30	50%	28,5	54,9	74,3	2,0
4000	28	50%	32	50%	29,0	59,3	74,3	4,0
4000	28	50%	35	50%	29,8	67,0	74,3	7,0
4000	26	50%	30	50%	27,0	59,4	74,3	4,0
4000	26	50%	32	50%	27,5	64,6	74,3	6,0
4000	26	50%	35	50%	28,3	73,0	74,3	9,0
4500	28	50%	30	50%	28,5	54,5	74,0	2,2
4500	28	50%	32	50%	29,0	59,5	74,0	4,5
4500	28	50%	35	50%	29,8	66,9	74,0	7,8
4500	26	50%	30	50%	27,0	59,4	74,0	4,5
4500	26	50%	32	50%	27,6	64,5	74,0	6,7
4500	26	50%	35	50%	28,3	72,9	74,0	10,0

## HRL 60

Flow-rate	Inside air		Fresh air		Conditioned air		Efficiency	Capacity
	m <sup>3</sup> /h	°C	UR	°C	UR %	°C		
5000	28	50%	30	50%	28,5	54,5	74,3	2,5
5000	28	50%	32	50%	29,0	59,3	74,3	5,0
5000	28	50%	35	50%	29,8	67,0	74,3	8,7
5000	26	50%	30	50%	27,0	59,4	74,3	5,0
5000	26	50%	32	50%	27,5	64,6	74,3	7,5
5000	26	50%	35	50%	28,3	73,1	74,3	11,2
5500	28	50%	30	50%	28,5	54,5	74,0	2,7
5500	28	50%	32	50%	29,0	59,2	74,0	5,5
5500	28	50%	35	50%	29,8	67,0	74,0	9,5
5500	26	50%	30	50%	27,0	59,4	74,0	5,5
5500	26	50%	32	50%	27,6	64,6	74,0	8,2
5500	26	50%	35	50%	28,3	73,0	74,0	12,3
6000	28	50%	30	50%	28,5	54,0	73,8	3,0
6000	28	50%	32	50%	29,0	59,2	73,8	5,9
6000	28	50%	35	50%	29,8	66,9	73,8	10,4
6000	26	50%	30	50%	27,0	59,3	73,5	5,9
6000	26	50%	32	50%	27,6	64,5	73,8	8,9
6000	26	50%	35	50%	28,4	72,9	73,8	13,3



HEAT RECOVERY UNIT PERFORMANCE - VERIFICATION IN COOLING MODE

HRL 90

Flow-rate	Inside air		Fresh air		Conditioned air		Efficiency	Capacity
	m <sup>3</sup> /h	°C	UR	°C	UR %	°C	UR	%
7000	28	50%	30	50%	28,5	54,5	74,4	2,5
7000	28	50%	32	50%	29,0	59,3	74,4	5,0
7000	28	50%	35	50%	29,8	67,1	74,4	8,7
7000	26	50%	30	50%	27,0	59,4	74,4	5,0
7000	26	50%	32	50%	27,5	64,6	74,4	7,5
7000	26	50%	35	50%	28,3	73,1	74,4	11,2
8000	28	50%	30	50%	28,5	54,7	74,0	2,7
8000	28	50%	32	50%	29,1	59,2	74,0	5,5
8000	28	50%	35	50%	29,8	66,9	74,0	9,5
8000	26	50%	30	50%	27,1	59,3	74,0	5,5
8000	26	50%	32	50%	27,6	64,5	74,0	8,2
8000	26	50%	35	50%	28,4	72,8	74,0	12,3
9000	28	50%	30	50%	28,5	54,4	73,8	5,3
9000	28	50%	32	50%	29,1	59,1	73,8	8,9
9000	28	50%	35	50%	29,9	66,7	73,8	13,3
9000	26	50%	30	50%	27,1	59,2	73,8	5,9
9000	26	50%	32	50%	27,6	64,3	73,8	8,9
9000	26	50%	35	50%	28,4	72,6	73,8	13,3

HRL 120

Flow-rate	Inside air		Fresh air		Conditioned air		Efficiency	Capacity
	m <sup>3</sup> /h	°C	UR	°C	UR %	°C	UR	%
10000	28	50%	30	50%	28,5	54,5	74,1	5,0
10000	28	50%	32	50%	29,0	59,2	74,1	9,5
10000	28	50%	35	50%	29,8	67,0	74,1	17,4
10000	26	50%	30	50%	27,0	59,4	74,1	9,9
10000	26	50%	32	50%	27,6	64,6	74,1	14,9
10000	26	50%	35	50%	28,9	73,0	74,1	22,3
11000	28	50%	30	50%	28,5	54,4	73,5	5,4
11000	28	50%	32	50%	29,1	59,2	73,5	10,8
11000	28	50%	35	50%	29,9	66,8	73,5	18,9
11000	26	50%	30	50%	27,1	59,3	73,5	10,8
11000	26	50%	32	50%	27,6	64,4	73,5	16,2
11000	26	50%	35	50%	28,4	72,8	73,5	24,4
12000	28	50%	30	50%	28,5	54,4	73,0	5,9
12000	28	50%	32	50%	29,1	59,1	73,0	11,7
12000	28	50%	35	50%	29,9	66,7	73,0	20,5
12000	26	50%	30	50%	27,1	59,2	73,0	11,7
12000	26	50%	32	50%	27,6	64,3	73,0	17,6
12000	26	50%	35	50%	28,4	72,6	73,0	26,4

## HEAT RECOVERY UNIT PERFORMANCE - VERIFICATION IN COOLING MODE

## HRL 150

Flow-rate	Inside air		Fresh air		Conditioned air		Efficiency	Capacity
	m <sup>3</sup> /h	°C	UR	°C	UR %	°C	UR	%
<b>13000</b>	28	50%	30	50%	28,5	54,5	74,7	6,5
<b>13000</b>	28	50%	32	50%	29,0	59,3	74,7	13,0
<b>13000</b>	28	50%	35	50%	29,8	67,2	74,7	22,8
<b>13000</b>	26	50%	30	50%	27,0	59,5	74,7	13,0
<b>13000</b>	26	50%	32	50%	27,5	64,7	74,7	19,5
<b>13000</b>	26	50%	35	50%	28,3	73,2	74,7	29,3
<b>14000</b>	28	50%	30	50%	28,8	54,3	77,2	6,7
<b>14000</b>	28	50%	32	50%	29,1	59,9	77,2	13,4
<b>14000</b>	28	50%	35	50%	30,0	66,3	77,2	23,5
<b>14000</b>	26	50%	30	50%	27,1	59,1	77,2	13,4
<b>14000</b>	26	50%	32	50%	27,7	64,0	77,2	20,2
<b>14000</b>	26	50%	35	50%	28,5	72,1	77,2	30,2
<b>15000</b>	28	50%	30	50%	28,5	54,5	73,9	7,4
<b>15000</b>	28	50%	32	50%	29,0	59,2	73,9	14,8
<b>15000</b>	28	50%	35	50%	29,8	64,9	73,9	26,0
<b>15000</b>	26	50%	30	50%	27,0	59,4	73,9	14,8
<b>15000</b>	26	50%	32	50%	27,6	64,5	73,9	22,3
<b>15000</b>	26	50%	35	50%	28,9	72,9	73,9	33,9



WATER COIL PERFORMANCE IN HEATING MODE

HRL 20

Air		Water 70/60				Water 45/40			
Va m³/h	T.i. °C	T.u. °C	Pot. kW	Pw. dm³/h	Dp W KPa	T.u. °C	Pot. kW	Pw. dm³/h	Dp W KPa
1000	17,0	38,7	7,30	640	3,8	28,4	3,83	663	4,0
1000	18,0	39,2	7,14	626	3,8	28,9	3,67	635	3,9
1000	19,0	39,7	6,98	612	3,7	29,4	3,51	607	3,8
1000	20,0	40,3	6,82	598	3,7	29,9	3,35	580	3,7
1500	17,0	35,5	9,33	818	4,5	26,7	4,89	847	4,8
1500	18,0	36,1	9,13	800	4,5	27,3	4,69	811	4,6
1500	19,0	36,7	8,92	782	4,4	27,9	4,48	776	4,5
1500	20,0	37,3	8,72	764	4,3	28,5	4,28	741	4,3
2000	17,0	33,3	11,00	964	5,2	25,6	5,76	998	5,6
2000	18,0	34,0	10,76	943	5,1	26,2	5,52	956	5,4
2000	19,0	34,6	10,51	922	5,0	26,8	5,28	914	5,1
2000	20,0	35,3	10,27	901	4,9	27,5	5,03	872	4,9

HRL 30

Air		Water 70/60				Water 45/40			
Va m³/h	T.i. °C	T.u. °C	Pot. kW	Pw. dm³/h	Dp W KPa	T.u. °C	Pot. kW	Pw. dm³/h	Dp W KPa
2000	17,0	36,6	13,18	1155	7,3	27,3	6,93	1200	8
2000	18,0	37,2	12,9	1131	7,1	27,9	6,65	1151	7,6
2000	19,0	37,7	12,6	1106	6,9	28,4	6,36	1101	7,2
2000	20,0	38,3	12,3	1081	6,7	29	6,08	1052	6,8
2500	17,0	34,8	15,02	1316	8,6	26,4	7,9	1368	9,5
2500	18,0	35,5	14,7	1288	8,3	27	7,55	1311	8,9
2500	19,0	36,1	14,4	1260	8,1	27,6	7,24	1254	8,4
2500	20,0	36,7	14,1	1232	7,9	28,2	6,92	1198	8
3000	17,0	33,5	16,55	1460	9,8	25,7	8,76	1516	11,3
3000	18,0	34,1	16,09	1428	9,5	26,9	8,4	1454	10,4
3000	19,0	34,8	15,9	1397	9,3	27,0	8,09	1391	9,7
3000	20,0	35,4	15,6	1365	9,0	27,6	7,67	1398	9,1

HRL 40

Air		Water 70/60				Water 45/40			
Va m³/h	T.i. °C	T.u. °C	Pot. kW	Pw. dm³/h	Dp W KPa	T.u. °C	Pot. kW	Pw. dm³/h	Dp W KPa
3500	17,0	37,4	24	2103	4,7	27,6	12,55	2173	5
3500	18,0	37,9	23,46	2057	4,6	28,2	12,02	2081	4,8
3500	19,0	38,5	22,9	2010	4,5	28,8	11,49	1989	4,6
3500	20,0	39,0	22,4	1964	44,0	29,3	10,96	1897	4,4
4000	17,0	36,3	25,94	2274	5	27,1	13,6	2350	5,3
4000	18,0	36,8	23,37	2224	4,9	27,6	13	2250	5,1
4000	19,0	37,4	24,8	2173	4,8	28,2	12,42	2151	4,9
4000	20,0	38,0	24,2	2123	4,7	28,8	11,84	2051	4,7
4500	17,0	35,3	27,75	2433	5,3	26,6	14,52	2514	5,7
4500	18,0	35,9	27,14	2379	5,2	27,2	13,9	2407	5,5
4500	19,0	36,5	26,5	2325	5,1	27,8	13,28	2300	5,2
4500	20,0	37,1	25,9	2271	5,0	28,4	12,66	2192	5

## WATER COIL PERFORMANCE IN HEATING MODE

## HRL 60

Air		Water 70/60				Water 45/40			
Va m <sup>3</sup> /h	T.i. °C	T.u. °C	Pot. kW	Pw. dm <sup>3</sup> /h	Dp W KPa	T.u. °C	Pot. kW	Pw. dm <sup>3</sup> /h	Dp W KPa
5000	17,0	36,6	32,98	2891	6,9	27,3	17,29	2954	7,5
5000	18,0	37,2	32,25	2827	6,7	27,9	16,57	2869	7,1
5000	19,0	37,7	31,5	2765	6,5	28,4	15,84	2743	6,8
5000	20,0	38,3	30,8	2701	6,4	29	15,12	2619	6,4
5500	17,0	3,8	34,84	3054	7,3	26,9	18,27	3163	8
5500	18,0	36,4	34,08	2987	7,2	27,5	17,51	3031	7,6
5500	19,0	37,0	33,3	2921	7,0	28,0	16,73	2897	7,2
5500	20,0	37,6	32,6	2853	6,8	28,6	15,97	2765	6,8
6000	17,0	35,1	36,6	3207	7,8	26,5	19,19	3323	8,6
6000	18,0	35,5	35,8	3138	7,6	27,1	18,39	3184	8,1
6000	19,0	36,3	35,0	3068	7,4	27,7	17,58	3043	7,7
6000	20,0	36,9	34,2	2998	7,2	28,3	16,77	2904	7,2

## HRL 90

Air		Water 70/60				Water 45/40			
Va m <sup>3</sup> /h	T.i. °C	T.u. °C	Pot. kW	Pw. dm <sup>3</sup> /h	Dp W KPa	T.u. °C	Pot. kW	Pw. dm <sup>3</sup> /h	Dp W KPa
7000	17,0	38,4	50,33	4412	8	28,2	26,23	4577	8,8
7000	18,0	38,9	49,25	4317	7,8	28,8	25,35	4389	8,3
7000	19,0	39,4	48,2	4221	7,6	29,3	24,24	4198	7,9
7000	20,0	40,0	47,1	4127	7,4	29,8	23,16	4009	7,5
8000	17,0	37,2	54,24	4774	8,8	27,6	28,62	4956	9,8
8000	18,0	37,8	53,32	4674	8,6	28,2	27,44	4751	9,2
8000	19,0	38,4	52,1	4508	8,3	28,7	26,24	4543	8,7
8000	20,0	38,9	50,9	4465	8,1	29,3	25,05	4338	8,2
9000	17,0	36,3	58,34	5114	9,7	27,1	30,65	5306	11
9000	18,0	36,8	57,07	5003	9,4	27,7	29,38	5086	10,2
9000	19,0	37,4	55,8	4894	9,1	28,3	28,1	4866	9,5
9000	20,0	38,0	54,3	4781	8,8	28,9	26,63	4645	9

## HRL 120

Air		Water 70/60				Water 45/40			
Va m <sup>3</sup> /h	T.i. °C	T.u. °C	Pot. kW	Pw. dm <sup>3</sup> /h	Dp W KPa	T.u. °C	Pot. kW	Pw. dm <sup>3</sup> /h	Dp W KPa
10000	17,0	37,1	67,82	5945	5,4	27,5	35,48	6143	5,7
10000	18,0	37,7	66,33	5814	5,3	28,1	33,97	5882	5,5
10000	19,0	38,3	64,8	5683	5,2	28,6	32,47	5621	5,3
10000	20,0	38,8	63,3	5550	5,0	29,2	30,95	5359	5
11000	17,0	36,4	71,71	6185	5,7	27,1	37,51	6495	6,1
11000	18,0	36,9	70,12	6146	5,6	27,7	35,91	6218	5,8
11000	19,0	37,5	68,5	6007	5,4	28,3	34,32	5941	5,5
11000	20,0	38,1	67,0	5868	5,3	28,8	32,72	5664	5,3
12000	17,0	35,7	75,4	6609	6	26,8	39,43	6827	6,4
12000	18,0	36,3	73,73	6463	5,9	27,3	37,75	6535	6,1
12000	19,0	36,8	72,0	6315	5,7	27,9	36,06	6244	5,8
12000	20,0	37,4	70,4	6169	5,6	28,5	34,38	5952	5,5



WATER COIL PERFORMANCE IN HEATING MODE

HRL 150

Air		Water 70/60				Water 45/40			
Va m <sup>3</sup> /h	T.i. °C	T.u. °C	Pot. kW	Pw. dm <sup>3</sup> /h	Dp W KPa	T.u. °C	Pot. kW	Pw. dm <sup>3</sup> /h	Dp W KPa
<b>13000</b>	17,0	35	78,9	6914	6,3	26,4	41,16	7143	6,8
<b>13000</b>	18,0	35,6	77,15	6763	6,2	27	39,5	6838	6,4
<b>13000</b>	19,0	36,2	75,4	6609	6,0	27,8	37,73	6533	6,1
<b>13000</b>	20,0	36,8	73,6	6455	6,0	28,2	35,97	6228	58,8
<b>14000</b>	17,0	34,4	82,22	7207	6,6	26,1	43	7445	7,1
<b>14000</b>	18,0	35,1	80,41	7049	6,5	26,7	41,16	7127	6,8
<b>14000</b>	19,0	35,7	78,5	6888	6,3	27,3	39,32	6808	6,4
<b>14000</b>	20,0	36,3	76,7	6727	6,1	28	37,49	6490	6,1
<b>15000</b>	17,0	33,9	85,41	7487	6,9	25,9	44,67	7734	7,3
<b>15000</b>	18,0	34,5	85,63	7322	6,8	26,5	42,75	7402	7,1
<b>15000</b>	19,0	35,2	81,6	7154	6,6	27,1	40,85	7072	67,7
<b>15000</b>	20,0	35,8	79,7	6986	6,1	27,7	38,93	6740	60



## WATER COIL PERFORMANCE IN HEATING MODE

## HRL 20

Air			Water 7/12					Water 8/13				
Va m <sup>3</sup> /h	T.i. °C	UR i. %	T.u. °C	UR u. %	Pot. kW	Pw. dm <sup>3</sup> /h	Dp W KPa	T.u. °C	UR u. %	Pot. kW	Pw. dm <sup>3</sup> /h	Dp W KPa
1000	27,0	60,0	15,3	97,4	6,53	1122	5,9	15,9	97,3	5,93	1019	5,3
1000	28,0	60,0	15,6	97,6	7,25	1246	6,6	16,2	97,4	6,65	1142	6,0
1000	29,0	60,0	15,9	97,7	7,99	1373	7,4	16,6	97,5	7,38	1269	6,7
1000	30,0	60,0	16,3	97,8	8,76	1506	8,3	17,0	97,6	8,14	1399	7,5
1500	27,0	60,0	16,6	95,0	8,25	1418	7,7	17,1	94,8	7,46	1283	6,8
1500	28,0	60,0	17,0	95,0	9,18	1578	8,8	17,6	94,9	8,37	1439	7,8
1500	29,0	60,0	17,5	95,1	10,13	1740	10,1	18,0	95,0	9,33	1603	8,9
1500	30,0	60,0	17,9	95,2	11,12	1912	12,0	18,5	95,1	10,31	1771	10,4
2000	27,0	60,0	17,5	93,1	9,63	1656	9,4	17,9	93,0	8,76	1505	8,2
2000	28,0	60,0	18,0	93,2	10,72	1842	11,2	18,5	93,1	9,77	1679	9,5
2000	29,0	60,0	18,5	93,3	11,85	2037	13,5	19,0	93,2	10,88	1870	11,5
2000	30,0	60,0	19,0	93,9	13,02	2237	16,0	19,5	93,2	12,04	2070	13,8

## HRL 30

Air			Water 7/12					Water 8/13				
Va m <sup>3</sup> /h	T.i. °C	UR i. %	T.u. °C	UR u. %	Pot. kW	Pw. dm <sup>3</sup> /h	Dp W KPa	T.u. °C	UR u. %	Pot. kW	Pw. dm <sup>3</sup> /h	Dp W KPa
2000	27,0	60,0	16,3	95,5	11,55	1986	7,3	16,8	95,4	10,47	1800	6,5
2000	28,0	60,0	16,7	95,6	12,63	2205	8,3	17,2	95,5	11,75	2019	7,4
2000	29,0	60,0	17,1	95,7	14,14	2431	9,4	17,7	95,5	13,05	2242	8,4
2000	30,0	60,0	17,5	95,8	15,53	2668	10,9	18,1	95,7	14,42	2478	9,6
2500	27,0	60,0	17	94,1	13,07	2246	8,5	17,5	94	11,83	2034	7,5
2500	28,0	60,0	17,4	94,2	14,53	2497	9,7	18	94	13,26	2278	8,6
2500	29,0	60,0	17,9	94,3	16,02	2754	11,5	18,4	94,2	14,76	2537	9,9
2500	30,0	60,0	18,4	94,4	17,06	3025	13,2	18,9	94,2	16,3	2802	11,9
3000	27,0	60,0	17,5	92,9	14,41	2476	9,6	18	92,8	13,1	2252	8,5
3000	28,0	60,0	18	93	16,02	2793	11,5	18,5	92,8	14,61	2512	9,8
3000	29,0	60,0	18,6	93,1	17,69	3040	13,8	19,0	93,0	16,28	2797	11,8
3000	30,0	60,0	19,1	93,2	19,42	3338	16,4	19,6	93	17,98	3090	14,2

## HRL 40

Air			Water 7/12					Water 8/13				
Va m <sup>3</sup> /h	T.i. °C	UR i. %	T.u. °C	UR u. %	Pot. kW	Pw. dm <sup>3</sup> /h	Dp W KPa	T.u. °C	UR u. %	Pot. kW	Pw. dm <sup>3</sup> /h	Dp W KPa
3500	27,0	60,0	16,6	94,8	19,30	3318	10,7	17,1	94,7	17,49	3006	9,1
3500	28,0	60,0	17	94,9	21,44	3685	12,9	17,6	94,8	19,59	3367	10,1
3500	29,0	60,0	17,5	95,0	23,65	4065	15,4	18,0	94,8	21,79	3745	13,2
3500	30,0	60,0	18,0	95,1	25,95	4640	18,3	18,5	94,9	24,05	4133	15,8
4000	27,0	60,0	17	94	20,77	3569	12,2	17,5	93,8	18,81	3232	10,1
4000	28,0	60,0	17,5	94	23,08	3698	14,8	18	93,9	21,06	3620	12,4
4000	29,0	60,0	18,0	94,1	25,46	4376	17,6	18,5	94,0	23,43	4027	15,1
4000	30,0	60,0	18,5	94,3	27,93	4801	20,9	19	94,1	25,91	4454	18,1
4500	27,0	60,0	17,4	93,2	22,10	3799	13,6	17,9	93,1	20,11	3455	11,4
4500	28,0	60,0	17	93,2	24,55	4220	16,5	18,4	93,1	22,41	3852	13,9
4500	29,0	60,0	18,4	93,3	27,12	4661	19,8	18,9	93,3	24,95	4289	16,9
4500	30,0	60,0	18,9	93,4	29,76	5114	23,4	19,4	93,3	27,59	4742	20,3



WATER COIL PERFORMANCE IN HEATING MODE

HRL 60

Air			Water 7/12					Water 8/13				
Va m³/h	T.i. °C	UR i. %	T.u. °C	UR u. %	Pot. kW	Pw. dm³/h	Dp W KPa	T.u. °C	UR u. %	Pot. kW	Pw. dm³/h	Dp W KPa
5000	27,0	60,0	17,3	93,9	24,51	4212	6,3	17,8	93,8	22,18	3811	5,6
5000	28,0	60,0	17,8	93,9	27,34	4698	7,1	18,3	93,9	22,86	4222	6,4
5000	29,0	60,0	18,3	94,0	30,28	5204	8,1	18,8	93,9	27,77	4772	7,2
5000	30,0	60,0	18,8	94,2	33,34	5730	9,1	19,3	94	30,8	5293	8,2
5500	27,0	60,0	17,6	93,3	25,78	4431	6,6	18,1	93,2	23,39	4020	6
5500	28,0	60,0	18,1	93,3	28,75	4942	7,5	18,6	93,3	26,15	4494	6,7
5500	29,0	60,0	18,6	93,4	31,86	5476	8,6	19,1	93,3	29,2	5018	7,7
5500	30,0	60,0	19,1	93,5	35,08	6030	9,8	19,6	93,4	32,4	5568	8,8
6000	27,0	60,0	17,9	92,7	27,00	4641	7	18,3	92,7	24,54	4218	6,3
6000	28,0	60,0	18,4	92,8	30,09	5171	8	18,8	92,7	27,4	4708	7,1
6000	29,0	60,0	18,9	92,9	33,32	5730	9,1	19,4	92,7	30,55	5250	8,1
6000	30,0	60,0	19,5	92,9	36,73	6312	10,6	19,9	92,9	33,89	5825	9,3

HRL 90

Air			Water 7/12					Water 8/13				
Va m³/h	T.i. °C	UR i. %	T.u. °C	UR u. %	Pot. kW	Pw. dm³/h	Dp W KPa	T.u. °C	UR u. %	Pot. kW	Pw. dm³/h	Dp W KPa
7000	27,0	60,0	16,6	95	38,54	6624	7,7	17,1	95	34,85	5989	6,8
7000	28,0	60,0	17	95,1	42,85	7364	8,8	17,6	95,1	39,11	6722	7,8
7000	29,0	60,0	17,5	95,3	47,28	8127	10,1	18,0	95,2	43,55	7484	8,9
7000	30,0	60,0	17,9	95,4	51,98	8933	12,0	18,5	95,2	48,12	8271	10,4
8000	27,0	60,0	17	94,2	41,44	7122	8,4	17,5	94,1	37,53	6451	7,4
8000	28,0	60,0	17,5	94,3	46,11	7924	9,7	18	94,2	42,08	7231	8,5
8000	29,0	60,0	18,0	94,4	50,92	8753	11,6	18,5	94,3	46,84	8051	9,8
8000	30,0	60,0	18,4	94,5	55,97	9620	13,8	18,9	94,4	51,84	8909	11,9
9000	27,0	60,0	17,4	93,5	44,13	7585	9,1	17,8	93,3	40,06	6885	8
9000	28,0	60,0	17,9	93,6	49,10	8439	10,8	18,4	93,5	44,75	7692	9,3
9000	29,0	60,0	18,4	93,6	54,27	9327	13,0	18,9	93,5	49,87	8570	11,1
9000	30,0	60,0	18,9	93,7	59,65	10252	15,5	19,4	93,6	55,19	9485	13,3

HRL 120

Air			Water 7/12					Water 8/13				
Va m³/h	T.i. °C	UR i. %	T.u. °C	UR u. %	Pot. kW	Pw. dm³/h	Dp W KPa	T.u. °C	UR u. %	Pot. kW	Pw. dm³/h	Dp W KPa
10000	27,0	60,0	16,5	94,7	55,85	9600	15,9	17,1	94,6	50,7	87313	13,3
10000	28,0	60,0	17	94,8	61,94	10646	19,2	17,5	94,7	56,73	3550	16,3
10000	29,0	60,0	17,4	94,9	68,17	11717	22,9	18,0	94,7	62,9	10810	19,7
10000	30,0	60,0	17,9	95,0	74,67	12830	27,1	18,5	94,9	69,33	11915	23,5
11000	27,0	60,0	16,8	94,1	58,89	10122	17,5	17,4	94	56,42	9181	14,8
11000	28,0	60,0	17,3	94,2	65,28	11221	21,2	17,8	94	59,68	10257	17,9
11000	29,0	60,0	17,8	94,3	71,30	12355	25,3	18,3	94,1	66,28	11391	21,7
11000	30,0	60,0	18,3	94,4	78,82	13546	29,9	18,8	94,1	73,1	12564	25,9
12000	27,0	60,0	17,1	93,5	61,67	10600	19,1	17,6	93,5	56,04	9631	15,9
12000	28,0	60,0	17,6	93,6	68,42	11759	23,1	18,1	93,5	62,56	10752	19,5
12000	29,0	60,0	18,1	93,7	75,40	12959	27,6	18,6	93,5	69,45	11935	23,6
12000	30,0	60,0	18,6	93,8	82,55	14188	32,6	19,1	93,5	76,67	13177	28,3

## WATER COIL PERFORMANCE IN HEATING MODE

## HRL 150

Air			Water 7/12					Water 8/13				
Va m <sup>3</sup> /h	T.i. °C	UR i. %	T.u. °C	UR u. %	Pot. kW	Pw. dm <sup>3</sup> /h	Dp W KPa	T.u. °C	UR u. %	Pot. kW	Pw. dm <sup>3</sup> /h	Dp W KPa
13000	27,0	60,0	17,4	93	64,36	11062	20,6	17,8	92,9	58,6	10070	17,3
13000	28,0	60,0	17,9	93,1	71,39	12259	24,9	18,4	93	65,27	11218	21,1
13000	29,0	60,0	18,4	93,2	78,70	13526	29,8	18,9	93,0	72,5	12460	25,6
13000	30,0	60,0	18,9	93,2	86,23	14821	35,3	19,4	93,2	80,01	13751	30,6
14000	27,0	60,0	17,6	92,5	66,91	11499	22,2	18	92,4	61,02	10287	18,6
14000	28,0	60,0	18,1	92,6	74,18	12790	26,8	18,6	92,5	67,87	11665	22,6
14000	29,0	60,0	18,7	92,7	81,85	14068	32,1	19,1	92,8	75,42	12962	27,5
14000	30,0	60,0	19,2	92,8	89,30	15416	38,0	19,7	92,7	83,17	14294	32,9
15000	27,0	60,0	17,8	92,1	69,37	11923	23,7	18,2	92	63,37	10891	20
15000	28,0	60,0	18,4	92,1	76,90	13217	28,6	18,8	92,1	70,4	12099	24,2
15000	29,0	60,0	18,9	92,2	84,79	14573	34,3	19,3	92,2	78,1	13423	29,3
15000	30,0	60,0	19,4	92,3	92,99	15983	40,6	19,9	92,2	86,18	14811	39,1

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